Submission - Fair Price for Solar

The first part of this submission addresses the questions from the Solar Issues Paper. The second part discusses the economics around a typical solar PV case, a 4kW system installed in 2016 and elaborates on aspects such as changes over time, demand based charging and battery storage. This discussion in the second part is used as a basis for addressing the questions in the first part, the Solar Issues Paper questions.

Questions from Solar Issues Paper

2.1 Is there evidence of significant and enduring market failures in the solar export market in Queensland? The main market failure is that the CO2 emissions that are causing climate change and the resultant global problems are not sheeted home to the cause – use of fossil fuels. Thus solar exports are compared to coal and gas generation costs which exclude this externality.

2.2 Where market failures are present, how are they best addressed? Probably with a carbon tax, an option that isn't available to the State Government. A carbon tax would put a higher cost on the electricity from fossil fuel sources and because solar export is to a certain extend tied to these costs, the export price would also go up. Without a carbon tax one option is to increase the feed in tariff to match greenhouse abatement benefits. However these benefits would be difficult to calculate and the implementation would probably require reintroduction of SBS charges. In the long term solar should be able to offer unsubsidised, cheap, clean and despatchable power but this is probably 6-10 years away.

2.3 Do solar PV exports produce positive environmental and social impacts that are currently not paid for through existing programs and rebates? Yes. As per above, solar PV exports are much lower CO2 emissions than coal and gas. Solar also provides an innovative, new technology industry which generates employment. It allows people/society to feel that they are doing their bit for the environment and society. However the current SRES payment does provide a significant benefit to solar PV - $3,150 for a 4kW system as per the case study (see below), giving a roughly 30% reduction in price. If you were to somehow put a monetary value on the environmental and societal benefits of solar over its lifetime it's difficult to know how the SRES payment would compare to this the benefit. The SRES and SBS benefits were much higher in the past and they were designed to get solar going, to promote it in the community. They weren't designed to match its environmental and social benefits. They were designed for it to be economical to install PV, to get the industry started and to keep it going.

2.4 If so, is the investment in solar PV suboptimal (from a societal point of view)? I believe it is, but only just, from the point of view of making it economical for people to install solar systems. As shown in the case study, with the existing SRES payments and with a proposed FIT of 10c most solar systems installed in 2016 would get a 10 year payback or better. Over time the economics will improve as the cost of PV systems drops. So to keep the industry going at a sensible level the regulated FIT in regional Qld is probably too low by 4 cents and the unregulated SEQ FIT is better but perhaps needs a 2c nudge. However I believe that the 1 million rooftops program is too high a target. It could lead to a boom for 5 years followed by a bust. Solar PV should continue to become more efficient and cheaper after 2020 as will batteries and at some point even the SRES will not be needed to boost rooftop solar installations. Therefore a significant proportion of those 1 million rooftops should be left free to get PV after 2020, in my view. I suggest the govt promote solar for businesses, community/low income solar and switch over more to the 3GW target with less emphasis on the 1 million roofs. Perhaps they should even count large scale PV solar as part of the 3GW target, which seems to line up with the national RET target of 33,000 GWh.

2.5 Would a regulated solar feed-in tariff be an effective and efficient tool to address environmental externalities? The deregulated FIT in SEQ seems to be providing a fairly good outcome, better than the regulated FIT in regional Qld. Maybe regional Qld should be deregulated and Ergon would probably select a higher value (maybe 8c) given they know the views of the govt with promoting solar. Or perhaps the calculated FIT for regional Qld should be a minimum figure that Ergon can raise if they wish. My view worked out in the case study is that the FIT should be around 10c, at least for a few years and perhaps the environmental externalities adjustment would provide just this amount. Can the SBS be revived to pay for this adjustment? Is this an effective and efficient tool especially for such a small amount and for a short time?

2.6 What are the objectives of a solar export pricing policy? One objective is to let the market work it out (unregulated as per SEQ). Another objective is to promote the installation of solar power. A third is to allow for environmental benefits.

2.7 Where objectives are in conflict, which objectives take priority and why? The promotion of solar power is perhaps primary, at least until it becomes cheap enough to install that a boosted FIT is no longer needed and the market can work the FIT value out. Ideally I think that the environment cost should be sheeted home to the fossil fuel production rather than that the environmental benefit be added to solar generation. This latter case if set up for the long term is not good for solar's image with the general public. As mentioned earlier, in the long term solar will be able to be fully unsubsidised, cheap and clean and be solving network problems, not causing them.

2.8 What principles should be used to guide solar export pricing policy and any regulation of feed-in tariffs?

2.9 How should fairness be defined?

3.1 What are the costs and benefits of exported solar electricity? The costs of exported solar electricity are due to negative network impacts and loss of income to utilities causing tariffs to increase. The benefits are generation of electricity (Retailers' wholesale generation use reduced), positive network impacts and environmental benefits. With storage the negative network impacts will be reduced and the positive network impacts will be increased. Also the amount of exported electricity will be reduced due to storage.

3.2 Who incurs the costs and accrues the benefits from exported solar electricity? How will future market developments impact on costs and benefits? The costs will be borne by the utilities and all electricity customers. In the long run the big impact will be loss of income to the utilities due to rooftop solar, which has the potential to increase prices for those unable or unwilling to install solar. To avoid or minimise this potential problem there will need to be cooperation between the utilities and customers with solar and storage to minimise network costs. At the same time it would be best if solar and storage installations at some point in the future were to be fully unsubsidised. That is in future the FIT should be worked out by the market, which will be tied to the cost of large power generation, which in turn will be more and more sourced from renewable energy sources.

In future while the network providers may want to work with customers to minimise network problems and costs, the Retailers may also want to work with multiple customers as a potential source of biddable power generation. And the solar owners will have their own requirements. How these conflicting requirements impact on the benefits of exported solar electricity is difficult to predict.

3.3 Where there is a case to regulate feed-in tariffs, is the existing approach to pricing solar exports appropriate? If not, what alternative approach would be the most effective and efficient way to price solar exports? The unregulated feed-in tariffs seem to be working reasonably well in SEQ. In regional Qld maybe the calculated FIT should be a minimum rather than a mandated figure. The SBS option of adding a fixed amount to this has worked in the past although there is complication and cost associated with this.

3.4 How should the price be structured and paid? Should feed-in tariffs account for variations in value due to location and time? A time of use FIT seems feasible but initially would probably need to be voluntary (similar to the time of use and demand based tariffs) due to smart meter requirements. A location based FIT seems more difficult although would it be possible for network providers to have an ad hoc interaction with some customers in particular problem areas?

A future smart grid could have intelligence built in to the customer's equipment which could then interact with intelligence in network operations centres and with retailer generation requests. As part of this process the enhanced benefit associated with the solar export would lead to increased payments.

3.5 Would market, regulatory or policy changes be required to implement feed-in tariffs? If so, what changes would be required?

3.6 When should the feed-in tariff be reviewed or updated? If a feed in tariff is boosted to promote solar, shouldn't that FIT be available for customers who install a system for a period of time, perhaps 8 years? The FIT could be reviewed annually or every two years.

3.7 How should the feed-in tariff be reviewed or updated?

4.1 What are the main barriers to pricing solar exports? How significant are these barriers?

4.2 How may broader market changes (e.g. metering) impact barriers? Over time smart meters and later a smart grid will provide more options for controlling and pricing exports

4.3 Can these barriers be overcome in an effective and efficient way?

4.4 Are there other barriers to a well-functioning solar export market?

4.5 Are there examples where efficient investments in solar did not proceed because of technical, market or regulatory barriers?

4.6 Are there cost-effective ways to remove or address those barriers?

Financial Benefits of Solar – 4 kW Case Study

Consider a solar PV system with 4 kW capacity which will typically generate 16 kWh per day in South East Qld. With a 10c FIT and if 25% goes to self-use and the remainder is exported, the financial benefit would be about $2.13 per day (4kWh * 25c (avoided import) + 12 kWh * 10c (FIT payment) – 7c (meter read)). This equates to $777 per year. If the system was to be installed in late 2016 it may cost $7.5K ($1.9 per watt) post STCs and the payback would be around 9.6 years. With a FIT of 6c the payback is about 12.5 years and at 15c it's 7.5 years. Regional Queenslanders mostly have even higher sunlight incidence and their return would be slightly better.

If the household is vacant during the day or they are low energy users they will struggle to reach 25% self use. However even if they only achieve 10% self use the payback will be 11.6 years with a 10c FIT. With a 6c FIT this becomes 17.2 years.

Therefore from the perspective of the customer installing solar in late 2016 a 10c FIT would be reasonable for most, and quite good for those able to operate appliances during the day, with larger systems and good roof access to sunlight.

However there are some complicating issues – changing costs over time, demand based tariffs and battery storage.

Changing Costs Over Time

The volume cost of electricity has increased significantly over the past decade, except recently when there was a small decrease to offset large increases in fixed prices. It seems likely that neither the volume costs nor fixed charges will change much over the next 5 years eg no more than CPI. It is more difficult to know what will happen over the subsequent 5 years; especially when the potentially disruptive impact of solar and storage could really take hold.

In the case study a reduction in system cost of $400 equates to a reduction of 1c in the FIT, that is giving the same payback. A reduction of $800 gives a payback improvement of 1 year (if the FIT is unchanged). While a 4kW system would cost about $7.5K in 2016 ($10.6K before STCs), it will probably reduce over time, perhaps by $500 per year. Therefore solar with a 10c FIT would gradually become more attractive to more people. By 2018 the case study payback could reduce from 9.6 to 8.4 years ($6.5K system cost) and by 2020 to 7.1 years ($5.5K cost). So as the cost of solar comes down uptake should increase which is a profile to aim for.

More PV and battery systems should be bought when they are more efficient and lower cost. That is there should be a gradual ramp up towards later years. A German energy expert made the statement that he wishes they hadn't proceeded so quickly so early. They installed a huge amount of solar PV that was expensive and relatively inefficient. (During a talk by Professor Andreas Löschel, Professor for Energy and Resource Economics at the University of Münster, Germany; chair of Germany's Expert Commission to monitor the energy transformation. INSIGHTS SEMINAR, 1st September 2015, The Global Change Institute UQ)

And of course as price of PV drops, either the FIT could reduce or the STC could be reduced or removed. However if the FIT is potentially going to reduce over time people who install a system (eg in say 2016 or 2017) should be able if possible to depend on the FIT at the time of install for a fixed period of time, perhaps 8 years, before it can then revert to the lower FIT.

Given this potential to reduce the FIT and/or the STC certificates in future years, reducing the costs to the utilities and thence to customers, perhaps there shouldn't be a mad rush to promote installations in 2016 but more of a gradual build up as we move towards 2020. And dare I say it, don't aim for 1 million by 2020. By 2025 a solar system could be cheap and efficient enough to not need any SRES or FIT assistance and still achieve a 9 year payback so it would be good to have lots of roofs still available for that happy event.

Demand Based Tariffs

In Queensland demand based charging will probably not be made compulsory in 2020/21 or even for a few years after that, one reason being the low penetration of smart meters. With Demand Based Tariffs (DBT) the volume cost of electricity will reduce significantly from 25c to possibly 12c – 17c. Assuming a value of 15c, using the case study figures the daily saving of $2.20 would reduce to $1.80 With a FIT of 6c this becomes only $1.32. Therefore DBT will significantly reduce the economic benefits of solar PV systems. Because of its delayed timeframe, owners of solar systems installed over the next year or two will probably be able to recoup much of their system cost pre DBT. And in later years the availability of battery storage to many but not all owners will help to offset this impact.

Battery Storage

Battery storage will provide benefits for both the solar owners and the network utilities and it could be said that storage is essential for their long term co-existence. For the solar owner the main benefit initially is the ability to increase self use. With a 7 kWh battery assume perhaps an increase of 6 kWh self use per day. With the volume charge of 25c and a FIT of 10c this equates to a saving of 90c/day or $330/year. For a 10 year payback a 7 kWh battery is not expected to become as cheap as $3,300 until about 2020. Therefore from around 2020 onwards, solar plus storage will probably become the norm. If the FIT was 6c the annual saving increases to $416 which improves the economics of batteries making the 10 year payback possible about 1.5 years earlier.

With Demand Based tariffs batteries should be able to reduce the impact of these new charges by smoothing and reducing the load at peak times. On the other hand the reduced volume price that comes with DBT will decrease the self-use benefit of solar. It's possible that these two factors would balance out and the introduction of DBT could have minimal impact on the economics of solar plus batteries, although this is difficult to quantify.

The message perhaps should be that if batteries are to be promoted the FIT should not be too high, and it is important that the use of batteries is promoted to make the significantly increased penetration of solar more viable.

The Utility Perspective

Solar does provide disruption to the Electricity Utilities and if it wasn't for the imperatives of acting on climate change and public health issues there wouldn't be a need to push it so strongly. Four ways that roof top solar impacts on the utilities are –

1. Payment for the STC certificates by the Retailers
2. Payment for the Solar Bonus Scheme (SBS) by the Networks
3. Reduced income from the customers who install solar thus putting upward pressure on tariffs and downward pressure on utility expenditure/services
4. The cost of rectification of Network problems that may be caused by high levels of solar penetration.

Environmental scheme costs make up 11% of customer bills (EPI Issues Paper page 8). Presumably the SRES/STC program and the SBS contribute the bulk of these costs.

The STCs for the 4 kW case study would have reduced the price by about $3,150 at a certificate price of $35 so this is still a significant factor in keeping solar financially viable, in fact the only one at this stage.

Given that Retailers in the open market of SEQ currently offer FITs of 6c – 11c, the 10c FIT in the case study can already be obtained, although for most customers it will probably mean changing over to a new Retailer, perhaps one they don’t want to use. A FIT of 8c is available from both a renewable focussed retailer and a mainstream retailer.