QUEENSLAND COMPETITION AUTHORITY

Draft Report

Estimating a Fair and Reasonable Solar Feed-in Tariff for Queensland

November 2012

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SUBMISSIONS

Public involvement is an important element of the decision-making processes of the Queensland Competition Authority (the Authority). Submissions are invited from interested parties concerning this Draft Report on a fair and reasonable solar feed-in tariff for Queensland. The Authority will take account of all submissions received.

Written submissions should be sent to the address below. While the Authority does not necessarily require submissions in any particular format, it would be appreciated if two printed copies are provided together with an electronic version on disk (Microsoft Word format) or by e-mail. Submissions, comments or inquiries regarding this paper should be directed to:

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The **closing date** for submissions is **21 December 2012**.

Confidentiality

In the interests of transparency and to promote informed discussion, the Authority would prefer submissions to be made publicly available wherever this is reasonable. However, if a person making a submission does not want that submission to be public, that person should claim confidentiality in respect of the document (or any part of the document). Claims for confidentiality should be clearly noted on the front page of the submission and the relevant sections of the submission should be marked as confidential, so that the remainder of the document can be made publicly available. It would also be appreciated if two copies of each version of these submissions (i.e. the complete version and another excising confidential information) could be provided. Again, it would be appreciated if each version could be provided on disk. Where it is unclear why a submission has been marked "confidential", the status of the submission will be discussed with the person making the submission.

While the Authority will endeavour to identify and protect material claimed as confidential as well as exempt information and information disclosure of which would be contrary to the public interest (within the meaning of the *Right to Information Act 2009 (RTI)*), it cannot guarantee that submissions will not be made publicly available. As stated in s187 of the *Queensland Competition Authority Act 1997* (the QCA Act), the Authority must take all reasonable steps to ensure the information is not disclosed without the person's consent, provided the Authority is satisfied that the person's belief is justified and that the disclosure of the information would not be in the public interest. Notwithstanding this, there is a possibility that the Authority may be required to reveal confidential information as a result of a RTI request.

Public access to submissions

Subject to any confidentiality constraints, submissions will be available for public inspection at the Brisbane office of the Authority, or on its website at www.qca.org.au. If you experience any difficulty gaining access to documents please contact the office (07) 3222 0555.

Information about the role and current activities of the Authority, including copies of reports, papers and submissions can also be found on the Authority's website.

GLOSSARY

ACT	Australian Capital Territory
AGL	AGL Energy Limited
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
APVA	Australian PV Association
ATA	Alternative Technologies Association
ASC	Australian Solar Council
SBC	Solar Business Council Incorporated
Authority	Queensland Competition Authority
c/kWh	Cents per kilowatt hour
CEC	Clean Energy Council
CSO	Community Service Obligation
DLF	Distribution Loss Factor
DUOS	Distribution Use of System
Direction	The Direction from the Minister for Energy and Water Supply pursuant to section 253AA of the *Electricity Act 1994*, directing the Authority to conduct a review into the establishment of a fair and reasonable value(s) for electricity generated from small scale solar photovoltaic (PV) generators and exported to the Queensland electricity grid (dated 7 August 2012).
EECL	Ergon Energy Corporation Limited
EEQ	Ergon Energy Queensland
Electricity Act	*Electricity Act 1994*
Energex	Energex Limited
ESCOSA	Essential Services Commission of South Australia
ERAA	Energy Retailers Association of Australia Ltd
ESAA	Energy Supply Association of Australia
FRC	Full Retail Competition
GEC	Gas Electricity Certificate
GST	Goods and services tax
GWh	Gigawatt hours
HV	High voltage
ICC	Individually Calculated Customer
ICRC	Independent Competition and Regulatory Commission
IPART	Independent Pricing and Regulatory Tribunal
Issues Paper	The Issues Paper released by the Authority on 24 August 2012 (acting under the Direction)

kWh	Kilowatt hour
Large customer	A customer that consumes more than 100 MWh of electricity per year
LRET	Large-scale Renewable Energy Target
LV	Low voltage
Minister	The Minister responsible for administering the *Electricity Act 1994*, currently the Minister for Energy and Water Supply
MLF	Marginal loss factor
MW	MegaWatt
MWh	MegaWatt hours
NECF	National Energy Customer Framework
NEM	National Electricity Market
NER	National Electricity Rules
Notified/regulated retail prices	The electricity prices that a retailer may charge its non-market customers, as defined under section 90 of the *Electricity Act 1994*
NSLP	Net System Load Profile
NSW	New South Wales
Origin	Origin Energy Retail Limited
Price Determination	The Authority's determination of notified prices to apply from 1 July 2012 to 30 June 2013 (acting under the 2012 Delegation)
QCOSS	Queensland Council of Social Service
Regulation	*Electricity Regulation 2006*
RET	Renewable Energy Target scheme
RNN	Regional reference node
SA	South Australia
SAC	Standard Asset Customer
SEQ	South East Queensland
SEIA	Solar Energy Industries Association Inc.
Small customer	A customer that consumes less than 100 MWh of electricity per year
SRES	Small-scale Renewable Energy Scheme
Stanwell	Stanwell Corporation Limited
STC	Small-scale Technology Certificate
Suntech	Suntech Power Australia Pty Ltd
SunWiz	Sunwiz Consulting
TCP	Transmission Connection Point
The Scheme	The Queensland Government's *Solar Bonus Scheme*
TLF	Transmission loss factor

TNI	Transmission Node Identifier
TOU	Time-of-use
TUOS	Transmission Use of System
TRUenergy	TRUenergy Pty Ltd
UTP	The Queensland Government's Uniform Tariff Policy
VIC	Victoria
WA	Western Australia
WEPC	Wholesale Energy Purchase Cost

PREAMBLE

In July 2008, the Queensland Government introduced the Solar Bonus Scheme (the Scheme) to encourage investment in renewable electricity generation. Since then, participation in the Scheme has exceeded all expectations, and the number of small-scale solar photovoltaic (PV) installations in Queensland has increased from less than 6000 in 2008-09 to nearly 200,000 at June 2012.

The initial Scheme was exceptionally generous, offering customers with PV installations 44 cents per kWh for their net exports of power to the network. This scheme was closed to new applications from 9 July 2012 and replaced with an interim scheme offering 8 cents per kWh which is scheduled to terminate in mid 2014. While the original scheme has closed, eligible customers will continue to receive the higher 44 cent rate until 2028.

The growth in PV installations is increasing electricity costs for all Queensland consumers. Energex and Ergon Energy expect to incur accumulated feed-in tariff payments of around $2.2 billion by the end of the scheme in 2028 and these costs will flow directly through to network charges and electricity bills. The Authority estimates that the costs of the Scheme will add around $28 to the average Queenslander's annual electricity bill in 2012-13, increasing to around $120 by 2015-16 and will continue to have a significant but declining impact on customer bills until the end of the Scheme in 2028.

In August 2012, the Minister for Water and Energy Supply directed the Authority to provide recommendations on a 'fair and reasonable value' for electricity generated by small-scale solar PV generators and exported to the Queensland grid. This Draft Report presents the Authority's preliminary advice to the Government, taking into account submissions received in response to its Issues Paper published on 24 August 2012. The Authority's draft recommendations provide independent advice to inform the Government's review of the current Scheme, which it will conduct by 30 June 2013.

This review is not about the benefits existing PV customers on the 44 c/kWh scheme will receive in the future. The Government has already made clear its intention to allow eligible customers to retain access to those benefits until the scheme ends in 2028. Similarly, this review is not about the benefits PV customers on the more realistic 8 c/kWh scheme receive into the future, though it is noted that that scheme is due to end in mid 2014.

This review is in part about the cost of some of those benefits and who is paying for them. It is also partly about how those costs might be more equitably shared in the future.

Surprising as it may be for some consumers, there is no magic pudding when it comes to electricity prices. If one group of consumers enjoys a benefit in excess of the true savings they make or enjoys prices below the cost of their consumption, other electricity customers have to pay the price of those excess benefits or lower prices. When those doing the paying are likely those least able to afford it and those enjoying the benefits are those likely to be most able to afford to meet their true costs, then something is truly wrong.

However, this review is overwhelmingly about what might be a fair and reasonable price for new PV customers to receive for the electricity they export into the network in a new scheme which will presumably commence in mid 2014 when the current 8c/kWh scheme ends. To be sustainable and fair to all consumers, any new scheme must be structured so that the price received for exports of electricity reflects the true savings and benefits that are being achieved by the installation and on-going operation of solar PV panels.

The Authority considers the current distributor-funded Scheme is no longer appropriate. It creates significant costs for the distribution businesses which are inequitably recovered through higher electricity prices for all customers. The Authority recommends that any future feed-in tariff scheme

should be funded solely by electricity retailers, based on the direct financial benefit they receive from on-selling PV exports.

The Authority's estimate of a fair and reasonable, cost-reflective value of exported PV energy for South East Queensland in 2012-13 is 6.81 cents per kWh. This is based on the direct financial benefit that a retailer would receive if it on-sold a kilowatt of exported PV electricity at an efficient cost-reflective price. This value will always be lower than the retail price because electricity retailers incur other costs that cannot be avoided, even when they receive the electricity itself at no financial cost.

The market for solar PV customers in South East Queensland appears quite competitive with six retailers currently offering voluntary retailer-funded feed-in tariff premiums between 6 and 10 cents per kWh in addition to the statutory distributor funded feed-in tariffs of 44 and 8 c/kWh. These premiums, on average, are actually higher than the Authority's best estimate of the fair and reasonable value and suggest that the Authority's estimate is probably conservative. Given the sate of competition in South East Queensland, the Authority found no persuasive evidence to justify a regulated minimum feed-in tariff for solar PV customers in this corner of the State.

However, in the Ergon Energy network area, there is little chance that competition can be relied on to deliver fair and reasonable solar feed-in tariffs in the foreseeable future. On this basis, the Authority has recommended that mandatory minimum feed-in tariff values be established. Due to the sheer scale and variability of the Ergon Energy network, the value of solar PV electricity exported in regional Queensland cannot be accurately captured in a single value. The Authority has attempted to estimate seven different values, for different parts of the Ergon Energy network, based on the value of avoided energy purchase costs, including network losses. These range from 6.07 cents per kWh to 12.45 cents per kWh and largely reflect the different losses incurred in supplying energy to various parts of Ergon Energy's network from traditional sources of generation.

Finally, the Authority considered that the impact of the existing Scheme on electricity prices could be somewhat ameliorated by requiring electricity retailers to contribute to the ongoing costs of funding those tariffs until their statutory end dates. However, this option is not without its risks and drawbacks. If the Government chooses to take this approach, it should be careful to ensure that the mandated contribution does not overstate the benefit accruing to retailers from on-selling excess energy exported by their grid connected PV customers.

Network tariff reform is a further option to be considered as a means of more equitably sharing the costs of the Scheme. Specifically, there may be scope for distribution businesses to establish new, cost-reflective network tariffs for PV customers which ensure that these customers are charged their full fixed network costs, which are largely avoided under the present network tariff arrangements.

Submissions in response to this Draft Report should be received by the Authority no later than 21 December 2012.

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1. INTRODUCTION

On 7 August 2012, the Minister for Energy and Water Supply (the Minister) issued a Direction Notice under section 253AA of the *Electricity Act 1994* to the Queensland Competition Authority (see **Appendix A**). The Direction requires the Authority to investigate and report on:

(a) a fair and reasonable value for energy generated by small scale solar photovoltaic (PV) systems and exported to the Queensland electricity grid;

(b) the mechanisms by which a fair and reasonable value/values could be implemented in Queensland;

(c) a potential retailer contribution to the cost of the Queensland Solar Bonus Scheme (the Scheme) that reflects the benefit to retailers of the energy produced by small scale solar PV generators connected to the grid; and

(d) updated costs of the Scheme and any options by which to minimise or more equitably share these costs.

The Authority is to publish a Draft Report no later than November 2012 and a Final Report no later than 22 March 2013.

1.1 Direction Notice Requirements

In its investigation into the fair and reasonable value for solar PV energy, the Authority is to have regard to the following factors:

(a) there must be no consequential increase in electricity prices in Queensland or cost to the Queensland Government budget;

(b) the Council of Australian Governments (COAG) first National Principles for Feed-in Tariffs and the concept of 'fair and reasonable' value;

(c) the geographical location at which the solar PV energy is generated and value of that energy in the local network;

(d) complementarity with the carbon pricing mechanism; and

(e) consistency with the operation of a competitive Queensland electricity market.

As part of its investigation and report the Authority is also to consider:

(a) the benefit gained by electricity customers, distributors and/or retailers from electricity produced from small scale solar PV, for example in remote areas of Ergon Energy's network where high energy supply costs may be offset, or the value to the distribution business of any network investment deferral in those networks;

(b) the benefit of net versus gross metering arrangements;

(c) the Renewable Energy Buyback scheme operating in Western Australia (WA), which from 1 July 2012 offers feed-in tariff rates that vary geographically and include stringent connection requirements; and

(d) other issues the Authority deems relevant.

In its investigations into the mechanisms for implementing a fair and reasonable value for solar PV energy, the Authority is to consider and report on:

(a) implementation options within the Queensland electricity market, including a mandated 'default minimum price' or price range, a recommended (non-mandated) price range, or a market determined price;

(b) support for a competitive electricity market in Queensland and any specific arrangements required/ barriers to implementation in the Ergon Energy distribution area;

(c) the need for certainty for small scale solar PV owners;

(d) appropriate review mechanisms and timeframes;

(e) potential transition to a national feed-in tariff if established through COAG processes; and

(f) similar pricing and mechanisms in other jurisdictions and findings from other jurisdictional feed-in tariff reviews.

1.2 Review Process to Date

On 24 August 2012, the Authority released an Issues Paper advising interested parties of the commencement of the review.

The Authority received 39 submissions in response to the Issues Paper. The list of submissions received is provided in **Appendix C**. A copy of the Issues Paper and the submissions received can be accessed from the Authority's website.

The Authority is now releasing this Draft Report, which includes draft recommendations on estimating and implementing a fair and reasonable solar feed-in tariff for Queensland. In preparing this Draft Report, the Authority has taken into account the Minister's Direction, matters raised in submissions, and its own investigations.

Submissions are now invited in response to this Draft Report and should be received by the Authority no later than 21 December 2012. In preparing its Final Report, the Authority will consider all submissions received by the due date. The Authority is required to submit its Final Report to the Minister no later than 22 March 2013. The timetable for the remainder of the review is as follows:

Task	***Dates***
Release of Authority's Draft Report	30 November 2012
Submissions on Draft Report due	**21 December 2012**
Release of Authority's Final Report by	22 March 2013

2. BACKGROUND

2.1 The Queensland Solar Bonus Scheme

On 1 July 2008, the Queensland Government introduced the *Solar Bonus Scheme* (the Scheme) to provide eligible customers with credit for the surplus electricity generated by solar photovoltaic (PV) systems and exported into the Queensland electricity network. The Scheme is available to small residential and business customers who consume less than 100 megawatt hours (MWh) per year, with grid-connected PV systems not exceeding 5 kilowatt hours (kW) capacity.

The Scheme was intended to provide an incentive for electricity customers to install PV systems, by providing an opportunity to recover the costs of the unit via a feed-in tariff paid for surplus electricity their PV systems fed back into the network.

How the Scheme works

The feed-in tariff is paid to Scheme participants for electricity exported back into the network when the PV system is generating electricity surplus to the customer's immediate consumption requirements. During times when the PV system is generating less electricity than the customer's consumption, the balance of electricity demanded is drawn from the network.

On 9 July 2012, the Queensland Government reduced the feed-in tariff under the Scheme from 44 cents per kilowatt hour (kWh) to 8 cents per kWh. Existing participants will continue to receive the 44 cents per kWh feed-in tariff for electricity exports until 2028, provided they maintain their eligibility for the Scheme. Eligible customers who connected after 9 July 2012 will receive 8 cents per kWh until 30 June 2014 .

Metering and billing

Customers participating in the Scheme require specialised meters connected between the network, the premises and the PV system. These meters are capable of recording the volume of electricity being drawn from the network (imports) and the volume of electricity fed back into the network (exports). This is known as a 'net' metering arrangement. This is distinct from a 'gross' metering arrangement where the meter separately records the total amount of electricity consumed and the total amount generated by the PV system.

At the end of each billing period, the customer's meter is read to determine the total amounts of surplus electricity exported to and imported from, the network. The distribution business provides this data to the retailer, which then calculates the amount of the 'solar bonus' by multiplying the number of kWh exported by the rate of the feed-in tariff. This amount is then deducted from the customer's consumption charge for imported electricity and is reflected on the retail bill.

If the value of the customer’s exports exceeds the value of energy consumed, the excess amount is applied as a credit to the customer's retail account. If the customer's solar bonus payments exceed their network imported consumption costs over a 12-month period, the customer may request payment of the balance, rather than retaining a credit.

Who pays the feed-in tariff?

The current Scheme is funded by the distribution network businesses, Energex and Ergon Energy. This means the electricity distribution business is currently liable to pay the amount of the feed-in tariff which is then credited to the PV customer by the retailer. As distribution

network charges are regulated, the costs incurred by the distribution business in funding the current Scheme are recovered through higher network charges for all customers. Under the existing arrangements, electricity retailers in Queensland are not required to contribute to the costs of the Scheme, nor are they required to pay for the electricity generated by their grid connected PV customers. This means that retailers are potentially receiving a windfall gain equal to the value of the avoided costs of sourcing that electricity through the National Electricity Market (NEM).

The current (distribution-funded) Scheme is distinct from a retailer funded scheme, where the feed-in tariff amount is credited to the customer's quarterly consumption charge directly by the retailer, with no financial flows from the distributor to the retailer. Unlike a distribution funded scheme, a retailer funded scheme does not rely on subsidisation through network charges, and therefore is not funded by spreading the cost across all network customers.

Voluntary retailer tariff premiums

While retailer contributions to the Scheme are not currently mandatory, there are a number of electricity retailers in Queensland offering a discount, or premium tariff, to customers who export surplus PV electricity, in addition to the feed-in tariff funded by the distributor. The Authority understands that some retailers are offering this additional premium tariff at a rate of between 6 cents per kWh and 8 cents per kWh for net exported electricity.

However, these tariff premiums should be interpreted carefully as they may be accompanied by additional contract terms and conditions potentially affecting the real net value to the customer of the tariff offer.

2.2 Outcomes of the Scheme

As at the end of June 2012, the total installed PV capacity in Queensland was estimated at 505.2 MW, up from 9.5 MW in the first year of the Scheme. Over the same period, the number of participants in the Scheme grew from under 6,000 to almost 200,000, with a significant number of additional connection applications pending. As a result, Queensland has the largest rooftop solar generating capacity of any state in Australia.

Table 2.1: Growth in PV installations in Queensland since 2008

	2008-09	*2009-10*	*2010-11*	*2011-12*	*Total*
Number of PV installations	5,926	24,514	66,355	97,042	198,837
Installed capacity (MW)	9.5	42.9	159.5	293.4	505.2
Energy exported (MWh)	1.4	10.6	52.1	214.4	278.5
Solar bonus payments ($m)	0.6	4.7	22.9	94.3	122.5

Source: Queensland Department of Energy and Water Supply (August 2012)

Note: Totals may not add due to rounding

2.3 Reasons for this review

As mentioned above, the Queensland Government recently reduced the solar feed-in tariff from 44 cents per kWh to 8 cents per kWh for new applicants.

The Government has stated that the 44 cents per kWh rate was set in 2008 when solar PV prices were substantially higher (around $6,000 per 1.5 kilowatt system installed, with rebates). The installed price of solar panels (inclusive of rebates) has decreased significantly since 2008. The Authority understands that a 1.5 kilowatt solar PV system can now be installed for under $3000 in South East Queensland.

In making its decision to reduce the feed-in tariff, the Government also noted the Scheme's impact on electricity costs for all Queenslanders. In particular, the Government noted that participation in the Scheme had surpassed expectations and, as a consequence, is now resulting in higher than expected feed-in tariff costs for Energex and Ergon Energy. These higher costs are beginning to be passed through to the electricity bills of all customers, impacting on affordability for all Queenslanders.

This raises concerns about the equity of the Scheme because electricity customers who may not be able to afford (or who choose not to invest in) a PV solar installation are forced to pay the solar feed-in tariff to those customers who choose to install PV solar panels, without receiving any benefit in return.

In light of the reduction in PV system costs and the impact on electricity affordability, the Government considered it timely to reassess the feed-in tariff rate to ensure it remains appropriate. The Minister's letter to the Authority notes that the 8 cent tariff will be reviewed by 1 July 2013, and will be legislated to end on 1 July 2014. The outcomes of the Authority's review of a fair and reasonable value for PV energy will be considered by the Government in its review of the 8 cents per kWh feed-in tariff.

2.4 Developments in other jurisdictions

The review of the Queensland feed-in tariff rate comes at a time when many similar schemes across Australia are subject to review and change. The current state of feed-in tariffs across Australia is summarised in Table 2.2 below.

New South Wales (NSW)

The NSW *Solar Bonus Scheme*, which was funded by distributors, was closed to new applications in April 2011, subject to review by the Independent Pricing and Regulatory Tribunal (IPART). In its May 2012 report, IPART recommended that feed-in tariff payments should be funded by retailers, not distributors, but that they should not be mandatory. In June 2012, IPART recommended a benchmark tariff range of 7.7 to 12.9 cents per kWh for a fair and reasonable market-determined feed-in tariff (funded by retailers) during 2012-13. IPART stated that the benchmark range would help customers understand the value of their exported energy and help them find the most competitive market offerings.

South Australia (SA)

SA's distributor-funded feed-in tariff scheme is being incrementally reduced from 44 cents per kWh to 16 cents per kWh and will be closed to all new applicants from 30 September 2013. This scheme runs parallel to a compulsory retailer funded feed-in tariff premium, which was set by the Essential Services Commission of South Australia (ESCOSA) in January 2012. The minimum retailer premium applies for three years, starting at 7.1 cents per kWh in 2011-12, increasing to 11.2 cents per kWh in 2013-14.

Western Australia (WA)

In May 2011, the WA distributor-funded feed-in tariff was reduced from 44 cents per kWh to 20 cents per kWh, before the scheme was closed to new applications on 31 July 2011.

Customers in WA still have access to the *Renewable Energy Buyback Scheme*, which mandates that a buyback rate be paid by retailers to net exporters of PV generated electricity. The buyback rates are set by the retailer and approved by the Public Utilities Office. The rates offered by Horizon Power are set on a locational basis and reflect the cost of electricity generation to each town. These buyback rates currently range from 10 cents per kWh to 50 cents per kWh and are reviewed annually.

Australian Capital Territory (ACT)

In the ACT, the distribution funded feed-in tariff scheme for small and medium scale systems reached its legislated total capacity target of 30 MW and was closed to new applications on 13 July 2011. New customers may still be eligible for ActewAGL's '1 for 1' buyback offer for net energy exports. This is a voluntary tariff offer where ActewAGL pays customers a feed-in tariff for net exports, equivalent to the customer's own energy tariff rate.

Victoria (VIC)

The feed-in tariff arrangements applying in VIC are currently under review by the Victorian Competition and Efficiency Commission (VCEC), which reported to the Victorian Treasurer on 27 July 2012. In its Final Report, VCEC recommended closing the transitional distribution funded feed-in tariff scheme by December 2013, with a move to a competitively determined, retailer funded feed-in tariff by December 2015.

On September 3 2012, the Victorian Government announced a new rate under both the Standard Feed-in Tariff (SFiT) and Transitional Feed-in Tariff (TFiT) of 8c per kilowatt hour.

Table 2.2: Current jurisdictional feed-in tariff arrangements

State	*Distributor contribution (c/kWh)*	*Retailer contribution (c/kWh)*	*Metering basis*
ACT	50.05 - 30.16c, nil from 14 July 2011	1:1 at customer's consumption tariff (voluntary offer)	Gross
NSW	60c, 20c , nil from April 2011	7.7c contribution to existing scheme 7.7-12.9c from July 2012 (voluntary)	Gross Net
SA	44c, 16c, nil from 30 September 2016 Nil from 1 Oct 2013	9.8c for 2012-13	Net
Tasmania	nil	1:1 at customer's consumption tariff (22.64c)	Net
Northern Territory	1:1 at customers consumption tariff 18.48c - 31.7c	nil	Gross
VIC	60c, 25c from 1 January 2012 8c from 30 September 2012	6-8c - voluntary market offers	Net
Queensland	44c, 8c, nil from 1 July 2014	6-10c - voluntary market offers	Net
WA	60c, 40c, nil from August 2011	Various location-based tariffs Horizon Power - 10c - 50c Synergy - 8.4094 c	Net

NOTE: Information current at 29 October 2012

3. DEFINING A 'FAIR AND REASONABLE' VALUE FOR PV EXPORTS

3.1 Introduction

In establishing a fair and reasonable value for energy generated from small-scale solar PV generators and exported into the Queensland electricity grid, the terms of reference require that the Authority should have regard to the following:

(a) the COAG's first National Principle for feed-in tariffs and the concept of fair and reasonable value;

(b) there must be no consequential increase in electricity prices in Queensland or cost to the Queensland Government budget;

(c) the benefit gained by electricity customers, distributors and/or retailers from electricity produced by small scale solar PV customers; and

(d) other issues the Authority deems relevant.

3.2 Defining fair and reasonable

In its Issues paper, the Authority suggested that the requirement that a fair and reasonable feed-in tariff must not result in an increase in electricity prices in Queensland, or require funding from the Queensland Government budget, meant that it should be subsidy free. On this basis the Authority suggested that any feed-in tariff for Queensland should be funded by electricity retailers rather than distribution businesses because a distributor funded scheme necessarily involved subsidies which were funded by higher electricity prices.

The Authority also suggested that a fair and reasonable value for feed-in tariffs that is consistent with COAG's first National Principle may be interpreted as the value to retailers from electricity exported to the grid by small scale solar PV customers.

The Authority discussed costs and benefits which PV generation might offer to distributors and customers and suggested that:

(a) network costs or benefits, whichever they might be, should not be included in a fair and reasonable value for a feed-in tariff, given that impacts on network expenditure requirements should be reflected in regulated network charges approved by the Australian Energy Regulator (AER), which retailers then pass through to customers;

(b) any benefits of PV generation on network loss factors should also be excluded from the feed-in tariff because they would be captured in the network loss factors which apply to wholesale energy purchases from the NEM, and would therefore be shared across all network customers; and

(c) the timing and volume of solar PV exports will influence the timing and volume of electricity that is drawn from the NEM, which in turn may affect wholesale electricity prices and therefore retail electricity prices for customers generally.

3.3 Approaches in Other Jurisdictions

Recent reviews of feed-in tariff arrangements by ESCOSA[1], IPART[2] and VCEC[3] considered this issue and concluded that 'fair and reasonable' value of PV exports should be interpreted as the direct financial benefit to the electricity retailer when it on-sells exported PV electricity. In each case, these reviews concluded that the value of the benefit to the retailer should be represented by the value of costs that retailers avoid when on-selling PV energy.

3.4 Submissions

The Solar Energy Industries Association (SEIA) suggested that the fair and reasonable value be set at 80% of the retail billing price, which would allow the retailers to recover a margin of 20%. Suntech suggested a similar approach whereby the value is set at between 70 and 80% of the consumption charge. A number of stakeholders, including Energex, also encouraged the Authority to develop a feed-in tariff which captures the value of the exported energy at the time of day it is generated.

A number of submissions, particularly from PV owners, suggested that a fair and reasonable feed-in tariff should be based on, or at least have regard to, the 'payback period' of the capital cost of a PV system to ensure an adequate return for their investments. In contrast, TRUenergy argued that setting a feed-in tariff based on a payback period would risk sending a misplaced signal to potential PV customers that this form of generation is more desirable in the market than it may actually be.

Some stakeholders further suggested that the fair and reasonable value should be at least equal to the retail price, or equivalent 'GreenPower' tariffs.

Many stakeholders put forward arguments for the inclusion of network costs and benefits in the value of the feed-in tariff. One common suggestion was that PV generation can allow investment deferrals by reducing demand peaks at certain times of the day.

Infinity Solar submitted that the feed-in tariff should reflect the benefits of reduced network congestion as well as quality and reliability improvements created by PV generation. In contrast, the Alternative Technologies Association (ATA) submitted that whilst any benefits of investment deferral at the residential level should not be included in the fair and reasonable value, it suggested that the potential benefit would be greater in commercial and industrial load centres and that this should be included in the feed-in tariff.

Energex suggested that small scale PV exports are unlikely to provide significant benefits in terms of deferred network investment and that there is a potential for increased investment costs to accommodate exported electricity while maintaining service delivery standards. Energex noted that these costs are likely to emerge in residential areas where PV generation occurs at times of light network load and has little or no impact on network loads during the evening peak consumption period.

Similarly, Ergon Energy stated that PV exports are unlikely to lead to significant network cost savings, pointing out a range of technical challenges it faces as a result of increased PV generation on its network, including voltage rises and imbalances, system stability issues and the potential for reverse flows in the high voltage network.

[1] ESCOSA, *2012 Determination of Solar Feed-in Tariff Premium, Final Price Determination*, January 2012
[2] IPART, *Setting a Fair and Reasonable Value for Electricity Generated by Small-scale Solar PV Units in NSW, Final Report*, March 2012.
[3] VCEC, *Inquiry into Distributed Generation*, Final Report, July 2012

Notwithstanding the comments above, both Energex and Ergon Energy stated that it would be difficult to accurately estimate network costs and benefits and that they are best addressed through the relevant regulatory frameworks and not the feed-in tariff. TRUenergy also considered that network benefits from PV exports would be very difficult to determine and may be small or offset by PV related costs. TRUenergy also agreed that any such impacts should be reviewed by the AER and included in network charges.

Energex stated that PV exports are likely to result in reduced transmission and distribution losses but noted that any improvement should be reflected in the loss factors used in the market settlement process. Through this process, any reduction in system-wide losses will be accounted for by the Australian Energy Market Operator (AEMO) when setting the loss factors to be applied to wholesale electricity purchases from the NEM. Energex argued that accurately quantifying the impact on losses would require considerable cost and effort.

TRUenergy stated that if the benefit of avoided losses were applied only to PV customers, this would disadvantage the local non-PV customers. It considered that the benefit of reduced losses is dependent on the presence of equivalent or larger loads in the vicinity, so the customers responsible for those loads should also share in any benefit, which would be impossible to administer.

A number of solar industry and advocacy groups submitted that the impact of PV generation on wholesale energy prices should be considered as a component in valuing PV exports[4]. The Clean Energy Council suggested that ignoring this benefit would be short-changing solar PV owners and would not be fair and reasonable.

Submissions from solar interest and industry groups suggested that a broad range of costs and benefits associated with solar PV, including environmental and social benefits, should be reflected in the fair and reasonable feed-in tariff.

Infinity Solar submitted that PV energy has a range of other benefits including, increasing owner's awareness and usage behaviours, improving asset values and resale values. It noted that these factors cannot be easily quantified but should still be considered.

3.5 The Authority's Position

As discussed in Chapter 2, the current solar PV Scheme is funded entirely by distribution businesses, which in turn recover these costs through higher network charges for all customers. These higher network charges in turn increase electricity prices in Queensland. As a result, the Authority considers that a distributor-funded solar PV feed-in tariff is inconsistent with the terms of reference. Similarly, the terms of reference preclude a taxpayer funded scheme, as this would require funding from the Queensland Government budget.

For these reasons, the Authority considers that feed-in tariffs, whether mandated or not, should be funded by electricity retailers, not regulated electricity distribution businesses.

Due to the subsidy arrangements which apply to Ergon Energy, the matter of budget neutrality and subsequent impact on electricity prices becomes more complex. These issues are addressed in Chapter 6.

Defining 'Fair and Reasonable'

The first national COAG principle establishes that the payment for PV exports should be

[4] ATA, Australian PV Association, Australian Solar Council, Clean Energy Council and SunWiz

> *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 the energy is exported...*

To define a fair and reasonable value for PV exports, it is worth examining the elements of this statement separately.

Value in the relevant electricity market

It is important to draw a distinction between the value of exported PV energy in the retail electricity market and its equivalent value in the wholesale spot market. The Authority considers that the relevant market in this case is the retail electricity market, not the wholesale electricity market. Small residential PV exporters are not direct participants in the wholesale market and their exported energy only has realisable financial value in the presence of the retailer as an intermediary. Without the retailer acting as an intermediary, there is no market or mechanism for small PV customers to on-sell excess PV electricity, nor any means of accurately valuing it. Therefore, the relevant market should be the retail market. On this basis, it follows that the starting point for valuing PV exports should be the value that the retailer ascribes to any exported PV energy that it can on-sell to its customers.

The Authority notes submissions arguing that the fair and reasonable value should be set close to, or at, the same level as the retail consumption charge. However, valuing PV exports on this basis would be inconsistent with the concept of value in the retail market. This is because when a retailer purchases electricity from the wholesale market, or on-sells exported PV to its customers, it incurs a range of costs that it cannot avoid.

If the relevant market for the purpose of determining a fair and reasonable feed-in tariff is the retail electricity market, then the value of PV exports in the retail market is the benefit that the retailer derives from on-selling PV exports generated by its customers. The financial benefit to the retailer is therefore the retail price it can charge for selling each unit of PV energy, less the costs it cannot avoid when on-selling that unit of energy. On this basis, a feed-in tariff which is equal to, or close to, the retail price would overstate the true value of that energy in the retail market.

The Authority understands that there may be other costs and benefits created by solar PV generation, including social and environmental factors, as suggested by some stakeholders. However, the Authority considers that the value of PV exports should, as far as possible, reflect the explicit value of that electricity in the relevant market, in this case, the retail electricity market. Assessing the extent to which the value of retail electricity captures all positive (and negative) externalities of its production and delivery is beyond the scope of the Authority's review. Further, it is questionable that feed-in tariff policy is the right vehicle to address these complex externalities and the Authority would suggest that these matters are best handled directly by other policy responses.

The requirement to consider the value in the relevant market also removes the option of basing the feed-in tariff on a payback period estimate, as suggested by some stakeholders. The return of investment to the PV owner is separate from the value to retailers of the energy generated and exported by the PV owner. Whilst an individual owner's payback period for their PV installation may be sensitive to the rate of the feed-in tariff, the value of the electricity it exports into the retail market is not. Given this, it would not be appropriate to derive a fair and reasonable feed-in tariff using the payback period approach.

Value in the relevant electricity network

It is also important to consider that the value of electricity in the retail market will differ depending on the costs of delivering that energy to the relevant network. These costs relate

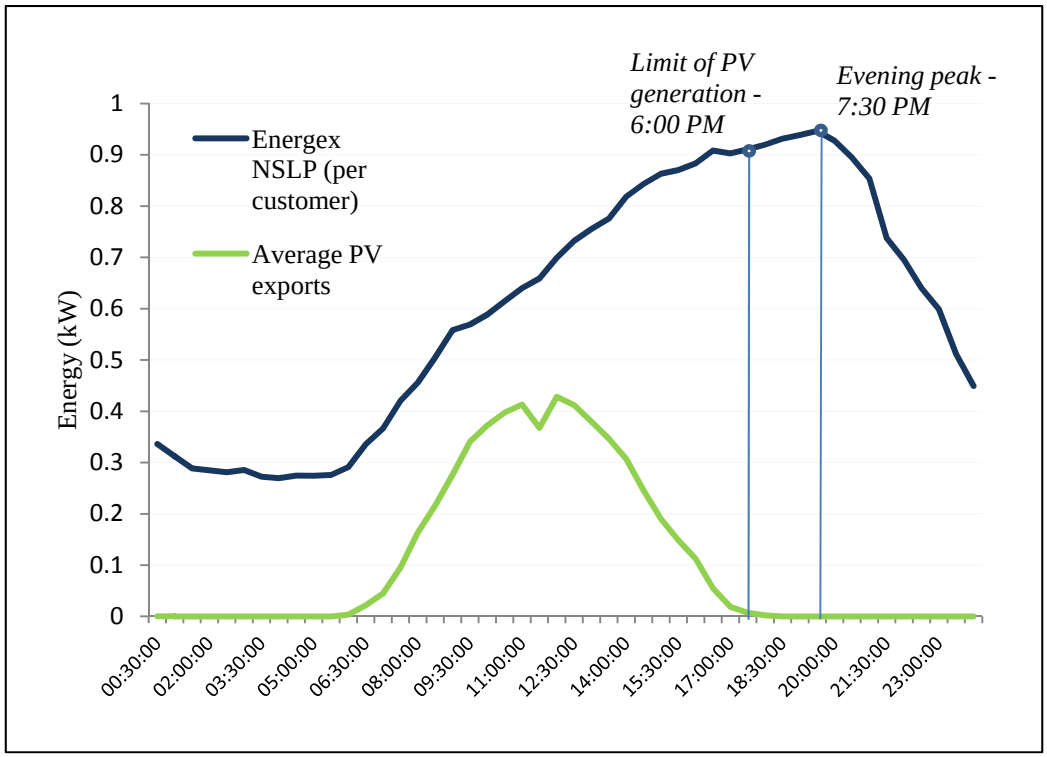
to network infrastructure and maintenance costs, the impact of energy losses incurred when transporting electricity over long distances and the potential for cost savings (and cost increases) which PV might bring to the network.

Network Costs and Benefits

Establishing the network costs and benefits arising from installation of PV generation is clearly not straightforward. There is evidence that increased PV penetration can reduce costs in some circumstances and increase costs in others. The most persuasive information before the Authority tends to suggest that the latter impact may be more significant, at least in aggregate terms. This issue is discussed further in Chapter 7.

With regard to the benefit of reduced peak demand due to PV generation, the Authority considers that this is currently unlikely to be of significant impact in Queensland. Some submissions correctly noted that the greatest impact would likely be in areas dominated by daytime commercial loads, which coincide with the typical generation profile of PV installations. However, networks are designed and built to handle the highest peaks, which typically occur outside of this time. Figure 3.1 shows an average PV net export profile for a sample of customers in South East Queensland on the highest peak demand day during 2011-12, charted against the Energex net system load profile (NSLP) of that same day. As this illustrates, the impact of PV generation diminishes prior to the onset of the highest evening residential peak, which the network is built to withstand.

Figure 3.1: PV Exports and Peak Demand - 9 January 2012

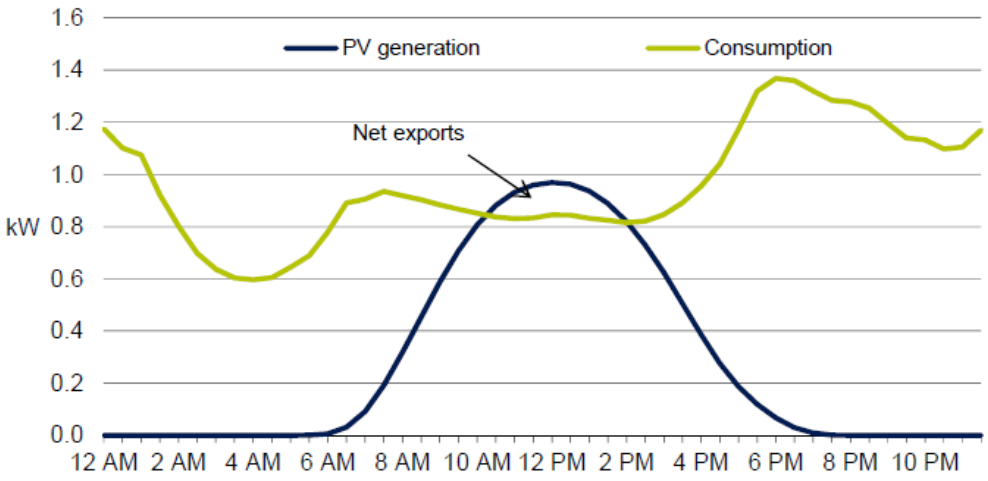


Note: PV profile reflects the net exports of a small sample of PV installations in a localised area. However, the shape of the export profile is a reasonable estimation of the generation profile on this day.

These findings are consistent with the findings of other feed-in tariff reviews. In its most recent determination of fair and reasonable feed-in tariffs for NSW, IPART concluded that PV exports are unlikely to create value for distributors because any benefits that arise are likely to be location- and time-specific and that these benefits are likely to be small or offset by system-wide cost increases as a result of the uptake of small-scale PV generators. The

relationship between the peaks in PV exports and electricity consumption in NSW, shown in Figure 3.2, is similar to the sample for Queensland shown above.

Figure 3.2: PV Generation, Exports and Peak Demand in NSW



Source: IPART.

Similarly, in its recent Final Report on its review into the design, efficiency and effectiveness of feed-in tariff schemes in Victoria, VCEC was of the view that the value of any network benefits should be returned to distributed generators, but acknowledged that this value cannot be efficiently captured through existing feed-in tariffs because it is highly location specific[5].

Whilst it appears unlikely that PV generation has so far had a material impact on peak demand in Queensland, this could become a more realistic proposition with greater penetration of electricity storage technologies. Storage would provide flexibility to use solar PV energy in ways that maximise its economic value to customers and networks.

Regardless of the net impact of PV on network costs, the Authority retains the view it suggested in the Issues Paper, that any network costs and benefits should be captured in the AER's revenue determination process for Energex and Ergon Energy. Through this process, any increase or decrease in efficient network expenditures attributable to PV generation will be reflected in future network tariffs and shared among all customers. This view was supported in submissions by Energex and Ergon Energy, as well as ESCOSA in its most recent determination of a fair and reasonable feed-in tariff for South Australia. For the reasons outlined, the Authority has decided not to include any allowance for network cost impacts in its estimate of the fair and reasonable feed-in tariff.

Benefit of improved loss factors

A benefit of PV exports may arise from changes in network loss factors due to electricity being consumed in close proximity to where it is generated (by PV customers). This concept should be distinguished from the benefit to retailers of not having to purchase a certain amount of additional energy to overcome losses on energy purchased from the NEM when they receive PV exports from customers - this issue is addressed in Chapter 3.

[5] VCEC, *Power from the People: Inquiry into Distributed Generation. Final Report*, July 2012 p. 85

The Authority acknowledges that increased small scale PV generation is likely to have some impact on system-wide network losses over time. However, the Authority agrees with Energex and TRUenergy that it is not necessary or appropriate to directly estimate this in the fair and reasonable value for two reasons.

Firstly, any reduction in network loss factors attributable purely to residential PV generation is likely to be small and prohibitively complex to calculate with accuracy. This is because the benefits will be highly variable and location specific. Furthermore, the value of the benefit is likely to be very small and outweighed by the costs of determining it.

Secondly, and more importantly, any reduction in system wide losses will be accounted for by AEMO when setting the loss factors to be applied to wholesale electricity purchases from the NEM. The Authority agrees with Energex that this is the most appropriate way to capture the value of this benefit and ensure that it is shared amongst all network customers. This treatment of loss factors is consistent with the approaches adopted recently by IPART, ESCOSA and VCEC.

Taking account of the time of the exports

The spot price of electricity in the NEM is dynamic and responds to changes in supply and demand on a half-hourly basis throughout the day. However, there are a number of reasons why this inter-temporal variation in price is not relevant to establishing the value of PV in the Queensland retail electricity market.

In Queensland, retailers' electricity purchases for all small retail customers on both the Energex and Ergon Energy distribution networks are settled by AEMO against the relevant NSLP, regardless of whether or not they have interval meters installed. This is because the majority of interval meters for small customers in Queensland are not equipped with telemetry capabilities and must be read on a quarterly basis as simple accumulation meters.

This means that it is not possible to identify each individual customer's consumption (or PV exports) for each half-hour settlement period. To address this issue, AEMO calculates an aggregate consumption profile (the NSLP) which is used to calculate each retailer's wholesale electricity purchase liabilities for the settlement period. More details on how retailers' energy costs are settled against the NSLP are provided in the Authority's Final Determination on Regulated Retail Electricity Prices for 2012-13.

The result of this metrology and settlement process is a weighted average price for each 24 hour period, calculated as a function of aggregate half-hourly consumption and the corresponding half-hourly pool price. The retailer then pays AEMO this price for each unit of electricity it buys for its customers, irrespective of the time of day at which it was actually consumed.

On this basis, the financial value of avoided energy purchase costs due to PV exports is the same, regardless of the time the electricity was generated and exported. As a result, it is not possible to take account of the time at which PV exports occur in determining the fair and reasonable feed-in tariff, as suggested in some submissions.

Benefit of lower wholesale electricity prices

The Authority understands that increased PV generation is likely to have placed some downward pressure on wholesale spot prices at certain times of the day, as suggested by a number of stakeholders.

When solar PV units are exporting to the network, they displace a portion of the dispatched NEM generation required to meet demand at the regional reference node. This does not

manifest as an increase in supply in the generation market itself (it is actually a reduction in demand) but the result is a lower spot price paid in the market. This effect is apparent in many markets, not just the NEM, and is a natural market outcome when suppliers of a homogeneous product are price-takers in a competitive market facing fairly predictable and inelastic demand.

In the case of net-metered solar PV generation, much of the impact on wholesale prices is likely a result of lower network demand due to self-consumption of PV power, not from additional supply exported to the network. By consuming PV electricity generated onsite, customers demand less from the NEM generation market, which typically results in a lower wholesale market price. However, this market response does not discriminate between a network demand reduction caused by self-consumption of PV, energy efficiency measures, load-shedding, or other demand curtailment activities. Each of these measures will similarly reduce demand for electricity from the NEM and force down the wholesale electricity price to some extent.

While the Authority does not dispute the potential for PV exports to influence the wholesale electricity price, it does not accept that any associated reduction to wholesale electricity prices should be returned to PV owners through a feed-in tariff as some stakeholders argued.

While the impact on wholesale prices may be in some part attributable to PV generation, the Authority notes that it would be difficult to distinguish between the self-consumption of PV electricity and any other demand management practices which reduce metered network consumption.

More importantly, the Authority does not consider there is a sound economic argument to support this proposal. The benefit of lower wholesale electricity prices is a consequence of competition in the market and should accrue to all participants. It follows then that, to return the benefit of lower prices solely to PV generators would require a subsidy from other participants. If this was funded by retailers, it would increase electricity prices for all other customers, which would be inconsistent with a key requirement under the terms of reference for this review. Specifically, that there should be no consequential increase in electricity prices in Queensland.

The Authority's view is shared by a number of regulators including IPART, ESCOSA and most recently by VCEC.

Conclusion

For the reasons discussed, the Authority considers that the term 'fair and reasonable' value should be interpreted as the value of the direct financial benefit to retailers from on-selling electricity exported by PV customers to the network.

This is generally consistent with the interpretation adopted by IPART in its most recent determination to set the upper end of the feed-in tariff range for NSW, the VCEC's definition of the term fair and reasonable in its Final Report and the definition of fair and reasonable value that ESCOSA was required to calculate in its most recent determination.

4. ESTIMATING THE FAIR AND REASONABLE VALUE OF PV EXPORTS TO THE RETAILER

As discussed in Chapter 3, the Authority considers that the fair and reasonable value of PV exports should be interpreted as the sum of direct financial benefits which accrue to a retailer when it on-sells energy exported by its grid-connected PV customers.

In order to estimate the fair and reasonable export value, it is necessary to assess each of the costs that a retailer incurs in providing retail services and determine whether a retailer avoids them when on-selling PV energy.

While there are various ways to calculate the costs that contribute to the retail price of electricity, the Authority suggested in its Issues Paper that it seemed reasonable to adopt the cost estimates determined in setting notified prices, on the basis that these are the Authority's best estimates of the retail costs of supplying electricity. There was general support for this proposed approach in submissions, but some stakeholders suggested various modifications to the calculation of specific cost components.

The process of estimating the value of PV exports in the Ergon Energy network is complicated by the Government's subsidisation of retail electricity prices in regional Queensland. This is considered separately in section 4.9 below.

4.1 Approaches in other Jurisdictions

New South Wales

In its 2012 review into solar feed-in tariffs for NSW, IPART estimated a benchmark range for the fair and reasonable value of PV exports, based on two approaches[6]. Firstly, it estimated the direct financial benefit accruing to retailers when they on-sell PV exports, based on the actual costs of the Standard Retailers in NSW. IPART examined those costs that could be avoided when PV exports are on-sold, and concluded that retailers can avoid some electricity purchase costs, a portion of losses and NEM fees when on-selling PV exports.

Secondly, IPART estimated the value of exported PV energy in the wholesale market based on the price that energy would have attracted if it was sold in the NEM at the time it was exported. This was done with reference to historical half-hourly PV generation profiles and historical half-hourly NEM spot prices.

In June 2012, IPART estimated that the direct financial benefit to retailers from on-selling exported PV electricity was between 10.3 and 12.9 cents per kWh. Using the second approach, IPART estimated the expected value of PV exports in the wholesale market to be between 7.7 and 9.9 cents per kWh. Based on these values, IPART recommended a voluntary benchmark feed-in tariff range of 7.7 to 12.9 cents per kWh (represented by the lowest and highest estimates from each estimation method)[7].

South Australia

In South Australia, ESCOSA also valued PV exports by estimating the value to the retailer, based on the direct costs avoided when it on-sells PV electricity[8]. Similar to IPART,

[6] IPART, *Setting a Fair and Reasonable Value for Electricity Generated by Small-scale Solar PV Units in NSW, Final Report*, March 2012.
[7] IPART, *Solar Feed-in Tariffs, Retailer Contribution and Benchmark Range for 1 July 2012 to 30 June 2013*. June 2012
[8] ESCOSA, *2012 Determination of Solar Feed-in Tariff Premium - Final Price Determination*. January 2012.

ESCOSA concluded that energy purchase costs, some losses and NEM fees are avoided when PV exports are on-sold by retailers. Based on this approach, ESCOSA estimated the value of PV exports to the retailer to be 7.1 cents per kWh in 2011-12 and 9.8 cents per kWh in 2012-13.

Australian Capital Territory

The ICRC determined a premium tariff rate of 39 cents per kWh to apply under the *Electricity Feed-in (Renewable Energy Premium) Act 2008* during 2011-12[9]. This rate was derived using an approach which allows customers with systems up to 5kW capacity to earn a return on their investment commensurate to the risk-free government bond rate. As discussed in Chapter 3, such an approach would not be suitable for this review, as the Authority has been tasked with estimating a subsidy-free feed-in tariff rate, rather than a premium rate, as was required of the ICRC.

Victoria

In September 2012, VCEC recommended that the Victorian Government replace the existing standard feed-in tariff scheme (SFiT) with a new scheme requiring retailers to offer a minimum 'efficient and fair' price for small renewable generation exports, based on the wholesale price of electricity, adjusted for the effect of reduced losses[10]. VCEC recommended that a minimum efficient and fair market price for 2013 would be in the range of 6 to 8 cents per kWh.

The Victorian Government accepted the recommendations of VCEC, but chose to set the new minimum standard feed-in tariff rate at the upper end of that range (8 cents per kWh).

4.2 Benchmark Retail Electricity Price for On-sold PV Exports

Estimating the value to retailers of PV exports requires first that the retail price at which exported PV electricity can reasonably be on-sold be established. From this starting point the value of PV exports to the retailer is estimated by subtracting the costs that the retailer cannot avoid when it on-sells exported PV electricity. The steps in this process are discussed in this Chapter and the result can be seen in Table 4.7.

Relevant Tariff Class

The Authority has used the residential retail tariff (Tariff 11) as the retail on-sell price for PV exports. This decision is based on a number of factors.

The current Scheme is available to small customers only, the majority of whom will be supplied under Tariff 11. The consumption by these customers is settled at a weighted average wholesale electricity price, based on the NSLP, which captures only residential and small business consumption. Consumption of large customers, controlled loads and unmetered supplies are netted off to produce the NSLP. The benefit to the retailer from on-selling PV exports arises from a reduction in the amount of electricity it must purchase from the NEM. In other words, the benefit is the reduction in the retailer's share of load settled against the NSLP for residential and small business customers.

While it is true that PV exports may be on-sold at prices other than Tariff 11, this has no bearing on the financial benefit to the retailer, due to the way that AEMO derives the NSLP and settles the retailers' energy purchase cost liabilities in Queensland. The outcome of this

[9] Independent Competition and Regulatory Commission, *Final Report, Electricity Feed-in Renewable Energy Premium: Determination of Premium Rate 2011-12*, March 2011.
[10] VCEC, *Inquiry into Distributed Generation, Final Report*, July 2012

process is that the retailer faces the same averaged wholesale energy purchase price for all consumption within the NSLP, regardless of the actual prices it charges its individual customers.

For these reasons, the appropriate benchmark on-sell price should reflect a best estimate of the efficient cost of supplying the residential and small business NSLP. This is reasonably represented by Tariff 11.

Use of Cost-Reflective Tariff

The Authority has also used a cost-reflective Tariff 11 for 2012-13 as the basis for estimating the benefit to the retailer. While this is not the actual Tariff 11 for 2012-13 (which was frozen by the Government at the 2011-12 level, adjusted for the effect of carbon pricing), it is the appropriate price to use.

Although the actual 2012-13 Tariff 11 variable charge is around 3 cents per kWh higher than the cost-reflective estimate, this additional revenue is actually allowing retailers to recover unavoidable fixed costs which they cannot otherwise recoup because the fixed charge component is currently held artificially low. The current average voluntary retailer premiums are at a level which reflects this. The consistency between the current retailer premiums and the Authority's cost-reflective estimate may also suggest that retailers are assuming the notified Tariff 11 will return to a cost-reflective level in the near future.

4.3 Wholesale Energy Costs in South East Queensland

Wholesale energy costs are those costs that AEMO charges a retailer for electricity purchased from the NEM. When on-selling energy from PV exports, wholesale energy costs are the most significant costs that are avoided by the retailer.

Estimating the value of electricity purchased from the NEM is a complex exercise, but one which the Authority conducts each year under for the purpose of setting notified prices for regulated retail electricity tariffs. For small residential customers, the Authority currently bases its wholesale energy cost estimate on the cost of supplying the Energex NLSP.

In the Issues Paper, the Authority suggested it would be reasonable to use the wholesale energy cost estimate that it used to determine notified prices for small customers as the value of the avoided wholesale energy cost component (before losses) in the feed-in tariff estimate.

Submissions

Sunwiz and the Clean Energy Council argued that using the NSLP does not capture the premium value of energy at the time it is exported. AGL suggested that the use of the NSLP to estimate the value of PV exports is only relevant as long as PV customers' imports and exports are settled on accumulation data.

Stanwell considered that the method used by the Authority to calculate notified prices provided a cost-reflective, unbiased estimate of energy purchase costs and was a suitable basis for estimating the fair and reasonable value of the feed-in tariff. Similarly, Infinity Solar submitted that using the cost estimates from notified prices is the most efficient method for determining the feed-in tariff.

Origin stated that it does not object in principle to using notified prices as the basis of cost estimates for a fair and reasonable value or benchmark, should that form of regulation apply, notwithstanding its concerns regarding the treatment of the retail margin (discussed in section 4.8).

Ergon Energy argued that while retailers with PV customers would need to purchase less wholesale electricity from the market, they may incur higher hedging costs given the intermittent nature of PV electricity generation. Ergon Energy argued that this could mean that retailers are more exposed to high and unhedged pool prices, and would potentially need to purchase additional hedging products to manage that risk. The basis of Ergon Energy's argument is that hedging costs may increase due to the peakier load profile arising from increasing solar PV penetration. Ergon Energy argued that it may need to purchase financial caps to support solar generated electricity when cloud cover, or other factors, reduce solar PV generation during times of high pool prices. In other words, for a given hedging position, an unexpected loss of PV generation capacity may leave it under-hedged and exposed to high spot prices.

In contrast, the Australian Solar Council suggested that PV exports have reduced volatility in the wholesale market, which should have the effect of reducing the retailers' risk.

The Authority's Position

Use of the NSLP to estimate wholesale electricity costs

The Authority notes the issues raised by SunWiz, Clean Energy Council and AGL regarding the limitations of the NSLP. However, given the existing metrology procedures in Queensland, the Authority considers that the NSLP remains the most appropriate means of assigning a market value to PV exports using the Authority's 'benefit to retailer' approach. As discussed in Chapter 3, for most residential consumption, the retailer is charged according to its share of the NSLP in the local network area rather than the individual consumption pattern of each household that it services. As such, the benefit to the retailer is the amount by which the PV exports reduce its share of the NSLP. This does not necessarily reflect the spot prices that the exports might have attracted if they were sold in the NEM at the time of generation. On this basis, the financial benefit to the retailer of the avoided energy purchase costs due to PV exporting is the same, regardless of the time the electricity was generated and exported.

With the further introduction of remotely-read interval meters, there may be more flexibility to isolate or 'peel off' the PV export volumes from the NSLP. This would be necessary before retailers could be charged by AEMO based on when they purchase energy from the NEM and the value of PV exports could be linked to the wholesale spot price throughout the day.

Impact of PV generation on retail hedging costs

The Authority does not consider there is a strong argument that PV generation materially impacts hedging costs, as suggested by Ergon Energy, because it is not clear that the volume risk a retailer faces from intermittent PV generation is any different to the volume risk associated with other demand management activities or consumption variability more generally. To the extent that a retailer underestimates the volume of electricity it must buy from the NEM, it may be under-hedged and exposed to the spot price. However, this will be the case regardless of what caused consumption to be underestimated. In any event, the Authority considers that a prudent retailers' hedging strategy would take account of all factors contributing to variability in consumption, including the intermittent nature of PV generation.

The Authority also notes Ergon Energy's statement that PV exports represent only around 0.4 per cent of the total energy delivered on its network. Given that this represents a small contribution to total energy requirements, it is not clear that Ergon Energy's hedging strategy and associated hedging costs would be materially influenced by the variability of PV

exports. While other retailers may receive a greater share of their electricity requirements from PV customers, no retailers other than Ergon Energy raised hedging costs as a specific issue.

The issue of hedging cost impacts raised by Ergon Energy was also addressed in some detail by ESCOSA in its January 2012 solar feed-in tariff determination[11]. ESCOSA found that there was no reason to conclude, all else being equal, that solar PV increases a retailer's hedging costs.

Based on these considerations, the Authority is not inclined to adjust the fair and reasonable value of PV exports to account for any additional hedging costs associated with PV exports.

The Authority's Position

For the purposes of this Draft Report, the Authority considers that an appropriate estimate of the avoided wholesale energy costs in South East Queensland is provided by the weighted energy purchase cost (WEPC) estimates developed by ACIL Tasman for the Authority's 2012-13 notified price determination[12] . On this basis, for 2012-13, the estimated benefit to the retailer of avoided wholesale energy costs, before losses, is 6.149 cents per kWh. For the Final Report, values will be updated to reflect estimates used in the Authority's 2013-14 draft determination on notified prices.

Table 4.1: Wholesale energy cost allowance (before losses) for South East Queensland

Settlement class	*c/kWh*
Energex NSLP and unmetered supply	6.149

Source: ACIL Tasman, Estimated Energy Purchase Costs for Final Determination, May 2012.

4.4 Network Costs

4.4.1 Direct Network Costs

Network charges represent around 50% of regulated retail tariffs. The Authority calculates notified prices for small customers using Energex's network charges.

Excess energy exported by PV customers is ultimately used by other customers on the network and will therefore register as metered consumption. As retailers are charged a variable network charge according to metered energy consumption, any PV exports that a retailer on-sells will still attract the full variable network charge. As such, network costs are unavoidable when a retailer on-sells PV exports and should therefore be excluded from the estimated export value.

4.4.2 Indirect Network Costs

As discussed in Chapter 3, the Authority considers that if there are any indirect network costs or benefits associated with PV generation such as deferral of investment expenditures, these should be reflected in network prices and therefore should not be separately estimated in calculating the fair and reasonable value of PV exports.

[11] ESCOSA, *2012 Determination of Solar Feed-in Tariff Premium - Final Price Determination*. January 2012. pp37-40.
[12] Further details of the Authority's approach to estimating wholesale energy purchase costs can be found in its *Final Determination: Regulated Retail Electricity Prices 2012-13*, May 2012.

The Authority's Position

The Authority considers that network charges are unavoidable when a retailer on-sells exported PV electricity and should be excluded from the estimated benefit to the retailer. For the purposes of this Draft Report, the Authority has used the variable charge for Energex's flat residential network tariff for 2012-13 as set out in Table 4.2 below.

Table 4.2: Energex Variable Network Charge for Residential Customers in 2012-13

Network tariff	*Variable rate c/kwh*
Residential Flat 8400 (SAC Non-Demand)	10.20

Source: Energex, Tariff Schedule for the Period 1 July 2012 to 30 June 2013. Version 8, 17 October 2012.

4.5 Green Scheme Costs

Green schemes include the Renewable Energy Target (RET) scheme and the Queensland Gas Scheme.

Under the RET scheme, retailers face costs for all purchases of energy from a grid with greater than 100MW of installed capacity. This would include the vast majority of PV exports in Queensland. As a result, RET scheme costs are unavoidable when a retailer on-sells PV exports and should be excluded from a feed-in tariff.

Under the Queensland Gas Scheme, retailers face costs according to gross energy sales to customers. As a result, costs related to the Queensland Gas Scheme are also unavoidable when a retailer on-sells PV exports and should be excluded from a feed-in tariff.

Submissions

The Clean Energy Council suggested that there is some 'double counting of green fees' arising from PV exports. Although it did not elaborate, the issue raised by Clean Energy Council seems to relate to the fact that electricity retailers are liable for green scheme fees on small scale PV exports that they purchase, which some may consider is inconsistent with the intent of renewable energy schemes. Sunwiz suggested that Queensland Gas Scheme charges are levied on gross electricity imports and argued that the scheme should be changed to apply only to net consumption.

The Authority's Position

The Authority understands that some green scheme costs, including the Queensland Gas Scheme, are levied on gross energy sales, which means that retailers do not avoid these cost when they on-sell exported PV energy. The Authority notes the concerns raised by the Clean Energy Council and SunWiz regarding the way in which some green scheme fees may be levied, but the manner in which these schemes are applied is outside the scope of the Authority's review.

The Authority is therefore of the view that the green scheme costs are not avoided when retailers on-sell PV exports and has excluded them from the estimation of the fair and reasonable value. The applicable costs used in setting 2012-13 notified prices are set out in Table 4.3 below.

Table 4.3: Green Scheme Costs for 2012-13

Cost component	*c/kWh*
Gas Electricity Certificates	0.085
LRET	0.410
SRES	0.638
Total	**1.133**

Source: ACIL Tasman, Estimated Energy Purchase Costs for Final Determination, May 2012.
Note: Totals may not add due to rounding

4.6 NEM Participation Fees and Ancillary Services Charges

NEM participation fees are levied on retailers by AEMO to cover the costs of operating the national electricity market and ancillary services charges cover the costs of the services used by AEMO to manage power system safety, security and reliability.

In the Issues Paper, the Authority suggested that retailers avoid these costs when on-selling their customers' exported PV energy and therefore these costs should be included in the fair and reasonable value of PV exports.

Submissions

TRUenergy suggested that in fact these costs are not avoidable as that they will be reallocated via usage charge increases to all customers. TRUenergy also suggested that the intermittent nature of PV generation is more likely to increase the costs for ancillary services required to stabilise system frequency and voltage support, which are directly related to the degree of generation and demand variability.

The Authority's Position

The Authority understands that NEM participation fees and ancillary services fees are paid based on net energy purchased and measured by AEMO at the regional reference node. It follows then that retailers avoid NEM and ancillary services fees at a rate which is proportional to avoided wholesale energy purchases resulting from PV exports.

To the extent that AEMO might adjust its fees in response to a declining revenue base, as suggested by TRUenergy, the Authority considers it would not be reasonable to attribute this to the impact of solar PV generation alone, as there are a range of other demand side responses contributing to decreasing network consumption.

Regardless of any effect that reduced network consumption may have on AEMO's market charges, the Authority's annual calculation of notified prices includes updated AEMO fees and charges. Therefore, by using the notified price as the basis for estimating a fair and reasonable feed-in tariff, any annual adjustments to AEMO charges will be captured in the Authority's calculations.

For this Draft Report, the Authority will use the NEM and ancillary services fees used in calculating notified prices for 2012-13, as set out in Table 4.4 below.

Table 4.4: AEMO market fees for 2012-13

	c/kWh
NEM fees	0.040
Ancillary services fees	0.046
Total	**0.086**

Source: ACIL Tasman, Estimated Energy Purchase Costs for Final Determination, May 2012.

4.7 Energy Losses

In delivering energy from a generator to a consumer, some electricity is lost through the transmission and distribution networks, as heat, due to the resistance of the conductors. The consequence of this is that retailers must purchase enough electricity from the NEM to supply the demand of their customers, plus an additional amount to compensate for the electricity lost during delivery.

One of the benefits of distributed generation, including solar PV, is that it reduces the need to transport energy long distances and therefore bypasses transmission losses. On this basis, it is likely that transmission losses can be avoided when a retailer on-sells PV exports and the value of the avoided losses should therefore be included in a feed-in tariff based on the benefits to retailers.

Distribution losses occur when transporting electricity through the lower voltage distribution network. In the Issues Paper, the Authority suggested that electricity from distributed generation, including solar PV, would also likely avoid a proportion of distribution losses.

In setting notified prices, the Authority applies AER approved loss factors from Energex's network area to its cost estimates to account for losses.

Submissions

ATA submitted that the value of avoided losses needs to take account of the time at which solar exports are occurring. It stated that exports often occur at times when the network is under heavy load so customers may benefit from lower losses.

Ergon Energy submitted that it would be very difficult to accurately estimate the value of avoided losses due to PV generation in its network area and the overall impact would likely be small as solar PV only accounts for around 0.4% of energy delivered across its network. To illustrate, Ergon Energy estimated that if the total energy requirement in its network area was supplied from within the distribution network (rather than the transmission network), the estimated reduction in distribution losses would be only 0.02%[13].

Energex agreed that PV exports are likely to result in some reduction in transmission and distribution losses. However, Energex noted there would be considerable cost and effort required to accurately quantify avoided distribution losses attributable to PV for the purposes of inclusion in a feed-in tariff value.

[13] Ergon Energy, *Submission on the Issues Paper - Estimating a Fair and Reasonable Solar Feed-In Tariff for Queensland*. 19 September 2012. p.8

The Authority's Position

The Authority considers that retailers avoid transmission losses when they on-sell PV exports supplied into the distribution networks and that this should be factored into the fair and reasonable value of PV exports as a reduced energy purchase requirement.

The Authority considers that it's likely that PV exports would be consumed close to where they are supplied into the distribution network and that it therefore seems reasonable to conclude that avoided distribution losses associated with PV exports would be low. However, as noted in submissions, estimating the impact of PV exports on distribution losses would be a costly and complex exercise. The Authority considers that the benefits of isolating the reduction in losses attributable only to PV would be outweighed by the cost of the exercise. For these reasons, the Authority proposes to assume that retailers avoid the full extent of distribution losses associated with the distribution loss factors the Authority uses to calculate notified prices.

The Authority notes ATA's submission and agrees that actual losses may vary at different times of the day and when the network is subject to different loads. However, the loss factor applied to wholesale energy purchases is a fixed value established at the regional reference node and applied to all retailers. Therefore, the value of actual losses during the time of PV generation has no bearing on the benefit to the retailer.

To estimate the value of avoided losses accruing to the retailer, the Authority has used the loss factors for Energex as used in its final determination on notified prices for 2012-13, as set out in Table 4.5. This loss factor reflects the transmission losses and AER approved distribution loss factors sourced from AEMO. For the Final Report, values will be updated to reflect estimates used in the Authority's 2013-14 draft determination on notified prices.

Table 4.5: Energy Loss Factors in South East Queensland for 2012-13

Settlement class	*Transmission Losses*	*Distribution Losses*	***Total Losses***
Energex NSLP	1.0%	6.2 %	**7.2 %**

Source: ACIL Tasman, Estimated Energy Purchase Costs for Final Determination, May 2012.

4.8 Retail Operating Costs

Retail operating costs relate to the cost of the services provided by an electricity retailer to its customers. These typically include customer administration costs (including call centres), corporate overheads, billing and revenue collection, IT systems, regulatory compliance and costs associated with marketing, advertising and sales overheads.

The treatment of retail operating costs is somewhat secondary to this feed-in tariff review, as under its current approach to setting notified prices, the Authority accounts for these costs with a per customer allowance. While retailers cannot avoid these costs when on-selling PV exports, they do not factor into the calculation of the feed-in tariff because they are accounted for in the fixed charge of a retail tariff rather than the variable charge.

Submissions

TRUenergy submitted that it incurs a higher proportion of fixed operating costs for its PV customers, noting that it and other retailers maintain dedicated teams to manage their PV customers. TRUenergy suggested that the higher cost of serving its PV customers is attributed to extra handling time in processing connections, billing complexity, extra

complexity in answering customer queries and complications associated with supporting various legacy feed-in tariff schemes.

Ergon Energy also submitted that retailers will forego a margin as a result of reduced energy sales, as well as incurring additional costs to manage PV customer accounts.

The Authority's Position

In its 2012 Final Determination, ESCOSA considered whether PV customers impose higher operating costs on retailers and argued that within every customer group there will be customers who require additional support from their retailer, not just PV customers[14]. The Authority shares this view and notes that its approach to retail operating costs for notified prices for small customers is based on estimating an average cost per customer within each class. It follows then that, while the cost of serving an individual customer may be higher or lower than the average, the retailer would not be financially disadvantaged on average.

The Authority is also inclined to agree with the argument put forward by IPART in its 2012 Final Determination that the cost to serve PV customers would fall over time as customers become more informed[15].

For these reasons the Authority has decided not to adjust its estimate of the fair and reasonable feed-in tariff to reflect higher retail operating costs for PV customers.

4.9 Retail margin and head room

The Authority currently applies a 5.7% retail margin and 5% head room to all cost components in setting notified prices. The retail margin represents the reward to investors for committing capital to a business and for accepting risks associated with providing retail electricity services. Head room is an allowance added to regulated retail tariffs to support the current level of competition in the market.

In its Issues Paper, the Authority suggested a number of ways that it could treat the margin and head room allowances when considering the feed-in tariff including:

(a) passing the full value of the margin and the head room to the PV customer to reflect the risks it may face in terms of return on investment;

(b) allowing retailers to retain the full value of the margin and head room on the basis that they face additional risk in servicing PV customers; or

(c) sharing of the margin and head room between the PV customer and the retailer.

In its Issues Paper, the Authority suggested that sharing of the margin and head room between the PV customer and the retailer may be a reasonable approach given that the margin and head room are currently applied uniformly across all cost categories. This would allow retailers to retain the margin and head room that applies to unavoidable costs but pass on the margin and head room that applies to avoided costs. This approach would ensure that retailers receive a return and head room on any factors that affect their cash flows, and PV exporters would receive the return and head room on the costs that they enable the retailer to avoid.

[14] ESCOSA, *2012 Determination of Solar Feed-in Tariff Premium -Final Price Determination*, January 2012. p.43

[15] IPART, *Setting a Fair and Reasonable Value for Electricity Generated by Small-Scale Solar PV Units in NSW, Final Report*, March 2012. p.51

Submissions

TRUenergy submitted that head room should not be included in the value of the feed-in tariff as PV customers tend to be more costly for retailers compared to non-PV customers. TRUenergy also stated that it would be inappropriate to share the head room allowance as PV exporters are not involved in competing for customers.

AGL shared a similar views stating that, when a customer receives a market contract rate and the head room allowance has been used to deliver that competitive offer, then the retailer does not 'avoid' this cost. AGL also said that sharing the head room allowance attributes a greater value to PV than energy generated from other sources.

TRUenergy noted that financing and capital risks faced by retailers are not faced by PV customers so there is no justification for sharing of the margin component. Origin stated that sharing the retail margin could perversely incentivise retailers to not offer feed-in tariff products if the retail margin is lower for PV customers than other customers. Origin also argued that sharing the margin would reduce the flexibility afforded to retailers when determining feed-in tariff offers.

In contrast, the Clean Energy Council and the Solar Business Council argued that sharing the margin and head room would reflect the risk borne by customers in buying a PV unit, as well as the reduced risk faced by retailers from lower electricity price volatility. Some submissions also suggested that the margin and head room should be shared to reflect the investment risk or the 'return on investment' expected by owners of PV systems.

The Authority's Position

The Authority disagrees with the proposal by the Clean Energy Council and the Solar Business Council that risks borne by PV customers should be accounted for in setting the feed-in tariff because, as discussed in Chapter 3, the Authority considers the feed-in tariff value should reflect the value that PV exports represent to retailers.

The key issue is whether the retailer should retain the value of the margin that is associated with the costs that it can avoid. In theory, to the extent that those costs are avoided, the margin associated with them also forms part of the direct financial benefit to the retailer in the market.

However, the margin represents a premium to retailers to reflect risks, many of which are not avoided by the on-sale of PV electricity. In addition to the risks unique to the NEM, retailers also face general commercial risks in operating a business including credit default, financing and regulatory risks. These are broad business-wide risks which would not be reduced as a direct result of on-selling PV exports.

In a similar way, the head room allowance within the notified price is not an explicit component of benefit to the retailer which is directly attributable to PV exports, rather it is a means of promoting competition in the market. The retailer is entitled to a head room allowance on every kWh of energy it sells at the notified price, including that sourced from PV customers. On this basis, it is not appropriate to consider head room an avoidable cost when estimating the benefit to the retailer.

Retailers have argued against including margin and head room in the fair and reasonable value on the basis that it will jeopardise competition and dissuade retailers from accepting new solar PV customers. While the Authority is not convinced this would occur in practice, it is mindful of the role that the margin and head room play in supporting competition in the retail market and accounting for commercial risks.

The Authority therefore considers it appropriate that the fair and reasonable PV export value should not include the value of margin and head room on avoided cost components. This acknowledges that the risks faced by retailers are not avoided when they on-sell PV exports.

4.10 Draft Decision on Fair and Reasonable Value of PV exports in South East Queensland

Based on the Authority's analysis, it is likely that the value of PV exports to a retailer in South East Queensland would be approximately 6.81 cents per kWh. The calculation of this value is illustrated in Table 4.6 below. For comparison, regulated and market-determined feed-in tariffs in other jurisdictions are presented in Chapter 5.

For the purposes of this Draft Report, the Authority has used the same methodology and cost data from 2012-13 notified prices as inputs for estimating the financial benefit to retailers. The Authority is currently reviewing the notified retail prices to apply during 2013-14 and will draw on the outcome of that work to update the fair and reasonable estimated feed-in tariff for the Final Report in March 2013.

Table 4.6: Estimated Fair and Reasonable Value PV Exports in SEQ (2012-13)

Cost Component	*Retail Cost (c/kWh)*	*Unavoidable Costs (c/kWh)*
Wholesale electricity costs	6.149	-
Green Scheme costs	1.133	1.133
NEM fees	0.040	-
Ancillary services fees	0.046	-
Subtotal	*7.367*	*1.133*
Plus losses (7.2%)[1]	0.575	-
Plus network costs	10.200	10.200
Plus margin (5.7%)	1.034	1.034[2]
Subtotal	*19.176*	*12.367*
Plus head room (5%)	0.958	0.958[2]
TOTAL (excl. GST)[3]	**20.134**	**13.326**
Less unavoidable costs	(13.326)	
Direct Financial Benefit to the Retailer	**6.81 c/kWh**	

Note: Totals may not add due to rounding
1 Calculation of loss factors are discussed in detail in Appendix D
2 As discussed in section 4.8, the full amounts of retail margin and head room are considered unavoidable.
3 Estimated retail price is based on 2012-13 cost reflective tariff.

4.11 Value of PV Exports in the Ergon Energy Distribution Area

Estimating feed-in tariffs in the Ergon Energy region is complicated by the application of the Queensland Government's Uniform Tariff Policy (UTP). This is because, under the UTP,

the notified price that applies across all of Queensland reflects the costs of supply in the Energex network area only. In reality, retailers supplying customers in Ergon Energy's network area will incur different (in aggregate higher) costs than those in Energex's network area.

On this basis, the Authority considers the value of PV exports to Ergon Energy (retail) would be more appropriately estimated using a bottom-up approach based on the costs that it avoids when it on-sells exported PV electricity.

Submissions

Ergon Energy[16] suggested that using the cost estimates from the notified prices is not a reasonable method for determining the feed-in tariff as it assumes that the retailer would avoid all of the elements that make up that cost estimate. Ergon Energy added that developing geographical based feed-in tariffs would require the Authority to consider substituting Energex's network costs with its own where appropriate, as well as reconsidering the value of the other avoided cost components.

TRUenergy submitted that, while it does not actively market to customers in the Ergon Energy network area, it considers the fair and reasonable value for Ergon Energy customers should reflect the value to retailers of PV exports in the Energex area alone. The Clean Energy Council suggested that the principles for determining and implementing the fair and reasonable value should be broadly the same for Energex and Ergon Energy, however, the actual values paid may legitimately differ.

The Australian Solar Council and the Solar Business Council Inc. supported broad geographical based feed-in tariffs provided they are not so complex as to impose significant administration costs. Similarly, Alternative Technologies Association pointed to the system in Western Australia where feed-in tariffs vary regionally based on losses and suggested a similar approach would be logical in Queensland.

In contrast, Ergon Energy argued that different feed-in tariffs for different areas will be more complex to administer and may impose additional costs on both the retailer and the distribution business. It stated that if more tariffs are introduced, it would need to update its billing systems and tariff codes.

Ergon Energy submitted that it supports establishing a fair and reasonable value for energy exported by small scale solar PV systems exported into its isolated community networks, valued at the energy cost allowed for in the regulated retail price determination. Ergon Energy noted that small scale PV generation on these networks can have a number of benefits, including savings of diesel fuel consumption, environmental benefits and the potential to delay upgrades to its power stations in a small number of communities which have daytime peak loads. However, Ergon Energy also noted that there are a range of technical limitations which constrain the amount of uncontrolled PV that can be installed on these networks.

Approaches in Other Jurisdictions

In Western Australia, Horizon Power applies feed-in tariffs set on a locational basis which reflect the avoided costs of generation fuel and capacity costs relevant to each location. These buyback rates currently range from 10 cents per kWh in towns where the cost of supplying electricity is lower, to 50 cents per kWh where these costs are higher. Horizon Power reviews the buyback rates annually.

[16] EECL and EEQ.

The Authority's Position

Estimating the fair and reasonable value

The Authority has concluded that wholesale energy purchase costs, some network losses and NEM and ancillary services fees are avoided by the retailer when it on-sells PV electricity. These costs will form the basis of the estimated value of PV exports to Ergon Energy (retail).

The Authority notes Ergon Energy's suggestion that its own network costs should be substituted for Energex's when estimating geographical based values. However, as the Authority is estimating the value of PV exports on the basis of avoided costs (rather than a benefit to the retailer based on the notified price), network costs have no bearing on the calculation.

Wholesale Energy Costs

The Authority proposes to estimate the value of Ergon Energy's avoided wholesale energy costs using the weighted energy cost estimates developed by ACIL Tasman for the Authority's 2012-13 notified prices determination[17]. The wholesale energy cost estimate is based on the Ergon Energy NSLP.

For 2012-13, the estimated value of avoided wholesale energy costs at the regional reference node, before losses, is 5.593 cents per kWh. For the Final Report, this value will be updated to reflect estimates used in the Authority's 2013-14 draft determination on notified prices.

Table 4.7: Wholesale Energy Cost Allowance (before losses)

Settlement class	***c/kWh***
Ergon Energy NSLP	5.593

Source: ACIL Tasman, Estimated Energy Purchase Costs for Final Determination, May 2012.

NEM participation fees and ancillary services charges

As discussed in section 4.5, the Authority considers that retailers avoid NEM and ancillary services fees at a rate which is proportional to avoided wholesale energy purchases resulting from PV exports. To estimate PV export values for Ergon Energy (retail), the Authority proposes to use the NEM and ancillary services fees used in calculating notified prices for 2012-13, as set out in Table 4.8 below.

Table 4.8: AEMO market fees for 2012-13

	c/kWh
NEM fees	0.040
Ancillary services fees	0.046
Total	**0.086**

Source: ACIL Tasman, Estimated Energy Purchase Costs for Final Determination, May 2012.

[17] Further details of the Authority's approach to estimating wholesale energy purchase costs can be found in its *Final Determination: Regulated Retail Electricity Prices 2012-13*, May 2012.

Energy Losses

As discussed in section 4.6, the Authority considers it reasonable to assume that no transmission or distribution losses are incurred when on-selling PV exports. The Authority proposes to estimate the value of avoided losses by analysing the relevant marginal loss factors for 2012-13 as published by AEMO, and average distribution loss factors published by Ergon Energy.

In section 4.6, the Authority concluded it is reasonable to use a single network loss factor to value avoided losses across the entire Energex network area. However, in the case of Ergon Energy, the Authority considers there is an opportunity to improve on that approach to better reflect the value of PV at different locations on the network.

The Authority has estimated seven loss factors which capture the regional variation in transmission and distribution losses across the Ergon Energy network, as illustrated in Table 4.9. The calculation of these loss factors is explained in **Appendix D**.

Table 4.9: Load Weighted Average Loss Factors for Ergon Energy (2012-13)

Transmission Region	*East Zone*	*West Zone*	*Mt Isa*
T_1	9.28 %	41.31 %	
T_2	18.63 %	49.35 %	7.90 %
T_3	22.65 %	54.39 %	

Sources: QCA analysis*;* AEMO, *List of Regional Boundaries and Marginal Loss Factors for the 2012-13 Financial Year.* 12 June 2012*;* Ergon Energy, *Network Tariff Guide of Standard Control Services 1 July 2012 to 30 June 2013. 9 July 2012.*

Isolated and Remote Networks

Ergon Energy is responsible for providing electricity to customers in 39 remote and isolated communities across Queensland. These networks are located throughout Western Queensland, Gulf of Carpentaria, Cape York, Torres Strait islands, Palm Island and the Mornington Islands. Customers on these networks are excluded by legislation from choosing their electricity retailer and may only purchase electricity from Ergon Energy on a standard contract at the notified price.

The Authority understands that Ergon Energy uses a range of technologies to supply electricity to these networks, including isolated generation and stand-alone power supply solutions[18], with the majority of power produced by Ergon Energy owned diesel generators. Given this, the use of more renewable generation such as PV may provide opportunities for savings on fuel costs and upgrades to diesel generation capacity, particularly in communities that have daytime peak loads.

The Authority agrees with Ergon Energy's suggestion that the value of PV in its isolated networks should be set to ensure a benefit for the customer and a reduction in the cost to operate the isolated systems, and that the value should capture issues unique to these isolated systems. These networks presumably have different characteristics, load profiles and operating costs which will determine the ability of solar PV to provide useful benefits. The Authority also acknowledges that there are a range of technical limitations which constrain the amount of uncontrolled solar PV that can be installed on these networks.

[18] Ergon Energy, *Network Management Plan, 2012-13 to 2016/17*, p.27.

The most efficient outcomes for these networks are unlikely to arise through regulation of feed-in tariffs. In fact, mandating minimum feed-in tariffs for these networks could hinder Ergon Energy's efforts to realise cost savings and efficiencies using renewable generation by providing signals which may not necessarily encourage the most efficient investment for the circumstances. The Authority considers that Ergon Energy (retail and distribution) are best placed to formulate effective programs, including feed-in tariffs, where there is a net benefit for these networks and customers. On this basis, the Authority has not attempted to estimate the value of fair and reasonable feed-in tariffs for PV customers in Ergon Energy's isolated networks and recommends that Ergon Energy should not be subject to a minimum mandatory feed-in tariff for its remote and isolated networks at this stage.

While Ergon Energy's Mt Isa zone is also an isolated network, the Authority was able to estimate a fair and reasonable PV export value due to the availability of a specific distribution loss factor for this network. However, the Authority's value is based on the Ergon Energy NSLP wholesale price estimates at the regional reference node, not the actual cost of generation in the Mt Isa network area. The Authority would welcome further advice from Ergon Energy regarding the cost of generation for the Mt Isa network, to develop a more accurate value of PV exports in this region.

4.12 Draft Decision on Fair and Reasonable Value of PV exports in Ergon Energy's Distribution Area

Based on the Authority's analysis, it is likely that the value of PV exports to a retailer in Ergon Energy's distribution area would range between 6.07 cents and 12.45 cents per kWh, depending on the location of the PV generation. The calculation of these values is illustrated in Table 4.10 below.

As for the value calculated for South East Queensland, the values in Table 4.10 are based on data from 2012-13 notified prices. The Authority will use values from its Draft Determination on notified retail prices for 2013-14 to update the fair and reasonable estimated feed-in tariffs for the Final Report in March 2013.

Table 4.10: Estimated Fair and Reasonable value of PV exports in Ergon Energy pricing zones (2012-13)

Avoided cost component	***East Zone (c/kWh)***			***West Zone (c/kWh)***			***Mt Isa Zone (c/kWh)***
	T_1	**T_2**	**T_3**	**T_1**	**T_2**	**T_3**	
Wholesale energy purchases	5.593			5.593			5.593
NEM fees	0.040			0.040			n/a
Ancillary services fees	0.046			0.046			n/a
Subtotal	**5.679**			**5.679**			**5.593**
Plus network losses % (transmission and distribution)	9.28	18.62	22.65	41.31	49.35	54.39	7.90
Value of network losses (c/kWh)	0.58	1.30	1.66	4.00	5.53	6.77	0.48
Value of avoided costs (c/kWh)	**6.26**	**6.98**	**7.34**	**9.68**	**11.21**	**12.45**	**6.07**

Note: Totals may not add due to rounding

5. IMPLEMENTING A FAIR AND REASONABLE SOLAR FEED-IN TARIFF

The terms of the delegation require the Authority to consider and report on three options for implementing the fair and reasonable value of a feed-in tariff for the Queensland market. The options included:

(a) mandating a 'default minimum price' or price range;

(b) recommending a price range; and

(c) letting the market set a voluntary feed-in tariff.

In its Issues Paper, the Authority suggested that each of these options might be appropriate in certain circumstances, for example:

(a) where competition in the market is insufficient to compel retailers to voluntarily offer a fair and reasonable feed-in tariff, a mandatory feed-in tariff would need to be established;

(b) where the market is more competitive a more light-handed form of regulation, such as publishing a non-mandatory recommended price range, may be appropriate; and

(c) where there is a healthy level of competition in the market it may be appropriate to allow retailers to voluntarily offer a feed-in tariff without regulatory intervention or guidance.

Submissions

Retailers such as AGL, Ergon Energy and TRUenergy[19], in addition to associations such as the Energy Supply Association of Australia and the Energy Retailers Association of Australia, argued that a mandated feed-in tariff was not necessary in South East Queensland. They argued that there was already a range of voluntary feed-in tariff offers available to customers, which retailers felt was indicative of a competitive market operating effectively without regulation. Retailers also highlighted that voluntary tariffs allow them to be more adaptive to changes in technology and market developments. Retailers and retailer associations also felt that a mandated feed-in tariff would represent an extension of regulation over the Queensland electricity market, increasing regulatory risk for retailers.

Solar PV customers, renewable energy associations (the Australian PV Association, the Alternative Technology Association, the Clean Energy Council, the Solar Energy Industries Association, the Solar Business Council and Sunwiz Consulting), as well as Infinity Solar and Stanwell argued for a mandatory minimum feed-in tariff to be set. It was argued by some that only a mandated feed-in tariff could take into account factors such as reduced network losses and environmental and health benefits which are not directly captured by retailers.

Solar PV customers and installers such as Infinity Solar argued that the certainty of a mandatory minimum was vital for the uptake of solar PV installations. In addition, the Solar Business Council expressed concern that individual customers did not have the power to negotiate with retailers.

The Clean Energy Council, Sunwiz and customers argued that vertically integrated retailers that owned generation assets faced different incentives to non-integrated retailers. In particular, it was suggested that vertically integrated retailers would be less likely to offer

[19] TRUenergy has now been rebranded as EnergyAustralia

fair and reasonable feed-in tariff rates, as solar PV generation reduced the profitability of their generation assets.

The Queensland Council of Social Service and the Queensland Consumers Association argued that some level of regulation, such as a non-mandatory benchmark range, would be appropriate in areas with sufficient competition.

Energex and Ergon Energy suggested that a light-handed regulatory approach should be considered. Energex was in favour of a benchmark approach unless a time of use methodology is adopted, in which case Energex stated that a more heavy handed approach may be required to ensure time of use pricing signals are passed on. Ergon Energy was in favour of market competition without regulatory intervention.

Infinity Solar, the ESAA, Energex and Ergon Energy suggested that competition in the Ergon Energy distribution area was not mature and that regulatory intervention would be necessary. In addition, renewable energy associations that advocated mandatory tariffs in the Energex distribution area also advocated mandatory tariffs in the Ergon Energy distribution area. The ESAA suggested that if the Authority recommended a voluntary feed-in tariff for Ergon Energy it would have to satisfy itself that any voluntary feed-in tariff would be consistent with a competitive outcome.

Ergon Energy suggested that it could calculate a voluntary feed-in tariff rate which the Authority could compare to competitive outcomes. Ergon Energy also highlighted the effect on its Community Service Obligation if any regulated feed-in tariff was set too high.

5.1 Form of Regulation in South East Queensland

As discussed above, the form of regulation appropriate for implementing a fair and reasonable feed-in tariff will depend on the level of competition in the retail electricity market in Queensland.

The extent of competition in the Queensland electricity market, as revealed by the proportion of customers on market contracts, is also relevant because in order for a customer to receive a feed-in tariff while on the regulated retail tariff, the customer would have to sign a separate power purchase agreement (PPA). PPAs are used widely in the large scale generation market. However, the cost of drawing up suitable PPAs makes them cost prohibitive for small scale generation, such as solar PV. As a result almost all solar PV customers are on market contracts

Retail Electricity Market Depth

As discussed in the Issues Paper, for most small customers (those consuming less than 100MWh per year), the option to choose their electricity retailer became available with the introduction of Full Retail Competition (FRC) on 1 July 2007. Retail competition for larger customers (those consuming more than 100 MWh per year) began to open up in 1998.

The retail electricity market in South East Queensland has developed considerably since the introduction of FRC. As at 30 June 2012, there were 18 retailers operating in Queensland, 12 servicing small customers and 16 servicing large customers. The Authority publishes statistics on the number of market and non-market customers on a quarterly basis. The June 2012 figures show that, in total, over two thirds (69%) of South East Queensland customers are currently on a market contract. This indicates that a majority of customers have opted for market contracts, which is consistent with a competitive retail electricity market.

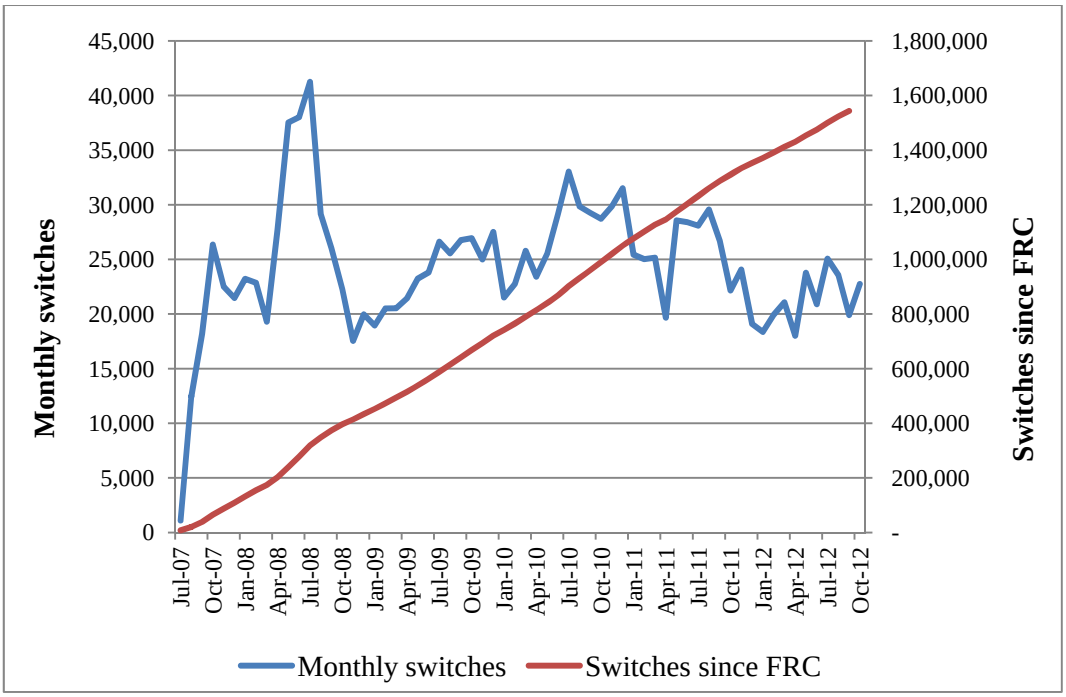
While the Authority does not have access to information on the market offers available to business customers, there are currently over 50 supply offers available to residential customers. These market offers provide customers with a range of contractual terms and conditions combined with potential savings and other incentives.

Customer Switching Activity

The rate of customer switching is often used to measure the level of activity in an electricity market. While not always the case, a high switching rate typically suggests that retailers are actively marketing in a region and that they are offering customers sufficient savings to incentivise them to switch retailers.

Since FRC commenced in Queensland, the level of customer switching activity has been relatively high. Figure 5.1 shows monthly and total customer switches in Queensland since 2007. While there was considerable volatility in the switching rate over the initial 18 months of FRC, customer activity has typically stayed within the range of 20,000 to 30,000 customer switches per month in more recent years. In comparison to other markets around the world, the level of customer switching activity in South East Queensland is particularly high.

Figure 5.1: Retail customer switching activity in Queensland



Source: AEMO Retail Transfer Statistical Data, July 2007 – October 2012 (Code M57B)

Based on the information available, the Authority currently considers there is a reasonable level of competition in the South East Queensland retail electricity market.

Competition in the Solar Feed-in Tariff Market

Table 5.1 shows the range of feed-in tariffs currently available in South East Queensland. Together, the retailers in Table 5.1 account for an overwhelming majority of market customers in South East Queensland. The table highlights that most retailers are voluntarily offering 6-10 cents per kWh to solar PV customers, a range that includes the fair and reasonable feed-in tariff value calculated by the Authority in Chapter 4.

Given that customers are free, within contractual limits, to transfer to the retailer of their choice, it is unlikely that any solar PV customers in South East Queensland are unable to access a voluntary feed-in tariff.

Table 5.1: Current voluntary feed-in tariff offers in South East Queensland

Retailer	*Voluntary Feed-in Tariff (c/kWh)*
AGL	8
Click Energy	10
EnergyAustralia (formerly TRUenergy)	6
Lumo Energy	6
Origin Energy	6
Powerdirect	6

Source: QCA analysis. Offers current as at 1 October 2012

Authority's Position

Based on the preceding analysis the Authority concludes that:

(a) there are a significant number of customers participating in the competitive electricity market in South East Queensland;

(b) the South East Queensland market is currently producing a variety of market offers from a number of retailers;

(c) customers have access to a variety of market offers that feature a voluntary feed-in tariff from different retailers; and

(d) retailers currently offer voluntary feed-in tariffs of between 6-10 cents per kWh, which is comparable to the value of PV exports estimated by the Authority in section 4.9.

In light of these findings, the Authority does not consider it necessary or desirable to impose a mandated value on the South East Queensland market.

5.2 Form of Regulation in the Ergon Energy Distribution Area

Competition in the Queensland electricity retail market has not developed uniformly. While all retailers are licensed to operate across the State, each retailer will choose the locations in which it is prepared to make offers for supply and the types of customers it is seeking to attract. Due to the Queensland Government's Uniform Tariff Policy, retailers are not inclined to offer market contracts to customers in the Ergon Energy distribution area. This is because Ergon Energy distribution costs and charges are significantly higher than those in South East Queensland, but retailers are required to honour the same notified prices charged in the south-east corner. To compensate for the difference between costs and the uniform regulated retail tariff, the retail arm of Ergon Energy (Ergon Energy Queensland) receives a subsidy from the state government. Without access to this subsidy, other retailers are currently unable to offer competitive market contracts to customers in the Ergon Energy distribution area.

As at the end of June 2012, approximately 68% of small customers in South East Queensland were supplied through competitive market contracts. In contrast, outside South East Queensland, less than 1% of small customers were supplied through market contracts. The Authority is not aware of any market contracts generally available to residential customers in Ergon Energy's distribution area.

Also, Ergon Energy (retail) is only able to supply customers on regulated retail tariffs. As noted earlier, this does not allow Ergon Energy to offer a feed-in tariff to customers without signing a PPA, which is cost prohibitive for most small residential PV installations. Even if this were not the case, the demonstrable lack of competition outside of South East Queensland means there is little competitive incentive for Ergon Energy to maximise the fair and reasonable value for a feed-in tariff.

Finally, the Authority is not aware of any retailers offering a voluntary feed-in tariff in Ergon Energy's distribution area.

Authority's Position

Despite supporting regulatory intervention in areas lacking competition in the retail electricity market, Ergon Energy suggested that it could offer a voluntary feed-in tariff rate in its distribution area. However, the Authority considers that the lack of competitive pressure makes it unlikely that Ergon Energy would necessarily offer a fair and reasonable feed-in tariff value. As a result, the Authority considers that the best way to ensure Ergon Energy's PV customers (or potential PV customers) receive a fair and reasonable value for their PV exports is to make the feed-in tariffs presented in Table 4.11 mandatory. This approach was supported by Infinity Solar, the ESAA, Energex and Ergon Energy, as well as those advocating mandatory feed-in tariffs state-wide.

In order to ensure a smooth transition to the fair and reasonable tariffs, Ergon Energy (retail) could be required to provide fair and reasonable feed-in tariffs to the following customers:

(a) existing customers who remain eligible for, and are receiving the 8 cent per kWh feed-in tariff under section 44A of the *Electricity Act 1994*, after this scheme is closed;

(b) customers who connect an eligible solar PV installation after the date on which the existing 8 cent per kWh distributor funded scheme is closed for new and existing customers; and

(c) existing customers who become ineligible for the existing 44 cent per kWh feed-in tariff in the future.

Ergon Energy (retail) should not be required to provide the mandated fair and reasonable feed-in tariffs to those customers who receive, and remain eligible for, the 44 cent per kWh distributor funded feed-in tariff because these customers are already more than adequately compensated for their PV exports.

These eligibility arrangements will ensure that PV customers continue to receive the feed-in tariffs they are currently entitled to, without further adding to the costs of the existing Scheme and placing more pressure on electricity prices, as required by the Direction Notice. However, to ensure that feed-in tariffs do not become a barrier to entry for other retailers wishing to compete in the Ergon Energy distribution area, the feed-in tariff rates calculated for the Ergon Energy distribution area should only apply to Ergon Energy.

5.3 Metering Arrangements

Feed-in tariffs can be applied in one of two ways, based on the way that solar PV generation output is measured. Each metering arrangement has a different set of implications and incentives which need to be considered.

Under a net metering arrangement, the output of the customer's PV system is first used to meet their own immediate consumption needs at any point in time (while it is generating), with any shortfall imported from the network and charged at the normal retail price. If the generation output of the PV system exceeds the customer's immediate requirements, any excess electricity is fed back into the network and registers on the customer's meter as exported energy. When the customer is billed, the retailer credits the value of the exported surplus electricity against the total consumption charge for electricity imported from the network.

Under the alternate gross metering arrangement, the customer exports all of the energy generated by their PV system back into the network, and imports all of the energy they consume from the network. At the end of the billing period, the total amount of exported electricity is multiplied by the feed-in tariff rate and then credited to the customer's retail account to offset the cost of imported electricity which is priced at the normal retail price.

Submissions

The majority of submissions, including those from retailers, clean energy associations, PV associations, customer groups and the distributors strongly opposed a move to gross metering. These stakeholders generally argued that gross metering unfairly forces PV customers to sell all of their PV energy at a low rate and draw all of their consumption from the network at a higher retail price.

Submissions from the Australian Solar Council, Energex, Ergon Energy, Infinity Solar, the Solar Business Council, Suntech, Sunwiz, and some solar PV customers also argued that gross metering does not provide appropriate incentives to modify consumption behaviour.

AGL, Energex, Ergon Energy and TRUenergy suggested that it would be preferable to address any cross subsidies between solar PV and non-solar PV customers that might arise due to less-than-cost-reflective network charges by improving the cost reflectivity of the network charges, rather than by adopting a gross metering arrangement.

In contrast, Stanwell Corporation supported gross metering on the basis that it would ensure that all customers paid a network charge for all of their consumption (fixed and variable components), regardless of whether they were exporting PV generated power to the grid.

A submission from an individual customer, Mr Trevor Berrill, also supported gross metering, on the basis that it could provide useful information, including the total volume of energy generated by PV units (separate from energy consumption), that cannot be easily recorded under net metering.

Energex and Ergon Energy suggested that net metering is more efficient and provided more customer choice than gross metering. The distributors also suggested that the introduction of gross metering would require additional metering for some consumers and impose significant additional costs on distribution businesses.

The Authority's Position

Many submissions which strongly rejected the option of gross metering incorrectly assumed that the outcomes of this review would apply retrospectively to customers on the existing net-metered feed-in tariffs. The purpose of this review is to advise the Minister on a fair and reasonable feed-in tariff value for Queensland customers, and the mechanisms through which such a tariff could be implemented.

The Authority discussed the option of gross metering in order to highlight that PV customers on a net metered tariff are able to avoid a disproportionate amount of network costs by minimising their reliance on grid-sourced electricity. Whilst they still pay a daily fixed network charge, their liability for volume based network charges may be significantly lower than other customers in the same consumption tariff class. This raises a potential concern because, generally, the network charge components are not cost reflective. That is to say, the variable network charges tend to overstate the true cost of each customer's use of the network, while fixed components tend to significantly understate the true value of the assets required to service each customer.

Implementing a gross metered feed-in tariff for new participants would be one way to alleviate inequities arising from sharing of the under-recovered network charges resulting from the net metering arrangement. However the Authority agrees with comments made in submissions from distributors and retailers, that it would be preferable to improve the cost reflectivity of network charges in order to eliminate the cross subsidies between solar PV and non-solar PV customers. This solution would come at the cost of much higher fixed network charges for all customers which, when viewed from other perspectives, might also be seen as imposing a high cost on those least able to afford it. An alternative might be to introduce a new network charge for customers with PV installations which is designed to recover the actual fixed costs: these customers network connection, which they are not paying under the current network charging arrangements, when they reduce their consumption from the network.

The Authority also notes that net metering is currently the dominant metering approach in Australia and its retention in Queensland would likely assist in any transition to a national feed-in tariff scheme, should one be introduced in the future.

Based on these considerations, the Authority is inclined to prefer a net metering arrangement. However, the Authority considers that retailers should not be precluded from offering gross metered feed-in tariffs, should they so choose.

5.4 Other Issues

Some submissions raised other issues in relation to implementing a fair and reasonable feed-in tariff that have not been addressed above.

Administration Costs of Multiple Feed-in Tariffs in Ergon Energy's Distribution Area

As discussed in Chapter 4, the Authority considers there is scope to apply some broad geographically sensitive feed-in tariffs across the Ergon Energy supply area. However, doing so raises some implementation issues identified in submissions.

The Australian Solar Council and the Solar Business Council Inc. supported broad geographical based feed-in tariffs provided they are not so complex that they would impose significant administration costs. Similarly, ATA pointed to the system in Western Australia

where feed-in tariffs vary regionally based on losses and suggested a similar approach would be logical in Queensland.

In contrast, Ergon Energy argued that different feed-in tariffs for different areas will be more complex to administer and may impose additional costs on both the retailer and the distribution business. It claimed that if more tariffs are introduced, it would need to update its billing systems and tariff codes.

Approaches in Other Jurisdictions

In Western Australia, solar PV customers are offered feed-in tariffs through the Renewable Energy Buyback Scheme, which requires retailers to offer a buyback rate to net exporters of renewable generated electricity. The buyback rates and terms and conditions are set by the retailer and approved by the Public Utilities Office.

Horizon Power is the incumbent electricity supplier to Western Australian customers outside of the South West Interconnected System (SWIS)[20]. Horizon Power's network area covers 2.2 million square kilometres and services around 100,000 residential customers across the Kimberley, Pilbara, Gascoyne, Mid West and Southern Goldfields regions. Horizon Power also manages and delivers electricity to 36 isolated systems in remote and regional areas.

Horizon Power applies feed-in tariffs set on a locational basis which reflect the avoided costs of generation fuel and capacity costs relevant to each location. These buyback rates currently range from 10 cents per kWh in towns where the cost of supplying electricity is lower, to 50 cents per kWh where these costs are higher. Horizon Power reviews the buyback rates annually.

The Authority's Position

While Ergon Energy suggested that administering multiple feed-in tariffs set on a locational basis would be complex and require billing system upgrades, it was not clear on the significance of those costs. However, given Horizon Power is able to administer numerous feed-in tariffs across WA, the Authority assumes that the cost to Ergon Energy of administering several feed-in tariffs would not be material. However, it welcomes further information from Ergon Energy on this issue.

The Authority has nonetheless been mindful of the cost of implementation and has developed its proposed feed-in tariffs based on existing Ergon Energy pricing zones and loss factors, as currently used to determine the allocation of its network charges. On this basis, the Authority considers that implementing the regional feed-in tariffs presented in Table 4.10 should not be excessively complex or costly for Ergon Energy.

Obligation to Connect PV Customers

The Clean Energy Council submitted that it was aware of some PV customers being refused a solar PV export connection to the distribution network. It argued there should be an enshrined 'right to connect' for customers wishing to install grid-connected PV systems.

The Authority considers there are several problems with this proposal. Firstly, any move to oblige a distributor to connect PV customers could significantly impede the distributor's ability to run its network in the most efficient way and could have potentially serious negative implications for the network and electricity prices. This is because network operators must observe a range of standards and limitations when modifying the network and

[20] Horizon Power is owned by the WA State Government and is a vertically integrated generator, distributor and retailer.

there may be sound reasons why some connections should not be made. Network businesses are best placed to make those decisions and should not be restricted from refusing individual PV connections where there are negative consequences for the safety, reliability or efficiency of the network. Furthermore, imposing a right to connect would likely interfere with the regulation of the distribution businesses, which would be inconsistent with the COAG principles.

For these reasons the Authority considers there should not be any enshrined right to connect for PV installations.

Eligibility of Commercial Customers

The Clean Energy Council argued that it is not fair or reasonable that commercial customers are excluded from accessing the existing Scheme. It argued that there are a significant number of commercial customers who are currently prevented, or de-incentivised by the lack of a right to connect or minimum mandatory feed-in tariff.

While the current review is not about access to the current Scheme, as the Authority is recommending that retailer-funded feed-in tariffs in South East Queensland not be regulated, if retailers choose to develop fair and reasonable feed-in tariffs for customers other than residential customers, they should not be restricted from doing so. Given that statistics indicate the proportion of commercial customers on market contracts is larger than for residential customers, the Authority considers it likely that there is a healthy level of competition for commercial customers in South East Queensland and, on this basis, it is likely that retailers would make voluntary feed-in tariff offers to commercial customers.

Eligibility of Other Technologies

A number of stakeholders, including Energex, submitted that the feed-in tariff should be made available to other types of renewable sources such as wind, fuel cells and energy storage, and should not be limited to small scale solar PV. It was also suggested that time-varying tariff rates and different rates for different technologies could be developed.

While the terms of reference for the current review specify that the Authority is to advise on a feed-in tariff for solar PV generation only, the Authority sees no reason why retailers could not develop fair and reasonable feed-in tariffs for other technologies.

5.5 Processes for Ongoing Review

In its Issues Paper, the Authority presented the following options to ensure that any mandatory fair and reasonable value remained appropriate over time:

(a) an annual review of the value(s), to apply for the following 12-month period;

(b) a multi-year review which establishes a fixed value or values for two or more years; or

(c) a multi-year review which establishes a variable value or values for two or more years, updated at defined intervals, or as necessary.

Submissions

Submissions provided mixed support for the annual and multi-year review options. Those that favoured a multi-year approach generally argued that this approach would provide certainty for customers and retailers. However, stakeholders that favoured this option also suggested the need for a mechanism to allow a flexible review of the benchmark value in response to material changes in circumstances affecting the value.

The Authority's Position

In its Issues Paper, the Authority noted that reviewing the value annually is likely to be the most administratively costly option. However, it would allow the fair and reasonable value to be updated to reflect unforseen changes in underlying determinants in a timelier manner than under a multi-year review.

At present, the Authority reviews and sets regulated retail electricity prices on an annual basis. There does not appear to be any reason why feed-in tariffs would need to be reviewed more frequently than notified retail prices. On the same basis, the Authority does not consider that there would be any need for a mechanism to 're-open' the value between annual reviews. More frequent reviews would likely impose unnecessary additional administrative costs on all parties, while less frequent reviews would risk values falling out of touch with the market.

For these reasons, the Authority considers that the benchmark value should be updated on an annual basis, concurrent with the Authority's review of notified retail electricity prices. This would allow for the same degree of flexibility and responsiveness to change as is available in setting notified prices.

5.6 Supporting Arrangements for Market-based Feed-in Tariffs

While not raised in the Issues Paper, several stakeholders suggested that introducing voluntary feed-in tariffs may require the implementation of measures to ensure that customers are able to make informed choices about feed-in tariffs. This may include monitoring of the market for a period of time to ensure that competition continues to provide customers with access to fair and reasonable feed-in tariff offers.

Submissions

The Queensland Consumers Association and the Queensland Council of Social Service emphasised the need for customers to be informed if they were to participate in the market, and cited anecdotal evidence that many solar PV customers are not well informed regarding the benefits of solar PV installations and electricity market offers generally. The Queensland Council of Social Service highlighted the importance of any revised feed-in tariff arrangements being supported by regulation that ensured customers could access clear and comparable information on market offers with a feed-in tariff component, such as an online price comparison tool.

Ergon Energy suggested that voluntary feed-in tariff offers could be monitored and compared by the Authority, and regulatory intervention could be considered were the market not to deliver fair and reasonable feed-in tariffs.

The Authority’s Position

The Authority agrees with submissions highlighting the importance of enabling customers to make informed choices if they are to benefit from competition in the market for solar PV customers. Informed choice requires that customers not only understand the terms and conditions of a market offer they are considering, but also how that market offer compares to others in the marketplace.

Current information requirements in the Electricity Industry Code (the Code) for non-solar PV customers provide the ability for customers to make informed choices and have supported the development of competition in the residential electricity market. These provisions could be extended to cover solar PV customers.

Alternatively, as Queensland is currently committed to the implementation of the National Energy Customer Framework (NECF) which includes information disclosure requirements that cover solar PV feed-in tariffs, this may provide the appropriate framework for informing customers. The price comparator established by the AER under the NECF already contains adequate solar feed-in tariff information for customers.

5.7 Statutory Implementation

As discussed in section 5.3, Ergon Energy (retail) is precluded from offering retail electricity on terms other than gazetted notified prices. The drafting of section 90(1) of the Electricity Act would also seem to preclude Ergon Energy from offering a feed-in tariff to customers without entering into a PPA.

Should the Government accept the Authority's recommendation to mandate minimum feed-in tariffs for Ergon Energy customers, it is more than likely that some supporting legislative changes may be necessary.

6. EQUITABLY SHARING THE ON-GOING COSTS OF THE SOLAR BONUS SCHEME

The Authority has been asked to investigate options for minimising, or more equitably sharing, the ongoing costs of the Scheme, including a potential retailer contribution.

As discussed in Chapter 2, the existing Scheme is a distributor-funded scheme, the costs of which are ultimately borne by electricity customers via higher network charges, and therefore higher retail electricity prices. This raises concerns about the equity of the Scheme for non-PV customers.

In addition, as discussed in Chapter 3, it is clear that retailers are likely to derive some financial benefit from their customers' PV energy exports. As a result, it would seem that requiring retailers to contribute to the future costs of the existing Scheme is one reasonable way to reduce the ongoing impact of the Scheme on network charges and customers' electricity bills.

6.1 Approaches in other jurisdictions

For its 2012 review of solar feed-in tariffs, IPART[21] recommended that NSW retailers be required to contribute 7.7 cents per kWh to the costs of the existing distributor funded scheme in NSW[22]. The value recommended by IPART represents the lower end of the estimated benchmark range for the fair and reasonable value of PV, as discussed in Chapter 3.

6.2 Submissions

Retailers generally did not support a mandatory contribution from retailers to the distributor funded Scheme. Origin argued that imposing such costs would be to the detriment of consumers and would create additional costs and reduce competition. The ERAA submitted that a mandatory retailer contribution, above what is commercially viable, would increase the risks faced by retailers. AGL also noted that voluntary premiums may be withdrawn should a mandatory retailer contribution be implemented, pointing to the outcomes of the mandatory contribution in NSW which saw retailers adjust their voluntary premiums accordingly.

The ESAA considered that retailers should not be required to contribute to the costs of the feed-in tariff Scheme, which it argued was a policy decision made against the advice of the energy industry. However, the ESAA stated that if the Government chose to make retailers fund a portion of the costs, it should allow time for existing contracts to end before changes are made, and only require retailers to contribute to the cost of the Scheme for their customers on the current 44 cent per kWh and 8 cent per kWh feed-in tariffs.

TRUenergy suggested that any retailer contribution should be simple and straightforward and should not exceed the real value to the retailer of the PV exports. TRUenergy submitted that it would be helpful if the Authority and Government played a part in creating awareness of the reasons for introducing a cost sharing arrangement as customers will likely be confused when voluntary retailer FIT's are withdrawn (or reduced).

Consumer groups were generally in favour of a retailer contribution to the distributor funded Scheme. QCOSS supported this approach but noted that it would be likely to impact on

[21] IPART, *Setting a Fair and Reasonable Value for Electricity Generated by Small-scale Solar PV Units in NSW, Final Report*, March 2012.
[22] IPART, *Solar Feed-in Tariffs, Retailer Contribution and Benchmark Range for 1 July 2012 to 30 June 2013*. June 2012.

retailers' willingness to continue to offer voluntary premiums. While QCOSS noted that this would not be an ideal outcome for some customers, it considered the 44 cent per kWh tariff is sufficiently generous to accommodate this outcome and that the overall benefit of reducing electricity price increases for all customers would outweigh the negative impact to individual PV customers. QCOSS suggested that the retailer contribution be set at a level to ensure that PV customers do not become less desirable to retailers and therefore disadvantaged in the market.

Queensland Consumers Association also raised concerns that the withdrawal of voluntary premiums could have significant impacts on customers whose investment decisions may have assumed the continuation of such premiums. Queensland Consumers Association suggested that any retailer contribution should be phased in over a number of years to minimise the impact of the likely withdrawal of voluntary premiums.

Mr PG Atherton raised concerns with the impact of solar PV on electricity costs for other consumers and suggested that costs could be distributed more equitably by requiring solar PV customers to pay a substantial annual grid connection fee, based on the capacity of their system. Mr Atherton considered that this policy would spread the capital costs across all customers in a much fairer manner.

Energex suggested that an equitable funding arrangement would include a contribution from electricity retailers as well as recognition that solar PV customers should not be exempt from appropriate network charges. However, Energex suggested that feed-in tariffs should not attempt to correct or compensate for other market arrangements that may distort customer behaviour and/or cost allocation to various market participants and customers. Energex also suggested that the retailer contribution should be linked to the Authority's estimation of the fair and reasonable value of PV exports and would reduce the distributor funded feed-in tariff payments that need to be recovered through higher network charges, which would reduce the cost impact of the Scheme on non-PV customers. Energex suggested that while a mandatory retailer contribution would likely result in voluntary premiums being withdrawn, it argued that this should not be a consideration in the Authority's deliberations as this represents part of the risk that customers accept when they choose to invest in solar PV.

Ergon Energy was also of the view that it is reasonable that retailers contribute to the ongoing costs of the Scheme. However, Ergon Energy suggested that the amount of the contribution should be established on a voluntary basis. Ergon Energy also suggested that introducing a combination of kWh tariffs and basic kW tariffs (preferably kVa), and having tariffs with capacity charging for import and export as well as an energy charge, could provide a fairer reflection of costs incurred for use of the network, import and export, and the volume of electricity consumed.

6.3 The Authority's Position

Options for Equitable Sharing of Costs

As discussed in Chapter 2, putting aside the extremely generous feed-in tariff offered to PV customers under the existing scheme which the Government has committed to maintaining, the Authority considers that the existing distributor funded Scheme is flawed, principally because it imposes the cost of the Scheme on all customers (via higher network charges) and because the windfall gain retailers receive from free PV energy is not recognised.

The first of these flaws could be addressed in part through improved network charges for PV customers. In particular, more cost reflective (fixed and variable) network prices for PV customers could reduce the extent to which other customers must pay for the network costs PV customers avoid as a result of in-house PV power consumption (as discussed in Chapter

7). Similarly, more cost reflective network prices for PV customers could reflect other costs of the Scheme, such as administration and infrastructure costs specific to PV installations. Establishing a new and cost reflective network tariff for PV customers is ultimately a matter for the distribution businesses and the AER to consider. Nevertheless, the Authority would encourage the distributors to seriously consider this change.

The main cost impact of the Scheme – the value of direct feed-in tariff payments made by the distributors – could be reduced by addressing the second flaw of the Scheme noted above and requiring electricity retailers to make a contribution to the feed-in tariff payments that recognises the benefit they currently obtain from the on selling of exported PV generated power.

Looking forward, the Authority concluded in Chapter 5 that whether, and how much, retailers other than Ergon Energy Queensland choose to pay for PV exports should be left to market participants to decide and not be mandated. Adopting the same approach here will not reduce the costs on the current scheme. Voluntary contributions on offer from retailers under the current Scheme do not reduce the cost of the direct payments made by the distributors or reduce the consequent burden being placed on all other network customers. The current voluntary contributions by retailers simply make an excessively generous scheme even more generous for PV customers.

Mandating a retailer contribution to the current Scheme would go some way to addressing the inequities inherent in the current Scheme. However, it would be forcing all retailers to mitigate the costs of the flawed distribution funded scheme at the expense of consumers, as noted by the ESAA.

The Authority agrees with a number of stakeholders that, if a retailer contribution to the existing Scheme is mandated, it is likely that there would be a corresponding reduction in any voluntary market offerings. While the Authority acknowledges that this would reduce the benefits accruing to PV customers, it would also reduce the burden being placed on those unable or unwilling to invest in PV panels. Existing PV customers have been assured that they will continue to be entitled to the generous 44 cents per kWh for a further 15 years. This view was shared by QCOSS which considered that the benefits for all customers of reduced pressure on network prices will outweigh the unfavourable outcomes for some individual customers. Similarly, customers receiving the 8 cent per kWh are also being adequately compensated, at a rate that is above the estimated fair and reasonable value estimated by the Authority but, in any event, the 8 cent per kWh tariff is due to end on 30 June 2014.

However, the Authority considers that if retailers are required to contribute to the costs of the current Scheme, the value of that contribution should be set below the fair and reasonable values the Authority estimated in Chapter 4. This is because setting a mandated contribution too high could adversely affect competition and make retailers less willing to offer services to PV customers. It might also encourage retailers to increase prices to recover the additional costs of the required contribution. Neither outcome would be desirable, or consistent with the terms of reference or the principles established by COAG.

As discussed in Chapter 5, there are additional problems to be considered in relation to the Ergon Energy distribution area. Mandating a feed-in tariff for second tier retailers in the Ergon Energy network area could create a barrier to entry in an area where competition is already very limited. On this basis, the Authority suggests that retailers in the Ergon Energy network area, other than Ergon Energy Queensland, be exempt from making mandatory contributions to the existing Scheme, should the Government take this course of action.

Based on the considerations above, the Authority has estimated the value that might be attached to a mandatory retailer contribution based on wholesale energy purchase costs at Regional Reference Nodes (RNNs) (see Table 6.1). These are likely to be conservative valuations of a possible retailer contribution as they represent the value to the retailer prior to any other avoided costs, network losses, margin or head room. The values in Table 6.1 are based on 2012-13 ACIL Tasman estimates. The Authority will update these values for its Final Report to reflect estimates used in the 2013-14 notified prices determination.

Table 6.1: Potential Retailer Contributions to Existing Scheme (2012-13)

	c/kWh
South East Queensland Retailers	6.149
Ergon Energy Queensland	5.593

Source: ACIL Tasman, Estimated Energy Purchase Costs for Final Determination, May 2012.

Impact on Electricity Prices

Currently, the Queensland distribution businesses incur the cost of direct feed-in tariff payments under the Scheme. These costs are then recovered through higher distribution network charges. The cost impacts of direct feed-in tariff payments are discussed in detail in Chapter 7.

The Authority has examined these costs and calculated the potential cost savings from mandating the estimated retailer contributions noted in Table 6.1. These estimates do not represent projections made by the distribution businesses, rather they are an estimate of the potential savings to each distributor from lower net feed-in tariff payments, after the retailer contribution.

To estimate the potential cost savings, the Authority calculated the value of the retailer contributions as a proportion of the 44 and 8 cent per kWh feed-in tariffs, and applied this as a weighted average to the total projected costs of direct feed-in tariff payments, as advised by the distributors. This is a simple approach but provides a reasonable estimate of the savings to be made by the distribution business.

Based on the Authority's analysis, retailer contributions to the existing 44 and 8 cent per kWh feed-in tariffs could reduce the distributors' annual costs of direct feed-in tariff payments by $26.1 million in 2013-14, with the potential savings declining by around 6% each year thereafter. By the end of the 44 cents per kWh Scheme in 2028, retailer contributions could provide total savings of around $260 millions. These cost savings are set out in Table 6.2.

Table 6.2: Potential Reduction in Feed-in Tariff Costs for 44c/kWh and 8c/kWh Schemes from Retailer Contributions ($ millions)

Distributor	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*	*2017-18*	*2018-19*	*2019-20*	*2020-28*	***Total***
Energex	113.1	119.7	111.8	105.5	99.5	93.9	88.6	83.5	518.8	1427.7
Ergon Energy	63.9	69.3	64.9	60.8	56.5	52.5	48.8	45.3	252.5	748.0
Total	177.0	189.0	176.7	166.3	156.0	146.4	137.4	128.8	771.3	2175.7
Potential cost saving	**n/a**	**26.1**	**24.4**	**23.0**	**21.6**	**20.2**	**19.0**	**17.8**	**107.0**	**259.1**

Source: Energex and Ergon Energy
Note: Totals may not add due to rounding. 'Total' column includes costs of $126.8 million incurred between 2010-11 and 2011-12, not shown on this table.

To the extent that the distribution businesses would face lower feed-in tariff payments under a retailer contribution arrangement, the Authority expects that distribution network charges would be lower than they might otherwise be, which would reduce the impact of the Scheme on retail prices.

The Authority estimates that the retailer contributions presented above could reduce the typical residential customer's annual retail bill by up to $16.07 as shown in Table 6.3.

Table 6.3: Impact of Solar Bonus Scheme on Tariff 11 (holding other costs constant)*

	2012-13	***2013-14***	***2014-15***	***2015-16***	***2016-17***	***2017-18***	*2018-19*	*2019-20*
Typical annual T11 bill impact ($)	28.16	58.55	79.97	120.53	112.05	56.97	54.93	52.36
Estimated annual impact after retailer contribution ($)	n/a**	n/a**	n/a**	104.46	97.76	52.26	50.69	48.48
Potential annual saving of retailer contribution on average customer bill ($)	n/a**	n/a**	n/a**	$16.07	$14.30	$4.71	$4.25	$3.88

* *Costs are presented to 2019-20 - the end of the next distribution regulatory period. The patterns established by the last year of the table will continue through to 2028.*

** *Savings on customer retail bills will not occur until 2015-16 because, prior to this, any retailer contribution will simply reduce the amount of cost under-recovered by Energex.*

Source: Energex and the Authority's analysis

7. PROJECTED COST OF THE SOLAR BONUS SCHEME

Although the feed-in tariff under the Solar Bonus Scheme (the Scheme) has recently been reduced from 44 cents per kWh to 8 cents per kWh for new customers, there remains a significant number of PV customers who will continue to receive the old rate until the end of the Scheme in 2028. This means the Scheme will continue to have an impact on electricity prices for some time.

As part of its review, the Authority has been asked to report updated projected costs of the current Scheme. To estimate these costs, the Authority requested information from Energex and Ergon Energy.

The Authority has also considered how these costs might impact retail electricity prices.

7.1 Solar Bonus Scheme Costs Incurred by Distributors

As discussed in Chapter 2, the Scheme is currently funded by the distributors. The majority of the costs arise from feed-in tariff payments by the distributors to solar PV customers for energy exported to the grid. In addition, the distributors incur infrastructure and administrative costs as a result of connecting solar PV customers.

Feed-in tariff payments

As shown in Table 7.1, feed-in tariff payments are expected to cost Energex and Ergon Energy $177 million in 2012-13, increasing to $189 million in 2013-14, before slowly tapering-off as a result of customers becoming ineligible for the scheme. Payments are expected to cost in the order of $2.2 billion by the close of the 44 c/kWh scheme in 2028.

Almost all (99.7%) of these costs reflect payment of the 44c/kWh feed-in tariff that was closed to new applicants on 9 July 2012. The remainder reflect payment of the 8c/kWh feed-in tariff.

Table 7.1: Feed-in Tariff Costs for 44c/kWh and 8c/kWh Schemes ($ million)*

Distributor	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*	*2017-18*	*2018-19*	*2019-20*
Energex	19.4	73.9	113.1	119.7	111.8	105.5	99.5	93.9	88.6	83.5
Ergon Energy	6.5	27.0	63.9	69.3	64.9	60.8	56.5	52.5	48.8	45.3
Total	**25.9**	**100.9**	**177.0**	**189.0**	**176.7**	**166.3**	**156.0**	**146.4**	**137.4**	**128.8**

* *Costs are presented to 2019-20 - the end of the next distribution regulatory period and shows the impact of the Scheme on the distributors' revenue due to the 'catch-up' of costs from previous years in 2014-15 to 2016-17 before reverting to normal. The patterns established by the last year of the table will continue through to 2028. – see also Figure 7.1.*

Source: Energex and Ergon Energy

Infrastructure and administrative costs

While less significant than feed-in tariff payments, the distributors also incur a considerable level of infrastructure and administrative costs as a result of the Scheme. Infrastructure costs include additional metering and connection equipment at the customer's meter box and the costs of upgrading local networks to ensure they are capable of dealing with PV exports. Administrative costs include increased call-centre operations, upgrading and checking billing systems, and assessing and actioning customer applications.

Energex and Ergon Energy provided infrastructure and administration costs in terms of the contribution these costs make to the revenue the AER allows the distributors to recover from distribution charges. As administration costs are operating expenditures that are reflected one-for-one in the distributors' allowed revenue, the administration costs presented in Table 7.2 reflect the actual costs expected to be incurred by the distributors in each year. In contrast, because infrastructure costs represent capital expenditure that would be added to the distributors' asset bases, the values shown in Table 7.2 reflect the regulated return on and return of these assets that the distributors are allowed to receive, not the full amount of the capital expenditure in the year it is incurred.

Table 7.2: Infrastructure and Administration Costs ($ million)*

	2010-11	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*	*2017-18*	*2018-19*	*2019 -20*
Energex										
Administration	2.3	2.1	1.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Infrastructure[a]	1.4	3.3	6.9	7.1	7.3	6.7	6.9	7.0	7.2	7.4
Total	3.6	5.4	**8.5**	**7.4**	**7.6**	**7.1**	**7.2**	**7.4**	**7.6**	**7.8**
Ergon Energy										
Administration	4.2	7.3	8.0	7.4	2.9	0.8	0.0	0.0	0.0	0.0
Infrastructure*[a]	0.6	2.8	7.8	12.6	13.5	12.7	12.3	12.0	11.6	11.3
Total	**4.8**	**10.1**	**15.8**	**20.0**	**16.4**	**13.5**	**12.3**	**12.0**	**11.6**	**11.3**

* *Costs are presented to 2019-20 - the end of the next distribution regulatory period. The patterns established by the last year of the table will continue through to 2028.*

Source: Energex and Ergon Energy

**.[a]return on and return of assets*

Source: Energex and Ergon Energy and the Authority's analysis

7.2 Impact of the Solar Bonus Scheme on the Distributors' Prices

Energex and Ergon Energy provided estimates of how the costs presented above are likely to flow through into distribution prices over the period to 2017-18.

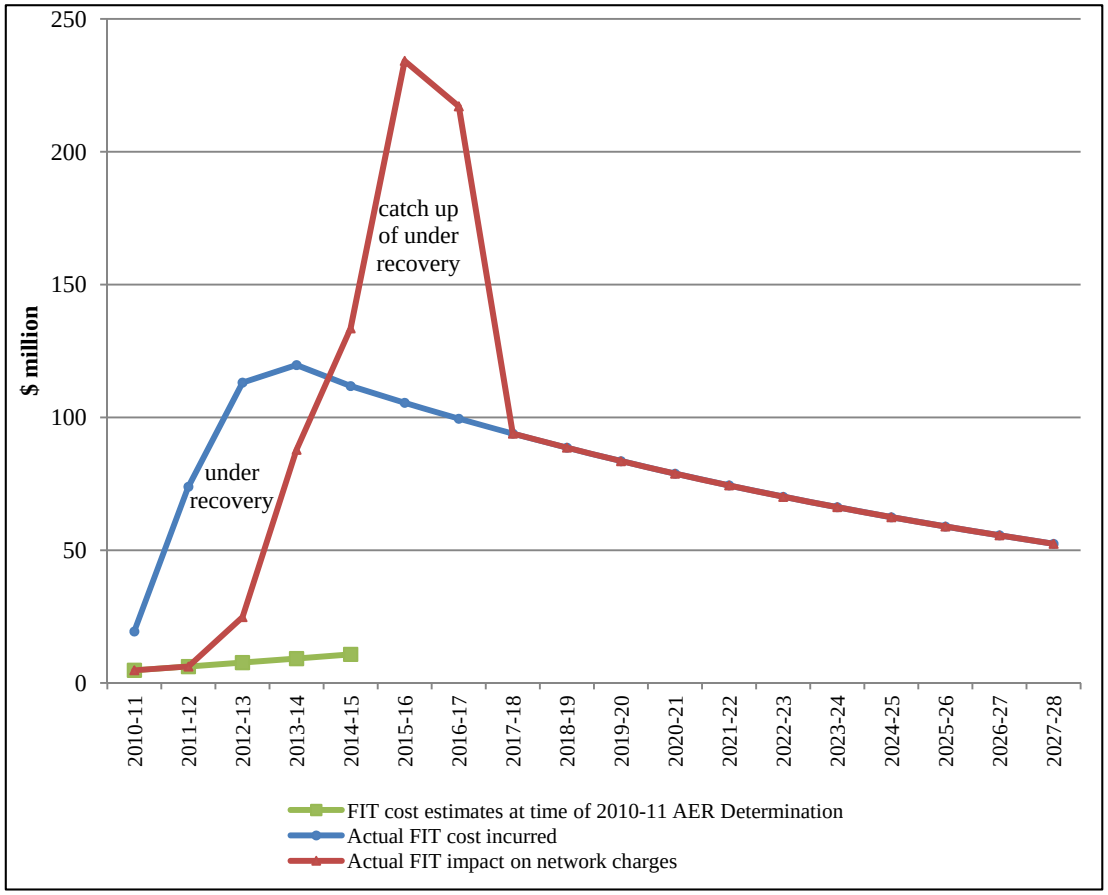
Feed-in tariff payments

The AER approves the amount of revenue to be raised by the distributors on a five-yearly basis (the regulatory period). The costs associated with feed-in tariff payments for 2012-13 to 2014-15 (the last year of the current regulatory period) presented in Table 7.1 are significantly higher than the level of costs that the AER approved for inclusion in the distributors' annual revenue for each of these years. However, the AER will allow the distributors to recoup any extra costs such as these but, for administrative reasons, there is a two-year lag between when the distributors incur the costs and when they can recover those costs via higher distribution prices. This means that distribution prices for any given year of the current AER regulatory period do not reflect the costs the distributors have actually incurred in making feed-in tariff payments. Rather, they reflect the level of costs that were forecast at the time the current AER regulatory period commenced.

For the next AER regulatory period, which starts in 2015-16, Energex and Ergon Energy should be able to more accurately forecast feed-in tariff costs, given the maturity of the

Scheme. As a result, the distributors' prices in 2015-16 and 2016-17 will likely reflect something close to the actual costs being incurred on feed-in tariff payments during those years. However, these will then be inflated by the significant catch-up of extra costs that the distributors did not recoup via distribution charges in 2013-14 and 2014-15. As a result, the high impact of PV payments on distribution prices for both distributors will peak in 2015-16 and 2016-17 when they catch-up that past under-recovery of PV costs, as shown in Figure 7.1 and Table 7.3.

Figure 7.1: Energex feed-in tariff payments and impacts on network revenue



Source: Energex and the Authority's analysis

With more accurate estimates of feed-in tariff costs accounted for in distribution prices from 2015-16, the prospect of further significant under-recovery of actual costs diminishes. As a result, revenue from network charges is likely to more closely reflect actual costs incurred on feed-in tariffs from 2017-18.

Infrastructure and administrative costs

The Authority understands that neither of the distributors' revenue allowances for the current AER regulatory period included explicit allowances for infrastructure and administration costs associated with PV generation. While the distributors may be entitled to recoup some of these costs via the AER's cost pass-through arrangements, neither have indicated an intention to do so. As a result, unlike the situation with feed-in tariff payments described above, there is not expected to be a doubling-up of network price impacts associated with infrastructure and administration costs in 2015-16 and 2016-17 due to earlier under-recovery of costs. In this instance, while the costs have still been incurred, the distributors have,

presumably, put off other previously approved operating and capital expenditure projects in order to absorb these new costs.

In-house consumption of PV energy

Under the Solar Bonus Scheme, the feed-in tariff is applied as a net tariff (on excess energy exported to the grid) rather than a gross tariff (on total energy generated). This means that PV customers avoid paying the network charges associated with energy they would have purchased from the grid if they did not produce their own energy.

Both distributors have network charges that rely on recovering a significant portion of fixed network costs via the variable volume component of the network charge. If the network costs were allocated to the fixed and volume charge components strictly on the basis of how those costs are incurred, the resulting network charges would be predominantly a flat fixed charge (reflecting the fact that the majority of network costs are fixed). While ever PV customers on a net feed-in tariff are charged for their access to the network on this basis (and hence no longer pay volume based network charges on their total use) they will not be meeting the true costs of retaining their network connection. In this case, the distributors will either under-recover their allowed network revenue (such under-recovery then being distributed to all network customers as higher prices in later years) or have to reduce their consumption forecasts which will also lead to higher unit prices for all customers.

There are good reasons why the networks would charge customers non-cost reflective fixed and variable price components. Primary among these are the necessity to have a substantial variable charge component in order to pass price signals to customers about the cost of their use of the network. But, under a net feed-in tariff arrangement, the apparent cost savings for customers with PV installations are exaggerated and the apparent but unreal cost savings are passed on to all customers in the form of higher prices.

While the cost of feed-in tariff payments will decrease over time, and the bulk of infrastructure and administrations costs will be incurred in the early years of the Scheme, Energex expects that in-house consumption will continue to grow into the future as more customers invest in PV panels. Since the close of the 44c/kWh feed-in tariff, Energex has continued to experience high levels of PV applications and expects to receive around 13,000 applications per annum in forthcoming years. Ergon Energy also expects that in house consumption will increase over the next couple of years after which it assumes it will remain constant. As such, the impacts of in-house consumption are expected to continue to grow into the future.

Energex has estimated that in-house consumption will reduce total distributed consumption by up to 646GWh per year over the period to 2017-18 as a result of the increasing number of PV owners consuming their own generation, and that this will increase network prices by up to 2.7% per year. Similarly, Ergon Energy has estimated that in-house consumption will reduce total distributed consumption by up to 419GWh per year over the period to 2017-18, and that this will lead to network price increases of up to 2.9% per annum.

Total distribution price impacts

Table 7.3 summarises the three main sources of distribution price impacts discussed above.

Table 7.3: Contribution of Solar Bonus Scheme to Distribution Prices (% increase)*

	2010-11	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*	*2017-18*	*2018-19*	*2019 -20*
Energex										
Feed-in tariff payments	0.4%	0.5%	1.7%	5.2%	7.7%	12.3%	11.3%	4.8%	4.3%	4.0%
Infrastructure & admin	0.3%	0.4%	0.6%	0.4%	0.4%	0.3%	0.3%	0.4%	0.4%	0.4%
In-house consumption	0.2%	1.2%	1.8%	2.4%	2.6%	2.6%	2.7%	2.7%	2.9%	2.9%
Total	**0.9%**	**2.2%**	**4.0%**	**8.1%**	**10.7%**	**15.3%**	**14.4%**	**7.9%**	**7.6%**	**7.3%**
Ergon Energy										
Feed-in tariff payments	0.2%	0.3%	0.6%	2.0%	4.3%	7.6%	6.9%	2.8%	2.5%	2.3%
Infrastructure & admin	0.4%	0.8%	1.2%	1.3%	0.9%	0.8%	0.7%	0.6%	0.6%	0.6%
In-house consumption	0.3%	1.1%	2.1%	2.9%	2.4%	2.3%	2.1%	1.9%	1.8%	1.6%
Total	**0.9%**	**2.2%**	**3.9%**	**6.1%**	**7.6%**	**10.7%**	**9.7%**	**5.3%**	**4.9%**	**4.5%**

* *Costs are presented to 2019-20 - the end of the next distribution regulatory period. The patterns established by the last year of the table will continue through to 2028.*

Source: Energex and Ergon Energy and the Authority's analysis

7.3 Impact of Solar Bonus Scheme Costs on Retail Electricity Prices

As retailers will seek to pass through network charges to customers in full, the network price impacts associated with the Scheme, as summarised in Table 7.3, can be expected to flow directly through to customers' retail electricity prices.

As a rule of thumb, network costs typically account for around 50% of a retail bill. As a result, the retail electricity bills of customers in the Energex and Ergon Energy distribution areas could be expected to increase by around half the network price impacts shown in Table 7.3 as a result of the costs of the Scheme.

However, there are two important exceptions to this. First, small customers (those consuming less than 100MWh a year) in Ergon Energy's distribution area on regulated retail tariffs will face increases associated with the Energex distribution area. This is because the Uniform Tariff Policy results in all small customers, regardless of their location, having access to regulated retail prices based on the cost of supply in Energex's distribution area (discussed in Chapter 5). Second, customers on obsolete regulated retail tariffs will not be affected because their tariffs already fail to recover the costs of their consumption and do not reflect the underlying (network and retail) costs of supply that are recovered in other regulated and market prices.

The Authority has calculated more accurate estimates of the expected impact of the Scheme on retail electricity prices for residential customers based on the regulated retail price for 2012-13 (Table 7.4 and Figure 7.1). The 4% increase in Energex's distribution prices in 2012-13 is estimated to add around $28 to the annual bill of a typical residential customer (one consuming around 5,370kWh on Tariff 11). Assuming all other costs are held constant at 2012-13 levels, this cost is expected to increase to around $120 (7.5%) in 2015-16, before tapering off in future years.

These retail price impacts are significantly less than those the Authority calculated in response to an earlier request for advice from the Minister for Energy and Water Supply[23],

[23] The Authority's advice to the Minister can be accessed on its website at: http://www.qca.org.au/electricity-retail/DirUnderElecAct/AdviceSBS.php

and which were recently reported in the media. This is because Energex has since changed the way it intends to recoup costs associated with feed-in tariff payments. Whereas it previously indicated it was (and would) recover these costs only from small customers – as it is only small customers who are able to participate in the Scheme – it has now indicated its intention to recover these costs from all customers (both small and large). Ergon Energy had previously advised the Authority that it would recover its PV costs from all customers. As a result, large customers in Energex's distribution area will now also be facing higher retail electricity prices as a result of the Scheme.

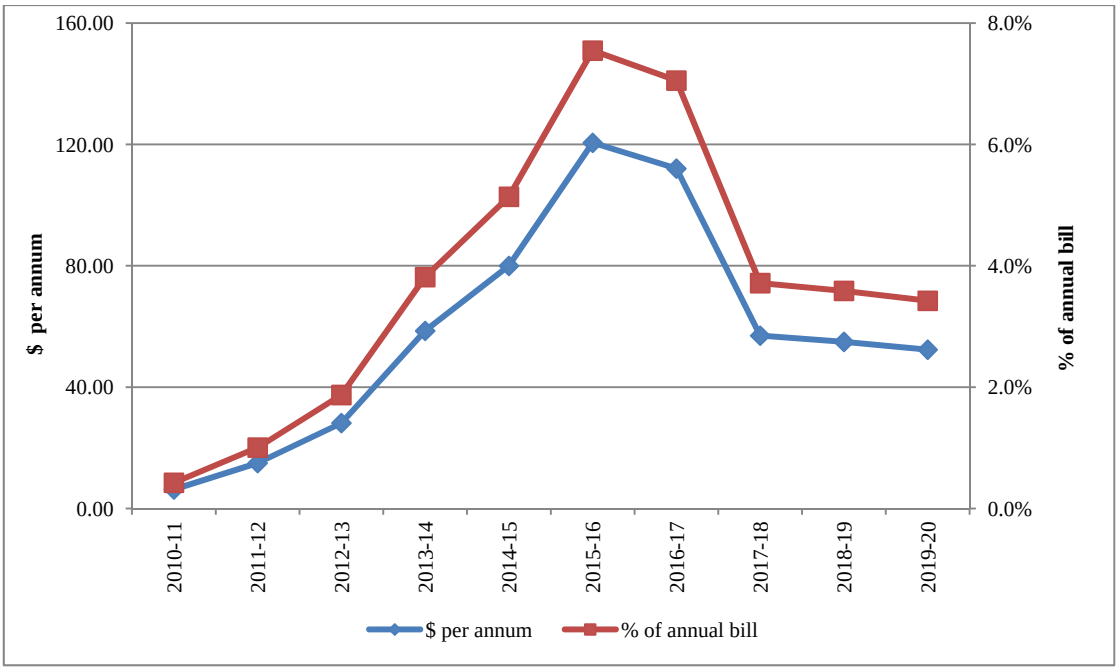
Table 7.4: Impact of Solar Bonus Scheme on Tariff 11 holding other costs constant*

		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Energex price change	%	0.9%	2.2%	4.0%	8.1%	10.7%	15.3%	14.4%	7.9%	7.3%	7.2%
Typical annual T11 impact	$	6.28	14.97	28.16	58.55	79.97	120.53	112.05	56.97	52.36	51.81
% of Annual T11 bill	*%*	0.4%	1.0%	*1.9%*	*3.8%*	*5.1%*	*7.5%*	*7.1%*	*3.7%*	*3.4%*	*3.4%*

* *Costs are presented to 2019-20 - the end of the next distribution regulatory period. The patterns established by the last year of the table will continue through to 2028 – See also Figure 7.2*

Source: Energex and the Authority's analysis

Figure 7.2: Indicative impact of Solar Bonus Scheme on the typical Tariff 11 customer's bill (other costs held constant at 2012-13 levels)*



* *Costs are presented to 2019-20 - the end of the next distribution regulatory period. The patterns established by the last year of the table will continue through to 2028.*

Source: Energex and the Authority's analysis

APPENDIX A: MINISTERIAL DIRECTION AND COVERING LETTER

QUEENSLAND GOVERNMENT

Office of the Minister for Energy and Water Supply

QLD COMPETITION AUTHORITY

Ref: EWS/001493
MC11288

13 AUG 2012
DATE RECEIVED

Level 13 Mineral House
41 George Street Brisbane 4000
PO Box 15456 City East
Queensland 4002 Australia
Telephone +61 7 3896 3691
Facsimile +61 7 3012 9115
Email energy&water@ministerial.qld.gov.au

7 August 2012

Mr Brian Parmenter
Chairman
Queensland Competition Authority
GPO Box 2257
Brisbane Qld 4001

Dear Mr Parmenter

I refer to the Government's recent decision to change the Queensland Solar Bonus Scheme (the Scheme) to reduce the credit amount for electricity produced by small photovoltaic (PV) generators (known as the feed-in tariff) from 44 cents to 8 cents per kilowatt hour (c/kWh) for new customers of the Scheme from 10 July 2012.

As part of this decision, the Government announced its intention to task the Queensland Competition Authority (QCA) with investigating a fair and reasonable value for exported energy from small scale solar PV system in Queensland.

I now direct the QCA to conduct an investigation into the establishment of a fair and reasonable value for electricity generated from small scale solar PV generators and exported to the Queensland electricity grid, as well as the mechanisms for its implementation. This direction is authorised under section 253AA of the *Electricity Act 1994*.

I attach my direction and the Terms of Reference which impose conditions on the QCA when undertaking the directed function. Consistent with the Terms of Reference, the Authority is required to undertake an open consultation process with all relevant parties and consider all submissions received within the consultation period.

The Authority must publish an issues paper no later than September 2012, its draft report by late November 2012, and its final report by 22 March 2013. The Government will give consideration to the QCA recommendations in a further review of the Scheme by 30 June 2013.

/2

Background

The Solar Bonus Scheme was established in 2008 with the aims of making solar power more affordable for Queenslanders, stimulating the solar power industry and encouraging energy efficiency. The Scheme pays eligible households and other small customers for the surplus electricity generated from solar PV panel systems, which is exported to the Queensland electricity grid. The cost of the feed-in tariff (FiT) is passed through to the electricity bills of Queensland electricity consumers.

Exponential growth in customer connections to the Scheme has escalated its costs well in excess of the allowances in the Queensland Distribution Determination 2010-11 to 2014-15. At the end of June 2012, approximately 504 MW of solar photovoltaic (PV) capacity had been connected to Queensland networks and around 190,000 small electricity customers are participating in the scheme.

Changes were recently made that reduce the FiT to limit the long-term cost of the Scheme and its associated impact on electricity bills. From 10 July 2012, new customers who are eligible for the Scheme will receive a FiT of 8 c/kWh, which will be legislated to end on 1 July 2014.

All Australian States and Territories with solar FiT schemes in place have reviewed their premium FiT schemes and subsequently reduced, capped, or withdrawn them following concerns regarding the high rate of growth of the industry and scheme costs. In 2011 and 2012, South Australian, New South Wales and Victorian Governments respectively tasked the Essential Services Commission of South Australia, the Independent Pricing and Regulatory Tribunal, and the Victorian Competition and Efficiency Commission to determine fair and reasonable FiT rates for household solar PV generation in their respective jurisdictions.

In a communiqué of 8 June 2012, Australia, State and Territory Energy and Resource Ministers announced that the Standing Council on Energy and Resources (SCER) was considering the merits and options for developing guidelines for a consistent national approach to fair and reasonable FiT for micro-renewable generation, including solar PV. SCER has tasked officials to prepare advice on options to achieve a consistent national framework for determining 'fair and reasonable' tariffs that jurisdictions may adopt. The framework would provide guidance to what constitutes a minimum tariff that may be offered by retailers to ensure a 'fair and reasonable' return to micro-generation owners for electricity supplied into the grid. The advice will also cover possible options to implement a national framework.

If you have any questions about my advice to you, Mr Benn Barr, General Manager, Energy Sector Reform of the Department of Energy and Water Supply will be pleased to assist you and can be contacted on telephone 3225 8305.

Yours sincerely

[redacted]

Mark McArdle MP
Minister for Energy and Water Supply

Att

ELECTRICITY ACT 1994
Section 253AA

As the Minister for Energy and Water Supply, pursuant to section 253AA of the *Electricity Act 1994*, I hereby direct the Queensland Competition Authority (the Authority) to conduct review into the establishment of a fair and reasonable value(s) for electricity generated from small scale solar photovoltaic (PV) generators and exported to the Queensland electricity grid, in accordance with the following Terms of Reference.

Terms of Reference

1) Matters to be considered

The Authority is to investigate and report to Government on:

a. a fair and reasonable value for energy generated by small scale solar PV systems and exported to the Queensland electricity grid;
b. the mechanisms by which a fair and reasonable value/values could be implemented in Queensland;
c. a retailer contribution to the cost of the Scheme that reflects the benefit to retailers of the energy produced by small scale solar PV generators connected to the grid; and
d. updated costs of the Scheme and any options by which to minimise or more equitably share these costs.

For the purposes of these Terms of Reference a small scale solar PV system is defined as solar PV embedded generators which complies with the Australian Standard AS4777, with an inverter with ratings up to 10 kilovolt-ampere (kVA) for single phase units, or up to 30 kVA for three-phase units. The Queensland electricity grid encompasses the Queensland distribution networks of Energex, Ergon Energy and Essential Energy.

In its investigations into (a) the QCA should have regard to the following factors:

- there must be no consequential increase in electricity prices in Queensland or cost to the Queensland Government budget;
- the Council of Australian Governments (COAG) First National Principle for Feed-in Tariffs, and concept of 'fair and reasonable' value;
- the geographical location at which the solar PV energy is generated and value of that energy in the local network;
- complementarity with the carbon pricing mechanism; and
- consistency with the operation of a competitive Queensland electricity market.

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

- the benefit gained by electricity customers, electricity distributors and/or electricity retailers from electricity produced from small scale solar PV, for example in remote areas of the Ergon Energy network where high energy supply costs may be offset, or the value to the distribution business of any network investment deferral in those networks;
- the benefit of net versus gross metering arrangements;
- the renewable buyback Scheme operated by Horizon Power in Western Australia, which from 1 July 2012 offers feed-in tariff rates that vary geographically and include stringent connection requirements; and
- other issues the Authority deems relevant.

In its investigations into (b), the QCA is to consider and report on:

- implementation options within the Queensland electricity market, including:

  - as a mandated 'default minimum price' or price range;
  - as set by the market;
  - as a recommended price range.
- support for a competitive electricity market in Queensland, and any specific arrangements required / barriers to implementation in the Ergon Energy distribution area;
- the need for certainty for small scale solar PV owners;
- appropriate review mechanisms and timeframes;
- potential transition to a national feed-in tariff if established through COAG processes; and
- similar pricing and mechanisms in other jurisdictions and findings from other jurisdictional feed-in tariff reviews.

2) Consultation

The QCA should consult with stakeholders, and consider submissions, within the timetable for investigating a fair and reasonable FiT and publishing the issues paper, draft and final reports. The Authority must make its reports available to the public.

3) Timing

a) *Issues Paper*

The Authority must publish an issues paper outlining the issues associated with its investigation no later than September 2012.

b) *Draft Report*

The Authority must publish a draft report on its investigation into a fair and reasonable value for electricity generated from small scale solar PV generators no later than November 2012.

The Authority must publish a written notice inviting submissions about the draft report. The notice must state a period (the *consultation period*) during which anyone can make written submissions to the Authority about issues relevant to the draft report. The Authority must consider any submissions received within the consultation period and make them available to the public, subject to normal confidentiality considerations.

c) *Final Report*

The Authority must publish a final report on its investigation into a fair and reasonable value for electricity generated from small scale solar PV generators no later than 22 March 2013.

MARK McARDLE

APPENDIX B: COAG'S NATIONAL PRINCIPLES FOR FEED-IN TARIFF SCHEMES

COUNCIL OF AUSTRALIAN GOVERNMENTS MEETING

CANBERRA

29 November 2008

National Principles for Feed-in Tariff Schemes

Micro renewable generation to receive fair and reasonable value for exported energy

1. That Governments agree that residential and small business consumers with small renewables (small renewable consumers) should have the right to export energy to the electricity grid and require market participants to provide payment for that export which is at least equal to the value of that energy in the relevant electricity market and the relevant electricity network it feeds in to, taking into account the time of day during which energy is exported.

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

2. That any jurisdictional or cooperative decisions to legislate rights for small renewable consumers to receive more than the value of their energy must:
    a) be a transitional measure (noting that a national emissions trading system will provide increasing support for low emissions technologies), with clearly defined time limits and review thresholds;
    b) for any new measures, or during any reviews of existing measures, undertake analysis to establish the benefits and costs of any subsidy against the objectives of that subsidy (taking into account other complementary measures in place to support small renewable consumers);
    c) give explicit consideration to compensation from public funds or specific levies rather than cross-subsidised by energy distributors or retailers; and
    d) not impose a disproportionate burden on other energy consumers without small renewable generation.

MCE to continue to advance fair treatment of small renewables

3. That the Ministerial Council on Energy (MCE) should continue to implement the regulatory arrangements for small renewable customers, consistent with the objectives of the relevant electricity legislation, whereby the:
    a) terms and conditions for PV customers should be incorporated into the regulation of the minimum terms and conditions for retail contracts such that they are no less favourable than the terms and conditions for customers without small renewables;
    b) connection arrangements for small renewables customers should be standardised and simplified to recognise the market power imbalance between small renewable customers and networks; and
    c) assignment of tariffs to small renewable consumers should be on the basis that they are treated no less favourably than customers without small renewables but with a similar load on the network.

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

4. That the arrangements for PV consumers by the MCE and jurisdictions:
    a) should not deter competition for their business from electricity retailers in jurisdictions where there is full retail contestability and innovation in the tariff offerings available to PV customers;
    b) in relation to jurisdictions in the National Electricity Market, should not interfere with the regulation of distribution tariffs or operation of the national electricity market under the National Electricity Law or duplicate the regulatory arrangements that are part of that Law;
    c) should be subject to independent regulatory oversight according to clear principles; and
    d) should be consistent with implementation of other intergovernmental agreements relating to energy, competition policy or climate change.

APPENDIX C: STAKEHOLDER SUBMISSIONS

The Authority received 39 formal submissions on the Issues Paper. Submissions can be viewed on the Authority's website at www.qca.org.au.

Stakeholder submissions	
AGL Energy Limited	D. Maddock
Australian PV Association	S. Muneshi
Australian Solar Council	Origin Energy
Alternative Technologies Association	Queensland Consumers Association
P.G. Atherton	QCOSS
B. Bartlett	S. Robertson
S. Beames	D. Rogers
T. Berrill	J & T Russo
I. Brimblecombe	G. Sanders
R.J Campbell	K. Smith
F & J Cipriani	Solar Business Council Inc
Clean Energy Council	Solar Energy Industries Association
Energex Limited	R. Sproxton
Energy Retailers Association of Australia	Stanwell Corporation Limited
Energy Supply Association of Australia	Suntech Power Australia Pty Ltd
Ergon Energy	SunWiz Consulting
I.H & C Herbert	The Solar Guys
R & G Hussey	Tony M
Infinity Solar	TRUenergy Pty Ltd
L & S Jones	

APPENDIX D: CALCULATION OF LOSS FACTORS AND AVOIDED LOSSES

Ergon Energy Network Area

In Chapter 3, the Authority used a single network loss factor to value avoided losses from PV exports across the entire Energex network area. However, given the scale and diversity of the Ergon Energy network, there is an opportunity to improve on that approach to better reflect the value of PV at different locations on its network.

The Authority estimated seven different feed-in tariffs for Ergon Energy which attempt to capture the value of avoided energy purchase costs by using the marginal loss factors and distribution loss factors for different areas of the Ergon Energy network. The proposed methodology draws on the existing ways in which Ergon Energy considers network losses for the purposes of applying its network charges to individual customers.

How Ergon Energy Accounts for Network Losses

Network Pricing Zones

For the purposes of distribution network pricing, Ergon Energy divides its network into three pricing zones based on broad geographical regions - East, West and a third zone which covers the isolated Mt Isa network. These zones are broadly based on local government boundaries, with some exceptions where individual network feeders are not wholly situated within those boundaries.

These zones are used to reflect the differences in costs of supplying electricity between the more densely populated Eastern coastal regions of Queensland (east of the Great Dividing Range), and the more sparsely populated regions of Western Queensland (west of the Great Dividing Range) which have much longer distribution feeders and more remote loads.

According to Ergon Energy, the East zone accounts for around 90% of its customer base, while the West zone accounts for 8%. The Mt Isa zone represents 2% of total customers in the Ergon Energy network area[24]. Table D.1 shows the general locations that fall within each pricing zone.

[24] Ergon Energy, *Network Management Plan-Part A: Electricity Supply for Regional Queensland 2012-13 to 2016-17*. p.12,15

Table D.1: Ergon Energy Network Pricing Zones

Zone	*Included areas*	*Other areas and exceptions*
East Zone		
Regional Councils	Bundaberg, Cassowary Coast, Fraser Coast. Gladstone, Mackay, North Burnett, Rockhampton, South Burnett, Southern Downs, Toowoomba, Whitsunday, Townsville City Council	Cairns –excluding areas north of Daintree River; Gympie – Ergon Energy area only; Isaac – excluding areas of Moranbah Township; Western Downs - Dalby Township and Wambo district; Central Highlands – excluding Emerald and areas west of Emerald; Tablelands – excluding Herberton and Mareeba areas not supplied by east distribution system
Shire Councils	Banana, Burdekin, Hinchinbrook, Cherbourg, Woorabinda, Yarrabah	
West Zone		
Regional Councils	Barcaldine, Blackall-Tambo, Charters Towers, Longreach, Maranoa	Barcoo – NEM connected areas only; Cairns – North of Daintree River only; Goondiwindi (Ergon Energy area only); Isaac – west of Moranbah township only; Western Downs – excluding Dalby township and Wambo District; Central Highlands – Emerald and areas west of Emerald; Tablelands – Herberton and Mareeba areas not supplied by east distribution system
Shire Councils	Balonne, Bulloo, Carpentaria, Cook, Croydon, Etheridge, Flinders, Hope Vale, McKinlay, Murweh, Paroo, Quilpie, Richmond, Winton, Wujal Wujal	
Mt Isa Zone		
Shire Councils	Cloncurry Shire Council, Mount Isa City Council	Areas of Burke and Boulia Shire Councils supplied by the Mt Isa system

Source: Ergon Energy, Network Tariff Guide of Standard Control Services 1 July 2012 to 30 June 2013. 9 July 2012.

Transmission Regions

Ergon Energy also divides its network area into three transmission use of system (TUOS) regions which reflect the different costs incurred by delivering high-voltage electricity over the transmission network in regional Queensland. These regions are used for allocating TUOS charges to customers.

The Authority understands that the three TOUS regions are broadly defined by distance from the regional reference node in order to reflect the impact of losses. Given the linear orientation of Powerlink's 275 kV transmission network in regional Queensland, losses would be expected to become more significant as latitude decreases. The TUOS regions are not relevant to the Mt Isa pricing zone as it is an isolated distribution system and is not supplied by Powerlink's transmission network.

Calculating Transmission Losses

Transmission losses are reflected in marginal loss factors measured at each transmission connection point (TCP) on the Powerlink transmission network. These marginal loss factors reveal the average losses incurred when transporting electricity from the regional reference node to each TCP[25].

The Authority's methodology for estimating transmission losses involves determining which TCPs align with each TUOS region and pricing zone, before calculating a volume-weighted average marginal loss factor for each TUOS region and network pricing zone, based on historical load data for the TCPs.

Allocating TCPs to TUOS Regions and Pricing Zones

To allocate TCPs to the relevant TUOS regions, the Authority referred to the list of TCPs published in Ergon Energy's network tariff guide for 2012-13. This lists each TCP, its transmission node identifier, and the TUOS region it relates to[26].

Each TCP was then allocated to either the East or West pricing zone using a high-level mapping approach to reconcile the geographical location of each TCP with Ergon Energy's published zone map and zone definitions[27].

Marginal Loss Factors

The Authority then examined the 2012-13 marginal loss factors for each relevant TCP in the Ergon Energy area, as published by AEMO[28]. From this point, a load-weighted average marginal loss factor for the group of TCP's in each of Ergon Energy's three TUOS regions was calculated, for both the East and West pricing zones, as set out in Table D.2.

The Authority did not have information about TCP's in TUOS region three of the West pricing zone. In the absence of these data, the estimated transmission losses in the West zone-TUOS region three have been proxied by the estimated marginal loss factor for East zone-TUOS region three.

As noted, the design of the transmission network means that the magnitude of losses will tend to be inversely proportional to the latitude of the relevant transmission connection point. On this basis it seems reasonable to assume that average marginal losses for TCPs in TUOS region three will be similar regardless of the pricing zone in which they are physically located. However, the Authority understands there may be some exceptions to this, particularly if TCPs are located on lower voltage transmission lines (132/110 kV) which extend laterally from the main 275 kV backbone. The Authority would welcome further information from Ergon Energy to improve the accuracy of these estimates.

[25] The Queensland regional reference node is Powerlink's South Pine 275kV bulk supply point, located in the northern Brisbane suburb of Brendale.
[26] See, Ergon Energy, *Network Tariff Guide for Standard Control Services, 1 July 2012 to 30 June 2013*. 9 July 2012. p 34.
[27] See, Ergon Energy, *Network Tariff Guide for Standard Control Services, 1 July 2012 to 30 June 2013*. 9 July 2012. pp. 14-15.
[28] AEMO, *List of Regional Boundaries and Marginal Loss Factors for the 2012-13 Financial Year*. 12 June 2012

Table D.2: Load-Weighted Average Marginal Loss Factors for Ergon Energy

TUOS Region	*East Zone*	*West Zone*	*Mt Isa*
T_1	1.0137	1.0414	
T_2	1.1004	1.1006	n/a
T_3	1.1377	1.1377	

Sources: QCA analysis; AEMO, *List of Regional Boundaries and Marginal Loss Factors for the 2012-13 Financial Year.* 12 June 2012; Ergon Energy, *Network Tariff Guide of Standard Control Services 1 July 2012 to 30 June 2013. 9 July 2012.*

Calculating Distribution Losses

The next step is to identify the relevant distribution losses that are incurred in each network pricing zone.

Distribution losses are predominately a function of distance between the load and the point where the distribution network joins the TCP. The impact of these losses is reflected in average distribution loss factors at different points on the distribution network, which are used to calculate DUOS and TUOS charges for Ergon Energy's distribution customers. The size and complexity of Ergon Energy's distribution network gives rise to a number of loss factors at different network levels across its area. These distribution loss factors are approved annually by the Australian Energy Regulator and are available in Ergon Energy's 2012-13 network tariff guide. The approved average distribution loss factors for each network pricing zone are set out in Table D.3 below.

Table D.3: Ergon Energy distribution loss factors for 2012-13

Network level	*East Zone*	*West Zone*	*Mt Isa Zone*
Sub transmission Bus	1.007	1.044	1.001
Sub-transmission Line	1.016	1.091	1.005
22/11 kV Bus	1.018	1.097	1.008
22/11 kV Line	1.038	1.133	1.036
Low Voltage (LV) Bus	1.077	1.185	1.057
Low Voltage (LV) Line	1.078	1.357	1.079

Source: Ergon Energy, *Network Tariff Guide of Standard Control Services 1 July 2012 to 30 June 2013.* 9 July 2012.

These values illustrate the significant difference in average losses across the distribution network area, between the TCPs and the customer. For standard small residential customers (represented at the 'LV Line' network level) in the East zone, about 7.8% of electricity is lost over the network. In contrast, the average energy lost when supplying customers in the West zone is estimated at 35.7%.

For the purposes of this Draft Report 2012-13 values have been used, however, the Authority intends to recalculate these estimates for its Final Report in March 2013 using updated data.

Calculating Combined Network Losses

From this point it is possible to determine the total average losses between the regional reference node and the solar PV customer.

To derive the total network losses, a combined loss factor for each TUOS region and pricing zone is calculated, as the product of the load-weighted average marginal loss factors (see Table D.2) and Ergon Energy's published average distribution loss factors for each pricing zone, at the LV line level (see Table D.3). The LV line level was selected, as it represents the network level at which most small-scale solar PV customers are connected. The estimated combined loss factors are set out in Table D.4.

Table D.4: Average Combined Loss Factors for Ergon Energy (2012-13)

TUOS Region	*East Zone*	*West Zone*	*Mt Isa*
T_1	1.0928	1.413	
T_2	1.1863	1.494	1.079
T_3	1.2265	1.544	

Sources: QCA analysis*;* AEMO, *List of Regional Boundaries and Marginal Loss Factors for the 2012-13 Financial Year*. 12 June 2012*;* Ergon Energy, *Network Tariff Guide of Standard Control Services 1 July 2012 to 30 June 2013. 9 July 2012.*

Application of Losses to Wholesale Energy Purchase Cost Estimates

Ergon Energy Network Area

The Authority applied the seven combined loss factors in Table D.4 to the wholesale energy purchase cost estimates at the regional reference node. This returns the total avoided wholesale energy purchase costs per kWh, including the value of avoided transmission and distribution losses between the node and the solar PV customer, for each pricing zone. This is derived using the following formula:

$$Value\ of\ Losses_{T_n}^{Z} = \frac{WEPC_{RNN}}{\{1 - (MLF_{T_n} * DLF_Z)\}}$$

Where:

T_n	is the Ergon Energy TUOS region (1,2 or 3)
Z	is the Ergon Energy network pricing zone (East or West)
$WEPC_{RNN}$	is the wholesale energy purchase cost at the regional reference node, including NEM and ancillary services fees
MLF	is the weighted average marginal loss factor calculated by the Authority
DLF	is the average distribution loss factor at the LV Line network level

This calculation produces seven discrete values of avoided energy purchase costs for different geographical areas which vary depending on the degree of transmission and distribution losses incurred in supplying electricity at the low voltage network level. The calculation of these values for each pricing zone is set out in Tables D.5 to D.7.

Table D.5: East Pricing Zone - Avoided Wholesale Energy Purchase Costs

East Pricing Zone	*TUOS Region 1*	*TUOS Region 2*	*TUOS Region 3*
Load-weighted average marginal loss factor (from Table D.3)	1.0137	1.1004	1.1377
Ergon Energy average distribution loss factor (from Table D.4)	1.078	1.078	1.078
Total average combined loss factor	1.0928	1.1863	1.2265
WEPC (c/kWh)	5.593	5.593	5.593
Plus NEM and ancillary services fees (c/kWh)	0.086	0.086	0.086
$WEPC_{RNN}$ (c/kWh)	5.679	5.679	5.679
Losses (%)	9.281	18.625	22.649
Value of losses (c/kWh)	0.581	1.300	1.663
Total avoided energy purchase costs (c/kWh)	**6.260**	**6.979**	**7.342**

Table D.6: West Pricing Zone - Avoided Wholesale Energy Purchase Costs

West Pricing Zone	*TUOS Region 1*	*TUOS Region 2*	*TUOS Region 3*
Load-weighted average marginal loss factor (from Table D.3)	1.0414	1.1006	1.1377
Ergon Energy average distribution loss factor (from Table D.4)	1.357	1.357	1.357
Total average combined loss factor	1.413	1.494	1.544
WEPC (c/kWh)	5.593	5.593	5.593
Plus NEM and ancillary services fees (c/kWh)	0.086	0.086	0.086
$WEPC_{RNN}$ (c/kWh)	5.679	5.679	5.679
Losses (%)	41.312	49.351	54.392
Value of losses (c/kWh)	3.998	5.534	6.773
Total avoided energy purchase costs (c/kWh)	**9.677**	**11.213**	**12.452**

Table D.7: Mt Isa Pricing Zone - Avoided Wholesale Energy Purchase Costs

Mt Isa Pricing Zone	
Load-weighted average marginal loss factor	n/a
Ergon Energy average distribution loss factor (from Table D.4)	1.079
Total average loss factor	1.079
WEPC (c/kWh)	5.593
Plus NEM and ancillary services fees (c/kWh)	0.000
$WEPC_{RNN}$ (c/kWh)	5.593
Losses (%)	7.900
Value of losses (c/kWh)	0.480
Total avoided energy purchase costs (c/kWh)	**6.073**

Note: The Mt Isa isolated network is not connected to Powerlink's transmission network, therefore TUOS regions do not apply.

Energex Network Area

To estimate the value of avoided losses accruing to the retailer, the Authority used the loss factors for Energex as used in its final determination on notified prices for 2012-13, set out in Table D.8. These loss factors reflect the transmission losses and AER approved distribution loss factors reported by ACIL Tasman. The total combined loss factor is calculated as the product of transmission losses and distribution losses.

For the Final Report, these values will be updated to reflect estimates used in the Authority's Draft Determination on notified prices for 2013-14.

Table D.8: Loss Factors for Energex Network Area - 2012-13

Settlement class	*Transmission Loss Factor*	*Distribution Loss Factor*	***Combined Loss Factor***
Energex NSLP	1.010	1.062	**1.072**

Source: ACIL Tasman, Estimated Energy Purchase Costs for Final Determination, May 2012.

Due to the different methodology used to calculate the value of PV in the Energex area, this loss combined factor is not used to directly estimate the value of avoided losses from on-selling of PV exports. Rather, the loss factor is applied to the total (avoidable and unavoidable) wholesale energy purchase costs at the regional reference node, based on the Authority's cost reflective residential tariff for 2012-13. The loss factor is applied using the following equation, consistent with ACIL Tasman's approach to calculating losses for the Authority's Final Determination on notified prices for 2012-13[29].

[29] ACIL Tasman, *Estimated Energy Purchase Costs for Final Determination*, May 2012. p. 29.

$$WEPC = \frac{WEPC_{RNN}}{(1 - CLF)}$$

Where:

WEPC	is the total wholesale energy purchase cost, including the value of transmission and distribution losses
$WEPC_{RNN}$	is the total wholesale energy purchase cost at the regional reference node, including NEM and ancillary services fees, and green scheme costs
CLF	is the combined loss factor reflecting transmission and distribution losses between the regional reference node and the customer

As illustrated in Table D.9 below (from Chapter 4), the direct financial benefit to the South East Queensland retailer from on-selling PV exports is calculated as the difference between the assumed on-selling retail price and the sum of unavoidable costs. In this sense, the value of avoided losses is indirectly implied in the calculation of the direct financial benefit to the retailer of PV exports.

Table D.9: Estimated Fair and Reasonable Value PV Exports in SEQ (2012-13)

Cost Component	***Retail Cost (c/kWh)***	***Unavoidable Costs (c/kWh)***
Wholesale electricity costs	6.149	-
Green Scheme costs	1.133	1.133
NEM fees	0.040	-
Ancillary services fees	0.046	-
Subtotal	*7.367*	*1.133*
Plus losses (7.2%)	0.575	-
Plus network costs	10.200	10.200
Plus margin (5.7%)	1.034	1.034[2]
Subtotal	*19.176*	*12.367*
Plus head room (5%)	0.958	0.958[2]
TOTAL (excl. GST)[3]	**20.134**	**13.326**
Less unavoidable costs	(13.326)	n/a
Direct Financial Benefit to the Retailer	**6.81 c/kWh**	

Note: Totals may not add due to rounding
1. As discussed in section 4.8, the full amounts of retail margin and head room are considered unavoidable.
2. Estimated retail price is based on 2012-13 cost reflective tariff.