IPART
Independent Pricing and Regulatory Tribunal
New South Wales

REVIEW OF SOLAR FEED-IN TARIFF BENCHMARKS

LONGER TERM VALUE OF SOLAR EXPORTS

Information Paper

April 2021

Customers want more information about the financial pay-off of solar panels in the longer term

IPART sets solar feed-in tariff benchmarks each year. These are based on the value of wholesale electricity when solar is exporting to the grid. Several of the stakeholders who responded to our Issues Paper consider that IPART's benchmark should be for a longer period, as solar panels are a long term investment.[i] This would allow people to better assess the financial value of their solar panels.

We set a benchmark range each year because the price of electricity can fluctuate significantly from year to year – and can be difficult to predict several years in advance (See Appendix A). As a result, most retailers change their retail prices (including their solar feed-in tariffs) at least once a year, rather than locking them in over the longer term. This means that IPART needs to provide an up-to-date guide of what solar exports are worth.

However, there are some clear trends emerging that mean that solar feed-in tariffs are likely to stay relatively low over the medium term. Solar exports are likely to be worth half of what they were over the last few years. This is because wholesale prices in the middle of the day – when solar is exporting to the grid – are likely to be much lower, as solar electricity continues to grow.

Solar panels are still likely to remain a good investment for many electricity customers. Customers can significantly reduce the amount of electricity they need to buy from their retailer by generating it themselves. However, customers should put less weight on the revenue from exporting excess electricity to the grid.

We set annual feed-in tariff benchmarks because prices are volatile

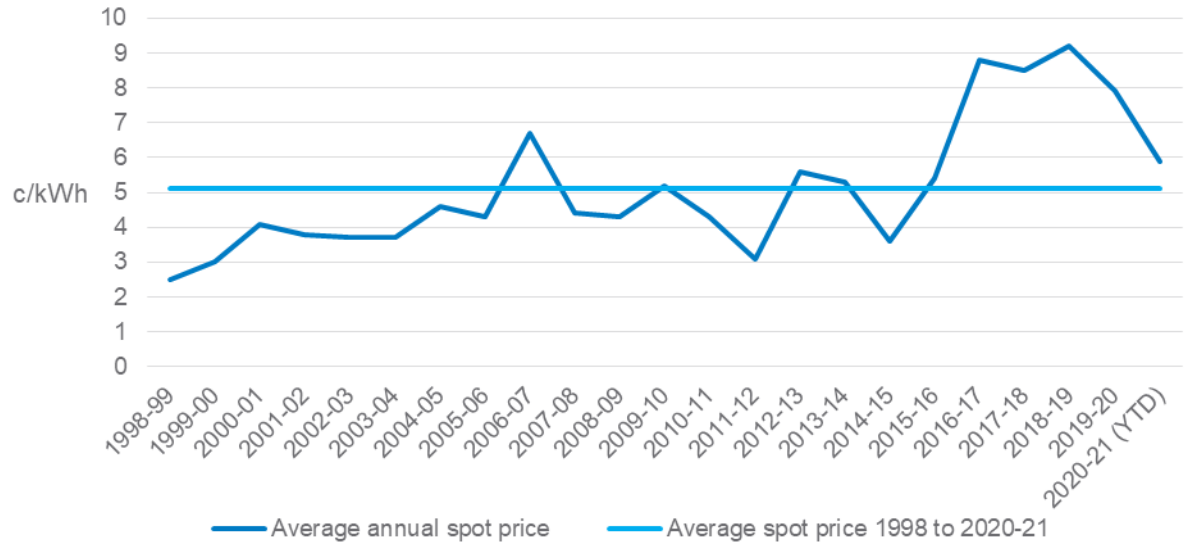
Our Terms of Reference requires us to set a benchmark range each year. This is because the price of wholesale electricity is volatile, and can vary significantly from year to year.

Figure 1 shows that since 1998-99, wholesale prices have fluctuated by an average of 25% each year. The largest price movement in recent years was a 63% increase in 2016-17, from around 5.4 c/kWh up to almost 9 c/kWh.

The price volatility reflects changes in demand and supply. For example, the large price increase in 2016-17 coincided with the closure of the Hazelwood power station in Victoria, high prices of coal and gas, and high summer temperatures for consecutive days at the same time as technical difficulties caused plant unavailability.[ii]

The significant reduction in price in the current year from around 8 c/kWh down to 6 c/kWh largely reflects increasing penetration of solar panels.[iii]

Figure 1 Wholesale prices – Average annual spot prices 1998-99 to 2020-21 (YTD) (c/kWh, nominal)



Note: The average annual spot price is volume weighted.

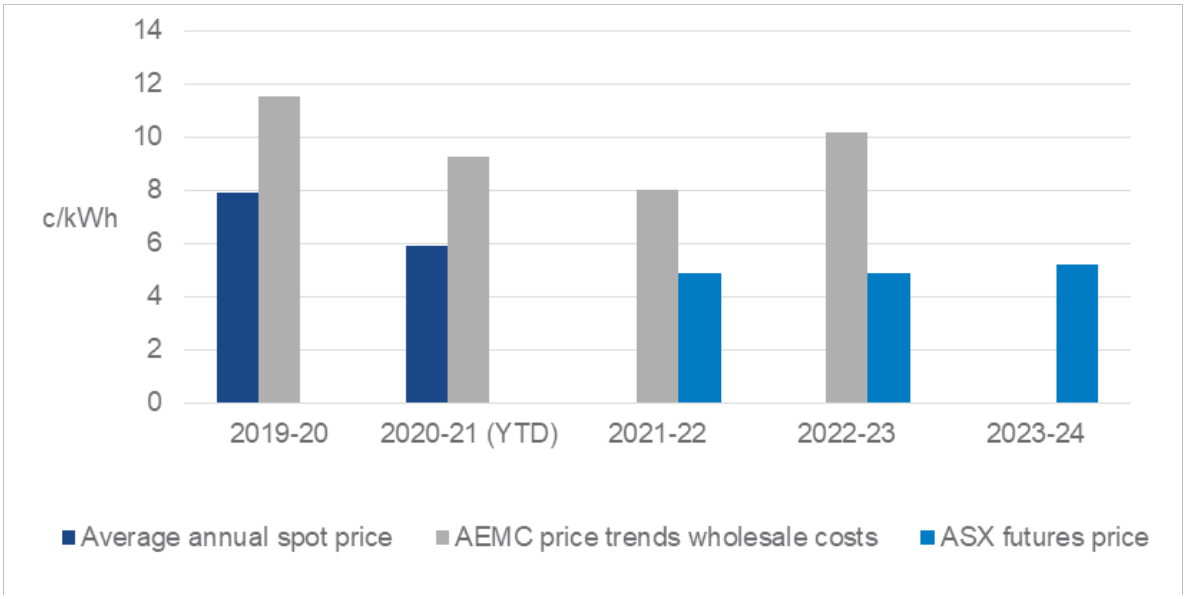
Source: AER, Annual volume weighted average spot prices - regions.

Average wholesale prices

There are few sources of data that provide information about wholesale prices in the future. The ASX futures market suggests prices of around 5 c/kWh between 2021-22 and 2023-24, based on the 40-day average to 12 April 2021 (Figure 2). This is similar to the long term average trend price over the last 20 years. However, as shown in Appendix A, ASX expectations can deviate significantly from actual prices.

Another source of short term information is the AEMC price trends report, which is produced towards the end of each calendar year. It models wholesale costs to retailers for the next two years. Its wholesale costs are higher compared to the ASX prices because it includes additional costs such as ancillary services costs and market fees. It also takes into account retailers' wholesale price purchasing strategies.[iv] This means that costs at a point in time reflect prices over a longer period. However, it can still provide useful information about the direction of wholesale prices. For 2022-23, the AEMC's forecasts show a 27%[v] increase in wholesale costs compared to the year before due to the closure of the Liddell Power Station in NSW.[vi]

Figure 2 Medium term trends in wholesale prices and retailers' wholesale costs (c/kWh)



Note: ASX futures price based on 40-day average to 12 April 2021.

Date source: Bloomberg, AEMO, AEMC, Residential Electricity Price Trends 2020 Final Report, December 2020, p 11, AEMC, Residential Electricity Price Trends 2019 Final Report, December 2019, p 7.

Various modelling has been undertaken for different purposes to predict prices in the longer term. Modelling will reflect a range of assumptions about demand, amount of battery storage, the mix of generation options and the timing that different generators will enter and exit the market, whether new interconnectors between states are built, fuel prices, and climate policies. Modelling by Frontier Economics in December 2018 predicts that **average wholesale prices** will be around 6 c/kWh for most of this decade, before stabilising at around 8 c/kWh (plus inflation) in the 2030s.[vii]

However, prices when solar is exporting to the grid are likely to be much lower than these average prices. Therefore when customers consider the likely value of the solar feed-in tariffs in the future, **they should reduce the forecasts of average wholesale prices by around 30%.** This is explained in the section below.

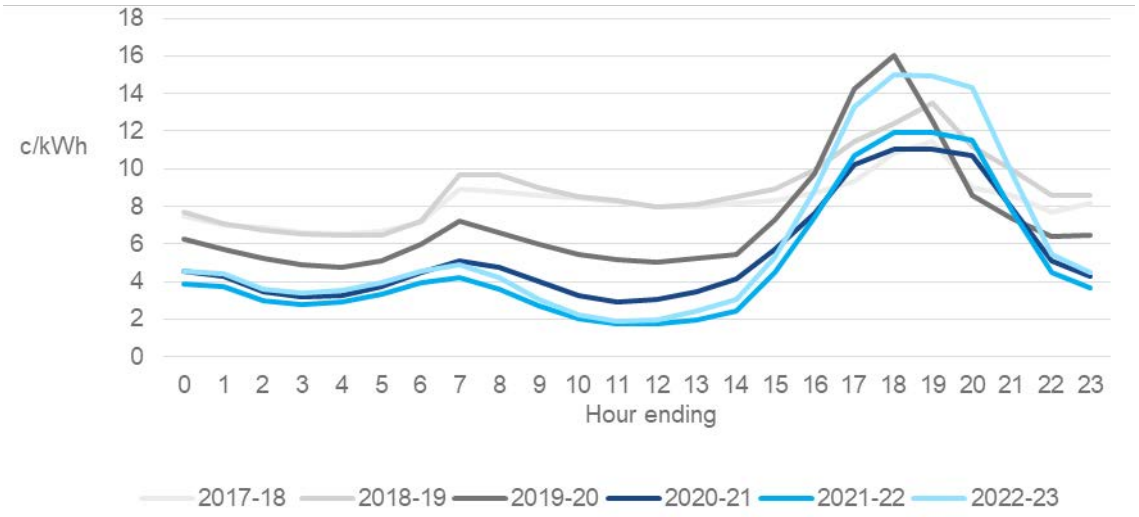
Prices are falling when solar panels are exporting to the grid

The available information suggests that the wholesale price when solar is exporting to the grid is likely to be much lower than that average price across the day.

Prices are falling during the middle of the day as a result of increasing solar penetration. Modelling undertaken by the AEMC indicates that over the next two years, prices during the middle of the day are likely to fall to around 2 c/kWh – down from around 8 c/kWh in 2018-19 (Figure 3).

The value of solar exports in the late afternoon are likely to remain high, particularly as coal-fired power plants are retired. Prices in the later afternoon and evening are expected to remain at around 10 to 15 c/kWh. However, only 2% of exports occurs after 5 pm when prices are highest.

Figure 3 Wholesale price by time of day (c/kWh, 2017-18 to 2022-23)

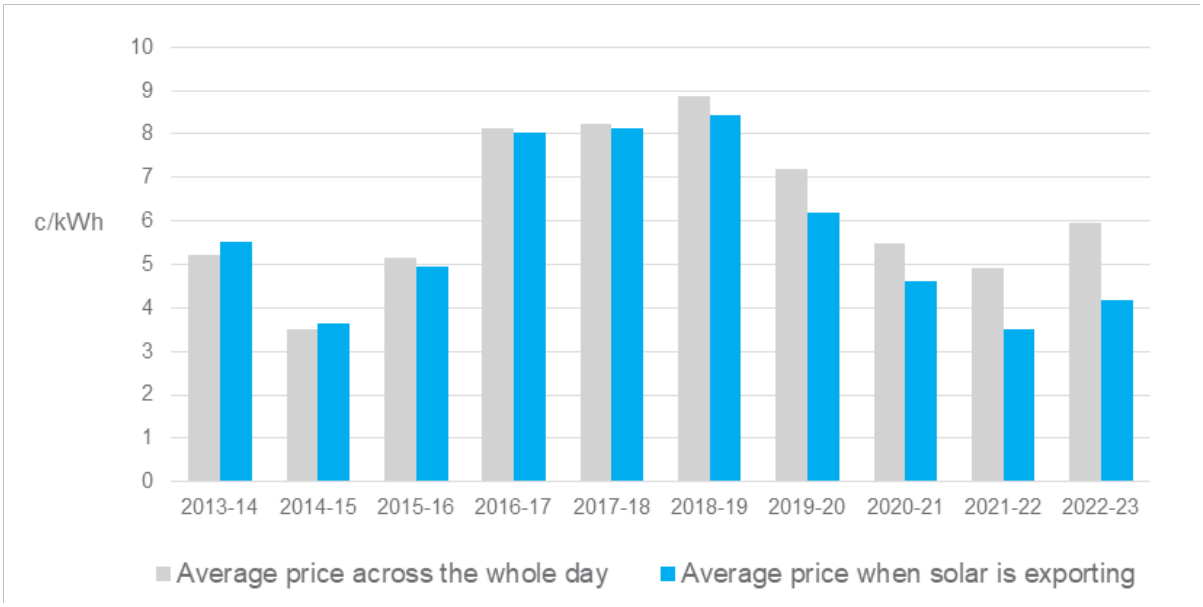


Source: IPART calculations, based to data from AEMO, AEMC, Residential Electricity Price Trends 2020 Final Report, December 2020, p 11.

Figures 4 and 5 show that wholesale prices used to be **higher** than average when solar was exporting to the grid. This reversed in around 2015-16. In 2019-20, prices were around 15% **lower** at times when solar is exporting to the grid.

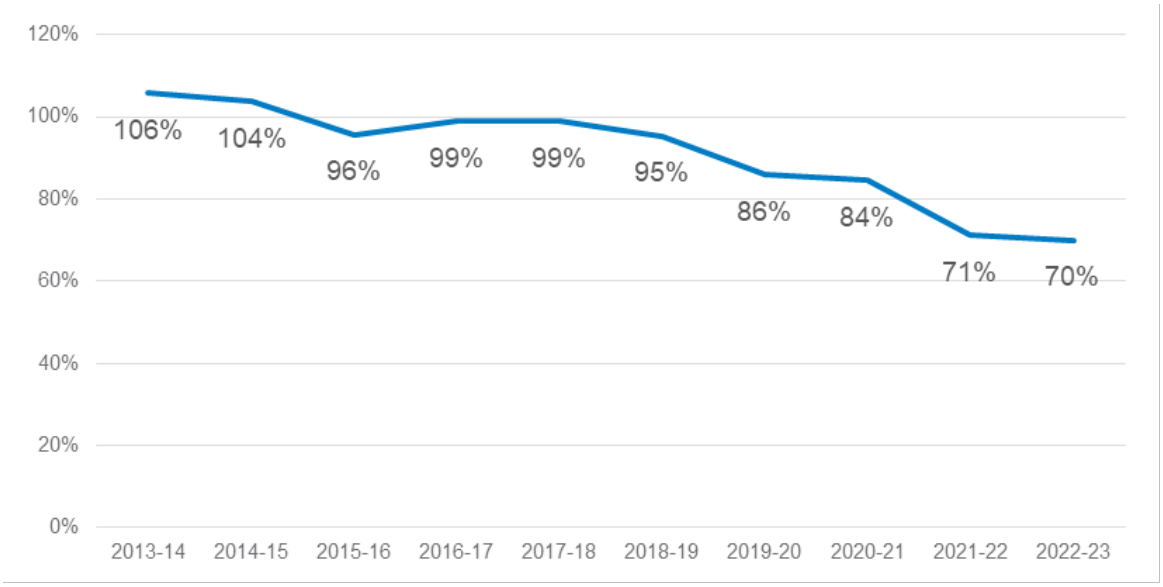
Forecasts for the next few years indicate that by 2022-23, wholesale prices are likely to be around 30% lower than the average price when solar is exporting to the grid. This means that when customers consider medium term wholesale forecasts of the average price of electricity across the day, they should reduce them by roughly 30% to estimate the value of their solar exports.

Figure 4 Average price of electricity when solar is exporting to the grid, compared to the average price across the day (c/kWh)



Data source: IPART calculations based on AEMO, Network data on solar exports by time of day, AEMC, Residential Electricity Price Trends 2020 Final Report, December 2020, p 11.

Figure 5 Average wholesale price of electricity when solar is exporting to the grid compared to the average across the day (%)



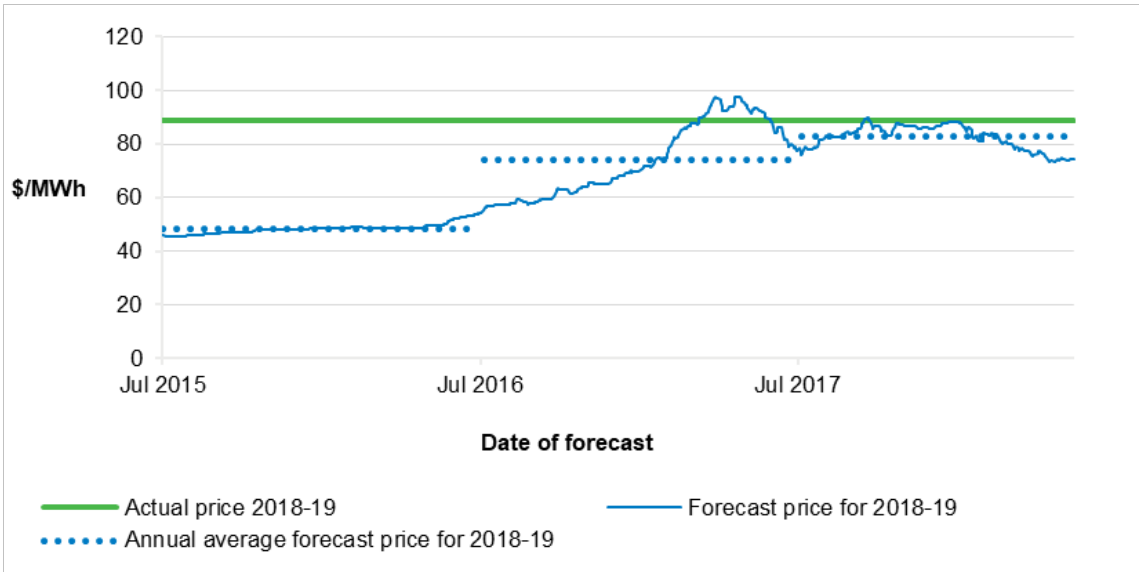
Data source: IPART calculations based on AEMO, Network data on solar exports by time of day, AEMC, Residential Electricity Price Trends 2020 Final Report, December 2020, p 11.

A Expectations of wholesale electricity prices

The ASX futures prices are the prices paid to purchase electricity contracts prior to the start of the financial year. These provide an indication of what the market expects prices to be in the future. These expectations can be quite different to what the prices turn out to be. Figures A.1 and A.2 show the difference between these expectations and actual prices for 2018-19 and 2020-21.

Figure A.1 shows that prices in 2018-19 were almost double what they were expected to be three years before, but the forecasts became more accurate over time. However, Figure A.2 shows that for 2020-21, the expectations of prices only a year before were still too high by more than 40%.

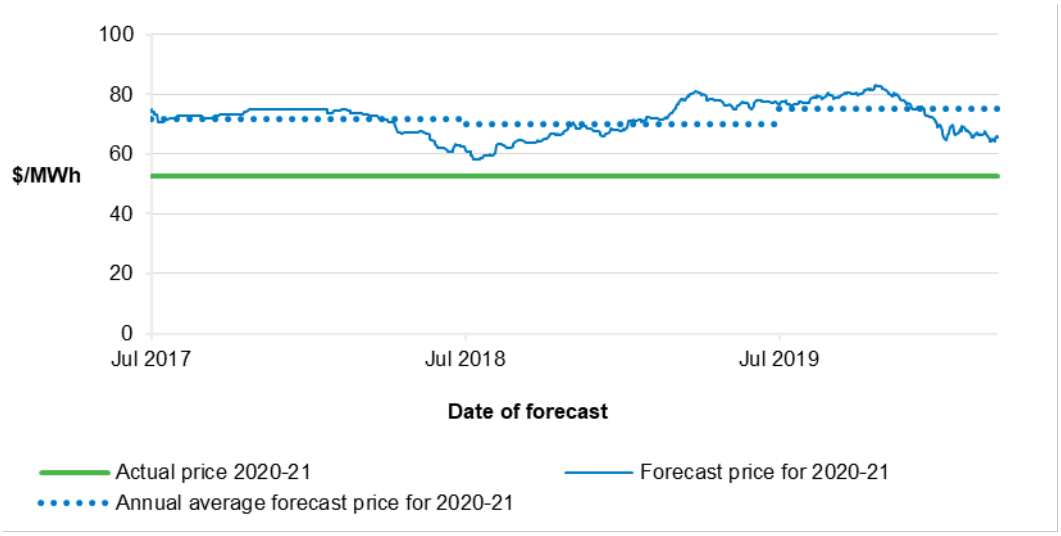
Figure A.1olesale spot prices versus ASX NSW Base Load Strip futures prices for 2018-19



Note: ASX futures contract prices typically trade at a premium to underlying spot prices. We usually assume this premium is around 5%, however no adjustments have been made to data in this chart.

Data source: Bloomberg, AEMO.

Figure A.2 Wholesale spot prices versus ASX NSW Base Load Strip futures prices for 2020-21



Note: ASX futures contract prices typically trade at a premium to underlying spot prices. We usually assume this premium is around 5%, however no adjustments have been made to data in this chart.

Data source: Bloomberg, AEMO.

[i] PIAC submission to IPART Issues Paper, March 2021, pp 1-2; Energy Australia submission to IPART Issues Paper, March 2021, p 3.
[ii] AER, AER electricity wholesale performance monitoring NSW electricity market advice, December 2017, pp 2-3,12.
[iii] AEMC, Final Report, Residential Electricity Price Trends 2020, December 2020, p 9.
[iv] AEMC, Final Report, Residential Electricity Price Trends 2020, December 2020, pp 27-28.
[v] IPART calculations, based on AEMC, Final Report, Residential Electricity Price Trends 2020, December 2020, p 9.
[vi] AEMC, Final Report, Residential Electricity Price Trends 2020, December 2020, p 3.
[vii] Frontier Economics, Wholesale electricity pricing modelling – A final report prepared for coal innovation NSW, December 2018, p 47.