ESSENTIAL SERVICES COMMISSION

MINIMUM ELECTRICITY FEED-IN TARIFFS

FOR APPLICATION FROM 1 JANUARY 2014 TO 31 DECEMBER 2014

FINAL DECISION

AUGUST 2013

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CONTENTS

PART A: FINAL DECISION

The Essential Services Commission (Commission) is authorised under s 40FBB of the *Electricity Industry Act 2000* (Vic) (hereafter 'EIA') to determine a rate for the purposes of s 40FBA(b)(i) — this rate being the minimum feed-in tariff (FiT) rate for relevant retailers within their general renewable energy feed-in terms and conditions.

The Commission has made a final decision for the minimum FiT to apply for the period 1 January 2014 to 31 December 2014 pursuant to s 40FBB of the EIA, and in making that decision has had regard to:

(i) the prices of electricity in the wholesale electricity market; and

(ii) any distribution and transmission losses avoided in Victoria by the supply of small renewable energy generation electricity (s 40FBB(3)).

Determination

The amount determined by the Commission under s 40FBB of the EIA, being the minimum FiT rate for relevant retailers within their general renewable energy feed-in terms and conditions for application during the calendar year commencing on 1 January 2014, is 8.0 cents per kilowatt-hour ($0.08/kWh).

Final decision summary

In determining the fair and efficient value of small scale embedded generation exports, the Commission has used the 'wholesale price plus' approach recommended by the Victorian Competition and Efficiency Commission (VCEC) and adopted by other jurisdictional regulators. The wholesale electricity spot market price corresponds to the marginal energy purchase cost that is avoided by an electricity retailer when one of its embedded generating customers exports an additional unit of electricity into the grid. For this reason, the wholesale spot price is the relevant avoided energy cost in relation to the marginal unit of embedded generation.

The 'plus' element of the 'wholesale price plus' formula refers to any other avoided costs associated with embedded generation. Because embedded generation reduces the average distance between generation and consumption, it is believed to reduce overall line losses. Thus, consistent with the approach adopted in other jurisdictions, the Commission has accepted that line losses are avoided because of embedded

generation. In the absence of better measures, the Commission has used the distribution loss factors published by the Australian Energy Market Operator (AEMO). The weighted average distribution loss factor for the five distribution zones in Victoria is calculated as 1.06. The energy value of embedded generation is multiplied by this factor to obtain the overall value of embedded generation.

The energy value of embedded generation has been calculated as a weighted average of the forecast spot market prices for Victoria in 2014, which includes a forecast spot market price for each half hour period of 2014 (17,520 periods in total). This 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 solar photovoltaic (PV) net exports which can be attributed to each half-hour period over the year. Ideally these weights should represent the time-profile of small embedded generator net exports over the year. However, this information was not available for the present review for Victoria, and instead the Commission has assessed two methods to approximate the export load profile for Victoria for the purpose of weighting the spot price.

The time-profile of production from a standard north-facing PV unit in Melbourne has been chosen as the basis for constructing these weights. Specifically, historical data for the half-hourly production of a standard unit of this kind has been obtained by the Commission from AEMO and ROAM Consulting for Melbourne for the period 2004-05 to 2011-12. The Commission has used an eight-year average of the values in these profiles relating to each ordered half-hourly period to derive a 'weather normalised' profile covering 17,520 half-hourly periods over a year. This profile has been used as the weights for the purpose of constructing the FiT.

Using this approach, the energy value of embedded generation has been estimated for 2014 at 7.2 c/kWh, and when the uplift associated with the distribution loss factor is taken into account, the overall value of embedded generation is estimated to be 7.6 c/kWh. This estimate is broadly consistent with the prevailing FiT rate of 8.0 c/kWh. This difference is small relative to the scope for forecasting error, and in the Commission's view there is a benefit in retaining the prevailing FiT rate of 8.0 c/kWh for the 2014 calendar year in order to provide stability for embedded generators and minimise administrative costs for industry participants.

PART B: BACKGROUND

Part B discusses the background to the Commission's role in determining the minimum FiT in Victoria. This information describes the context in which the Commission has conducted its role relating to FiTs. The structure of this part is as follows:

- Chapter 1 introduces FiTs and outlines the Commission's statutory role in determining the minimum FiT in Victoria.
- Chapter 2 discusses small embedded renewable generation in Victoria generally, the nature and forms of FiTs, and outcomes of the VCEC inquiry into FiTs.

1 INTRODUCTION

1.1 What is a Feed-in Tariff?

A FiT is a price that distributed generators are paid per unit of electricity that they export into the grid (or in some cases, the amount they generate — see section 2.2).[1] Since January 2008, licensed electricity retailers in Victoria with over 5000 customers are required to publish a general renewable energy FiT offer for customers that have a small renewable generation facility (i.e. one with a nameplate capacity of less than 100kW). In the great majority of cases, these facilities are rooftop solar PV systems, but other potential sources of renewable energy include wind energy, hydro-generation and biomass generation.

The obligation that retailers publish their general renewable energy FiT is intended to ensure that it is generally available to any small embedded generator. This generally available FiT must be no lower than the minimum FiT. Retailers may have more than one FiT, but they must be no lower than the legislated minimum.[2] At present, the minimum FiT is 8.0 cents per kilowatt hour (c/kWh).

The purpose of the regulation of FiTs is to ensure that all customers that are small embedded renewable generators have access to an efficient and fair price for exported electricity (DTF 2012, 7). That is, prices that reflect the economic value of those electricity exports, without cross subsidies between those electricity customers that generate electricity and those that do not (VCEC 2012, xxx).

1.2 Commission's role

With the recent amendment of the EIA by the *Energy Legislation Amendment (Feed-in Tariffs and Other Matters) Act 2013*, the Commission has been given the responsibility of determining minimum FiTs for small scale renewable energy embedded generation in Victoria. The Commission is required to determine the minimum FiT by 31 August in the year before it will take effect. This final decision represents the Commission's determination of the minimum FiT that will apply from 1 January 2014 to 31 December 2014.

[1] Distributed generation refers to electricity produced by generators connected to the distribution network. In this paper the terms 'embedded generation' and 'distributed generation' are used interchangeably.

[2] Refer to sections 40G, 40GA and 40FB of the EIA.

There is an implied obligation under the EIA that the generally available FiT terms and conditions should be fair and reasonable.[3] Further, VCEC recommended that the minimum FiT should be an 'efficient and fair' rate that avoids cross-subsidies between consumers, or groups of consumers, to the extent possible, and this principle has been supported by the Victorian Government (VCEC 2012, xxi; DTF 2012).

The Commission's role of deciding the minimum FiT follows an inquiry into distributed generation by VCEC in 2012. The inquiry recommended that a minimum FiT be imposed for a transitional period before moving to market-determined FiTs at a later date. The minimum FiT should ensure that distributed generators receive a price that reflects the value of the electricity they export to the grid and provide an efficient price signal to investors in small-scale distributed generators that will help achieve efficient use of distributed generation in a competitive electricity market (VCEC 2012, 147).

VCEC's findings and the Victorian Government's response to those findings are relevant to the Commission's present determination of the minimum FiT. Some of VCEC's key findings are presented in section 2.3. In determining the minimum FiT, the Commission is seeking to give effect to the relevant provisions of the EIA, and VCEC's findings and the Victorian Government's response to those findings assist to understand the purpose of the EIA provisions.

The Commission released a draft decision in July 2013 that detailed (1) its approach to setting the minimum FiT, and (2) its proposed FiT to apply for the period 1 January 2014 to 31 December 2014. The Commission received ten submissions in response to the draft decision – from five retailers (AGL, Origin Energy, EnergyAustralia, Lumo and Alinta), the Energy Retailers Association of Australia (ERAA), the Energy Supply Association of Australia (ESAA), the Clean Energy Council (CEC), and two individual submissions from Mr Trevor Bergman and Mr David Sparks.

The Commission received a number of submissions on its role and the scope of the review, and several submitters raised arguments that were examined in the VCEC inquiry.

The Commission's task does not extend to policy making, but rather is limited to implementing the existing legislative provisions. For this reason, some of the submissions on the draft decision cannot be considered by the Commission as part of

[3] Under sections 40I and 40J of the EIA, the Minister may refer FiT terms and conditions to the Commission for assessment as to whether they are fair and reasonable. The Commission must report to the Minister on that assessment.

this final decision. For example, Alinta Energy stated that its "preferred position is for the deregulation of the FiT rate in Victoria", and Origin Energy and the ESAA expressed similar views (Alinta Energy 2013; Origin Energy Retail 2013; ESAA 2013). The CEC presented arguments why FiTs should be regulated and addressed issues relating to the coverage of technologies in the legislation (Clean Energy Council 2013). The ERAA suggested that the Commission publish a fair and reasonable value of exported solar energy as a guideline, rather than as a minimum FiT (ERAA 2013).

The views and arguments mentioned above are outside the scope of the Commission's task, and have been disregarded.

Mr Sparks (Sparks 2013, 1) noted that the Commission's draft decision did not discuss the arguments presented to VCEC or recognise VCEC's draft recommendation 6.1. That draft recommendation was superseded by recommendation 9.1 in VCEC's final report, and related to closing former FiT schemes and transitioning to a market-based FiT by 1 January 2017. These matters, and the Victorian Government's response to VCEC's recommendations, are discussed in sections 2.3 and 2.4.

The Commission considers that it is beyond the scope of its tasks to reassess all of the issues examined by VCEC. For this reason, this final decision does not canvass the wide range of stakeholder views that were presented to VCEC during the course of its inquiry.

2 APPLICATION OF FEED-IN TARIFFS

This chapter provides summary background information relating to small renewable energy generation and the types of FiTs that can be used with different metering technologies. This information explains why the FiT determined by the Commission is primarily designed for solar rooftop PV embedded generation and why it is a net FiT.

2.1 Solar PV electricity generation in Victoria

At present, the great majority of small, embedded renewables generation is from rooftop PV systems. The power generated from these units will offset some of the consumption of the households where they are installed, and at times there may be electricity exported into the network. For present purposes, only facilities with a capacity of less than 100 kW are of interest because the minimum FiT will not apply to larger units.[4] Solar hot water systems generate heat from solar energy, rather than generating electricity that can be exported to the grid, and for this reason they are not relevant to this paper.

There has been a strong take-up of solar PV systems in the past four years, in part reflecting strong demand for electricity generated from renewable sources, and also the influence of upfront subsidies to households installing solar systems, such as under the Renewable Energy Target (RET) scheme, and FiT schemes. AEMO has estimated that the total installed rooftop PV capacity in Victoria was 288 MW in February 2012 (AEMO 2012a, 9). AEMO estimated the average capacity of a solar installation per household to be 3.5 kW,[5] which would suggest that around 4 per cent or more of Victoria's retail customers had solar PV installations by 2012.

AEMO's estimates suggest that in 2010-11, Victorian rooftop PV systems generated around 260 GWh, or approximately 0.6 per cent of total demand. The amount of solar PV produced will generally be lower than rated capacity for a variety of reasons including the alignment of the panels, shading from nearby trees or buildings, and cloud cover. The amount of electricity exported will also be reduced by the amount of

[4] See the definition of 'small renewable energy generation facility' in section 40F of the EIA.
[5] The average installed PV capacity per household indicated by AEMO is at market saturation. At present, the average may be slightly lower.

the household's consumption at the relevant time. AEMO estimated that at periods of maximum demand, solar generating units are on average producing at between one-third and one-half of their maximum rated capacity (AEMO 2012a, 28). The amount of electricity exported from small embedded solar generators in Victoria is not known, but in New South Wales (NSW), IPART found that on average customers export from 32 to 50 per cent of the power they generate (IPART 2012, 2).

Under a moderate uptake scenario, AEMO forecasts the amount of solar PV generated will increase to 1160 GWh in 2020 and 2840 GWh in 2030 (AEMO 2012a, 28). This suggests that rooftop solar PV production is anticipated to account for approximately 2 per cent of total energy consumption in Victoria by 2020,[6] and may account for around 5 per cent by 2030.

2.2 Feed-in Tariffs and metering

There are two types of FiT schemes. The schemes used in Victoria, South Australia and Queensland all operate on a net basis, in which the FiT only applies to net power exports from the household. When the solar PV system is producing less power than is being consumed by the household, then the household benefits by reducing the power it draws from the grid—reducing the variable component of its electricity bills. When the household's power generation exceeds its consumption, it becomes a net power exporter and receives the FiT rate applied to the electricity exports.[7]

NSW, the Northern Territory and the Australian Capital Territory use gross FiT schemes. In gross FiT schemes, households are compensated via the FiT for all of the power they generate from their solar PV system. On the other hand, they do not obtain the benefit of lower bills on account of drawing less power from the grid, as is the case with the net tariff.

The net and gross FiT approaches have different metering requirements. A gross FiT scheme requires the household to have both a gross meter[8] and an ordinary household electricity meter (which can be an accumulation meter or an interval meter[9]). A net FiT scheme requires that the household either have an interval meter, or

[6] Based on AEMO's medium forecast for Victorian energy consumption (AEMO 2012b, 8–4).
[7] Exports are defined as the surplus of household electricity production over consumption in a period.
[8] Measures the output of a solar PV system separately from the meter used for household energy imports from the grid.
[9] 'Interval meter' refers to a meter that measures usage in half-hourly periods, and includes 'smart' meters.

the combination of a gross meter and an accumulation meter. Since the great majority of small customers in Victoria have a single interval meter, only the net FiT approach is supported by current metering facilities.

Metering arrangements are a critical factor determining the design options available for FiTs. Accumulation meters only measure the amount of electricity consumed between two points in time, and provide no information about the time pattern of usage within that period, or even whether there were any periods during which electricity was exported by the household, and if so, when they occurred. Household power exports need to be calculated and system-wide averages are used to estimate the value of exported power. However, interval meters measure the electricity flows in half-hourly intervals, and can measure the amounts imported or exported by the household in each half-hourly period—which are the pricing periods in the national electricity market. (NEM). Interval meters support a calculation of the value of electricity exports by each individual household based on their actual power exports in each half-hourly period and on the value of electricity in such periods.

The interval meters being rolled out in Victoria provide two-way communications, remote meter reading, and remote connection and disconnection. The regulatory timetable for the interval meter rollout requires it to be substantially complete by the end of 2013.[10] Since the minimum FiT to be determined by the Commission will take effect from 1 January 2014, it can be assumed that the great majority of small customers in Victoria, and small embedded renewable generators, will have an interval meter installed at their premises.

2.3 VCEC inquiry

VCEC reviewed the underlying policy rationale of the Victorian FiT schemes in light of Commonwealth policies such as:

(i) the $23/tonne carbon price introduced on 1 July 2012, and

(ii) Commonwealth subsidies for small-scale renewable generation directed to its target for 20 per cent of Australia's electricity supply to come from renewable energy by 2020 (VCEC 2012, xiv).

It concluded that, given the Commonwealth policies, further subsidising small scale embedded generation was likely to be a relatively expensive option for achieving

[10] Department of Primary Industries, http://www.dpi.vic.gov.au/smart-meters/resources/reports-and-consultations/advanced-metering-infrastructure-cost-benefit-analysis/2.-background

reductions in greenhouse gas emissions, and would no longer be an appropriate policy instrument for the state government (VCEC 2012, 144). Further:

> *The distributed generation industry is now more viable, without the need for industry support measures and subsidies. Moreover, it is growing more rapidly than expected indicating that it is able to compete and secure a place in the electricity generation network into the future (VCEC 2012, xxv).*

VCEC recommended that the FiT should:

> *provide an efficient price signal to investors in small-scale distributed generators that will help achieve efficient use of distributed generation in a competitive electricity market. … distributed generators should receive a price that reflects the value of the electricity exported to the grid … (VCEC 2012, 147)*

In the long-term, VCEC considered that competition between retailers can be expected to ensure that market-determined FiTs will be the most efficient. However, transitional arrangements would be needed in the short-term.

VCEC reviewed a number of options and concluded that the 'wholesale price plus' option is the most appropriate methodology to value the electricity exported into the network by distributed generators (VCEC 2012, 144). The 'wholesale price plus' option is based on the wholesale electricity price with additions to reflect other avoided costs such as network losses.

2.4 Victorian Government response to VCEC inquiry

An important part of VCEC's recommendations concerned the closure of several statutory FiT schemes which offered advantageous FiT rates. The closed schemes include:

- The Premium FiT scheme, which commenced on 1 November 2009 and was closed to new applicants from 29 December 2011. It provided a FiT rate of 60 c/kWh. Those who entered the scheme during that period can continue in it until 2024, provided they don't add extra solar panels to their system.[11]
- Standard FiT arrangements, which have operated since January 2008 and were closed to new applicants on 31 December 2012. These arrangements

[11] See http://www.dpi.vic.gov.au/energy/environment-and-community/victorian-feed-in-tariff-schemes/closed-schemes/premium-feed-in-tariff

generally provided a ‘one-for-one’ rate.[12] Customers already on this scheme should be able to access their 'one-for-one' rates until 31 December 2016.[13]

- The Transitional FiT scheme commenced on 1 January 2012, replacing the Premium FiT, and was closed to new customers on 31 December 2012. This scheme provided small-scale solar PV generators with a FiT rate of 25 c/kWh. Eligible premises with an effective Transitional FiT contract in place will continue to receive this rate until 31 December 2016, provided they remain eligible.[14]

The minimum FiT determined by the Commission relates to new FiT offers made by retailers, and is not part of these schemes.

[12] This refers to a FiT which is approximately equal to the variable component of the customer’s electricity retail tariff.

[13] See http://www.dpi.vic.gov.au/energy/environment-and-community/victorian-feed-in-tariff-schemes/closed-schemes/standard-feed-in-tariff

[14] See http://www.dpi.vic.gov.au/energy/environment-and-community/victorian-feed-in-tariff-schemes/closed-schemes/transitional-feed-in-tariff

PART C: REASONS FOR DECISION

Part C discusses the Commission's reasons for its decision on the minimum FiT in Victoria, presented in Part A. The structure of this part is as follows:

- Chapter 3 discusses the Commission's overall approach to determining the minimum FiT, including the adoption of the 'efficient and fair' criterion for determining the FiT, which was recommended by VCEC and endorsed by the Victorian Government. This chapter also discusses the possible forms that a FiT can take, and the reasons for the Commission's adoption of a single-rate FiT for 2014.

- Chapter 4 discusses the methodological issues relating to calculating the 'efficient and fair' value of embedded generation exports and hence the minimum FiT. A number of matters raised in submissions to the draft decision are discussed in the context of the methods for determining the FiT. The discussion establishes the Commission's approach in relation to each methodological issue and explains the Commission's decision regarding the minimum FiT rate for the 2014 calendar year.

3 APPROACH TO DETERMINING THE FEED-IN TARIFF

This chapter explains the Commission's overall approach to determining the minimum FiT based on the 'efficient and fair' criterion, which is associated with the 'wholesale price plus' approach to quantifying the value of embedded generation. It also considers the possible forms that a FiT can take, and discusses the reasons for the form chosen by the Commission.

3.1 Wholesale price plus approach

As discussed in chapter 2, the Victorian Government has supported the use of VCEC's proposed 'efficient and fair' criterion which is based on the principle of avoiding cross subsidies between consumers who do and do not have embedded generation capacity (DTF 2012). Cross-subsidies between consumers may lead to over-investment in renewable generation installations and cause unnecessary hardship or expense for customers unable to invest in renewable generation – e.g. due to lack of efficient investment opportunity, lack of income or tenancy restrictions. The minimum general FiT should be based on benefits (i.e. cost savings) attributable to the export of power by small-scale distributed renewable generators.

In the draft decision, the Commission indicated that it does not intend to further consider approaches already reviewed and rejected by VCEC (VCEC 2012, chapter 9), including the payback period and 'one-for-one' approaches. It was proposed to adopt the 'wholesale price plus' approach.

The Commission received several submissions in relation to adopting the 'wholesale price plus' approach. These submissions are discussed below.

Draft decision responses and discussion

Several submissions – including those from AGL, ERAA and EnergyAustralia – supported the use of the 'wholesale price plus' approach. AGL stated that this approach "is consistent with the approach adopted by regulators in other jurisdictions, namely, IPART, QCA and ESCOSA" (AGL 2013, 2).

Mr Bergman submitted that, at least for small embedded generators with solar PV systems of less than 5 kW, the 'one-for-one' approach should be used, in which the

FiT is equal to the retail price of electricity (Bergman 2013). But as detailed in section 2.4, the Victorian Government closed the former Standard FiT arrangements which offered a 'one-for-one' rate, rejecting the view that this was consistent with an 'efficient and fair' rate.

In light of the above considerations, the Commission has decided to use the 'wholesale price plus' approach.

3.2 Form of the Feed-in Tariff

Most current FiTs in Australia take the form of a single rate per kWh which applies to all periods of the day and year. Several policy development forums and bodies, such as Council of Australian Governments (COAG) and the Productivity Commission (PC), have recommended greater attention be paid to FiTs that are higher during periods when electricity value is highest and are lower at other times.[15] The purpose of price structures of that kind would be to improve incentives to maximise embedded generation exports at times when its system-wide value is highest.

The Commission considers there are three approaches that could be used to formulate a FiT:

- A single fixed-rate FiT in cents per kWh.
- A time-of-use FiT which has different rates applying to different periods of the day such as peak, off-peak and shoulder periods, perhaps with seasonal variation.
- A continuously varying FiT rate based on a formula linked to movements in the wholesale price of electricity and applied to each household based on their metered electricity exports during each half-hourly period.

Only the first two of these approaches would be within the scope of the Commission's discretion to implement under s 40FBA of the EIA, when it determines "*the amount* to be credited against the charges payable to a relevant licensee by a customer who is a

[15] The Australian Energy Market Commission (AEMC) and the PC stated that time-varying FiTs can provide households with the greatest incentive to export solar power during system peaks when its value is highest. This can be achieved by reducing household consumption during these periods to a level lower than the output of the solar PV system. It may also provide incentives to align solar panels to maximise output when the electricity value is highest. In the fixed-rate FiT models the household does not have this incentive.

relevant generator" (emphasis added). Therefore, the Commission has not considered a continuously-varying FiT (as defined above) any further.

A fixed-rate FiT, as the name suggests, does not change from period to period during the year. It is determined ex ante based on forecast aggregate quantities of embedded generation exports, and forecast wholesale electricity prices, in each half-hourly period of each day of the year.

A time-of-use FiT refers to an ex ante tariff that potentially has different rates applying during peak, off-peak and shoulder periods of the day, weekdays and weekends, and seasons. Each of the elements of a time-of-use FiT is a fixed rate. The design of time-of-use tariffs can be complicated. The fixed rate for each period could be calculated analogously to the fixed-rate FiT, but based on the forecast aggregate quantities of embedded generation exports, and the forecast electricity prices, applying during the periods for which the tariff element applies. However, analysis of this kind would not be adequate without taking the demand (and potentially supply) responses to such a tariff structure into account. An understanding of the capacity of households to switch load between periods would be needed to ensure that, after such adjustments have been made, the tariff would produce financial benefits to embedded generators equivalent to the value of their production.

In its draft decision, the Commission proposed to determine a single fixed-rate minimum FiT for 2014 for reasons of practicality. A comprehensive analysis would be required to determine an appropriate form for a time-of-use FiT, which was not feasible within the available time-frame. It would also be necessary for the Commission to understand whether there would be administrative complexities associated with introducing a time-of-use FiT. Further, it was considered more practical to defer consideration of a time-of-use FiT until after the introduction of time-of-use electricity retail prices for Victorian small consumers in the second half of 2013.

The Commission received a number of responses on this issue. These responses are discussed below.

Draft decision responses and discussion

EnergyAustralia supported the Commission's proposed approach because:

> *it is too soon to contemplate a FiT that has more than one time period per day. As outlined by the ESC, this would take additional time to set appropriately and be administratively more complex. In our view, it is more sensible to consider this*

> *option after flexible (time-varying) electricity prices are implemented in Victoria later in 2013. (EnergyAustralia 2013, 2)*

AGL saw merit in flexible or time-varying FiTs, in part because they can better cater for different technologies for renewable energy embedded generation. It noted that a fixed rate FiT must assume a certain generation profile, and therefore will not be suitable for non-solar PV embedded generators. However, AGL supported the Commission's proposed approach to defer consideration of time-of-use FiTs until after the introduction of the time-of-use retail pricing "so that any issues are not compounded" (AGL 2013, 2).

The CEC emphasised that when it comes to framing and evaluating a time-variable FiT, it is not enough to only consider different rates during peak, off-peak and shoulder periods of the day, weekdays and weekends, and seasons, but should also consider critical peak pricing:

> *this would require a high FiT payment (commensurate with the prevailing wholesale electricity price) to be available during critical peak periods. By opening up competition to power supply during critical peak periods, the financial savings in poles and wires investment will be maximised. (Clean Energy Council 2013, 1)*

The CEC also favoured location-specific FiTs. It argued that there needs to be a strategy for the development and implementation of time-varying FiTs, which could be introduced as an alternative option for small embedded generators (Clean Energy Council 2013, 1).

The Commission will consider the opportunities to develop a time-of-use minimum FiT when it considers the FiT for 2015. Insights from the introduction of time-of-use electricity retail pricing will be taken into account. Over the coming months, the Commission intends to carry out quantitative research needed to develop options for time-varying FiTs. Stakeholder comment may be sought on that research, to assist the consultation to be undertaken in 2014 on the FiT for the 2015 calendar year.

The observations made by submitters confirm the reasoning of the Commission in its draft decision, and a fixed rate FiT has been adopted for 2014.

4 METHOD OF CALCULATING THE FEED-IN TARIFF RATE

This chapter outlines the Commission's approach, and explains its decision, to applying the 'wholesale price plus' method of determining the minimum FiT for 2014.

4.1 Retailer and system-wide perspectives

When a small customer exports solar electricity into the network, its retailer benefits because it is able to sell that power to other customers. Although there may be benefits to other parties in the electricity supply chain, there is a question whether such benefits should be recovered through the FiT. One approach to determining the value of electricity exports is to value the benefits flowing to the retailer supplying that customer. Another approach is to consider the system-wide benefits.

The most common approach in recent reviews of FiTs by bodies such as the Essential Services Commission of South Australia (ESCOSA), the Independent Pricing and Regulatory Tribunal (IPART) and the Queensland Competition Authority (QCA) is to interpret the fair and reasonable value of embedded electricity exports as:

> *… the direct financial benefit to the electricity retailer when it on-sells exported PV electricity. … [and] the value of the benefit to the retailer should be represented by the value of costs that retailers avoid when on-selling PV energy. (QCA 2012, 9)*

One limitation of this approach is that it is contingent on the structure of financial settlements in the wholesale electricity pool and of transactions between retailers and distributors or other input suppliers. In Victoria, the financial settlement process in the electricity pool is different from those in South Australia, New South Wales and Queensland because of the advanced stage of the smart meter rollout. Further, the structure of transactions between retailers and distributors may not yet fully reflect principles established or proposed by relevant regulatory agencies. For example, the Australian Energy Market Commission (AEMC) has stated that there remain shortcomings in the existing arrangements relating to passing-on avoided Transmission Use-of-System (TUoS) charges to embedded generators under the National Electricity Rules (AEMC 2012, 233). The PC has recommended changes to the arrangements by which embedded generators are reimbursed by network businesses for savings in network costs (PC 2013, 51). Changes of this kind may

affect the retailer benefits arising from embedded generation, more closely aligning them with system-wide benefits.

Although it is important to have regard to the direct financial benefit to the retailer, the Commission also has regard to the system-wide benefits where it is reasonable to do so — for example, where it is reasonable to expect some changes in the commercial arrangements relevant to the retailer. The CEC supported this principle (Clean Energy Council 2013).

4.2 Value of embedded electricity exports

The value of electricity supplied by embedded generators broadly comprises the energy value of electricity produced and exported, associated reductions in line losses, and the 'network value' of distributed generation (ACIL Tasman 2012, 21). Table 4.1 shows a summary of the main retailer costs, and specifies which of those costs other jurisdictions or previous reviews have considered to be avoided costs associated with embedded generation.

Table 4.1: Avoided Costs of FiTs

Avoided cost item	IPART	ESCOSA	QCA	VCEC
Wholesale electricity	✓	✓	✓	✓
Hedging	x	x	x	x
'Merit order effect'	x	x	x	x
System operation	✓	✓	✓	x
Transmission	x	x	x	x
Distribution*	x	x	x	x
Line losses	✓	✓	✓	✓
Metering	x	x	x	x
Retail services	x	x	x	x
Green scheme costs	x	x	x	x

* May be compensated directly by distributors.

Sources: (IPART 2012; ESCOSA 2012; QCA 2012; VCEC 2012)

Each of the components in Table 4.1 is discussed below.

Wholesale electricity

Energy value is the main element of the FiT rate in all jurisdictions. It is usually measured in terms of the forecast wholesale market cost of energy, but since this varies on a half-hourly basis there are various methods of estimating a representative value as a fixed rate. In Victoria, retailers mainly pay for the electricity used by their customers based on the amounts these customers actually use in each half-hourly interval (as recorded by their smart meter), whereas in other jurisdictions settlements are based on profiling using an aggregate average net consumption profile of all consumers over each half-hour of each day and season.[16] The retailer's avoided cost in these two situations will be quite different, so the method used to calculate the energy value of the FiT in Victoria will necessarily differ from the methods used by other regulators. The energy value of embedded generation is discussed in section 4.2.1.

Hedging

There is a question whether solar PV exports may affect retailer costs associated with risk mitigation through hedging contracts. For example, if the time-profile of embedded generation exports is correlated with demand it may provide a 'natural hedge', and reduce hedging requirements, but if the effect of embedded generation is to make the overall patterns of net demand more peaked and volatile, then the opposite could be the case. Other jurisdictions have either rejected hedging costs as an avoided retailer cost (QCA 2013a, 20–21; ESCOSA 2012, 37–40) or have not addressed the question.

In its draft decision, the Commission noted that:

- some of the conclusions reached in other jurisdictions regarding hedging strategies may not apply in Victoria due to different settlement arrangements
- in Victoria, solar PV does not appear to provide a 'natural hedge' because embedded generation exports tend to be greatest during the 'shoulder' period

[16] The Commission understands that once a meter is read as an interval meter and its data stream is set up in MSATS, it is settled in the NEM using the interval meter data (and therefore the NSLP is not applied). However, there remain a number of interval capable meters installed that are still being read as a basic meter and so their data streams are still set up in MSATS as a basic meter (they are waiting for the logical conversion to interval process to be completed). Those meters are settled in the NEM using basic meter data and NSLP is applied to determine half hour values.

in the middle of the day, and make a relatively small contribution during the summer evening peak.

- at this stage there is insufficient information to conclude that there are avoided hedging costs.

The Commission received a number of responses on this issue. These responses are discussed below.

Draft decision responses and discussion – Hedging

AGL supported the draft decision and noted that because solar PV generation has a smaller effect on the evening peak than it has during the shoulder periods in the middle of the day:

> *load profiles are generally worsening ie becoming peakier and it will increase retailers' hedging costs. Until further analysis is undertaken, AGL accepts that it will be difficult to assess this additional cost for 2014. (AGL 2013, 2)*

Alinta Energy suggested that "the value of solar as a hedge should be discounted" because its contribution in peak periods is uncertain (Alinta Energy 2013).

ACIL Tasman has argued that the typical portfolio of swap and cap contracts held by a retailer is designed to hedge against price risk, but does not limit the retailer's volume risk. Consequently, for a fixed contract position, any variation in the quantity of electricity the retailer purchases incurs a cost (or cost saving) equal to the wholesale spot price. ACIL argued that the wholesale spot price is the relevant avoided cost in relation to the marginal unit of embedded generation (ACIL Tasman 2011, 22 & Ap. A).

In light of these considerations, the Commission has not included hedging costs and prefers to measure the avoided energy cost by the spot market electricity value in the relevant periods.

Merit order effect

The 'merit order effect' referred to in Table 4.1 has been described by IPART as follows:

> *PV generation reduces 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 (ie, at a lower point on the supply cost curve) thereby*

lowering wholesale spot prices. This is referred to as the merit order effect. (IPART 2012, 81)

Any source of reduced electricity demand, such as by reducing use of appliances that consume electricity, or installing more efficient appliances, or by generating electricity, may affect the wholesale market price of electricity, at least in the short-term and if the reduction in demand is unanticipated. But in the medium-term, the available central generation capacity can be more closely matched to the residual demand not met by embedded generation, either by deferring investment in new capacity or by phasing out of operation older or more costly to operate generation plants sooner than would otherwise be the case. The same process may apply in a more timely way if the reduction in demand is anticipated. Given these market-related adjustment processes, there is no reason to expect there will be a merit order effect on the wholesale price of electricity in the medium-term.[17]

Since the obligation to make Standard FiTs available to all relevant customers is an ongoing one, in the Commission's view the minimum FiT should not take account of possible short-run factors unlikely to be sustained. For these reasons, the Commission has not included a 'merit order effect' in the calculation of the minimum Standard FiT and notes that this approach is consistent with that taken by IPART, ESCOSA, QCA and VCEC (refer Table 4.1).

No responses were received on this issue.

System operation

System operation fees are levied by AEMO. Most other jurisdictions have considered these fees as an avoided cost to retailers because they are levied on the quantity of electricity traded on the wholesale market. The Commission has some reservations about whether these fees can truly be considered an avoided cost, because since AEMO's costs are independent of the amount of electricity traded through the wholesale market there will not be an avoided cost to retailers in aggregate. In any case, the Commission does not consider these benefits to be sufficiently material to take into account, since they amount to less than 0.1 c/kWh (SKM-MMA 2011, 3). Specifically, they have been estimated at between 0.035 and 0.050 c/kWh (SKM-MMA 2013, 11).

No responses were received on this issue.

[17] See also VCEC (2012, 178).

Distribution and transmission network value

The network value of embedded generation refers to avoided costs of distribution or transmission network capacity augmentation caused by small-scale distributed renewable generation. In broad terms, the distributed generators are closer to the sources of electricity demand, and this may incrementally reduce the amount of infrastructure needed to conduct electricity over distances per unit of electricity consumed. Embedded generation can be a substitute for capacity augmentation that would otherwise be required to meet an increase in demand in a given locality from additional production by central generators (ACIL Tasman 2012, 23). When considering the question of network value, there is an important distinction between transmission capacity required to deliver energy from central generators to a distribution network, and distribution capacity needed to transfer energy from a transmission station to all of the customers within that distribution network. We firstly discuss distribution network value.

Distributed generation exports must inevitably be carried on the distribution network. From the retailer's perspective, there is no avoided Distribution Use-of-System (DUoS) charges associated with embedded generation exports because these charges are partly fixed and partly depend on the amount of electricity the retailer sells to its customers (irrespective of the source) (IPART 2012, 52). But from a system-wide perspective, whether or not there is an avoided cost relating to distribution network infrastructure is a complicated matter. The benefits of embedded generation will vary between distribution networks and localities within them, and over time, depending on whether capacity is constrained in that locality and technological compatibility (see ENA 2011). VCEC observed:

> *No reliable estimates of this value currently exist — at least in the public domain. The size of the network value is difficult to determine because it will be both time and location specific, but in constrained areas of the network it is likely to be large. (VCEC 2012, xxxvii)*

VCEC argued that recovering any distribution network value "is appropriately dealt with outside the FiT payment" (VCEC 2012, 179). Distribution network value should be compensated through an adjustment to the connection fee to take into account any reduction in the long run marginal cost of augmenting the distribution network as a result of the embedded generator being connected to the distribution. This would appear to be consistent with the principles established in section 5 of the National Electricity Rules (NER). It may require a case-by-case assessment of network value

(ACIL Tasman 2012, vii).[18] For these reasons, avoided distribution network costs should not be included in the minimum FiT. The Commission agrees with the submission of the CEC, which argues that more data and analysis is needed to determine whether there is any location-specific network value (Clean Energy Council 2013, 3).

Distributed generation exports are not carried on the transmission network. In principle, the use of the transmission network is avoided for that electricity, and this could give rise to an avoided cost. However, we are unaware of any avoided costs of this kind having been established. In addition, the Commission is not aware of any specific pass-through arrangements for avoided transmission network costs via network use of system charges to retailers for customers who are small embedded generators. Again, the previous reviews summarised in Table 4.1 have all excluded network value as an avoided cost. For these reasons, the Commission does not propose to include avoided costs for transmission network capacity in the minimum FiT.

Line losses

Line losses occur when electricity is conducted along wires, and are generally related to the distance over which the electricity is conveyed and the voltages used. They are usually a substantial cost. Because embedded generation reduces the average distance between generation and consumption, usually quite dramatically, it is believed to reduce overall line losses. Most jurisdictions have included avoided transmission and distribution line losses as a benefit of embedded generation exports for this reason. Line losses are discussed in section 4.2.2.

Retail services

Retailer costs associated with metering and customer services are not avoided when a customer exports electricity into the distribution network because these services are needed to support the contracts which provide for feed-in arrangements. Alinta Energy suggested that the cost of managing FiT customer accounts is relatively high (Alinta Energy 2013, 1). ESCOSA has previously concluded that if there are any net effects of feed-in arrangements on retailer costs, they are considered too small to be taken into account (ESCOSA 2012, 21). In the absence of evidence to the contrary, the Commission has decided to adopt the same assumption.

[18] The Australian Energy Regulator (AER) is responsible for resolving disputes in relation to network connection charges and also issues connection charging guidelines, which address connection of small embedded generators (AEMC 2007).

Green scheme costs

Other regulators have considered whether any of the 'green scheme' costs on retailers are avoided due to embedded generation.[19] The overall consensus has been that such costs are not avoided costs. This is so for the RET, which is levied on the basis of the gross amount of electricity that the retailer supplies to its customers (whatever the sources), but the same conclusion has also been reached with regard to the various state-based schemes. The Commission has not included any benefit associated with 'green schemes' of this kind.

No responses were received on this issue.

Avoided cost conclusions

The discussion above has rejected most of the cost elements shown in Table 4.1. Sections 4.2.1 and 4.2.2 discuss further the following avoided costs to be included in determining the FiT for 2014:

- the value of avoided electricity costs (including transmission line losses)
- avoided distribution line losses.

4.2.1 Wholesale electricity energy value

In the NEM, financial settlements relating to energy used by customers with interval meters are based on the metered half hourly consumption of each of those customers. Settlements for customers with accumulation meters are based on the overall average time-profile of consumption for all customers with such metering – the 'net system load profile' (NSLP).[20] In jurisdictions where small customers usually have accumulation meters (such as South Australia), the avoided cost for the retailer of embedded generation will be a weighted average of electricity spot prices, with the weights given by the NSLP. In Victoria, where most small customers have smart meters,[21] the avoided cost for the retailer of embedded generation (value of electricity exported) is:

[19] For example, the Renewable Energy Target scheme (RET) and various state-based schemes.
[20] The NSLP is defined for each half-hourly period as: NSLP = Total electricity traded – estimated line losses – controlled load (e.g. off-peak hot water) – interval metered load. The result is the aggregate consumption of all network customers with accumulation meters plus public lighting use.
[21] The Victorian smart meter rollout is expected to be substantially completed by 31 December 2013. Data presented in a recent study suggests that by mid-2012, interval meters (including smart meters) had been installed for approximately one-quarter of customers in NSW,

the wholesale spot price in each half-hour
multiplied by ***the quantities of embedded generation exports of that retailer's customers in each corresponding half-hour period***.[22]

In the Victorian context, the appropriate weights for averaging electricity spot market prices are given by the aggregate profile of small embedded generator electricity exports. The implications of the settlement process in Victoria is that each retailer pays for electricity consumed by its customers in each half-hour on the basis of the spot market price for that period, which represents the marginal cost of power generation in each half-hourly period. In the Victorian market, there is no distinction between the avoided energy cost to the retailer and the system-wide benefit, as is the case in other jurisdictions. For example, in South Australia virtually all settlements for small customers are based on the NSLP, which is an average consumption profile, and each retailer pays the same price per kWh no matter when its customers consume electricity during the day.[23] In this situation there is a clear divergence between the avoided energy cost to the retailer and the system-wide benefit of a kWh of embedded generation in a specific period.

Wholesale spot price

For the purposes of determining the 2014 FiT, the Commission proposes to use a projection of the half-hourly wholesale (spot) price of electricity in the Victorian region of the NEM, on each day of the year, prepared by ACIL-Allen. This forecast uses ACIL-Allen's PowerMark electricity price forecasting model (see ACIL Tasman 2012).

ACIL-Allen's market price forecast assumes that the carbon tax remains at its present level of $23/tonne. This is the appropriate assumption until there is any legislated change to the framework.

The Commission did not receive any specific responses on the use of the wholesale spot price. However, Mr Sparks submitted that the Commission has not given sufficient

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Queensland, Western Australia and the ACT, and negligible percentages in South Australia, Tasmania and the Northern Territory (KEMA 2013, sections 2.4, 3.1 and 4.1).

[22] The relevant electricity spot price is the Regional Reference Price (RRP) which applies in each half-hour period in the Victorian 'regional reference node' of the NEM. The RRP for each half-hour period and each node is published by AEMO. It includes an allowance for transmission line losses.

[23] Controlled load, such as off-peak hot water use, is settled on the basis of a separate profile. For details of the wholesale electricity market financial settlement process in South Australia; see ACIL-Tasman (2011, 6).

regard to “the environmental advantages of small scale renewable energy” in determining the FiT (Sparks 2013, 1). The Commission considers that an important environmental benefit is reduced carbon emissions, and the value of this environmental benefit has been taken into account as the carbon tax is factored into the price of electricity.

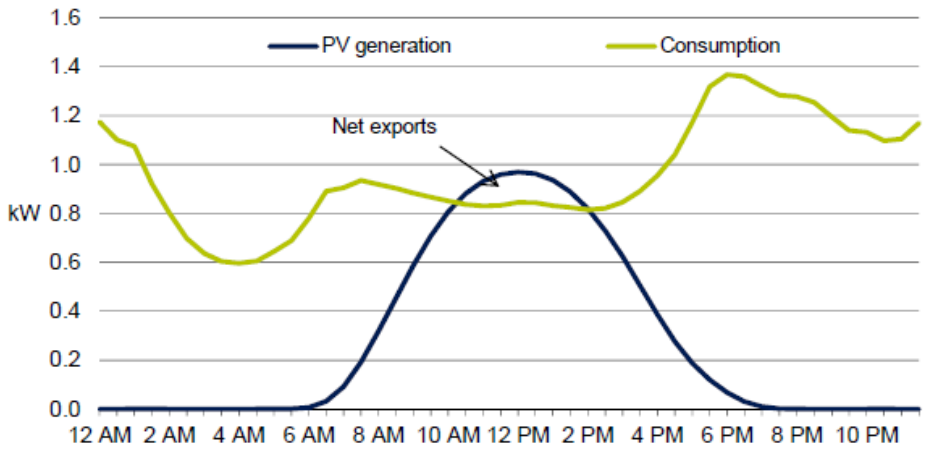
Embedded generation exports

There are several different kinds of weights that can be used for calculating FiTs. These are summarised in Figure 4.1, which represents one example of the average consumption and solar PV generation patterns of a residential consumer in NSW. Two different profiles are shown for this small customer—and a third is discernible as the intersection of the two profiles shown. The three profiles are:

- *The average daily electricity consumption profile:* In jurisdictions where small customers have accumulation meters this is equal to the NSLP. This form of profile was used by ESCOSA (2012) and QCA (2013a).
- *The PV generation profile:* This is the total amount of electricity produced by the solar PV units in each period of the day.
- *The net export profile:* Net exports are the difference between this household’s solar PV production and its consumption. IPART (2012) used an average net export profile in addition to the NSLP. The net export profile was developed using actual residential embedded generation export data supplied by distribution businesses. VCEC (2012) used a net export profile that was the difference between the NSLP and a typical solar production profile.

It is clear from Figure 4.1 that, for a given household, net solar PV exports will usually occur in a narrower band of the day than the overall output of the solar PV unit. In the example shown, exports only occur between approximately 10am and 3pm, whereas a solar PV unit typically produces electricity from 7am to 6pm. However, all households will be different. Households with greater generating capacity relative to consumption will produce power over a wider period of the day. Households with east-facing or west-facing panels would be likely to export electricity during an earlier or later period. There will be wide variation among individual household consumption profiles. Because of this heterogeneity, the aggregate solar PV export profile of all small embedded generators will not be the same as the difference between the average consumption profile and the average solar PV production profile. It will be a wider and flatter profile.

Figure 4.1: Example Electricity Use Profiles*



Source: (IPART 2012, 35). * Average consumption and solar PV generation patterns of residential consumers in NSW with north-facing solar units of 2 kW capacity over a typical single day.

The Commission has considered several methods to estimate the aggregate profile of net exports. The use of the NSLP is not suitable for Victoria because it does not correspond to either the retailer avoided cost or the system-wide benefit (which are equivalent in this market). The aggregate profile of net exports is required, but this information is not available for Victoria and therefore a profile needs to be adopted that provides the best approximation to that profile.

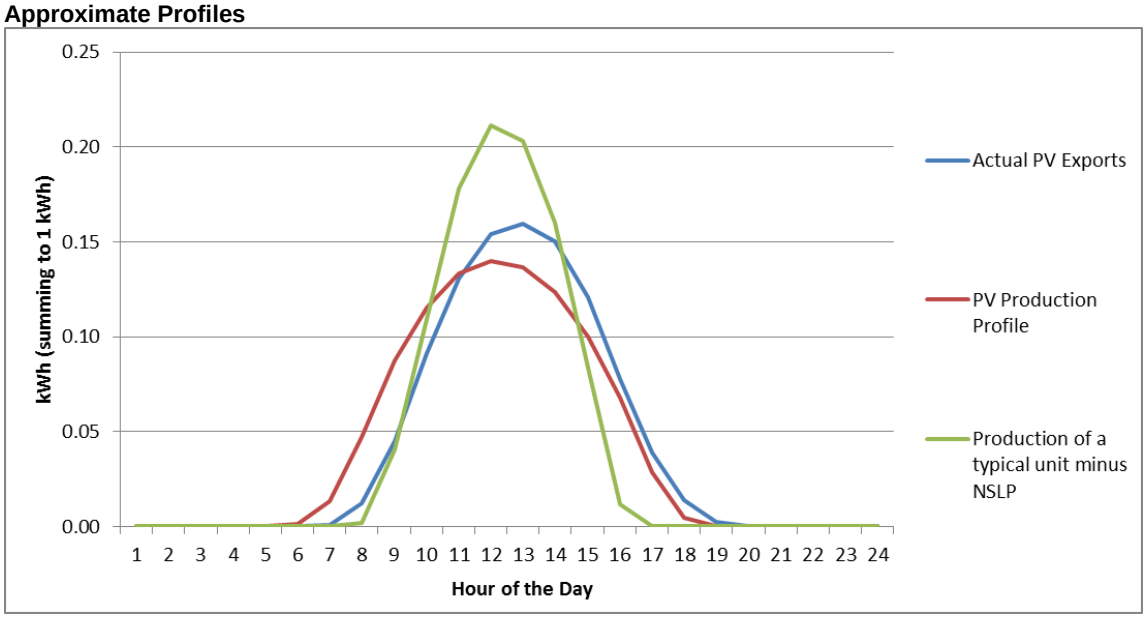
The remaining two available methods of approximating the net export profile are:

(a) estimating the value of exported PV output based on the consumption and output generation characteristics of a typical residential solar customer.

(b) using the solar production profile to reflect the aggregate net export profile.

These two methods have been compared using data for Sydney, where 2011-12 data collected by IPART for actual household PV net export profiles is available on a half-hourly basis. The Commission has compared the actual aggregate solar net export profile for Sydney against method (a) and method (b) using Sydney data. This comparison is shown in Figure 4.2.

Figure 4.2: Actual Solar Net Export Profile Ausgrid Network NSW – Comparison with Approximate Profiles



Data source: Ausgrid data provided to IPART, and the Commission's analysis of that data. Solar production profiles from AEMO and ROAM Consulting. Each profile is normalised to total 1 kWh over the day shown. Note, however, that the profiles for Victoria used by the Commission in its analysis sum to 1 kWh over a whole year.

The comparison shows that the actual solar PV net export profile is not confined to as narrow a period as the profile that is derived using method (a) — that is, the typical solar production profile for Sydney (assuming a 2.5 kW capacity unit) minus the average consumer consumption profile (the NSLP). That was essentially the method used by VCEC for Victoria. Figure 4.2 shows that method (b) — that is, the typical Sydney solar production profile — provides a closer approximation to the actual aggregate solar net export profile, particularly in the afternoon period when electricity prices tend to be higher. As mentioned, this result is due to the heterogeneity of both the solar production units and the household consumption patterns among embedded generators. The Commission has therefore used method (b) — the solar production profile — to approximate the aggregate solar net export profile to determine the FiT for 2014.

Specifically, the Commission has used a time series for the electricity production of a typical solar PV installation in Melbourne with a capacity of 1 kW in half-hourly periods from July 2003 to June 2012 provided by AEMO and ROAM Consulting. For each ordered half hour period of the year, the eight-year average of the solar production for that period has been calculated. The resulting average solar production profile (the

'weather-normalised solar production profile') is used in the Commission's analysis to weight the spot prices for the purposes of calculating the FiT.

The Commission received one submission related to this approach. EnergyAustralia queried why the Commission does not have actual profile data for electricity net exports for Victorian small embedded generators, since most Victorian customers have interval meters (EnergyAustralia 2013, 2). The reason is simply due to limitations of time to gather such data, given that the relevant provisions of the *Energy Legislation Amendment (Feed-in Tariffs and Other Matters) Act 2013* (Vic) commenced on 10 July 2013, and the Commission has until 31 August 2013 to make its final determination. However, in future years the Commission will gather the data for Victoria mentioned by EnergyAustralia.

4.2.2 Line losses

By reducing line losses, embedded generation can reduce the amount of electricity that a retailer has to buy at the transmission node because extra electricity is available within the network to be used by another customer (ESCOSA 2012, 35). Line losses are taken into account in pricing by applying loss factors to the wholesale price of electricity and applying this uplifted price to the quantity of electricity transmitted and distributed through the network (AEMO 2012c, 22–25). The cost of line losses is the amount of the uplift, and there will be avoided costs if embedded generation reduces the uplift. Transmission line losses are already factored into the Regional Reference Prices reported by AEMO, so it is not necessary to take these into account separately.

In consultations in other jurisdictions, some stakeholders have suggested that the effects of embedded generation in reducing distribution network line losses cannot be accurately quantified, and should not be included in the FiT (QCA 2012, 24). ESCOSA used the average distribution network loss factors to approximate the marginal benefits of embedded generation in terms of reducing network losses (ESCOSA 2012, 36). A similar approach has been adopted by IPART (2012, 58) and QCA (2013a, 26–27). The Commission adopted this approach in its draft decision.

An alternative approach would be to rely on empirical information from trials that have quantified typical savings in distribution losses. Although there has been some analysis of this kind (see: ENA 2011), in the Commission's assessment further analysis would be required before it could be relied on for setting the FiT rate.

The Commission has decided to use the AEMO average distribution loss factors (DLF), as have other regulators. The Commission has calculated an average DLF for Victoria of 1.06 using a representative DLF for each of the five distribution zones, and using customer numbers in each zone to calculate the weighted average.[24]

EnergyAustralia noted in its submission that "the method used by the Commission to calculate losses is appropriate" (EnergyAustralia 2013, 3).

4.3 Value of embedded generation

In mathematical terms, the methodology for calculating the FiT rate for the period 1 January 2014 to 31 December 2014 can be summarised as follows:

$$FiT = DLF \sum_{h=1}^{17520} w_h p_h$$

Where:

- DLF is the average distribution loss factor
- *h* = 1 … 17520 is an indicator for the ordered half-hourly periods over a non-leap year
- w_h is the weather-normalised solar PV production profile expressed as weights with $\sum w_h = 1$ (kWh), and
- p_h is the forecast electricity spot price in each half-hour period of 2014, expressed in c/kWh. The forecast spot price was produced by ACIL-Allen.

Table 4.2 shows the results of this method of calculating the value of embedded generation for 2014. The estimated value of small customer embedded generation is 7.6 cents per kWh. This can be decomposed into the wholesale energy value of 7.2 c/kWh, and the uplift that is due to the DLF which is estimated to be 0.4 c/kWh.

[24] The representative DLFs are those published by AEMO for the short sub-transmission systems in each zone, and specifically the DLF E, which is the distribution loss factor applied to a second tier customer or market customer connected to a low voltage line at 240/415 V.

Table 4.2: Value of Embedded Generation

Avoided Cost	Contributions to FiT Rate (cents per kWh)
Wholesale energy value (incl. transmission line losses)	7.2
Distribution line losses	0.4
Total	**7.6**

The resulting estimate is broadly consistent with that reached by VCEC in 2012. Two counterbalancing factors have produced this result. Firstly, the forecast for Victorian electricity spot market prices prepared by ACIL-Allen is on average lower than the forecast it produced in 2012. This appears to be due to a combination of reduced electricity demand per household, and the sensitivity of spot prices to demand at certain times, particularly with regard to the number of days when prices are forecast to be above $300/MWh. The second factor is the different profiles used by the Commission for weighting spot market prices compared to the method used by VCEC. Under the method used by the Commission, more weight is given to afternoon periods when spot market prices tend to be higher, resulting in a higher average energy value overall.

The Commission's estimate is similar to the FiT recently recommended for Queensland by the QCA of 7.55 c/kWh (QCA 2013b), and lower than ESCOSA's determination for the South Australian FiT of 9.8 c/kWh. Although there are methodological differences which prevent direct comparison, the higher FiT in South Australia is consistent with higher electricity spot market prices compared to Victoria. Over the period from 2004-05 to 2011-12, the average electricity spot price in South Australia was $59/MWh, compared to $41/MWh in Victoria (AER 2012, 44).

4.4 Determining the Feed-in Tariff rate – responses and discussion

In its draft decision the Commission noted that the estimated value of small embedded generation exports of 7.6 c/kWh for 2014 is broadly consistent with the prevailing FiT rate of 8.0 c/kWh. Given the sensitivity of the estimated FiT to forecast electricity spot prices, which are in turn sensitive to demand forecasts, the Commission concluded that it would be appropriate to retain the prevailing FiT rate, rather than to make a minor change.

Several submissions, including those from Origin Energy and the ESAA, questioned why the Commission's proposed minimum FiT of 8.0 c/kWh was rounded up from the estimated value of embedded generation of 7.6 c/kWh. Although Origin noted "the uncertainty inherent in forecasting the wholesale value of electricity", it felt that this rounding "would appear to contravene the conservative approach that the determination of a minimum FiT might call for" (Origin Energy Retail 2013, 1). Similarly, the ESAA suggested that the FiT "should be set on the lower side of the Commission's estimate of the value of exported energy" (ESAA 2013, 2). Lumo and the ERAA both suggested that the rate of 7.6 c/kWh would avoid cross-subsidies between consumers, but a rate of 8.0 c/kWh would not.

EnergyAustralia described the rounding as "unusual", but was:

> *not totally opposed to rounding of the minimum FiT, particularly where this would help provide better continuity for customers and help us avoid the need to update our systems. However, we would like to see further analysis on the need for rounding and the direction of rounding. (EnergyAustralia 2013, 3)*

The reason given for the rounding by the Commission in its draft decision was its preference to retain the current FiT rate rather than make a small change given there is some uncertainty surrounding the estimated value of embedded generation. There is regulatory precedent for similar reasoning in ESCOSA's 2013 decision on the South Australian FiT. The estimated value of embedded generation of 9.3 c/kWh was not considered by ESCOSA to be materially different to the prevailing rate of 9.8 c/kWh and ESCOSA chose to retain the prevailing rate (ESCOSA 2013, 36). ESCOSA's main reasons, namely to avoid unnecessary administrative costs and to enhance certainty for embedded generators, were consistent with the views expressed by EnergyAustralia as part of the Commission's review (quoted above). While the Commission fully supports the view that the minimum FiT should be determined using sound methodology that can be reproduced in subsequent processes, there is merit in avoiding minor changes to the minimum FiT in order to avoid unnecessary administrative costs and provide a greater degree of stability for embedded generators.

It remains to assess the argument presented by some retailer bodies that the Commission should choose the minimum FiT from the lower end of the plausible range of estimates (which from their perspective is a "conservative" rate). It needs to be emphasised here that the methodology adopted by the Commission to derive the estimates of the value of embedded generation, which includes only those avoided costs for which strong grounds have been made out for inclusion and that can be

adequately quantified, builds into the analysis a considerable amount of conservatism. Once the estimates are derived there is a judgment to be made about the appropriate minimum FiT that retailers should pay small embedded generators. The question is whether the Commission's preferred retention of the current FiT rate appropriately follows relevant principles.

We find little support for the retailers' claim that the FiT to be determined by the Commission should be "conservative", meaning that it should be chosen from the lower parts of the reasonable range of estimates. The principle adopted by COAG is that market participants should be required to pay for exported power at a price *at least* equal to the value of that energy (COAG 2008). VCEC's 2012 assessment of the efficient and fair value of solar PV exports for 2013 was "at a minimum, in the range of 6 to 8 cents per kWh" (VCEC 2012, XXI). Notably, the upper end of this range was the estimate chosen by the Victorian Government for the minimum FiT to apply in 2013. These observations do not support the contention that the minimum FiT should be chosen from the lower side of the range of likely values. The minimum FiT can be chosen from the upper part of the range of reasonable estimates.

These considerations support the Commission's view that it is appropriate to adopt the minimum FiT rate of 8.0 c/kWh for 2014 having regard to the benefits of stability and minimising administrative costs.

The Commission's final decision is to set a minimum feed-in tariff rate of 8.0 c/kWh for the period 1 January 2014 to 31 December 2014.

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