Hedging Fundamentals Part 5 – The role of Forecasting in Hedging.

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By Paul Chapman

Forecasts of spot prices are an important tool in the hedging toolkit, and this post provides an overview of the role of forecasts in hedging.

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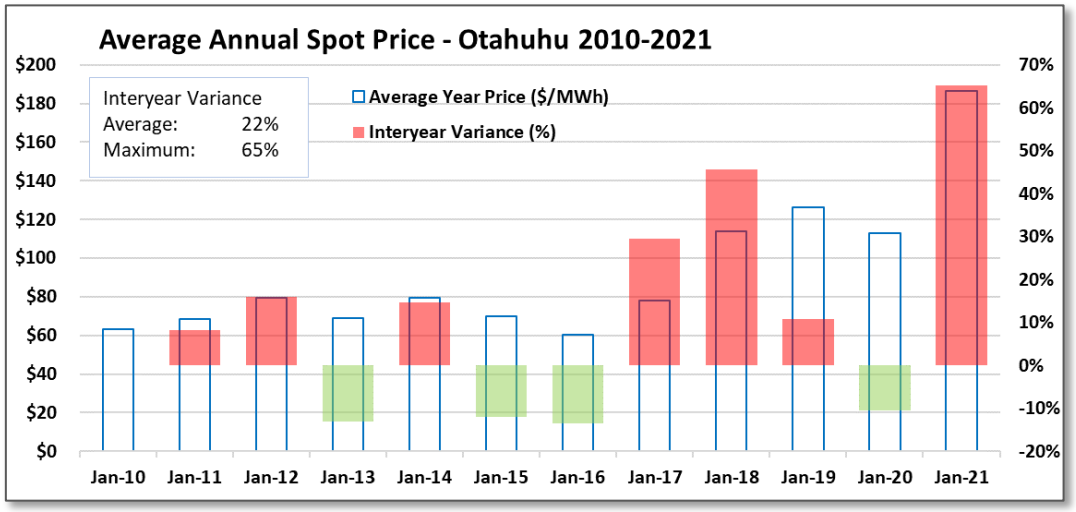
By Paul Chapman, 30th August 2021

Remember this chart from Hedging Fundamentals part 2? It shows wholesale electricity prices vary greatly from year to year; and should help convince you that predicting future spot price is more difficult than simply projecting past prices into the future.



As either a buyer or a seller of a hedge contract, you will be keenly interested in the strike price. This is fixed price in the contract that determines whether you payout or receive money as spot prices evolve over time; and, of course, future spot prices are unknown at the time you make the commitment to a hedge.

The primary reason for hedging is to provide an acceptable level of certainty over future financial outcomes. But no one likes paying more than they must, which is what can happen when spot prices move away from the strike price and against you. Based on the old adage that "two heads are better than one", it can pay to take in the views of others with different perspectives when making a decision of consequence. This is where forecasting comes in.

In the broadest sense, a forecast is a prediction, or set of predictions, about the future. The forecasting field is often divided into qualitative and quantitative methodologies. Qualitative forecasters rely more on expertise, introducing an element of subjectivity, while quantitative forecasts are built on deterministic and probabilistic models to provide objective results. Both approaches have their merits; an expert with deep industry knowledge can accommodate factors that have not, or cannot be factored into the objective models, while the objective model will not dismiss potentially valuable results that even a seasoned expert may regard as too counterintuitive to consider.

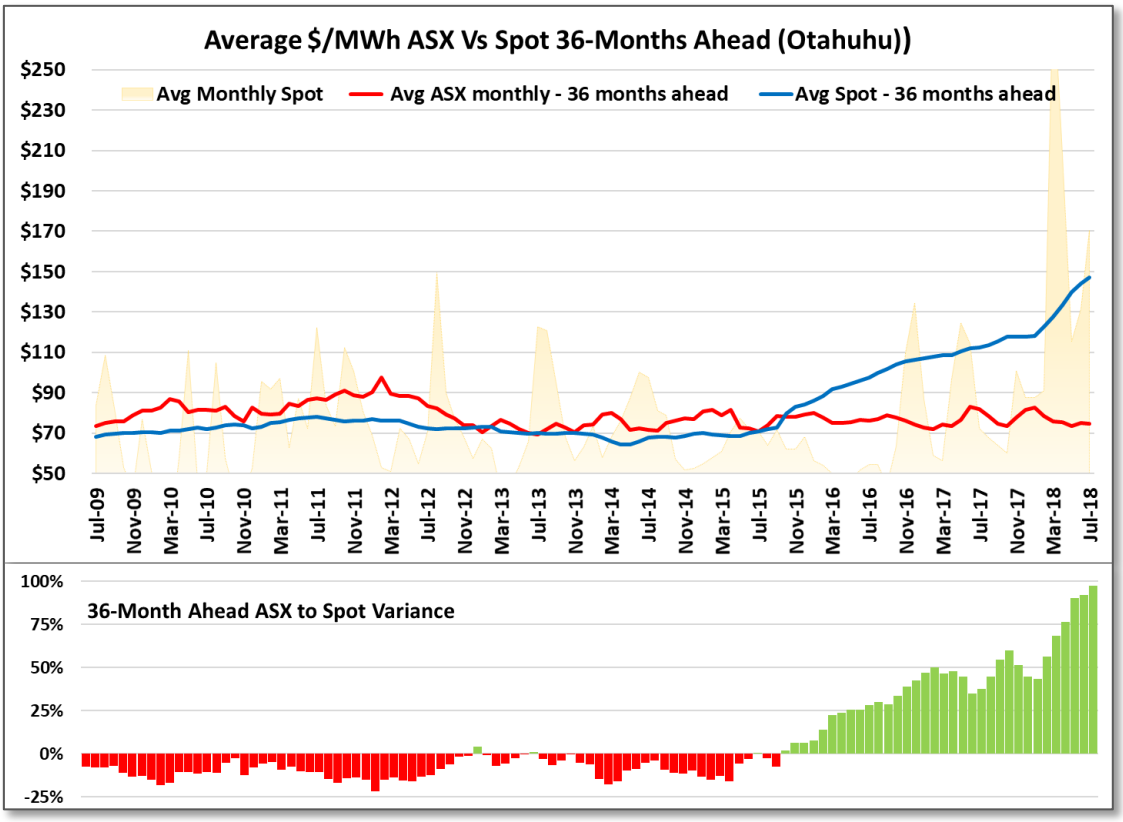
Both approaches are best combined when forecasting for the electricity market. The industry produces vast amounts of detailed historical pricing data which must not be completely discounted by the forecaster, as some elements of past price behaviour do extend into the future. For example, we know that past prices were highly volatile, and we should expect the same in future. But just because the average spot price over the last three years was $X, doesn't mean that will be the case for the next three years!

Also, the future spot prices which the forecast attempts to predict will be discovered in real time by a process that takes into account: generator offers, consumer demand, and the electrical topology and capacity of the transmission system. But the prices being offered, and the demands being made, will be influenced in the future by factors some of which will be too uncertain or too 'lumpy' to model objectively. Expert knowledge is needed to constrain the output of quantitative analysis to manageable levels. The application of weightings to specific results across a range of outcomes is a commonly used example of how the two approaches can be combined.

For those without in-house forecasting resources, the most publicly accessible forecast of NZ electricity spot prices is the ASX forward curve. Published daily on the ASX website the forward curve is based on the prices of contracts traded by traders betting real money on their "informed guesses" about future spot prices. A large part of the rationale for establishing NZ electricity futures contracts on an exchange-traded platform was to provide electricity market participants and other interested parties with a publicly available sources of future price information to help guide their risk management decisions.

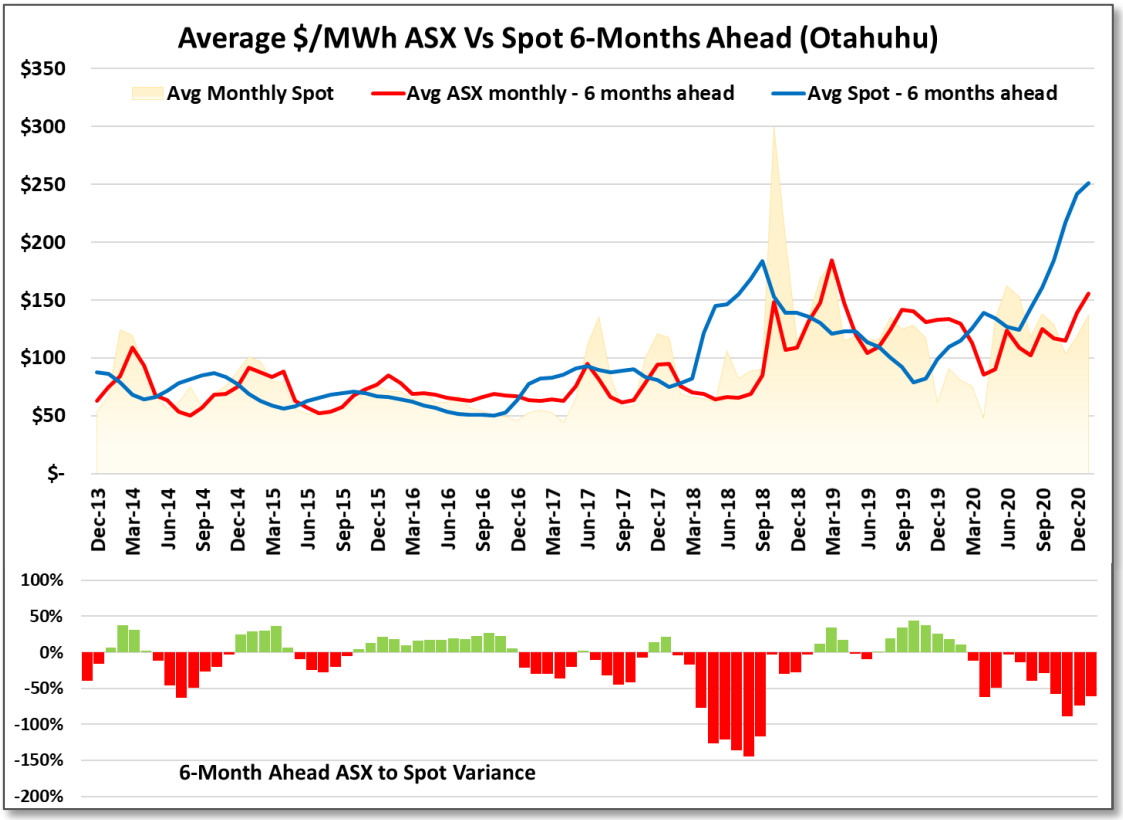
The futures market started in July 2009, so let's see how it has performed as an aggregator of the 'forecasts' of energy traders.

Pick a date on the x-axis in the chart below and the corresponding point on the red line shows the average contract (proxy forecast) price over the following 36 months (based on ASX quarterly futures contracts). The point on the blue line shows what actually happened to spot prices over those 36 months. The bars in the lower companion chart show the percentage difference between forecast and actual; red bars for when spot prices were lower than forecast and green for higher than forecast.



It seems clear that traders contracting from late 2015 onwards did not expect the volatility seen in the market since 2017 onwards. Across the whole sample range for this chart the correlation between forecast and actual was a not very impressive -12%. Even if we only consider the period from July 2009 to June 2017, when the average spot price was more stable, the correlation only improves to -6%.

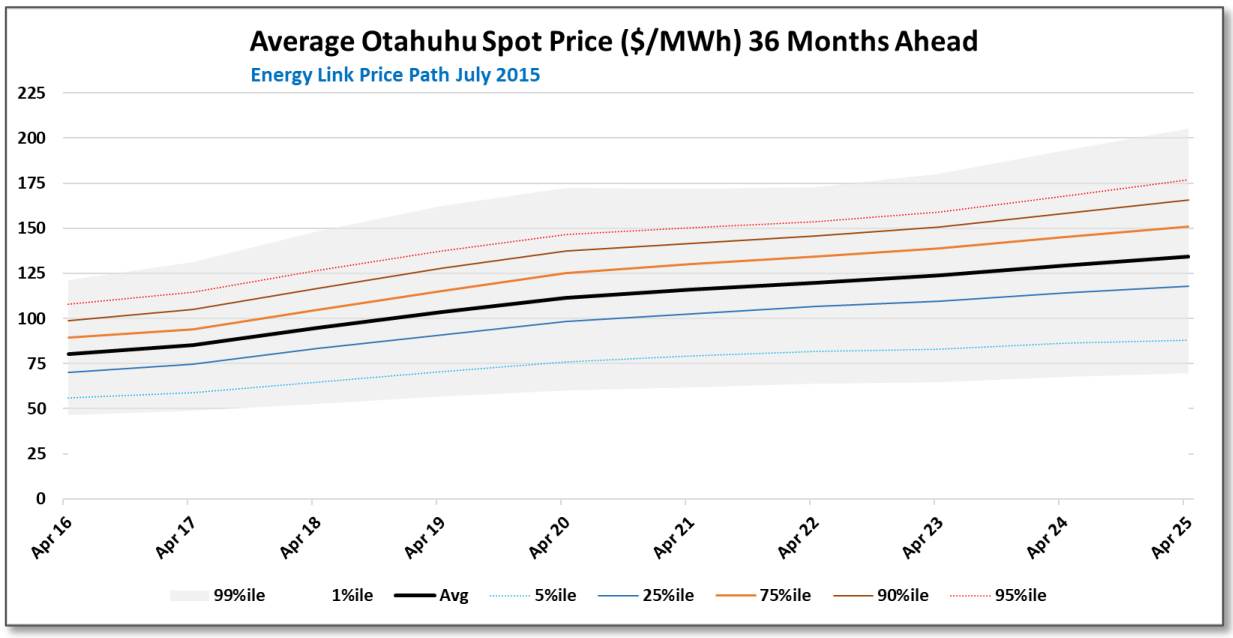
Long range forecasting is difficult; clearly. Things do look better for shorter range forecasting. The next chart repeats the comparison using prices from ASX monthly futures contracts and only looking 6 months into the future.



The variance is greatest during events such as the 2018 Pohokura outage or the 2020 Covid lockdown, indicating they were not anticipated, but the overall correlation is a much healthier +54%. Interestingly the correlation between the average ASX six-month ahead price and the average price in the month in which the trades were made is a quite strong +74%.

Those watching the ASX daily know futures pricing does respond quickly to new information, as any healthy market should. The response to near-term weather forecasts indicating increased hydro lake storage is a good example. But despite this, there are reasons why a trader may want to consult alternative sources of forecast data. Not least because the futures curve at any moment in time is a condensation of several traders' forecasts weighted by their willingness to trade at prices diverging from those forecasts. The curve offers a single price point for any given future period. What you can't see is the sensitivity of the pricing around that point. The futures price is discovered daily through actual trades in a marketplace. On any given day a large demand on one side of the market may not move the price by much, while on another day even a relatively small demand may shift the price significantly.

A more useful forecast would provide a probability distribution of prices at a future point in time. Something like the simplified Energy Link forecast from July 2015 in the next chart (which, by the way, is well out of date by now), which uses percentile lines to show both the level of sensitivity around the average price and where the outlying prices might land under feasible but less likely scenarios.



Returning to our adages; “in the democratic republic of the blind the one-eyed citizen is first among equals”, when considering committing to a hedge contract with a financial obligation dependent on uncertain future prices it is worth taking into account the views of others who may have a different perspective and knowledge base than you do. Forecasts can influence your hedging decisions in areas such as how much volume to hedge at a given trading price, from what point in time and for how long. They can also feed into answering questions like: is it worth waiting for the market to move before hedging or can I allow myself some exposure to spot prices?

Forecasts have other, less obvious applications. For one thing, the ASX forward curve only goes out four years, so you need a forecast beyond that. Secondly, a good forecast includes forecasts at all nodes on the grid (ASX only has two nodes), which can be used to inform decisions around where you hedge, how much you hedge at any given node, and how to assess more exotic and complex hedges such as Financial Transmission Rights (which hedge the price differences between two nodes on the grid).

An important thing to bear in mind when consulting a forecast is that even the best electricity price forecasts are subject to error. A forecast is a tool to inform, not replace the decision process. A good forecast should disclose the basis of its methodology and expose the assumptions used to constrain its results. This allows you to identify where your views differ from the forecaster’s and assess how much weight to give to the forecast, and how to assess the prices in the ASX forward curve. A good forecaster should also track their forecast accuracy over time and make efforts to improve their accuracy.

Key takeaways:

A forecast can help with your hedging decisions by influencing when, if and how much to hedge, and for how long.

A good forecast is an informed prediction and should always be subject to critical assessment before being used to support a hedging decision.

The ASX futures market mentioned in this blog is an example of a platform for trading standardised hedging products. There is another class of hedging instruments with more flexibility than futures contracts which are trading bilaterally “over the counter” directly between counterparties. I’ll be contrasting exchange and OTC traded hedges in the next blog.