ENERGY TRENDZ PERSPECTIVE

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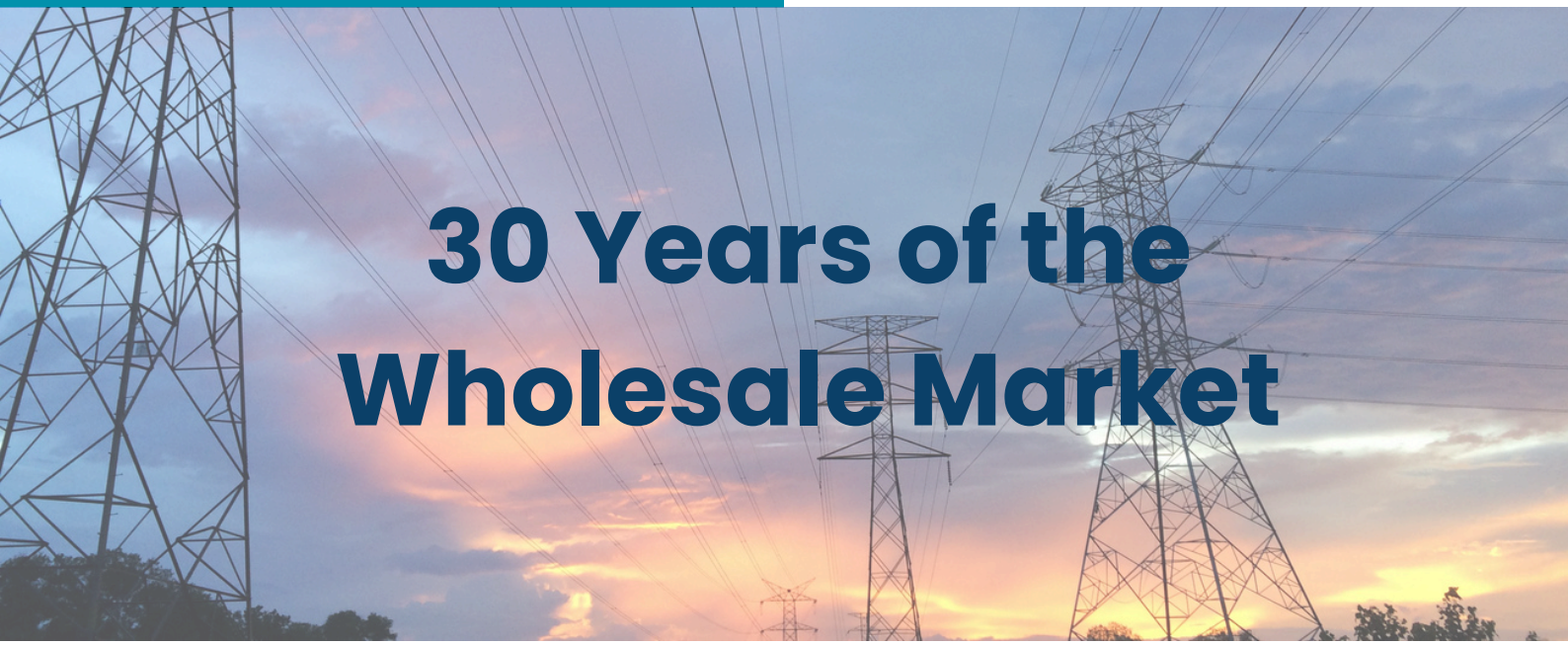


30 Years of the Wholesale Market

Welcome to Energy Link's publication of a perspective newsletter!

Each publication, we provide insights into news or topics within the electricity industry from Energy Link's perspective.

Discussion

30 Years of Market - Why?

Our Executive Chairman, Greg Sise, reflects on 30 years of the wholesale market.

30 Years of Market - Why?

Our Executive Chairman, Greg Sise, looks back over 30 years of the wholesale market, in the first of a series of perspectives on the market.

2026 is a milestone year for the wholesale market and for Energy Link, because on 1st October the electricity market will be 30 years old, and on 28th August Energy Link will be 30 years old. I commenced work on setting Energy Link up in May 1996, but the company was registered in August of that year and commenced trading on 2nd September.

This series of posts will be a mix of perspectives on the market, focussing on key elements such as demand and generation, but also on Energy Link, the role that we've played, and how this has evolved with the passage of time.

Many things have changed over three decades, but many have not. Despite regular 'crises', one thing that has not changed is that we still have a market. In this first perspective I will look at why we have a market, and the second post will look at how it has performed, and whether it is still valid in today's world.

Then in subsequent perspectives I will look at demand for electricity, electricity generation and the electricity hedge market.

Talking of crises, it seems that every few years there is some crisis that prompts many calls for an end to the market, with the implication being that the government should take control of electricity generation, in particular, but potentially also electricity retailing.

But what did we have before the market?

For most of the history of electricity supply in NZ, the government did indeed own and control most of the generation in NZ, under the auspices of the electricity department of the Ministry of Energy.

But on 1st April 1987, the Electricity Corporation of NZ (ECNZ)*[1]* was established as a state-owned enterprise (SOE), to own and operated most of the generation in the country, along with the transmission grid. ECNZ really only had one consumer as a customer, NZ Aluminium Smelters (NZAS) which owns the Tiwai Pt aluminium smelter. Most of the retailing of electricity was done by the lines companies, which at the time were known as Electricity Supply Authorities (ESAs), who purchased electricity from ECNZ and sold it to customers on their respective networks.

[1] ECNZ still exists with the sole function of transferring any of its remaining assets to Transpower or it's the three gentailers that still have government shareholdings.

Some of the ESAs also had their own generation, but this only added up to about 3% of all the generation in the country, with ECNZ owning the rest.

So ECNZ generated most of the electricity and sold it to NZAS and the ESAs. ECNZ and the ESAs were the supplier and customers for 'bulk' energy, respectively, and the ESAs and their connected customers were the suppliers and customers for retail supply. By definition, a market is a set of arrangements that allow suppliers (sellers) and customers (buyers) to interact to exchange goods or services, which suggests there was a market even back in those days.

There were indeed monopoly wholesale and retail markets for electricity, the former dominated by ECNZ, and the ESAs dominating the retail markets in their respective networks.

So, when we hear calls to end the market, what they are really calling for is an end to the competitive market and, by implication, return to some form of monopoly in the wholesale market, with the monopoly provider being the government.

For example, prior to the general election in 2014, Labour and the Greens had a 'single-buyer' policy known as 'NZ Power' which would see a regulator determine the need for new generation, run auctions for this new generation, and contract with the successful bidders to buy their generation output at an agreed price. National won that election, and NZ Power never saw the light of day.

Now that we have the context right, a key question is: why was there a move away from the monopoly model, which reached its peak under ECNZ, to a competitive market?

During the 1980s and 1990s there was a move towards deregulation and privatisation in many developed countries, and NZ was no exception, including the deregulation of the economy under the fourth Labour Government led by David Lange, ably assisted by Roger Douglas as Minister of Finance from mid-1984 to the end of 1988, hence "Rogernomics". During this period the NZ dollar was floated, financial markets were deregulated, agricultural subsidies removed, the tax system reformed (reductions in the top marginal tax rates and introduction of GST), import licensing was phased out, and a range of government departments were corporatised and some were privatised.

ECNZ was a result of this process. Labour lost the election in 1990 and National came into power under Jim Bolger, and continued with the reforms started under Labour. In June 1993 the government established the Wholesale Market Development Group (WEMDG) which was tasked with developing specific, cost-effective proposals to ensure electricity was delivered at the lowest cost to the economy.

WEMDG's draft proposal in March 1994 presented two potential models for a new market, one being a single buyer monopoly model (like NZ Power mentioned above) and the other a competitive wholesale market model.

The group delivered its final report in August 1994 and recommended:

1. establishment of a new competitive wholesale market, at the earliest opportunity;
- sale of most electricity under long-term, tradable contracts with a contracts market to enable trading of unders and overs in these contracts;
- establishment of a voluntary electricity spot market operated by a neutral entity;
- an independent grid owner (Transpower) to provide neutral access to the grid;

2. steps to stem ECNZ's dominance of generation including;
- progressively leasing approximately 40% of ECNZ's plant to other operators;
- constraints on new investment by ECNZ;
- ECNZ's proposed Stratford (Taranaki Combined-Cycle gas turbine (TCC)) project, along with rights to gas, to be sold to a third party;
- disclosure of all spot market offers and bids;
- initially 95% of ECNZ's capacity sold under long term contract, reducing to 80% as the leasing program progressed;

3. a levy to promote energy efficiency and conservation.

Not of all these recommendations made it into its final report, in which WEMDG stated that in the past, new generation capacity was often built before it was required, and the "investment was underwritten by the taxpayer", and that "the government previously set wholesale electricity prices which led to periods in the 1970s of long price freezes, followed by massive price hikes".

For example, in March 1976 the then Minister of Energy, Eric Holland, announced a 60% increase in the bulk (wholesale) supply tariff for electricity, which he claimed was necessary because the NZ Electricity Department (of the Ministry of Energy) was operating at a loss for three years.[2] Then just a year later a new Minister of Energy, George Gair, raised the tariff again by 40%, so in the space of the two years the total increase was 124%.

[2] Connecting the Country, NZ's National Grid 1886-2007, Helen Reilly, 2008.

From 1914 onward, the government funded the capital cost of new generation using debt, and charged for bulk supply based on maximum (peak demand) power in kW or kVA, which in turn was based on an assumption that once the capacity is available the energy is essentially free.

But this pricing structure gave no incentive to conserve electricity, and it under-recovered by a substantial amount. In 1957 the State Supply of Electrical Energy Act was amended to allow a 25% margin on operating costs, although still not including loan repayments, and the increase took effect in 1961.

The Act was amended again in 1965 to include an energy charge and the margin increased to 50%. The new tariff remained in place until the 60% increase in 1976 noted above.

Things were also very different back then in terms of supply security. As a teenager, I recall in the early 1970s eating dinner by candlelight during electricity shortages in winter, when hydro lakes were low.

Shortages were also common during the 1940s and 1950s in the North Island before the 610 km HVDC (inter-island) link was commissioned in 1965 (shown in red on the grid map as running from the Benmore 220 kV grid node to the Haywards 200 kV node).

WEMDG said that reducing government's involvement in the market required deregulation and that a "properly structured wholesale electricity market should also attract a wider range of sources of investment capital (and consequently risk sharing) than would be available if all future generation . investment was solely the province of … ECNZ". WEMDG saw the involvement of independent power producers (IPPs) as "essential to providing wholesale competition and the lowest possible retail prices to consumers".

The first steps toward restructuring were already underway as WEMDG deliberated. In 1993 the monopolies of the ESAs over small customers (consuming less than 500,000 kWh per annum) were removed, opening up competition in this sector, and in 1994 the monopolies for all other customers were removed. I hadn't set Energy Link up at this time, but I was already involved in the energy sector, and one of my more satisfying commissions as a consultant at the time, was to renegotiate the electricity supply contract for a large consumer in the South-Island, achieving a saving of the order of 10%. The opportunity for this arose because the incumbent supplier did not want to lose one of its biggest customers as the market arrangements allowed more competition between the ESAs as retailers.

In 1993 the Metering and Reconciliation Information Agreement (MARIA) facilitated the reconciliation of metering information against contracts between market participants, and the Electricity Market Company (M-co) was set up to support development of new market and trading arrangements.

In 1994 the grid owner-operator role was split out of ECNZ and given to Transpower as a new SOE.

Then in February 1996 Contact Energy was created by splitting 22% of ECNZ's assets by generation share, out into a separate company, with Edison Mission Energy as cornerstone shareholder with 50.1% of Contact's shares.

In October 1996, the wholesale spot market commenced trading, initially on a voluntary basis, with the ECNZ-NZAS and several other smaller contracts remaining within the MARIA framework.

In the meantime, Energy Link was set up with me and two ESAs as shareholders, MainPower from North Canterbury and Central Electricity from Central Otago. Energy Link's strategy was to attract two additional smaller ESAs as shareholders and to provide its shareholders and other smaller participants in the new market with cost-effective specialised services they would find difficult to provide themselves. These included submission of bids and offers into the spot market, spot price forecasting, assistance with hedging, and general advice and support in respect of the market.

On 30th September, Energy Link submitted the first bids into the new market ready for market opening at midnight on 1st October, on behalf of Central Electric.These bids were required at the time, to indicate each spot purchaser's expected off-take from the spot market for each half-hourly trading period of each day.

As it turned out, Energy Link did not attract another two ESA shareholders, partly because three buying groups were set up to help ESAs participate in the spot and hedge markets: Energy Brokers, Powerbuy and Pacific Energy. As a result, Energy Link faced a potential shortfall in revenue, which probably could have been made up by its two ESA shareholders, but the Board decided that to rely totally on just two shareholder-clients was a big risk, and so I set about selling our services to the wider market.

By the end of our second year of operation, we had grown from nothing into a significant and rapidly expanding business, based on this strategy. But then less than two years into the new market, the next major reform occurred on 1stApril 1999, potentially spelling disaster for Energy Link.

The then Minister of Energy, Max Bradford, introduced the Electricity Industry Reform Act (EIRA) which required all ESAs to divest either their electricity generation and retailing (energy) activities or their local network business activities.They were allowed to retain up to 10% cross-ownership between these two businesses, but none did, and all but two sold their electricity customers, along with any generation they owned, and retained their local network business.

At the same time, ECNZ's remaining assets were split out into three new SOEs: Genesis Energy with the Tongariro hydro scheme and the Huntly power station; Mighty River Power (now Mercury) with the Waikato hydro scheme; and Meridian Energy with the Waitaki and Manapouri-Te Anau hydro schemes and the contract with NZAS.

The ECNZ split took effect on 1st April 1999 but leading up to this, three establishment units were set up, and they set about competing for the customers being sold off by the ESAs.

And so, on 1st April 1999, the market consisted of the four large gentailers (generator-retailers) that are still in the market today, along with Trustpower and some smaller gentailers and independent generators.

TransAlta, a Canadian utility, played an interesting role in the early years of the new market. In 1996 it purchased the two ESAs serving Wellington and the Hutt Valley (Capital Power and Energy Direct, respectively). Then the EIRA prompted TransAlta to sell these companies in 1998 and instead focus on a strategy as a generator and retailer, which it had commenced in at more or less the same time that it purchased Capital Power and Energy Direct, as part of a consortium building the TCC mentioned earlier.

In 2000, TransAlta exited NZ, selling its customers to the Natural Gas Corporation, who then created On Energy as its energy trading arm. The first dry year 'crisis' then happened in the autumn and winter of 2001, which caused On Energy to come under severe financial stress, presumably because it was inadequately hedged. This prompted the sale of its customers to Meridian Energy.

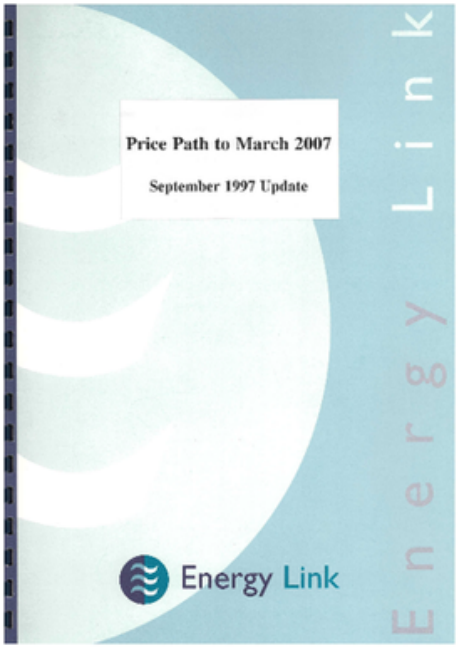
Central Electric was one of the two ESAs that sold its network and customers, and became an independent generator, which created a problem for Energy Link, because to this day, we work hard to be independent of generation and retail

So Central Electric sold out of Energy Link, leaving me and MainPower as shareholders.MainPower was then a regulated network, which meant there were virtually no issues with independence for Energy Link, and it remained a shareholder until 2005 when I finally bought them out.

Many of Energy Link's customers were ESAs, but the sell-off of their customers and generation meant they no longer required Energy Link's services, and so our forecast revenue took a dive in 1999. Nevertheless, the capabilities and expertise developed over the first 18 months of the market stood us in good stead, and we managed to get through the year with only a small loss, before setting about growing the business again.

Ironically, despite the three buying groups mentioned above having large companies as shareholders, and being bigger than Energy Link on paper, the need for them ceased when their respective shareholders sold their customers, so the buying groups all closed down within a couple of years of the EIRA being enacted.

In 1997 we developed a spot price forecasting model in Excel and in that year we produced and sold our first 10-year Price Path using that model.



Also in that year, we partnered with what was then Mercury Energy, and is now Vector, the ESA serving Auckland, to develop the EMarket model of the NZ electricity spot market, which we could then use for our Price Path and for all custom modelling of the market.

At this point, Matt Woods joined the team to develop EMarket, and today he remains with the company as our Development Manager.

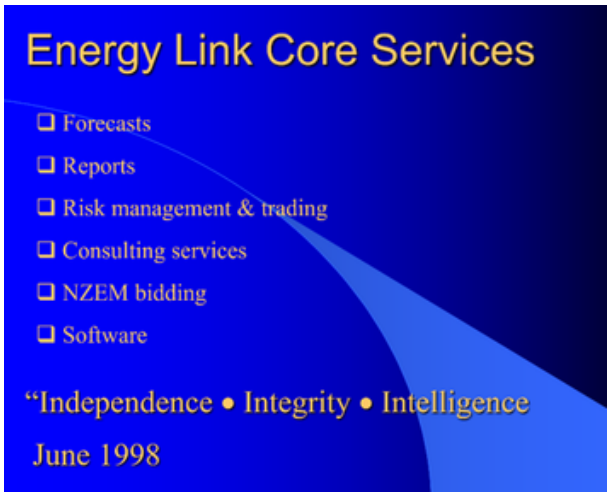
That was version one of EMarket and today, after running millions of simulations, EMarket is in its 8th version. Its capabilities expanded enormously as we gained experience in modelling and as the hardware it runs on became ever more powerful, year after year.

EMarket is set up to model the NZ electricity market, including the complexity around hydro storage, hydro inflow volatility and a high percentage of renewable generation, but in the 2000s we licenced it to a client in Singapore as the country moved to a spot market model very similar to NZ's, and later on we set it up to model the market in England and Wales. We use EMarket for all our longer-term modelling, from our monthly 12-month-ahead forecast, through to long-term Price Paths that can extend out 30 years in some custom modelling assignments.

Initially we modelled a highly aggregated transmission grid, but over the years we moved to a model which only aggregates grid circuits that are in parallel, allowing the model to accurately model locational price differences across the grid.The model can be run from half-hourly resolution up, although most of our long-term modelling is done at three-hourly resolution so that we capture intraday effects without producing mountains of output data.

Having a proprietary in-house model is one of our strengths because our developers can respond rapidly to requests for enhancements or announcements about possible new market developments. On that last point, as far as I know, we were the first company to model the Lake Onslow pumped hydro energy storage (PHES) system in 2020 after the government of the day announced it would spend $30 million on an investigation of the scheme, along with other options for managing dry years.

We've also had the privilege of modelling several other out-of-the-box scenarios, and one that sticks in my mind was undertaken for Firstgas (now Clarus) in which we modelled a dry year and peak demand generation solution using green hydrogen produced by electrolysers connected to the grid, with the hydrogen stored in a depleted natural gas field. There are technical aspects of this arrangement that would need to be, or are being researched to prove its feasibility, but if feasible it could be a superior zero-emission solution for the very long-term.



As it turns out, our core business has not changed much from 1996, as illustrated by this title page from a presentation for clients from 1998.

Modelling and forecasting are still core business, as is consulting and writing reports.

Hedging for wholesale market participants still occupies us from time to time, but starting in 2006 we added procurement services and contract management for large energy consumers.

NZEM bidding is no longer required for all demand, so this has disappeared, but our software systems, including our EMarket and EMO market models, still underpin a lot of what we do, day after day.

An item not in the list in the slide is training, which kicked off in July 1997 with our first Nodal Pricing course at the James Cook Hotel in Wellington. We still run our three standard courses today: Intro to the Electricity Market, Hedging Electricity and, you guessed it, Nodal Pricing of Electricity.

Our motto back then was “independence, integrity, intelligence”, but our current tag line is much better at defining why we exist as a company: “Informing the transition to renewable electricity”.

If you’d asked me 30 years ago if we’d still be in business in 2026, I think I would have answered “who knows, but I hope so”. Well, here we are.

The next post in this series will examine in detail how the market has performed for 30 years, and whether it delivered what WEMDG intended.

Greg Sise
Executive Chairman

Energy Link
decision power