How is NZ’s energy crisis impacting the pulp, paper and packaging industry?

GEELONG, AUSTRALIA

New Zealand’s pulp and paper industry has lost a pulp mill – and could lose another – to an energy crisis that shows little signs of abating.

The Winstone Pulp International (WPI) pulp mill on the Central North Island will close permanently and cease manufacturing Bleached Chemi Thermo-Mechanical Pulp (BCTMP) immediately.

A second pulp mill, the recycling mill owned by Oji Fibre Solutions at Penrose in the Auckland region, has been proposed for closure by the end of the year, citing energy costs as fundamental to the expected decision. The Penrose mill employs around 75 people and is the sole fibre recycling facility in New Zealand. Oji was quick to point out that its extensive collections would continue, the fibre being shipped to other Oji recycling mills, including most likely the Malaysian operation.

IndustryEdge’s long experience in the pulp and paper industry reminds us no manufacturer likes closing facilities, including because of the impact on the workforce and their families and livelihoods. That means the situation is serious, so, how did it come to pass?

Pulp, paper and energy

At a facility level, and also at a national level, there is no escaping the fact that manufacturing the world’s paper, paperboard and fibre packaging products is energy intensive.

Though energy is used throughout the process of manufacturing pulp and paper, some operations can be self-sufficient for thermal (heat) and electrical energy. These are mainly the chemical pulp mills, where one of the by-products of circular manufacturing and the recovery of chemicals, is abundant energy.

Other facilities are however less self-sufficient, but still energy intensive. This is the case for the WPI mill, which uses energy to produce a ‘mechanical’ pulp and has limited thermal and even less electrical energy outputs. The situation is even more severe for Oji’s Penrose recycling mill, which has little to no capacity to recover or create energy.

These facilities are essentially stand-alone energy-sinks and are far more vulnerable to energy price rises than other pulp and paper mills. Couple that with the vulnerabilities created from selling into global commodity markets where ‘the price is the price’ and we can easily see there is also no opportunity to recover higher energy costs.

Especially when those costs have increased 600% over three years!

Energy prices exploded in NZ – whats going on?

New Zealand's energy prices have increased a widely reported 600% over the last three years, from around NZD100/MWh to NZD700/MWh in early August.

How could that possibly happen?

There is no easy answer to this question, but its enough to say it's a complex mix of too much reliance on a single source of electricity (hydro), insufficient gas to supply domestic industry and a zealous approach to create electricity markets that in their design appear to have been short on what should have been the real objective: supply sufficient electricity to meet the nation's needs!

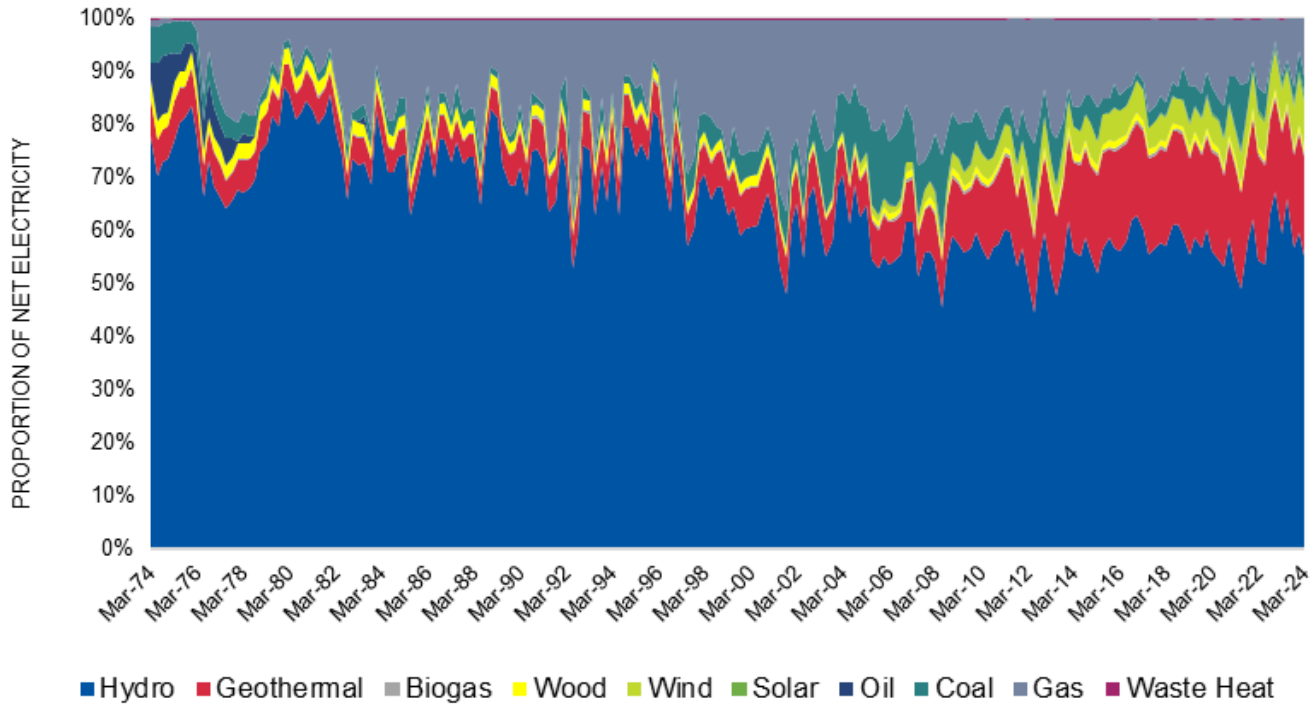
We'll take these in turn.

Over-reliance on hydro

It is important at the outset to note that the forestry and wood products industries, including the pulp and paper manufacturing sector, are among the fiercest advocates for renewable energies, whether biomass, wind, geo-thermal, chemical, solar, hydro or other.

That said, we think it reasonable to say that perhaps New Zealand has been overweight hydro-electricity for a VERY long time. The chart below shows the last fifty years of New Zealand's energy generation and the dominance and importance of hydro over all time periods. From an astounding peak of 83.7% of total electricity production in the DQ75 (that's the oil crisis), through to a low of 45.6% in JQ08 (due to a drought), hydro has ruled in New Zealand.

NZ Electricity Production by Type: MQ74 – MQ24 (Proportion)



Source:
MBIE

Data available at
https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/electricity-statistics

In many respects, hydro has been the cornerstone of the New Zealand economy, and has led it to be a country in which renewables have averaged more than 80% of all electricity supply, delivering 85.7% of total electricity in MQ24, for instance. The long run advantages of that difference to countries like Australia are not insignificant, but they also do not come without risks.

As was evidenced in 2008 when there was an extended drought, the reliance on one energy source alone, left New Zealand's domestic economy vulnerable. Since then, a concerted effort has been deployed to introduce new forms of electricity generation. Geothermal has expanded dramatically, as has wind, while gas by contrast, has contracted its share of total electricity supply.

Changes in the energy mix focussed on more renewables because gas, coal and oil place a heavy carbon burden onto an economy which has operated without them for so long.

It seems it is not the reliance on renewables that has caught New Zealand out so sharply most recently but it is *in part,* the reliance on hydro that has left it vulnerable and seen prices rise very sharply. Despite the current drought, hydro contributed more than 55% of New Zealand's electricity in MQ24.

Gas is in retreat

The second chart shows the growth rates, over the last forty years, of the four major electricity sources. It is remarkable for some important reasons.

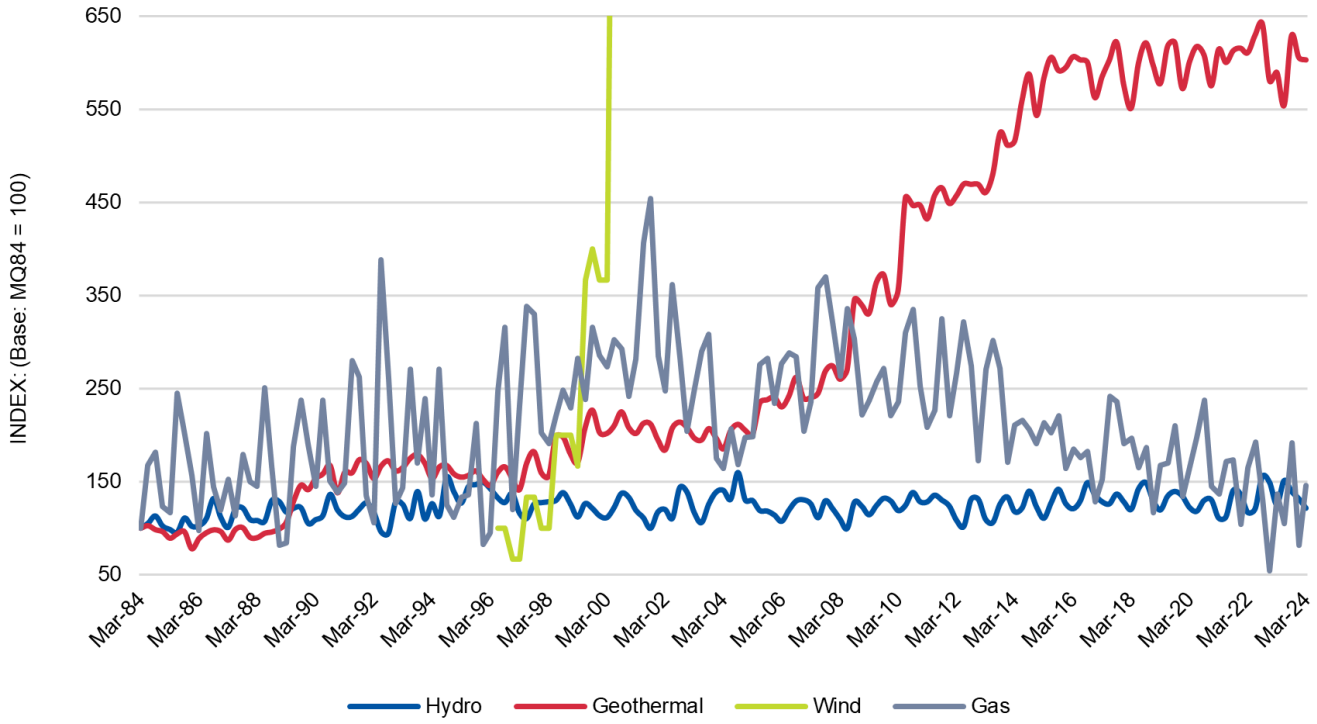
First, because no sooner was it introduced and wind energy exploded, literally, off the chart (see the arrow).

Second, because geothermal has grown four-fold in the last twenty years.

Third, because hydro has consistent, seasonal ups and downs but has been relatively stable over the full period.

Fourth, because gas fuelled electricity supply has halved over the last decade, compared with the average of the previous decade.

NZ Electricity Production by Main Type: MQ84 – MQ24 (INDEX)



Source:
MBIE

Data available at
https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/electricity-statistics

Wholesale energy prices in New Zealand increased by 600% from September 2021 to August 2024, hitting NZD700/MWh in early August, albeit falling back to NZD450/MWh as this analysis was being prepared.

In a balanced supply, as the renewables drop off for natural occurrences (droughts, for instance), we could anticipate a shift to gas, as peaking or replacement capacity. That cannot occur in New Zealand because it does not have sufficient gas and its fields are reportedly expected to halve again over the next few years.

Energy ‘market’ or supply assurances?

As time passes, the great experiment with fragmenting the production and supply of electricity is delivering some uncomfortable truths for businesses and households alike.

One of those is that supply constraints create distortions that are easily exploited by those with the supply (electricity generators) supported by regulatory frameworks that could be described as ‘market first, supply second’. This is especially the case where they are also the retailers!

Industrial producers of the things that people need are now routinely being priced out of production, because of the volatility and excessive pricing of a key manufacturing input: electricity.

Electricity supply is a national necessity. Though it is an opinion, our view is that energy markets

should be structured to assure supply and the maintenance of economic activity. The operation of market economic principles is a secondary consideration.

When market principles are weaponised against the national interest, it's the market at fault, not the national interest. This is a form of market failure and probably requires some form of intervention.

Toward sustainable solutions

As IndustryEdge outlined at the commencement of this short analysis, the move towards renewables is not the challenge in New Zealand. Its balance of renewables has altered little over half a century. The challenge is its reliance on one form of renewable energy.

A fossil fuel alternative would be a step in reverse, so where do the better solutions lie?

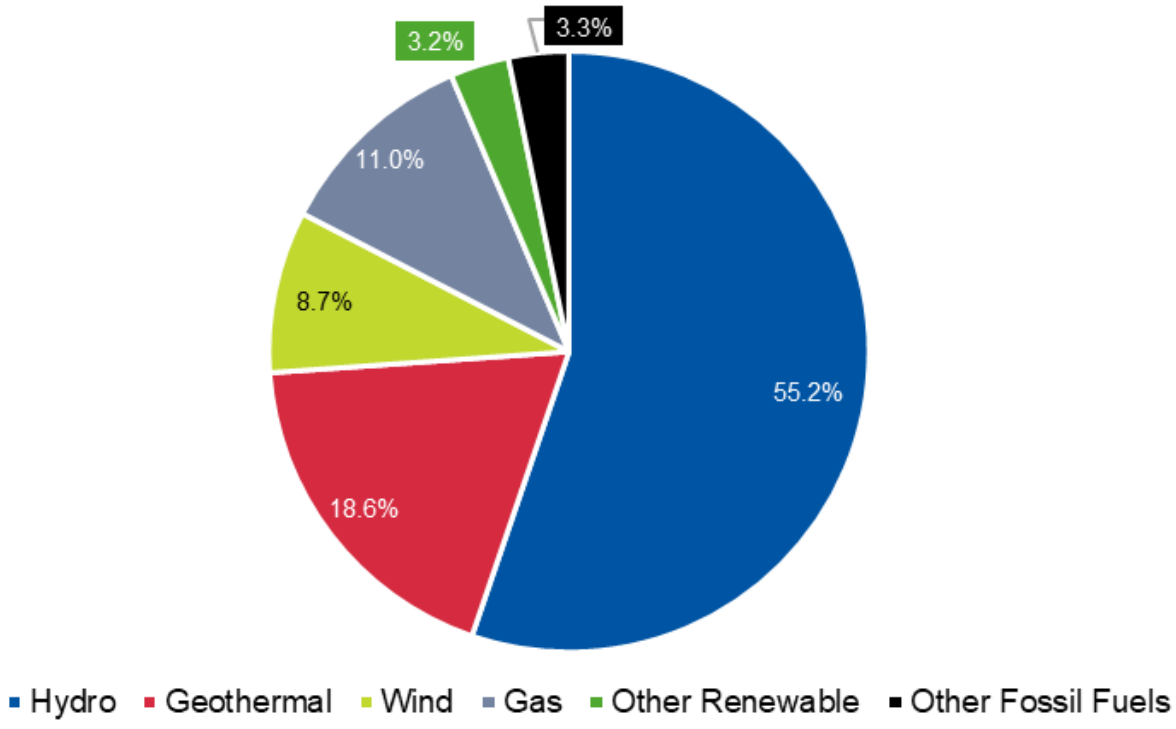
Stellar growth in wind powered electricity is important and can continue. It is still only 8.7% of New Zealand's total national electricity supply as the March quarter chart for 2024 shows.

Incremental gains in the use of biogas, waste heat and energy and biomass as a specific energy source can all provide assistance, but the main game is likely to be in under-represented renewables, like solar.

Solar is just 1.4% of New Zealand's electricity mix, and as three leading independent energy market analysts wrote in The Conversation in recent days, the better option for New Zealand:

> "…would be to prioritise the expansion of rooftop solar throughout New Zealand. This could not only add significantly to the overall electricity supply, but also help bring down prices."

NZ Electricity Production by Main Type: MQ24 (PROPORTION)



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