IPART
New South Wales

Independent Pricing and Regulatory Tribunal

Solar feed-in tariffs

Setting a fair and reasonable value for electricity generated by small-scale solar PV units in NSW

Energy — Issues Paper
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ISBN 978-1-921929-28-1 DP136

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Invitation for submissions

IPART invites written comment on this document and encourages all interested parties to provide submissions addressing the matters discussed.

Submissions are due by 12 September 2011.

We would prefer to receive them by email <ipart@ipart.nsw.gov.au>.

You can also send comments by fax to (02) 9290 2061, or by mail to:

Solar feed-in tariffs
Independent Pricing and Regulatory Tribunal
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We may choose not to publish a submission—for example, if it contains confidential or commercially sensitive information. If your submission contains information that you do not wish to be publicly disclosed, please indicate this clearly at the time of making the submission. IPART will then make every effort to protect that information, but it could be disclosed under the *Government Information (Public Access) Act* 2009 (NSW) or the *Independent Pricing and Regulatory Tribunal Act* 1992 (NSW), or where otherwise required by law.

If you would like further information on making a submission, IPART's submission policy is available on our website.

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1 Introduction

Renewable energy sources, including small-scale solar photovoltaic (PV) panels, are part of Australia's energy future. The Federal, State and Territory governments have provided generous subsidies to encourage small electricity customers[1] to install these panels. Where such customers are connected to the grid, the electricity they produce can be used to meet their own energy needs and, when it exceeds these needs at particular times, exported to the grid.

Customers installing solar PV panels have had access to both Federal and State subsidies. Under the Renewable Energy Target scheme (RET scheme), the Federal Government provides a one-off subsidy at the time of installation.[2] State governments have provided subsidised feed-in tariffs to pay customers for the electricity their PV unit generates (or exports). Under the NSW Government's Solar Bonus Scheme, participating customers receive a gross feed-in tariff set at either 60c or 20c per kWh of electricity generated, depending on when they joined the scheme.[3]

The combination of these subsidies and the falling capital costs of installing solar PV panels promoted a rapid uptake of installations, particularly in NSW and Queensland. Nearly 140,000 small-scale PV units have been installed in NSW since the RET scheme commenced – the largest number of all the states and territories (Figure 1.1). This includes more than 300 MW of generation capacity installed under the Solar Bonus Scheme.[4]

However, the generosity of the subsidies and the higher than expected uptake of solar PV have resulted in much higher than anticipated costs to governments and electricity retailers. These higher costs have contributed to the recent rises in electricity prices from 1 July 2011 and increased the burden on taxpayers.

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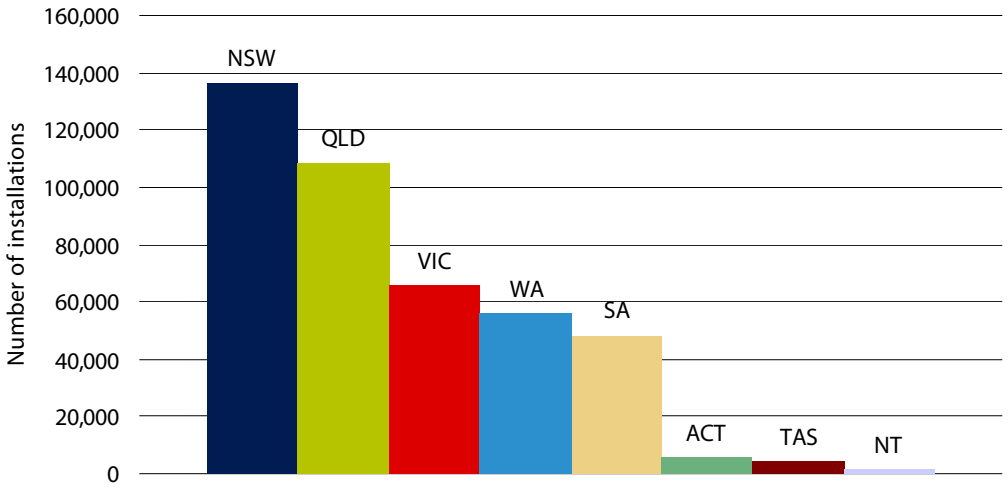
1 Household and small business customers that consumer less than 160 MWh of electricity per year.

2 The RET provides an up-front subsidy to customers installing solar PV units by allowing them to create renewable energy certificates based on the amount of renewable energy their solar PV units can produce. The Federal Government also applies a Solar Credit Multiplier which allows more certificates to be created than renewable energy produced by the units.

3 The eligibility for the 60 c and 20 c/kWh feed-in rates is determined by the date of applying for connection to the distribution network.

4 Advice provided by the Department of Investment & Trade, Regional Services & Infrastructure, 10 August 2011.

Figure 1.1 Number of PV installations under the Renewable Energy Target



Note: Number of units installed to 4 July 2011 that resulted in the creation of at least 1 renewable energy certificate under the Federal Government's Renewable Energy Target scheme.

Data source: ORER, data provided 14 July 2011.

In light of these costs, the NSW Government closed the Solar Bonus Scheme to new participants on 1 July 2011.[5] In addition, it asked the Independent Pricing and Regulatory Tribunal of NSW (IPART) to review certain other actions it might take to stem the costs arising from the installation of small-scale PV units in NSW and their impact on electricity prices and taxpayers, while continuing to support a sustainable solar PV industry in NSW.

1.1 What has IPART been asked to do?

IPART's terms of reference for this review (see Appendix A) ask us to complete 2 tasks. The first task relates to establishing a future feed-in tariff that is for customers who **are not** participants in the Solar Bonus Scheme, and are **not** subsidised by the Government or other customers. We are to review and recommend:

- a 'fair and reasonable value' for the electricity generated by small-scale solar PV units and exported to the grid, which is consistent with the Council of Australian Government (COAG) principles for feed-in tariffs
- how this value should be implemented in NSW – for example, whether it should be used to set a minimum feed-in tariff that all retailers must pay for the solar-generated electricity their customers export to the grid, or a benchmark price that retailers and customers can use as a guide in negotiating a price for this electricity

5 However, it will continue to pay the relevant gross feed-in tariff to participants who joined the scheme prior to that date until the scheme ceases to operate, in 2016.

- whether comprehensive network system modelling is required to value the impact of small-scale solar PV on network costs.

The second task relates to mitigating the ongoing costs of the Solar Bonus Scheme to the Government and taxpayers over the remaining 5 years of the scheme's life. While the Solar Bonus Scheme is closed to new participants, it will continue to operate and generate costs until 31 December 2016. We are to investigate the level of contribution retailers could be required to make towards these costs, to reflect the benefit they currently receive from the scheme, due to metering and payment arrangements. Please note that we **will not** review or make recommendations about the statutory feed-in tariffs paid to participants in this scheme.

1.2 How do we propose to approach this task?

In undertaking the first task of the review, we propose to calculate the value of the electricity produced by small-scale solar PV units using 2 methods:

1. By estimating the **financial gain** to retailers if they were to pay no feed-in tariff to customers for the electricity these units export to the grid. For those retailers whose customers export electricity, this financial gain occurs due to the difference between the revenues the retailers collect from their customers and the costs that they face in supplying their customers.
2. By estimating the **wholesale market value** of the electricity these units export to the grid (including energy losses).

We will consider and consult on the impact of small scale solar PV, if any, on the costs of distribution networks to the extent necessary to make recommendations as to whether comprehensive network system modelling is warranted.

We will then consider the results of the above calculations and consultations, and each of the matters set out in the terms of reference, to determine the most appropriate 'fair and reasonable value' for a future feed-in tariff.

In undertaking the second task, we propose to estimate the financial gain to retailers whose customers are participants in the Solar Bonus Scheme, in a similar manner to the first approach that we are taking to establishing a future feed-in tariff.

1.3 How and when can you provide input into the review?

As is IPART's usual practice, we will conduct this review as a public process. We invite all interested parties to make written submissions in response to this Issues Paper by 12 September 2011. You may comment on some or all of the issues raised in the paper, as well as other issues that you consider relevant to our terms of reference. After considering all submissions, we will release a draft report by the end of November and call for further submissions. We will then release our final report in April 2012.

In addition, we will send information requests to the NSW electricity distributors and retailers, to obtain information on the production and consumption profiles of customers with solar PV panels. We will also seek information from the distributors on the impact of solar PV generation on network costs. We invite other stakeholders with relevant information to provide it to IPART for our consideration.

Table 1.1 sets out our proposed timetable for the review.

Table 1.1 Timetable for review

What	When
Release Issues Paper	11 August 2011
Submissions due	12 September 2011
Release draft report	End November 2011
Public forum	Early December 2011
Submissions due	End January 2012
Release final report	Early April 2012

1.4 What does the rest of this report cover?

To assist you in making your submissions, the rest of this paper provides more information about the review, and identifies and discusses the issues on which we particularly seek stakeholder comments. It is structured as follows:

- Chapter 2 provides the context for the review, including an overview of the Solar Bonus Scheme and the current arrangements for customers who install solar PV units outside of this scheme
- Chapter 3 discusses the issues involved in determining a fair and reasonable value for the electricity generated by small-scale solar PV units and exported to the grid
- Chapter 4 discusses the issues involved in deciding how best to implement a feed-in tariff based on this fair and reasonable value
- Chapter 5 focuses on the contribution retailers might be required to make to the costs of the Solar Bonus Scheme for existing participants.

1.5 List of issues on which we seek comment

As noted above, the following chapters identify the issues on which we particularly seek comment. For convenience, a full list of these issues (and the page on which they appear) is set out below.

Estimating the financial gain to the retailer

1 What are the direct financial gains to retailers as a result of their solar PV customers exporting electricity to the grid? 23

2 Do retailers pay for the cost of complying with the RET on electricity exported by solar PV customers? 23

3 Are there other indirect financial gains to retailers as a result of their solar PV customers exporting electricity to the grid? If so, how can these be estimated? Should these indirect financial gains be fully reflected in the feed-in tariff or shared with all electricity customers? 23

4 Are there additional costs to retailers associated with serving PV customers? 23

5 Are there alternative approaches to estimating the financial gain to retailers as a result of their solar PV customers exporting electricity to the grid? 23

Estimating the wholesale market value of solar PV electricity

6 What is the most appropriate approach to estimating the market value of the electricity exported by solar PV customers to the grid? What are the key issues that need to be considered? 25

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8 How can any network benefits resulting from solar PV generation be shared with solar PV customers? 28

9 How should any value from reduced energy losses as a result of solar PV generation be estimated? 29

10 If the value of reduced energy losses is material, should it be shared with solar PV customers? If so, how could this be achieved? 29

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11 What are the implications of setting the feed-in tariff too high or too low? What is the most appropriate way of managing this risk? 30

Assessing retail market competition

12 Is our proposed approach for analysing the effectiveness of retail market competition appropriate for this review? Are there any other factors we should consider? 34

13 Are there any barriers (or emerging barriers) to entry that may limit the potential for competition in the NSW retail electricity markets, particularly in relation to solar PV customers? 34

14 Are there any other developments that may affect the competitiveness of the retail electricity market in NSW? 34

15 Has there been any change in the types of customers being offered competitive contracts? Is there any evidence to suggest that there are particular groups of customers (particularly solar PV customers) that have been more or less active in the competitive market, such as pensioners? 34

16 What evidence is available on the number of solar PV customers receiving voluntary feed-in tariffs? Does the level of these voluntary feed-in tariffs represent a fair and reasonable value of the electricity exported by solar PV customers? 34

Form of regulation

17 What degree of regulatory intervention is required to ensure solar PV customers receive a fair and reasonable value for the electricity they export to the grid? Are there options (other than those listed in section 4.2) that are more appropriate? 36

18 Should IPART recommend a single year feed-in tariff? If so, how should the feed-in tariff be updated over time? 38

19 Should there be a limit on the size of the customer or solar PV unit that is eligible for this fair and reasonable value? If so, what should this limit be? 38

20 Should there be a single feed-in tariff across NSW or should it vary by distribution network supply area? 40

21 Should there be different feed-in tariffs for different customer types (eg business and residential?) 40

Retailer contribution to the Solar Bonus Scheme

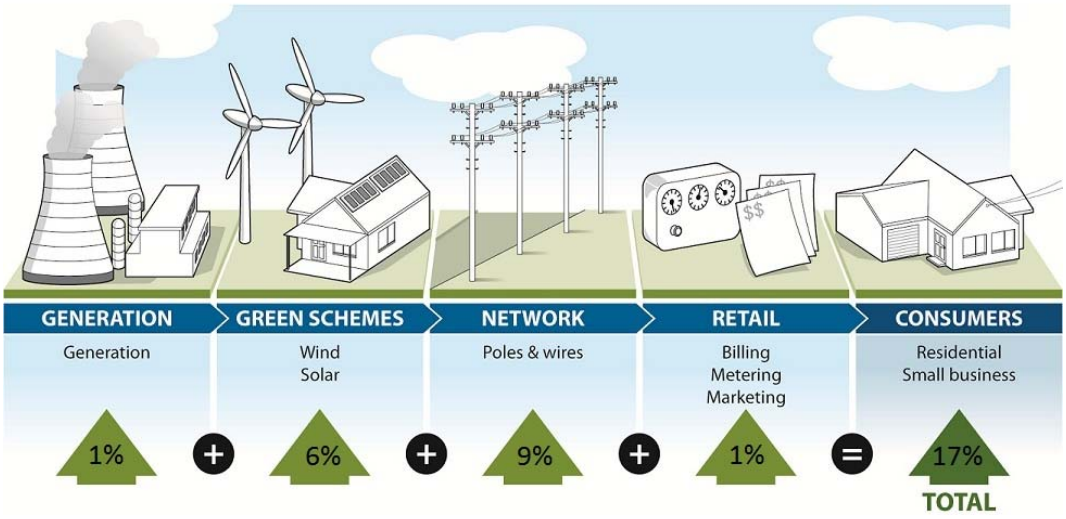
2 Context for this review

As Chapter 1 noted, in recent years, the generous government subsidies to encourage the installation of solar PV units have increased small-scale renewable generation and supported the solar industry. However, they have also resulted in much higher than anticipated costs to electricity retailers and governments. These costs have already increased electricity prices and the burden on taxpayers – and will continue to put pressure on these prices and/or government budgets over the coming years.

For example, on 1 July 2011, regulated retail electricity prices in NSW increased on average by around 17%. One of the main factors driving these increases was the significant increase in the costs retailers incur in complying with government green schemes, especially the Federal Government's RET scheme.[6] As Figure 2.1 illustrates, these costs added 6 percentage points to these prices.

[6] The RET provides an up-front subsidy to customers installing solar PV units by allowing them to create renewable energy certificates based on the amount of renewable energy their solar PV units can produce. Retailers must buy the renewable energy certificates created by customers with solar PV units to meet their obligations under the RET. The cost to the retailers of purchasing these certificates is passed onto customers through higher electricity prices.

Figure 2.1 Contributions from the supply chain to overall electricity price increases on 1 July 2011



Note: Green Schemes include the Federal Government's RET scheme and the NSW Government's Greenhouse Gas Reduction Scheme and Energy Savings Scheme. However it is the changes to the RET scheme that results in additional green costs and higher electricity prices. The generation and retail costs increases are broadly consistent with inflation.

These price increases do not include the costs relating to carbon under the Federal Government's *Clean Energy Future* package. Costs associated with the carbon pricing mechanism will be included in prices from 1 July 2012.

The costs of complying with the NSW Government's Solar Bonus Scheme did not directly contribute to the 1 July 2011 price increases, as the Government has announced it will meet these costs in 2011/12 using uncommitted funds in its Climate Change Fund.[7] However, from 2012/13, these costs will need to be met either through higher electricity prices or be borne by the taxpayer (from consolidated revenue). The Government estimates that the total costs over the life of the scheme will be around $1.44 billion.[8]

These costs, and their future impact on prices and taxes, are key elements of the context for this review. This review will help the NSW Government decide how best it can provide predictability for customers wanting to install small-scale solar PV, while also minimising the impact of the Solar Bonus Scheme and any future feed-in tariff for customers outside this scheme on electricity prices and taxpayers.

7 However the Solar Bonus Scheme alongside other State, Territory and Federal Government subsidies did result in a significant up-take in solar PV and the creation of a significant number of renewable energy certificates. These certificates are purchased by retailers under the RET scheme with the costs passed onto to customers.

8 http://premier.nsw.gov.au/sites/default/files/110608-SBS.pdf

The sections below discuss other important elements of the context for the review, including:

- the Solar Bonus Scheme
- the current arrangements for customers who install solar PV units (PV customers) and are **not** participants in the Solar Bonus Scheme
- the terms of reference for the review, and
- the COAG principles for feed-in tariffs.

2.1 Solar Bonus Scheme

In November 2009, the NSW Government announced that it would provide a subsidised feed-in tariff that applied to the output from eligible small-scale solar PV units and wind turbines from 1 January 2010 to 31 December 2016 under the Solar Bonus Scheme. The goals of this scheme were to:

- provide an additional means of support to PV customers in NSW who wish to generate renewable energy locally
- build the State's green collar jobs sector (eg, service, manufacturing or research and development) by helping solar technology compete with non-renewable energy sources, and
- expand the visibility of renewable energy technologies to help motivate the whole community in responding to climate change.[9]

The Solar Bonus Scheme was open to small retail electricity customers[10] who were connected to the grid, and who produced electricity through solar PV (and wind turbines) with up to 10 kW capacity. PV customers who are participants in the scheme are paid a specified feed-in tariff by their electricity distributor (normally through their electricity retailer) for the electricity produced by their solar PV unit until the scheme ceases. They will continue to be paid this tariff until the scheme ceases on 31 December 2016.

The scheme operates on **gross metering basis**.[11] This means that the electricity produced by participating customers is independently metered, and they are paid the relevant feed-in tariff for **all** the electricity they produce. Participating customers' consumption is also independently metered, and they are billed for **all** the electricity they use (their **gross** consumption).

9 Industry & Investment NSW, *NSW Solar Bonus Scheme, Statutory Review, Report to Minister*, October 2010, p 6.

10 Small retail customers are households and small businesses consuming less than 160 MWh of electricity a year.

11 While customers could connect with gross or net metering arrangements under the Solar Bonus Scheme, the vast majority of customers were installed under gross metering arrangements.

Initially, the feed-in tariff was set at 60 c/kWh. However, the legislation that established the scheme provided for the former Minister for Energy to review the scheme when the generation capacity of participating customers reached 50 MW or after 1 July 2012, whichever came first. [12] The Minister reviewed the scheme in mid-2010 when the generation capacity reached 50 MW, approximately 6 months after the scheme opened.[13]

As a result of the Minister's review, the Government announced changes to the scheme on 27 October 2010, including a reduced feed-in tariff of 20 c/kWh for new participants. However, transitional arrangements applied, so that new participants were still eligible for the original 60 c/kWh tariff provided that:

- they had purchased or leased an eligible system on or before 27 October 2010, and
- they (or their representative) had lodged an application to apply to connect this system to the grid on or before 18 November 2010.

Some 38,000 customers purchased or leased eligible units on 27 October 2010, and then applied for connection to the grid by 18 November, making them eligible for the 60 c/kWh feed-in tariff.[14]

The Minister for Energy announced a 2-month hold on applications to the Solar Bonus Scheme on 29 April 2011,[15] and closed the scheme to new participants on 1 July 2011.[16]

Figure 2.2 illustrates the rapid growth in eligible capacity installed under the Solar Bonus Scheme, including the large increase in installations resulting from the announcement to reduce the feed-in tariff from 60 to 20 c/kWh. It also shows the back-log of customers that are eligible for the Solar Bonus Scheme and are yet to have their PV units installed (the gap between the green and blue lines).

As at 30 June 2011 there was 301 MW of generator capacity installed (318 MW of inverter capacity), with an additional 71 MW of outstanding applications for generator capacity (72 MW of inverter capacity). If all the eligible outstanding applications are installed, there would be 372 MW of generator capacity (390 MW of inverter capacity) installed under the Solar Bonus Scheme.[17]

12 *Electricity Supply Act 1995*, s 195.

13 Industry & Investment NSW, *NSW Solar Bonus Scheme, Statutory Review, Report to the Minister for Energy*, October 2010, p 4.

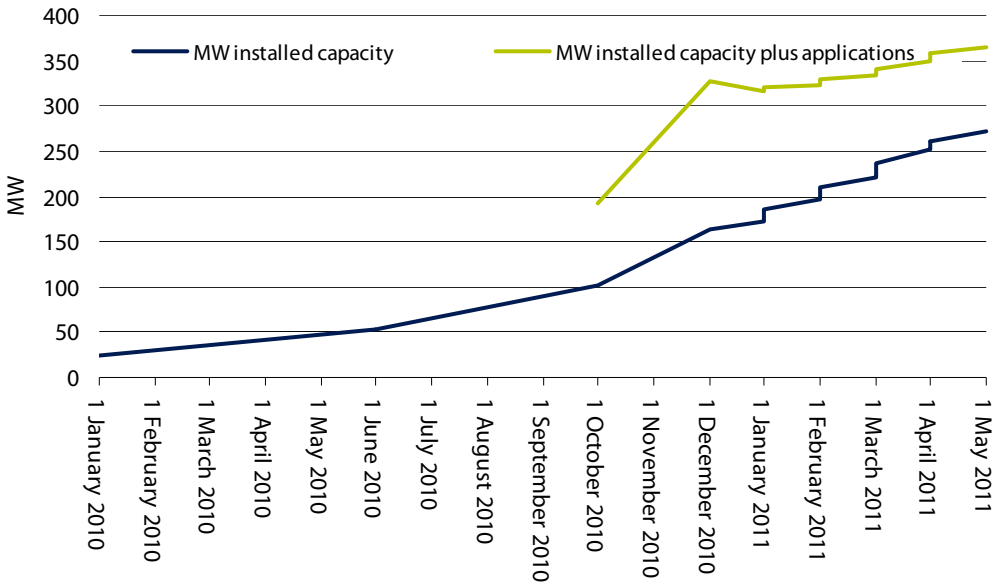
14 Mark Duffy, *Solar Summit Stage One: Opportunities for containing Solar Bonus Scheme costs*, Presentation to Solar Summit, 6 May 2011.

15 http://www.dtiris.nsw.gov.au/__data/assets/pdf_file/0007/386926/nsw-govt-places-hold-on-solar-bonus-scheme.pdf

16 Government Gazette of the State of NSW, No. 67, 1 July 2011, p 4801.

17 Advice provided by Department of Trade & Investment, Regional Infrastructure & Services, 10 August 2011.

Figure 2.2 Installations and applications for connection under the Solar Bonus Scheme (MW)



Note: MW applications for connection includes the MW installed capacity.

Data source: Industry & Investment NSW, *NSW Solar Bonus Scheme, Statutory Review, Report to the Minister for Energy*, October 2010, p 10 and http://www.dtiris.nsw.gov.au/energy/sustainable/renewable/solar/solar-scheme/applications

Appendix F discusses feed-in tariffs in other jurisdictions.

2.2 Current arrangements for PV customers who are not participants in the Solar Bonus Scheme

Currently, NSW customers who buy and install solar panels can still access an up-front subsidy through the Federal Government's RET scheme, and connect their new system to the electricity grid. But now that the Solar Bonus Scheme is closed, they cannot receive the subsidised feed-in tariff discussed above.

Without a subsidised feed-in tariff, these customers are likely to be financially better off under **net metering arrangements** (rather than the gross metering arrangements under the Solar Bonus Scheme). Under net metering arrangements, any electricity generated by PV customers will be used to meet the customer's own energy needs at the time of production.[18] If this generation exceeds the customer's needs at this time, the excess electricity will be exported to the grid.[19]

[18] Therefore customers on net metering arrangements will receive the feed-in tariff for significantly less energy than those on gross metering arrangements. While those on gross metering arrangements attract the feed-in tariff for 100% of the energy they generate, estimates suggest those on net metering arrangements export between 9% and 40%. See Appendix E for more detail.

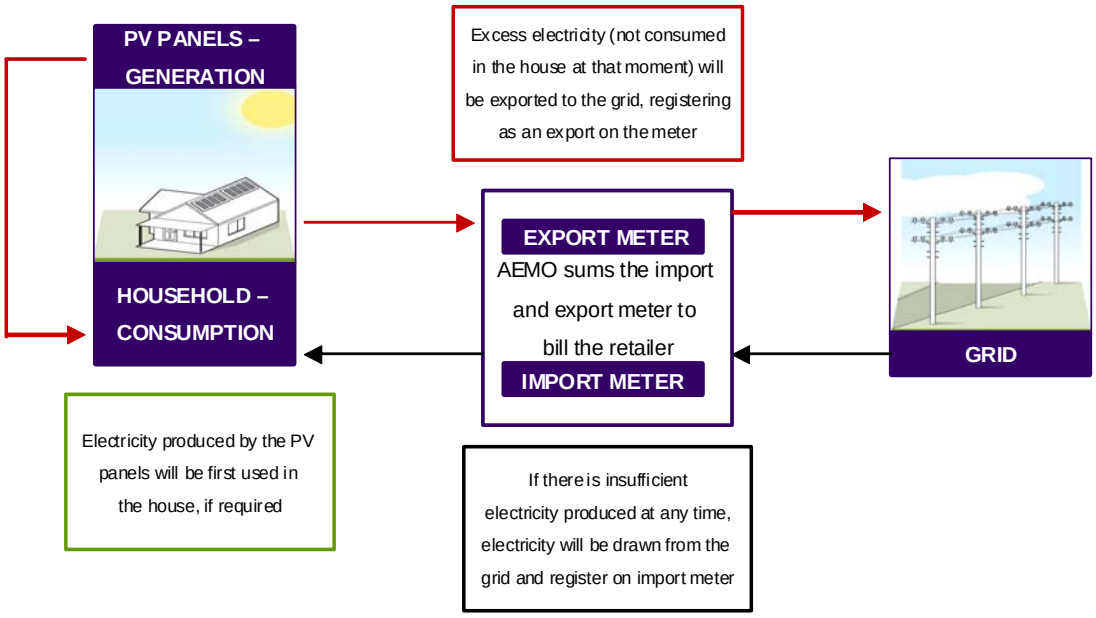
[19] For example, this might occur on a sunny week-day, when the panels are producing at their peak, but consumption is low as few members of the household are at home.

In general, the main benefit of these arrangements is that they reduce the amount of electricity the customer has to import from the grid (and purchase from their retailer) over a billing period, and so reduce their total bill. For every kWh of electricity PV customers produce and consume at the time of production, they avoid having to pay a retail tariff of around 20 to 25 cents/kWh.

The customer may also receive a subsidy-free feed-in tariff from their retailer for the excess electricity they export to the grid. Currently, many retailers voluntarily offer a feed-in tariff of 6 to 8c/kWh to PV customers who are not participants in the Solar Bonus Scheme.

Figure 2.3 provides a simple illustration of net metering arrangements, and Appendix E describes these arrangements in more detail.

Figure 2.3 Net metering arrangements



Note: the Australian Energy Market Operator (AEMO) is responsible for the operation of the National Electricity Market. It collects money from the retailers for electricity produced and pays it to the relevant scheduled generators.

A key task of this review relates to the electricity that is exported to the grid. This electricity has a value to the PV customer's retailer. Therefore, it is appropriate that the retailer be required to pay the customer a 'fair and reasonable' value for this electricity (in the form of a 'feed-in' tariff). Our task is to investigate and recommend what this 'fair and reasonable' value is, and how the Government might ensure or encourage retailers to offer a feed-in tariff that reflects this value.

Potentially, the electricity that PV customers export to the grid also has a value to the wider community in the form of avoided network expenditure and reduced loss factors. We will also consider the level of this value and potential mechanisms to capture the value, where appropriate.

2.3 Terms of reference

In relation to a 'fair and reasonable' value for the electricity PV customers export to the grid, the terms of reference indicate that our recommendations should be consistent with the Council of Australian Governments (COAG) principles for feed-in tariffs (see Box 2.1). They also specify that our recommendations must:

- not result in any increase in retail electricity prices, nor require any funding from the NSW Government budget (ie, they must be subsidy-free)
- be administratively simple and take into account its impact on business operations of administering the pricing, and
- support a competitive retail electricity market.

In conducting the review, the terms of reference require us to consider a range of factors. These include:

- the benefit gained by customers and retailers from electricity produced from small-scale solar PV units
- whether a fair value should be linked to particular metering arrangements
- whether the facilitation of retailer competition would require any supporting arrangements
- whether a fair value should be limited in application to generators of a particular size or in a particular location
- the impact of small-scale solar PV, if any, on the costs of network distribution businesses, including capital and operating costs. IPART is requested to investigate this issue to the extent necessary to make recommendations as to whether comprehensive network system modelling is warranted.

We are also to investigate the contribution that could be made by retailers to the costs of the Solar Bonus Scheme.

Box 2.1 Principles for feed-in tariffs established by the Council of Australian Governments

In 2008, the COAG established national principles for feed-in tariff schemes. Of these principles, the following 2 are relevant to this review:

1. Micro-renewable generation should receive fair and reasonable value for exported energy.
2. The feed-in tariff policy should be consistent with previous COAG agreements, particularly the Australian Energy Market Agreement.[a]

The first principle means that all residential and small business consumers who install small-scale renewable generation units (PV customers) should have the right to export the electricity generated by these units to the grid. In addition, market participants (such as retailers) should be required to pay PV customers for that exported electricity. Further, this payment should be at least equal to the value of that electricity in the relevant electricity market and the relevant electricity network it feeds into, taking into account the time of day that it is exported.

The second principle means that the government's feed-in tariff policy:

- should not deter competition for PV customers' business from electricity retailers in jurisdictions where there is full retail contestability, or innovation in the tariff offerings available to PV customers
- should not interfere with the regulation of distribution tariffs or the operation of the National Electricity Market under the National Electricity Law, or duplicate the regulatory arrangements that are part of that Law
- should be subject to independent regulatory oversight according to clear principles, and
- should be consistent with implementation of other intergovernmental agreements relating to energy, competition policy or climate change.

a http://www.ret.gov.au/Documents/mce/_documents/quicklinks/Final%20Amended%20AEMA%20as%20at%202%20July%202009.pdf

3 What is a 'fair and reasonable' value for solar PV generation exported to the grid?

One of our key tasks in this review is to investigate and recommend a 'fair and reasonable value' for the electricity generated by small-scale solar PV units and exported to the grid. This value may be used to set the level of a subsidy-free feed-in tariff for PV customers who are **not** eligible for the Solar Bonus Scheme.

The terms of reference specify that the recommended value should be consistent with COAG's principles for feed-in tariffs (discussed in Box 2.1). This means that the recommended value:

- should be at least equal to the value of that energy in the relevant electricity market and the relevant electricity network it feeds into, taking into account the time of day during which energy is exported
- should not deter retailers from competing for PV customers' business.

The terms of reference also make it clear that any feed-in tariff based on the recommended value should not increase electricity prices in NSW, and will not be funded from the NSW Government budget (ie, will not be subsidised).

The following sections discuss how we propose to estimate the value of the electricity exported by PV customers, and the implications of setting a future feed-in tariff higher or lower than this value.

3.1 Proposed methods for estimating the value of the electricity exported by PV customers

As Chapter 1 indicated, there are 2 ways to value the electricity exported by solar PV units:

1. By estimating the **financial gain** to the retailer. For retailers that serve PV customers who export electricity, this financial gain occurs due to the difference between the revenue the retailers collect from their total customer base and the costs that they face in supplying this customer base (due to the fact that their PV customers export energy).
2. By estimating the **wholesale market value** (including an allowance for energy losses) of the electricity PV customers export to the grid.

We propose to apply both methods and then consider the results together with the matters specified in the terms of reference. Section 3.5 discusses the impacts of setting the feed-in tariff higher or lower than the financial gain retailers make as a result of their PV customers' exports.

3.2 Method 1: Estimating the financial gain to the retailer

If a retailer that serves PV customers who export electricity to the grid did not pay these customers any feed-in tariff for that electricity, it would make a financial gain. This is because the retailer would avoid some of the costs it would normally incur in supplying its customer base, due to its PV customers' exports. As a result, the difference between the total revenues it collects from its customer base and the total costs it incurs in supplying this customer base would be smaller than if it did not serve PV customers who export to the grid.

Given this, one way to estimate the value of the exported electricity is to calculate the costs the retailer can avoid as a result of its PV customers' exports to the grid. These avoided costs can arise directly and indirectly.

3.2.1 Direct financial gains

Electricity retailers incur 4 broad cost components in supplying electricity to their customer base: energy costs, network costs, green scheme costs and retail costs. (See Box 3.1 for a brief description of these costs, and Appendix C for more detail.)

Another component that we need to assess is green costs. A retailer that serves PV customers that export to the grid can avoid some of the **energy costs** it would normally incur in supplying its customer base. In particular, it can avoid some of the costs involved in purchasing wholesale electricity on the National Electricity Market (NEM), including the costs of hedging and NEM fees and energy losses.[20] These avoided costs (which otherwise comprise around 30% to retail prices) constitute the main direct financial gain to retailers with PV customers who export electricity to the grid.

If the retailers liability under the RET scheme is calculated without explicitly adding PV exports to the settlements data provided by AEMO, retailers would also avoid the costs of complying with the RET scheme for electricity exported.[21] For the purposes of our illustrative example, we have assumed that ORER makes this adjustment to account for electricity exported by solar PV customers. Compliance with the RET currently represents around 6% of retail prices.

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20 The energy purchase costs included in the retail price account for the different prices and loads during the day.

21 AEMO settlement data is the amount of electricity purchased by the retailer to satisfy the amount imported by the customer, less the amount exported by the customer.

The retailers' liability under GGAS and ESS is based on their electricity purchases, and will therefore include the electricity purchased by the retailer from solar PV units. Therefore, the retailers will not avoid GGAS and ESS costs if they pay a feed-in tariff. However, these currently add less than 1% to retail prices.

However, a retailer cannot avoid paying the network costs on the electricity its PV customers export to the grid. Nor can it avoid the majority of retail costs. Together, these cost components represent over 60% of the retail price of electricity.

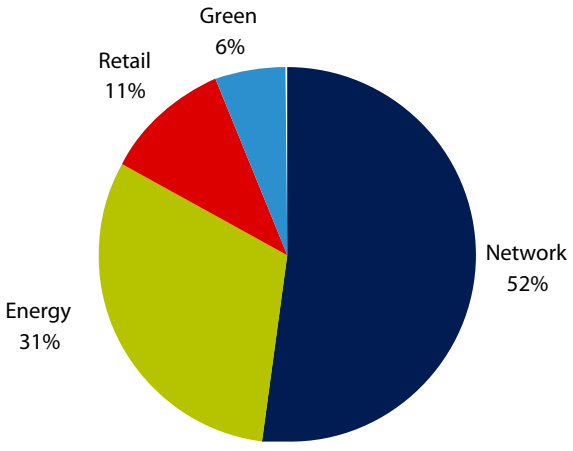
Box 3.1 The cost components reflected in the retail price of electricity

Retailers' costs in supplying electricity are made up of 4 main components:

- **Energy costs,** which include the costs of:
  - Purchasing wholesale electricity from generators on the National Electricity Market (NEM), including managing the risks of the volatile spot market through hedging products
  - Paying for NEM fees, and
  - Paying for electricity losses (ie, electricity that the retailer purchases but does not supply to customers, as it is lost in the network as it moves through equipment and along the wires).

  These costs are based on the total electricity the retailer purchases on the NEM. As a result of the NEM metering and settlement arrangements, the retailer avoids these costs for the electricity it obtains from its PV customers who export to the grid.
- **Network costs,** which are the costs of transporting electricity from the generators to customers via the transmission and distribution networks. These costs are based on the total electricity the retailer supplies to customers, so are incurred by the retailer regardless of whether the electricity is purchased from the NEM or obtained from PV customers. Therefore, the retailer does not avoid any network costs when its PV customers export to the grid.
- **Green scheme costs**, which represent the costs of complying with several climate change mitigation schemes, as required by the Federal and NSW Governments. The most costly green obligation is currently the RET scheme, adding 6% to retail prices. If compliance with the RET scheme is assessed by adding PV exports to the AEMO settlement data, then the retailer will not avoid these costs. GGAS and ESS add around 1% to retail prices and the retailer does not avoid these costs when exporting to the grid.
- **Retail costs**, which include the costs of running the retail business (including call centre costs, billing costs, etc) and making a profit. These costs do not vary significantly according to customers' consumption or other factors, and are so recovered through the fixed component of customer bills. The retailer does not avoid these costs when its PV customers export to the grid.

As the figure below indicates, the costs retailers avoid for electricity obtained from PV customers (energy costs), which together currently represent over 30% of the retail price. The costs retailers do not avoid represent the remaining 70%.



Box 3.2 and Figure 3.1 provide an illustrated example of the direct financial gain that retailers would make if they paid no feed-in tariff for the electricity their PV customers export to the grid.

Box 3.2 An illustration of the financial gain to retailers if they paid no feed-in tariff to PV customers under net metering arrangements

For illustrative purposes, let's assume that a PV customer who is **not** participating in the Solar Bonus Scheme consumes 6000 kWh and produces 2000 kWh of electricity in a year. Of the 2000 kWh they produce, they consume 1500 kWh at the time of production and export 500 kWh. Therefore, they import 4500 kWh.

Under net metering arrangements with no feed-in tariff, the **customer** would:

- **Pay** their retailer the applicable retail price for the 4500 kWh they import.
- **Receive** nothing for the 500 kWh of electricity they export.
- **Save** the retail price on the 1500 kWh of electricity they produce and consume.

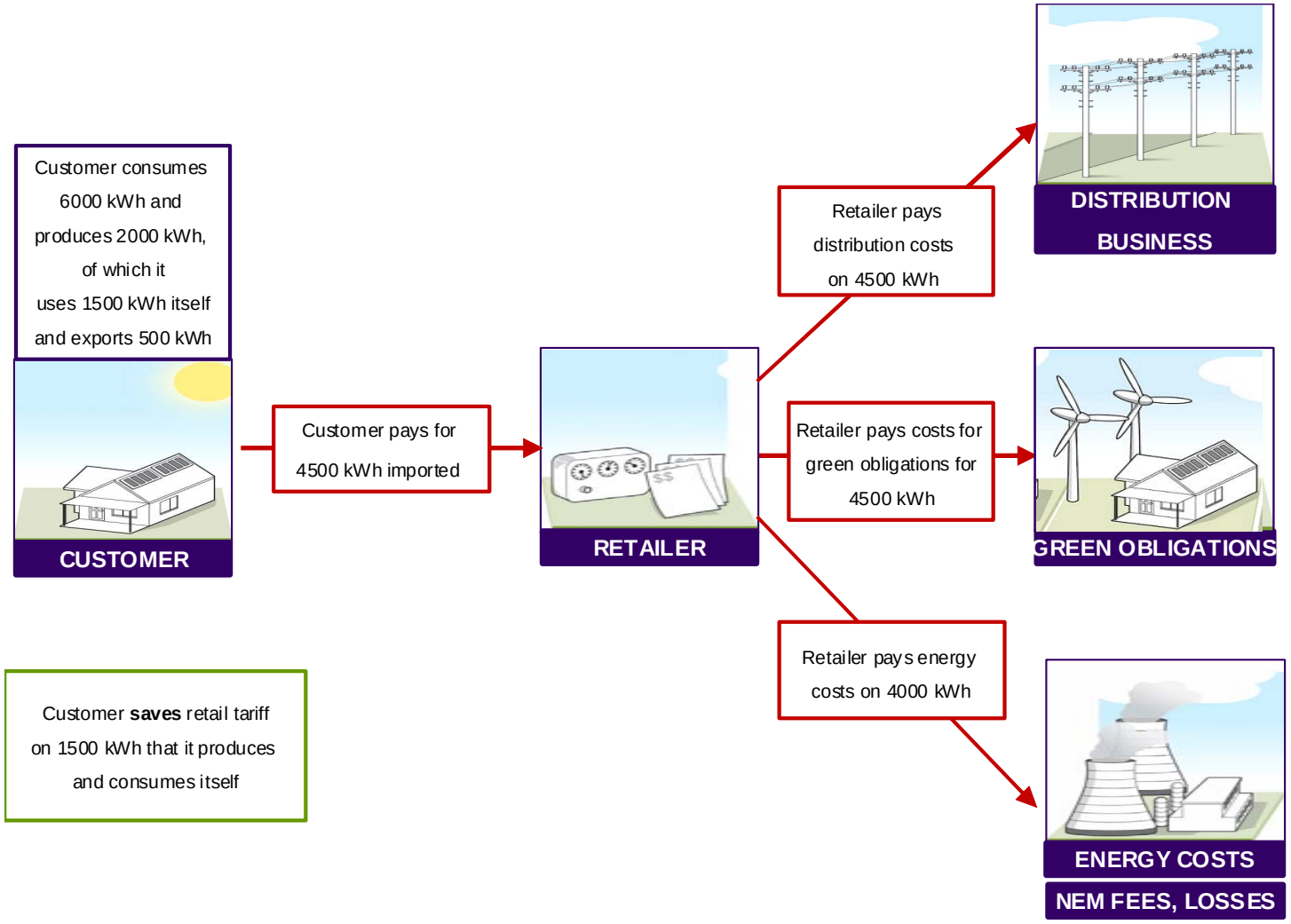
The **retailer** would**:**

- **Pay** the Australian Energy Market Operator (AEMO) the pool price for 4000 kWh of electricity (the amount the customer consumes minus the amount they produce), including the energy losses incurred in supplying that electricity. There may be additional financial flows for financial hedges.
- **Pay** AEMO market fees for 4000 kWh of electricity, including energy losses incurred in supplying that electricity.
- **Pay** the distributor network charges on 4500 kWh (the amount the customer imports from the grid).
- **Pay** RET, GGAS and ESS obligations on 4500 kWh.[a]
- **Receive** the retail price for 4500 kWh from the customer.

These financial flows are represented in Figure 3.1.

a The GGAS obligation will be on 4500 kWh if the retailer pays the feed-in tariff. If the retailer does not pay the feed-in tariff, it will be on 4000 kWh.

Figure 3.1 An illustrative example of financial flows under net metering arrangements if retailers pay no feed-in tariff



3.2.2 Indirect financial gains

In addition to direct financial gains, a retailer may obtain indirect financial gains as a result of its PV customers exporting electricity to the grid. For example, it may reduce wholesale electricity purchase costs (a component of energy costs, discussed above) due to a change in the load profile the retailer needs to supply its entire customer base.[22]

The load profile is a key driver of a retailer's electricity purchase costs. The more peaky this profile is – ie, the larger the difference between peak demand and average demand across its whole customer base – the more expensive per MWh it is to supply. This is because higher peak demand (relative to average demand) requires the retailer to purchase relatively more electricity from the NEM at times when pool prices are typically high, or to enter into relatively more expensive contracts suited to peak period supply.[23]

The electricity PV customers export to the grid may change a retailer's load profile by reducing the difference between peak demand and average demand (typically considered an 'improvement' in the load profile). In this case, it could reduce the electricity purchase costs the retailer incurs in supplying its customer base on a per MWh basis.[24] Thus, the retailer would receive an indirect decrease in costs from PV customers' exports.

Conversely, the electricity PV customers export to the grid could lead to a larger difference between peak demand and average demand (typically considered a 'deterioration' in the load profile). This could increase the electricity purchase costs the retailer incurs in supplying its customer base on a per MWh basis. In this case, the retailer would incur an indirect increase in costs.

Therefore, one of the issues we will consider in this review is whether the electricity generated by a retailer's PV customers and exported to the grid is likely to lead to a change in its load profile. If it is, and this change can be calculated, any resulting change in electricity purchase costs can be estimated using the following approaches:

- The avoided long run marginal cost (LRMC) of electricity generated by the solar PV system. This would be consistent with the basis for setting regulated retail prices in 2011/12.

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22 The consumption profile refers to the distribution of a customer's energy requirements over time (usually a period of 24 hours). A load profile typically refers to the distribution of the energy requirements of a retailer's entire customer base (ie, the sum of the consumption profiles).

23 Integral Energy customers typically have relatively peaky consumption compared to EnergyAustralia and Country Energy customers. This is the result of climate, dwelling type and heating/cooling choices.

24 It is important to note that this financial gain does not result from retailers having to buy less electricity from the NEM; rather it arises as a result of them potentially having to buy **relatively** less energy from the NEM at particular times.

- The avoided spot price of electricity due to the solar PV system, taking account of avoided spot price payments only.
- The avoided market-based cost of electricity due to the solar PV system, taking account of both avoided contracting payments and avoided spot price payments.[25]

It is difficult to know whether the electricity PV customers export to the grid provides an indirect financial gain to retailers. We will be seeking information from the distribution network businesses and retailers as well as conducting our own analysis to enable us to do this.

Consideration also needs to be given to whether any indirect financial gain, for example as a result of solar PV customers improving a retailers' load profile, should be fully reflected in the feed-in tariff or shared with all customers (through lower retail prices).

IPART seeks comments on the following

1 What are the direct financial gains to retailers as a result of their solar PV customers exporting electricity to the grid?

2 Do retailers pay for the cost of complying with the RET on electricity exported by solar PV customers?

3 Are there other indirect financial gains to retailers as a result of their solar PV customers exporting electricity to the grid? If so, how can these be estimated? Should these indirect financial gains be fully reflected in the feed-in tariff or shared with all electricity customers?

4 Are there additional costs to retailers associated with serving PV customers?

5 Are there alternative approaches to estimating the financial gain to retailers as a result of their solar PV customers exporting electricity to the grid?

3.3 Method 2: Estimating the wholesale market value of the electricity

An alternative approach to establishing a 'fair and reasonable' value for the electricity exported by PV customers is to estimate the **wholesale market value** of this electricity.

[25] This is consistent with our approach to regulating retail prices (although we are required to use the greater of market based costs and long run marginal costs). Because this cost estimate includes the costs of hedging, it could capture a greater saving than the avoided spot price approach.

3.3.1 Market value of the energy exported

The electricity PV customers export to the grid has a market value in the NEM at the time it is generated and exported. This electricity is the same as electricity exported to the grid by any other generator (such as a wind turbine, or coal-fired power station).

The NEM is a wholesale market in eastern and southern Australia through which generators sell electricity to energy retailers, who in turn bundle this electricity with network services for sale to customers. (See Appendix D for more information on the NEM.) The prices that generators receive for the electricity exported to the grid, and the prices that retailers pay for this electricity are determined by supply and demand. During periods of higher demand (or constrained supply), prices tend to rise, reflecting the relative scarcity of supply and the higher costs of meeting this demand. These higher price events occur mostly in the late afternoon or early evening, when residential demand is highest. Prices can be particularly high during extreme weather, such as very hot summer days and very cold winter evenings.

Because of this, the market value of the electricity PV customers export to the grid will depend on when this electricity is exported, and the prices in the NEM at these times. To estimate this value, we will need to consider the profile of the electricity PV customers export both today and in future years, and the likely spot prices in the NEM **at these times**. To assist our understanding we will consider the correlation between electricity exported to the grid and prices in the NEM over previous years. We will seek detailed information on the production and consumption profiles of PV customers from the retailers and distributors.

Even though they are rare, high peak price events (when prices in the NEM can be up to $12,500/MWh) are likely to be responsible for a significant part of the average value of the electricity exported by PV customers. Our pool price forecasts will include high price events consistent with the number and duration of these events in previous years.

There are also likely to be wide differences in PV customers' export profiles during high price events – depending, for example, on the size of their PV unit, their metering arrangements, and climatic conditions. This means that using average export profiles in estimating the market value will involve a risk that this estimated value will be significantly higher or lower than the 'actual' market value for some PV customers. We will also need to consider these differences carefully. (Section 3.5 discusses the implications of setting the fair value either too high or too low.)

In its report for the Clean Energy Council, SKM MMA estimated the market value using an estimate of the LRMC of electricity and applied a margin to account for the time of day when PV customers export energy.[26] We will also estimate the value of electricity that PV customers export to the grid using an estimate of the long run

[26] SKM MMA, V*alue of Generation from Small Scale Residential PV Systems*, Report to the Clean Energy Council, Final Report, 14 July 2011.

marginal cost (LRMC) of generation as a proxy for market prices in the NEM. This will provide a view of the market value of the electricity exported over the longer term, noting that the LRMC can deviate significantly from market prices in the short term.[27] However, in deciding which estimate of the market value of the electricity exported should be reflected in the feed-in tariff, we will need to consider the implications for the form of regulation and the competitiveness of the retail market (discussed in Section 4.2).

IPART seeks comments on the following

6 What is the most appropriate approach to estimating the market value of the electricity exported by solar PV customers to the grid? What are the key issues that need to be considered?

3.4 Other possible benefits of PV generation

The electricity PV customers export to the grid may also lead to other benefits. For example, it may lead to cost savings for network businesses, reduce energy losses and avoid greenhouse gas emissions that might otherwise occur.

3.4.1 Resource costs savings to network businesses

The electricity PV customers export to the grid may also lead to resource cost savings to the NSW network businesses. These businesses incur large costs in maintaining and augmenting the transmission and distribution network. A significant proportion of these costs are required to ensure the network can manage the infrequent but large spikes in demand that occur during high demand events.

PV customers' electricity exports to the distribution network (the grid) could lead to lower network expenditure in some localised areas – ie, those in which the network is nearing its capacity and would otherwise require augmentation. The extent of any cost savings will depend on:

- Whether this exported electricity delivers savings to the network and, if so, the significance of these savings. One issue we will need to consider is the extent to which this electricity is likely to be exported during periods of peak demand on the network. (See Box 3.3 for an illustrative example of this issue.) Another issue is the certainty of the supply of this electricity. If there is a high risk that electricity exports from these units will not be available to help meet peak demand **at all times**, the benefits will be less significant.[28]

[27] In periods when the LRMC of generation exceeds the average market price (as is currently the case), setting the feed-in tariff in line with the LRMC of generation may overstate the value of the electricity at that time, which may impact the competitiveness of the retail market.

[28] The network infrastructure is built to service peak levels of demand, and therefore a key question for a network operator is the extent to which solar PV can reliably assist in managing the peak.

- The characteristics of the network and solar PV generation in those localised areas. The greatest savings are likely to occur in areas where a feeder or substation is nearing capacity and there is a critical mass of solar PV generation that can reliably deliver peak demand benefits. Sufficient PV units would need to be installed to significantly reduce peak demand.
- The extent to which the cost of augmenting the network in those localised areas is large.

It is also worth noting that customers' installation of solar PV units can impose costs on networks. In some cases, the network needs to be augmented to stabilise the voltage, due to the intermittency of PV generation and its effect on the low voltage network. Further, AusGrid (formerly EnergyAustralia) estimated that implementation and administrative costs for PV customers under the Solar Bonus Scheme would cost it $35 million over the period to 2013/14.[29]

The terms of reference specifically require us to consider the impact of small-scale solar PV on the costs of network distribution businesses, including operating and capital costs. At this stage, we are to investigate this issue to the extent necessary for us to determine whether comprehensive network system modelling is required to estimate (or quantify) this impact. To fulfil this requirement, we propose to consider whether PV customers' units are likely to generate during peak periods of demand on the network. While we will examine this issue in aggregate, we will consider the benefits of focusing on parts of the network that are close to capacity. We will seek information from the distribution network business and retailers to inform this analysis.

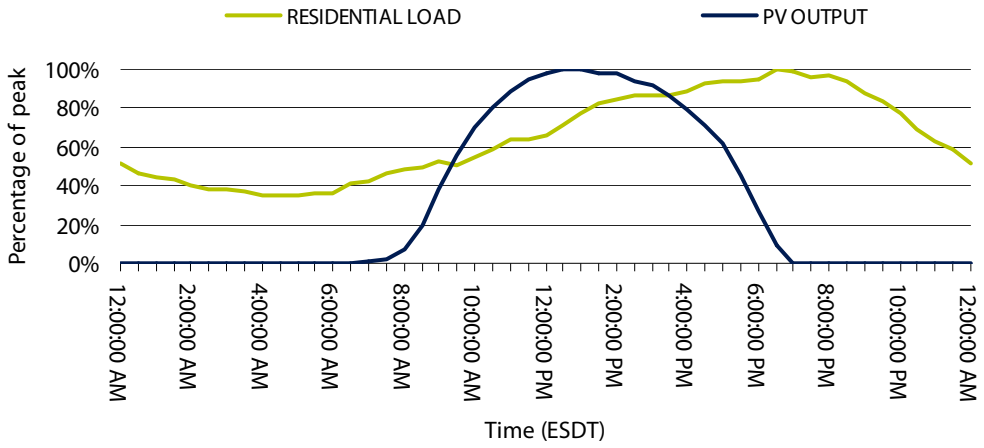
[29] EnergyAustralia, *Revised pass through application : NSW Solar Bonus Scheme*, 24 December 2010, p 4.

Box 3.3 Are PV customers' electricity exports likely to help meet peak demand?

To assess the significance of the benefits of small-scale solar PV generation to the network, we need to understand the extent to which PV customers are likely to export electricity during periods of peak demand. To illustrate this issue, the figure below compares data provided by Essential Energy on PV generation and the typical residential load in its supply area in summer.

These data indicate that in this area, summer PV generation peaks at around 12 noon. In contrast, residential consumption peaks after 6 pm, when PV customers' output is only around 10% of their capacity. This suggests that on an aggregate level, electricity exported by solar PV units may not materially assist in managing the peak demands on the network. However, as noted above, the main benefits to the network are likely to be localised. In areas with commercial or industrial load, the electricity exported to the grid by solar PV units may better match the load profile.

Figure 3.2 PV output and typical residential load in summer, Essential Energy's network supply area



Data source: Data provided by Essential Energy on 15 July 2011.

However, we note that if we do recommend comprehensive network system modelling and this analysis indicates that small-scale solar PV generation can result in material cost savings for network businesses, it will be difficult to share these benefits with PV customers by including it in a generally-available fair and reasonable feed-in tariff. This is because:

- The benefits will be highly localised, and thus would need to be allocated back to specific PV customers (or those in specific local areas) in order to target the areas where PV customers can add most benefit. This would make the feed-in tariff more difficult to administer, and so would not be consistent with the terms of reference for this review.

- The COAG principles state that feed-in tariffs should not interfere with the regulation of distribution tariffs or duplicate arrangements that are part of the National Electricity Law. The Australian Energy Regulator (AER) regulates the networks revenues and prices, in line with the National Electricity Rules (Rules) administered by the Australian Energy Market Commission. The AER determines the average prices that the distributors can earn and establishes the regulatory framework, in accordance with the Rules. While the current regulatory framework limits the ability to extract and redirect any network savings, it may be appropriate for alternative regulatory mechanisms to be considered.

Given this, in addition to considering whether comprehensive network system modelling is required to estimate the benefits of small-scale solar PV generation to the network, we will also consider whether there are alternative ways of sharing any benefits with PV customers.

IPART seeks comments on the following

7 What impact does solar PV generation have on network costs? How can this impact be most accurately measured?

8 How can any network benefits resulting from solar PV generation be shared with solar PV customers?

3.4.2 Reduced energy losses

As electricity flows through the transmission and distribution networks, some is lost due to electrical resistance and the heating of conductors (see Appendix C). Because the power stations where most electricity is generated are located some distance from the main population centres, these losses can be significant. As a result, retailers need to purchase more electricity from generators than their customers actually consume, and this adds to the retail price of electricity.[30]

However, PV customers' units are generally located much closer to population centres and are connected directly to the distribution system. This means that for the electricity they export, energy losses are likely to be much lower, and this may reduce overall energy losses.

Currently, there is no mechanism to capture the value of any reduction in energy losses due to PV customers' exports. Therefore, if this reduction is material, all electricity customers will benefit through lower retail electricity prices.[31] It may not be possible to allocate this benefit through the feed-in tariff, but it might be appropriate to establish a mechanism to capture this benefit on behalf of the customers.

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30 IPART 'scales up' the energy purchase costs allowance in regulated retail tariffs to account for these energy losses.

31 Energy losses are one of the components of retailers' energy costs. Total energy costs account for about 30% of the retail price of electricity. See Box 3.1 for more information.

IPART seeks comments on the following

9 How should any value from reduced energy losses as a result of solar PV generation be estimated?

10 If the value of reduced energy losses is material, should it be shared with solar PV customers? If so, how could this be achieved?

3.4.3 Avoided greenhouse emissions

PV generation might produce other benefits, including environmental benefits such as avoided greenhouse gas emissions. However, we do not intend to try to capture these benefits in our analysis. This is because these environmental benefits are already captured via other mechanisms, including GGAS (through pricing carbon abatement measures) and the RET scheme (by providing up-front subsidies to customers installing solar PV units). In addition, the Federal Government's proposed carbon price will value greenhouse gas emissions and this value will be reflected in higher retail prices if and when it is introduced. Solar PV customers with net metering arrangements will avoid the carbon price reflected in retail prices for electricity that they produce and consume.

3.5 Implications of setting a future feed-in tariff higher or lower than the value of the exported electricity

In determining a 'fair and reasonable' value for PV customers' exported electricity – or, more specifically, a feed-in tariff based on this value – we need to consider the implications for PV customers, retailers and the competitiveness of the retail electricity market. For example, if the feed-in tariff is set too high relative to the financial gain retailers make as a result of their PV customers' exports, serving these customers may impose costs on retailers. Clearly, this will reduce PV customers' attractiveness to retailers, and they may either try to avoid entering into market contracts with these customers, or offer them higher rates than other customers. This could have implications for the competitive retail market.[32]

Alternatively, if the feed-in tariff is set too low relative to the market value of the exported electricity, then this tariff may not be 'fair' to PV customers. However, if the market is sufficiently competitive, retailers could still offer premium rates above the rate of any regulated feed-in tariff.

In this review, we will be guided by the terms of reference in setting the fair and reasonable value for the electricity PV customers export to the grid.

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32 All customers have a right to be supplied with electricity by standard retailers, and standard retailers cannot discriminate against customers on the basis that customers use alternative forms of energy or energy from alternative sources, or use products or services that reduce energy demand. *Electricity Supply Act 1995*, ss34 and 35.

IPART seeks comments on the following

11 What are the implications of setting the feed-in tariff too high or too low? What is the most appropriate way of managing this risk?

4 How should the 'fair and reasonable value' be implemented in NSW?

In addition to estimating a 'fair and reasonable value' for the electricity PV customers export to the grid, we need to recommend a mechanism for implementing this value in NSW. For convenience, we refer to this mechanism as the 'form of regulation'.[33]

The terms of reference indicate that the form of regulation should potentially be able to transition to a national feed-in tariff scheme, if one is established. It should also support a competitive retail electricity market in NSW, and be easy to understand and simple to administer. In addition, in considering the form of regulation, we should take account of existing and potential PV customers' need for certainty in relation to the income they can receive for electricity exported to the grid, and the need for the fair and reasonable value of this electricity to be reviewed and updated over time (see Box 4.1 for more information).

As our starting point for determining the most appropriate form of regulation, we propose to consider the current competitiveness of the retail electricity market. By first assessing the extent to which the market by itself is likely to deliver the fair and reasonable value to customers, we can then determine whether regulatory intervention is required, and if so, how heavy- or light-handed this regulation should be. We will need to consider a range of issues, including:

- Should retailers be required to pay a specified feed-in tariff based on the recommended 'fair and reasonable' value? If so, which retailers?
- How should a specified feed-in tariff be set and updated over time?
- Should all PV customers be eligible for this feed-in tariff?
- Should the feed-in tariff vary by tariff component, location or customer type?
- Should the feed-in tariff apply to both net and gross metering arrangements?

[33] The form of regulation can be defined as the rules and methodologies used to set, monitor and adjust the price of the regulated services (i.e. the feed-in tariff) over a regulatory period.

Box 4.1 What must we consider in determining the form of regulation?

The terms of reference indicate that in recommending an appropriate form of regulation, we should ensure that any resulting feed-in tariff or price:

- should be administratively simple and take into account the impact on business operations of administering such pricing
- should operate in such a way as to support a competitive electricity market in NSW
- should potentially be able to transition to a national feed-in tariff if one is established.

In addition, we should consider:

- whether a fair value feed-in tariff should be linked to particular metering arrangements
- whether the facilitation of retailer competition would require any supporting arrangements
- how requiring retailers to provide a feed-in tariff will affect the competiveness of the retail market
- whether a fair value should be limited in application to PV solar generators of a particular size or in a particular location.

In reporting on the form of regulation, the terms of reference require us to consider:

- the need for predictability to customers wanting to install solar PV units
- arrangements for reviewing the fair and reasonable value at appropriate intervals
- the place of an independently derived fair and reasonable value within a competitive market which has a mixture of regulated and market-determined price offerings, including whether the fair and reasonable price should be:
  - a mandated floor price
  - a mandated price range (with or without an upper limit) or
  - discretionary or advisory.
- similar pricing mechanisms in other states.

4.1 How competitive is the retail electricity market in NSW?

If competition is effective, retailers are less likely to be able to offer PV customers prices for exported electricity that are significantly below fair value. This means that the form of regulation can be more light-handed, as competition will provide PV customers with choices and provide payments to them at efficient levels.

We propose to analyse the effectiveness of retail market competition using an approach consistent with the one we used in our 2010 review of regulated retail electricity prices from 2010 to 2013.[34] This approach includes considering:

- the definition of effective competition

[34] IPART, *Review of regulated retail tariffs and charges for electricity 2010-2013*, March 2010, p 31.

- the definition of the market, including the existence of sub-markets defined along consumption, income, residential/business and homeowner/tenant lines
- the market structure, including the number of retailers contesting the market, market concentration, and barriers to entry
- market conduct, including customer awareness, retailer marketing activity and market information, and retailer offers to customers
- customer outcomes, including the exercise of customers' choice and customer switching behaviour.

As part of the 2010 review, we assessed the level of retail market competition in the 3 standard supply regions. We found that although the competitiveness of the market had not changed significantly since 2007, new competitors had won a significant share of the market from the Standard Retailers since competition was introduced in 2002. In addition, 12 retailers were contesting the small retail market in NSW and there were no significant barriers to entry.[35] These findings indicated that a relatively light-handed approach to regulation was sufficient to protect customers from higher than efficient retail prices. As a result, we decided to set an overall price cap for each Standard Retailer's regulated tariff, providing the retailer with significant discretion to set individual tariffs within this cap.[36]

Several market developments may have affected competitiveness since that review. For example:

- The NSW Government has sold the 3 Standard Retailers to TRUenergy and Origin Energy as part of its energy reform strategy, which has increased market concentration.
- The market information on retail tariffs available to customers has improved.
- Several retailers are offering market prices that offer higher discounts relative to the regulated price.
- New research has found that customers in certain rural and regional areas in NSW are less aware of their choices in relation to electricity supply than customers in Sydney, and the Blue Mountains, Illawarra, Hunter and Central Coast regions.
- Some retailers, including Origin Energy, TRUenergy and AGL, are voluntarily offering feed-in tariffs of 6 to 8 c/kWh to PV customers who are not participants in the Solar Bonus Scheme. These retailers also offer 6 to 8 c/kWh premiums on top of the statutory feed-in tariff under the Solar Bonus Scheme.

35 IPART, *Review of regulated retail tariff and charges for electricity 2010-2013*, March 2010, p 32.

36 We decided to introduce an additional regulatory constraint on Country Energy in addition to the weighted average price cap (WAPC). This was due to our finding that the level of competition in the Country Energy supply area was lower than in the metropolitan markets served by EnergyAustralia and Integral Energy.

Appendix G provides further information on our 2010 findings on the competitiveness of the market, including recent market developments.

IPART seeks comments on the following

12 Is our proposed approach for analysing the effectiveness of retail market competition appropriate for this review? Are there any other factors we should consider?

13 Are there any barriers (or emerging barriers) to entry that may limit the potential for competition in the NSW retail electricity markets, particularly in relation to solar PV customers?

14 Are there any other developments that may affect the competitiveness of the retail electricity market in NSW?

15 Has there been any change in the types of customers being offered competitive contracts? Is there any evidence to suggest that there are particular groups of customers (particularly solar PV customers) that have been more or less active in the competitive market, such as pensioners?

16 What evidence is available on the number of solar PV customers receiving voluntary feed-in tariffs? Does the level of these voluntary feed-in tariffs represent a fair and reasonable value of the electricity exported by solar PV customers?

4.2 Should retailers be required to pay a specified feed-in tariff?

In light of our findings on the competitiveness of the market, we will consider whether regulatory intervention is required, and if so, how heavy- or light-handed this regulation needs to be to ensure solar PV customers receive a fair and reasonable value for the electricity they export to the grid. For example, should all retailers be required to pay a specified feed-in tariff based on the recommended fair and reasonable value, or only certain retailers? Or should this recommended value simply serve as a guide or benchmark, to help solar PV customers negotiate a feed-in tariff with retailers?

4.2.1 Requiring all retailers to pay a specified feed-in tariff

Requiring all retailers to offer a specified feed-in tariff is a relatively heavy-handed form of regulation. It involves placing a legal obligation on both Standard Retailers[37] and 'second tier' retailers to offer a specified tariff to all eligible PV customers. This would ensure that all eligible PV customers in NSW receive the specified rate.[38] It would probably also be the simplest form of regulation to administer, and would be easy for customers to understand. In addition, it would also provide PV customers with certainty of the rate that they will receive for the electricity they export to the grid, regardless of which retailer supplies them.

However, we need to consider whether the benefits of this form of regulation outweigh the costs. We note that:

- It is not consistent with our general approach to retail price regulation. We currently set the maximum change or increase average prices[39] the 3 Standard Retailers can charge their customers on regulated tariffs. However, we don't regulate the prices of 'second tier' retailers. These retailers can make offers to specific customers, and enter into market contracts with customers that set out the tariffs and other fees they will pay. Placing a general obligation on all retailers to offer a specified feed-in tariff to all eligible PV customers would not be consistent with this approach and may reduce innovation and pricing in the competitive retail market.
- It may increase the regulatory risk associated with setting the specified tariff either too high or too low, discussed in section 3.5. This may affect the development of the competitive retail market.
- It might stifle product innovation in the competitive market by locking in a price component.

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37 Standard Retailers are the default retailers in NSW. They are EnergyAustralia (owned by TRUenergy) and Integral Energy and Country Energy (both owned by Origin Energy). If a customer has not entered into a contract with a retailer, then they are supplied by their Standard Retailer under a standard form customer supply contract with the prices regulated by IPART.

38 This does not mean that second tier retailers do not have the choice of whether or not to supply a customer, but rather, it would be an obligation to offer a feed-in tariff at the specified rate to any customer that it chose to supply.

39 Since 2007 we have allowed the Standard Retailers to set their own regulated prices, including the components of a price (for example, the service availability charges and the usage charges), within an overall price cap (known as the weighted average price cap). IPART considered this cap an appropriate form of regulation given the evolving competitive retail market.

4.2.2 Requiring only the Standard Retailers to pay a specified feed-in tariff

A more light handed option would be to require only the Standard Retailers to offer a specified feed-in tariff. Second tier retailers would be free to offer any feed-in tariff, with the level of this tariff being subject to negotiation with customer. Unlike the first option, this is consistent with our general approach to regulating retail electricity and gas prices, in that PV customers could choose either to be supplied on a regulated contract by their Standard Retailer for regulated prices and charges (including a regulated feed-in tariff), or choose to enter into a market contract and be supplied for unregulated prices agreed with the retailer. Having this choice may encourage diversity of product offerings so that customers can choose a package that is best for them.

This form of regulation would also mean that existing and potential PV customers would be certain that they will receive **at least** the specified feed-in tariff from their Standard Retailers (subject to any contract that they have already signed), and have the option of negotiating a higher price with a second tier retailer.

4.2.3 Setting a benchmark rate

Setting a benchmark feed-in tariff in line with the fair and reasonable value is the most light-handed option. Under this option, no retailer would be required to pay a specified feed-in tariff. Rather, all retailers would be free to offer any feed-in tariff, with the level of this tariff being subject to negotiation with the customer.

This option would be appropriate if the market were sufficiently competitive to deliver feed-in tariffs that closely reflect the fair and reasonable value without the need for regulation. In this case, setting a benchmark rate could help customers understand the fair and reasonable value of their electricity exports, and negotiate a similar value with a retailer. This option would also minimise the regulatory risk associated with setting a specified feed-in tariff too high or too low, and the implications of this for the competitive retail market. (That is, if the benchmark rate were set too high or too low, there would be no obligation on retailers to pay this rate so the competitive market could correct for this error.) However, it would provide less certainty for PV customers than the other options.

IPART seeks comments on the following

17 What degree of regulatory intervention is required to ensure solar PV customers receive a fair and reasonable value for the electricity they export to the grid? Are there options (other than those listed in section 4.2) that are more appropriate?

4.3 How should a fair and reasonable feed-in tariff be updated over time?

Once we have determined the most appropriate form of regulation for implementing a specified or benchmark feed-in tariff in NSW, we will need to consider how this tariff should be set, and if so, how it should be updated over time.

One option would be for IPART to provide a multi-year estimate of the value of the electricity exported to the grid. This would provide certainty to potential PV customers in relation to the future value of this energy (which would help them in deciding whether to install a solar PV unit).

However, retail tariffs and their underlying cost components are likely to change over time. This means that not only would PV customers' main source of 'revenue' from electricity generation change over time (ie, savings due to reduced electricity bills),[40] but the value of their electricity exports would also change. If we were to set an estimate today of the value of energy exported to the grid in future years, there is a risk that our estimate would not reflect the future market circumstances. Depending on how the feed-in tariff is applied this could:

- affect the financial viability of retailers and the competitive retail market, if the feed-in tariff set today is above the 'true' value of the energy in future years
- disadvantage PV customers (to the benefit of retailers), if the feed-in tariff set today is below the 'true' value of the energy in future years.

Another option would be for IPART to provide a multi-year estimate of the value of the electricity exported to the grid, and update this value annually as part of our annual review of regulated electricity prices. This would reduce the risk of estimation error and the consequences for retailers' financial viability. It would also be more likely to ensure customers received the fair and reasonable value of the energy exported to the grid.

However, this option would not necessarily provide potential PV customers with certainty about the income they would get for energy exported in future years. This may make it more difficult for them to decide to install a solar PV unit (although as suggested above, this income is likely to be less important as an incentive for installing a unit than the savings they would make in electricity bills). This option would also involve administrative costs for IPART and other stakeholders.[41]

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40 As section 2.2 noted, under net metering arrangements, the main benefit of installing a solar PV unit for customers is reductions in the amount of electricity they have to import from the grid (and purchase from their retailer) over a year. For most customers, the savings through reductions in electricity bills will outweigh the additional income earned by exporting energy to the grid.

41 IPART's current determination lasts until 30 June 2013 and it is a matter for Government whether IPART will continue to regulate electricity tariffs after this time. However if retail price regulation is removed on the basis that the market is sufficiently competitive, then presumably there would be no need to regulate the feed-in tariff as the market would ensure that customers receive the fair and reasonable value of the energy exported to the grid.

A third option is to automatically update the feed-in tariff in line with movements in some externally referenced benchmark. For example, this benchmark could be exchange traded electricity contract prices (such as d-Cypha), which represent market estimates of future wholesale electricity contract prices. This is the approach used in the UK where the feed-in tariff is adjusted annually to reflect changes in the retail price index.[42] This would reduce the administrative costs of reviewing the value of energy exported. However, the extent to which an externally referenced benchmark would accurately reflect movements in the value of the energy exported is not clear.

IPART seeks comments on the following

18 Should IPART recommend a single year feed-in tariff? If so, how should the feed-in tariff be updated over time?

4.4 Should all PV customers be eligible for the feed-in tariff?

The terms of reference require us to consider whether the feed-in tariff should be limited in application to generators of a particular size.

Given that the terms of reference require us to recommend a value and form of regulation that does not involve any government subsidy, it makes sense to limit any requirement for retailers to pay a specified tariff to their small retail customers only (ie, those consuming less than 160 MWh per annum). That is, small retail customers only (regardless of PV unit size) would be eligible to receive the feed-in tariff, while larger customers (those consuming more than 160 MWh per annum) would not be eligible to receive the specified feed-in tariff. These larger customers would need to negotiate any feed-in tariff with retailers. This would be consistent with retail price regulation, which applies to small retail customers only. Larger customers are better placed and resourced to negotiate with retailers, so there is no need to provide them with regulatory protection.

If the feed-in tariff is only an advisory benchmark rate then this is not an issue.

IPART seeks comments on the following

19 Should there be a limit on the size of the customer or solar PV unit that is eligible for this fair and reasonable value? If so, what should this limit be?

42 http://www.decc.gov.uk/assets/decc/Consultations/fits-review/fits-fast-track-government-response---final.pdf

4.5 Should the feed-in tariff vary by tariff component, location or customer type?

The terms of reference require us to consider whether a single feed-in tariff should be applied across NSW, or whether it should vary by location.

While the spot price of electricity at any particular time is the same across NSW, there are differences in the profile of consumption and generation across the State's 3 standard or network supply areas.[43] There are also differences in the amount of energy lost, and differences in network constraints across the State's 3 network supply areas, including the potential for solar PV to assist in managing network capacity. As a result of these differences, the value of energy exported by solar PV customers across the State's 3 network supply areas may differ.

Therefore, to address this issue, we first need to establish the extent of any differences in the value of the electricity PV customers export to the grid across the 3 supply areas in NSW. Our preliminary view is that we should consider recommending location-based feed-in tariffs only if these differences are material. This is because multiple feed-in tariffs would involve considerably more administrative complexity, and would be more difficult for customers to understand.

The terms of reference also ask us to consider whether the feed-in tariff should vary by customer type. This may be warranted, due to the differences between the consumption and generation profiles of customers in similar locations. For example, residential customers where generally no household members are home during working-week-days may have quite different consumption profiles to those of business customers. This is because these residential customers are likely to have low levels of consumption at times when their generation output is likely to be highest, and therefore are likely to export a higher proportion of the electricity they generate than business customers.

Once again, our preliminary view is that there should be a single feed-in tariff unless there are material differences between customer types and that any differing rates need to be able to be practically applied.

PV customers in the Essential Energy and Ausgrid areas have time-of use-meters, measuring their imports and exports in time bands, while customers in Endeavour Energy's area have accumulation meters, which measure total energy imported and total energy exported over the period, but not at the time of day. For customers with time-of-use meters, it would be more cost reflective to set the feed-in tariff by time band, but this would complicate the tariff for customers. Further, it is not consistent with our approach to setting average prices for regulated tariffs.

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43 The profile of consumption refers to a customer's pattern of electricity use over a particular time period, say 24 hours. Integral Energy customers typically have relatively peaky consumption compared to EnergyAustralia and Country Energy customers. This means there is a larger difference between peak demand and average demand.

IPART seeks comments on the following

20 Should there be a single feed-in tariff across NSW or should it vary by distribution network supply area?

21 Should there be different feed-in tariffs for different customer types (eg business and residential?)

22 Should the feed-in tariffs vary by tariff component? For example, should there be a peak rate, a shoulder rate and an off-peak rate for customers with time-of-use metering and a standard (or block rate) for customers with accumulation meters?

4.6 Should the feed-in tariff apply to net and gross metering

To date, the majority of PV customers in NSW have installed gross meters because under the Solar Bonus Scheme, gross metering arrangements provided the best financial outcome. However, that scheme is closed to new participants. Customers who are not participants in that scheme are likely to better off under net metering arrangements. (See Chapter 2 for an overview of the Solar Bonus Scheme and the difference between gross and net metering arrangements.)

Regulation could be used to ensure that customers to move onto the more financially advantageous net metering arrangements. However, effective provision of customer information could achieve a similar result.

IPART seeks comments on the following

23 Should the feed-in tariff apply to both net and gross metering, or net metering only?

5 What contribution should retailers make to the future costs of the Solar Bonus Scheme?

As previous chapters discussed, the Solar Bonus Scheme offered generous subsidies which encouraged customers to install solar PV units, mostly under gross metering arrangements. When combined with the subsidies available under the Federal Government's RET scheme and the falling capital costs of units, the payback period for these units fell dramatically over 2010. The number of installations far exceeded expectations, with 136,000 customers installing solar PV units in NSW.[44] The vast majority of these customers would be eligible under the Solar Bonus Scheme to receive a subsidised feed-in tariff of 60 c/kWh or 20 c/kWh for all the electricity they generate until 31 December 2016.

With the subsidised feed-in tariff and large uptake, the NSW Government now estimates that the Solar Bonus Scheme will cost $1.44 billion over the life of the scheme.[45] From 2012/13 on the scheme's costs will need to be met either through higher electricity prices or by taxpayers.

However, the retailers make a financial benefit from customers participating in the Solar Bonus Scheme. As part of our 2011 annual review of regulated retail electricity prices, we recommended that the NSW Government consider requiring retailers to make a contribution to the costs of the scheme to reflect some or all of this financial benefit. This contribution would reduce the Solar Bonus Scheme's future impact on electricity prices or state government budgets. The terms of reference for this review ask us to investigate an appropriate level for such a contribution.

The sections below explain gross metering arrangements, how retailers make a financial benefit from the Solar Bonus Scheme, how we propose to estimate an appropriate retailer contribution, and the risks associated with setting this contribution either too high or too low relative to the retailers' financial benefit.

5.1 What are gross metering arrangements?

Under gross metering arrangements, all electricity produced by a solar PV unit is independently metered and attracts the feed-in tariff. A separate independent meter measures all electricity used in the house.

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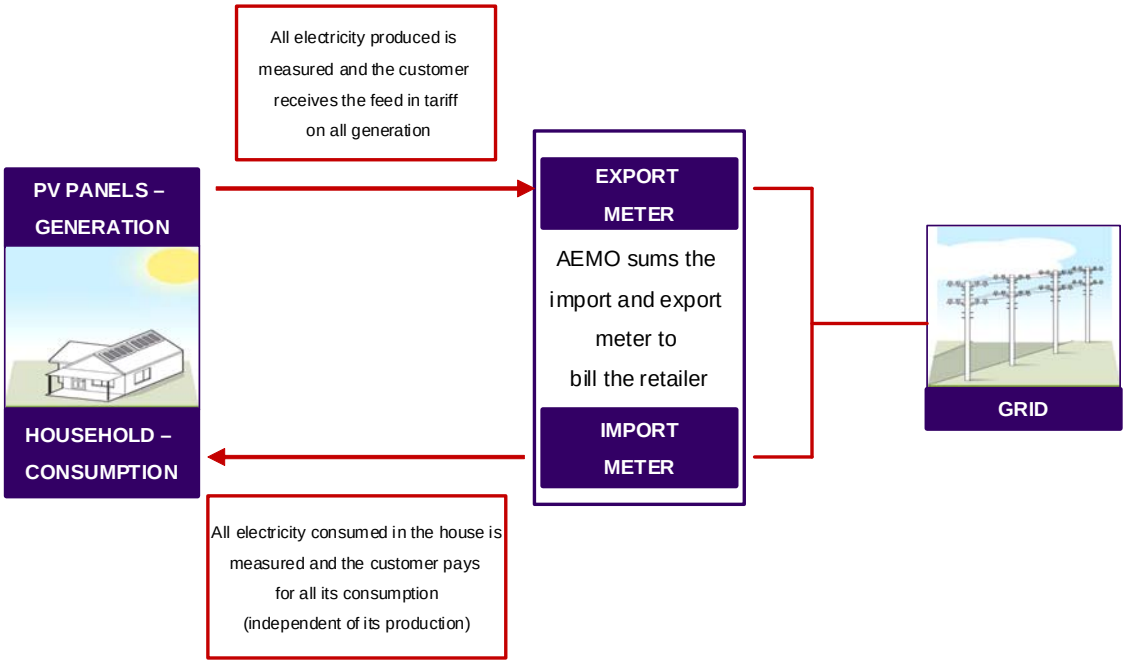
44 See Figure 1.1.

45 http://premier.nsw.gov.au/sites/default/files/110608-SBS.pdf

Figure 5.1 illustrates gross metering arrangements. It shows that the electricity flows from the panels through a meter that registers all generation. Energy from the grid or the solar PV units flows into the premises through a separate meter. Therefore, all generation and all consumption are measured separately.

When the Australian Electricity Market Operator (AEMO) settles the market, it sums together the generation and consumption meters.

Figure 5.1 Gross metering arrangements



5.2 How do retailers make a financial benefit from Solar Bonus Scheme participants?

The design of the Solar Bonus Scheme results in retailers receiving a financial benefit. Some retailers have shared this benefit with PV customers. This benefit is the same as the benefit described in Chapter 3 and arises because the retailer would avoid some of the costs it would normally incur in supplying its customer base, due to its PV customers' exports. As a result, the difference between the total revenues it collects from its customer base and the total costs it incurs in supplying this customer base would be smaller than if it did not serve PV customers.

This benefit goes to retailers, regardless of whether their customers are on the 60c/kWh or 20 c/kWh rate. Some retailers voluntarily share this benefit with customers by paying a 6 to 8 c/kWh premium on top of the statutory feed-in tariff.

That is, under the Solar Bonus Scheme:

1. **The participating customer** pays the retail price for their gross electricity consumption and receives at least the statutory feed-in tariff for the total electricity generated by their solar panels.
2. **The distributor** pays the statutory feed-in tariff for the electricity generated by the customer's panels, and recovers that money from the NSW Government[46] (or in future years, potentially through a levy on the electricity prices paid by all customers).
3. **The retailer** collects its retail price for the customer's **gross** consumption. It pays the distributor the network charges associated with the customer's **gross** consumption. However, it pays the AEMO for the energy purchase costs associated with the customer's **net** consumption (total consumption minus total generation) at the spot price. For energy produced, retailers do not avoid costs associated with complying with GGAS and ESS, but could avoid the costs associated with complying with the RET scheme.

This means that through retail prices, the retailer recovers its energy purchase costs (including NEM fees and losses) and costs associated with complying with the RET scheme based on gross consumption, but pays these costs based on net consumption, which results in it making a financial gain.

Box 4.4 and Figure 4.2 illustrate the financial gain to a retailer using a hypothetical customer who is a net consumer (ie, who consumes more electricity than they generate over a year).

5.3 How do we propose to estimate an appropriate retailer contribution?

We could estimate the appropriate retailer contribution consistent with our estimate of the financial gain to retailers for customers that are not eligible for the Solar Bonus Scheme. As discussed in Chapter 3, a retailer that serves PV customers that export to the grid can avoid some of the **costs** it would normally incur in supplying its customer base. In particular, it can avoid some of the costs involved in purchasing wholesale electricity on the National Electricity Market (NEM), paying NEM fees, paying for energy losses and paying for costs associated with the RET scheme. These avoided costs constitute the main direct financial gain to retailers with PV customers who export electricity to the grid. As Box 3.1 shows, energy and green costs represent nearly 40%of the retail price of electricity, which is currently around 20 to 25 cents per kWh.

46 Through uncommitted funds in the Climate Change Fund.

However, a retailer cannot avoid paying the network costs on the electricity its PV customers export to the grid. Nor can it avoid the majority of retail costs or ESS and GGAS compliance costs. Together, these cost components represent over 60% of the retail price of electricity.

We acknowledge that this contribution would reduce or eliminate the feed-in tariff premiums offered by retailers. However, these premiums are discretionary and can be changed in accordance with the retailer's obligations notifying the customer in accordance with the *Electricity Supply (General) Regulation 2001*[47] and the terms of the contract.

IPART seeks comment on:

24 How should we estimate an appropriate contribution of retailers to the Solar Bonus Scheme?

25 What are the key issues that need to be considered in recommending a contribution by retailers to the Solar Bonus Scheme?

47 *Electricity Supply (General) Regulation 2001*, reg 21 and 22.

Box 5.1 An illustration of the financial flows under the Solar Bonus Scheme

For illustrative purposes, let's assume that a household participating in the Solar Bonus Scheme consumes 6000 kWh and produces 2000 kWh in a year. The financial flows are described below, and are also represented in Figure 4.2.

The **customer**:

- **Pays** their retailer the applicable retail price for the entire 6000 kWh.
- **Receives** the statutory feed-in tariff from the distributor for the 2000 kWh of electricity generated. (In practice the distributor pays the retailer who passes it through to the customer, but Figure 5.2 shows the distributor paying the customer for simplicity.)
- **Receives** any premium rates on the feed-in tariff that their retailer offers (eg, an additional 6c/kWh) for the 2000 kWh of energy produced. This is a market offering that can be changed subject to the retailer notifying the customer in accordance with the *Electricity Supply (General) Regulation 2001* (reg 21 and 22)) and the terms of the contract.

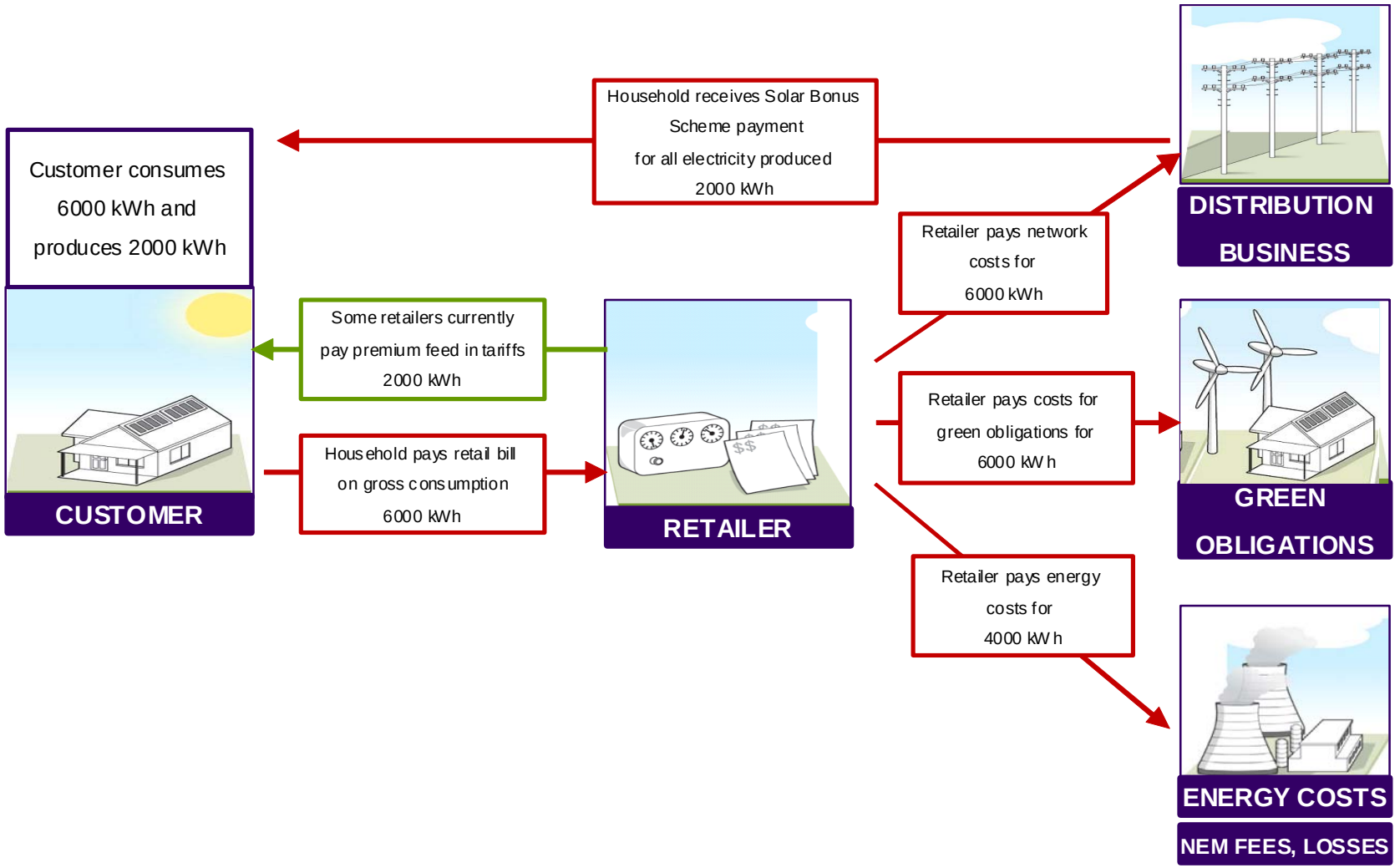
The **distributor:**

- **Pays** the feed-in tariff for the 2000 kWh of electricity generated to the customer (in practice through the retailer).
- **Recovers** the costs of the feed-in tariff for the 2000 kWh of electricity generated through funding arrangements determined by the NSW Government, which could include funds from the Climate Change Fund, a special Solar Bonus Scheme levy or funds from consolidated revenue.
- **Receives** from the retailer the network tariff for the 6000 kWh consumption.

The **retailer:**

- **Pays** AEMO the pool price for customer's net consumption of 4000 kWh (there may be additional financial flows for financial hedges), including the energy losses incurred in supplying that electricity. (AEMO deducts the electricity produced from the PV system from the energy consumed by that household and bills the retailer for the net amount of energy consumed.)
- **Pays** AEMO market fees for the customer's net consumption of 4000 kWh of electricity, including the energy losses incurred in supplying that electricity.
- **Pays** RET**,** GGAS and ESS obligations on the customer's gross consumption of 6000 kWh
- **Pays** the distributor network charges for the customer's gross consumption of 6000 kWh.
- **Receives** the retail price for the customer's gross consumption of 6000 kWh.

Figure 5.2 An illustrative example of financial flows under Solar Bonus Scheme with gross metering arrangements



5.4 Impact on competition of setting the retailer contribution too high or too low

Similar to the "reasonable and fair value" tariff, the level of the retailer contribution relative to the level of the financial gain made by the retailers will affect the attractiveness of customers with solar PV units. If the rate is set too high relative to the financial gain retailers make as a result of their PV customers' exports, serving these customers may impose costs on retailers. Clearly, this will reduce PV customers' attractiveness to retailers, and they may either try to avoid entering into market contracts with these customers, or offer higher rates than other customers.[48] This could have impacts for the competitiveness of the market. Alternatively, if we set the rate too low then electricity prices will need to increase by more than otherwise to meet the costs of the Solar Bonus Scheme.

[48] All customers have a right to be supplied with electricity by standard retailers, and standard retailers cannot discriminate against customers on the basis that customers use alternative forms of energy or energy from alternative sources, or use products or services that reduce energy demand. *Electricity Supply Act 1995*, ss34 and 35.

Appendices

A Terms of Reference

Reference to IPART under s9 of the IPART Act

I, Barry O'Farrell, Premier of New South Wales, approve the provision of services by the Independent Pricing and Regulatory Tribunal (IPART) under section 9 of the Independent Pricing and Regulatory Tribunal Act 1992, jointly to the Office of Environment and Heritage (Department of Premier and Cabinet) and the NSW Department of Trade, Investment, Regional Infrastructure and Services, by conducting a review in accordance with the following terms of reference.

IPART is to independently investigate and report on a fair and reasonable value for electricity generated from small-scale solar PV consistent with the COAG National Principles for Feed-in-Tariffs.

In investigating and reporting on a "fair and reasonable" value for small-scale solar PV, IPART is to consider the following key parameters:

- there should be no resulting increase in electricity prices in NSW;
- a fair and reasonable value will not be funded from the NSW Government budget;
- any price should be administratively simple and must take into account the impact on business operations of administering such pricing; and
- a fair and reasonable price benchmark should operate in such a way as to support a competitive electricity market in NSW.

As part of its investigation and report, IPART is also to consider:

- the benefit gained by customers and retailers from electricity produced from small-scale solar PV;
- whether a fair value should be linked to particular metering arrangements;
- whether the facilitation of retailer competition would require any supporting arrangements;
- whether a fair value should be limited in application to generators of a particular size or in a particular location; and

- the impact of small-scale solar PV, if any, on the costs of network distribution businesses, including capital and operating costs. IPART is requested to investigate this issue to the extent necessary to make recommendations as to whether comprehensive network system modelling is warranted.

IPART is also to report on the mechanism(s) by which a fair and reasonable value could be implemented in NSW and which can potentially transition to a national scheme if one is established. In reporting on an implementation mechanism IPART is to consider:

- The need for predictability for customers wanting to install small-scale solar PV;
- Arrangements for reviewing the fair and reasonable value at appropriate intervals;
- The place of an independently derived fair and reasonable value within a competitive market with a mixture of regulated and market-determined price offerings.
- A key question for consideration is how a fair and reasonable value should apply within NSW, for example:
  - as a mandated floor price;
  - as a mandated price range (with, or without an upper limit);
  - at the discretion of the competitive market; and/or
  - as an advisory benchmark.
- Similar pricing and mechanisms in other jurisdictions.

As a related task, IPART is to investigate the contribution that could be made by retailers to the cost of the Solar Bonus Scheme. This contribution would reflect the benefit to retailers of the energy produced by small scale solar PV generators.

Public consultation

IPART should consult with stakeholders by issuing an Issues Paper and Draft Report and calling for submissions. It may also hold a public hearing. IPART must make its Issues Paper and Draft and Final reports available to the public.

Timing

IPART is to complete this investigation within 8 months of receiving the terms of reference, and release its Draft Report by the end of November 2011.

Background

Renewable energy is a critical part of Australia's energy future and the NSW Government is committed to building a prosperous sector in NSW that will contribute to meeting Australia's 20 per cent renewable energy target by 2020.

The NSW Government recently held a Solar and Renewable Energy Summit that brought together industry, energy experts, government, environment and community groups to discuss actions to ensure further development of solar and other renewable energy in NSW. A draft Solar and Renewable Energy Plan will be prepared for public consultation, informed by discussions at the Summit, with oversight from a Joint Industry-Government Taskforce.

Electricity retailers gain a benefit for the net electricity exported from small-scale solar PV to the grid.

In this context the NSW Government is committed to there being a fair and reasonable value for energy generated from small-scale solar PV following the closure of the Solar Bonus Scheme. Such a value should operate to support a sustainable solar PV industry, avoiding "boom/bust" cycles.

The NSW Government's preference is for a national renewable energy buy-back framework, consistent with the COAG National Principles for Feed-in Tariffs. In the absence of a national framework, however, the NSW Government supports the introduction of a state-based fair value framework for small-scale solar PV electricity buy-back.

An independently determined value will provide customers with a level of assurance that the price they are receiving is fair and reasonable and also a point of comparison to enable customers to better consider and negotiate offers.

The potential benefits and costs to network distribution businesses from small-scale solar PV will also be considered, including impacts (such as costs or avoided costs) which may be attributable to specific small-scale solar PV systems.

This component of IPART's investigation will be completed in light of a number of reviews planned or underway, including by the Australian Energy Regulator and the Australian Energy Market Commission, examining network pricing rules and policies.

B IPART's role in setting regulated electricity prices

IPART is responsible for setting the regulated electricity prices for around two thirds of residential and small business customers in NSW. These are the prices that the Standard Retailers – EnergyAustralia (now owned by TRUenergy) and Country Energy and Integral Energy (now owned by Origin Energy) – charge customers who have not signed a negotiated contract with either with them or another retailer.

IPART sets prices to enable Standard Retailers to recover the costs they incur in supplying electricity to small retail customers.

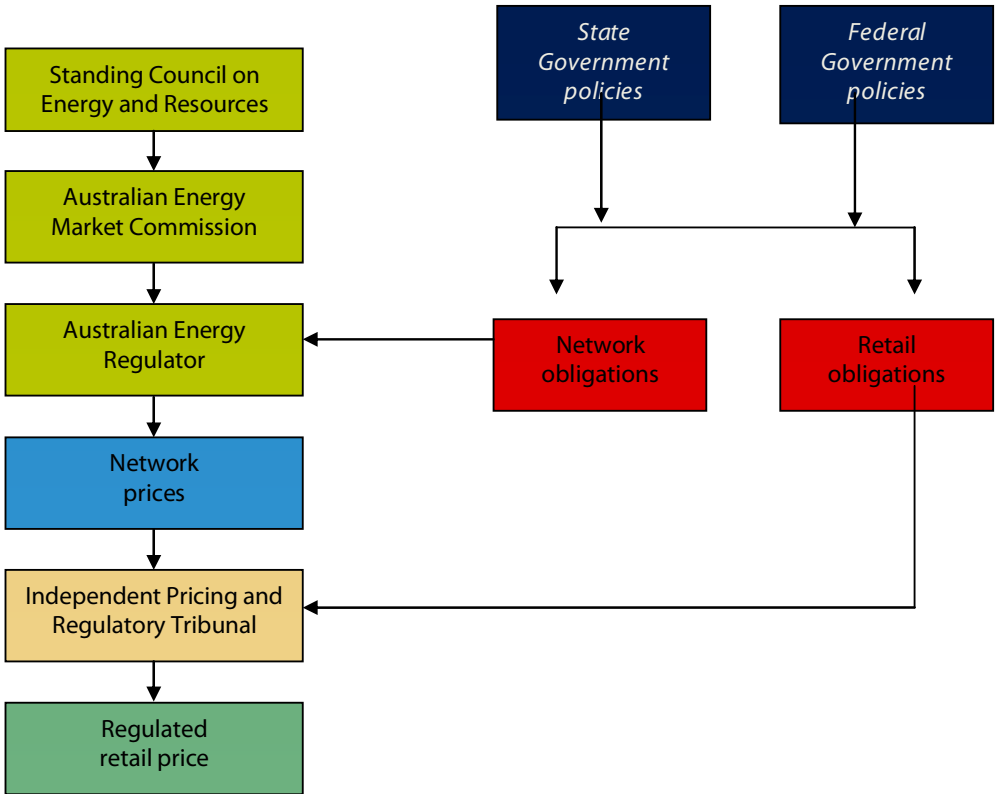
The largest cost component of electricity prices is network charges, which are the costs of transporting electricity from generators to homes and businesses across the wires. These costs, which are around half the end price, are set by the Australian Energy Regulator, who regulates networks under the National Electricity Rules. These Rules are set by the Australian Energy Market Commission. In turn, the Australian Energy Market Commission provides advice to the Standing Council on Energy and Resources (formerly the Ministerial Council on Energy) and operates under the National Electricity Law.

The next largest cost component is energy costs. The wholesale energy market is not subject to economic regulation, but is operated by the Australian Energy Market Operator under the Rules.

State, Territory and Federal Governments have imposed statutory obligations on network and retail businesses. An example is the Federal Government's Renewable Energy Target scheme, which imposes obligations on retailers under the *Renewable Energy (Electricity) Act 2000* (Cth) and accompanying regulations. Another example is the reliability standard imposed on the network businesses by the NSW Government.

After considering the costs of running the business, buying and transporting electricity and meeting all relevant statutory obligations, we set the final retail price that is paid by regulated customers.

Figure B.1 IPART's role in setting regulated prices



C Components of the retail price

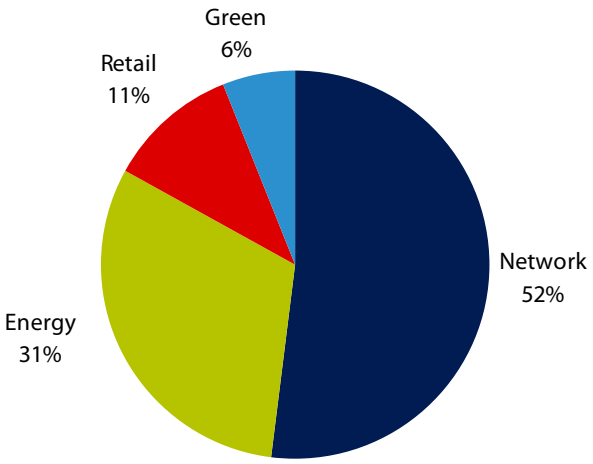
The retail price for electricity has 4 main components:

- Network costs, which are the costs of transporting electricity from the generators to customers via the transmission and distribution networks. These charges are regulated by the Australian Energy Regulator and have increased significantly in recent years.
- Energy costs, which include the costs of
  - purchasing electricity from generators on the wholesale electricity market, including managing the risks of the volatile spot market through hedging products
  - paying for National Electricity Market (NEM) fees and for electricity losses, which is electricity that is lost in the distribution system due to electricity resistance and heating of conductors.
- Green scheme costs, which represent the costs of complying with several green (or climate change mitigation) schemes, as required by the Federal and NSW Governments.
- Retail costs and margin, which includes the costs of running the retail business (including call centre costs, billing costs, etc) and making an appropriate return.

Figure C.1 illustrated the components of a retail price.[49] The largest component is network costs, comprising more than half the retail price. The energy costs component is the second largest component. While green costs represent only 6% of the final price, it is the fastest growing cost driver.

[49] Based on the regulated price for small retail customers.

Figure C.1 Components of a retail price, 2011/12



C.1 Network costs

Network costs reflect the charges that retailers must pay to transport electricity from the generator to the customer using the transmission and distribution networks.

These charges are regulated by the Australian Energy Regulator (AER) and have increased significantly in NSW in recent years. On 1 July 2011 they increased by:

- 20% for AusGrid (formerly EnergyAustralia) and Essential Energy (formerly Country Energy)
- 15% for Endeavour Energy (formerly Integral Energy).

The increases in network costs are driven by the major capital investment programs the network businesses are undertaking to:

- Cope with growing loads and meet rising peak demand as the State's population grows and patterns of electricity use change.
- Replace aging assets.
- Meet more rigorous licensing conditions intended to import network security and reliability.

The AER has made a price determination for the NSW network businesses that applies until 30 June 2014.

C.2 Energy costs

Energy costs are the second largest component of the final retail price. It represents the costs of purchasing electricity in the NEM, which reflects the spot price of the mandatory electricity pool and the hedging arrangements that retailers enter into to manage their risk. Energy costs also include NEM fees and ancillary charges and the recovery of costs associated with technical electricity losses.

C.2.1 Electricity and hedging costs

Electricity retailers buy energy in a wholesale market characterised by volatile spot prices, currently ranging from -$1,000 to $12,500/MWh, but sell energy to customers at prices that tend to be fixed. In this environment, retailers' margins can be quickly eroded by a short period of high spot prices if retailers are not adequately hedged. In order to manage the price risk associated with buying at variable prices and selling at fixed prices, retailers enter into a range hedging contracts.

In our recent electricity price determination we estimated the market based energy costs (inclusive of hedging) at $46 to $50/MWh for 2011/12 (varying by supply area).[50]

C.2.2 Loss factors

As electricity flows through the transmission and distribution networks, energy is lost due to electrical resistance and the heating of conductors.

The impact of network losses on spot prices is represented as transmission and distribution loss factors. All transmission loss factors and high-voltage distribution loss factors are calculated using engineering analysis. However, distribution loss factors for the low voltage network are calculated by deducting metered electricity (as read by the distributors from each premises) from the amount of electricity that is delivered to the low voltage network. The distributors calculate distribution loss factors, which the AER approves.

In setting the retail price, the energy allowance is 'scaled up' to account for the energy losses so that the retailer can recover the costs that it faces.

Historically there has not been a large amount of generation exported to the grid from small scale solar PV units. Because the first tier retailer is responsible for the net electricity delivered to the transmission connection point (see Figure D.1), the loss factors calculation needs to specifically account for the increasing PV generation.

50 IPART, *Changes in regulated electricity retail prices from 1 July 2011 - Final Report and Determination*, June 2011, p 34.

Around 10% of electricity generated is lost in its transport to customers, meaning that more electricity must be generated than is used by customers.[51]

C.2.3 NEM fees

AEMO imposes fees on retailers to recover the costs of operating the market. NEM fees are levied on retailers on a per MWh basis according to their net electricity purchases (imported electricity minus exported electricity, as recorded by AEMO). NEM fees represent less than $1/MWh and less than half a percent of the retail bill.

Currently, AEMO bill the retailers based on its own data. The amount billed is the amount taken from the gird less the amount generated (for gross metering) and exported (for net metering).

C.3 Green scheme obligations

Both the NSW and Federal Governments impose green scheme obligations on retailers.[52] While historically these obligations have not significantly increased retailers' costs, small-scale solar obligations have materially added to costs more recently. On 1 July 2011 changes to the Federal Government's RET scheme added 6% to retail bills. The vast majority of that increase was attributed to the small scale component of the RET scheme. The costs of the Solar Bonus Scheme were not factored into the 1 July 2011 price increases.

C.3.1 RET scheme

The Federal Government's Renewable Energy Target scheme (RET scheme) is designed to generate 20% of Australia's annual electricity consumption from renewable sources by 2020. On 1 January 2011 the scheme was split into 2 parts:

- the Large-scale Renewable Energy Target (LRET), and
- the Small-scale Renewable Energy Scheme (SRES).

The LRET has annual targets set by the legislation that transition to at least 41,000 GWh of generation by 2020. Under the LRET, electricity retailers are obliged to purchase and surrender a certain number of Large Scale Certificates (LGCs) per year, each representing 1 MWh of renewable energy generation from large-scale technology. The price of certificates is determined by the market.

The SRES is a new obligation that commenced on 1 January 2011. Under this scheme, retailers are obliged to surrender Small-scale Technology Certificates (STCs) from households and small businesses that take up small-scale technologies like solar panels and solar hot water heaters. Each represents 1 MWh of renewable energy

51 AEMO, *An introduction to Australia's National Electricity Market*, July 2010, p 16.
52 Under the *Electricity Supply Act 1995* (NSW) and *Renewable Energy (Electricity) Act 2000* (Cth).

from small-scale solar generation, except for the Solar Credits multiplier effect, which allows more STCs to be created than MWh of renewable energy generated. The number of STCs that retailers must surrender each year is not capped – rather it depends on the extent to which customers take up small-scale technologies. While the price of each certificate is determined by the market, certificates can be sold through a clearing house for a set price of $40.

Currently meeting the obligations under the RET scheme adds around $9/MWh or 6% to electricity bills.

C.3.2 ESS and GGAS

The NSW Greenhouse Gas Reduction Scheme (GGAS) is designed to reduce the greenhouse gas emissions associated with the production and use of electricity. The scheme establishes emissions benchmarks for the scheme participants (which includes electricity retailers). They must meet these benchmarks by obtaining and surrendering NSW Greenhouse Gas Abatement Certificates based on the size and their share of the NSW electricity market.

The NSW Energy Savings Scheme (ESS) was introduced on 1 July 2009. This scheme establishes legislated annual energy savings targets for electricity retailers (and other participants). To meet their obligations, retailers must surrender an appropriate number of Energy Savings Certificates (ESCs). ESCs may be created from recognised energy savings activities that either reduce electricity consumption or improve the efficiency of energy use.

The retailers' liabilities under both GGAS and ESS is dependent on the amount of electricity that they purchase. This calculation will be made by taking the AEMO net consumption data and adding electricity exported by solar PV units.

Currently ESS and GGAS collectively add about $1.10/MWh to the electricity price, which is less than 1% of the total energy price.

C.4 Retail costs and margin

In supplying their customers, electricity retailers perform a range of retail functions including billing, marketing, providing advisory services, promoting and advertising their services, and handling customer inquiries.

Retailers also face a range of risks, including systematic (or market) risks and non-systematic (or industry-specific) risks. In setting the regulated prices, we factored in allowances for the risks.

The costs to supply customers with solar PV units may differ from a customer without solar PV units because the retailer is required to produce additional statements and provide a refund or deduction for the generation exported or produced. Additionally, customers with solar PV units might be more likely to contact the call centre with queries or a request for a refund.

D The National Electricity Market

The National Electricity Market (NEM) operates as a wholesale market for the supply of electricity to end-users (usually through retailers) in Queensland, NSW, Victoria, South Australia and Tasmania. It is the world's longest interconnected power system – 5000 kilometers from Port Douglas to Port Lincoln.

Exchange between electricity producers and consumers is facilitated through a pool where output from generators is aggregated and scheduled to meet demand. Electricity lends itself to pool trading because it is used instantaneously and is a homogenous product – one unit of electricity cannot be distinguished from another unit and it is impossible to tell which generator produced a particular unit.

The Australian Energy Market Operator (AEMO) is responsible for the operation of the power system and market. It also performs a data management function.

D.1 The spot market

Wholesale trading in electricity is conducted as a spot market where supply and demand are instantaneously matched. Generators offer to supply the market with specific amounts of electricity at particular prices. Offers are submitted every 5 minutes of every day. AEMO issues instructions to each generator to produce the required quantity of electricity that will meet demand at all times in the most cost efficient way, while maintaining the technical security of the power system.[53]

A dispatch price is determined every 5 minutes and 6 dispatch prices are averaged to determine half-hourly spot prices in each region (which is usually each state). These spot prices are then used to settle financial transactions for energy traded in the NEM.

The National Electricity Rules set a maximum spot price (called the Market Price Cap) of $12,500/MWh and a price floor (called the Market Floor Price), which is -$1,000/MWh. Generators might offer electricity at a negative price if it will cost it more to shut down than it does to continue running and pay to put electricity onto the grid.

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53 AEMO stacks the offer bids of all generators in ascending price order for each 5 minute dispatch period. It dispatches the cheapest generator bids first, then progressively more expensive offers until enough electricity is dispatched to satisfy demand. This results in demand being met at the lowest possible cost. AER, *State of the Energy Market 2009*, p 74-5.

In our recent electricity price determination we estimated that the average spot price of electricity in NSW for 2011/12 will be around $37/MWh.[54]

D.2 AEMO settlements arrangements

Customers are required to install meters to record their electricity consumption. This data is used for the retailer to bill the customers, but is also used for the distributor and AEMO to bill the retailer for the network and spot price costs, respectively.

The distributor reads the meter and sends the metering data is to AEMO for financial settlements. Electricity customers in NSW have the right to choose to be supplied by a licenced retailer. AEMO facilitates the transfer of metering information from the distributors (who read the meters for small customers) and the respective retailers.

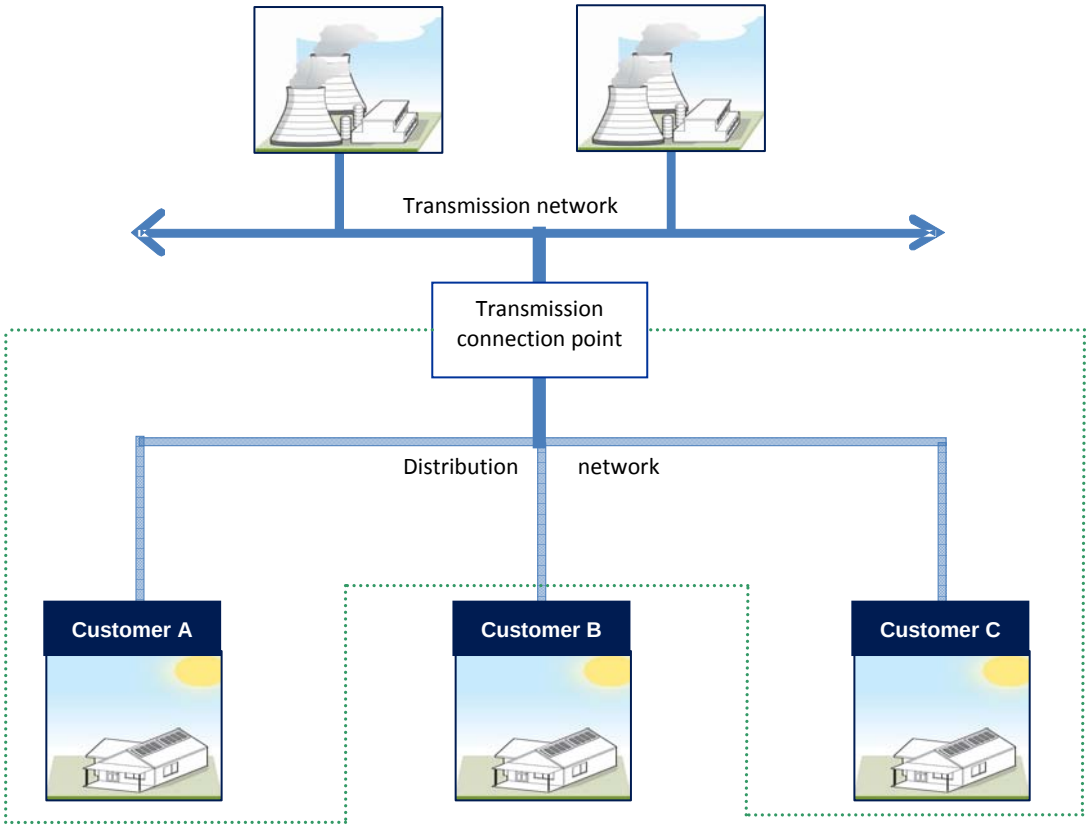
AEMO settles the NEM weekly. This involves AEMO collecting money due from the retailers (and large customers) and paying the generators. The spot price is the basis for these financial transactions.

AEMO settles the market by charging first tier retailers (known as the host, local or default retailer) for all electricity supplied to the distribution network, measured at the transmission connection points, less energy supplied to any customers within the distribution network that are supplied by alternative retailers.

This is illustrated in Figure D.1, below where Retailer 1 is the first tier retailer and has customers A and C. Retailer 2 has customer B. Retailer 1 will be billed for all energy delivered to the transmission connection point less the amount of energy read from the meter of customer B (adjusted for losses) – therefore it will responsible for the energy inside the dashed green area.

54 Frontier Economics, *Energy costs – annual review for 2011/12 and 2012/13, a final report prepared for IPART*, June 2011, p 28.

Figure D.1 AEMO's settlement of the market



E Gross and net metering arrangements for solar PV

Customers have meters on their premises to measure their consumption. Some older-style meters for small customers are 'accumulation' meters, with the spinning disk, which measure the total amount of electricity consumed, but not the time of day when it was consumed. There are also 'interval' or 'time of use' meters, which measure the band in which the electricity was consumed (peak, off peak and shoulder) or usage by half hour.

Customers with solar PV units usually have interval or time of use meters. There are different types of interval or time of use meters. While AusGrid collects data on a 30 minute basis, Essential Energy collects the data only in the time-bands that it uses for billing (peak, off-peak and shoulder). Endeavour Energy does not collect information from its solar PV customers on the time of day when electricity is generated or consumed.

As set out in Appendix D, the distributor is responsible for reading the meters and providing the data to AEMO.

There are 2 types of metering arrangements for customers with solar PV units:

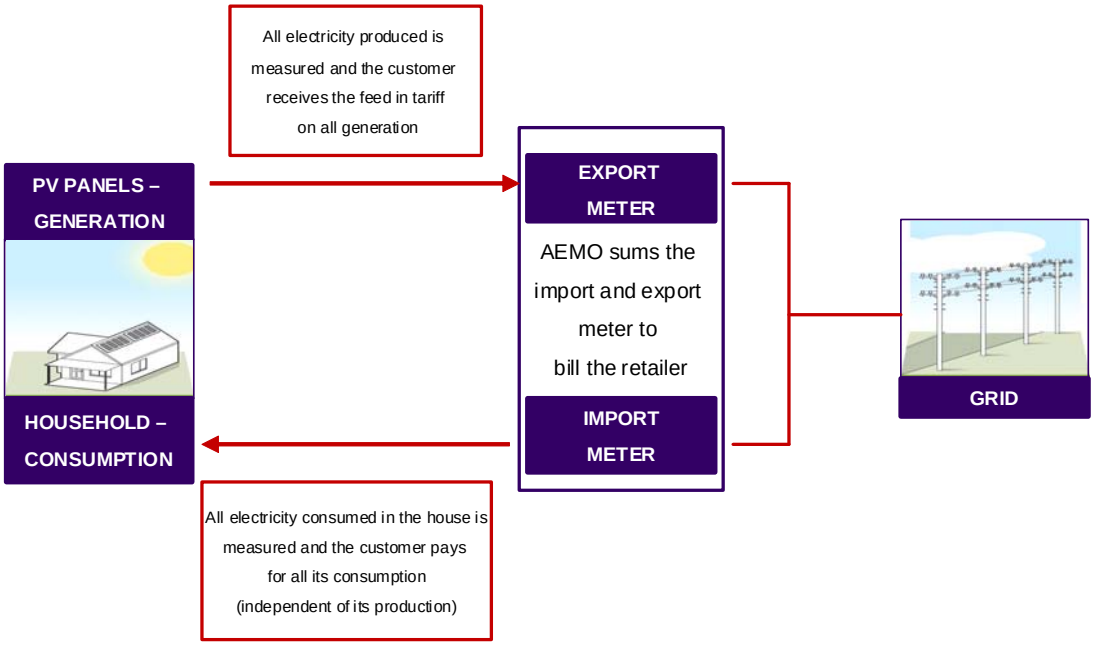
- gross metering arrangements – where all electricity produced by the PV units is measured on one meter and all consumption in the premises is separately measured on a different meter, and
- net metering arrangements – where electricity exported to the grid is measured on the export meter and electricity imported from the grid is measured on an import meter.

E.1 Gross metering arrangements

Figure E.1 illustrates gross metering arrangements. It shows that the electricity flows from the panels through a meter that registers all generation. Energy from the grid or the solar PV units flows through the consumption meter. Therefore, all generation and all consumption are measured separately.

When AEMO settles the market it sums together the generation and consumption meters.

Figure E.1 Gross metering arrangements



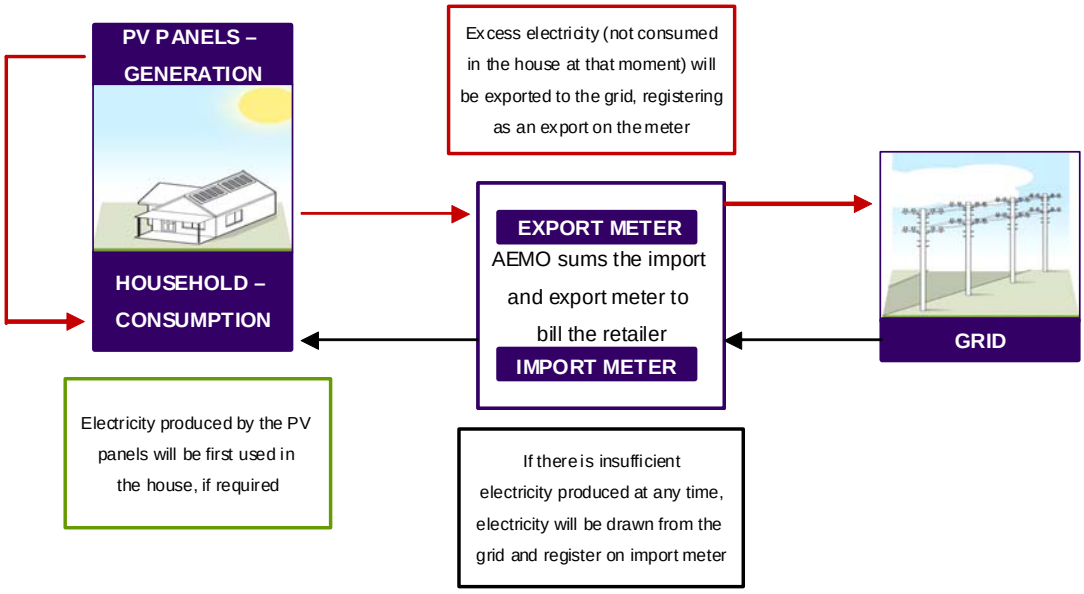
E.2 Net metering arrangements

Figure E.2 illustrates net metering arrangements. It shows that electricity that is generated by solar PV units is first used in the house, if required. If there is excess electricity generation at any point in time, it will be exported to the grid, registering on the export meter. If at any time there is not sufficient electricity being generated for use in the premises, electricity will be imported from the grid, registering on the import meter. For example, this would occur at night, when the PV panels are not generating electricity. The customer pays the retail price for this imported electricity.

Therefore, the metering will not measure electricity produced that is consumed in the premises but rather the amounts of electricity imported and exported.

When AEMO settles the market it sums together the import and export meters.

Figure E.2 Net metering arrangements



The distributor uses the metering information to bill the retailer for network charges for each customer. For customers participating in the Solar Bonus Scheme with a gross metering arrangement, the distributor will bill the retailer for all energy used in the house. For customers with solar PV units on a net metering arrangement, the distributor will bill the retailer for imported electricity. This means that the distributor will not levy network charges on electricity that is produced by the solar PV units that is consumed within the house.

Therefore, the usage that the distributor bills the retailer for is greater under gross metering arrangements than it is under net arrangements.

In the absence of a subsidy, customers installing PV units will be better off with net metering arrangements because they will save the entire retail price for electricity that it produces and consumes itself but will only earn a proportion of that retail price for electricity that it exports.

F Feed-in tariffs and retailer contributions in other jurisdictions

State, Territory and Federal governments have offered financial subsidies to customers installing solar PV units.

The schemes in each jurisdiction have differed in the scheme length, the rate paid, the metering arrangements, eligibility requirements and the funding of the scheme.

As illustrated in Figure 1.1, there has been a substantial uptake of solar PV units across Australia, but particularly in NSW, Queensland, Victoria and South Australia, reflecting the generous subsidies offered to customers. Both State and Federal Governments have adjusted their subsidies in response to this rapid uptake. This has led to uncertainty for customers looking to install PV units and for the industry itself.

NSW was the first jurisdiction to indicate that its feed-in tariff will be subsidy free. In August 2011, the Western Australian Government suspended its scheme. Without a subsidy, the feed-in tariff policy should be more stable as the Government does not seek to make changes to the level of the feed-in tariffs in order to manage the costs of the scheme.

F.1 Feed-in tariffs in other Australian jurisdictions

Most Australian jurisdictions offer subsidised feed-in tariff schemes. Table F.1 summarises the arrangements currently in place. While NSW and the ACT previously had gross feed-in tariff schemes, all jurisdictions now have net feed-in schemes.

Table F.1 Feed-in tariff schemes

City*	Net feed-in tariff
Adelaide	44 c/kWh
Brisbane	44 c/kWh
Canberra**	20 c/kWh
Darwin	19 c/kWh
Hobart	20 c/kWh
Melbourne	60 c/kWh
Perth^	7 c/kWh
Sydney#	6-8 c/kWh

* The SA feed-in tariff scheme will be closed to new applications for the 44 c/kWh feed-in tariff category on 30 September 2011. From 1 October 2011 new entrants to the scheme between this date and 1 October 2013 will be able to receive a 16 c/kWh feed-in tariff to 30 September 2016.

** Applications to the ACT feed-in tariff have been placed on hold. No new applications to the scheme will be considered from midnight 31 May 2011.

^ The WA feed-in tariff scheme was suspended on 1 August 2011, after reaching its quota. No new applications are being taken. The Government has introduced the Renewable Energy Buyback Scheme (REBS) in which retailers purchase electricity exported to the grid at a rate that reflects its value to the retailer. Synergy is currently offering 7c/KWh for energy exported to the grid.

Applications to the NSW feed-in tariff have been placed on hold. No new applications to the scheme will be considered from midnight 28 April 2011. Some retailers are voluntary offering customers a feed-in tariff of 6-8c/kWh on electricity exported to the grid.

Source: Adapted from the Clean Energy Council, *Consumer Guide to buying household solar panels.*

http://www.cleanenergycouncil.org.au/cec/resourcecentre/Consumer-Info/solarPV-guide.html

F.2 Retailer contributions to feed-in tariff schemes

Some feed-in tariff schemes require retailers to make a contribution towards the cost of the scheme.

In South Australia, the current tariff of 44 c/kWh will be closed to new customers from the end of September 2011. The *Electricity (Miscellaneous) Amendment Bill 2011* (SA) as passed by both houses provides for a feed-in tariff rate of 16 c/kWh from 1 October 2011. Electricity retailers will also be required to make a prescribed contribution that will be determined by the Essential Services Commission of South Australia.

While now closed to new connections, the ACT electricity feed-in tariff scheme required retailers to make a contribution of 6 c/kWh. According to the Independent Competition and Regulatory Commission, that was approximately the saving that retailers were able to make by avoiding the purchase of electricity from the NEM.[55] Although the feed-in tariff scheme has now closed, ActewAGL is currently offering a Solar Buyback Scheme where it purchases the net energy exported at the customer's energy tariff rate.[56]

55 Independent Competition and Regulatory Commission, *Electricity Feed-in Renewable Energy Premium: Determination of Premium Rate,* March 2010, p 4.

56 http://www.actewagl.com.au/Product-and-services/Green-energy/Connecting-green-energy-systems/ActewAGL-Solar-buyback-scheme.aspx

G Competition in the retail electricity market

If competition is effective, retailers are less likely to be able to provide payments to customers for the energy produced by small scale solar PV, significantly below fair value. This means that the form of regulation can be more light-handed, as competition will provide customers with choices and provide payments to customers at efficient levels.

The purpose of reviewing competition in the retail electricity market is **not** to determine whether it is sufficiently effective for regulation to be phased out. The responsibility for this rests with the Australian Energy Market Commission (AEMC), which is scheduled to conduct a review of the NSW retail electricity market in 2012.[57] The NSW Government has committed to maintaining retail price regulation at least until 2013.

G.1 Our 2010 analysis of the competitiveness of the retail electricity market

As part of its 2010 review, IPART considered the level of retail market competition in the three standard supply regions and found that competitiveness of the market had not changed significantly since 2007.[58] This supported a relatively light-handed approach to regulation where there is significant discretion for retailers to set individual tariffs within an overall price cap.

G.1.1 Market structure

Several structural features of a market are likely to promote competitive pressure. These include the number of retailers and the market concentration (or relative market share of the retailers), as well as barriers to new retailers entering the market.

57 Under the Australian Energy Market Agreement, the AEMC is responsible for reviewing and publicly reporting on the effectiveness of retail competition in all jurisdictions participating in the NEM, for the purpose of removing retail price regulation where competition is effective.

58 IPART, *Review of regulated retail tariff and charges for electricity 2010-2013*, March 2010, p 32.

The more concentrated the market, the greater the potential for businesses to exercise market power. Therefore, a market with a considerable number of businesses may still not exhibit effective competition if it is concentrated in the hands of a small number of businesses. In our 2010 review we found that Standard Retailers had continued to lose market share to second-tier retailers, however Country Energy had retained a more substantial market share in its standard supply area than the other Standard Retailers.

Barriers to entry are the characteristics of a market that may make it difficult or less attractive for businesses to enter or exit (excluding obstacles that are part of the normal process of entering a market). Generally, a competitive market does not have significant barriers to entry. We found there were relatively low barriers to entry to entering this market.

G.1.2 Market conduct and customer outcomes

In an effectively competitive market, the market information available and the retailers' behaviour should be conducive to customers negotiating deals that are in the customer's best interest. In March 2010, we found there had been an increase in marketing activity from 1 July 2009 and customer switching rates had increased over the second half of 2009. The proportion of customers on regulated prices in each of the standard areas was declining.

However, the retail market was found to be less transparent over the 2007 to 2010 determination period. This made it difficult for customers to access tariff information for comparison purposes. In addition, some retailers had moved away from the practice of marketing retail offerings based on a discount relative to regulated tariffs. This was likely to have increased the search costs for customers looking for more competitive offers in the market place. The lack of transparency also affected the accuracy of pricing comparator services offered by private businesses.

For customers who entered the competitive market, outcomes were not uniformly beneficial. Although a substantial number of customers continued to enter into negotiated contracts with second-tier retailers at discounted rates compared to the regulated tariffs, some were likely to be paying rates higher than the regulated tariffs. With regard to service offerings, there had been a large increase in the Green Power or renewable energy content products available to customers, which increased the level of product diversity to customers.

G.2 Recent market developments

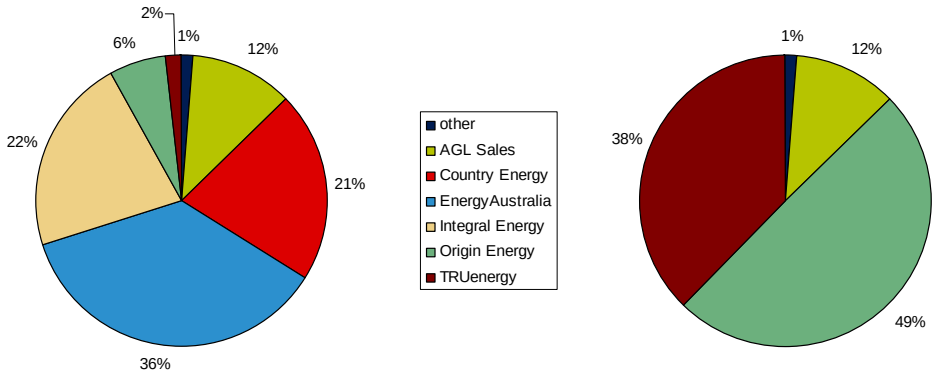
There have been a number of changes in the retail electricity market since our 2010 review. In some cases, the full implications for retail electricity competition have yet to be seen.

G.2.1 Market structure

Earlier this year, the NSW Government sold the three State-owned retailers to TRUenergy and Origin Energy as part of its energy reform strategy. Origin Energy bought Integral Energy and Country Energy's retail business and TRUenergy bought EnergyAustralia's retail business. As a result, the market concentration in NSW has increased (Figure G.1 below). The market shares of these retailers within their individual supply areas would have also increased.

However, just because the market concentration has increased does not necessarily mean that the market is any less competitive. A concentrated market can be competitive if it has sufficient competitors or low barriers to entry.

Figure G.1 Retail market shares of small customers pre and post NSW market reforms (customer numbers as at 30 June 2010)



Data source: Collated from IPART, *Electricity retail businesses' performance against customer service indicators in NSW - For the period 1 July 2006 to 30 June 2010* - Information Paper, January 2011, p 5.

G.2.2 Market conduct and customer outcomes

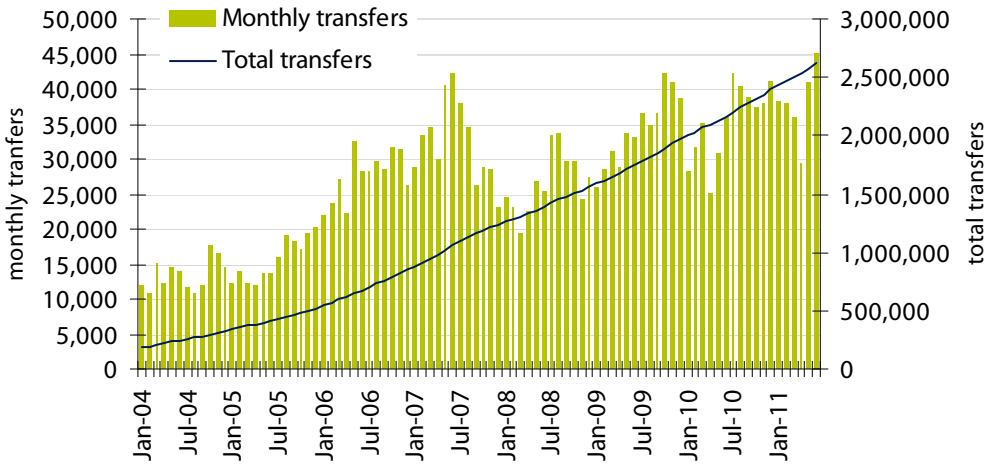
We made recommendations in our 2010 review to impose conditions on retailers to make it easier for customers to gain access to information about retail tariffs. We also made a recommendation that the NSW Government provide a price comparison service to make it easier for customers to determine if they were getting the most appropriate deal. Both these recommendations were implemented and we believe they have improved market information.[59]

[59] For further information see IPART, *Electricity and gas retail price disclosure and comparison guidelines*, June 2010.

For a market to be effectively competitive, customers need to participate in it and this participation must lead to positive outcomes for them. When we considered this issue in 2010, we cautioned against over-emphasis on customer switching rates. While switching rates may provide a good indicator of whether customers are active in the market, they are not necessarily a good measure of whether they are exercising choice effectively.

Figure G.2 shows the number of small customers in NSW who have switched retailers since the end of 2003. Over our 2007 and 2010 electricity determination periods customer switching rates continued to grow steadily.

Figure G.2 Number of transfers for small customers in NSW, January 2004 to June 2011



Data source: Collated from AEMO, Retail Transfer Statistics - http://www.aemo.com.au/data/retail_transfers.html

The Public Interest Advocacy Centre (PIAC) recently completed a study of consumer awareness and market behaviour in the electricity market in 5 regions of rural and regional NSW.[60] Results from the study indicated that the majority of respondents were aware of the ability to choose electricity retailer. However, in each region the proportion of respondents who indicated such awareness was lower than in regions previously surveyed by IPART.[61]

[60] Public Interest Advocacy Centre, *Choice? What Choice? A study of consumer awareness and market behaviour in the electricity market in five regions of New South Wales: Cooma, Lismore, Bourke, Wagga Wagga and Orange*, June 2011.

[61] IPART, *Residential energy and water use in Sydney, the Blue Mountains and Illawarra – Results from the 2006 household survey – Research Paper*, 2007. IPART, *Residential energy and water use in the Hunter, Gosford and Wyong – Results from the 2008 household survey - Research Paper*, December 2008. IPART, *Residential energy and water use in Sydney, the Blue Mountains and Illawarra – Results from the 2010 household survey – Research Paper*, December 2010.

The PIAC study also found both a lower level of marketing activity and a lower proportion of households switching electricity retailers in the surveyed regions, compared to regions in IPART surveys.

Overall, the PIAC study indicated that the NSW electricity market is not a single market, and found no clear evidence that the 5 regions examined were effectively participating in the electricity market.[62]

62 Public Interest Advocacy Centre, *Choice? What Choice? A study of consumer awareness and market behaviour in the electricity market in five regions of New South Wales: Cooma, Lismore, Bourke, Wagga Wagga and Orange,* June 2011, p 4.