IPART
Independent Pricing and Regulatory Tribunal | NSW

Solar feed-in tariff benchmark ranges

Methodology to calculate the benchmark ranges for 2024-25

Information Paper

February 2024

Energy »

IPART's solar feed-in tariff benchmark ranges

Since 2012, IPART has set benchmarks to guide customers about the feed-in tariffs they could expect to be paid by retailers for their solar exports. These benchmark ranges help consumers to:

- compare solar feed-in tariff offers to see if they are getting a reasonable rate
- understand the financial returns available from investing in solar panels and/or battery storage systems.

Our solar feed-in tariff benchmark ranges for 2023-24 are available on the IPART website.

We have been asked to set benchmark ranges for the next 3 years

The NSW Government has asked IPART to continue to set annual solar feed-in tariff benchmark ranges for the next 3 financial years (2024-25 to 2026-27).[1]

We have also been asked to ensure that the solar feed-in tariff benchmark ranges we set remain fit-for-purpose given new tariff structures including network charges for solar exports and demand charges, and how retailers reflect these in their tariffs.[2]

We will consult in 2 stages

In past reviews when we have set solar feed-in benchmark ranges, we have consulted on the methodology to set the benchmark ranges at the start of the review and then applied this methodology for the next 3 financial years.

Over this review period, significant changes are being made to how the energy market will operate, and there is limited information about how these changes will affect the value of solar exports. In particular, from 1 July this year, Distributed Network Service Providers will be able to charge for the export of solar into the network (see Box 1). Once these charges are in place, we will have a better understanding of how they will affect the costs of exporting solar to the grid.[a]

As a result, we will conduct consultation in 2 stages:

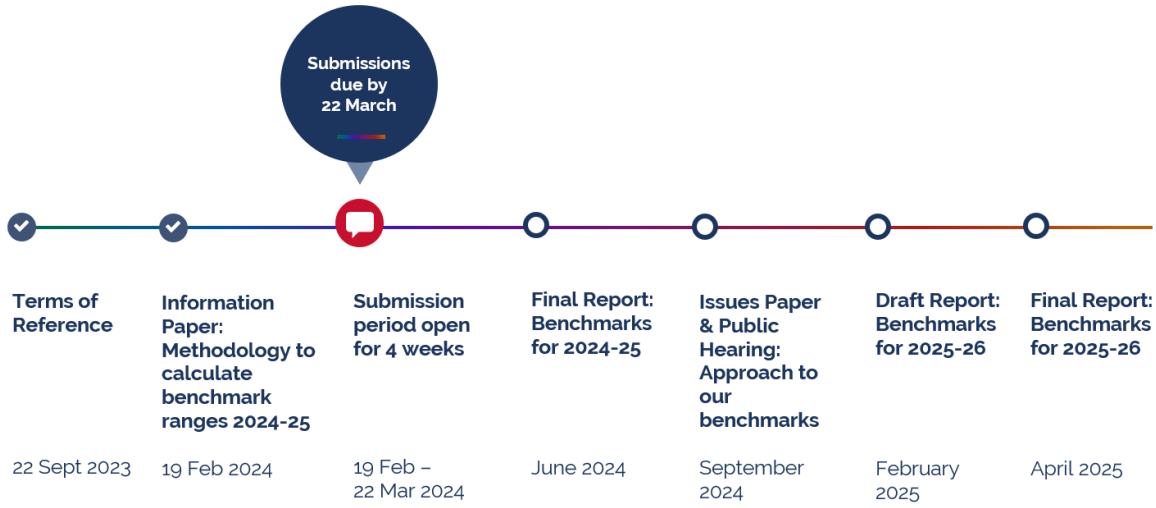
- through this Information Paper we are seeking targeted feedback on whether our existing methodology remains appropriate to continue to apply in 2024-25.
- in September 2024, once network charges for solar exports are in place, we will undertake a second consultation seeking feedback on whether our benchmark ranges and methodology remain fit-for-purpose given new tariff structures.

The timeline for this review is shown in Figure 1 below.

[a] Small customers will be able to choose (opt-into) network charges for solar exports from 1 June 2024. Distributed Network Service Providers cannot assign or reassign an existing customer to network charge for solar exports until 1 July 2025.

Information Paper

Figure 1 Timeline for our solar feed-in tariff benchmark review



We are conducting a targeted consultation to make sure our methodology remains appropriate for 2024-25

Subject to stakeholder feedback, we will continue to use our existing methodology to set the benchmark ranges for 2024-25. We welcome your feedback on whether there are changes or refinements that should be made. In particular, we are interested in feedback regarding the solar multiplier and whether our approach to calculate it remains appropriate given changing dynamics in the energy market.

We provide detail on our existing methodology in the following section.

We welcome your comment on the following:

1.	Should we change or refine the methodology we use to calculate our solar feed-in tariff benchmarks for 2024-25? If so, how?	6
2.	Does our methodology to calculate the solar multiplier remain appropriate given the weakening relationship between the average wholesale price across the whole day and the average wholesale price when solar is exporting?	10
3.	Given the sharp decline in the solar multiplier in recent years, should we continue to use 3 years of wholesale price and solar export data in the solar multiplier calculation? If not, what would be a more appropriate time period to incorporate?	10

Have your say

You can get involved by making a submission or submitting feedback by **22 March 2024**.

Submit feedback »

Learn more »

Information Paper

We will undertake a full review of our methodology and consult in September 2024

In September 2024, we will undertake a full review of our methodology and consult on how new tariff structures, including network charges for solar exports and demand charges impact our solar feed-in tariff benchmark ranges. We discuss these new tariff structures in Box 1 below.

The consultation in September 2024 will focus on:

- how retailers are incorporating network charges for solar exports and demand charges into their tariffs and whether we need to adjust our benchmark ranges to account for this
- how we forecast the wholesale value of electricity and whether our approach remains appropriate
- whether there are other avoided costs that we should factor in when calculating our solar feed-in tariff benchmark ranges.

Box 1 Network charges for solar exports and demand charges

Retailers pay network charges to the Distributed Network Service Provider and choose how to pass these costs onto their customers.

Network charges for solar exports

Network charges for solar exports are a new tariff structure that is coming into effect from 1 July 2024. Network charges for solar exports aim to send price signals to customers about when it is beneficial (and not beneficial) for the grid to receive energy generated by distributed energy resources.[b, 3]

Network charges for solar exports may consist of:

- a charge for exports – this signals when exported energy would not benefit the network (and would drive future network investment). At these times, it is better for customers to use or store their own rooftop generated solar electricity.
- a rebate for exports – this signals when the network would benefit from exports and customers can be rewarded for exporting any energy they do not use (or store).

Network charges for solar exports will incorporate a basic export level. This is a threshold up to which a customer may export to the grid without charge.[4]

Retailers may choose to include a separate charge (or rebate) for network costs for solar exports in their energy plans or bundle this charge with a solar feed-in tariff.[c]

[b] Distributed energy resources refer to generation units that are located on the consumer's side of the meter. Examples of distributed energy resources include rooftop solar panels, wind generating units, battery storage and batteries in electric vehicles used to export power back to the grid.

[c] Ausgrid discussed in their 2024-29 Tariff Structure Statement Explanatory Statement that:
Stakeholders emphasised that more customer education was required, particularly on how the export tariffs contribute to their cost. This includes explaining that it is unlikely customers would be charged to export (by their

Information Paper

Demand charges

Demand charges are a tariff structure that is intended to better inform customers about the network costs of using electricity during peak periods and incentivise behavioural change.

In general, demand charges involve a retailer measuring a customer's consumption over a 30-minute window and charging a monthly fee based on the highest demand during peak periods in a given month.

Customers can only be charged a demand charge if they have a smart meter, which records energy consumption in at least 30-minute intervals. Around 6% of customers in NSW are currently on energy plans with demand charges.[5]

retailer). Rather, it is much more likely that customers will experience export pricing by receiving a slightly lower retail feed-in tariff (or slightly higher feed-in tariff depending on the time of export). They are also being rewarded for shifting their usage and smoothing out load on the grid.

Ausgrid, *Our revised TSS Explanatory Statement for 2024-29*, November 2023, p 9

Information Paper

How we calculate the solar feed-in tariff benchmark ranges

We set our solar feed-in tariff benchmark ranges equal to our forecast of what it would cost retailers to buy electricity from the National Electricity Market at the times that solar is exporting to the grid.

Each year, we set:

- an all-day (or flat) solar feed-in tariff benchmark range
- time-of-day (or time-varying) solar feed-in tariff benchmark ranges.

The methodology we use to set the solar feed-in tariff benchmark ranges has been developed and refined over many years in consultation with stakeholders including retailers, industry associations, energy market consultants and consumer advocacy groups. It is also broadly similar to the approaches of other State and Territory regulators that set solar feed-in tariffs. We detail this methodology in Table 1 below.

Table 1 Our methodology to calculate the solar feed-in tariff benchmark ranges

Step	What we do
Step 1. Forecast the average NSW wholesale electricity price for the next financial year	• We forecast the average NSW wholesale electricity price on the National Electricity Market (NEM) for the next financial year using NSW baseload electricity futures contracts traded on the Australian Securities Exchange (ASX). • We take a 40-day average of the latest market information on forecast wholesale spot prices to establish one end of the range. We adjust this 40-day average downward by 5%, reflecting that contracts typically trade at a premium to spot prices. • We also take a volume-weighted average of all historical trades available to establish the other end of the range to reflect retailers' actual practices in purchasing wholesale electricity to hedge wholesale spot price risk. We do not adjust this end of the range downward by 5%.
Step 2. Apply the solar multiplier	• We calculate a 'solar multiplier' to adjust this forecast benchmark price range to account for whether wholesale electricity prices are likely to be higher or lower than the average price at the times when solar exports occur. • Generally, wholesale prices in the NEM are lowest in the middle of the day when solar generation is high as this meets a large proportion of demand, and highest in the evening when demand is high and there is little solar energy exported to the grid.

Information Paper

Step	What we do
	• To calculate the solar multiplier, we calculate the ratio of the average solar-weighted price to the average time-weighted price using the most recent 3 years of historical wholesale spot prices and net solar export data.[d] • When we set the benchmarks in 2023-24, we calculated individual solar multipliers for different network areas, and reflected the variations within our benchmark range.
Step 3. Increase the value by an avoided loss factor	• We increase the value of the range by multiplying it with an avoided loss factor. • When electricity is purchased from the NEM and flows through the transmission and distribution networks some of it will be lost. However, given that solar exports are located closer to where electricity will be used by other customers, less needs to be purchased by retailers to meet the same level of demand.
Step 4. Add back the value of NEM fees and charges	• We add back the value of the NEM fees and ancillary service charges that retailers avoid paying when they supply customers with other customers' solar exports because these charges are levied on retailers' net purchases.

We seek comment on the following:

1. Should we change or refine the methodology we use to calculate our solar feed-in tariff benchmarks for 2024-25? If so, how?

[d] For the purposes of setting our solar feed-in tariff benchmarks we are focusing on customers' net solar exports – the unused electricity that is exported to the grid. This is the volume of electricity for which customers will earn feed-in tariff revenue, depending on the retailers' specific offers.

Information Paper

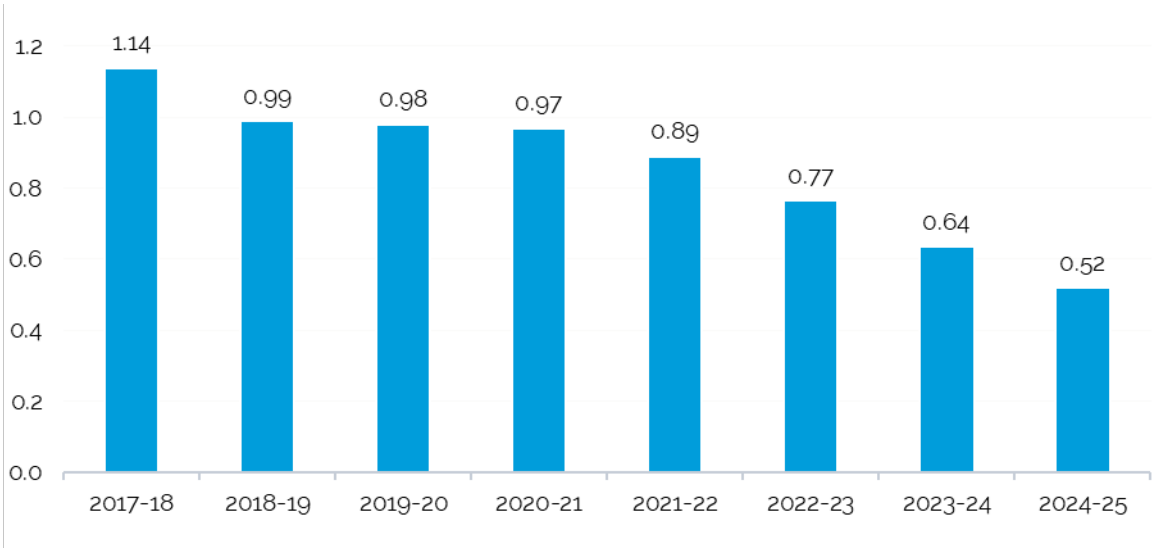
The solar multiplier has fallen materially in recent years

A key component of our solar feed-in tariff benchmark ranges is the solar multiplier. When we calculate our solar feed-in tariff benchmark ranges, we multiply our forecast of the wholesale price of electricity by the solar multiplier. This scales the average wholesale price to account for differences between the average wholesale price across the whole day (or a set time period during the day) and the average wholesale price when solar is exporting.

The all-day solar multiplier has fallen materially in recent years, from 1.14 in 2017-18 to 0.64 in 2023-24. We estimate it will fall to around 0.52 for 2024-25 and continue to decline in the coming years as the number of houses with solar panels in NSW increases.

Due to the large decline in the solar multiplier in recent years, we are seeking your feedback on whether our methodology to calculate the solar multiplier remains appropriate for 2024-25.

Figure 2 IPART's all-day solar multiplier, 2017-18 to 2024-25



Note a: For 2021-22 to 2024-25 the solar multiplier shown is the midpoint between the highest and lowest solar multiplier for the 3 networks in NSW.

Note b: The solar multiplier for 2024-25 is a forecast using futures market data as of January 2024.

How we calculate the solar multiplier

The solar multiplier is calculated as the ratio of the solar output-weighted wholesale price to the time-weighted wholesale price, where:

- the solar output-weighted price is the average wholesale price through the year weighted by how much solar is exported at the time
- the time-weighted price is simply the average wholesale price across the year.

Information Paper

The solar multiplier captures how much solar exports occur when wholesale prices are high or low. If more solar exports occur when wholesale prices are higher than average, the solar multiplier will be greater than 1. Inversely, if more solar exports occur when wholesale prices are lower than average, then it will be less than 1.

Using historical data, the solar output-weighted price is calculated by taking the spot price in each of the 17,520 half-hours in the year (48 per day, 365 days a year), and multiplying each price by the proportion of solar exports that occurred in that half hour. We then sum the result. The time-weighted price is simply the average price across those 17,520 half-hours in the year.

A stylised worked example of how we calculate the all-day solar multiplier is set out in Box 2.

Box 2 stylised worked example of how we calculate the all-day solar multiplier

Assume that the spot price is set in the electricity market 4 times across the day, and there are only 3 days in a year, so that there are only 12 prices in the year. The first spot price that occurs each day is for the morning, the second is for the afternoon (when the majority of exports occur), the third is in the evening (when exports are very low), and the fourth is at night (when the solar exports are negligible).

The first 2 days in this example are sunny days, and the third is cloudy, and so the proportion of exports over this day is lower.

Day	Time period	Wholesale spot price ($/MWh)	Proportion of solar exports	Price * proportion of solar exports
Day 1				
	Morning (spot price 1)	$90	10%	$9.0
	Afternoon (spot price 2)	$30	25%	$7.5
	Evening (spot price 3)	$160	2%	$3.2
	Night (spot price 4)	$60	0%	$0.0
Day 2				
	Morning (spot price 5)	$90	10%	$9.0
	Afternoon (spot price 6)	$35	26%	$9.1
	Evening (spot price 7)	$150	1%	$1.5
	Night (spot price 8)	$50	0%	$0.0
Day 3				
	Morning (spot price 9)	$90	8%	$7.2
	Afternoon (spot price 10)	$30	17%	$5.1
	Evening (spot price 11)	$160	1%	$1.6
	Night (spot price 12)	$50	0%	$0.0
Solar export weighted price				**$53.2**
Average (time-weighted price)		**$82.9**		
Solar multiplier (solar weighted price/average price)			**0.64**	

Information Paper

In addition to the all-day solar multiplier, we also calculate solar multipliers for discrete time periods across the day (for example, one-hour period blocks) for our time-of-day benchmarks. We do this by dividing the average price in the discrete period (weighted by solar output) by the average price across all periods in the day. Our time-of-day solar multipliers for 2023-24 are shown in Table 2 below.

Table 2 IPART's time-of-day solar multipliers by network 2023-24

Time period	Ausgrid	Essential Energy
6 am to 3 pm	0.60	0.58
3 to 4 pm	0.81	0.80
4 to 5 pm	1.03	0.99
5 to 6 pm	1.06	0.98
6 to 7 pm	1.89	1.89
7 to 8 pm	1.21	1.21
8 pm to 6 am	0.91	0.91

Note: We did not calculate a solar multiplier for Endeavour Energy in 2023-24 due to data quality issues.

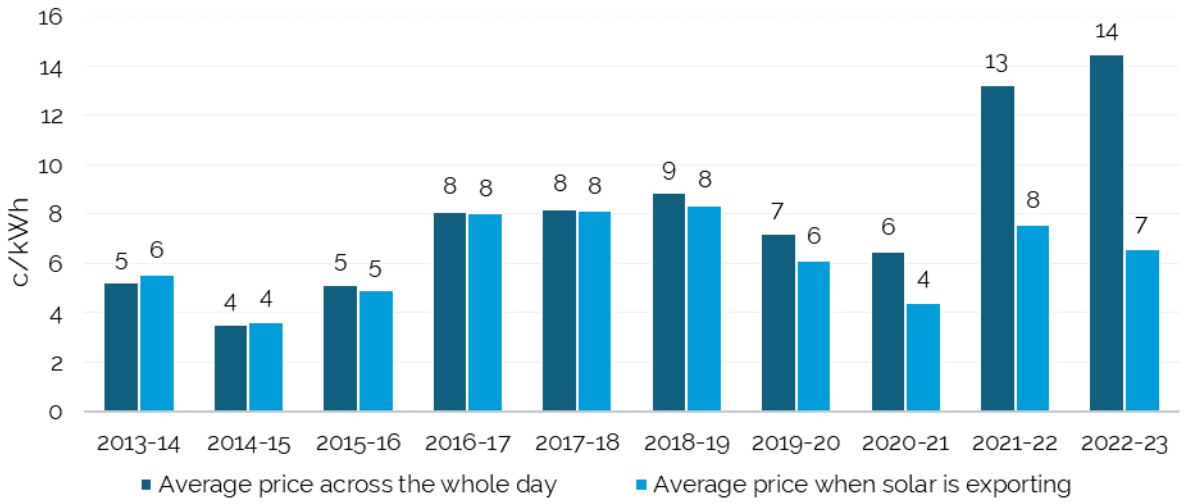
The relationship between the average price across the day and the average price when solar is exporting is changing

Over the past decade, the average annual wholesale price of electricity across the whole day and the average annual price of electricity when solar is exporting have directionally moved together. That is, when the average annual price has increased, so has the average price when solar is exporting. However, this co-movement did not occur in 2022-23. This was the first time over the past decade that these 2 average annual prices moved in different directions; the average annual price across the whole day increased from 13 to 14 c/kWh, while the average price when solar is exporting decreased from 8 to 7 c/kWh.

Further, since 2018-19 there has also been an increase in the difference between the average annual price across the whole day and the average annual price when electricity is exporting. While this difference was 1 to 2 c/kWh between 2018-19 and 2020-21, it has increased to 7 c/kWh for 2022-23.

Information Paper

Figure 3 Average wholesale price of electricity across the day compared to the average price when solar is exporting (c/kWh) (average over the financial year)



Note: The 'average price when solar is exporting' is based on solar exports in the Ausgrid network.
Source: AEMO wholesale spot prices 2013-2023 and Ausgrid solar export data.

We seek comment on the following:

2. Does our methodology to calculate the solar multiplier remain appropriate given the weakening relationship between the average wholesale price across the whole day and the average wholesale price when solar is exporting?

How we incorporate solar multiplier data from past years

When we calculate a solar multiplier, we use the most recent 3 years of wholesale price and solar export data to create a multiplier for each period. This results in:

- solar multiplier 1 – based on the most recent year of wholesale price and export data
- solar multiplier 2 – based on the most recent 2 years of wholesale price and export data
- solar multiplier 3 – based on the most recent 3 years of wholesale price and export data.

We then calculate the average across these 3 multipliers. This methodology places more weight on the most recent year (by factoring it into each of the 3 multipliers) as it reflects the current state of the market. However, we consider the second and third year of data are also important for balancing out recent unusual price shocks.

We seek comment on the following:

3. Given the sharp decline in the solar multiplier in recent years, should we continue to use 3 years of wholesale price and solar export data in the solar multiplier calculation? If not, what would be a more appropriate time period to incorporate?

Information Paper

[1] Penny Sharpe MLC, *Terms of Reference – investigation and determination by IPART of an annual benchmark range for feed-in tariffs for financial years 2024-25, 2025-26 and 2026-27*, 22 September 2023.
[2] Penny Sharpe MLC, *Terms of Reference – investigation and determination by IPART of an annual benchmark range for feed-in tariffs for financial years 2024-25, 2025-26 and 2026-27*, 22 September 2023.[3] Australian Energy Market Commission, *Distributed Energy Resources*, accessed 7 February 2024.
[4] Australian Energy Regulator, *Export Tariff Guidelines*, May 2022, p 3, 17.
[5] Australian Energy Market Commission, *Directions paper - Review of the regulatory framework for metering services*, September 2021, p i.