ESSENTIAL SERVICES COMMISSION

MINIMUM ELECTRICITY FEED-IN TARIFF TO APPLY FROM 1 JANUARY 2016 TO 31 DECEMBER 2016

Final Decision

August 2015

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EXECUTIVE SUMMARY

The Essential Services Commission (Commission) is responsible for determining the minimum rate that an electricity retailer must pay to its customers who are small renewable energy generators for electricity they produce and export into the grid. This is referred to as the feed-in tariff (FiT).

Section 40FBB(3) of the *Electricity Industry Act 2000* (Vic) (EIA) requires the following factors to be taken into account when determining the FiT:

(a) prices of electricity in the wholesale electricity market

(b) any distribution and transmission losses avoided in Victoria by the supply of small renewable energy generation electricity.

In determining the 2016 FiT, the Commission has considered these factors using the principles and methodology established in the 2014 and 2015 FiT determinations. The Commission has adopted these same principles and methodology to determine the 2016 FiT. The Commission may reconsider its approach in the future if new evidence becomes available.

By applying the established methodology, the Commission has determined the **minimum energy value of feed-in electricity for 2016 to be 5.0 c/kWh.** The FiT of 5.0 c/kWh reflects the forecast wholesale market value of photovoltaic (PV) electricity for 2016. The rate is lower than the 2015 FiT of 6.2 c/kWh due to a lower forecast wholesale market price of electricity, particularly during daylight hours when PV electricity is being generated.

This report sets out the calculations made to determine a FiT of 5.0 c/kWh for energy supplied into the grid in 2016.

GLOSSARY[1]

Relevant generator (small renewable energy generator, PV customer)	A generation company or a person engaging in the generation of electricity for supply or sale that has been exempted from the requirement to hold a licence in respect of that activity.
Relevant licensee (retailer)	A person that holds a licence to sell electricity and sells electricity to more than 5 000 customers.
Small renewable energy generation facility	A wind, solar, hydro or biomass energy facility (or other facility specified by order in council), connected to a distribution system, that generates electricity and has an installed or name-plate generating capacity of less than 100 kilowatts.
Small renewable energy generation electricity (PV electricity, distributed generation)	Non-pool electricity supplied by a relevant generator from a small renewable energy generation facility operated by that generator.

[1] Definitions from the *Electricity Industry Act 2000*, section 40F.

ACRONYMS

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
c/kWh	cents per kilowatt hour
Commission	Essential Services Commission (Victoria)
DLF	Distribution loss factor
EIA	*Electricity Industry Act 2000* (Vic)
ESC Act	*Essential Services Commission Act 2001* (Vic)
FiT	Feed-in tariff
IPART	Independent Pricing and Regulatory Tribunal (NSW)
kW	kilowatts
kWh	kilowatt hour
NAGA	Northern Alliance for Greenhouse Action
NEM	National electricity market
NSLP	Net system load profile
PV	photovoltaic
RET	Renewable Energy Target
RRN	Regional Reference Node
TUoS	Transmission Use of System
VCEC	Victorian Competition and Efficiency Commission

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FINAL DECISION

Pursuant to section 40FBB(1) of the *Electricity Industry Act 2000* (Vic), the Commission's final decision is that the minimum rate for purchases of small renewable energy generation electricity for the calendar year commencing 1 January 2016 is 5.0 cents per kilowatt hour ($0.05/kWh).

FINAL DECISION PROCESS

The process by which the Commission reached its final decision is detailed below.

A draft decision was released in June 2015 which:

- described the Commission's proposed methodology for setting the minimum feed-in tariff (FiT), and
- indicated the proposed FiT to apply for the calendar year commencing 1 January 2016.

Twenty submissions were received in response to the draft decision, from:

- energy retailers: AGL, Origin Energy and Simply Energy
- Energy Retailers Association of Australia (ERAA)
- groups with an interest in renewable energy generation: Northern Alliance for Greenhouse Action (NAGA) and Melbourne Energy Institute, and
- individuals: Mr Edward Williamson, Mr William Lahn, Dr Daryl Tucker, Mr Phillip Reynolds, Mr John Wilson, Mr Gary Baker, Mr Rod Williams, Mr Clive Amery, Mr Brian Krahnert, Ms Loris Wood, Mr David Lyons, Mr Peter Roberts, Mrs Christine Kennedy and Mr B. Bhavnagri.

These submissions can be found on our website (www.esc.vic.gov.au).

The Commission has considered the information and views presented in these submissions, and the issues raised are discussed in this report. Several submissions supported the Commission's proposed approach, and none have introduced information or raised issues that have led the Commission to change its current approach or the analysis put forward in the draft decision.

FINAL DECISION SUMMARY

In determining the value of electricity supplied by small renewable energy generators, the Commission considered:

- the marginal cost of the equivalent amount of electricity that would otherwise need to be purchased from central generators
- the locational value of electricity produced close to the final consumers compared to relatively distant central generators.

The Commission has evaluated these factors using the principles and methodology established in the 2014 and 2015 FiT determinations. The Commission has not revised these principles and methodology to determine the 2016 FiT.

To derive the marginal cost of the equivalent amount of electricity that would otherwise need to be purchased from central generators, the Commission requires a forecast of the value of electricity produced by small renewable energy generation facilities and delivered into the grid. The energy value of photovoltaic (PV) electricity is calculated as a weighted average of the forecast spot market prices for Victoria for each half-hour period of 2016. The set of forecast spot market prices was prepared by ACIL Allen Consulting using its *PowerMark* model. Like all such forecasts, it is based on normal weather conditions, forecast electricity demand and the anticipated available generation capacity, for each period.

The weights used for averaging the spot market prices represent the relative amount of PV net exports which can be attributed to each half-hour period over the year. These weights represent the time-profile of PV net exports over the year. The Commission used the 2013 actual profile of PV exports data from a sample of Victorian customers.

The locational value of electricity is derived from identifiable avoided costs associated with PV electricity. The methodology used by the Commission to determine the 2015 FiT and for the 2016 FiT review include avoided costs associated with line losses and avoided market fees and network costs.

By applying the established methodology, the Commission has determined the **minimum energy value of feed-in electricity for 2016 to be 5.0 c/kWh.** The proposed rate is lower than the 2015 FiT of 6.2 c/kWh due to a lower forecast wholesale market price of electricity, particularly during daylight hours when PV electricity is being generated.

1 INTRODUCTION

The Essential Services Commission (Commission) is responsible for determining the minimum rate that a relevant retailer must pay to its customers, who are small renewable energy generators, for electricity they produce and export into the electricity distribution system. The feed-in tariff (FiT) refers to an amount credited to the generating customer per kilowatt hour (kWh) of electricity it exports to the grid. The purpose of the minimum FiT is to ensure that small renewable energy generators receive a fair and reasonable rate for the electricity they supply for use by others.

The small renewable energy generation facilities to which the minimum FiT applies have capacities of less than 100 kilowatts (kW), and produce electricity using renewable energy sources such as wind, solar, hydro or biomass.[2] At present most small renewable energy generation in Victoria is from rooftop solar photovoltaic (PV) systems. Small-scale wind powered generation is a potential source of small scale electricity generation in future, but has not achieved wide-scale application at present. For this reason we focus on PV electricity in this report, and the value of feed-in electricity will be based on the time-profile of PV exports.

We will monitor the number of wind and hydro small renewable energy generation facilities and will consider including them in future reviews if required. For now, the Commission considers it sufficient to treat PV electricity as the representative type of small renewable generation facility.

The submission from AGL supported the Commission's focus on PV electricity for the 2016 FiT and the continued monitoring of all small renewable energy generation facilities.

[2] An important exception is that a 'small renewable energy generation facility' does not include a generating facility that is under either the premium solar or transitional feed-in schemes (Electricity Industry Act (EIA) s 40F(1)). Further, the Governor in Council, by Order published in the Government Gazette, can specify a facility or class of facility that generates electricity in any way as a small renewable energy generation facility (EIA s 40F(2)).

Each year before the end of August, the Commission determines the minimum FiT for the following calendar year. This final decision presents the Commission's conclusion on the minimum FiT that should apply in Victoria from 1 January 2016.

Since January 2008, each licensed electricity retailer in Victoria with more than 5,000 electricity customers (relevant retailer) is required to publish and offer generally available renewable energy feed-in terms and conditions. These terms and conditions include the FiT and any other associated terms and conditions. Following amendments in mid-2013, the *Electricity Industry Act 2000* (EIA) requires that the FiT which forms part of the general renewable energy feed-in terms and conditions offered by relevant retailers must not be lower than the minimum FiT determined by the Commission.

1.1 COMMISSION'S OTHER FEED-IN TARIFF REGULATORY ROLE

The Commission has another regulatory role in relation to general renewable energy feed-in terms and conditions. The Minister administering the EIA can direct the Commission to investigate whether a retailer's general renewable energy feed-in terms and conditions, including prices or other terms and conditions, are fair and reasonable. If they are found not to be fair and reasonable, the Commission must recommend prices, terms and conditions that it considers to be fair and reasonable, and the Minister can impose those prices, terms and conditions on that retailer.

The Commission's regulatory functions relating to FiTs are confined to the generally available renewable energy feed-in terms and conditions. The premium and transitional FiT schemes are outside the scope of the Commission's functions and of this report.[3]

[3] These schemes are now closed to new members but will continue to provide beneficial FiT rates for some time to those who are already scheme members.

2 REQUIREMENTS & PRINCIPLES

The scope of this review and the Commission's approach to carrying out its task are governed by a number of specific statutory requirements and several established principles. The purpose of this chapter is to briefly outline these important requirements and principles.

2.1 LEGAL REQUIREMENTS

The Commission is required under s 40FBB of the EIA to determine a rate for the purposes of section 40FBA(b)(i) — this rate being the minimum FiT rate for relevant retailers within their general renewable energy feed-in terms and conditions.

The principal statutory requirement that the Commission must address when determining the minimum FiT, is that it must have regard to:

(a) prices of electricity in the wholesale electricity market

(b) any distribution and transmission losses avoided in Victoria by the supply of small renewable energy generation electricity.

A number of submissions stated that emerging new technologies, such as battery storage, should be reflected in the principal statutory requirements the Commission must have regard to. The Northern Alliance for Greenhouse Action (NAGA) and the Melbourne Energy Institute stated that the Victorian Government should review the broader benefits of distributed generation, which could lead to an updated methodology for determining the FiT. One retailer suggested the FiT legislation should be limited to small customers only; currently any customer can qualify for the FiT.

The Commission notes the stakeholder submissions regarding the effect of emerging or new technologies on the FiT and the legislative parameters of the FiT review. However, the Commission considers that the EIA limits its ability to address these matters in this review.

2.2 RELEVANT PRICING PRINCIPLES

The general principle that the Commission adopted in its determination of the minimum FiT for 2014 and 2015 is that small renewable energy sources should receive full credit for the benefits of the electricity they supply to the market.

This principle is consistent with the views of the Australian Energy Market Commission (AEMC 2012) and the (then) Victorian Competition and Efficiency Commission (VCEC) in its 2012 inquiry into distributed generation. VCEC concluded that under an 'efficient and fair' FiT,

> *"distributed generators should receive a price that reflects the value of the electricity exported to the grid" (VCEC 2012, p.147).*

The Commission has continued to adopt this established principle for the 2016 FiT review. Submissions from retailers (AGL and Origin Energy) and renewable energy advocacy groups (Melbourne Energy Institute and NAGA) generally supported the principles adopted by the Commission for the determination of the FiT for 2016.

However, NAGA, the Melbourne Energy Institute and Mr Rod Williams indicated that the methodology used by the Commission does not fully account for the benefits of distributed generation, and questioned if the efficient and fair FiT principle is being achieved.

One retailer suggested the minimum FiT should not consider any avoided distribution and transmission losses, and should wholly be based on the forecast wholesale electricity cost.

The relevant pricing principles of an efficient and fair FiT are consistent with the legal requirements set out in the EIA. They are also consistent with those applied by several other Australian state-based regulators who have a role in determining FiTs. These principles have been considered and applied in the 2014 and 2015 FiT decisions. In addition, submissions were generally supportive of principles adopted by the Commission in setting the 2016 FiT. The Commission has decided to apply the established principles as per the draft decision.

2.3 METHODOLOGY

The methodology used to calculate the minimum FiT for 2016 is based on the methodology established in both the 2014 and 2015 minimum electricity feed-in tariff – draft decision and final decision papers. The Commission indicated in its 2016 draft decision that it did not consider that the established methodology needed to be revisited in the 2016 review, as it was sufficiently addressed in the 2014 and 2015 FiT reviews.

However, several submissions raised issues with maintaining the established methodology for the 2016 FiT review.

Renewable energy advocacy groups submitted that environmental factors are not currently reflected in the FiT methodology and suggested that the repeal of the carbon tax means the environmental benefits are no longer captured. They argued that an alternative methodology is required to ensure the Commission's general principle—that renewable energy sources should receive full credit for the benefits of the electricity they supply to the market—is applied.

In addition, renewable energy advocacy groups questioned whether section 40FBB of the EIA specifically limits the factors the Commission may have regard to when setting the FiT. They questioned whether the established methodology is efficient and fair, and adequately accounts for benefits to the network such as reduced gas fired generation during peak demand periods and reduced transmission capital expenditure.

Submissions from Mr Rod Williams, Ms Christine Kennedy, Mr Clive Amery and Mr Peter Roberts proposed that other factors—such as the environmental benefits of distributed generation—should be considered as part of the Commission's FiT methodology.

The Commission is of the view that the legislation limits its capacity to consider environmental matters in the FiT methodology and will apply the established methodology for the 2016 FiT review.

The Commission notes the views of some stakeholders that other network benefits such as reduced demand or avoided transmission capital expenditure could be considered in the FiT methodology. These matters could be considered in future reviews if sufficient evidence is available.

2.4 OTHER ISSUES RELEVANT TO THE REVIEW

The Commission indicated in its draft decision that some issues, previously established as out of scope, would not be revisited for the 2016 review. Those issues are briefly discussed below.

TIME VARYING FIT, MERIT ORDER EFFECT AND AVOIDED TUOS

NAGA questioned the Commission's conclusion in the 2015 FiT determination that time-varying FiTs are out of scope. The Commission continues to consider that section 40FBA(b)(ii) of the EIA requires the Commission to set a single 'rate' for the FiT. As such, the Commission considers that legislative change would be required before it could consider multiple tariffs.

NAGA and Mr Rob Williams raised issues relating to the inclusion of avoided transmission use of system (TUoS) costs. Avoided TUoS charges were reviewed and evaluated in the 2014 and 2015 FiT determinations, and the Commission concluded that the benefits of avoided transmission costs could not be substantiated at that time. The Commission notes that the submissions to the 2016 FiT review did not provide any new evidence to support the inclusion of avoided TUoS costs in the FiT methodology. On this basis, avoided TUoS was not included in the 2016 FiT review. With more evidence, the Commission may consider this matter in future.

NAGA also submitted that benefits associated with a 'merit order effect'[4] on average electricity prices should be reflected in the FiT, but provided no new evidence to support its view. This matter was considered in the 2014 and 2015 FiT reviews, and the Commission concluded that the benefits of a merit order effect had not been substantiated at that time. In the absence of new evidence, the methodology used for the 2016 FiT determination therefore did not include merit order effect. This can be considered in the future if new evidence becomes available.

GROSS AND NET FIT SCHEMES

Mr Peter Roberts argued that the Commission should use a gross feed-in calculation, rather than a net system. Net metering means that the electricity produced by a small renewable energy generation facility is firstly used to meet its own consumption, offsetting purchases from the grid, and in periods when the amount it generates exceeds its electricity consumption, the excess is exported to the grid. In a gross metering scheme, all the electricity produced by the small renewable energy generation facility attracts the FiT. Gross metering requires a separate meter to record electricity production. In Victoria, single interval meters are the main meter type, and therefore a gross FiT scheme (which requires two meters) is not supported.

REGULATION OF THE FIT

Retailers advocated a deregulated FiT regime, suggesting the market is sufficiently mature not to require a minimum FiT. However, renewable energy advocacy groups and members of the public supported the continued regulation of the minimum FiT.

Issues relating to the continued regulation of the FiT and its parameters are a matter for Government policy, and are not considered in this 2016 FiT review.

[4] PV electricity can reduce the amount of electricity that retailers need to purchase from the wholesale market. This means that demand in the market can be settled at a lower bid in the merit order (i.e. at a lower cost point), thereby lowering wholesale spot prices. This is referred to as the merit order effect.

OTHER ISSUES

A number of submissions commented that the FiT methodology should consider the costs incurred by PV customers—such as the cost of the panels, the cost to connect the panels to the grid, and maintenance costs.

For example, Dr Daryl Tucker and Mr Brian Krahnert submitted that the costs associated with connection to the grid should be recoverable through the FiT. Ms Christine Kennedy supported the inclusion of maintenance costs in the FiT methodology, and a number of submitters argued that the cost of purchasing the small renewable energy generation facility should be accounted for in the FiT methodology.

The Commission notes the views of some stakeholders regarding costs incurred by PV customers. However, consistent with the discussion of applicable pricing principles in the final decision for the 2015 FiT (ESC 2014, p.5), and in section 2.2 of this paper, the Commission considers that set up and maintenance costs for distributed generation do not fall within the efficient and fair principle. These costs were therefore not considered in this decision.

3 THE ECONOMIC VALUE OF SMALL SCALE PV ELECTRICITY

This section provides a forecast of the value of the electricity produced by small renewable electricity generators and delivered into the grid, and discusses other avoided costs included in calculating the 2016 FiT.

3.1 OVERVIEW

Factors that are relevant to the value of power supplied by small renewable energy generators include:

- the marginal cost of the equivalent amount of electricity that would otherwise need to be purchased from central generators
- the locational value of electricity produced close to the final consumers compared to relatively distant central generators.

The marginal cost of obtaining the same amount of energy for the same market from alternative sources, is referred to as the avoided energy cost of small-scale generation. It is based on the cost of purchasing the same amounts of energy, at the same times, from central generators via the electricity pool.

The formula used by the Commission in past FiT determinations, and also used here, is:

Formula 3.1

$$Avoided\ energy\ cost = LF \times \sum_{t=1}^{n} w_t\, p_t$$

Where: *LF* is the average loss factor (which is greater than 1); *n* is the number of half-hourly or hourly periods in a year; the w_t*'s* are the weights that represent the time-profile of small-scale solar PV exports over the year, with: $\sum_t w_t = 1$; and p_t is the series of forecast wholesale electricity prices for each period of the year.

Further details of the methodologies used in this 2016 FiT determination can be found in the 2014 and 2015 draft and final decision papers.

3.2 FORECAST WHOLESALE ELECTRICITY PRICES

An important element of setting the minimum FiT is the forecast value of electricity in the wholesale market in each period of each day of the forecast year. Forecasts based on market models have been used widely by Australian regulators. They have the benefit that they can take into account up-to-date information about significant changes in demand or supply conditions likely to affect the electricity market in 2015 and 2016. This method was used by the Commission in its previous two FiT determinations.

The Commission engaged ACIL Allen to prepare a forecast of electricity prices for 2015 and 2016 using its *Powermark* electricity market model, building on similar forecasts completed for 2014 and 2015. For its 2016 FiT review, the Commission has used the mean of the forecast range compiled by ACIL Allen in its calculation. The forecast for 2016 is $40.19/MWh.

The ACIL Allen forecast predicts a reduction in price volatility in 2016 compared to previous years, which can be attributed to lower demand—both peak and annual energy. This reduction in demand reflects the revised Australian Energy Market Operator (AEMO) outlook for national electricity market demand, and assumptions relating to a reduced Renewable Energy Target (RET), although ACIL Allen observes that the latter assumption has only a minor effect on electricity prices in the forecast period.

Reduced price volatility and demand in the electricity spot price forecast can result in a lower FiT. This is because high price events generally occur when demand is high, for example on extreme temperature days in summer. The high prices typically occur when solar PV is feeding into the grid and they increase the value of the PV electricity.

Further details on the projections can be found in the ACIL Allen report on *Wholesale Electricity Spot Prices—2015 and 2016 projections*, which is available on our website.

Retailer and ERAA submissions stated that the method used to forecast electricity prices for the FiT overstates the forecast price and is not sufficiently transparent. As part of the Commission's process for making this final decision, the Commission reviewed its inputs and methodology to forecast the wholesale electricity price for 2016 and concluded that it was a reasonable method for predicting price over time.

The retailers and ERAA also argued that the requirement to set the FiT by 31 August prior to the commencement year increases the risk that the forecast will be incorrect, which may cause retailers to pay over the going rate for wholesale electricity. The Commission notes these views, however section 40FBB(2) of the EIA requires the Commission to determine the FiT by 31 August in the year preceding the year in which it is to apply.

3.3 SOLAR EXPORT PROFILES

The second element required to establish the value of solar PV energy is an appropriate set of weights to apply to the forecast average wholesale electricity price established in section 3.2.

For the 2014 minimum FiT, the Commission based its calculations on the typical electricity production profile of a 1 kW north-facing PV unit in Melbourne (ESC 2013, p.28). When determining the 2015 minimum FiT, the Commission calculated average profiles for PV exports based on sample data for the actual PV export patterns of 1163 PV customers in 2013. The Commission compared both methods and they were found to produce similar results (ESC 2014, p.23).

We also considered applying a 10 year average of historic solar premiums to the forecast price; however, the Commission considered this methodology did not sufficiently take into account recent changes in supply and demand in the electricity market. On this basis, the Commission has continued to use the 2013 actual PV export data to calculate the PV energy value.

Retailer submissions suggested updating the profile annually.

The Commission acknowledges that the profile could be updated annually, and proposes to consider the options for solar export profiles as part of the 2017 FiT review.

3.4 LOCATIONAL VALUE

Line losses are taken into account when determining the FiT by applying a loss factor to the weighted average wholesale price of electricity, as shown in formula 3.1. The wholesale electricity price published by AEMO is determined at the Regional Reference Node (RRN), and this price includes transmission losses between generators and the RRN.[5] The loss factor used in formula 3.1 takes into account the cost of line losses that occur between the RRN and the end-customer meters.

This has two parts:

- transmission line losses between the RRN and each bulk supply connection point (or terminal station) are measured by marginal loss factors (MLFs) published by AEMO[6]
- distribution line losses are measured by distribution loss factors (DLFs), which are estimated by each distribution network service provider and published by AEMO.[7]

The combined loss factor for a particular locality and voltage class can be calculated as:

Formula 3.2 $\quad$ Loss factor = MLF $\times$ DLF

Formula 3.2 has been quantified as follows.

AEMO estimates the MLF for every transmission network connection point (AEMO 2015b). Using this data, we estimate the weighted average MLF in 2015-16 for Victorian mass-market customers at 1.0091.[8] DLFs are estimated by the distribution network service providers in each zone for each line voltage class and published by AEMO (2015a). Using these published DLFs, we estimate that for a low voltage customer on Victoria's short sub-transmission systems, the weighted average DLF for

[5] In Victoria the RRN is at Thomastown.

[6] The MLF measures the amount of additional generation that would be required at the RRN to deliver 1 kW of electricity to the transmission network connection point (or terminal station).

[7] The DLF represents the average quantity of electricity that needs to be transported across a distribution network in order to provide for one unit of consumption at the customer's premises. DLFs are generally greater than one.

[8] The weights used in this calculation are the total billing units (MW) of mass market customers at each terminal station used for levying the Transmission Use of System (TUOS) location charge. This data was provided by AEMO to the Commission on a confidential basis. Only MLFs for voltage classes 66 kV and lower are used.

2015-16 is 1.0557.[9] That is, around five and a half per cent of the electricity supplied into the distribution system is lost before it reaches the customer.

The overall loss factor is therefore (1.0091 × 1.0557) = 1.0653. For the reasons already given, the Commission considers this to be the appropriate loss factor to apply in formula 3.1.

There were no submissions relating to locational value.

3.5 SUMMARY

Table 3.1 presents summary results for the value of PV-produced electricity derived using the methodology discussed in this section.

TABLE 3.1 FORECAST AVOIDED ENERGY COSTS OF PV
Victoria, 2016

	2016 FiT $/MWh
Forecast average pool price	40.19
PV energy value (value at RRN)	**45.69**
Locational value (line losses)	2.98
PV energy value at generation source	**48.67**

To calculate the value of PV electricity at its generation source, we take the forecast price of electricity at each half-hour period for the year and apply the profile of PV electricity generated in each half-hour period (the 2013 actual solar profile). This forecasts the price the PV energy could have received if it was directly sold to the wholesale market when it was generated. This is then calculated as an average forecast price for the PV energy in $/MWh for the year.

[9] The weights used in this calculation were the numbers of customers in each distribution zone.

Using the ACIL Allen forecast and the 2013 actual solar export profile, the value of solar PV electricity is forecast to be $5.50/MWh higher than the forecast average pool price. This equates to a 14 per cent premium for PV electricity (this is the percentage difference between $45.69/MWh and $40.19/MWh).

The locational value of associated line losses is calculated by applying the loss factor to the PV energy value ($45.69 x 1.0653 = $2.98/MWh). The PV energy value and the line losses is equal to PV energy value at the generation source.

Table 3.1 shows that the PV energy value at the generation source for 2016 is $48.67/MWh.

3.6 AVOIDED MARKET FEES AND NETWORK COSTS

Retailers pay market fees and ancillary charges to AEMO to support its role of managing the wholesale electricity market and we include these as avoided costs associated with feed-in electricity. Retailers pay these fees based on the amount of their electricity purchases from the wholesale market, and avoid these fees to the extent that they source electricity from small embedded generators.

A retailer that has a higher proportion of customers who generate PV electricity will avoid more of these fees than a retailer with a smaller proportion of such customers. Therefore this can result in an avoided cost to the retailer due to feed-in electricity.

The Commission previously found that market operator fees add approximately 0.05c/kWh to the FiT (SKM-MMA 2013, p.11). A current estimate is 0.1 c/kWh (IPART 2014, p.22; ACIL Allen 2014, p.10). The Commission considers 0.1c/kWh to be an appropriate estimate for the 2016 FiT.

There were no submissions relating to avoided market fees and network costs.

4 CONCLUSIONS

4.1 SUMMARY OF METHODOLOGY

The results of quantifying each of the elements of the avoided cost of small renewable electricity supplied into the grid is summarised in table 4.1. The results are based on the ACIL Allen market model half-hourly average electricity price forecast and the actual solar PV export profile in 2013.

TABLE 4.1 FORECAST VALUE OF FEED-IN ELECTRICITY
Victoria, 2016

	$/MWh	c/kWh
Forecast average pool price	40.19	4.02
PV energy value (value at RRN)	45.69	4.57
Locational value (line losses)	2.98	0.30
PV energy value at source	**48.67**	**4.87**
Avoided market and ancillary fees	1.00	0.10
TOTAL AVOIDED COST OF PV	**49.67**	**4.97**

Note: Based on the ACIL Allen forecast half-hourly average electricity price and the 2013 actual small-scale solar PV export profile.

The method used to estimate the value of feed-in electricity, as presented in table 4.1, is consistent with the method adopted by the Commission in previous years. The results for 2016 can be summarised as:

- the energy value of solar PV exports is forecast to be approximately 4.6 c/kWh
- the locational value of solar PV exports is estimated to be 0.3 c/kWh
- the avoided cost of market fees is estimated to be 0.1 c/kWh
- the total value of the above elements of feed-in electricity is 5.0 c/kWh.

4.2 FEED-IN TARIFF RATE FOR 2016

The Commission's final decision is to set a minimum FiT of 5.0 c/kWh to apply from 1 January 2016 to 31 December 2016.

REFERENCES

ACIL Allen 2014, ‘Estimated value of PV exports, calendar year 2015’ (Report for Essential Services Commission of South Australia).

ACIL Allen 2015, ‘Wholesale Electricity Spot Price, 2015 and 2016 projections’.

AEMC 2012, 'Power of choice review — giving consumers options in the way they use electricity: Final Report'.

AEMO 2015a, 'Distribution Loss Factors for the 2015/2016 Financial Year'.

AEMO 2015b, 'Regions and Marginal Loss Factors: FY 2015-16'.

ESC 2013, 'Minimum Electricity Feed-in Tariffs: For Application from 1 January 2014 to 31 December 2014: Final Decision'.

ESC 2014, 'Minimum Electricity Feed-in Tariff to Apply from 1 January 2015: Final Decision'.

IPART 2014, 'Solar feed-in tariffs: The subsidy-free value of electricity from small-scale PV units from 1 July 2014, Final Report'.

SKM-MMA 2013, 'Analysis of Electricity Retail Prices and Retail Margins 2006-2012' (Report for the Essential Services Commission).

VCEC 2012, 'Power from the People: Inquiry into distributed generation, Final Report'.