Retailer wholesale energy purchasing practices given solar exports

A report for the Independent Pricing and Regulatory Tribunal

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Disclaimer

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Executive summary

HoustonKemp has been asked by the Independent Pricing and Regulatory Tribunal (IPART) to consider whether its approach to valuing solar exports appropriately reflects retailers' actual practices in purchasing wholesale electricity. The request includes providing:

1. a description of how retailers manage wholesale costs given end-users' solar exports;
2. a description of the relationship between retailer wholesale practices and tariff setting;
3. advice on the appropriateness of the use of solar multipliers; and
4. advice on the appropriateness of time-dependent feed-in tariffs.

Description of how retailers manage wholesale costs in relation to end-use customers' solar exports

Solar exports by end-users are an important consideration in a retailer's approach to managing wholesale risks. Solar exports affect the hedging approaches adopted by retailers by changing the aggregate customer load profile for which energy must be procured from the wholesale market, specifically by:

- reducing the volume that needs to be supplied – all other things equal; and
- changing the load shape that needs to be supplied.

Retailers generally consider solar PV customers as contributing to increasing the peakiness of a retailer's customer load profile by reducing the required load during the middle of the day, which has the general effect of increasing a retailer's wholesale hedging costs on a per MWh basis.

Relationship between retailer wholesale practices and tariff setting

When considering the setting of solar feed-in tariff components as part of a market offer, retailers will consider the contribution of the overall solar exports to their wholesale purchasing costs. However, retailers routinely adjust tariff components upwards or downwards from this level according to competitive market conditions and competitors' tariff offers. Ultimately, retailers are seeking to maximise profit on the total energy sold to, and bought from, a consumer on a tariff as a whole, taking into account any feed-in tariffs paid.

The use of a solar multiplier

In our opinion, the use of a solar multiplier (the ratio of the solar output weighted wholesale price to the time-weighted wholesale price) in IPART's methodology is a reasonable approach to approximating the value of solar exports. More specifically:

- the solar multiplier allows IPART to estimate the relative value of a solar energy shape compared to a flat base energy shape, and so provide a reasonable basis for adjusting a time-weighted average of future energy costs, as measured through the ASX base load futures contract prices; and
- while contracts that may allow for more direct estimation of the value of solar exports (such as solar shape futures contracts) may be bought and sold Over-the Counter [OTC], the depth of this market is unknown and deal values and terms are commercial in confidence and not

publicly available - it follows that these products are unlikely to form a reliable basis for assessing the value of solar exports.

Use of longer-term historical forecast to set the solar multiplier:

In our opinion, IPART's current approach of modifying the baseload contract prices by a solar multiplier to reflect the timing of solar exports remains reasonable. This is because:

- the historical forecasts are being used as an indication of expected future average wholesale prices, which while inclusive of expected solar exports, does not directly measure the incremental value of solar exports to retailers and the wholesale market;
- while a retailer uses hedging products to manage wholesale price risks, the timing of solar exports affects the net load profile that retailers supply and so affects retailers' hedging strategy and associated costs; and
- in principle, over the longer term the cost of wholesale energy hedged in a manner consistent with retailer's actual practices should be equivalent to the wholesale price for the load being hedged, plus any premium associated with the purchase of hedging contracts – IPART's methodology is a reasonable approximation of the latter, and so is an appropriate means of estimating the value of solar exports from the perspective of a retailer.

It follows that in the absence of reliable wholesale futures prices for specific periods, that reflect the timing of solar exports, it remains appropriate for IPART to modify baseload contract prices by a solar multiplier to reflect this timing.

We understand IPART has used the most recent three years of historical data to calculate the solar multiplier. We consider the use of multiple years, in the manner applied by IPART, is reasonable for smoothing out variations in weather conditions that may occur in individual years.

The appropriateness of time-dependent retail tariffs

In our opinion, IPART's current approach of modifying the base load futures contract prices by a solar multiplier to reflect the timing of solar exports remains reasonable.

The reasons for using historical forecasts of wholesale prices for setting feed-in tariff benchmarks appear to apply equally between all-day feed-in tariff benchmarks and time-dependent feed-in tariff benchmarks. It follows, that in our opinion it is equally appropriate to use historical base load futures contract prices to set time dependent feed-in tariff benchmarks.

1. Introduction

The Independent Pricing and Regulatory Tribunal (IPART) provides advice to the NSW government on the value of solar electricity exported to the network, for the purpose of determining feed-in tariff benchmarks to guide customers on the amount they can expect to be paid by retailers for their solar exports.

Within this context, HoustonKemp has been asked to consider whether the approach used by IPART to value solar exports appropriately reflects retailers' actual practices in purchasing wholesale electricity. In so doing, we have been asked to:

- describe how retailers manage wholesale price risks given an expected profile of solar exports from their customers;
- describe how retailers set feed-in tariffs as part of competitive retail tariff offers, given the value of the energy in avoiding wholesale energy costs;
- consider whether IPART's application of a solar multiplier applied to long-term historical forecasts of wholesale prices can be considered to reflect retailers' actual practices; and
- advise whether using longer-term historical forecasts of wholesale prices is appropriate for setting time-dependent feed-in tariff benchmarks.

This report sets out our advice in detail, and is structured as follows:

- section 2 provides a brief description of how retailers manage wholesale price risks given solar exports, and how feed-in tariffs are considered as part of competitive retail tariff offerings to customers;
- section 3 explains the relationship between IPART's methodology for determining the value of solar exports and how this relates to the approaches typically used by retailers when considering the value of solar exports; and
- section 4 sets out our advice on IPART's application of a solar multiplier to long-term historical forecasts of wholesale prices, and whether those longer-term historical forecasts are appropriate for setting time-dependent feed-in tariff benchmarks.

2. Retailer approaches to managing wholesale price risks and setting solar export tariffs

Retailers play an important role in the National Electricity Market (NEM) by buying electricity on the wholesale market and then on-selling that electricity to its retail customers. Retailers manage all the direct interactions with the power system, including customer connections, metering and billing, and manage risks around participation in the wholesale market.

Wholesale spot prices in the NEM are highly volatile. Exposure to these prices poses risks for retailers as they seek to procure the energy needed to meet the load of their customers. Retailers seek to manage these risks through engaging in hedging by either entering into contracts, or through physical hedging, ie, having a physical position in generation. Effectively managing wholesale prices risks is central to the ability for a retailer to compete in the retail market.

In this section, we describe how retailers practically manage wholesale price risks through hedging using contracts, and the implications of solar exports. In the discussion throughout this report, we focus on the hedging approach that a standalone prudent retailer may adopt in procuring electricity, as a reasonable means of developing an understanding of retailer behaviour for the purpose informing a benchmark feed-in tariff. We recognise that a hedging strategy for a vertically-integrated retailer would involve different considerations, which we have not addressed in this report.

2.1 Retailers hedge the aggregate customer load profile

The aggregate load profile for a retailer reflects the total quantity of electricity that a retailer needs to procure to supply its customers. The starting point for a retailer in managing wholesale spot price risks, is to understand this aggregate load profile. The shape of a retailer's load profile represents the energy purchases in the wholesale market that are required in each time period to match customer's loads, and so the potential exposure to the wholesale market risks at each point in time.

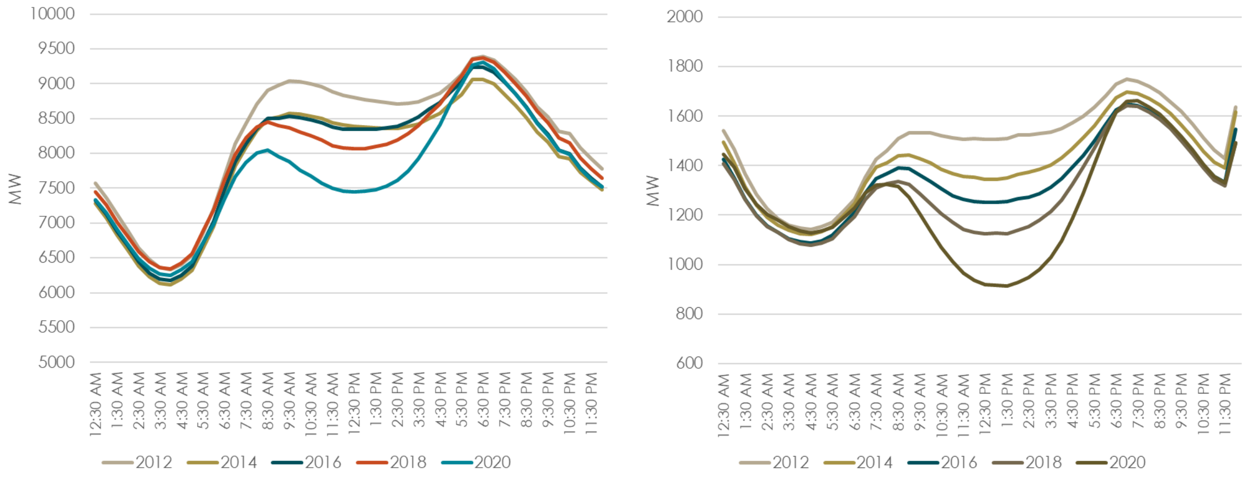
Supply from rooftop PV generation is fundamentally changing the approach that retailers adopt to manage their wholesale price risks. Solar generation by customers affects a retailer's load profile in two principal ways, namely:

- by reducing consumption of a solar PV customer during periods when the solar PV is generating but where the customer is still drawing energy from the network; and
- by reducing the net purchases by the retailer from the wholesale market when customer exports solar PV energy to the grid.

In recent years, as customer solar PV penetration has grown, retailer load profiles have reduced during the middle of the day and display a more pronounced peak in the late afternoon when output from solar PV reduces. Aggregate load growth driven by economic growth and population increases has also been more muted as grid-sourced energy consumption by some customers has fallen with increasing solar PV penetration over time.

This trend is illustrated in Figure 2.1 below, which shows the changes in the shape of the regional daily load profiles in New South Wales (NSW) and South Australia (SA) between 2012 and 2020. As the figure illustrates, increasing solar PV penetration has reduced demand during the day with more limited impact on the level of maximum demand. The distribution of these effects on the aggregate load profiles of individual retailer's will vary based on the mix of customers within their portfolio of customers.

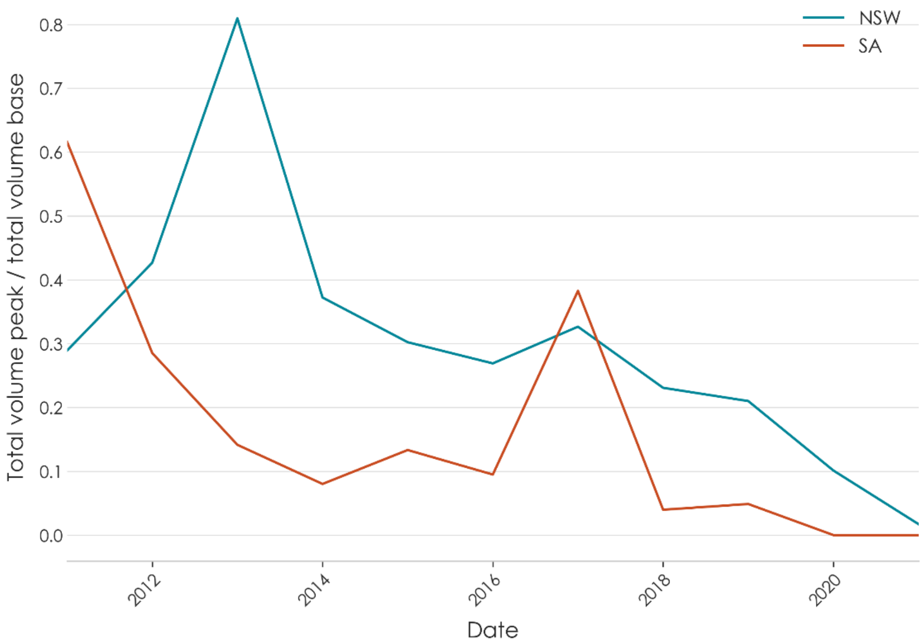
Figure 2-1: Impact of increasing solar exports on regional load profiles – NSW (left) and SA (right)



Source: AEMO MMS database.

This trend in the shape of the load profile has had a material impact on the hedging strategies of retailers. As an example of this, Figure 2-2 below shows the declining volumes of trade in peak load futures contracts over recent years as compared to trading volumes for base load futures contracts. Peak load futures contracts cover a period in the day from 7am to 10pm (on weekdays), during which times the aggregate load profiles of retailers have reduced, relative to other periods in the day, owing to rooftop solar PV output. The increase in solar PV and lower load means that average quantity of peak load futures contracts that a retailer would seek to purchase in their hedge portfolio is reduced.

Figure 2-2: The ratio of trading volumes for peak load futures contracts as compared base load futures contract in New South Wales and South Australia



Source: ASX energy, Base load futures and peak load futures trading volumes. The chart shows the ratio of trading volumes for a given Contract Quarter, ie,; date refers to the Contract Quarter for each contract.

2.2 Managing wholesale price risks through a hedging strategy

Retailers, in the absence of physical hedging, typically enter into a range of contracts to construct a portfolio of hedge products that reflects the characteristics of their load profile. The use of these financial hedge contracts is central to wholesale price risk management by retailers. There are two key sources of hedging contracts, namely:

- ASX traded products – which are standardised contracts available to be traded on the ASX, including base and peak load futures, options and $300 cap contracts; and
- Over-The-Counter products (OTC) – which are exchanged through bilateral negotiation between the two parties to the contract.

Base load futures contracts (also called swaps), as traded on the ASX, reflect an agreement to purchase or sell electricity at an agreed strike price. In practical terms, if the wholesale spot price is above the strike price of the contract, then a generator will pay the retailer the difference in price for the contracted volume. Similarly, if the spot price is below the strike price, then a retailer will effectively pay the generator for the difference between the strike price and the contract price. A retailer that enters a base load futures contract effectively pays a fixed price for the contracted volume of energy.

Peak load futures contracts are similar to base load contracts but only apply during the hours from 7am to 10pm during the day on weekdays (and excluding public holidays). In the same manner as a base load contract, peak load contracts are settled based on the difference between the contract strike price and the wholesale spot price, during the applicable hours.

Cap contracts, as traded on the ASX, provide a limit on market prices of $300 per MWh. Should market prices exceed this amount, the seller of the cap contract, in effect, pays the buyer of the contract the difference between spot price and $300 per MWh. In exchange, the buyer pays the contract price to the seller.

In addition, call and put options on base load futures contracts are also traded on the ASX. These provide another layer of flexibility for retailers, through only purchasing swap contracts if it is their interests to do so, and they pay a price for this flexibility.

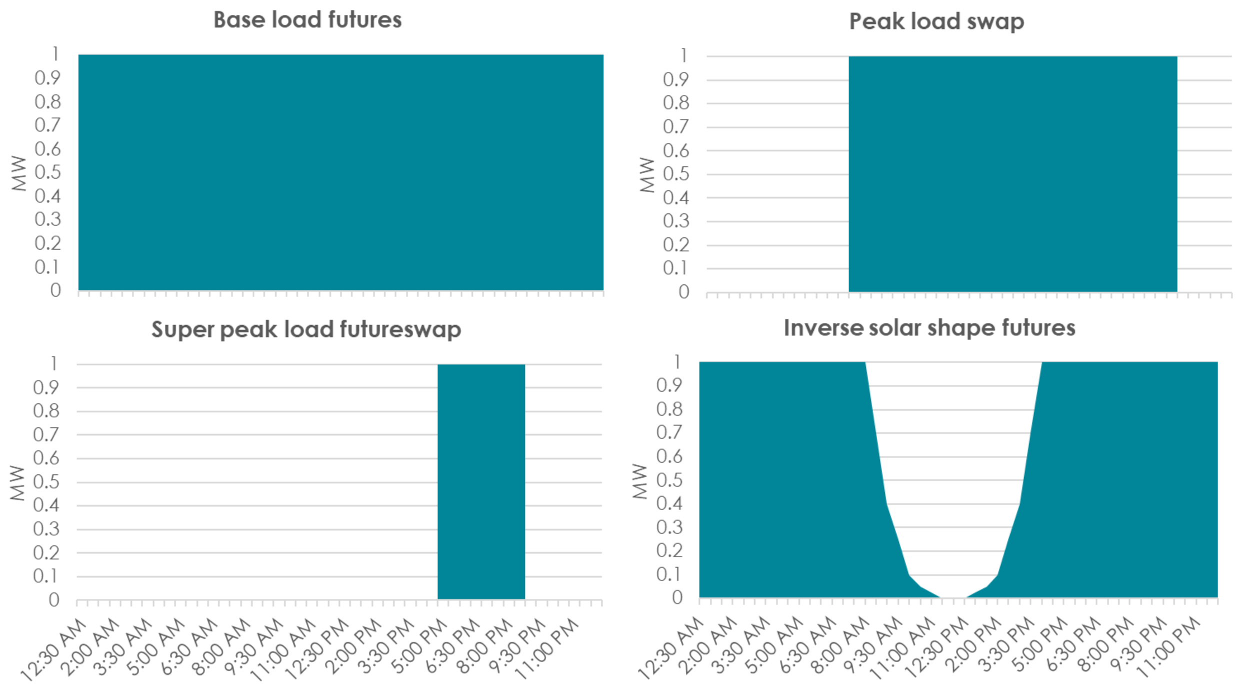
In addition to these standardised hedging products traded on the ASX, retailers can purchase OTC contracts. These contracts are traded between counterparties and can have varying terms including time period, settlement terms and credit support terms. Examples of these contracts include:

- load following swaps – which involve agreeing a fixed strike price irrespective of load and time of day. This has the effect of shifting wholesale price risks for the load profile to the counterparty, or seller, of the contract;
- inverse solar load swaps – which enable hedging specifically during non-solar periods to allow more retailer load volume coverage via swaps to account for reduced volume (due to solar PV) during the day; and
- super peak swaps – similar to ASX-traded peak contracts, but with a different and shorter time period. The time period can vary based on the contract – an example would be from 5pm-9pm on weekdays.

Since OTC products are not traded publicly, the valuation and terms of these products are commercial in confidence to the contracting parties. It follows that the terms and pricing of these contracts are not publicly available.

The timing dimension of the ASX base and peak load futures contracts and these alternative OTC hedging products are illustrated in Figure 2-3 below.

Figure 2-3: Illustrative daily profiles for 1MW wholesale energy ASX and OTC futures contracts



The principal advantage of ASX-listed products is that they are readily available to retailers and have transparent prices and contract terms. OTC products, on the other hand, provide greater flexibility to agree on terms for the product to match the retailer's net load profile.

In the context of the options available to a retailer described above, there are many strategies used by retailers to manage risks and improve their competitive position in the market. For example, a simple hedging strategy for a retailer may involve:

- purchasing base load futures contracts to the level of the average expected minimum load, to minimise exposure to the wholesale price when volumes fall below contracted volumes; and
- purchasing cap contracts to manage periods of higher load and spot price risks (including the risk of high prices during high demand events, ie, high temperature days), which may involve purchasing a conservatively high level of cap contracts to manage lower probability but high impact price and load events.

We describe an example of applying this hedging strategy in Box 1 below.

Box 1: Example purchasing cost under a simplified hedging strategy without solar exports

Figure 2-4 below provides an illustrative example of a simple hedging strategy. In this example, base load futures contracts are purchased up to the level of expected minimum load and caps are purchased for up to 105 per cent of the expected maximum demand in a half hour period. This level of cap contracts reflects uncertainty in maximum demand and the expected benefit of over-hedging to minimise the risk of exposure to high prices when demand exceeds expected values. More specifically, in this example:

- the retailer will effectively pay a fixed price for 150MW of load, as determined by the strike price for their base load futures contract;
- in some periods on particular days, the customer load may fall below the 150MW base load futures contract level, at which times the retailer will, in effect, need to 'sell' this electricity back into the

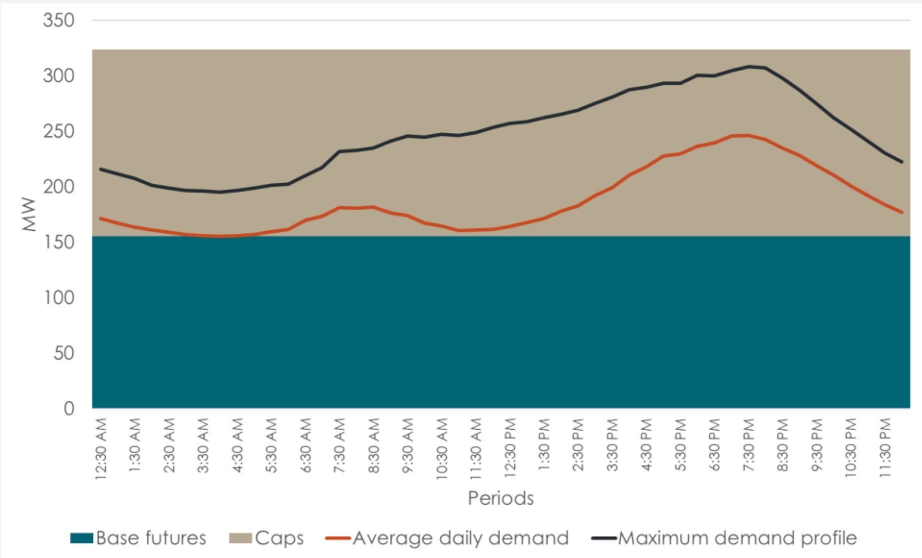
market – these periods will tend to have low demand, and so low prices, and therefore the retailer will tend to make a loss for the difference between the strike price and the prevailing spot price;

- the retailer will be exposed to the spot price, at prices less than $300 per MWh, for load greater than 150MW, but less than the quantity of cap and base load futures contracts, ie, 320MW; and
- the retailer will be exposed to the full spot price for load greater than 320MW.

In summary, the aggregate purchase costs of electricity for the retailer in this example will comprise:

- the price under the base load contract for 150MW; plus
- the spot price, capped at $300 per MWh, for load greater than 150MW, but less than 320MW; plus
- the cost of the cap contract; plus
- contract losses resulting from exposure to low spot prices when load is less than the base load contract level, ie, 150MW; plus
- the cost of purchasing energy from the spot market for load greater than 320MW.

Figure 2-4: Illustrative hedging behaviour for a load profile without solar exports



2.3 Impact of solar exports on a retailer’s approach to managing wholesale price risks

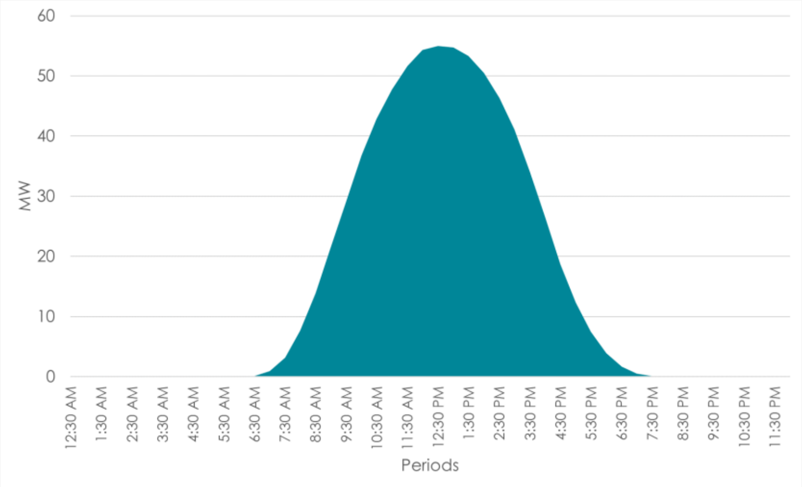
Customers’ solar exports have the effect of changing the aggregate load profile of the retailer’s customers, and so the profile that the retailer needs to hedge when purchasing contracts. This will in turn effect the combination of contracts that a retailer will seek to purchase to hedge their load.

It follows that the value of solar exports to a retailer will be based on the change in wholesale electricity purchasing costs resulting from the changed load profile. We illustrate the implications of a change in the aggregate load profile through the simplified example continued in Box 2 below.

Box 2: Example purchasing cost under a simplified hedging strategy with solar exports

Figure 2-6 below shows a case where a retailer is seeking to hedge the same load described in Box 1, but now with additional exports from solar PV from their customers, as depicted in Figure 2-5.

Figure 2-5: Illustrative solar exports profile



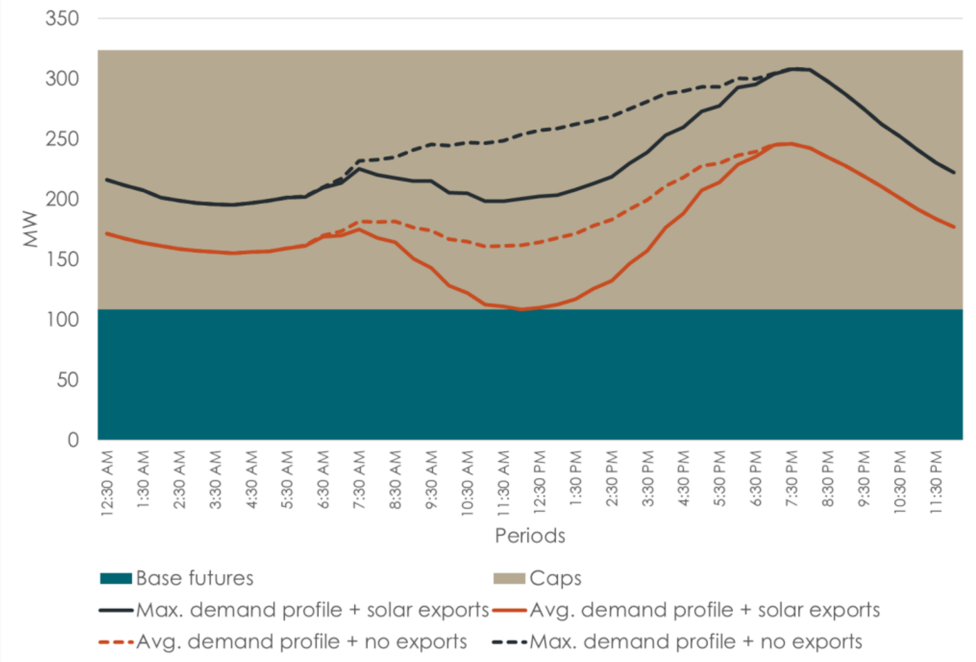
The introduction of exports from solar has several implications in this example. Under the same simplified hedging strategy, the retailer:

- has a lower total load that it is seeking to hedge;
- has effectively the same expected maximum daily load;
- would tend to reduce the quantity of base load contracts purchased, reflecting the lower minimum average daily load; and
- would purchase a higher quantity of cap contracts, to achieve effectively the same level of total contract cover, reflecting no change in maximum load levels.

It follows that the change in wholesale electricity purchasing costs as a result of the solar exports would result from:

- lower total quantity to spread the costs over, and so a higher per unit cost, all else being equal;
- higher costs incurred in purchasing cap contracts;
- lower costs incurred in purchasing base load futures contracts; and
- additional exposure to the spot price for prices less than $300.

Figure 2-6: Illustrative impact of solar exports on retailer hedging behaviour



In summary, as a retailer's demand for energy during the day falls and so the profile becomes peakier, under a simplified hedging strategy, this will decrease a retailer's choice of the proportion of base load futures contracts relative to cap contracts, with a tendency towards purchasing less base load futures contracts.

The introduction of solar exports will tend to have the effect of decreasing aggregate electricity purchasing costs for the retailer but will tend to increase electricity purchasing costs on a per MWh basis. Ultimately, the aggregate effect on electricity purchasing costs and so, the value of solar exports to a retailer would be a function of:

- relative contract prices and premiums between cap and futures contracts;
- wholesale prices, to the extent that a retailer has a different level of exposure to wholesale prices; and
- the underlying shape of the retailer's load profile – a retailer with higher relative load during the middle of the day will value solar exports more than a retailer with lower relative load during the middle of the day.

2.4 Hedging exposure to wholesale spot price risk for specific periods of the day

Retailers may desire a hedge of wholesale spot price exposure for specific time periods during the day to reflect the fluctuation in the aggregate load profile of their customers. Retailers have a number of options as to how they cover this exposure, each with different costs and benefits. The availability of options for hedging exposure during specific periods of the day varies, based on the typical needs of retailers, for example, during periods of very high demand in the evening peak or during periods of very low demand during the day when rooftop solar PV output is high.

As indicated in our discussion in section 2.2 above, ASX-traded products do not provide exact cover for the solar profile shape. In particular, none of the ASX traded products allow a retailer to specifically hedge to match the time of day of the solar exports into the grid from customers.

OTC products provide additional flexibility for retailers to hedge for specific periods of the day. The wider variety of OTC contracts, relative to ASX-traded contracts, means retailers can create more flexible hedging approaches using these contracts. For example, potential OTC contracts that could be used to manage the effects of increasing solar PV exports on the aggregate load profile include:

- peak $300 cap contract – a cap contract that applies to only a portion of the day, which can be used to increase cap coverage specifically for periods of the day with risks of very high demand and wholesale prices;
- super peak load futures contract – a peak load futures contract that applies to fewer periods in the day than an ASX peak load futures contract, which can be used to manage exposure to high demand and prices during, for example, the evening peak;
- inverse solar futures contract – a futures contract whereby the quantity varies throughout the day to reflect the inverse of a solar shape, which can be combined with other products to create a more precise hedge for an aggregate load shape with low levels of load during periods of high rooftop solar PV output (see example in Figure 2-3); and
- solar shape futures contract – a futures contract whereby the quantity varies throughout the day to reflect the profile of solar PV output, which is most valuable to those retailers with relatively high load during periods of solar PV output. This is a product typically offered by a solar PV generator.

In general, we understand that the availability and trading volumes of these contracts is more limited, with fewer counterparties with which to enter agreements with. It follows that these contracts, while available to the market, are not likely to provide a reliable estimate of electricity purchasing costs, particularly for specific periods of the day.

2.5 Retailer approach to setting feed-in tariff offers

The starting point for retailers in developing competitive feed-in tariff offers is understanding how the profile of solar exports is likely to affect its aggregate load profile, and so underlying wholesale costs and price risks.

Within a retail electricity business, the setting of feed-in tariffs requires the alignment of both pricing and electricity cost-based considerations. More specifically, in setting retail prices, the pricing function within a retailer will have regards to input from the wholesale markets function within the retailer as to the incremental cost associated with different components of a retail tariff, including the solar feed-in tariff.

From this starting point, the development of feed-in tariff offers is based on a retailer’s understanding of the competitive dynamics within the market that it is operating within. For example, retailers may seek to target customer acquisition in particular customer cohorts, consistent with a broader strategy. It follows that in considering setting the levels of the different tariff components, in addition to the incremental costs of procuring the energy for that component, a retailer may also consider:

- other retailer market offers, and the relative prices across tariff components adopted by these retailers; and
- the value of cohorts of end-customers as a whole, taking into account their load and typical export profiles.

In other words, competitive dynamics within the market may lead some retailers to offer feed-in tariffs below the value of the associated solar exports of those customers, as a way of offsetting lower consumption tariffs. Similarly, a retailer may offer feed-in tariffs above the value to them from wholesale costs, as a way of attracting a customer, although this may be partially offset through profit margins for other tariff components.

It follows that there is not a direct relationship between retailer practices in setting feed-in tariffs and the value of the associated energy. That said, the underlying value of feed-in energy does provide some guidance as to a reasonable feed-in tariff, with deviations reflecting different competitive dynamics.

3. Measuring the value of solar exports

In this section, we describe the relationship between alternative approaches to valuing solar exports and consider the practicalities of setting a benchmark given publicly available information.

3.1 IPART's approach directly values solar exports in the market

IPART's methodology for setting feed-in tariff benchmarks involves:

- projecting wholesale electricity prices using:
  - a 40-day average of ASX NSW base-load electricity futures contracts; and
  - volume weighted average of all historical trades for NSW base load future contracts;
- applying a solar multiplier to reflect the timing of solar exports in the wholesale market, calculated as the ratio of the average solar export-weighted price to the average time-weighted price using the most recent three years of historical wholesale spot prices and net solar export data;
- increasing the value of the benchmark based on the assumed reduction in network losses; and
- adding the value of the NEM fees and charges that retailers avoid paying when they supply customers with other customers' solar exports.

This approach directly values the solar energy generated and exported in the same manner as if the solar exports were a source of a wholesale generation that would otherwise be earning wholesale market prices for export volume (adjusted for differences in losses and contract premiums), at the time those exports occur.

In this way, this method can be considered as valuing solar exports at the wholesale price that could have been earned by the solar exports if they were engaged in the wholesale market directly. The solar multiplier then allows IPART to estimate the relative value of a solar energy shape compared to a flat load profile.

The application of the solar multiplier (based on relative historical prices) to estimates of future wholesale prices as measured by the ASX base load futures contract price then gives rise to an estimate of the value of solar PV that reflects:

- the general level of expected prices in future periods, as indicated by the ASX base load futures contract price; and
- the value of solar PV exports, relative to this expected level of prices.

In our opinion, the use of ASX base load futures contract prices as the basis for the estimated level of future prices is an appropriate starting point, and consistent with approaches adopted in other jurisdictions.

A more direct estimate of the value of solar output may, in theory, be able to be observed based on prices for solar shape futures products, that are potentially traded OTC. That said, such an approach is not practical for IPARTs feed-in tariff benchmark because:

- the trading volumes and prices in this market are not able to be easily observed; and
- deal values and terms are commercial in confidence and not publicly available.

It follows that, in our opinion, assessing the value of the solar shape based on outcomes in the wholesale and contract market, consistent with IPARTs approach, is an appropriate and proportionate approach to estimating a solar feed-in tariff benchmark.

3.2 Solar exports can also be valued based on the change in hedging costs given changes to a retailer's load profile

As set out in section 2, retailers manage wholesale price risks through engaging in hedging, given expected aggregate customer load profiles. It follows that an alternative approach to estimating the value of solar feed-in tariffs would be to estimate the change in total energy purchasing costs of a benchmark retailer that behaves in a manner consistent with retailers' actual practices. Practically, this would involve:

- costing a strategy for procuring energy with the use of hedging contracts to meet a retailer's load profile with expected solar exports;
- costing a strategy for procuring energy to meet a retailer's load profile absent solar exports; and
- estimating the value of solar PV exports (on a per MWh basis) by the differences in purchasing costs between these scenarios, divided by the quantity of solar PV exports.

In practice, such an approach would entail IPART establishing a view as to a representative hedging strategy that would be adopted by a retailer, both with and without solar PV exports, or alternatively, directly seeking to estimate the incremental costs of hedging a solar PV profile.

In our opinion, in the context of a wide range of potential hedging strategies adopted by retailers and the potential use of, more targeted, but confidential OTC contracts, the benefits of adopting an approach that may reflect the practices of retailers is outweighed by the practical challenges of such an approach.

In principle, over the longer term the cost of wholesale energy hedged in a manner consistent with retailer's actual practices should be equivalent to the wholesale price for the load being hedged, plus any premium associated with the purchase of hedging contracts. Differences may arise in the context of rigidities in contract markets that mean that retailers may adopt approaches to hedging which are dictated by available hedging products rather than economic fundamentals. This relationship holds since customer solar exports essentially provide a physical hedge for retailers by avoiding the need for the retailer to purchase energy directly from the wholesale market.

It follows that so long as the solar exports upon which IPART's solar multipliers are calculated are equivalent to a retailer's customers solar exports, then taking a longer-term historical average of ASX base load futures prices and multiplying it by a solar multiplier, as calculated using IPART's methodology, would be a reasonable approximation of the costs that are avoided by the retailer.

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4. Considerations when using longer-term forecasts of wholesale prices

In this section, we address the remaining matters that IPART has raised, specifically:

- whether IPART's application of a solar multiplier to long-term historical forecasts of wholesale prices reflects retailers' actual practices and so is appropriate; and
- whether using longer-term historical forecasts of wholesale prices is appropriate for setting time-dependent feed-in tariff benchmarks.

4.1 Appropriateness of applying solar multiplier to long-term historical forecasts of wholesale prices

IPART has introduced the use of a volume weighted average of all historical trades of ASX base load energy futures to reflect retailers' avoided efficient wholesale costs, into its methodology for the calculation of the feed-in tariff benchmark. The estimate of futures wholesale prices is then adjusted by a multiplier to reflect the difference in the prices for the profile of solar exports in the load profile, relative to the average load profile.

IPART is seeking our opinion as to whether it is appropriate to apply a solar multiplier to these long-term historical forecasts. In our opinion, it is appropriate for IPART to modify historical forecasts of wholesale prices using the revised approach for the estimation of future wholesale price based on the solar multiplier. This is because:

- the historical forecasts are being used as an indication of expected future average wholesale prices, which while inclusive of expected solar exports does not directly measure the incremental value of solar exports to retailers and the wholesale market;
- while a retailer uses hedging products to manage wholesale price risks, the timing of solar exports affects the net load profile that retailers to supply and so affects retailers' hedging strategy and associated costs; and
- IPART's methodology is a reasonable approximation of the wholesale price for the load being hedged, plus any premium associated with the purchase of hedging contracts, and so is an appropriate means of estimating the value of solar exports from the perspective of a retailer, since these two values should be equivalent in the long-term.

We understand IPART has used the most recent three years of historical data to calculate the solar multiplier. We consider the use of multiple years, in the manner applied by IPART, as reasonable for smoothing out variations in weather conditions that may occur in individual years.

As solar penetration has increased, so has the impact on the wholesale market and the differential in prices weighted by solar PV export as compared to the time-weighted average of spot prices. This is because increases in supply from solar PV will tend to place downward pressure of prices during periods of solar PV output. It follows that an approach that places more weight on more recent years would more likely take this trend into account. We understand that IPART reflects this trend through the adoption of the mid-point of the multiplier calculated on the basis of:

- the most recent year of data;
- the most recent two years of data; and
- the most recent three years of data.

This approach includes an implicit higher weight on more recent values.

We note that by estimating the solar multiplier based on historical price outcomes, this approach does not take account of potential future changes in the distribution of wholesale prices in response to increase in solar PV output. However, in our opinion, it remains the most robust and transparent approach based on publicly available information.

4.2 Use of longer-term historical forecasts of wholesale prices for setting time-dependent feed-in tariff benchmarks

IPART also uses a trade volume-weighted average of all historical trades of ASX base load futures as one basis for determining future wholesale prices for setting time-dependent feed-in tariff benchmarks.

Ideally, for time-dependent feed-in tariffs the appropriate benchmark would be a relevant time-dependent energy futures contract. In principle, this would reflect current market expectations about future wholesale prices during that time period.

In our opinion, IPART's current approach of modifying the base load futures contract prices by a solar modifier to reflect the timing of solar exports remains reasonable.

The reasons for using historical forecasts of wholesale prices for setting feed-in tariff benchmarks appear to apply equally between all-day feed-in tariff benchmarks and time-dependent feed-in tariff benchmarks. It follows, that in our opinion it is equally appropriate to use historical base load futures contract prices to set time dependent feed-in tariff benchmarks.

It is worth noting that a time-dependent value for feed-in-tariffs has limited application in the current market environment. This is principally because customers with the ability to change the timing of their exports to the grid, for example, through the use of battery storage, will first seek to avoid, typically higher, retail consumption charges, as a priority over seeking to optimise the timing of their exports, unless their aggregate solar energy production exceeds their consumption. These tariffs have been provided for in other jurisdictions but are rarely offered by retailers.

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