# Real Time Pricing

## More actionable and accurate pricing is here

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ELECTRICITY AUTHORITY
TE MANA HIKO

# Overview

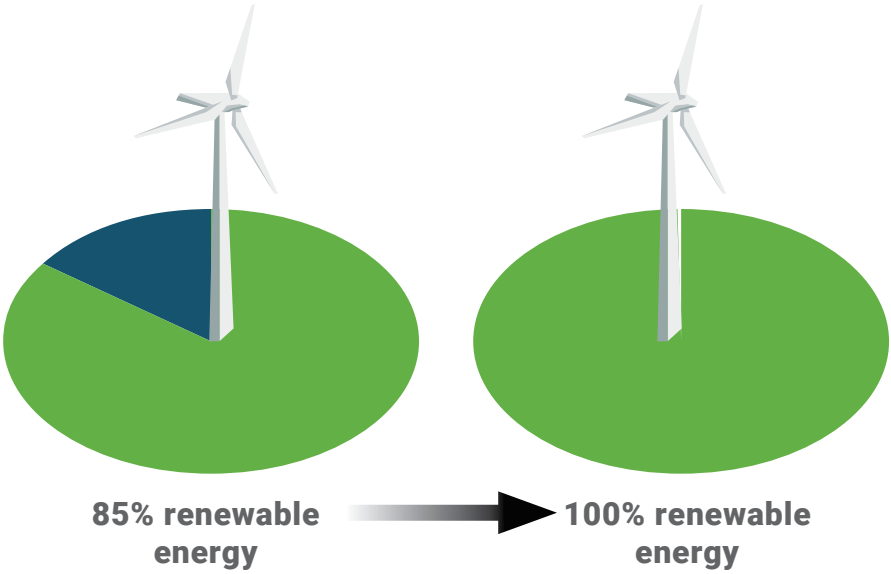
**The Electricity Authority regulates the electricity industry for the long-term benefit of consumers. Unlocking the potential for more renewable energy is one of the ways we can do this, as part of the Authority's strategic ambition of low emissions energy.**

A cleaner mix of energy will require large quantities of new renewable electricity generation, increased use of Distributed Energy Resources, new ways to participate and more participants – changing the dynamics of the electricity system as we know it. We need a stable regulatory environment with robust rules and clear price signals. That is why the Authority is introducing Real Time Pricing into the wholesale electricity market.

Real Time Pricing will deliver accurate and reliable spot prices to be published at the end of each half hour trading period, removing any guess work and encouraging more participants to take part in the market with certainty around costs and benefits. The current indicative spot prices for energy and instantaneous reserve in the wholesale electricity market are not finalised until at least two days after the trading period, meaning industry participants make decisions on spot prices two days before they know what the final prices will be. They rely instead on an indicative series of forecasts to estimate the financial consequence of their decisions.

This makes spot prices uncertain, and harder for parties to make efficient real time decisions about their consumption and generation. In this brochure we review what opportunities and benefits Real Time Pricing will deliver to the market.

# Transition to a low emissions economy




**In times of peak demand, when we are unable to meet energy demand with renewable energy production, we turn to energy powered by gas or coal. More accurate and actionable wholesale pricing will be needed to transition to a low emissions economy.**

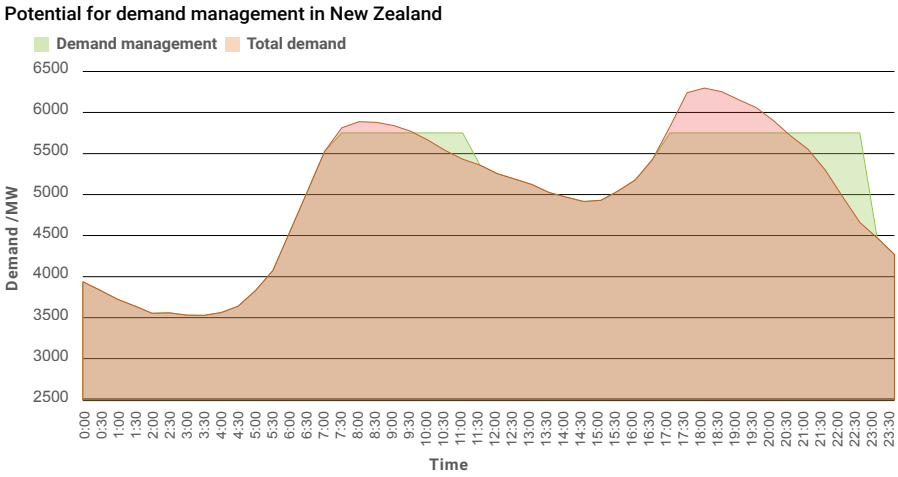
## Displacing coal and gas powered peaking plants

Real Time Pricing will pave the way for increased renewable generation as New Zealand transitions to a low emissions economy.

Real Time Pricing will provide a low-cost means for smaller-scale interaction with the wholesale market. Small providers such as residential solar and battery systems, will be able to have their resources bid and offered on their behalf into the wholesale market.

Allowing these distributed resources to interact with the market will contribute to displacing gas powered peaking plants and using more renewable sources of energy.

# Management of variable generation




## Renewable resources such as solar energy and wind are variable as their production is dependent on when the sun is shining and the wind is blowing.

The above graph illustrates how demand management can be used to reduce peak demand to better respond to times when the wind stops blowing or the clouds cover the sun.

Renewable electricity generation can be ramped down but cannot be ramped up to balance increasing demand.

The increase in variable renewable generation will likely lead to more volatile wholesale electricity spot pricing without moderation.

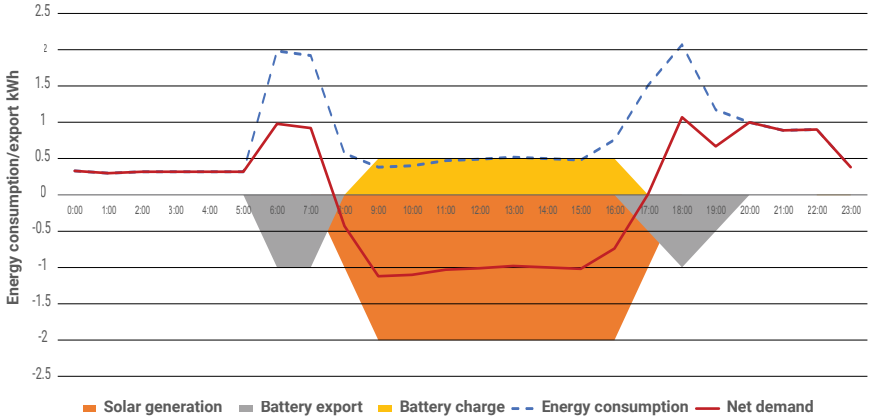
To deliver renewable energy in an efficient, secure, and resilient way we need accurate and actionable pricing signals in real time.

### An increase in variable generation will need actionable and accurate pricing

Demand response and Distributed Energy Resources are cost effective ways to manage variability.

By enabling demand response and Distributed Energy Resources to signal their price sensitivity in the wholesale market, spot market prices will be more stable and, on average, lower than they would otherwise have been.

**Illustrative effect of DER on residential consumption**




## Demand response (DR)

The above graph illustrates the effect that a solar generation and battery installation can have on a household's energy consumption – reduced morning and evening peaks and potentially exporting energy during the day.

Real Time Pricing in the wholesale electricity market will help moderate electricity prices in various ways. The main way we expect this will happen is through people getting price signals and as a result changing when and how they use electricity known as 'demand response'. Consumers on smart meters will be able to choose to schedule things like dishwashers and washing machines for times when electricity consumption is cheaper or smart devices will be automatically controlled based on pricing signals from the wholesale market.

If enough people change their electricity use, this could help minimise the need for construction of new generation plant, with flow-on benefits for all consumers.

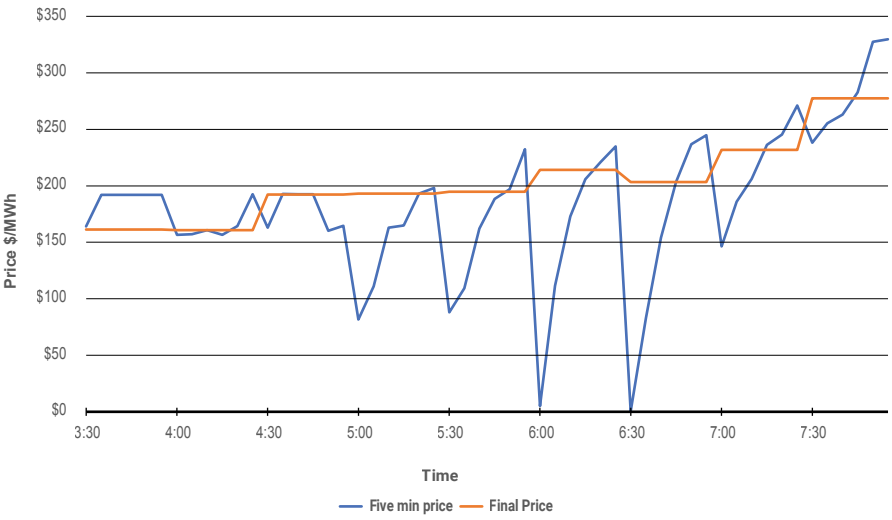
## Distributed Energy Resources (DER)

Real Time Pricing will add a low-cost path for small providers (such as residential and solar and battery systems subject to approval by the system operator), and participants of small providers, to bid and offer their resources into the wholesale market. This will enable the system operator to use that information in the market schedules to balance the volatility of variable renewable generation.

It will help mitigate price volatility within a trading period as wind and solar generators ramp up and down in response to their respective resources.

# Wholesale pricing

**Comparison 5-minute forecast price vs final price at Otahuhu 28 June 2022**




## Indicative wholesale pricing

The above graph shows the variance between the current five-minute indicative pricing (blue) and the final price (red).

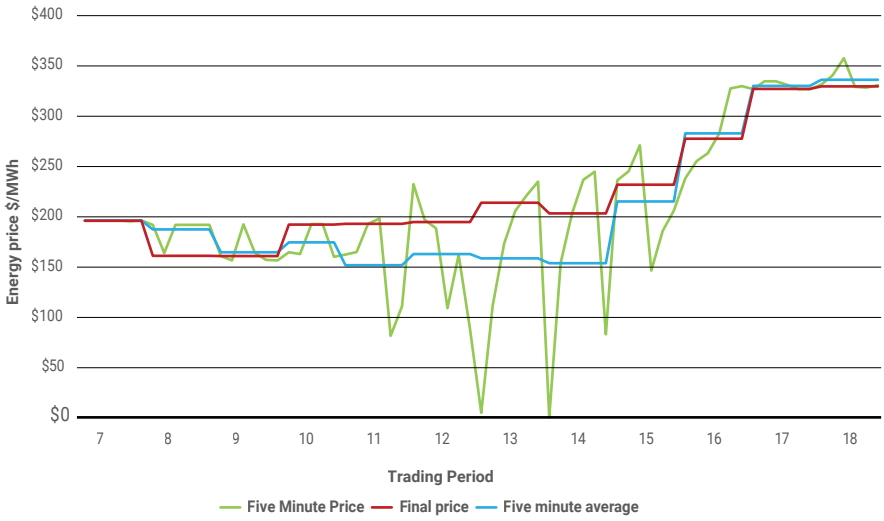
The price people see when they sell or buy electricity on the wholesale electricity market is only indicative, they get the final price two days later. As the market continues to evolve, the lack of price certainty in real time will slow development and frustrate investment.

Large commercial and industrial consumers can find the lack of price certainty means some of their consumption decisions prove to be more expensive than they would like.

Similarly, residential customers who want to take advantage of spot price contracts cannot be certain of the right time to restrict or increase their consumption.

Retailers are making decisions on their hedging strategies based on the volatility of spot prices. When supply conditions are tight (that is, when demand exceeds or comes close to exceeding the available generation), retailers have higher financial risk to high spot prices for the portion of their customer's load that they have not bought a hedge for.

**Illustrative difference between current final pricing and 5-minute average pricing**




## More accurate pricing and lower wholesale pricing

The above graph shows the closing of the variance between the five-minute pricing and final pricing.

Real Time Pricing will make the spot price simpler. What you see is what you pay as prices will be driven by live conditions.

Consumers and retailers will have real time information for short-term decisions about when to supply or use electricity.

Consumers on spot price contracts will be able to buy from the wholesale electricity market and will be able to make decisions on prices that they will pay.

Retailers will have better pricing information that will allow them to manage their exposure to high spot periods and keep their purchasing costs down.

Retailers will be able to offer competitive prices to customers in return for using demand flexibility. Consumers on smart meters will be able to choose to have some of their electricity use automatically managed when spot prices are high reducing the overall cost to supply electricity.

Real Time Pricing will mean pricing will be more dynamic. If enough consumers respond to a high spot price by reducing their consumption, the spot price would go down – resulting in a lower final price for the trading period.

# Scarcity pricing

## Scarcity pricing

In any given half hour trading period, if the amount of generation available decreases, the supply of electricity becomes more scarce and this causes spot prices to rise.

Higher spot prices encourage generators to make more of their existing generation available, and it encourages retailers and other purchasers to reduce power use or shift their consumption to lower price periods. Over time, spot prices provide longer-term signals which influence investment decisions by wholesale electricity purchasers and generators.

Although spot market prices generally signal the state of demand and supply conditions appropriately, on rare occasions generation capacity can become so scarce that forced power cuts are required. Normally, when a good or service becomes scarce, demand is rationed by increasing the price. However, forced power cuts reduce spot prices for electricity, undermining the financial incentive for wholesale parties to make arrangements with consumers to voluntarily conserve power and for generators to maximise available supply.

The final pricing process then applies an adjustment to the final prices after the event has occurred to reflect scarcity, hence participants do not receive appropriate information to modify their behaviour in a meaningful way in real time.

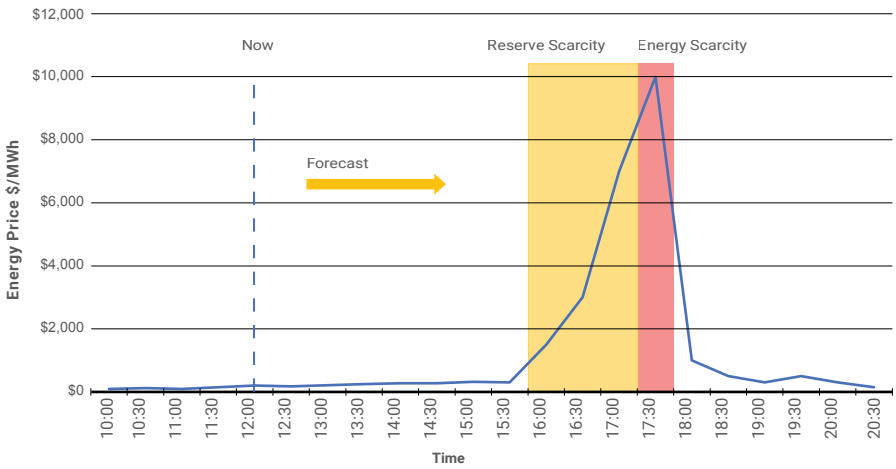
## Real Time Pricing and scarcity pricing

Under Real Time Pricing, scarcity pricing will automatically be applied to any reserve or energy shortfall in both the forecast and real time dispatch schedules.

Prices will reflect the type and severity of the shortfall and provide the information that consumers need to manage their demand or use Distributed Energy Resources to provide extra resources to the market.

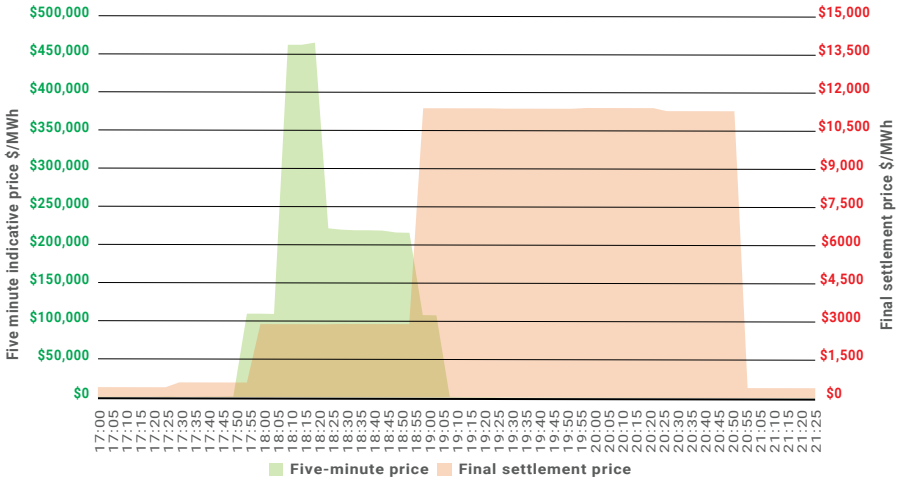
Low-cost ways of signalling Distributed Energy Resources and Demand Response availability to the market will also be introduced. This will allow these resources to be included in the market schedules and reduce the severity of scarcity situations.

**Forecast scarcity pricing**




Scarcity pricing will now show up in the forecast market schedules, giving more certainty of the system conditions ahead of time and the actions needing to be taken.

**9 August 2021 five-minute price vs final price Otahuhu**




Under the old pricing regime, scarcity would show as an infeasible price. These infeasible prices would not give an indication where the final price might settle at. It would also not suggest what action would be needed to alleviate the scarcity, or even if the scarcity occured in real time at all.

# What's next

## 1 November 2022

From 1 November 2022 wholesale market pricing is calculated in real time.
The settlement price for each trading period will be calculated at the end of the trading period and published immediately.

Retailers are able to reliably develop new products and consumers who are on plans where they buy from the spot market, will for the first time be able to make decisions on prices that they will actually pay.

**Actions:**

- Develop plans on how your business can use Energy Management systems to generate value for yourselves and consumers using the Real Time Pricing changes.

## April 2023

From April 2023 the dispatch notification product will enable the inclusion of Distributed Energy Resources and aggregated demand management in the wholesale market, subject to approval by the system operator. Enhancements to dispatchable demand will allow large industrial consumers to bid in demand management in a way that better suits the physical constraints of their plant and processes.

**This will enable:**

- better management of spot price volatility
- an alternative to financial hedges to manage spot price exposure
- better outcomes for large industrial participants bidding dispatchable demand and/or offering interruptible load to the instantaneous reserves.

## What can I do to make the most of the opportunities presented by the Real Time Pricing project?

- **Engage early** – A combination of tools and process changes are needed to realise the full benefits of Real Time Pricing. Engage with the distributors and other industry participants (e.g. load aggregators, battery providers) to put in place the mechanism to optimise this new pricing certainty.
- **Energy management programmes** – Think about whether any consumer energy management systems will be managed in-house or by a third party. The use of domestic or commercial loads to provide physical peak price hedges may be a strong commercial benefit.
- **New product offering** – Real Time Pricing will deliver a dynamic pricing system, which will enable retailers to offer a new suite of products to support customer retention. You could identify customers who are most likely to alter consumption in response to Real Time Pricing and tailor products for them.
- **Smart technologies** – Cloud-based products may help consumers manage demand control and monitoring.
- **Residential and light industrial customers** – Can reduce their electricity bill, by the use of smart technology that will give retailers or a third party the ability to adjust their consumption according to cost.
- **Large industrial customers** – Can manage their exposure by having part of their load based on fixed price and the other part on demand response and bidding that demand response into the wholesale market.
- **Improve price forecasting** – Actively participating in the market, as opposed to passively responding to published prices, will lead to more stable and certain pricing outcomes.

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