IPART
New South Wales

Independent Pricing and Regulatory Tribunal

Solar feed-in tariffs

The subsidy-free value of electricity from small-scale solar PV units from 1 July 2014

Electricity — Final Report
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1 Executive summary

Households and small businesses with solar photovoltaic units in NSW (PV customers) can earn feed-in tariffs for the electricity they export to the grid. Those who are part of the NSW Solar Bonus Scheme currently receive a subsidised feed-in tariff of either 20 or 60 cents per kilowatt hour (c/kWh).[1] Those who are not part of this scheme can receive unsubsidised feed-in tariffs in the competitive retail electricity market.[2]

The NSW Government has asked IPART to investigate and determine:

- the benchmark range for the unsubsidised feed-in tariffs that retailers may voluntarily offer PV customers who **are not** part of the Solar Bonus Scheme (the benchmark range), and
- the amount NSW electricity retailers must pay the Government per kWh exported by their PV customers who **are** part of the Solar Bonus Scheme to help fund this scheme (the retailer contribution).[3]

This report sets out our final decisions for 2014/15, and explains how they differ from the draft decisions we released in April 2014. It also summarises stakeholders' comments on this review and our consideration of these comments, including additional analysis.

1.1 Our final determination

Our final determination is that for 2014/15, the benchmark range for unsubsidised solar feed-in tariffs is **4.9 to 9.3 c/kWh** with a median of 5.6 c/kWh and the retailer contribution is **5.1 c/kWh** (Table 1.1).

Table 1.1 Final determination on solar feed-in tariffs, 2014/15 ($nominal, c/kWh)

	2013/14	2014/15 (Draft decision)	2014/15 (Final decision)
Benchmark range	6.6 – 11.2	5.0 – 9.6 (median 5.8)	4.9 – 9.3 (median 5.6)
Retailer contribution	6.6	5.3	5.1

1 http://www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/solar/small-scale/solar-bonus-scheme accessed 12 June 2014.

2 Based on information provided by NSW Trade & Investment in March 2014, there are currently around 145,000 customers receiving subsidised feed-in tariffs under the Solar Bonus Scheme, while around 100,000 may receive unsubsidised feed-in tariffs on the competitive market.

3 See Terms of Reference in Appendix A.

1.1.1 Final decision on benchmark range

The benchmark range reflects the forecast wholesale market value of PV electricity in the coming year at different times of the day. The upper end of the range represents this value during the period when solar PV exports have the highest wholesale market value (between 3pm and 5pm). The lower end of the range represents this value at all other times of day. The median value across all times is 5.6 c/kWh.

Our final decision on the benchmark range is lower than in 2013/14 because the forecast market price of wholesale electricity is lower. The main reason for this is that wholesale market prices currently incorporate the electricity market's expectation that the carbon pricing mechanism will be repealed in 2014/15, reducing the cost of electricity. The final benchmark range is also slightly lower than our draft benchmark range, as we have updated the data used in our analysis, including wholesale market prices which have declined slightly.

In reaching our final decision, we considered stakeholders' submissions on our draft report. We agreed with stakeholders' argument that the value of retailers' avoided National Electricity Market (NEM) fees should be included in the wholesale market value of PV electricity (and thus be reflected in both the benchmark range and retailer contribution). In previous determinations, we accounted for these avoided costs in our 'direct financial gains to retailers' approach. However, given we no longer use this approach, we have now accounted for the value of avoided NEM fees in our 'wholesale market value' approach, in line with stakeholders' recommendation. (This is discussed in more detail in section 3.2.)

However, we do not agree with some stakeholders' recommendations that IPART set mandatory minimum feed-in tariffs. In our view, a competitive market is the best way to deliver the fair value for PV exports. For example, mandating a specific feed-in tariff could preclude retailers from offering different tariffs, such as time-of-export tariffs. This would mean PV customers have fewer retail offers to choose from.

Our recommended benchmark range is not binding on retailers. Like other components of electricity retailers' competitive offers,[4] solar feed-in tariffs are not regulated by IPART. We consider our recommended benchmark range should support a competitive market for feed-in tariffs. Retailers are best placed to make decisions on whether to offer feed-in tariffs, how to structure the feed-in tariff, and what rate(s) per kilowatt hour (kWh) to offer. Our recommended benchmark range provides guidance on the likely value of the electricity exported by PV customers, and can assist retailers in making these decisions and customers in deciding whether to install PV units and in comparing market offers.

4 For example 'green premiums'.

Some stakeholders argued for time-varying feed-in tariffs. We agree that time-varying feed-in tariffs are likely to contribute to more efficient outcomes. For example, retailers could offer feed-in tariffs that approximate the wholesale price of electricity at times of peak and non-peak demand. However, we do not support making such tariffs mandatory. In our view, a competitive market will drive innovation (including price and quality innovations) as retailers compete for customers. Retailers are in the best position to deliver time-varying tariffs in response to demand in the market and we encourage retailers to provide such tariffs.

Several stakeholders also submitted that we should publish our final decision on the benchmark range (and retailer contribution) 'with and without' the carbon price, as this would provide better guidance to customers in the event the carbon price is not repealed during 2014/15. We have decided to maintain our draft decision of using market prices for electricity, which incorporates the market's expectation on the repeal of the carbon price in 2014/15. As noted above, our benchmark range is voluntary. Retailers will have discretion to adjust their feed-in tariffs in response to the carbon price being repealed (or not repealed) during 2014/15.

It is important to note that the availability and rate of solar feed-in tariffs are likely to be **secondary considerations** for many PV customers. In general, most of the electricity generated by a PV unit is used to meet the customer's own energy needs at the time of generation, and the amount exported is relatively small.[5] In addition, the customer is still likely to import a significant amount of electricity to meet their needs when the PV unit is not generating (eg, at night). This means that in most cases:

- the primary financial benefit of having a PV unit is reduced electricity bills, and
- the most important financial consideration in selecting a market offer is likely to be the retail price of electricity**.**

Appendix D provides our analysis that shows that feed-in tariffs should be considered as a part of an overall electricity market offer, and that the offers with the highest feed-in tariff are not necessarily the best overall energy deal for customers with PV units.

5 Assuming they have net metering arrangements.

1.1.2 Retailer contribution

The retailer contribution to the Solar Bonus Scheme reflects the financial benefit that retailers receive from their customers' participation in this scheme. Like the benchmark range, our final decision on the retailer contribution for 2014/15 is lower than in 2013/14 because the forecast market price of electricity is lower. It is also lower than in our draft decision mainly due to a further reduction in forward market prices for electricity.

As noted above, we agreed with stakeholders' argument that the value of retailers' avoided NEM fees should be reflected in both the benchmark range and retailer contribution, and adjusted our analysis on the retailer contribution accordingly.

Our determination on the retailer contribution is binding on retailers, but **does not** affect the solar feed-in tariffs Solar Bonus Scheme customers receive under the scheme. The contribution is paid by these customers' electricity retailers to offset some of the costs of the scheme, which are funded by all electricity customers (through a levy included in retail electricity prices).

Box 1.1 provides more information on our review.

Box 1.1 What has IPART been asked to do?

Solar feed-in tariffs review

Households with solar units earn feed-in tariffs for energy that is exported to the grid. Some customers are eligible for a subsidised feed in tariff under the Solar Bonus Scheme. Other solar customers who are not eligible under the Solar Bonus Scheme need to assess feed-in tariff offers in the market. IPART has been asked to investigate feed-in tariffs for both groups.

RETAILER CONTRIBUTION TO THE SOLAR BONUS SCHEME

The Solar Bonus Scheme offered subsidised feed-in tariffs of 60 or 20 c/kWh for the energy supplied to the network from solar panels, depending on date of connection. This scheme is now closed to new participants.

The scheme is paid for in two ways:

- A levy on all electricity customers that is recovered through electricity prices, and
- A contribution from retailers, that reflects the value of the exported electricity to the retailer.

IPART sets the amount that retailers must contribute towards the subsidised scheme.

This 'retailer contribution' lessens the levy that is paid by all electricity customers, and means that electricity prices do not need to be as high as they would otherwise be.

IPART's decision does not affect the statutory feed-in tariff rates that customers receive (either 60c or 20c/kWh), as that has already been set at the time of connection.

BENCHMARK FEED-IN TARIFFS

Most consumers with solar panels first consume the energy that they produce and export only excess energy, so the bulk of the savings they make are from buying less energy from retailers.

Customers not eligible for the subsidised feed-in tariff can receive a feed-in tariff for the energy they export to the network directly from their retailer. These feed-in tariffs are set by retailers operating in the competitive market.

Customers can compare feed-in tariff offers on the www.energymadeeasy.gov.au website in the same way all energy and gas consumers can compare prices and overall packages to find the best deal for them.

IPART's review will value the energy that is exported to determine a fair and reasonable feed-in tariff.

The benchmark rate is only a guide for retailers and consumers, and is not mandatory.

1.2 How we made our final decision

We made our final decision on the benchmark range and the retailer contribution in line with the terms of reference provided by the NSW Government. In particular, we:

1. Estimated the value of PV customer exports based on the 'wholesale market value' method, using data from both gross and net metered customers. This involved calculating the price the PV exports would receive if they could be sold on the wholesale market at the time they were exported.
2. Set the benchmark range based on the lower and upper end of our estimate of the wholesale market value for **net** metered customers.[6]
3. Set the retailer contribution based on the lower end of our estimate of the wholesale market value for **gross** metered customers.[7]

In doing so, we had regard to the requirement that our decision should not result in an increase in retail electricity prices and should support a competitive retail electricity market.

We also had regard to stakeholder comments in response to our issues paper from November 2013 and our draft report in April 2014 and public forum in May 2014. We also received expert advice from our consultant, Frontier Economics (Frontier).

1.3 What does the rest of this report cover?

The rest of this report explains our review and final determination in more detail. It is structured as follows:

- Section 2 provides some context and the terms of reference for the review, and responds to the main issues raised in the submissions we received from stakeholders
- Section 3 discusses our estimate of the value of PV customer exports in 2014/15 and how we used this to make our final determination for 2014/15.

Appendices A to D provide our terms of reference, information on the current number and characteristics of PV customers in NSW (as at March 2014), the Revised National Principles for Feed-in Tariff Arrangements, and our analysis on market offers for PV customers.

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6 **Under net metering** the electricity generated by the customer is first used to meet the customer's own consumption. Only when generation exceeds the customer's consumption at any point in time, will the excess be exported to the grid.

7 **Under gross metering** all the electricity generated by the customer is 'exported'.

2 Context and terms of reference

IPART first reviewed solar feed-in tariffs in 2011/12. Our terms of reference for that review included 2 key requirements: that our recommendations must not lead to higher retail electricity prices, and must support competition in the retail market.

After extensive consultation and analysis, we found that setting mandatory feed-in tariffs for customers outside the Solar Bonus Scheme would **not** meet these requirements. Instead, we recommended that NSW retailers be encouraged to voluntarily offer an unsubsidised feed-in tariff to these non-Solar Bonus Scheme customers, and we should set a benchmark range for this tariff to assist customers in comparing retail offers. We also recommended that NSW retailers be required to make a contribution towards the subsidised feed-in tariffs paid to customers **inside** the Solar Bonus Scheme. In addition, we recommended an approach and methodologies for determining the values of the benchmark range and retailer contribution.

The Government accepted these recommendations, and subsequently asked us to conduct reviews to update the values of the benchmark range and retailer contribution each year. The terms of reference for these annual reviews are much narrower than those of our first review, and limit the scope of issues we can consider.

2.1 Our terms of reference

The NSW Government provided us with revised terms of reference for the 2014/15 review (see Appendix A). These terms of reference are slightly different to those we referred to in our issues paper released in November 2013. Essentially, they ask us to:

- update the benchmark range and the retailer contribution
- in setting the benchmark range and retailer contribution, take into account the wholesale market value of PV customer exports at the time of day of export
- ensure the value estimated reflects the subsidy-free value of PV customer exports to a retailer
- ensure there is no resulting increase in retail electricity prices
- ensure the benchmark range operates in a way that supports a competitive electricity market in NSW, and
- undertake the determination in broad conformance with the *Revised National Principles for Feed-in Tariff Arrangements*.[8]

8 See Appendix C.

The main difference between these and last year's terms of reference relates to what we are asked to consider in setting the benchmark range and retailer contribution. Previously, we considered the estimated value of PV exports derived using 2 methods:

1. **the direct financial gain to retailers method**, which involves estimating the financial benefit that retailers receive per kWh of electricity their PV customers export to the grid
2. **the wholesale market value method**, which involves calculating the price the PV exports would receive if they could be sold on the NEM at the time they were exported.

The revised terms of reference indicate that we should consider only estimates derived using the wholesale market value method. The direct financial gain to retailers method is no longer referred to because it does not estimate the value 'at the time of day of export'. This means it does not comply with the Revised National Principles for Feed-in Tariff Arrangements.[9]

Please note that under the revised terms of reference, many of the issues stakeholders have raised in previous reviews continue to be outside the scope of this 2014 review (discussed further in the section 2.3).

2.2 Our process for conducting this review

In making our final decisions, we have undertaken extensive analysis and public consultation.

We released an issues paper in November 2013. It outlined the purpose and scope of the 2014 review, and sought comment from stakeholders on ways we could enhance our approach and methodologies. We received 9 submissions from energy retailers, solar industry organisations and individuals. We carefully considered stakeholders' comments on the issues paper in making our draft decisions. We also received expert advice on the value of PV customers' exports from Frontier.

We released a draft report in April 2014, which explained our draft decisions and addressed the issues raised in the submissions on the issues paper. We received 8 submissions on the draft report. We held a public forum on 13 May 2014 where we invited all interested parties to present their views on our draft decisions. We considered all the issues raised at the public forum and in submissions, and conducted additional analysis where necessary to assist us in making our final decisions.

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9 The estimated value under the direct financial gain to retailers method was roughly equivalent to the energy cost allowance from IPART's retail electricity determination. This energy cost allowance does not specifically relate to the time of day that PV customers export electricity to the grid.

2.3 Key issues raised in submissions and IPART's response

Stakeholders raised several main issues in submissions to our review. These issues and our responses are summarised below.

2.3.1 Mandating minimum feed-in tariffs

Some stakeholders called for a mandatory minimum feed-in tariff in NSW.[10] Clean Energy Council (CEC) submitted that competition between retailers is not delivering fair and efficient feed-in tariffs as no solar PV customers have been offered tariffs which recognise the value of the electricity when and where it is exported.[11] Public Interest Advocacy Centre (PIAC) submitted that some retailers do not offer feed-in tariffs or offer feed-in tariffs that are below IPART's benchmark range. It recommended mandating a minimum feed-in tariff of 8c/kWh until a better methodology is developed (discussed in section 2.3.2).[12]

In our view, a competitive market is the best way to provide the fair value for PV exports, and the market should determine the fair value of PV exports through competition. We consider that mandating minimum feed-in-tariffs will lead to fewer offers that consumers can choose from and less incentive for retailers to innovate. This could discourage retailers from offering different tariffs such as time-of-export tariffs (see section 2.3.3). Mandating minimum feed-in tariffs will also not guarantee that PV customers will be better off. This is because feed-in tariffs are only one component of a retailer's market offer. In Appendix D we present analysis which highlights that market offers with the highest feed-in tariff are not necessarily the best overall deal for PV customers.

Furthermore, our terms of reference ask us to set a voluntary benchmark range (not a mandatory minimum).

2.3.2 Methods for estimating the value of PV customer exports

Improving our methodology to estimate feed-in tariffs

The submissions from energy retailers commented on our methods for estimating the value of PV customer exports. While there was broad support for improving our methodologies, there were differing views on the data we should use in our analysis. We respond in detail to these issues in section 3.

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10 See submissions from Campaign For a 1 For 1 Solar Feed-in Tariff for NSW, December 2013, pp 1-2; G Tosio (Individual), December 2013, p 1; Public Interest Advocacy Centre, May 2014, pp 2-4.

11 Clean Energy Council submission, May 2014, pp 2-3.

12 Public Interest Advocacy Centre, May 2014, pp 3-6.

PIAC recommended IPART develop a 'best practice' methodology to estimate feed-in tariffs which considers the value of externalities, the planning value and broader societal costs and benefits in addition to avoided losses, NEM fees and network investment. It also suggested monitoring and reporting on consumer acceptance of voluntary feed-in tariffs, including the cross-subsidy that households provide to retailers.[13]

We agree that feed-in tariffs should include a value for avoided NEM and ancillary service fees. Retailers are able to avoid these fees for the amount of electricity their customers export to the grid and therefore this value should be included in the feed-in tariff.[14] These avoided costs were included in the 'financial gains to retailers' approach that we applied in our decision last year. Now that the terms of reference no longer require us to use this approach, we consider that this value should be included in the wholesale market value. Avoided losses are already included in our decisions, and our views on avoided network investment are discussed in section 2.3.3.

We have not included values for externalities, planning values and other social costs in our decisions. Our terms of reference ask us to estimate the subsidy-free value of PV exports to a retailer. Providing a payment to PV customers for externalities and social values is a matter of government policy, however any such payment would need to be funded. Where funding is provided by customers through electricity prices, it generally has the most detrimental effect on the lowest income customers. It is important to note that PV customers are already provided with a financial incentive for the renewable energy they produce. Under the small-scale renewable energy scheme customers are provided with a financial incentive reflecting the amount of renewable electricity the system generates over its lifetime.

The NSW Government has proposed that IPART undertake a monitoring role in the retail electricity market following retail price deregulation. We propose to include voluntary feed-in tariffs as part of this role.

13 Public Interest Advocacy Centre submission, May 2014, pp 4-6; Public forum in May 2014.

14 See IPART, *Solar feed-in tariffs – Setting a fair and reasonable value for electricity generated by small-scale solar PV units in NSW – Final Report*, March 2012, p 50.

Feed-in tariffs with and without carbon price

CEC and PIAC submitted that we should present results 'with and without' the carbon price.[15] CEC submitted that the benchmark range with the carbon price should be published to provide customer guidance if the Commonwealth Government's repeal proposal is unsuccessful. PIAC commented that our methodology assumes that the carbon price will be removed, and that this was not consistent with our approach to the gas review. Energy retailers supported our draft decision.[16]

We have considered these submissions, but decided to continue with the approach in our draft report of using forward market prices for electricity. We do not agree that our decision assumes there is no carbon price. Forward market prices for electricity incorporate the market's expectation on the repeal of the carbon price and therefore include a market value for carbon. We consider that these prices are more indicative of feed-in tariffs being offered in the marketplace relative to feed-in tariffs based on a 'with and without' carbon approach. Importantly, as the benchmark range is voluntary, retailers have discretion to adjust their feed-in tariffs in response to the carbon price being repealed (or not repealed) during 2014/15. A well-functioning competitive market should ensure customers are offered benefit reflective feed-in tariffs.

Our approach to carbon differs between our solar and gas reviews to reflect where the liability for carbon is created. In solar, the liability for carbon costs is created when electricity is generated and carbon costs are included in the price a retailer pays a generator for electricity (which is subsequently passed through to customers). In gas, the liability for carbon costs is created when a customer uses gas at home or in a business, and carbon costs are included in the price a customer pays a retailer.

2.3.3 Time-varying solar feed-in tariffs

Stakeholders raised the need for time-varying feed-in tariffs so that PV customers can receive a fair price for their PV exports when the value of the energy is higher. For example, CEC submitted that Australia's solar industry does not seek a '1-for-1' feed-in tariff, however retailers should pay 'benefit-reflective feed-in tariffs' that are:

- technology-neutral
- time-varying and include a critical peak payment, and
- (ideally) location specific.[17]

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15 See submissions from Clean Energy Council, May 2014, p 3; Public Interest Advocacy Centre, May 2014, p 6.

16 See submissions from AGL, May 2014, p 2; EnergyAustralia, May 2014, p 1; Origin Energy, May 2014, p 2.

17 Clean Energy Council submission, January 2014, p 1.

CEC submitted that benefit-reflective feed-in tariffs would promote more efficient outcomes and lead to lower costs for electricity customers.[18] Similar comments were made in the submissions from Solar Citizens and PIAC.[19] A submission from Mr Russell suggested that as most customers have an interval meter, retailers could retrospectively apply the average half-hourly electricity price in the spot market to each customer's net exports on a half-hourly basis.[20] This would ensure PV customers benefit from high prices in the spot market.

We support time-varying solar feed-in tariffs and agree this can contribute to more efficient outcomes where customers can respond to these price signals. Our solar feed-in tariff reviews provide information for both retailers and customers regarding how the value of solar PV exports varies by time of day. We have found that the value of PV exports on the wholesale electricity market tends to be highest between 3pm to 5pm. We have used this information to estimate the value of solar PV exports during this period, and at all other times. This is discussed in section 3.3.

Time-varying solar feed-in tariffs may comprise 2 elements:

- the value of energy on the wholesale electricity market
- the pass through of any net benefits associated with relieving network congestion.

We discuss each of these elements below.

Time-varying value of energy in the wholesale electricity market

In this report, we are concerned with the payments made to PV customers to reflect the value that PV exports provide to retailers. In this context, time-varying feed-in tariffs would provide a price incentive to export more electricity at times when it has a greater value on the wholesale electricity market.

As mentioned above, we support retailers providing benefit-reflective tariffs such as time-varying tariffs as it can contribute to more efficient outcomes where customers can respond to these price signals. We also support retailers offering feed-in tariffs that approximate the wholesale price of electricity at times of peak and non-peak demand.

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18 Ibid., pp 1-2.

19 Solar Citizens submission, January 2014, pp 1-2; Public Interest Advocacy Centre submission, May 2014, pp 2-5.

20 See submission from Russell, I., May 2014, p 3 and Public forum, May 2014, p 29.

We recognise that currently no retailers are offering time-varying feed-in tariffs in NSW. In the short-term, a lack of smart meters (ie, "online" interval meters[21]) may be an obstacle to implementing time-varying tariffs. We found that:

- Approximately 26% of customers in Ausgrid's network area have either interval or smart meters, meaning the proportion of customers with smart meters alone would be lower than 26%.[22]
- In Essential Energy's supply area, the roll-out rate of smart meters is even lower at around 0.1%.[23]

We encourage retailers to offer time varying and capacity or critical peak tariffs. As discussed above, in his submission to our draft report, Mr Russell also proposed an approach where spot market prices are retrospectively applied to PV exports so that customers benefit from high price events. Under our decision, retailers have the flexibility to provide these sorts of market offers. However, this flexibility would be removed if feed-in tariffs were mandatory. It is important to note that our methodology already captures extreme price events because it samples from actual historical spot prices.

We consider a competitive market will drive innovations in terms of service quality and prices as retailers compete for customers. Currently, most customers may only be able to respond to prices by reducing their discretionary consumption. As noted in a number of submissions[24], a battery storage system would assist PV customers in deciding when to export their PV generation at a time when it has a greater value. When this technology becomes economic and more widespread, customers will be better able to respond to prices in the market.

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21 An interval meter and a smart meter are similar in that they both measure the electricity consumption every 30 minutes, but are different in that the former requires a person to read the meter every quarter whereas the latter reads and stores the electricity usage every 30 minutes "online".

22 We do not have accurate numbers of customers with a smart meter and an interval meter in Ausgrid's network area. It is possible that we are underestimating the proportion of customers with interval or smart meters as it is based on the number of customers on time-of-use tariffs (TOU) versus non-TOU tariffs and some customers with interval meters may be on non-TOU tariffs.

23 In Essential Energy's supply area, there are approximately 1,700 smart meters, 550 Type 5 interval meters and 1.46 million accumulation meters.

24 See submissions from Campaign For A 1 For 1 Solar Feed-in Tariff for NSW, December 2014, pp 2-3; Clean Energy Council, January 2014, p 1; Solar Citizens, January 2014, pp 1-2.

Time-varying value to network businesses

Some stakeholders submitted that our feed-in tariffs should incorporate the value that solar PV exports provide to network businesses.[25] For example, PV customer exports may delay the investment needed to augment the network and therefore have a value to network businesses. Mr Russell noted at our public forum that regulatory arrangements prevent PV customers from realising the benefits they provide to network businesses.[26] He also submitted that because PV exports do not use the transmission network, PV customers should not be charged for these costs.[27]

We recognise that PV customers can impose both costs and benefits to network businesses. We also agree that PV exports do not use the transmission network but PV customers do not receive a benefit for this through feed-in tariffs. For retailers to pass through any network benefits in a feed-in tariff, they would need to receive a payment or benefit from the network businesses. However, under the current arrangements network businesses in NSW are not providing payments to retailers to reflect any net benefits from PV customers.

These are issues outside the scope of IPART's review and need to be resolved through network pricing arrangements. We note that the Standing Council on Energy and Resources has proposed a rule change in relation to the distribution network pricing principles which is being considered by the Australian Energy Market Commission (AEMC).[28] These proposed rule changes would result in more cost-reflective network prices and explicitly address locational benefits and time-of-use pricing where available. Under the proposed arrangements, PV customers would pay lower network charges when they improve congestion during peak times in the local network. While not a payment through a feed-in tariff, PV customers would receive the benefit through lower network charges at specific locations and times of day where available. It is important to note that cost-reflective network tariffs would also reflect where PV solar customers add to network costs.

We also note that the AEMC is assessing a rule change proposed by CEC which aims to improve the process for embedded generator applicants to negotiate a connection to a distribution network.[29]

We support these developments because they contribute to more efficient outcomes for society and fair treatment for PV customers.

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25 See submissions from the Clean Energy Council, January 2014, p 3; Solar Energy Industries Association Inc, January 2014, p 2; Clean Energy Council, May 2014, p 3; Russell, I., May 2014, p 1; Russell, I., Public forum, May 2014, p 29.

26 Russell, I., Public forum, May 2014, p 29.

27 Submission from Russell, I., May 2014, p 2.

28 See http://www.aemc.gov.au/Rule-Changes/Distribution-Network-Pricing-Arrangements.

29 See http://aemc.gov.au/Rule-Changes/Connecting-embedded-generators-under-Chapter-5A.

2.3.4 Setting the upper end of the benchmark range

In our draft decision, we found that between 3pm and 5pm solar PV exports have the highest wholesale market value and we set the upper end of the benchmark range based on this time. Mr Russell commented that we should set the upper bound of the benchmark range based on the period from 2pm to 8pm as this is when households on time-of-use tariffs face the highest prices (ie, periods of peak demand for electricity).[30]

We have decided not to change how we set the upper end of the benchmark range. In determining this, we are considering the time when the solar PV generation has the highest value in the wholesale electricity market. The period from 2pm to 8pm is the network peak period, which does not necessarily coincide with the period when solar PV generation is most valuable in the wholesale electricity market. However, we have undertaken some additional analysis to examine how the benchmark range would change if we used the 2pm to 8pm period. We found that the wholesale market values for the 2pm to 8pm period are lower than those based on the 3pm to 5pm period. The results are discussed in more detail in section 3.3.

2.3.5 Gentailers will not provide fair feed-in tariffs

Some stakeholders noted that electricity generators make a lot of revenue from high price events in the wholesale electricity market. They argue, 'gentailers' (retailers who are part of an integrated energy company that also generates electricity) have no incentive to compete for electricity supply at these peak price times and will not provide fair feed-in tariffs.[31]

We strongly disagree with this view. Any retailer has an incentive to obtain wholesale electricity at the best possible price. Similarly, any 'gentailer' also has a commercial incentive to source electricity at the best possible price (ie, cheapest). Therefore, any retailer, regardless of whether it is a gentailer or not, has an incentive to offer a fair price for a customer's PV exports or risk losing these customers to competitors.

The feed-in tariffs currently available in the market support this view. We have examined a sample of voluntary feed-in tariffs on offer in each network area in NSW (Table 2.1). Figure 2.1 shows how voluntary feed-in tariffs that different retailers provide compare with our final benchmark range for 2014/15. For information, we have provided feed-in tariffs in other jurisdictions in the same figure. Key findings are that:

- Of the 11 retailers included in the sample, 9 retailers offer a voluntary feed-in tariff.

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30 See submission from Russell, I., May 2014, pp 2-3; Russell, I., Public forum, May 2014, p 30.

31 See submissions from the Clean Energy Council, January 2014, p 4; Solar Citizens, January 2014, p 1.

- Of those that offer voluntary feed-in tariffs, 6 retailers offer a voluntary feed-in tariff which is within our benchmark ranges for 2013/14 and 2014/15, and 1 retailer offers a tariff which is far higher than the upper end of the benchmark range for 2014/15.
- The 3 largest gentailers in NSW (AGL, EnergyAustralia and Origin), with around 80% of market share, currently offer feed-in tariffs within our final benchmark range for 2014/15. Specifically, AGL and EnergyAustralia offer tariffs towards the higher end of the benchmark range, and Origin offers a tariff close to the median value.
- There are no differences in a retailer's feed-in tariffs between network areas.

Table 2.1 Retailers' voluntary feed-in tariffs (June 2014)

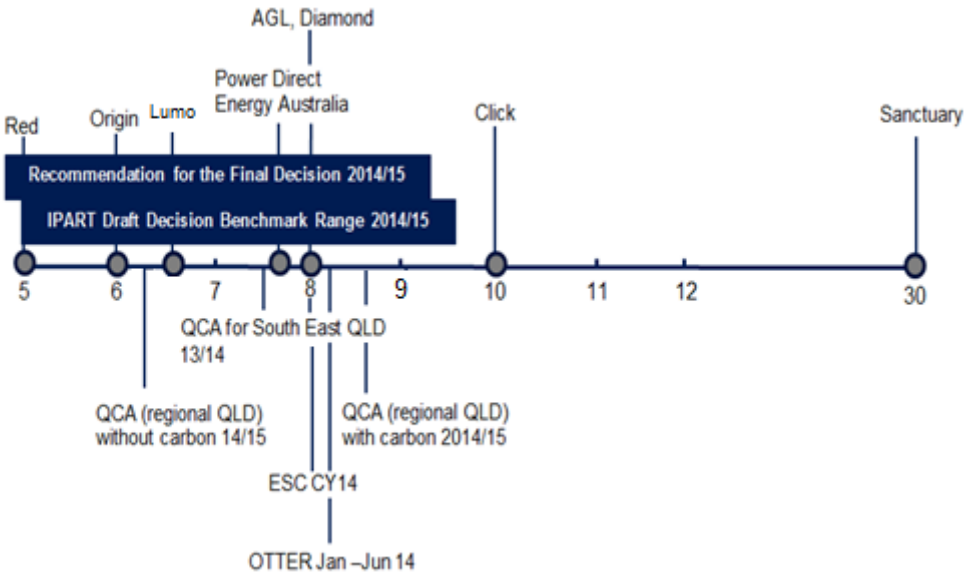
Retailer	Feed-in tariff (c/kWh) and network area		
	Ausgrid	Endeavour	Essential
AGL	8	8	8
Click Energy	10	10	10
Diamond Energy	8	8	8
Dodo Power & Gas	Nil	Nil	Nil
EnergyAustralia	7.7	7.7	7.7
Lumo Energy	6.6	6.6	6.6
Momentum Energy	Nil	Nil	Nil
Origin Energy	6	6	6
Powerdirect	7.7	7.7	7.7
Red Energy	5	5	5
Sanctuary Energy[a]	30	30	30

[a] This offer is available to customers purchasing a solar system (max 3.6kW) from one of Sanctuary Energy's authorised sales partners in NSW. In addition, this feed-in tariff is subject to Fair Use Allowance of 1600 kWh per annum, calculated pro rata each billing period (ie, PV customers receive 30 cents up to 400 kWh per quarter). Any unused allowance does not transfer to the next billing cycle.

Note: Postcodes sampled in the Ausgrid, Endeavour and Essential areas 2048, 2147, 2795 respectively.

Source: www.energymadeeasy.gov.au (accessed 2 June 2014).

Figure 2.1 Retailers' voluntary feed-in tariffs based on market offers available in June 2014



Data source: www.energymadeeasy.gov.au (accessed 2 June 2014).

3 Determining the retailer contribution and benchmark range

To determine the retailer contribution and the benchmark range, we first estimated the value of PV customer exports in 2014/15. As section 2.1 discussed, we have previously used 2 methods to estimate this value. However, in line with the revised terms of reference for this review, we only used the wholesale market value method. We engaged Frontier to assist us with this task. We then used Frontier's advice to make our draft and final decisions on the benchmark range and the retailer contribution.

The section below sets out our final finding on the estimated value of PV exports. The subsequent sections discuss the data and approach Frontier used to derive this estimated value, the estimated value in more detail, and our final decisions on the benchmark range and retailer contribution.

3.1 Estimated value of PV customer exports for the final decision

In line with Frontier's advice, our final finding is that the estimated value of PV customer exports in 2014/15 ranges **from 4.9 to 10.0 c/kWh** (Table 3.1). This range represents Frontier's estimate of the wholesale market value of PV exports at different times of the day by customers with both gross and net meters, and a range of PV unit sizes. (Frontier's methodology is discussed further in section 3.2.)

Table 3.1 Estimated value of PV customer exports ($2014/15, c/kWh)

Method	2013/14	2014/15
Direct financial gain to retailers	6.8 – 11.5	
Wholesale market value	8.5	4.9 – 9.3 (based on net meters)
		5.1 – 10.0 (based on gross meters)

Note: There is no range for the wholesale market value in 2013/14 as we based our analysis on net metered 1.5kW units only.

Data source: IPART and Frontier Economics.

For both net meters and gross meters, the upper end of the range for the estimated value of PV exports represents this value during the period of the day when the wholesale market value of PV exports is highest (3pm to 5pm). The lower end of the range is the wholesale market value during other periods of the day.

The final wholesale market values are slightly lower than in our draft report, mainly due to updated market prices.[32] These prices have decreased by around 5% (from $38.33/MWh to $36.32/MWh).[33] Other changes since our draft report are discussed further below.

There are several reasons why the estimated value of PV exports in 2014/15 is lower than in 2013/14, including changes in the method used to derive this range of values. However, the most significant reason is that this value reflects the forecast wholesale price of electricity in the coming year, and this price is lower than last year. This is because market prices factor in a high probability that the carbon price will be repealed in 2014/15. This means relative to 2013/14, there is a much smaller carbon cost incorporated in wholesale prices in 2014/15. This is discussed further in section 3.3.

[32] We used a 40-day average of ASX Energy contract prices as at 23 May 2014.

[33] Frontier Economics, *Market value of solar PV exports – A draft report prepared for IPART*, April 2014, p 15; Frontier Economics, *Market value of solar PV exports – A final report prepared for IPART*, June 2014, p 15.

3.2 Data and approach used to derive this estimated value

In line with our terms of reference, we asked Frontier to estimate the value of PV exports in 2014/15 using the wholesale market value method. This method calculates the value of PV customer exports if they could be sold on the NEM. Using this approach, the value will depend on when and where the PV electricity is exported to the grid and what spot prices are at these times.

3.2.1 Data used for estimating the wholesale market value

To estimate the wholesale market value, Frontier used historical data for half-hourly PV exports, half-hourly spot prices in the NEM, NEM fees and loss factors.

Half-hourly PV exports

The best available source of data on half-hourly PV exports relates to the Ausgrid network area. This is because this area includes a large number of solar PV customers with time-of-use meters that record PV generation or exports each half-hour. Neither Endeavour Energy nor Essential Energy routinely collects and stores half-hourly data – either because basic accumulation meters are in use, or time-of-use meters record data less frequently than half-hourly.

Ausgrid previously provided data for around 1,000 and 10,000 PV customers over the 2009/10 and 2010/11 financial years respectively. It also provided a random sample of around 1,000 PV customers for the 2011/12 and 2012/13 financial years. These customers included business and residential PV customers with gross and net meters and a range of PV unit sizes (in kW).

In our issues paper, we asked stakeholders to comment on a few issues in relation to this data, including whether we should base the analysis on:

- a single 'base year' of historical data, or a broader range of historical data
- 1.5kw PV units only (as we did in 2013/14), or a range of PV units sizes, and
- half-hourly exports from gross and/or net metered customers.

The comments we received and our responses are summarised below.

Single base year or broader range of historical data

Both AGL and Origin Energy supported using more historical data because if only a single base year is taken into account then results are very sensitive to which base year is chosen.[34] We agree with this view and have revised our approach to take account of more historical data. This is discussed in section 3.2.2.

[34] Origin Energy submission, January 2014, p 2; AGL submission, January 2014, p 1.

1.5kw PV units or a range of PV units sizes

AGL supported continuing to use the most common PV unit size, but queried whether the 1.5 kW unit is still the most common unit size as anecdotally larger units are being installed.[35] However, both EnergyAustralia and Origin Energy put forward the view that using a range of PV unit sizes is more representative of the market.[36] We made a final decision to use a random sample of PV unit sizes in our analysis rather than 1.5kW units only. In our view, this approach is preferred because it is more representative of the range of different unit sizes that PV customers have installed. More information on the range of PV unit sizes included in our analysis is provided in Frontier's report.[37]

Exports from gross and/or net metered customers

In their submissions to our issues paper, retailers expressed differing views on the use of a gross or net metered solar export profile in our analysis.

AGL supported the continuation of using the net profile to estimate the wholesale market value because previously Frontier found little difference between values based on gross and net profiles.[38] The Solar Energy Industries Association Inc submitted that it makes sense to use net meters now that this is what most customers are installing.[39] Origin Energy submitted that the net metered profile is more appropriate because it better reflects the physical flow of electricity. Even though gross metered customers 'export' all electricity their PV unit generates, typically much of this flows straight back into the customer's consumption meter and is not physically exported to the grid.[40]

In contrast, EnergyAustralia put forward the view that both gross and net profiles be used with the results applying to the PV customers they relate to.[41] For example, it submitted that gross profiles should be used for the retailer contribution because most customers in the Solar Bonus Scheme have gross meters. Similarly, net profiles should be used for the benchmark range as most customers outside the Solar Bonus Scheme have net meters.

We agreed with EnergyAustralia and made our draft decisions on the benchmark range using the net metered solar export profile and the retailer contribution using the gross metered solar export profile. While the physical flow of electricity may not be very different between gross and net metered customers, the metering and settlement arrangements are different. Therefore, by using both gross and net profiles, our decisions on the benchmark range and retailer

35 AGL submission, January 2014, p 1.
36 EnergyAustralia submission, January 2014, p 3; Origin Energy submission, January 2014, p 2.
37 Frontier Economics, *Market value of solar PV exports – A final report prepared for IPART*, June 2014, pp 3-4.
38 AGL submission, January 2014, p 1.
39 Solar Energy Industries Association Inc submission, January 2014, p 2.
40 Origin Energy submission, January 2014, p 2.
41 EnergyAustralia submission, January 2014, p 3.

contribution can more closely capture these arrangements. (See Appendix B for more information on PV customers' metering arrangements.) Retailers generally supported our approach for the draft decision.

However, Origin maintained its view that the net metered profile should be used to determine both the retailer contribution and the benchmark range. It submitted that the costs that a retailer avoids as a result of a customer's solar PV generation is a result of electricity exported to the grid, which is captured under the net metered profile.[42]

We have considered Origin's submission with respect to using the net metered profile for the retailer contribution, but decided to continue to use the gross metered profile. This is primarily because the retailer contribution relates to the financial benefit that retailers receive from customers under the Solar Bonus Scheme, and these customers mostly have gross meters. We consider that the retailer's avoided purchases from the wholesale market will be the total, gross-metered, PV generation. For example, assume customers A and B have identical electricity consumption, but customer B also has PV exports on a gross meter. In both cases, a retailer will collect the same retail bill from customer A and B. However, customer B also exports all electricity that is generated on the gross meter. Therefore, the financial benefit for the retailer as the result of a PV customer with a gross meter will be customer B's total PV exports measured under a gross profile.

Half-hourly spot prices

In NSW, the spot electricity price is referenced to the NSW regional reference node (RRN). Half-hourly spot prices for the NSW RRN are publicly released by AEMO. Frontier used this public information to obtain historical spot prices for each half-hour.[43]

Loss factors

The wholesale market value of PV exports includes the value of energy losses. This reflects the fact that PV exports tend to be consumed close to where they were injected into the grid, and therefore benefit from favourable loss factors. We used transmission and distribution loss factors applicable to the Ausgrid network area (6.47%) from our 2013 electricity determination.[44]

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42 Origin Energy submission, May 2014, p 2.

43 Frontier Economics, *Market value of solar PV exports – A final report prepared for IPART*, June 2014, p 8.

44 IPART, *Review of regulated retail prices and charges for electricity – From 1 July 2013 to 30 June 2016 – Final Report*, June 2013, p 87.

NEM fees

Having further considered the PIAC's submission to our draft report,[45] we agree that we should include in the wholesale market value an amount for a retailer's avoided NEM (market) fees. Retailers pay NEM fees, which include market fees and ancillary charges based on the amount of electricity they purchase from the NEM. Because these charges are levied on retailers' net purchases as measured by the AEMO, they avoid having to pay these costs for the amount of electricity their customers export to the grid. NEM fees are very small compared to the other costs of supply, so avoiding them provides a small financial gain to retailers, which approximately amounts to 0.1 c/kWh. Avoided NEM fees were included in our previous 'direct financial gains to retailers' approach.

3.2.2 Approach used to estimate the wholesale market value

The approach Frontier used for estimating the wholesale market value is outlined in detail in its report.[46] In summary, this approach draws on historical PV export and spot price data to simulate a large number of possible outcomes for the wholesale market value in 2014/15.[47] This approach means that there is reduced reliance on the outcome from a single historical year (as has been the case in our previous solar determinations). We consider that by taking account of more historical data the wholesale market value methodology is more robust this year.

We also asked Frontier Economics to examine how wholesale market values might change depending on the time of day. To do this Frontier looked at wholesale market values over 2-hour blocks of the day. It then estimated the wholesale market value for the 2-hour 'period of highest value', and for all 'other periods'. The purpose of this analysis was to gain a better understanding of the potential value of PV exports and how this varies according to the time of day of export.[48]

45 Public Interest Advocacy Centre submission, May 2014, p 5.

46 Frontier Economics, *Market value of solar PV exports – A final report prepared for IPART*, June 2014.

47 In particular, the outcomes are expressed in terms of a 'solar premium', which is the ratio of the PV export weighted price to the time weighted price. The wholesale market value ($/MWh) is estimated by multiplying the solar premium by the forecast time weighted average spot price in 2014/15 and multiplied again by (1 + the loss factor).

48 Frontier Economics, *Market value of solar PV exports – A final report prepared for IPART*, June 2014, pp 18-21.

3.3 Frontier's estimate of the wholesale market value in 2014/15 in more detail

Frontier's estimates of the wholesale market value are summarised in Table 3.2 below. They include estimates of the average market value across all times, as well during the period of highest value (3pm to 5pm) and other periods.

Table 3.2 Estimated wholesale market values ($2014/15, c/kWh)

	2013/14	2014/15	
		Gross profiles	Net profiles
All times	8.5	6.0	5.6
Period of highest value (3-5pm)		10.0	9.3
Other periods (excluding 3-5pm)		5.1	4.9

Note: The wholesale market value in 2013/14 was based on net metered 1.5kW PV units only. The estimates for 2014/15 are based on median values.

Source: Frontier Economics.

The wholesale market values under gross and net profiles are fairly similar. These profiles produce slightly different results because they have different 'shapes'. A gross profile will reflect all generation from the PV unit (ie, all generation is 'exported'). Under a net profile, there are exports only when, at any point in time, generation exceeds the customers' consumption. The wholesale market value is slightly higher under the gross metered profile. As Frontier noted in its report, gross profiles tend to export more in the afternoon when spot prices are higher.[49]

The values for 2014/15 in Table 3.2 are around 0.2c/kWh lower than in our draft decision. This reflects:

- updated ASX Energy market prices (as discussed in section 3.1, these were around 5% lower than in our draft decision)
- updated analysis from Frontier Economics (in particular the Monte Carlo simulation modelling)
- the inclusion of a value for avoided NEM fees (adding around 0.1c/kWh).

[49] Frontier Economics, *Market value of solar PV exports – A final report prepared for IPART*, June 2014, pp 13-14.

Frontier found that the 'all-times' wholesale market values in 2014/15 are lower than estimated for 2013/14. This is mainly due to a relatively weaker wholesale price forecast in 2014/15, which is related to the market's expectations of the carbon price repeal.[50] Currently, market prices incorporate a high probability that the carbon pricing mechanism will be repealed in 2014/15.

Frontier also found that the period in which the value of PV exports was highest was between 3pm to 5pm. Note that this is not the time when most PV exports occur, but it is the time when PV exports are most valuable. During this 'period of highest value', forecast wholesale market values for 2014/15 are almost twice as high as in 'other periods'.[51]

Please note that this information is provided to assist both retailers and customers. It can assist retailers in designing innovative feed-in tariffs and can assist customers in understanding the potential value of their PV exports. While our analysis focuses on 2-hour blocks for the value of PV exports, we are not suggesting that the design of solar feed-in tariffs should necessarily reflect this approach: retailers are best-placed to design feed-in tariffs that meet the needs of their customers.

In response to Mr. Russell's submission (discussed in section 2.3.3), we have conducted additional analysis and estimated ranges for the values of solar PV exports using the 2pm to 8pm peak period for both gross and net metered profiles. For the upper end of the range, we calculated the wholesale market value based on the solar premiums during the 2pm to 8pm peak period. For the lower end of the range, we calculated the wholesale market value based on the solar premiums at all other times of day.

Table 3.3 shows that using the 2pm to 8pm peak period reduces the estimated values of solar PV exports for both gross and net metered profiles. The upper end of both ranges is lower because the 'solar premiums' during 2pm to 8pm are lower compared to those during 3pm to 5pm.

Table 3.3 Estimated values of solar PV exports with different peak periods ($2014/15, c/kWh)

	2-8pm peak period	3-5pm peak period (IPART's approach)
Based on net meters	4.5 – 7.6	4.9 – 9.3
Based on gross meters	4.6 – 8.2	5.1 – 10.0

Note: The estimates for 2014/15 are based on median values.

Source: Frontier Economics.

50 Frontier estimated a time weighted average spot price of $36.32 ($2014/15) in 2014/15 which is lower than last year's forecast for 2013/14 of $54.89 ($2013/14).

51 Frontier Economics, *Market value of solar PV exports – A final report prepared for IPART*, June 2014, pp 20-21.

As discussed in section 2.3.4, we have decided not to base our final decisions on the estimates in Table 3.3. This is presented for information only.

3.4 Final decision on the benchmark range and retailer contribution

Based on the estimated value of PV customer exports discussed above, we have made final decisions on the benchmark range and retailer contribution, shown in Table 3.4.

Table 3.4 Final decision on solar feed-in tariffs 2014/15 ($nominal, c/kWh)

	2013/14	2014/15 (Draft decision)	2014/15 (Final decision)
Benchmark range	6.6 – 11.2	5.0 – 9.6 (median 5.8)	4.9 – 9.3 (median 5.6)
Retailer contribution	6.6	5.3	5.1

3.4.1 Benchmark range

Our final decision on the benchmark range for 2014/15 includes the upper and lower bounds of the range for the wholesale market value method based on **net** metered customers. This is because the benchmark range is most relevant to customers with net meters.

This decision also incorporates the wholesale market value of PV exports during their highest value period (upper bound of the range) and outside this period (lower bound of the range). We consider that by setting the benchmark range this way we are having more regard to the value of PV exports at the time of day of export, as required by our revised terms of reference. However, we have also set a single range so that it is simple for customers to understand. Note that a single (all-time) solar feed-in tariff would be most closely represented by the median value in the benchmark range (5.6 c/kWh).

While our approach for setting the benchmark range is consistent with our draft decision, it has changed since our 2013/14 decision. Last year we set the benchmark range using 2 methods (the wholesale market value and the direct financial gains to retailers) and we did not estimate the wholesale market value of PV exports at different times of day.

3.4.2 Retailer contribution

Our final decision on the retailer contribution is in line with the lower bound of the range for the wholesale market value based on **gross** metered customers. This is because the retailer contribution relates to customers under the Solar Bonus Scheme who mostly have gross meters. This approach is consistent with our draft decision, but a change from 2013/14 where we set the retailer contribution using the lower bound of the direct financial gains to retailers method. We have been conservative using the low end of the range because this does not financially disadvantage Solar Bonus Scheme customers (ie, they still receive either 20c or 60c/kWh) and ensures that a competitive market remains for these customers.

Appendices

A Terms of reference

Investigation and determination by IPART of a retailer benefit component and benchmark range for feed-in tariffs

Reference to IPART under section 43ECA of the *Electricity Supply Act 1995*

I, Anthony Roberts, Minister for Resources and Energy, refer to the Independent Pricing and Regulatory Tribunal (IPART) under section 43ECA of the *Electricity Supply Act 1995* (the Act) for investigation and determination:

1) The component payable by a retailer to a customer for electricity produced by a complying generator and supplied to the distribution network by a customer under the Solar Bonus Scheme (the retailer contribution); and

2) The voluntary benchmark range for solar feed-in tariffs paid by retailers for electricity produced by complying generators and supplied to the distribution network (the voluntary benchmark range).

Conduct of investigation

In conducting this investigation IPART is to consider the following key parameters:

- there should be no resulting increase in retail electricity prices;
- the benchmark range should operate in such a way as to support a competitive electricity market in NSW; and
- the determination should be broadly in conformance with the *Revised National Principles for Feed-in Tariff Arrangements*.

In making the determination on the retailer contribution and benchmark range, IPART should take into account the wholesale market value of the photovoltaic exports at the time of day of export. The value estimated should reflect the subsidy-free value of photovoltaic exports to a retailer.

Reporting

IPART is to report the feed-in tariff offered by each retailer at the time of writing its report and to note whether that tariff was within the benchmark for the preceding financial year.

Consultation

In making its determination on both the retailer contribution and the benchmark range, IPART may consult on any matter that it regards as material.

Timing

IPART is to complete the investigation and provide its determination in June 2014 or as soon as practicable afterwards.

Definitions

"Solar Bonus Scheme" means the Scheme established under s.15A of the *Electricity Supply Act 1995*.

B More information on PV customers

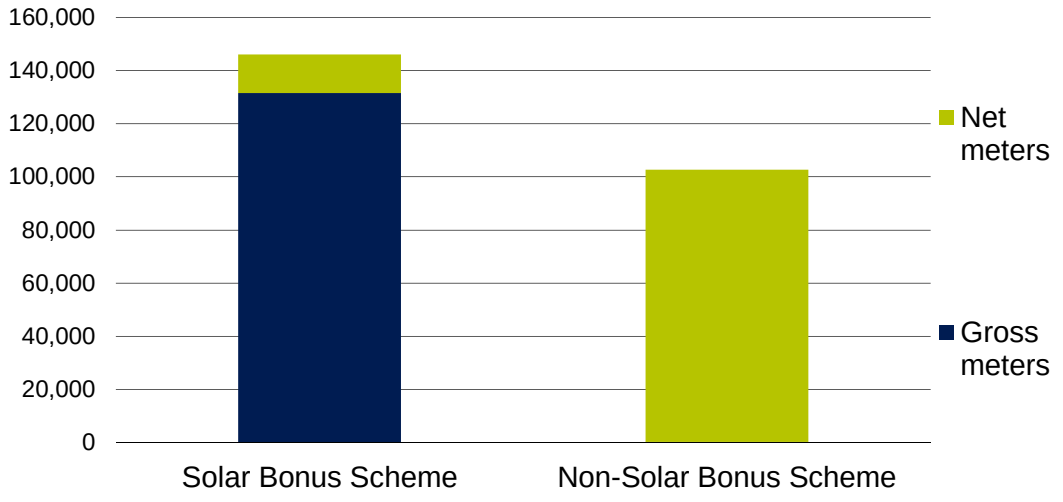
In this Appendix we provide some additional information about PV customers.

B.1 Number of PV customers and their metering arrangements

Under the NSW Solar Bonus Scheme, more than 145,000 PV customers currently receive a subsidised feed-in tariff of either 20 or 60 cents per kilowatt hour (c/kWh) for electricity exported to the grid. Another 100,000 PV customers, who are not part of this scheme, may receive unsubsidised feed-in tariffs in the competitive retail electricity market.

Figure B.1 shows that most Solar Bonus Scheme customers have gross meters, while PV customers not part of this scheme have net meters.

Figure B.1 Number of PV customers (as at March 2014)



Data source: NSW Trade and Investment.

Under gross metering arrangements, all the electricity generated by the customer is measured independently from all the electricity consumed in the customer's premises. The customer earns the applicable feed-in tariff for all the electricity they generate, and pays the applicable retail price for all the electricity they consume.

Under net metering arrangements, the electricity generated by the customer that is exported to the grid and the electricity consumed by the customer that is imported from the grid are independently measured. The electricity generated and consumed in the customer's premises at the time of generation is not metered, and the customer pays nothing for this electricity. Whenever generation exceeds the customer's demand at a point in time, the excess amount is exported to the grid, and the customer may earn an unsubsidised feed-in tariff

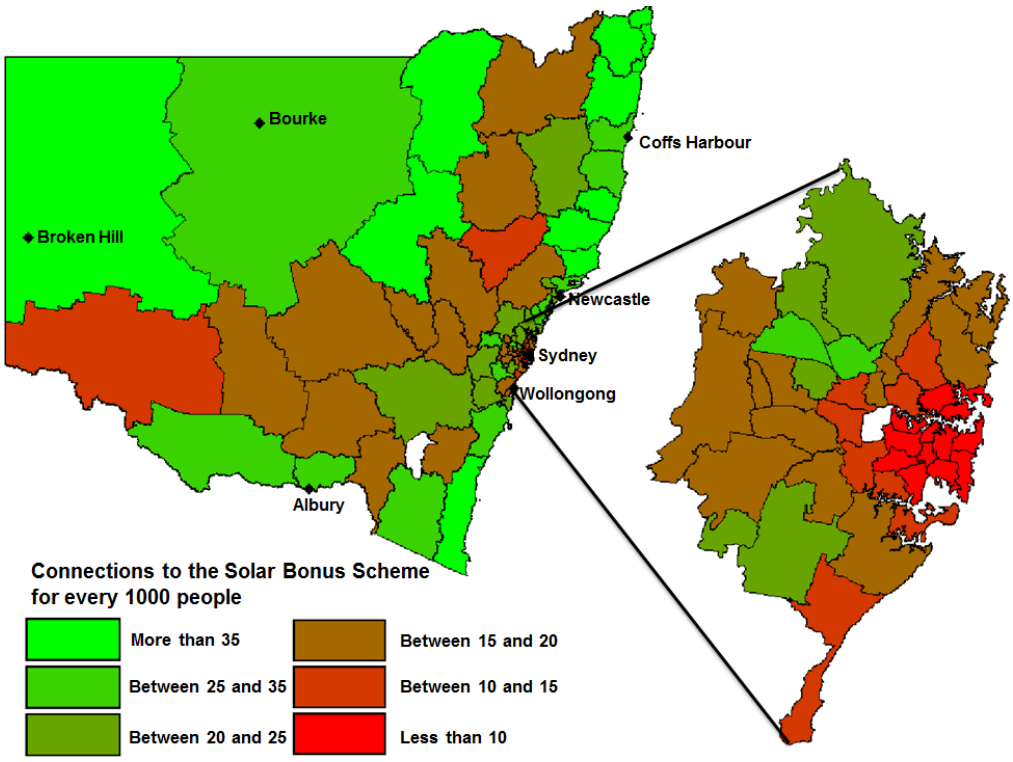
for this exported electricity (if offered by their retailer). Whenever the electricity being generated is insufficient to meet this demand, the extra electricity required is imported from the grid, and the customer pays the applicable retail price for this imported electricity.

Solar Bonus Scheme customers tended to install gross meters because their subsidised feed-in tariff is either higher than or similar to the retail price they pay for electricity. This means they are financially better off with a gross meter. In contrast, the vast majority of PV customers who are not eligible for the scheme have net metering arrangements. These customers are financially better off under these arrangements. This is because the unsubsidised feed-in tariff they can potentially earn is much lower than the retail price they pay for electricity.

B.2 Where are Solar Bonus Scheme customers located?

Using data provided by NSW Trade and Investment, we can create a visual representation of where Solar Bonus Scheme customers are located (based on their postcode). Figure B.2 shows the proportion of connections to the Solar Bonus Scheme per 1,000 head of population.

Figure B.2 Location of Solar Bonus Scheme customers



Data source: NSW Trade and Investment.

In Figure B.2, green areas have a higher concentration of scheme connections. Generally, the highest concentrations are either along the coast or well-inland. Not surprisingly, the concentration of Solar Bonus Scheme connections is not as high in inner city areas as a large proportion of the population live in apartments (and therefore cannot have solar PV units).

Figure B.2 should be considered as indicative only. To create this figure we converted data from postcodes to Australian Bureau of Statistics (ABS) statistical regions.[52] Where postcodes cross regions, we have assigned the number of solar connections by weight of population, which may not correspond exactly to the locations of the connections. As a result, there may be cases where solar connections are attributed to the incorrect region.

B.3 Average PV unit size

The average PV unit size for customers in the Solar Bonus Scheme is around 2.3kW (based on generator capacity).

However, as at March 2014, the average PV unit size for customers outside the Solar Bonus Scheme is around 3.1kW. This suggests that since the Solar Bonus Scheme closed, customers have been installing larger systems. The analysis in this report uses a range of different PV unit sizes. More information about this range is provided in Frontier's report.[53]

52 In particular, Statistical Area 3 (SA3). For more information on ABS statistical regions see www.abs.gov.au.

53 Frontier Economics, *Market value of solar PV exports – A final report prepared for IPART*, June 2014.

C Revised National Principles for Feed-in Tariff Arrangements

Council of Australian Governments Meeting
Canberra, 7 December 2012
National Principles for Feed-in Tariff Arrangements

Micro generation to receive fair and reasonable value for exported energy

1. Governments agree that residential and small business consumers with grid connected micro generation[54] should have the right to export energy to the electricity grid and market participants should provide payment for exported electricity which reflects the value of that energy in the relevant electricity market and the relevant electricity network it feeds in to, taking into account the time of day during which energy is exported.

Any premium rate to be jurisdictionally determined, transitional and considered for public funding

2. That any jurisdictional or cooperative decisions to legislate rights for micro generation consumers to receive more than the value of their energy must:

    a) be a transitional measure (noting that a national emissions trading system will provide increasing support for low emissions technologies), with clearly defined time limits and review thresholds and be closed to new participants by 2014;

    b) for any new measures, or during any reviews of existing measures, undertake analysis to establish the benefits and costs of any subsidy against the objectives of that subsidy (taking into account other complementary measures in place to support micro generation consumers);

    c) give explicit consideration to compensation from public funds or specific levies rather than cross-subsidised by energy distributors or retailers; and

    d) not impose a disproportionate burden on other energy consumers without micro generation.

SCER to ensure fair treatment of micro generation

3. That the Standing Council on Energy and Resources (SCER) should maintain regulatory arrangements for micro generation customers, consistent with the objectives of the relevant electricity legislation, whereby the:

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54 These national principles apply to grid connected micro generation compliant with the relevant Australian Standard (AS4777).

a) terms and conditions for compliant micro generation customers should be incorporated into the regulation of the minimum terms and conditions for retail contracts such that they are no less favourable than the terms and conditions for customers without micro generation;

b) connection arrangements for micro generation customers should be standardised and simplified to recognise the market power imbalance between micro generation customers and networks; and

c) assignment of network tariffs to micro generation consumers should be on the basis that they are treated no less favourably than customers without micro generation but with a similar load on the network.

FiT policy to be consistent with previous COAG agreements (particularly the Australian Energy Market Agreement and COAG complementary principles)

4. That the arrangements for micro generation consumers by SCER and jurisdictions:

   a) should not deter competition for their business from electricity retailers in jurisdictions where there is full retail contestability and innovation in the tariff offerings available to micro generation customers;

   b) in relation to jurisdictions in the National Electricity Market (NEM), should not interfere with the regulation of distribution tariffs or operation of the NEM under the National Electricity Law or duplicate the regulatory arrangements that are part of that Law;

   c) should be subject to independent regulatory oversight according to clear principles; and

   d) should be consistent with implementation of other intergovernmental agreements relating to energy, competition policy or climate change.

D Additional analysis on solar PV market offers

We have undertaken analysis of market offers available to solar PV customers. In summary, it demonstrates that:

- feed-in tariffs should not be considered in isolation, but rather as part of an overall electricity package
- the electricity market offers with the highest feed-in tariff do not necessarily provide the best overall deal for PV customers
- the overall benefits for PV customers depend on their electricity consumption and export patterns, in addition to feed-in tariffs.

The analysis in this Appendix relies on several assumptions which are outlined below. The results will change if these assumptions change. The analysis should not be considered financial advice and customers should undertake their own research before taking up a market offer.

Sample

We have assessed different electricity offers available to PV customers in the Ausgrid network area in NSW. In total, there were 29 electricity contracts (either market or regulated offers), and 24 of these electricity contracts provided voluntary feed-in tariffs.[55] These contracts were obtained using a postcode of 2048 and assuming a household of 3 people with a single rate tariff. Based on this postcode and household size, the EnergyMadeEasy website estimates an annual bill cost using average consumption of 6,399 kWh per annum. Where a retailer offers multiple electricity contracts with different estimated annual costs, we have selected the contract with the lowest total estimated annual cost including all available discounts. In total, our sample includes 10 electricity contracts from 10 different electricity retailers.

Methodology

Our aim is to estimate a total annual electricity bill after taking into account all usage discounts and solar feed-in tariffs. To do this, we have first estimated the effective average usage charge for each retailer as the total annual bill including all discounts less total annual supply charge divided by annual consumption of 6,399 kWh. For simplicity, we assume that the effective average usage charge is the single rate at which the total bill saving is calculated.[56]

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55 These offered were available on 12 June 2014.

56 Each retailer provides different usage charges for different consumption levels. Hence for simplicity we have estimated the effective average usage charge using the estimated total annual costs including all discounts and excluding the annualised daily supply charge, rather than using actual usage charges.

IPART's 2012 Solar Review found that an average solar PV customer with a 1.5kW unit generates 1,882 kWh per annum, consumes 65% of her/his total generation onsite and exports the remaining 35%.[57] Given this information, we have estimated an expected total annual bill as:

> Expected total annual bill for an average PV customer = Annual bill including all discounts – (Total bill savings by consuming 65% of the total PV generation + Total gain by exporting the remaining 35%)

Results and conclusion

Table D.1 shows estimated bills for an average PV customer based on each retailer's electricity contract and voluntary feed-in tariff. In the last 4 columns of the table, the values in brackets show rankings based on the voluntary feed-in tariffs and the estimated bills for an average PV customer assuming different consumption and solar PV export patterns. We find that:

- **An electricity contract with a higher feed-in tariff does not necessarily deliver a better value to solar PV customers**. For example, for an average PV customer who consumes 65% of PV generation and exports the rest, the electricity contract from Retailer B with a zero feed-in tariff is a better offer than that from Retailer F which offers an 8 cent feed-in tariff. This is because Retailer B has a relatively lower average effective usage rate.
- **Solar PV customers' electricity consumption and export patterns also affect the overall benefits to solar PV customers.** For simplicity, we have assumed 2 scenarios where (i) a PV customer consumes all PV generation on site and (ii) a PV customer exports all PV generation. In the first scenario, the best electricity contract in this sample for an average PV customer is provided by Retailer A, which offers lower feed-in tariffs than most other retailers, and Retailer B, which does not offer a feed-in tariff. In the second scenario, the best electricity contract in this sample is provided by Retailer A, and the next best contract is provided by Retailer D which offers the highest feed-in tariff.

57 IPART, *Solar feed-in tariffs – Setting a fair and reasonable value for electricity generated by small-scale solar PV unites in NSW – Final Report,* March 2012, pp 32, 36.

Table D.1 Sample of electricity contracts available to PV customers in the Ausgrid network area in NSW as at 12 June 2014

Retailer	Estimated annual cost excluding discounts	Estimated annual cost including all discounts (ranking)	Daily supply charge (cents/day)	Effective usage charge (cents/kWh)[a]	Voluntary feed-in tariff in cents/kWh (ranking)	Estimated bills for an average PV customer (ranking)[b]		
						Consume 65% Export 35%	Consume 100%	Export 100%
A	$2,077	$1,808 (1)	78.10	23.80	6.0 (7)	$1,477 (1)	$1,360 (2)	$1,695 (1)
B	$2,077	$1,808 (1)	78.09	23.80	0.0 (9)	$1,517 (2)	$1,360 (1)	$1,808 (6)
C	$2,077	$1,869 (3)	78.10	24.75	5.0 (8)	$1,533 (3)	$1,403 (3)	$1,775 (3)
D	$2,077	$1,931 (4)	78.10	25.72	10.0 (1)	$1,550 (4)	$1,447 (5)	$1,743 (2)
E	$2,033	$1,932 (5)	76.46	25.83	6.6 (6)	$1,573 (5)	$1,446 (4)	$1,808 (5)
F	$2,077	$1,951 (6)	78.10	26.03	8.0 (2)	$1,580 (6)	$1,461 (6)	$1,800 (4)
G	$1,987	$1,987 (7)	78.10	26.60	0.0 (9)	$1,662 (10)	$1,486 (7)	$1,987 (10)
H	$1,987	$1,987 (7)	78.10	26.60	7.7 (4)	$1,611 (7)	$1,486 (7)	$1,842 (7)
I	$2,076	$2,013 (9)	78.10	27.00	8.0 (2)	$1,630 (8)	$1,505 (9)	$1,862 (8)
J	$2,139	$2,028 (10)	80.30	27.11	7.7 (4)	$1,646 (9)	$1,518 (10)	$1,883 (9)

a Effective usage charge = [Annual cost including all discounts – (Daily supply charge x 365)] ÷ 6,399kWh.

b Estimated bills for an average PV customers are calculated assuming different consumption/PV export patterns and that consumers take advantage of all possible discounts (ie, non-conditional and conditional discounts such as paying on time and direct debit discount).

Note: These bill estimates and supply charges are taken directly from the report generated from the EnergyMadeEasy website based on the assumptions described in Appendix D. The results will change if these assumptions change. The analysis should not be considered financial advice and customers should undertake their own research before taking up a market offer.

Source: EnergyMadeEasy accessed 12 June 2014.