Submission from

Climate Change Balmain-Rozelle[1]

on IPART's Issues Paper on

Solar feed-in tariffs in 2018-19[2]

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Abstract

We show that :

- *IPART's terms of reference are open to several interpretations, so IPART is not as constrained as claimed.*
- *IPART's arguments for excluding infrastructure savings are very weak.*

In addition, we propose a post facto *method for calculating a tariff.*

1 Terms of Reference

The issues paper quotes its terms of reference and an interpretation.

> *"Our Terms of Reference indicate that the benchmark range we recommend:*
>
> - *should not lead to solar feed-in tariffs that contribute to higher retail electricity prices,*
> - *should operate in a way that supports a competitive electricity market in NSW*
>
> *Essentially, these two conditions mean that we cannot set the benchmark range higher than the financial value of the electricity exported by solar customers to a retailer – that is, the price it would pay to purchase that electricity from the National Electricity Market"*

That is only an interpretation, not a direct inference, as we shall see.

2 Higher than what?

This could mean:

- **Higher than if no feed-in tariff were paid**

In that view, the answer would be simple: pay no feed-in tariff. Of course, if that had been the intent there would have been no need to involve IPART, but this illustrates how vague the terms of reference as quoted are. It is thus necessary to infer the spirit of the terms of reference as including a fair compensation for the feed in.

- **Higher than if the feed-in were from just another fleet of spot price bidders**

This appears to be the view taken by IPART. While reasonable in itself, there is nothing in the terms of reference that implies this interpretation.

Since households generating PV feed-in are not able to specify a bid price, IPART effectively takes the bid to be $0/kWh. This becomes problematic with domestic battery and plug-in electric vehicle uptake, as households will evolve a threshold rate for feeding in versus storing.

1 http://www.climatechangebr.org/
2 https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/pricing-reviews-energy-services-publications-solar-feed-in-tariffs-201819/solar-feed-in-tariffs-201819-issues-paper-march-2018.pdf

- **Higher than if there were no PV feed-in**

IPART specifically excludes this as not being how markets work (p15), though such a constraint does not appear to be in the terms of reference. Thus, this is purely a choice made by IPART.

3 Value of Reduced Network Demand

The terms of reference as quoted above encompass all elements of the retail price. However, IPART (p15) excludes savings in infrastructure:

> *"solar exports may also impose costs on networks by creating a need for additional investment in the network, for example to support bi-directional flows of electricity to handle the volume of solar exports"*

This appears to be conjecture. There is no reason to suppose that such costs balance the savings. In principle they could even exceed the savings. The appropriate conclusion is that networks will need to be able to curtail PV feed-in, but it is highly unlikely that this point has been reached in NSW.

IPART's rationale for excluding network savings continues ...

> *"any such benefits or costs are realised by the network service providers, rather than retailers"*

This is a curious argument. The network service providers recoup their costs (and then some) from the retailers, who in turn recoup from their customers.

... then descends into the bizarre:

> *"while solar exports reduce the use of the transmission network (because they are delivered directly through the distribution network), any savings would be distributed across all customers – not just solar customers"*

Perhaps IPART's reasoning here is that reducing grid costs reduces what the retailers have to pay the transmission and distribution networks, so the retailers correspondingly cut charges to all customers, leaving nothing over to pay additional feed-in tariff. But exactly the same could be said of spot prices. If that is not the reasoning then I am at a loss to understand what it is.

Retailers charge business customers a cost-reflective fee of 33c/kW per day, excluding GST, based on the peak kW drawn by the customer in the calendar month. Allowing for overhead and profit, this suggests a network cost of $300 per day per MW of grid capacity.

But not all businesses will draw their peak demand at the same time, so if this is truly cost-reflective the grid capacity must cost more, say $400/day-MW. For example:

- Four businesses each peak at 30kW on three days and 40kW on a fourth, in the same month
- Each peaks at 40kW on a different day
- Total paid by the businesses is based on 4x40kW=160kW
- Actual peak is 130kW
- Charge to businesses based on 160kW is therefore cost-reflective of an actual peak of 130kW

Further, this charge applies each month, independently, even though the peak demand on the grid occurs mostly in summer months. In the twelve months to the end of March 2018, the monthly peak demands in NSW total 135600 MW, the highest individual peak being 12986 MW in December 2017. Adjusting for the month lengths, the revenue is based on an annual MW-days of 4,123,881, while the cost is based on the 12986 MW peak.

Thus, we take the cost of providing and maintaining the poles and wires to be $400x 4,123,881/12986 = $127,000 per MW of annual peak per annum. Thus, a household PV system trimming 1kW from annual peak demand is worth $127 p.a.

Note that these savings come from all PV generated power, not just that fed in to the grid. That which is fed in will mostly be consumed within the same few streets; that which is self-consumed does not threaten to overload the local network.

4 Estimating Solar Power Fed in

To corroborate the feed-in data collected from the networks, it is possible to estimate the extent and profile of PV generation from these knowns:

- installed PV capacity
- PV output profiles
- domestic consumption profiles

E.g. for January 2015 and 2016, adding expected PV output to perceived demand produces a somewhat persuasive real demand curve:

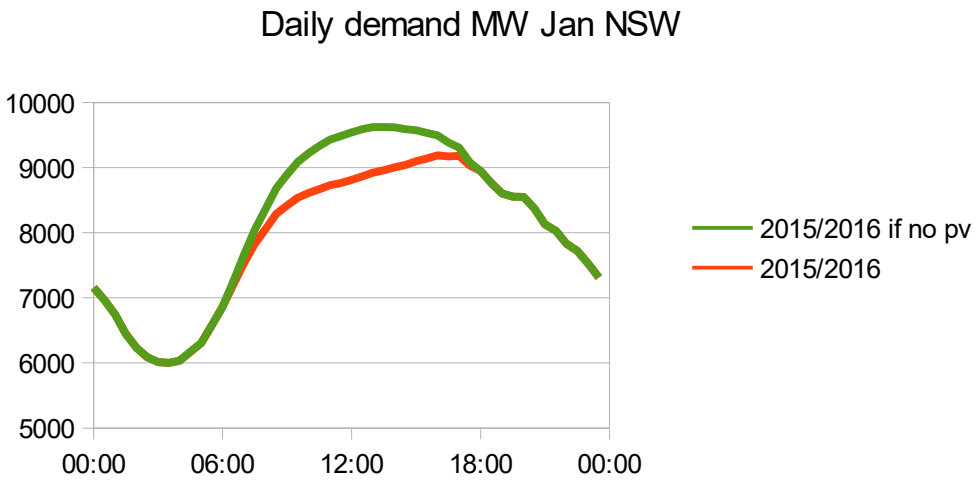

Fig 1: Daily demand with and without PV generation, 2015 and 2016 January average

We note, however, that this differs markedly from figure 2.1 in the Issues Paper.

This then needs to be adjusted according to patterns of self-consumption. This is generally estimated at around 50%, but let's consider 60%, so only 40% fed in.

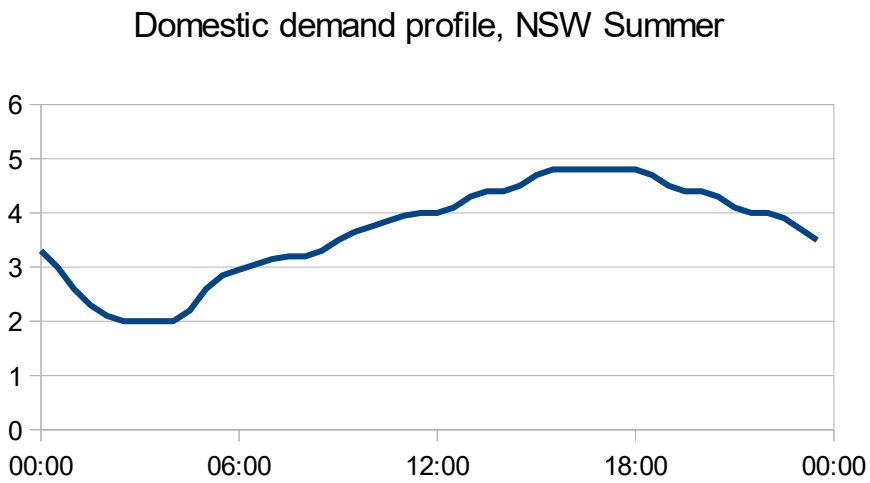

Fig 2: Domestic demand profile, NSW Summer

The feed-in per kW of panel at a given time of day, *t*, is given by:

$$fed\_in\_power(t) = max\{power\_output(t) - demand\_profile(t) \times scale\_factor, 0\}$$

where *scale_factor* is adjusted to make the total feed-in over the day equal 40% of the power generated. The resulting feed-in profile is shown below.

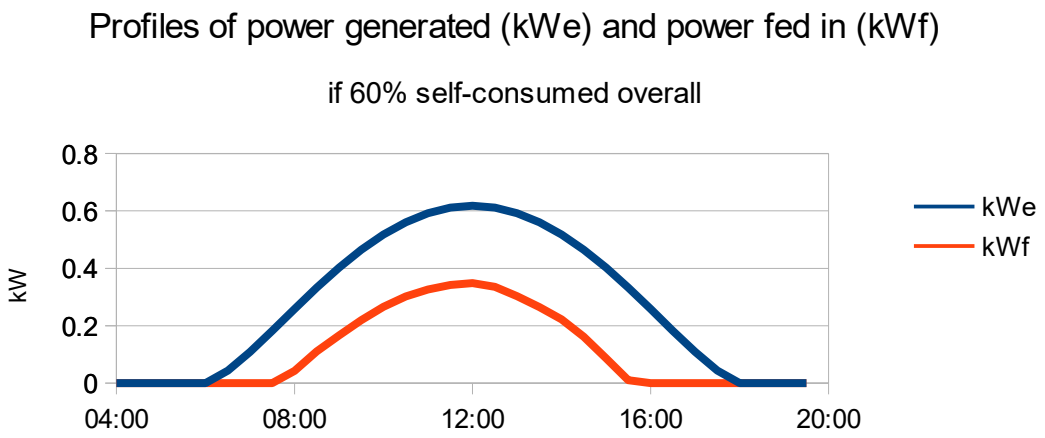

Fig 3: PV generation and feed in profiles

We recommend this method of analysis be used to validate the data currently collected.

5 Time of Day Tariffs

The issues paper does not appear to address feed in tariffs for PV households on a time of use meter.

The standard flat-rate charging model that retailers currently use for households bundles much of the connection cost into the per-kWh cost. This is likely to become unsustainable. Domestic PV, air-con and plasma TVs all increase the ratio between peak demand and daily total demand. It is therefore in the interests of all other customers to encourage PV households to migrate to time-of-use meters. Corresponding recommended feed-in tariffs could assist this.

It will become even more valuable with the roll out of domestic storage.

6 Responses to specific questions

1. *Do you agree with our overall approach to setting a benchmark range for solar feed-in tariffs? If not, why not?*

No. In that it ignores the savings in grid infrastructure, it does not meet the spirit of the quoted terms of reference.

2. *What is the best way of setting a benchmark that reflects the average value of solar exports across a day? How should a benchmark range be set to reflect the value of solar exports at different times across the day?*

IPART goes to great lengths to predict spot prices more than a year ahead so that a tariff can be proposed for the whole year. This is unnecessary, and given IPART's conservative approach to its terms of reference we suspect that it will lead to an underestimate of the value of the feed in.

It is well within the capabilities of the grid operator to estimate the level of PV feed in at any instant and calculate its value at the time. The grid operator would publish the resulting per-kWh value of PV feed in for each half hour.

Since IPART's feed-in tariff recommendations are non-binding, it is then up to individual retailers to offer customers a preset tariff (flat or time-of-day), pay a tariff based on the grid operator's published values for the billing period (again, flat or time-of-day), or nothing at all.

In this scheme, the tasks for IPART would be to propose the algorithm for the grid operator and a

recommendation to the retailers for how to turn the published values into a tariff.

3. - 6.

The scheme proposed above obviates the need to answer 3 to 6.