

# Minimum Feed-in Tariff rates to apply from 1 July 2024

Draft decision

22 November 2023

## **Acknowledgement**

We acknowledge the Traditional Owners of the lands and waterways on which we work and live.

We acknowledge all Aboriginal and Torres Strait Islander communities and pay our respects to Elders past and present.

As the First Peoples of this land, belonging to the world's oldest living cultures, we recognise and value their knowledge, and ongoing role in shaping and enriching the story of Victoria.

### **An appropriate citation for this paper is:**

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Draft decision, 22 November

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# Summary

- Our draft decision is to set the flat minimum feed-in tariff for the 2024–25 financial year at 3.3 cents per kWh.
- Our draft decision sets time-varying minimum feed-in tariffs at rates ranging from 2.1 to 8.8 cents per kWh.
- The proposed minimum feed-in tariffs are lower because solar weighted wholesale electricity prices are forecast to be lower in the 2024–25 financial year – especially at the times when solar customers export most of their power to the grid.
- We will update our cost forecasts when we make our final decision. As wholesale electricity contract prices will change, the minimum feed-in tariffs in our final decision are likely to be different to those in this draft decision.
- Retailers can offer the flat feed-in tariff and/or time-varying feed-in tariffs. Retailers cannot offer feed-in tariff rates below the minimum rates, but they can offer more than the minimum.

## The feed-in tariff is paid to customers for their energy exports

Retailers with a minimum of 5,000 customers must pay eligible customers at least the minimum feed-in tariff when those customers export energy into the grid. Eligible customers are those who have a generation facility with total output at the connection point of less than 30 megawatts.<sup>1</sup>

For simplicity, this decision refers to eligible customers as solar customers. Roof-top solar accounts for 99.9 per cent of small-scale renewable energy generation in Victoria.<sup>2</sup>

This draft decision includes flat and time-varying feed-in tariffs:

- customers on the flat feed-in tariff are paid the same rate per kWh for their exports regardless of when they export energy

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<sup>1</sup> *Electricity Industry Act 2000, s. 40F(1) and clause 13(1) of the General Exemption Order 2017 (as amended) made under s. 17 of the Electricity Industry Act.*

<sup>2</sup> Clean Energy Council, <https://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations#Installation-numbers-for-small-scale-systems-by-stateterritory>, accessed 25 September 2023

- customers on time varying feed-in tariffs receive a different per kWh rate depending on the time of day.

## We must consider certain costs in setting the minimum feed-in tariffs

Solar exports are electricity that is fed back into the grid by retail customers who generate electricity (typically by rooftop solar).

Minimum feed-in tariffs reflect the *value* that solar exports provide to the energy market. This includes the social benefits derived from reducing the pollution associated with fossil fuel electricity generation.

Feed-in tariffs are determined based on cost components set out in the *Electricity Industry Act 2000*.

### Electricity Industry Act

Under the Electricity Industry Act (the Act), when setting the minimum feed-in tariffs, we must have regard to:

- prices in the wholesale market
- avoided transmission and distribution losses
- the avoided social cost of carbon and human health costs attributable to a reduction in air pollution.<sup>3</sup>

While we determine the **minimum** feed-in tariffs, it is electricity retailers who set the feed-in tariffs they pay their customers. **Retailers can pay more than the minimum we set, but they cannot pay less.**

The Act requires us to publish the minimum feed-in tariffs to apply for the coming financial year by 28 February each year.<sup>4</sup>

## We protect the interests of solar and non-solar customers

Under the Essential Services Commission Act 2001 and the Electricity Industry Act, our objectives include the promotion of:

- the long-term interests of Victorian consumers

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<sup>3</sup> Electricity Industry Act 2000, s. 40FBB(3)(a)(b), and (c).

<sup>4</sup> Electricity Industry Act 2000, s. 40FBB(2)(a)

- protections for customers, including in relation to assisting customers who are facing payment difficulties
- development of full retail competition.<sup>5 6</sup>

In setting the minimum feed-in tariff we must consider the long-term interests of both solar and non-solar customers. We do this by setting the minimum feed-in tariffs at a level equal to the value of solar exports.

### The value of solar exports

The value of solar exports is:

- the costs retailers avoid when they receive solar exports and
- the value of avoiding pollution.

Minimum feed-in tariffs above the value of solar exports would result in non-solar customers subsidising solar customers through higher electricity rates.

Retailers must pay at least the minimum feed-in tariffs to their solar customers. Retailers set their own prices for market offers. When costs go up, such as the cost of feed-in tariffs for solar exports, retailers pass these on to customers in their market offers. Customers paying more than needed for electricity would not be consistent with our objectives.

In contrast, if the feed-in tariffs were below the value of the solar exports, solar customers would be subsidising other energy users.

### Feed-in tariffs are forecast to decrease

In setting the minimum feed-in tariffs for financial year 2024–25, we propose to use the same avoided costs approach as our previous tariff reviews. As explained above, this approach forecasts the value of the solar exports using the costs retailers avoid when purchasing customers' exports and adding the value of avoided environmental costs.

The draft flat minimum feed-in tariff for 2024–25 is 3.3 cents per kWh. This is around 33 per cent lower than the flat minimum rate for 2023–24. For the proposed time varying feed-in tariffs for

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<sup>5</sup> Essential Services Commission Act 2001, s. 8.

<sup>6</sup> Electricity Industry Act 2000. s. 10.

2024–25, the rates range between 2.1 and 8.8 cents per kWh which is 17 and 46 per cent lower than the corresponding rates for 2023–24.

The minimum feed-in tariff rates are shown in Table S.1.

**Table S.1: Minimum feed-in tariffs to apply from 1 July 2024, excluding GST<sup>7 8</sup>**

Flat rate (c/kWh)	Time-varying rates (c/kWh)		
	<b>Time-varying tariff option 1</b>		
<b>All times</b>	<b>Overnight</b> Weekdays: 10 pm – 7 am Weekends: 10 pm – 7 am	<b>Day</b> Weekdays: 7 am – 3 pm, 9 pm – 10 pm Weekends: 7 am – 10 pm	<b>Early Evening</b> Weekdays: 3 pm – 9 pm Weekends: n/a
<b>3.3</b>	<b>8.1</b>	<b>2.8</b>	<b>7.3</b>
	<b>Time-varying tariff option 2</b>		
	<b>Shoulder</b>	<b>Off-peak</b>	<b>Peak</b>
	9 pm – 10 am, 2 pm – 4 pm	10 am – 2 pm	4 pm – 9 pm
	<b>4.2</b>	<b>2.1</b>	<b>8.8</b>

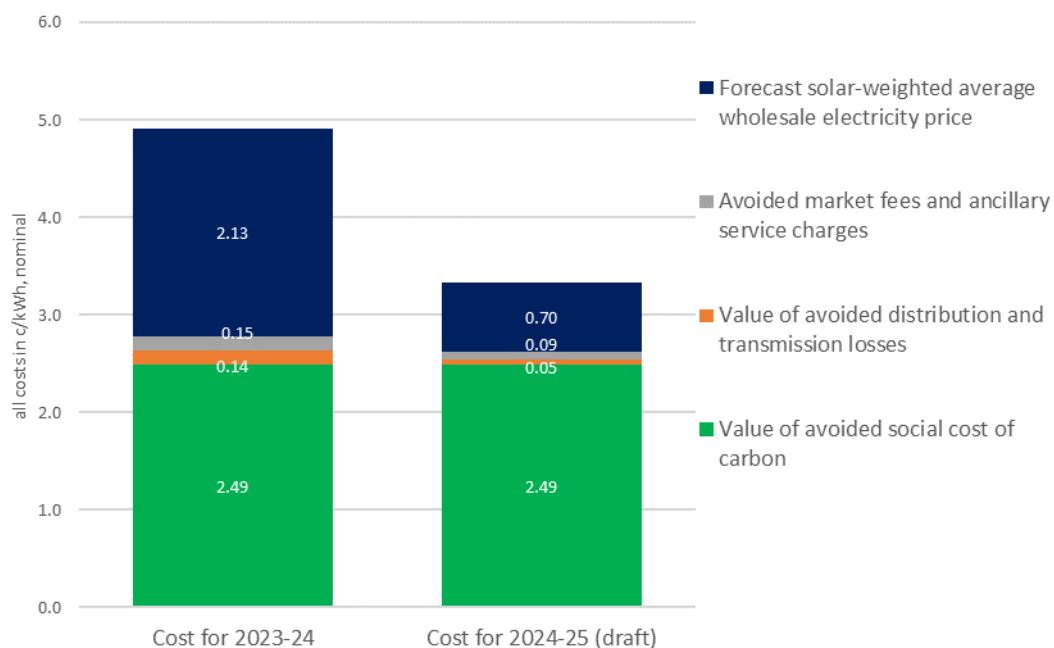
We will update all cost components with the most recent data available, including solar weighted wholesale prices, when we make our final decision in February 2024. Figure S.1 shows how the cost components for the flat feed-in tariffs have changed between our 2023–24 final decision and those proposed in this 2024–25 draft decision.

<sup>7</sup> These tariff periods reflect arrangements in older time varying network tariffs. The periods were set in an Order in Council: Victoria Government Gazette, No S 216, 19 June 2013, Advanced Metering Infrastructure (AMI Tariffs) Order, Schedule, p 9. Accessed 3 October 2023, <http://www.gazette.vic.gov.au/gazette/Gazettes2013/GG2013S216.pdf>

<sup>8</sup> Feed-in tariffs for solar customers registered for GST are subject to GST. Most residential solar owners are not registered for GST. Australian Tax Office, Electricity and Gas Industry Partnerships, accessed 3 October 2023, <https://www.ato.gov.au/law/view/pdf/adhoc-sqml/gstir-electricity-gas-industry.pdf>.



**Figure S.1: Comparison of costs in the flat feed-in tariffs for 2023–24 and 2024–25 (draft)**



### **Solar weighted wholesale prices drive the change in the feed-in tariffs**

The proposed flat minimum feed-in tariff for 2024–25 is 33 per cent lower than the feed-in tariff for 2023–24. This is mostly because solar weighted wholesale prices are forecast to decrease. This is driven by the growth in solar installations which is leading to higher supply of, and lower demand for, electricity during daylight hours.

Night-time wholesale electricity spot prices are higher than daytime prices. But night-time solar weighted wholesale electricity prices are nevertheless forecast to decrease in 2024–25. This leads to our proposed early evening and overnight feed-in tariff rates also being lower than their equivalents in 2023–24.

We use solar weighted wholesale prices to determine minimum feed-in tariffs. This means that spot prices when solar exports are high, contribute more to our wholesale price benchmarks. The spot prices when solar exports are low, contribute less.

Average wholesale spot prices (without solar weighting) are strongly influenced by peak spot prices during the early evening. As nearly all solar exports occur during the day, solar weighted wholesale prices best reflect the value of the solar exports.

## Solar weighted wholesale prices are decreasing

During the day, solar panels on rooftops generate electricity. Households use what they can and export the rest.

With the increasing number of solar installations in Victoria, more electricity is now being exported to the grid. At the same time, daytime demand is falling because as people leave their houses, household consumption falls, and more electricity is exported to the grid.

The wholesale spot price, which is set by supply and demand in the national electricity market, varies according to the time of day: when there is low demand, generators are willing to accept a lower price for their electricity.

This has reduced the wholesale spot price of electricity during daylight hours when most solar exports take place. As the solar weighted wholesale price is a major component of the feed-in tariff (solar customers mostly generate and get paid for daytime exports), the flat feed-in tariff has declined.

In contrast, in the evenings (as people are returning home and solar exports decline due to less sunlight) there is an increase in electricity demand and the wholesale spot price increases. This is why the peak, early evening, shoulder and overnight time varying feed-in tariff blocks are higher than the daytime periods.

However, each of the proposed minimum feed-in tariff rates are lower in 2024–25 than the 2023 – 24 rates. This is because solar weighted wholesale prices are forecast to be lower for all parts of the day in 2024–25 than prices have and will be in 2023–24. This reflects market expectations that wholesale spot prices will be lower on average for all parts of the day in the next financial year.

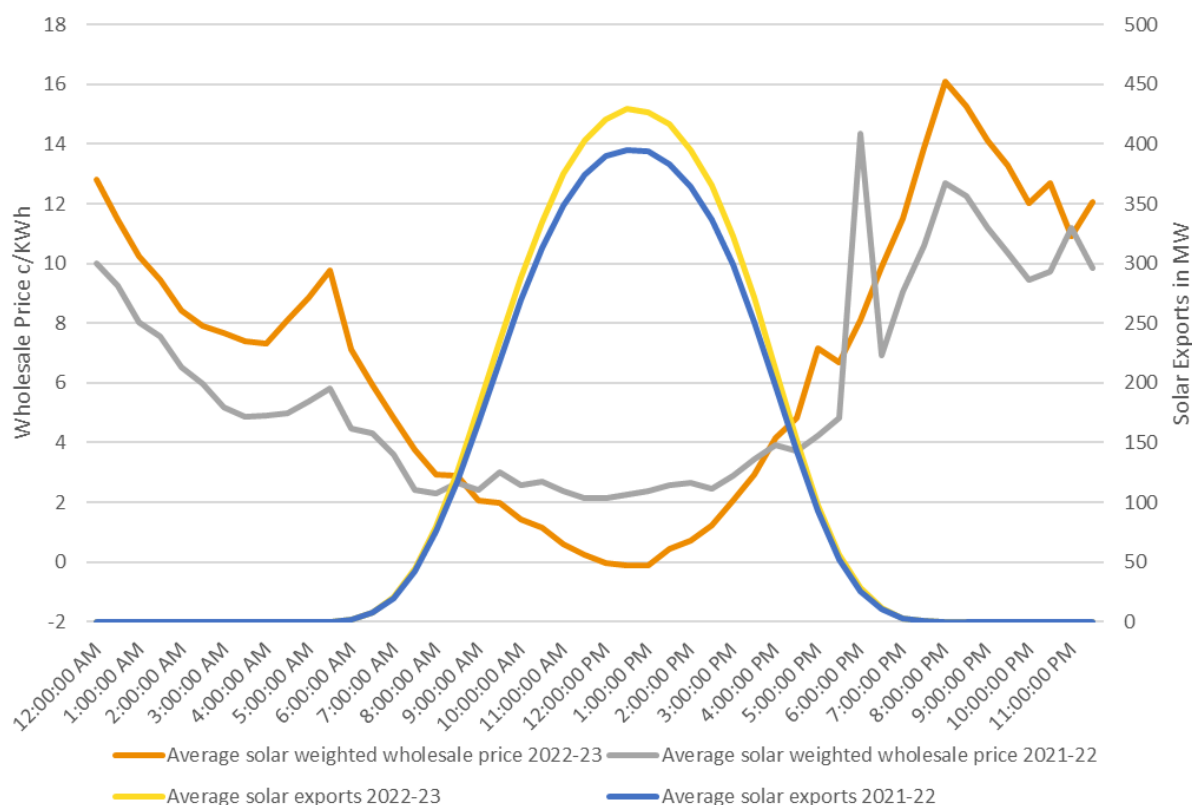
We will update our solar weighted wholesale price forecasts in February when we must make our final decision for the minimum feed-in tariffs to apply in the 2024–25 financial year.

The relationship between solar weighted wholesale prices and total solar exports is shown in Figure S.2 below. Frontier Economics' report on wholesale electricity prices contains further details.<sup>9</sup>

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<sup>9</sup> Frontier Economics, *Wholesale price forecasts for calculating minimum feed-in tariff: Draft report for the Essential Services Commission*, October 2023, chapter 4.

**Figure S.2: Average solar weighted prices and solar exports across the day**



## Electricity generators and retailers have different costs

Solar customers are electricity generators. They are not electricity retailers.

Retailers must purchase enough energy to cover all their customers’ electricity consumption across the day. This means they are buying smaller amounts of low-priced daytime electricity and larger volumes of higher priced electricity at night.

Despite fluctuations in the wholesale spot price, retailers generally charge their customers a flat price across the day, regardless of the wholesale spot price at the time. By pricing in this way, retailers shield their customers from the peaks and volatility of the wholesale market.

Along with purchasing electricity from the wholesale market on behalf of their customers across the entire day, retailers also incur extra costs.

These extra costs include:

- hedging energy risks
- transporting electricity
- environmental obligations
- regulatory obligations

### Summary

- corporate overheads.

It would not be appropriate to compensate solar customers for value they do not provide when exporting electricity to the grid. Solar customers do not incur ongoing regulatory or environmental costs, billing systems, or hedging costs for their solar panels. These extra costs retailers face mean that the minimum feed-in tariffs will always be lower than retail tariffs.

## **Solar's main benefit is avoiding retail electricity prices**

While each customer is different, the main financial benefit for solar customers is the savings to their electricity bills from using the electricity they generate to avoid paying retail rates for electricity. Therefore, customers should install a solar system that best aligns with their own consumption and not necessarily rely on exports.

The feed-in tariffs provide a financial benefit to solar customers when they export unused electricity. But generally solar customers receive greater savings when they self-consume the electricity they generate. Your bill does not measure how much power you *did not buy*, the savings from your solar panels may not be obvious from your bill.

Because self-consumption provides savings, the payback period on your solar system should also account for these avoided retail costs. It is critical to include these savings as most customers will save more by using what they produce than they would receive from the feed-in tariffs.

For customers to maximise the return on their investment, it is best to install a system that roughly matches your daytime electricity requirements and not significantly more. If you connect a system which far exceeds your daily usage the return per kilowatt installed will be relatively low, and your payback period longer.

Return on investment can also be increased if solar customers can shift some of their electricity demand to when their solar systems are operating (for example by running washing machines or hot water systems during the day instead of at night). That way solar customers further reduce the amount of electricity they buy from their retailers.

## **We want to hear your views on our draft decision.**

We are specifically seeking feedback on whether there are potential updates or changes that could be made to our proposed methodology.

Submissions should be made by **5pm, 22 December 2023**. We may not be able to consider suggestions made in submissions received after this date.

Go to Engage Victoria's website to make a submission: [www.engage.vic.gov.au](http://www.engage.vic.gov.au).

If the deadline for making submissions, or method for making a submission, presents difficulties, please email us at [fitreview@esc.vic.gov.au](mailto:fitreview@esc.vic.gov.au) to discuss other options for making a submission.

**Table S.2: Review timeline**

<b>Review Milestone</b>	<b>Date</b>
Submissions on draft decision close	22 December 2023
Final decision and determination	By 28 February 2024
Minimum feed-in tariff 2024–25 takes effect	1 July 2024

### **Sensitive or confidential information**

Submissions will be made available on our website, except for any information that is commercially sensitive or confidential. Submissions should clearly identify which information is sensitive or confidential.

# Our minimum feed-in tariff draft decision

Our draft decision is to set three minimum feed-in tariffs for financial year 2024–25. These are:

- a flat minimum feed-in tariff and
- two time-varying minimum feed-in tariff options.

Solar customers with a flat feed-in tariff get paid the same amount regardless of the time of day or day of the week. Solar customers with time-varying feed-in tariffs get paid different amounts at different times of the day.

## The proposed flat minimum feed-in tariff is lower

The proposed flat minimum feed-in tariff for 2024–25 is 3.3 cents per kWh. The flat minimum feed-in tariff for 2023–24 was 4.9 cents per kWh.

Solar weighted electricity prices are forecast to be lower in 2024–25, especially during daylight hours. The growing number of solar installations have caused lower daytime prices by adding to the supply of and reducing the demand for electricity during the day. The flat minimum feed-in tariff reflects these lower solar weighted wholesale prices.<sup>10</sup>

**Table 1.1: Flat minimum feed-in tariff 2024–25 (cents per kWh)**

Tariff	Flat rate to apply at all times
Minimum feed-in tariff	3.3

## The proposed two time-varying minimum feed-in tariffs are lower

Tables 1.2 and 1.3 set out the proposed time-varying minimum feed-in tariff rates for 2024–25 and the time blocks for when they apply. Retailers that choose these time blocks must offer at least the minimum rates that apply but are free to offer higher rates.

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<sup>10</sup> Frontier Economics, *Wholesale price forecasts for calculating minimum feed-in tariff: Draft report for the Essential Services Commission*, October 2023, chapter 5.

**Table 1.2: Time-varying minimum feed-in tariffs 2024–25: option one (cents per kWh)**

Time block	Overnight	Day	Early Evening
Minimum feed-in tariff	8.1	2.8	7.3
Time period weekdays	10 pm – 7 am	7 am – 3 pm, 9 pm – 10 pm	3 pm – 9 pm
Time period weekends	10 pm – 7 am	7 am – 10 pm	n/a

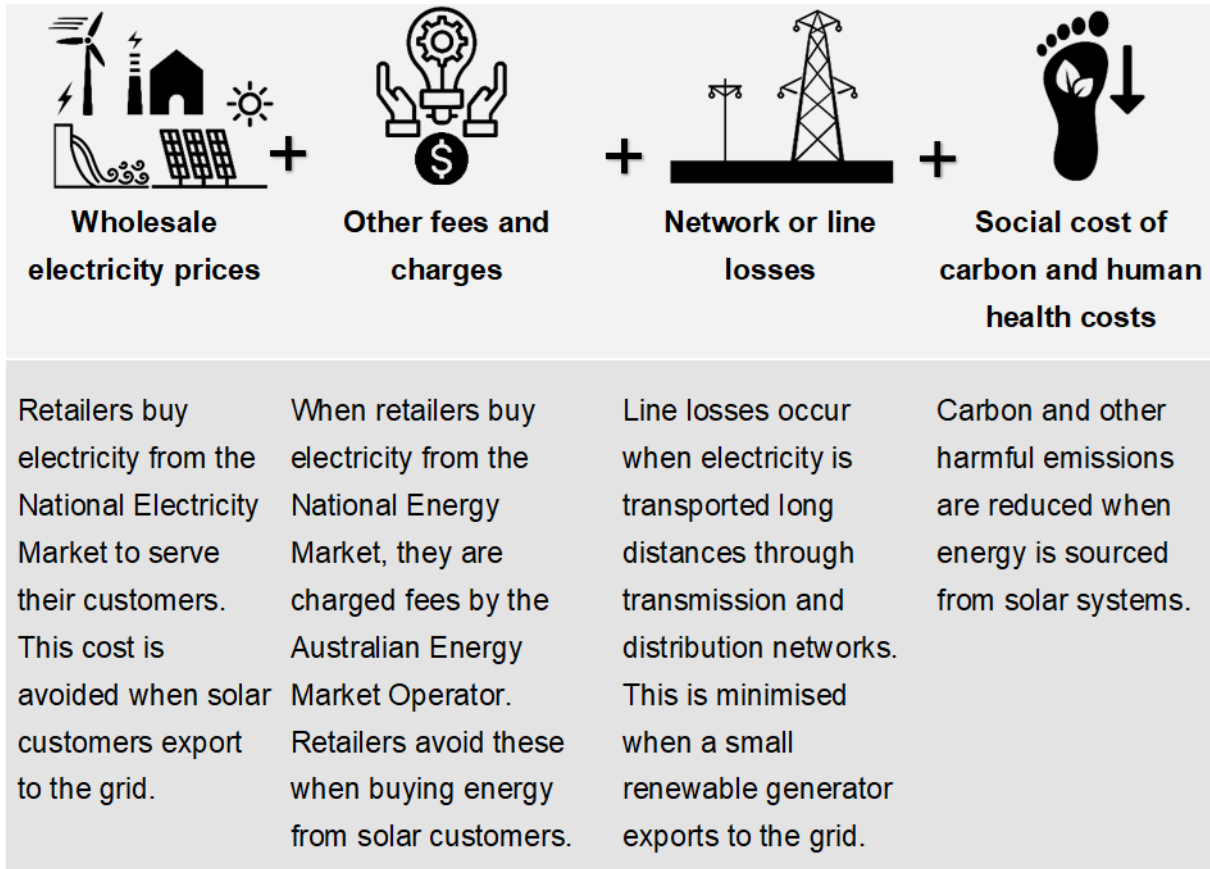
**Table 1.3: Time-varying minimum feed-in tariffs 2024-25: option two (cents per kWh)**

Time block	Shoulder	Off Peak	Peak
Minimum feed-in tariff	4.2	2.1	8.8
Applicable period every day	2 pm – 4 pm, 9 pm – 10 am	10 am – 2 pm	4 pm – 9 pm

# How we set the minimum feed-in tariffs

Figure 2.1 outlines the costs included in the minimum feed-in tariff calculations. The Electricity Industry Act requires that we have regard to these costs when setting the minimum feed-in tariffs.<sup>11</sup>

**Figure 2.1: Costs we must have regard to in setting the minimum feed-in tariff**



## We must consider certain costs in setting minimum feed-in tariffs

The minimum feed-in tariff is an estimate of what a retailer would pay if they bought electricity from the national electricity market (plus payment for the benefits of renewable energy) instead of receiving solar exports.

<sup>11</sup> *Electricity Industry Act 2000*, s. 40FBB(3)



When solar customers export electricity into the grid, they become electricity generators. Retailers pay generators the wholesale spot price of electricity. When we set the minimum feed-in tariffs, we start with prices in the National Electricity Market. These prices are determined in a competitive market through the supply of and demand for electricity. We then add:

- the costs of avoided market fees
- energy saved by not transporting power long distances
- the avoided social cost of carbon and human health costs attributable to air pollution.

This is the same approach we have used in previous feed-in tariff reviews. After careful consideration we still consider this to be the most appropriate method.

These costs are explained in more detail in the following chapter.

## **The steps for setting the minimum feed-in tariffs**

In line with previous years, we have used the following process to determine the minimum feed-in tariffs and account for the factors outlined in Figure 2.1:

- Develop a forecast of solar weighted wholesale electricity prices to reflect market expectations for 2024–25:
  - For the flat minimum feed-in tariff, we forecast solar weighted wholesale electricity prices by weighting forecast spot prices by the share of solar exports that take place during the relevant time intervals.
  - For the time-varying minimum feed-in tariffs we forecast solar weighted wholesale electricity prices by weighting forecast spot prices by the share of solar exports that take place during the relevant time intervals.
- Add in the benefit of market fees, ancillary service charges and other market operator charges retailers avoid when they get electricity from solar customers instead of the wholesale market.
- Increase the resulting values to account for energy saved by not transporting the energy long distances from large scale generators (transmission and distribution losses).
- Add the avoided social cost of carbon and human health costs attributable to air pollution.

## The wholesale value of solar energy

When retailers get energy from solar customers, they avoid buying electricity from the wholesale market. So, calculating the minimum feed-in tariff for the upcoming financial year requires that we estimate the solar weighted wholesale price of electricity in the National Electricity Market.

We have used a futures market approach to forecast wholesale spot prices. The market's expectation of what average wholesale spot prices will be in 2024–25 is best represented by Victorian baseload swap futures contracts that are traded on the Australian Securities Exchange.<sup>12</sup>

The prices in the futures market reflect retailers' and generators' expectations for wholesale electricity prices.

A futures market approach to forecasting wholesale spot prices is the same approach we have used in past decisions and is the same we use to forecast spot prices in our Victorian Default Offer decisions.<sup>13</sup> However, there are some differences between our wholesale benchmarks for the Victorian Default Offer and the minimum feed-in tariffs.

The wholesale benchmark in the Victorian Default Offer includes hedging costs. Solar customers do not incur hedging costs and solar exports do not prevent retailers from incurring hedging costs. For this reason we do not include hedging costs in the minimum feed-in tariffs.

In addition to this, we do not solar weight wholesale prices for the Victorian Default Offer. This is because electricity retailers must purchase electricity at all times, even when the sun is not shining. For the minimum feed-in tariff wholesale price benchmarks we do use solar weighted wholesale prices.

### **The solar weighted wholesale costs for the flat minimum feed-in tariff**

Solar panels account for 99.9 per cent of small-scale renewable generation in Victoria.<sup>14</sup>

Unmodified futures prices reflect the average wholesale price for both the day and night and are

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<sup>12</sup> Frontier Economics, *Wholesale price forecasts for calculating minimum feed-in tariff: Draft report for the Essential Services Commission*, October 2023, p. 10.

<sup>13</sup> Essential Services Commission, *Victorian Default Offer to apply from 1 July 2022: Final Decision 24 May 2022*.

<sup>14</sup> Clean Energy Council, Postcode data for small-scale installations, accessed 19 October 2023, <http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations#Installation-numbers-for-small-scale-systems-by-stateterritory>.

therefore not appropriate for setting the feed-in tariffs because most exports from solar panels happen during the day.

To calculate the minimum feed-in tariffs, we need to estimate the average wholesale spot price when electricity from solar panels is being exported: the solar weighted wholesale price.

We estimate the solar weighted wholesale price by ‘weighting’ prices at each price interval by the share of solar exports that happen at that interval. For example, for the flat feed-in tariff, we multiply the wholesale spot price for each half hour wholesale market interval by the amount of solar exports that took place at that price and then divide by the total amount of solar exports for the year. We then add all the results together to find the solar weighted average price for the year. We refer to this process as ‘solar weighting’.

Solar weighting means that prices for electricity when solar panels are not exporting – such as in the evening – have almost no impact on the calculation of the feed-in tariff.<sup>15</sup> Said another way, small scale solar generators do not get paid the wholesale spot price that applies when they are not exporting to the grid. This helps the minimum feed-in tariffs reflect the value consumers get from solar energy exports.

## **We forecast solar weighted wholesale prices for different parts of the day**

Solar weighted wholesale prices vary throughout the day. But distinct patterns are evident. They are generally lower during daylight hours, when there are more solar exports, and higher in the early morning and night times.

To reflect these changes in the solar weighted wholesale price, we have time-varying minimum feed-in tariffs in addition to the flat minimum feed-in tariff. We allow retailers to choose whether to offer customers time-varying feed-in tariffs, a flat tariff or a combination.

We use the same forecast solar weighted wholesale prices to calculate the flat feed-in tariff and time-varying feed-in tariffs.

The flat tariff is based on the overall solar weighted average for all times. However, the time varying feed-in tariffs, are calculated using the solar weighted average wholesale electricity prices for the relevant time periods.

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<sup>15</sup> A very small amount of exports from small-scale renewable generators happen at night (for example from small wind turbines or small batteries). For this reason, some weight is placed on overnight prices, but not very much.

# We account for AEMO fees, charges and line losses

## Market fees and ancillary service charges

When retailers buy energy from the wholesale spot market, they must pay market fees and ancillary service charges to the Australian Energy Market Operator (market operator).<sup>16</sup>

Retailers avoid these fees when they buy electricity from solar customers. These cost savings increase the value of energy produced by solar customers. Including these savings in the value of the feed-in tariff is consistent with the approach we have used in past reviews.

The market operator sets its fees for each year through its annual budgeting process. As with previous decisions, we have used fees published in the most recent Budget and Fees paper (in this case for 2023–24) to derive our best estimate for costs avoided.

The market operator also recovers the cost of providing ancillary services from market participants (retailers) and publishes the recovery rate of ancillary service charges on a weekly basis. As in past years we forecast the cost of ancillary services using the average charges over the last year. For this draft decision we used the period October 2022 to October 2023.

We will update the value of ancillary service charges when we make our final decision. If newer data is available on market fees when we make our final decision, we will update our forecast using that data.

Further details on the calculation of market fees and ancillary services are in Appendix C – Technical methodology.

## Network or line losses

As most energy consumers are far away from where large-scale generators are located. The energy from those generators must travel long distances through the grid (transmission and distribution networks). Some energy is lost when it moves through the grid, and we refer to this as ‘network losses’ or ‘line losses’. The magnitude of network losses depends on the location of the generator and factors like the quality of the line.

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<sup>16</sup> The Australian Energy Market Operator manages electricity and gas systems and markets across Australia. This includes the National Energy Market (NEM), which connects the power systems of Queensland, New South Wales, the Australian Capital Territory, Victoria, South Australia, and Tasmania.

We consider carbon and human health costs

In contrast, energy generated by solar systems is typically close to the point of consumption, so less energy is lost travelling along the grid.

We account for the network losses that retailers avoid when they buy energy from solar customers by using a loss factor which we apply to the (avoided) cost of wholesale energy. This increases the value of wholesale electricity included in the minimum feed-in tariffs.

We have used the market operator's estimates of distribution loss factors and marginal loss factors for 2023–24 to develop a loss factor for Victoria. We also use the actual load volumes on long and short sub-transmission lines for loss factors in the AusNet and Powercor distribution zones. This is the same approach we used for last year's minimum feed-in tariffs. Further details on the calculation of network losses are in Appendix C – Technical methodology.

We will update the value of network losses if more up to date data is available when we are preparing our final decision for release in February 2024.

We consider carbon and human health costs

## We consider carbon and human health costs

Emissions released during gas or coal-fired generation impose a cost by contributing to the greenhouse effect. This cost is often referred to as the cost of carbon. Along with carbon, fossil fuel generation is associated with air pollution (such as particulate matter) which can have a negative impact on human health. It follows that when solar energy is made available to the grid, some of this air pollution is avoided.

These carbon and human health costs are included in the factors we consider when determining the minimum feed-in tariff.<sup>17</sup>

That there is overlap between the avoided human health costs attributable to a reduction in air pollution and the avoided social cost of carbon was noted at the time these avoided costs were introduced into the minimum feed-in tariff.<sup>18</sup>

We have kept the same assumptions for the social cost of carbon and human health costs that we have used in previous decisions.

We note that the Department of Energy, Environment and Climate Action is currently reviewing the methodology specified for determining the avoided social cost of carbon.<sup>19</sup>

### Cost of carbon

The National Electricity Market uses energy generated from a variety of fuel sources and technologies, including:<sup>20</sup>

- coal
- natural gas
- biomass
- wind
- solar

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<sup>17</sup> *Electricity Industry Act 2000*, s. 40FBB(3)

<sup>18</sup> Victorian Government 2016, *Energy Legislation Amendment (Feed-in Tariffs and Improving Safety and Markets) Bill 2016, Explanatory Memorandum*, p. 4.

<sup>19</sup> On 1 January 2023, the Department of Environment, Land, Water and Planning became the Department of Energy, Environment and Climate Action.

<sup>20</sup> Australian Energy Market Operator, Data dashboard: Fuel Mix, <https://www.aemo.com.au/Energy-systems/Electricity/National-Electricity-Market-NEM/Data-NEM/Data-Dashboard-NEM>, accessed 19 October 2023.

We consider carbon and human health costs

- hydro-electric power.

The Victorian Government published an Order in Council in February 2017 specifying a methodology and the factors that we must have regard to when setting the social cost of carbon.<sup>21</sup> We have adopted this methodology for our decision.

The Order in Council methodology gives the avoided social cost of carbon a value of 2.5 cents per kWh. This is the same value as for previous years.

We have added this to the flat feed-in tariff and time-varying feed-in tariffs (See Appendix C – Technical methodology for more details).

## **Human health costs**

The human health costs are the estimated health costs of air pollution (such as particulate matter) associated with fossil fuel powered electricity generation.<sup>22</sup>

There is no Order in Council that specifies a factor or method for determining the avoided human health costs attributable to a reduction in air pollution and there are different methods to estimate these costs.

In past years we have not given a separate valuation of the avoided human health costs. This reflects the fact that there is potential overlap between the social cost of carbon and human health costs. There is also potential overlap between the avoided human health costs and other subsidies for solar customers.

On the basis of the information currently before us, our draft decision is to use the same approach as in previous years.

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<sup>21</sup> *Order specifying a Methodology and Factors for the Determination of the Avoided Social Cost of Carbon 2017* (Vic) made under section 40FBB(3B) of the *Electricity Industry Act 2000*.

<sup>22</sup> Victorian Government 2016, *Energy Legislation Amendment (Feed-in Tariffs and Improving Safety and Markets) Bill 2016, Explanatory Memorandum*, p. 4.

We consider carbon and human health costs

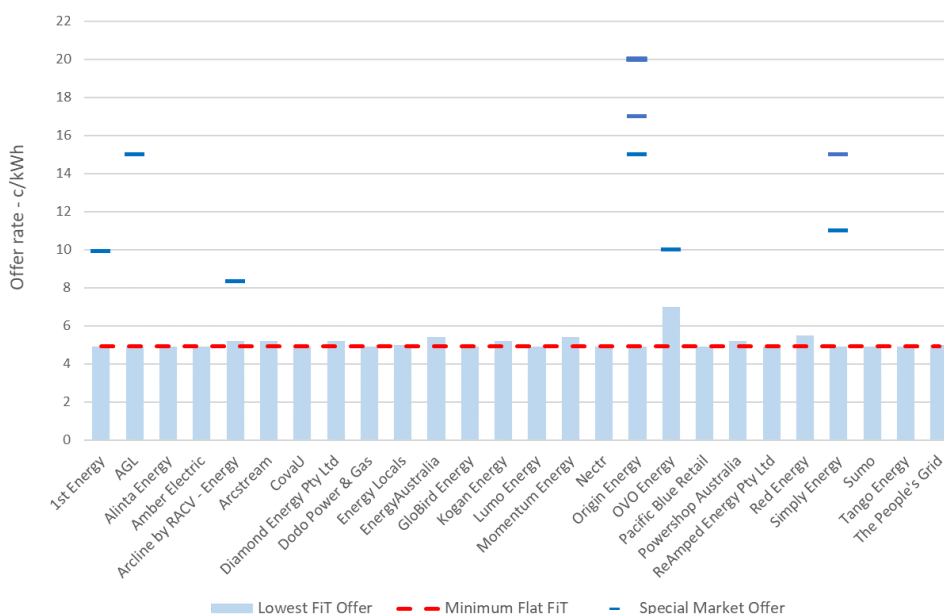
# Appendix A – Feed-in tariffs are decreasing over time

## What feed-in tariff offers are currently in the market?

All Victorian energy retailers with more than 5000 customers are required to provide at least the minimum feed-in tariffs on all offers.<sup>23</sup>

Retailers are free to offer a feed-in tariff above the minimum tariffs we set. Figure A.1 shows the flat feed-in tariffs available in the market as at the end of September 2023.<sup>24</sup>

**Figure A.1 – Residential flat feed-in tariff market offers available in Victoria, September 2023**



Notes: (a) We define market offers with conditions or implied conditions as 'special' market offers. For example, Origin's Solar Boost Plus plan is open to customers who purchase and install new solar system from Origin Energy. If the system is over 7 kW, Origin offers 17 c/kWh; if the system is under 7 kW, Origin offers 20 c/kWh. See details below. (b) Some retailers offered two 'general' feed-in tariff plans, both without additional conditions. For example, Sumo Energy offered a flat rate of 4.9 c/kWh for a single rate plus controlled load plan and a flat rate of 5.2 c/kWh for a single rate plan. We do

<sup>23</sup> The relevant electricity retailer is a person that holds a licence to sell electricity and sells to more than 5000 customers in Victoria. See section 40F *Definitions of the Electricity Industry Act 2000*. Not all Australian states mandate a feed-in tariff.

<sup>24</sup> Publicly available information submitted to the government energy price comparator website Victorian Energy Compare as of 26 September 2023, <https://compare.energy.vic.gov.au/>.



not consider any of these as a 'special' offer. (c) Premium FiTs are not considered special offers: they are offered to an exclusive set of customers.

There were 26 retailers offering flat feed-in tariffs in Victoria. The lowest market rate for each retailer is represented by the light blue columns. Special market offers with higher feed-in tariffs and additional conditions are presented by the dark blue bands. Our research found that 11 energy retailers' lowest flat feed-in tariffs are higher than the current minimum feed-in tariffs.

We found some retailers offer higher feed-in tariffs on certain plans or under special terms and conditions. For example, some retailers will offer customers higher feed-in tariffs if they abide by limits placed on their inverter capacity or follow solar export limits set by the retailer (for example 1st Energy, AGL, Origin).<sup>25</sup>

Several other retailers such as OVO Energy and Simply Energy have offered contractual arrangements to electric vehicle owners that involve a fee for charging their EV overnight in exchange for a higher feed-in tariff for solar exports.

The presence of offers with higher feed-in tariffs illustrates the benefits of shopping around. But customers should carefully consider the net cost of such offers, as higher standing charges and/or prices for electricity imports may offset the benefits of the higher feed-in tariffs.

EnergyAustralia and Globird seem to be the only retailers to currently offer time-varying feed-in tariffs.

## History of feed-in tariffs in Victoria

We note that changing or extending past feed-in tariff incentives and schemes, or any bonus that retailers may offer above the minimum feed-in tariff, is outside the scope of our role to set minimum feed-in tariffs.

The feed-in tariff has developed significantly since it began in 2008. Table A.1 sets out the schemes that pre-date the minimum feed-in tariff.

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<sup>25</sup> 1st Energy - Maximum 10 kW inverter capacity on 1st Solar Bonus plans: [1st Energy Solar Feed-in Tariffs for NSW QLD SA TAS & VIC \(wattever.com.au\), accessed 24 October 2023](#); AGL - Higher FiT on Solar Savers plan is capped to the first 10 kWh per day and limited to PV systems up to 10 kW: [AGL Solar Feed-in Tariffs NSW QLD SA & VIC - WATTeVer, accessed 24 October 2023](#); Origin - Solar Boost Plus - 17 or 20 c/kWh (17 c/kWh for an Origin solar system over 7 kW and 20 c/kWh for an Origin solar system under 7 kW). [See our solar feed-in tariff rates – Origin Energy, accessed 24 October 2023](#)

**Table A.1: Current and closed feed-in tariff schemes since 2008**

Tariff	Minimum rate	Closed to new applicants	Scheme end date
Premium feed-in tariff for solar (PFiT)	60 cents per kWh	29 December 2011	November 2024
Standard feed-in tariff (SFIT)	'One for one', based on the customer's retail electricity rate	31 December 2012	31 December 2016
Transitional feed-in tariff for solar (TFiT)	25 cents per kWh	31 December 2012	31 December 2016
Minimum feed-in tariff	Updated annually (5.2 cents per kWh for 2022–23)	Not closed	No end date

### Premium feed-in tariff

To provide an incentive for households, small businesses and community groups to invest in small-scale solar systems, the government established the premium feed-in tariff. This required retailers to pay a feed-in tariff of at least 60 cents per kWh to premium feed-in tariff customers from late 2009.<sup>26</sup> This scheme closed to new applicants at the end of 2011, although customers that signed up to the premium scheme will remain eligible to receive the premium rate until November 2024.<sup>27</sup>

### Standard feed-in tariff

The state government offered the standard feed-in tariff to customers from January 2008 until it was closed to new applicants at the end of 2012. This tariff was no longer paid from 2016. The standard feed-in tariff provided a 'one-for-one' rate for excess renewable electricity generated by eligible properties across Victoria, based on the retail electricity rate paid by the customer.

### Transitional feed-in tariff

The government replaced the premium feed-in tariff with the transitional feed-in tariff in 2011, which closed to new customers at the end of 2012. This scheme provided customers with a minimum credit of 25 cents per kWh until the scheme ended on 31 December 2016.<sup>28</sup>

<sup>26</sup> *Electricity Industry Act 2000*, s. 40FA

<sup>27</sup> Department of Energy, Environment and Climate Action, Standard feed-in tariff and transitional feed-in tariff, accessed 16 October 2023, <https://www.energy.vic.gov.au/for-households/solar-premium-feed-in-tariff>

<sup>28</sup> *Electricity Industry Act 2000*, s. 40FAB

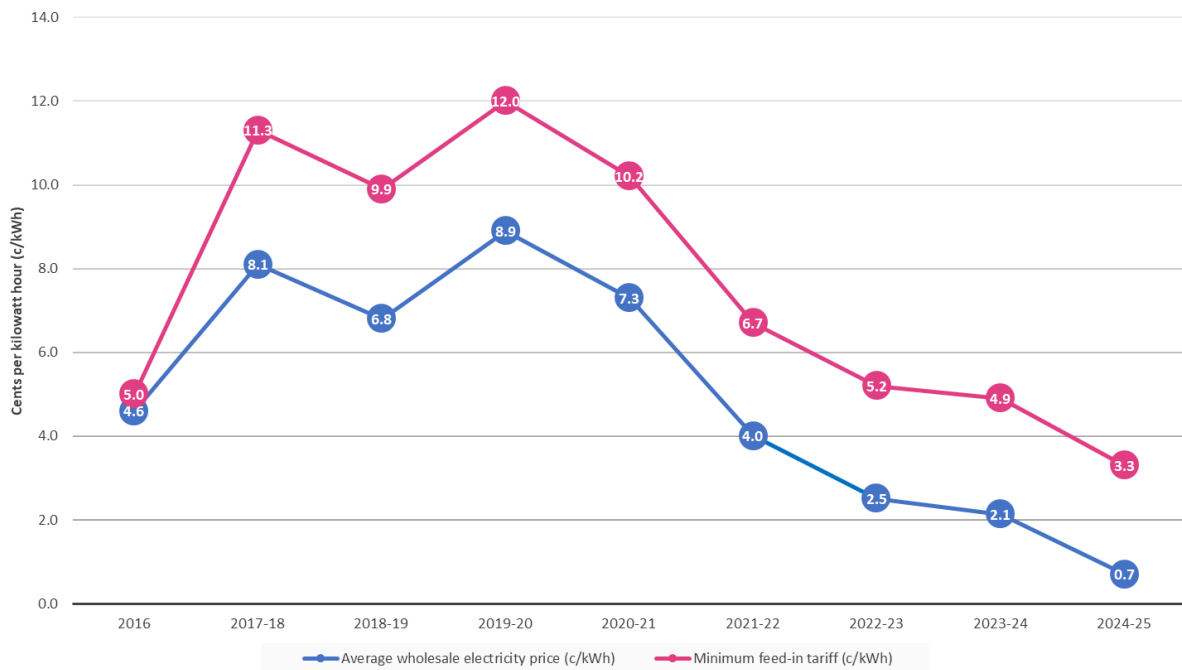
## Minimum feed-in tariff

From 2014, the Essential Services Commission has determined the minimum feed-in tariffs to reflect the factors set out in the Electricity Industry Act. These factors represent the value of solar customers' exports.

The Essential Services Commission updates the minimum feed-in tariffs each year to update for changes in the factors that determine the feed-in tariff. From 2017–18, legislation required that we also consider the social cost of carbon (set at a rate of 2.5 cents per kWh). This caused the forecast wholesale electricity price and the minimum feed-in tariff to diverge.

Figure A.2 shows the change in the minimum feed-in tariff since 2016. Table A.2 shows how all the cost components in the flat minimum feed-in tariff have changed over time.

**Figure A.2 – Comparison of flat feed-in tariffs and wholesale costs 2016 to 2024–25 (draft)**



Appendix A – Feed-in tariffs are decreasing over time

**Table A.2: Flat minimum feed-in tariffs 2016 to 2024–25 (c/kWh)**

<b>Feed-in tariff component</b>	<b>2016</b>	<b>2017 –18</b>	<b>2018 –19</b>	<b>2019 –20</b>	<b>2020 –21</b>	<b>2021 –22</b>	<b>2022 –23</b>	<b>2023 –24</b>	<b>2024–25 proposed</b>
Forecast solar-weighted average wholesale electricity price	4.6	8.1	6.8	8.9	7.3	3.9	2.5	2.1	0.7
Avoided market fees and ancillary service charges	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Value of avoided distribution and transmission losses <sup>29</sup>	0.3	0.6	0.5	0.5	0.3	0.2	0.2	0.1	0.05
Value of avoided social cost of carbon	n/a	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
<b>Feed-in tariff rate</b>	<b>5</b>	<b>11.3</b>	<b>9.9</b>	<b>12.0</b>	<b>10.2</b>	<b>6.7</b>	<b>5.2</b>	<b>4.9</b>	<b>3.3</b>

<sup>29</sup> The value of avoided distribution and transmission losses has declined over time as the value of the wholesale component has declined.

## Appendix B – Feed-in tariffs across Australia

Feed-in tariffs are not regulated in all Australian jurisdictions. South Australia, the Australian Capital Territory, and Southeast Queensland have unregulated feed-in tariffs.

New South Wales does not regulate feed-in tariffs but the Independent Pricing and Regulatory Tribunal (IPART), on request by the NSW government, sets a benchmark range annually as a guide.<sup>30</sup>

In Victoria and Tasmania retailers can offer higher than the regulated rate.<sup>31</sup>

In Western Australia, the Northern Territory and Regional Queensland, a set rate is mandated.<sup>32 33</sup>

Figure B.1 compares the different regulated feed-in tariffs from across Australia.

In Victoria there are two sets of regulated time-varying feed-in tariffs. Western Australia has one. In Figure B.1 we have compared the lowest off-peak rate and the highest peak rate from Victoria to the rates in Western Australia.

Victoria's flat minimum feed-in tariff is currently lower than other regulated flat feed-in tariffs. This is due to a number of reasons. These include:

- some other jurisdictions do not solar weight wholesale prices included in their feed-in tariffs
- some other jurisdictions include wholesale hedging costs in their feed-in tariffs
- in some jurisdictions solar exports are more closely correlated with higher prices due to
  - lower solar penetration and/or
  - warmer climates
- other jurisdictions' wholesale electricity prices tend to be higher.

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<sup>30</sup> Independent Pricing and Regulatory Tribunal, Solar feed tariffs, accessed 12 September 2023, <https://www.ipart.nsw.gov.au/all-day-solar-feed-tariffs>

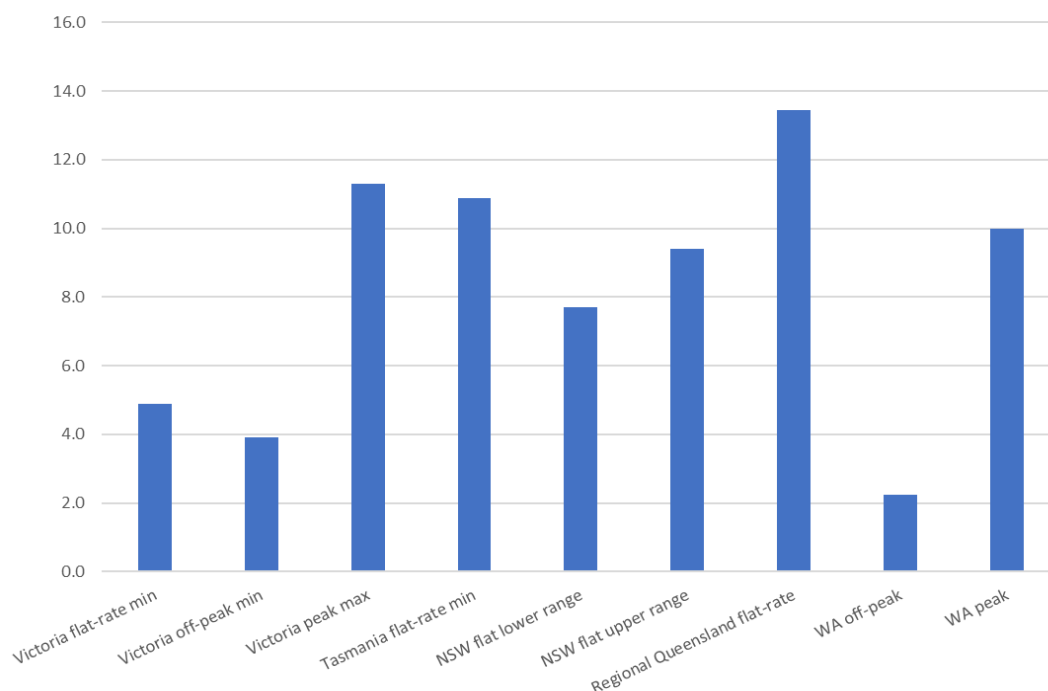
<sup>31</sup> Office of the Tasmania Regulator, Feed-in Tariffs, accessed 12 September 2023, <https://www.economicregulator.tas.gov.au/electricity/pricing/feed-in-tariffs>.

<sup>32</sup> Western Australia Government, Energy Buyback Schemes, accessed 12 September 2023, <https://www.wa.gov.au/organisation/energy-policy-wa/energy-buyback-schemes>.

<sup>33</sup> Northern Territory Government, Changes to Feed in Tariffs, accessed 12 September 2023, [https://industry.nt.gov.au/\\_data/assets/pdf\\_file/0008/811628/changes-to-feed-in-tariffs-fact-sheet.pdf](https://industry.nt.gov.au/_data/assets/pdf_file/0008/811628/changes-to-feed-in-tariffs-fact-sheet.pdf).

<sup>34</sup> Queensland Competition Authority, Regional Queensland solar feed-in tariff 2023-24, accessed 12 September 2023, <https://www.qca.org.au/project/customers/solar-feed-in-tariffs/regional-queensland-solar-feed-in-tariff-2023-24/>.

**Figure B.1 – Regulated feed-in tariff benchmarks across Australia in 2023–24**



### Most states base feed-in tariffs largely on wholesale electricity prices

Different states have slightly different methodologies for calculating their regulated feed-in tariffs, but all set their rates primarily on forecast wholesale electricity prices (see Table B.1).

**Table B.1: Regulated feed-in tariff methodology comparisons in other jurisdictions**

State/Territory	Avoided wholesale electricity costs	Avoided network losses	Avoided ancillary & NEM costs	Avoided carbon and human health costs
Victoria	✓	✓	✓	✓
New South Wales	✓	✓	✓	✗
Queensland (excl. SEQ)	✓	✓	✓	✗
Tasmania	✓	✓	✓	✗

Western Australia	✓	Uncertain	Uncertain	✗
Northern Territory	✓	Uncertain	Uncertain	✗

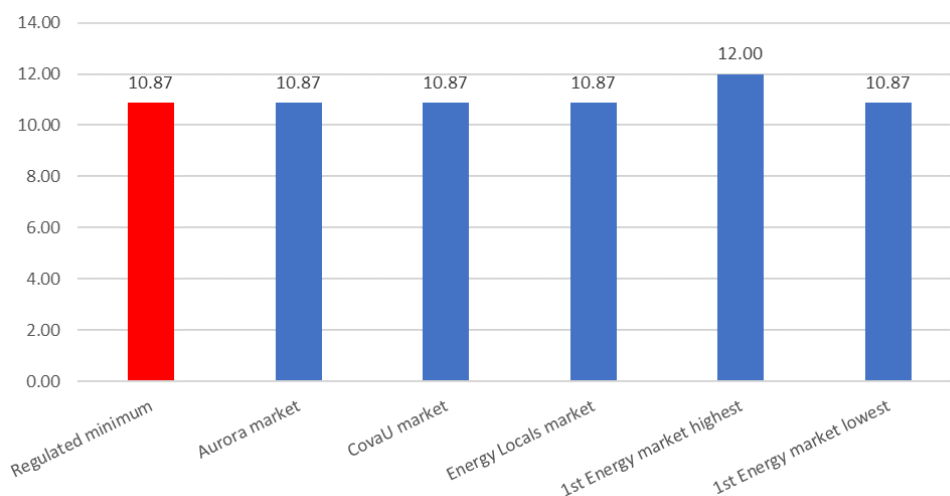
## How do regulated rates compare with market rates?

In Australia, only Tasmania, New South Wales and Victoria have both market rates and regulated benchmarks (noting that regulated feed-in tariffs for rural Queensland are not comparable to market rates for Southeast Queensland). Looking at these states we can see how market rates compare to regulated rates.

### Most market feed-in tariffs are the same as the regulated rate in Tasmania

In Tasmania, most of the small number of retailers in operation only offer feed-in tariffs at the regulated minimum rate except for one retailer. This is similar to what we observe in Victoria, where most retailers only offer the minimum feed-in tariffs.

Figure B.2 – Flat feed-in tariffs in Tasmania in 2023–24 (c/kWh)

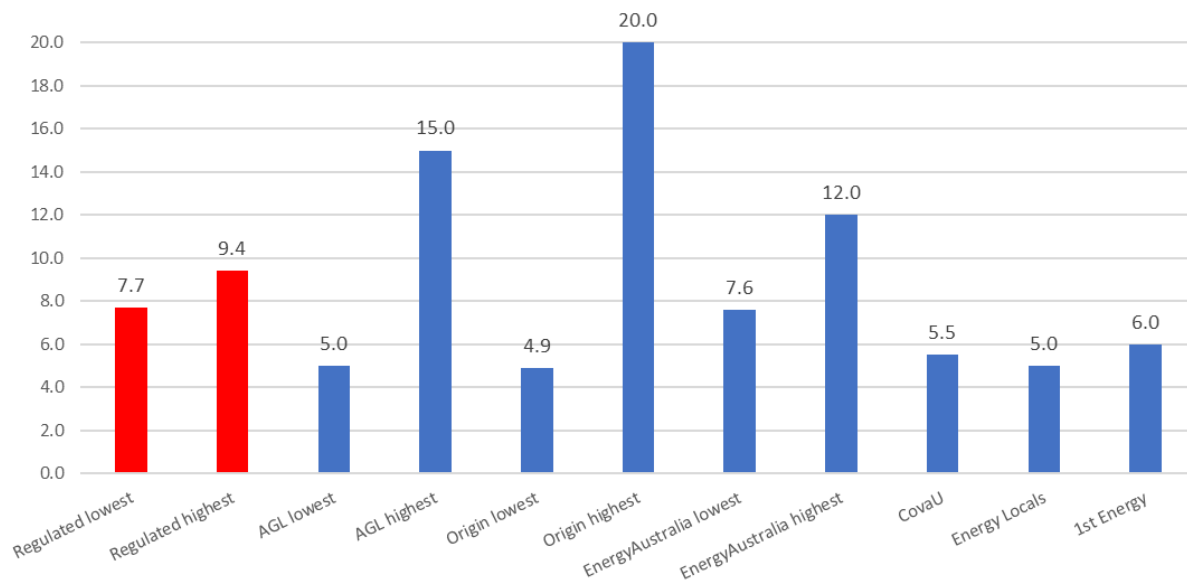


Source: Office of the Tasmania Regulator; comparison website watterver.com.au

### Market feed-in tariffs tend to be below the recommended range in New South Wales

As discussed above, IPART sets a benchmark range for feed-in tariffs. Figure B.3 shows that retailers' offered market rates tend to be outside of this range.

**Figure B.3 – Flat feed-in tariffs in New South Wales in 2023–24 (c/kWh)**



Source: Independent Pricing and Regulatory Tribunal; comparison website [wattver.com.au](http://wattver.com.au)



## Appendix C – Technical methodology

Our approach to determining the minimum feed-in tariffs for 2024–25 is consistent with the approach used to set the minimum feed-in tariffs for 2023–24. The methodology is made up of the steps below:

- Forecast solar weighted wholesale costs: the value of electricity sourced from small scale renewable generators, based on the avoided cost of purchasing an equal amount of electricity from the wholesale market, accounting for price changes throughout the day and seasonally, including:
  - Both flat rate and time-varying rate solar weighted wholesale electricity price forecasts
  - avoided market fees and ancillary service charges.
- Account for electricity lost in transport: increase solar weighted wholesale costs to account for avoided transmission and distribution losses.
- Account for social benefits: add the avoided social cost of carbon and avoided human health costs.

Table C.1 shows how the minimum feed-in tariff is calculated from these components.

**Table C.1: Calculating the minimum feed-in tariff**

Component	Calculation	Flat rate	Time-varying rate option 1			Time-varying rate option 2		
			Overnight	Day	Early evening	Shoulder	Peak	Off peak
<b>A:</b> Solar weighted wholesale electricity prices	Solar export-weighted average price forecast (cents per kWh)	0.70	5.20	0.23	4.48	1.52	5.87	-0.41
<b>B:</b> Avoided market fees and ancillary service charges	Budget National Electricity Market fees for 2023–24 used as a best estimate for 2024–25 + Average of the ancillary service charges recovered from customers between week 40 of 2022 and week 38 of 2023 (cents per kWh)	0.09	0.09	0.09	0.09	0.09	0.09	0.09
<b>C:</b> Transmission and distribution loss adjustment	Multiply overall losses for each distribution business by the share of total customer numbers and sum these then make loss adjustment.	6.35%	6.35%	6.35%	6.35%	6.35%	6.35%	6.35%
<b>D:</b> Value of avoided transmission and distribution losses	Multiply (A + B) by C	0.05	0.34	0.02	0.29	0.10	0.38	-0.02

Component	Calculation	Flat rate	Time-varying rate option 1			Time-varying rate option 2		
			Overnight	Day	Early evening	Shoulder	Peak	Off peak
<b>E: Value of avoided social cost of carbon</b>	Based on the amount specified in the order in council specifying a methodology and factors for the determination of the avoided social cost of carbon.	2.49	2.49	2.49	2.49	2.49	2.49	2.49
<b>F: Value of avoided human health costs</b>	Not accounted for separately for a number of reasons including overlap with social cost of carbon and installation subsidies.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total (rounded to one decimal place)</b>	<b>A + B + D + E + F</b>	<b>3.3</b>	<b>8.1</b>	<b>2.8</b>	<b>7.3</b>	<b>4.2</b>	<b>8.8</b>	<b>2.1</b>

## Forecasting solar weighted wholesale electricity prices

Consistent with previous feed-in tariff decisions, we have used a futures market approach to forecast solar weighted wholesale electricity prices in 2024–25. The benefits of using a futures market approach include:

- ensuring our decision matches the view of ‘the market’ as represented by contract prices
- providing more transparency to stakeholders than a market modelling approach.

It is in the long-term interests of Victorian Consumers to have the benefit of a price that reflects efficient market outcomes. It also promotes competition in the energy industry by creating the right investment incentives.

Transparency of the inputs for analysis is consistent with our objectives to promote protections for customers<sup>35</sup> and to promote the long-term interests of Victorian consumers.<sup>36</sup> Increased transparency gives stakeholders greater opportunities to understand and provide meaningful feedback on our decisions.

### Solar weighted wholesale price forecasts for 2024–25

We engaged Frontier Economics to forecast solar weighted wholesale electricity prices for 2024–25 using a futures market approach. The following section outlines the approach.

<sup>35</sup> *Electricity Industry Act 2000*, s. 10(c).

<sup>36</sup> *Essential Services Commission Act 2001*, s. 8.

Forecasting the solar weighted wholesale electricity price for the flat minimum feed-in tariff involves five steps. The purpose of this is to estimate what retailers would pay for customers' solar exports if this electricity were sold in the wholesale spot market in 2024–25 in the same way as other generators' output. The steps we take to calculate the flat feed-in tariff are as follows:

1. **Calculating the price level for 2024–25.** We use the average price of 2024–25 quarterly baseload future swaps from the Australian Stock Exchange (after adjusting for an assumed contract premium of five per cent) weighted by traded volume across the most recent 12 months up to a particular date (for this draft decision this was 30 September 2023).

Frontier Economics will update these estimates for our February 2024 final decision to reflect market expectations at that point in time. These updates are likely to result in a difference between the estimates contained in our draft and final decisions.

2. **Selecting the appropriate historical prices and export profile.** The commission collected half-hourly actual export data for customers from each Victorian electricity distribution network for the period from 1 July 2022 to 30 June 2023. The most recent data is likely to be the best indicator of solar export profiles in 2024–25. Similarly, corresponding spot price data for the same period is available from the Australian Energy Market Operator.
3. **Calculating the scaling factor 2024–25.** After averaging prices for each quarter for the relevant historical year, they are compared to the quarterly futures prices in step 1 to determine a scaling factor for each quarter.
4. **Apply the scaling factor to the historical prices.** Each half-hourly price in the base year is scaled by the relevant factor calculated in step 3 to forecast the half-hourly prices expected in 2024–25.
5. **Calculate the solar weighted wholesale price.** The solar weighted wholesale electricity component of the flat feed-in tariff is calculated by averaging the half-hourly prices from step 4, weighted by the volume of solar exports from step 2. The formula for this is:

$$\text{Flat feed-in tariff solar weighted wholesale electricity price} = \frac{\sum_{t=1}^{17,568} (\text{expected price } 2024-25_t \times \text{solar exports}_t)}{\text{Total solar exports } 2022-23}$$

## Solar weighted wholesale price forecast for the time-varying minimum feed-in tariffs

Steps 1 to 4 of forecasting the time-varying feed-in tariffs are the same for forecasting the flat feed-in tariff. Like the flat feed-in tariff approach, the commission has set the time-varying feed-in tariffs using weighting based on solar export profiles. For step 5, the only difference is that the above weighting is done three times, once for each time-block, using only the expected prices and solar exports from the relevant time-block.

## Estimate of market fees and ancillary service charges

When retailers purchase energy from the wholesale market, they must pay market fees and ancillary service charges to the Australian Energy Market Operator (market operator). The market operator charges these fees based on the amount of electricity that retailers purchase from the wholesale market. Retailers can avoid them if they get electricity from solar customers.

We have included these fees and charges in our calculation of avoided costs. The total value of market fees and ancillary services are 0.09 cents per kWh.

**Table C.3: Avoided market fees and ancillary service charges**

Item	Fee \$ per MWh	cents per kWh
National Electricity Market fees	0.41	0.04
Ancillary service charges	0.45	0.05
<b>Total</b>	<b>0.86</b>	<b>0.09</b>

Source: AEMO 2023-24 Budget and Fees report for market fees; AEMO ancillary services recovery summaries for 2022 and 2023.

### Market fees

The National Electricity Market (NEM) fees levied by the market operator – core and functions – are set in advance each year through its annual budgeting process. We have used the market fees published in the 2023–24 AEMO Budget and Fees paper as the best estimate for fees in 2024–2025.<sup>37</sup> This leads to an estimate of the total market fees avoided in the 2024–25 minimum feed-in tariffs to be 0.041 cents per kWh.

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<sup>37</sup> Australian Energy Market Operator, 2023–24 AEMO Budget and Fees, published in June 2023, accessed 04 September 2023, <https://aemo.com.au/about/corporate-governance/energy-market-fees-and-charges>

In its 2022–23 Budget and Fees paper, the market operator approved an increase of 4.5 per cent year on year in 2023–24 and 2024–25 for fees on NEM core functions.<sup>38 39</sup> Therefore, we have increased the 2023–24 budget for NEM core fees by 4.5 per cent as the estimated cost for 2024–25.

Other market fees – such as IT upgrades, five-minute settlements and global settlement compliance, and the Distributed Energy Resources integration program – do not have a clearly planned trajectory. Changes between the 2023–24 budget and the 2022–23 budget were also close to zero. Therefore, we have used the 2023–24 budget for these fees as the estimated costs for 2024–25.

In the 2021 Electricity Fee Structure Final Report and Determination, the market operator also announced it would change the structures of all the fees mentioned above from financial year 2023–24.<sup>40</sup> The new structure involves charging 50 per cent of the fees based on a variable rate per MWh (megawatt-hour) and the remaining 50 per cent based on a fixed rate per connection point per week. Because our approach estimates the costs avoided when retailers purchase exports from solar customers, we only include the variable fees in our calculation. Fixed costs are not avoided when retailers purchase solar exports.

The rebalancing of fixed and variable fees has reduced the market fees included in the 2024–25 minimum feed-in tariffs. The NEM fees we propose in our draft decision for 2024–25 are 0.04 cents per kWh. The National Electricity Market fees in our 2023–24 decision were 0.11 cents per kWh.

### Ancillary services

The market operator recovers the cost of providing ancillary services from market participants (retailers) and publishes the recovery rate of ancillary service charges on a weekly basis. We estimate the avoided costs for ancillary services to be 0.045 cents per kWh.

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<sup>38</sup> Australian Energy Market Operator, 2022–23 AEMO Budget and Fees, page 6-7. Published in June 2022, accessed 18 October 2023, <https://aemo.com.au/en/consultations/current-and-closed-consultations/2022-23-aemo-budget-and-fees>

<sup>39</sup> See 'NEM benchmark fee' in Table 9 on page 25 of the 2023-24 AEMO Budget and Fees paper, referenced above.

<sup>40</sup> Australian Energy Market Operator, Electricity Fee Structure Final Report and Determination, published in March 2021, last access 28 September 2023, [https://aemo.com.au/~/\\_aemo-electricity-fee-structure-final-report-and-determination.pdf](https://aemo.com.au/~/_aemo-electricity-fee-structure-final-report-and-determination.pdf)

We have estimated the average cost of ancillary services in 2024–25 using the average costs over the last year (from October 2022 to October 2023).<sup>41</sup> <sup>42</sup> This is the same approach we used last year.

## Estimating avoided transmission and distribution losses

Electricity supplied to the wholesale market is often produced by large generators located some distance away from the point of consumption. Electricity is transported to households and businesses via a transmission and distribution network (also known as the ‘grid’). During this process, a small portion of electricity originally exported to the grid is lost as heat and sound. This is referred to as network or line losses.

Small scale renewable generation reduces network losses because the generated electricity is transported a short distance, so line losses are minimal. The extent of the associated cost savings varies depending on the location of the generation facility (among other factors such as the quality of the line and the amount of electricity flowing through it). These cost savings are incorporated into the feed-in tariffs by applying a ‘loss factor’ to the avoided cost of purchasing electricity in the wholesale market, including market fees and ancillary service charges.

Using the market operator’s estimates of distribution and marginal loss factors for 2023–24, we have estimated a flat customer share-weighted loss factor of 1.0635 for Victoria. We have then applied this loss factor to derive the value of avoided network losses used in the minimum feed-in tariff calculations. Table C.4 sets out the inputs to the loss factor calculation which are publicly available on the market operator’s website.

In this review, we have used the same approach to network losses as we use for the Victorian Default Offer. This is the same approach we took in the last feed-in tariff review. To calculate the distribution loss factors (DLF), urban distribution areas we have used the short sub-transmission factor.<sup>43</sup> For the Powercor and AusNet distribution zones, however, we took the load weighted

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<sup>41</sup> Australian Energy Market Operator, AS Recovery Summary File 2023 (spreadsheet downloadable), accessed 03 October 2023, <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/data-nem/ancillary-services-data/ancillary-services-payments-and-recovery>.

<sup>42</sup> We have used this 52-week average up to October in past years’ draft decisions, and the 52-week average up to December for final decisions. Even though there are a few months’ gap to 1 July when the new minimum feed-in tariff applies, we have decided a forecast adjustment is unnecessary. We consider that because the ancillary charges are published week by week, our approach allows for the actual ancillary charges avoided to always be reflected in the minimum feed-in tariff.

<sup>43</sup> Australian Energy Market Operator, *Distribution loss factors for the 2023-24 Financial Year*, accessed 31 August 2023. [https://aemo.com.au/-/media/files/electricity/nem/security\\_and\\_reliability/loss\\_factors\\_and\\_regional\\_boundaries/2023-24/distribution-loss-factors-for-the-2023-24-financial-year.pdf?la=en](https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/loss_factors_and_regional_boundaries/2023-24/distribution-loss-factors-for-the-2023-24-financial-year.pdf?la=en).

average of the short and long sub-transmission distribution loss factors using data provided by Powercor and AusNet.

We then calculated the marginal transmission loss factors (MLF) using the simple average of the marginal loss factors across each distribution area (removing some nodes that have no small business or residential load). We multiply the DLFs and MLFs to derive the total loss factors. These factors are then weighted by the number of low voltage customers in each distribution zone to develop a Victoria wide loss factor. See Table C.4 for detail.

**Table C.4: Inputs for calculating loss factors**

Distribution business	Distribution loss factor	Average marginal loss factor	Total loss factor	Number of customers
AusNet Services	1.0810	1.0041	1.0854	790,228
CitiPower	1.0450	1.0000	1.0450	343,144
Jemena	1.0447	1.0006	1.0454	370,535
Powercor	1.0738	0.9980	1.0717	893,146
United Energy	1.0483	0.9987	1.0469	701,454
Customer share-weighted			1.0635	

## Estimate of the avoided social cost of carbon and human health costs

In February 2017, the Victorian Government issued an Order in Council ('Order') specifying a methodology for determining the social cost of carbon and the factors we must consider when applying this methodology.<sup>44</sup>

It defines the avoided social cost of carbon as the avoided 'cost per kilowatt-hour (kWh) of small renewable energy generation electricity purchased by a relevant licensee' (e.g., retailer), determined in accordance with the following methodology and factors:

$$\text{Avoided social cost of carbon} = \text{Volume factor} \times \text{Price factor}$$

The volume factor, in the Order is an emissions intensity coefficient factor of 1.27 kilograms (kg) of carbon dioxide equivalent (CO<sub>2</sub>e) per kWh of electricity exported by a small renewable energy generator. This means that 1.27 kg (or 0.00127 tonne) of CO<sub>2</sub>e is assumed to be avoided for each kWh of electricity exported by a small renewable energy generator.

<sup>44</sup> Victorian Government 2017, *Victoria Government Gazette* No. S 36, Tuesday 21 February 2017, Order specifying a methodology and factors for the determination of the avoided social cost of carbon (Order in Council)

For the price factor, we have used the method specified in the Order to determine the value of a tonne of CO<sub>2</sub>e. It results in a value of \$19.63 per tonne of CO<sub>2</sub>e. The resulting avoided social cost of carbon is 2.5 cents per kWh.

### Human health costs

The Victorian Government has not made a separate Order in Council that specifies a factor or method for determining avoided human health costs attributable to a reduction in air pollution.

We reviewed the associated health benefits as part of our inquiry into the energy value of distributed generation in 2016.<sup>45</sup> We have re-examined this matter a number of times since. However, due to a lack of sufficient evidence and data, we have not been able to reliably place a separate monetary value on the avoided human health costs.

We note that there is evidence that the avoided human health costs are already be accounted for through the avoided social cost of carbon and/or subsidies provided for solar installations. We have adopted this view. As a result, our decision is to set the stand-alone avoided human health costs at 0 cents per kWh.

There is a variety of methodologies to price the avoided human health costs attributable to the reduction in air pollution, with no approach widely accepted. These methodologies fall into two broad categories:

- damages caused by the pollution (damages costs)
- costs of avoiding the pollution (abatement costs).

### Damages costs

Under the damages cost approach, the avoided human health costs are calculated using estimated health costs of pollution from electricity generation. The costs of the damages vary significantly according to where the generation, and therefore pollution, occurs. The dispersion of pollutants depends heavily on local conditions.

If generators are in a densely populated area, the pollution will affect more people and the human health costs will be higher. In contrast, if the generation occurs in a low population area, there will be lower health costs.

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<sup>45</sup> Essential Services Commission 2016, The energy value of distributed generation, August 2016, pp. 62-63, <https://www.esc.vic.gov.au/sites/default/files/documents/Distributed-Generation-Inquiry-Stage-1-Final-Report-Energy-Value-FINAL-20160916.pdf>



There is no detailed research on the dispersion of pollutants in Victoria. The state's coal fired generation is in the Latrobe Valley. This is a relatively long distance from Victoria's larger population centres. In many other parts of the world, the distance between generation and consumption is not as large. While there is some gas generation within Melbourne, it accounts for only a small share of total generation.

To calculate the damages costs and total avoided human health costs, it would be necessary to establish the unit health costs of fossil fuel generation and then assess how solar exports displaces this generation.

### **Abatement costs**

An alternative is to use the cost of avoiding pollution. Under this method, we measure the cost of preventing pollution to get the value of avoided human health costs. This approach can be especially helpful when abatement costs are known but damages costs are not.

Some other jurisdictions have adopted abatement costs as a possible way of measuring environmental externalities (such as the cost of carbon) when damages costs are unknown or uncertain. The Order in Council uses an abatement cost approach for determining the avoided cost of carbon.

When using an abatement cost approach there may be an overlap between the avoided health costs and the social cost of carbon.

Abatement of fossil fuel generation is paid for through the social cost of carbon. Both carbon emissions and other harmful pollutants are avoided when this abatement takes place. If we pay to avoid carbon pollution, it follows that we also avoid other types of pollution.

### **Solar panel installation subsidies**

To encourage solar installations, and acknowledging the associated social benefits, customers receive government subsidies when they install solar systems. These include both state (Victorian solar panel rebate scheme) and federal programs (small scale renewable energy scheme).

As the main social benefits of solar installation are reductions in carbon emissions and noxious pollutants, there may be some overlap between these subsidies and the avoided cost of carbon and avoided health costs.