new zealand wind energy association

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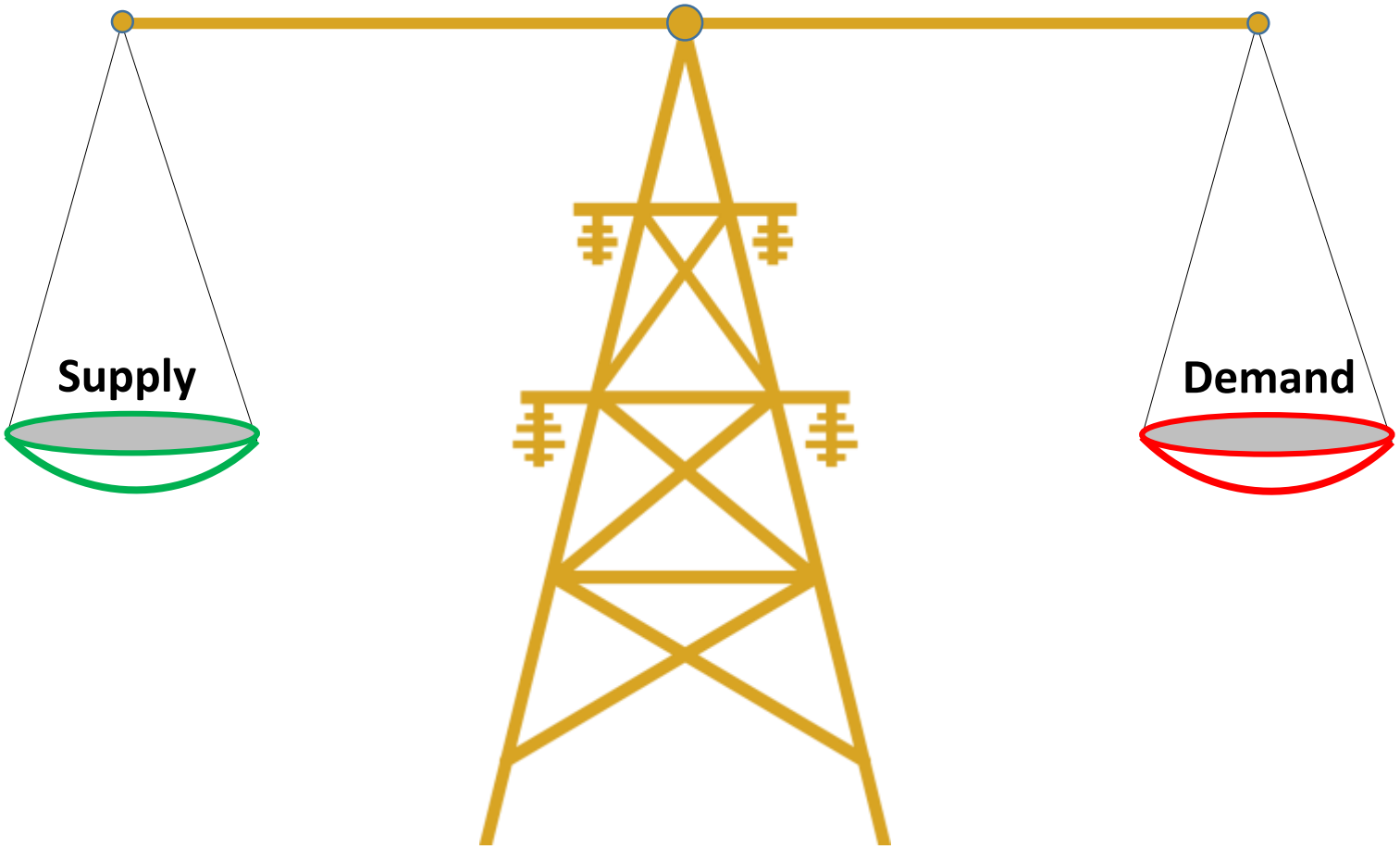

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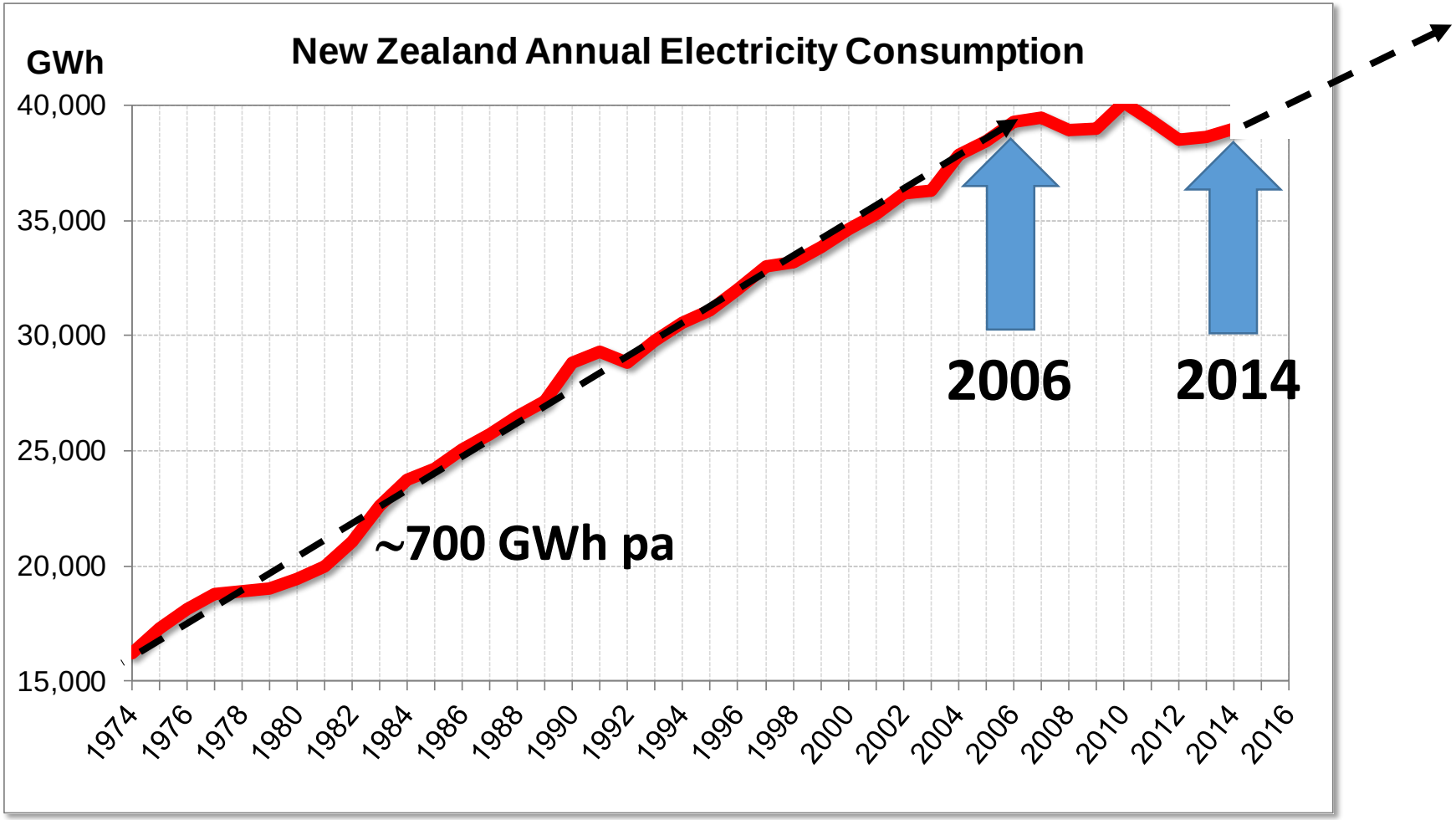
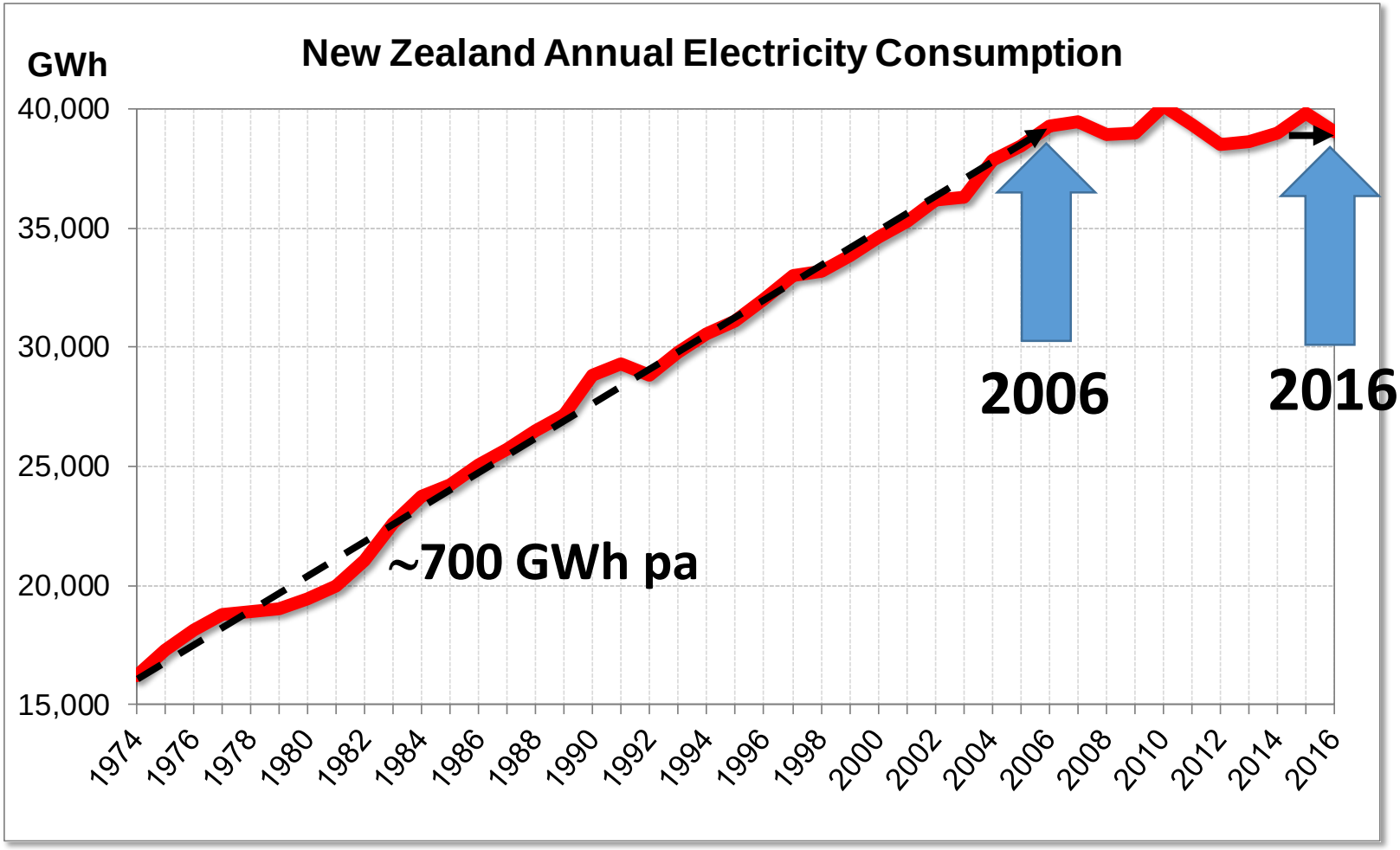
Demand – what I said last year



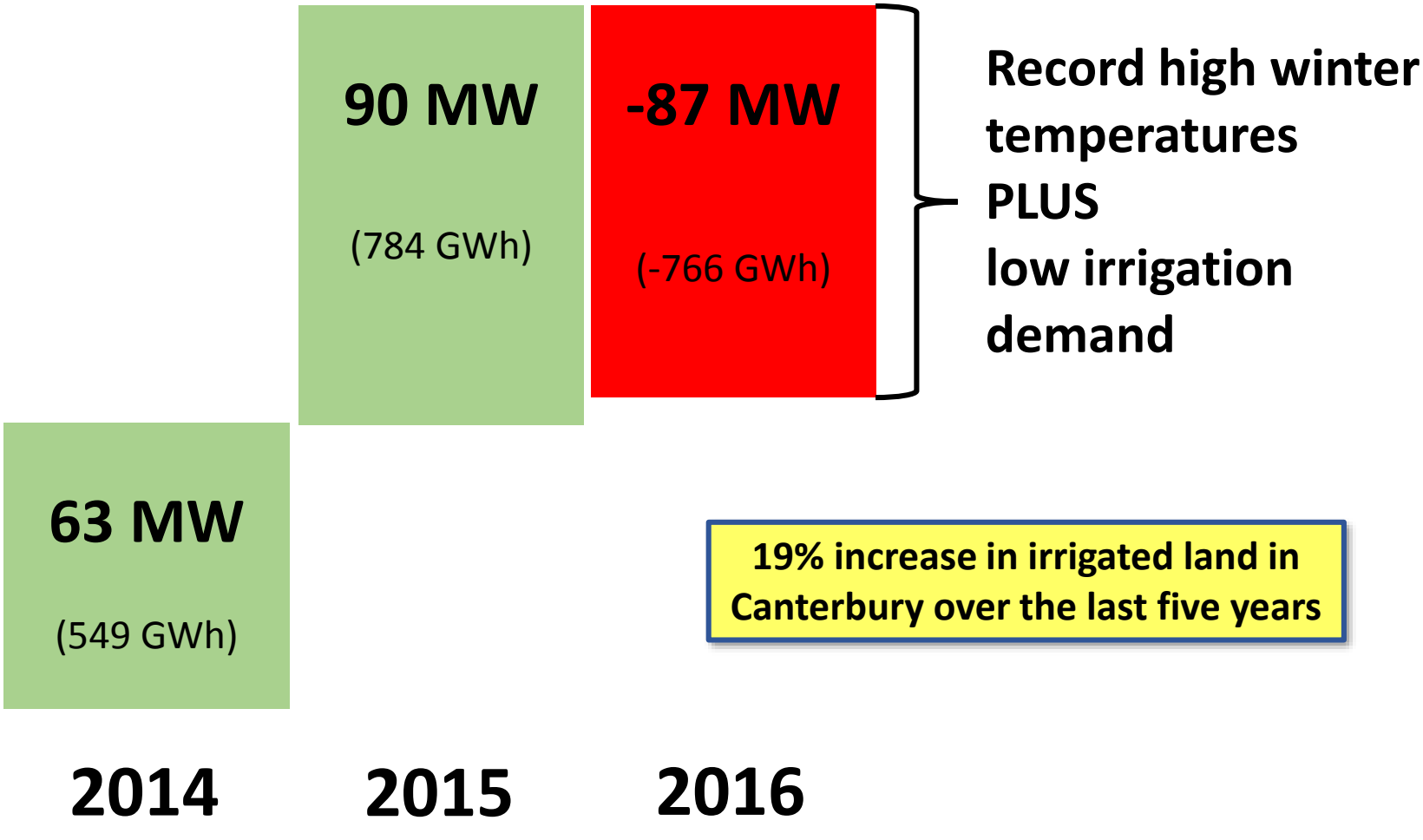
MBIE consumption data for end users

Demand – what actually happened



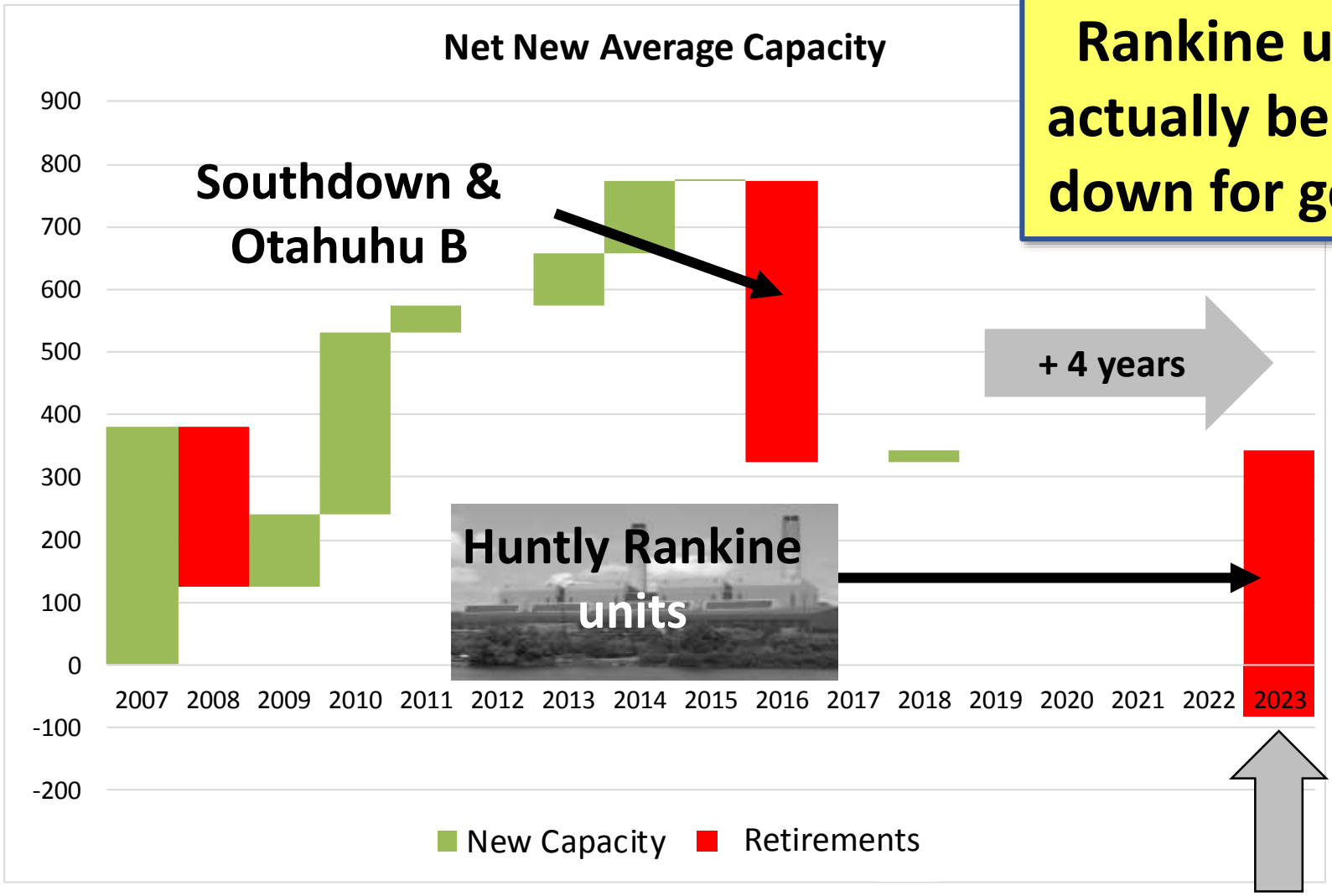
MBIE consumption data for end users, plus estimate for 2016

Demand Growth ~~Returns~~ Falters



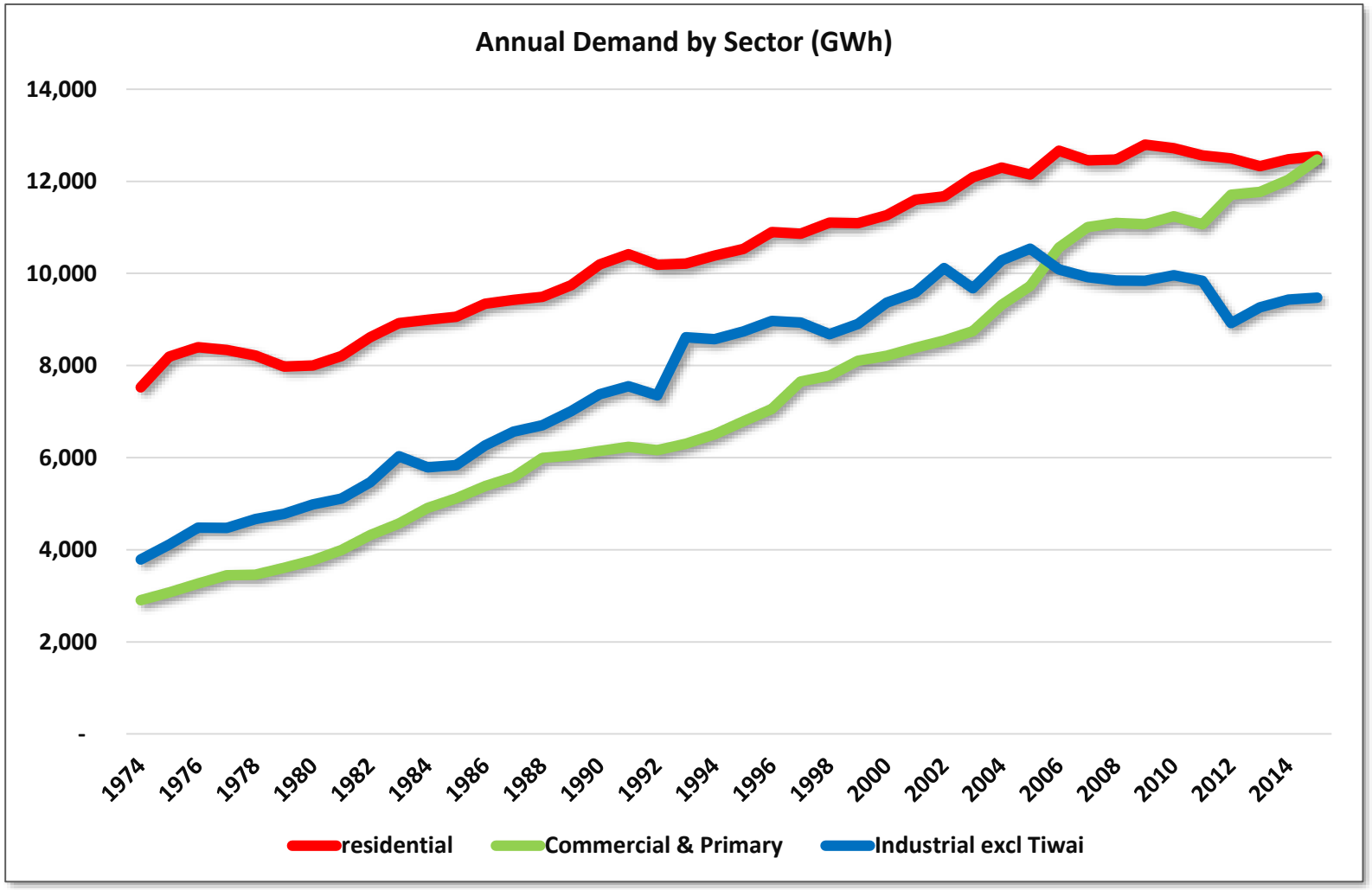
Supply – what I'm saying this year

When will the Rankine units actually be shut down for good?



2023: -80 MW without any change in demand

Demand to 2015



MBIE consumption data for end users

Residential Demand Drivers

- Occupied households => Population
- Electricity prices => demand becoming more “elastic”
- Weak signal from average temperature

Commercial & Primary Demand Drivers

- NZ GDP
  - Population plus per capita economic activity
- Household income for Primary (???)
- Moderate signal from average temperature (Primary)
- Gas prices

Industrial Demand Drivers (excl Tiwai)

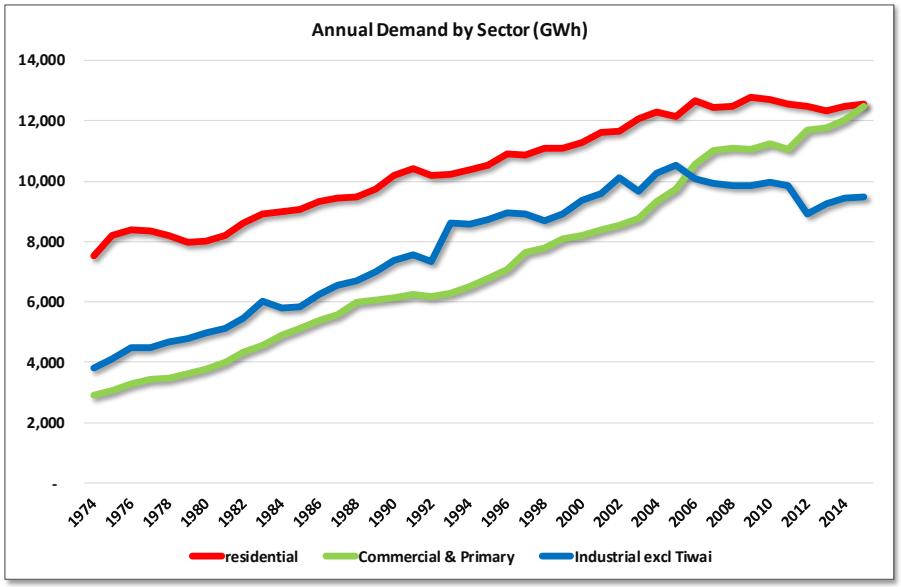
- NZ GDP
  - Population plus per capita economic activity;

    OR

  - Population plus US GDP i.e. world markets

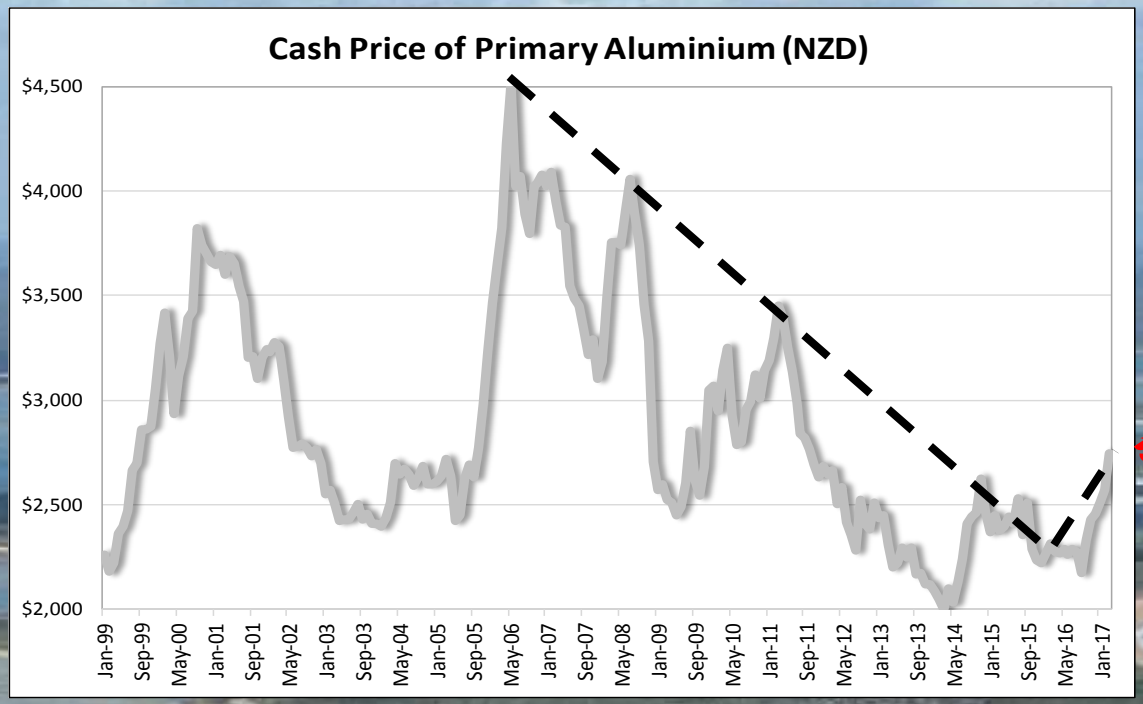
Weaker correlations, sectors differ in drivers, harder to call

Demand Summary excl Tiwai



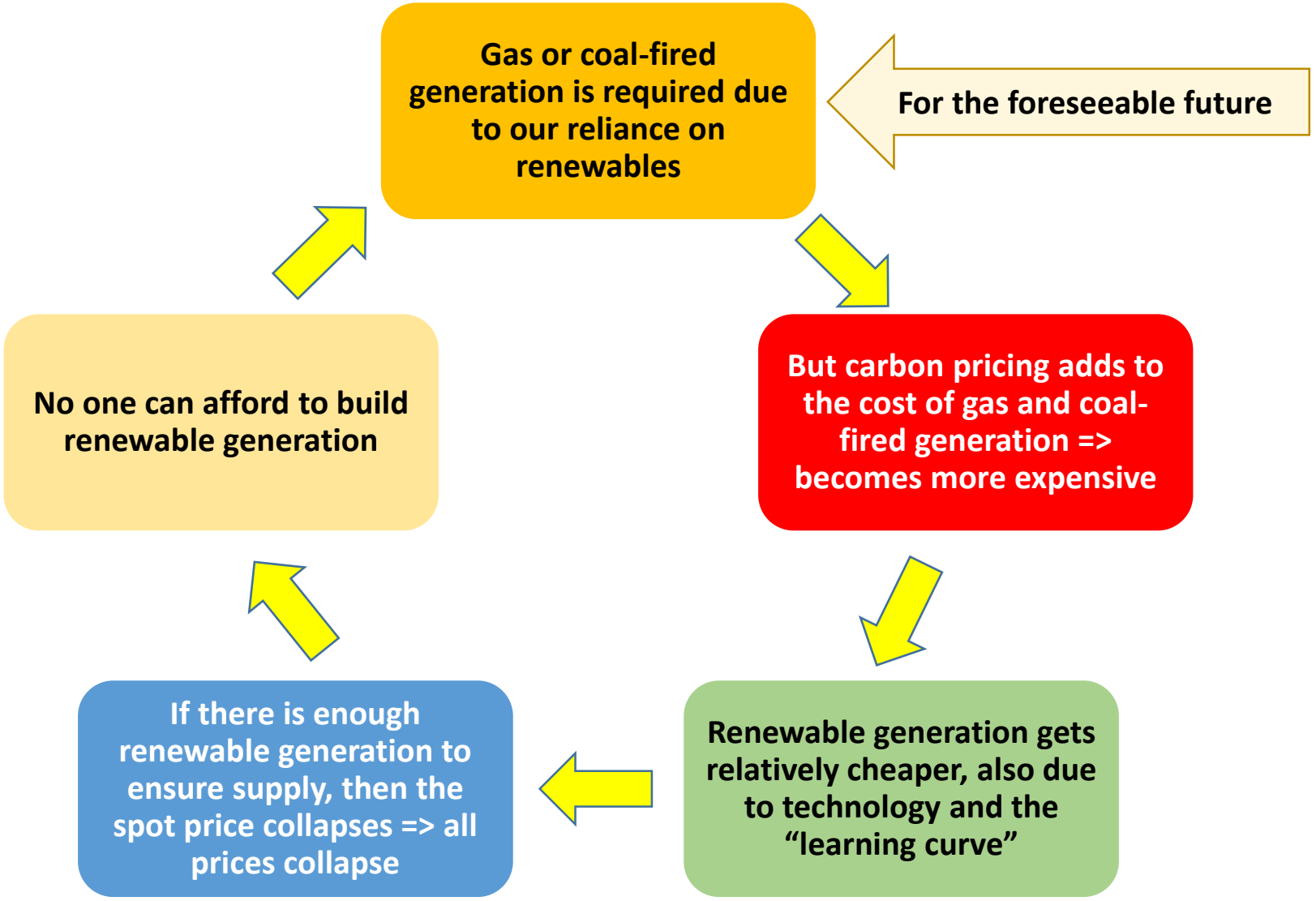
- Lots of positives due to rising population and GDP
- BUT negatives as demand elasticity rises over time
- Climate change could go either way
- Uncertainty over industrial sectors

Tiwai Smelter

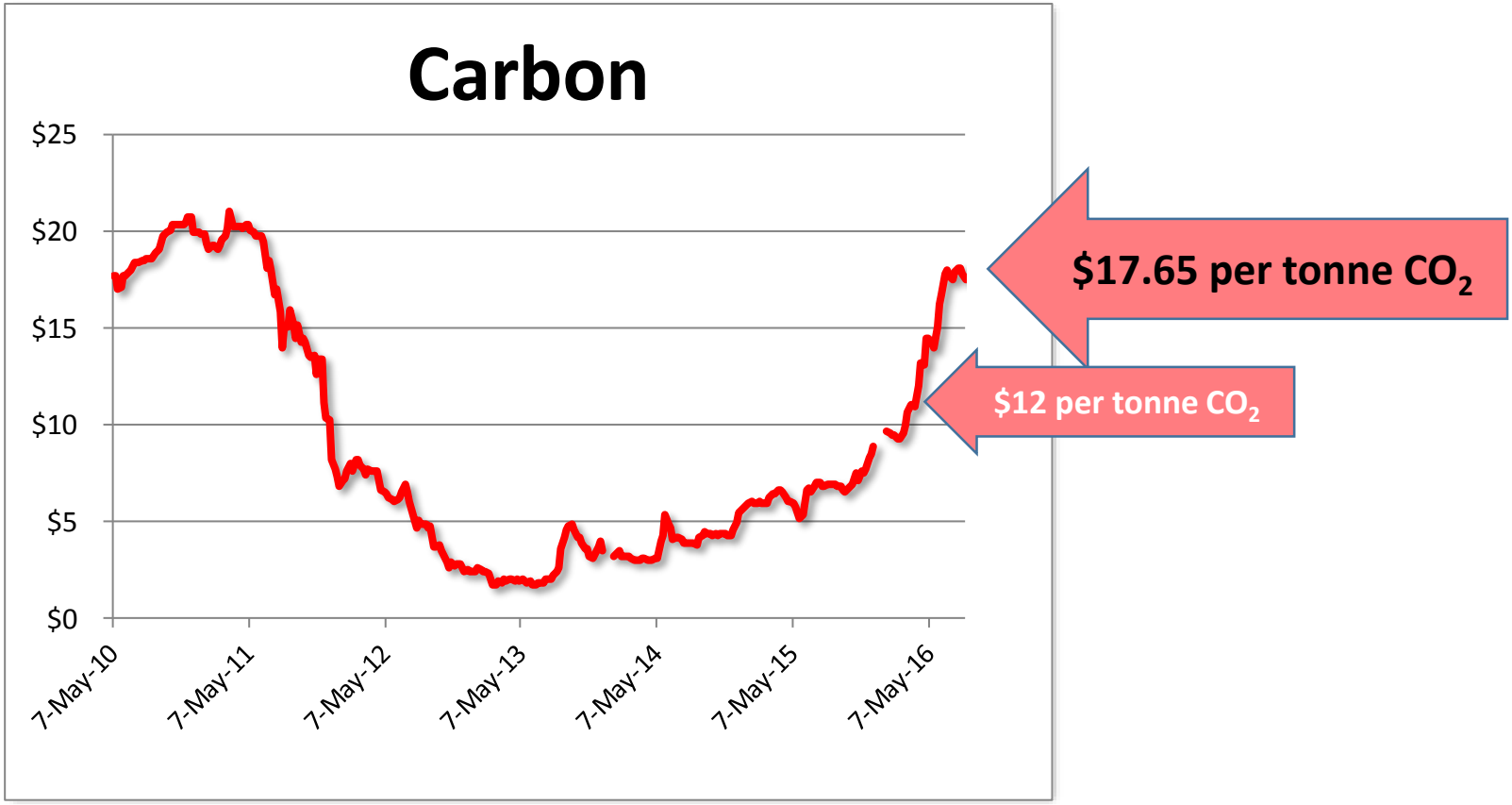


- NZD aluminium prices up 21% on last March
- Up 37% on the low of March 2014
- Will the smelter restart pot line #4?
  - 60 – 65 MW additional demand (526 – 570 GWh)

Supply Paradox: Renewable vs Thermal

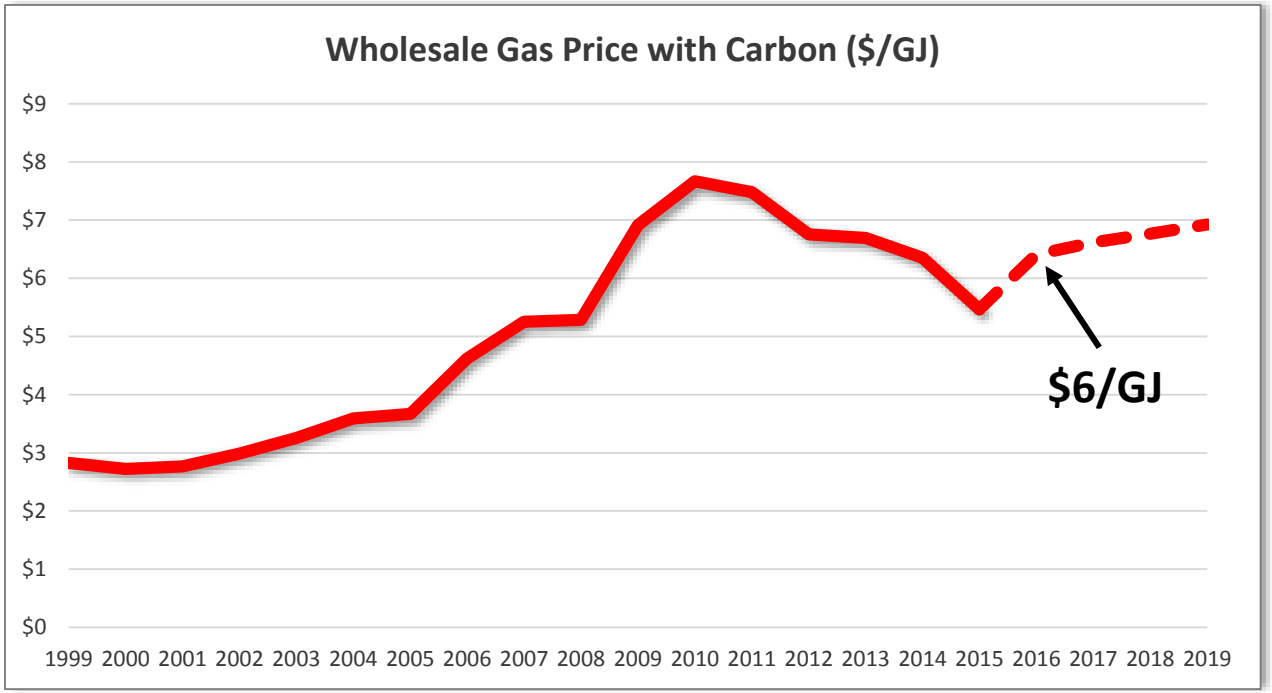


Carbon Pricing



- Carbon subsidies for electricity will go by 2019
  - ➢ 50% last year, now 33%, 17% in 2018, 0% in 2019

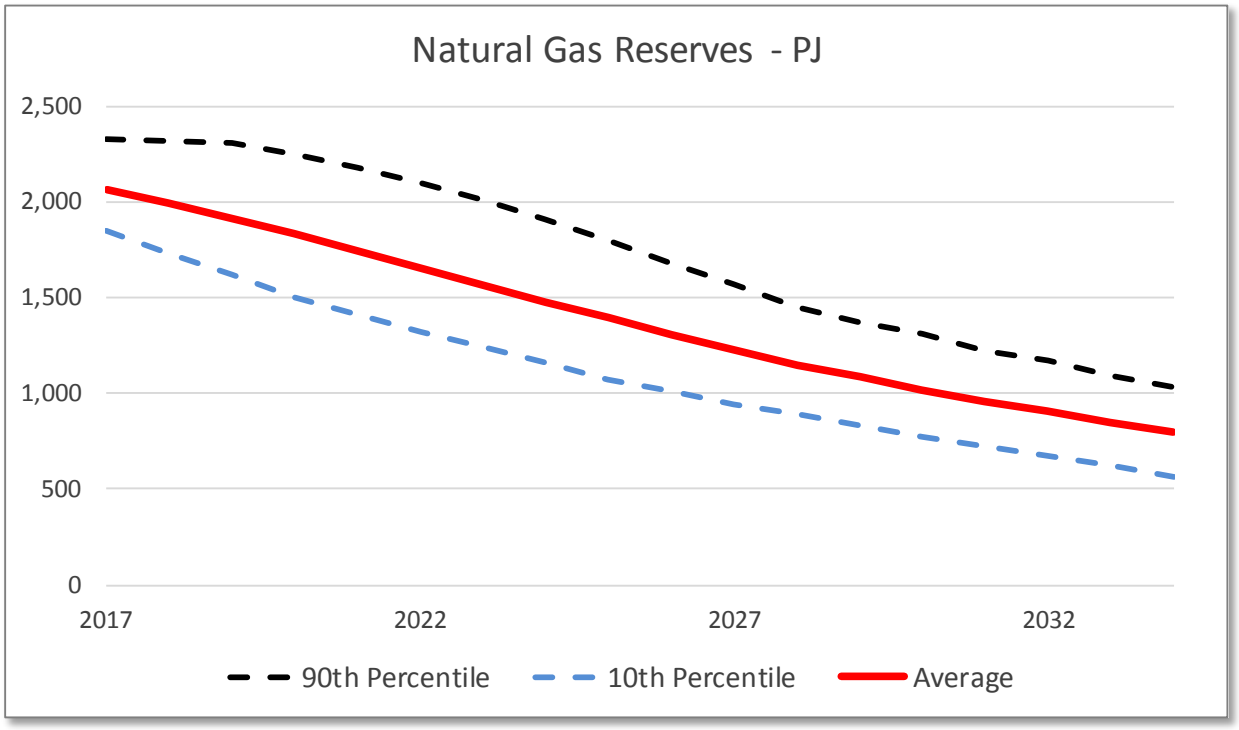
Gas Price with Carbon



Wholesale price includes electricity generation, Methanex and a couple of other large industrials

- $6/GJ reported by Contact Energy for the last 6 months
- Carbon subsidies removed by 2019
- Carbon price just over $17 per tonne (optimistic?)

What About Gas?



On and offshore Taranaki

- No significant new fields discovered since 2005
- We allow for development wells extending existing fields
- Gas price increases

Implications for Renewable Sector

- Market participants tend to build at a rate that gives a positive return on investment
- Evidence that wind farms and smaller renewable generators are turning off when prices are low

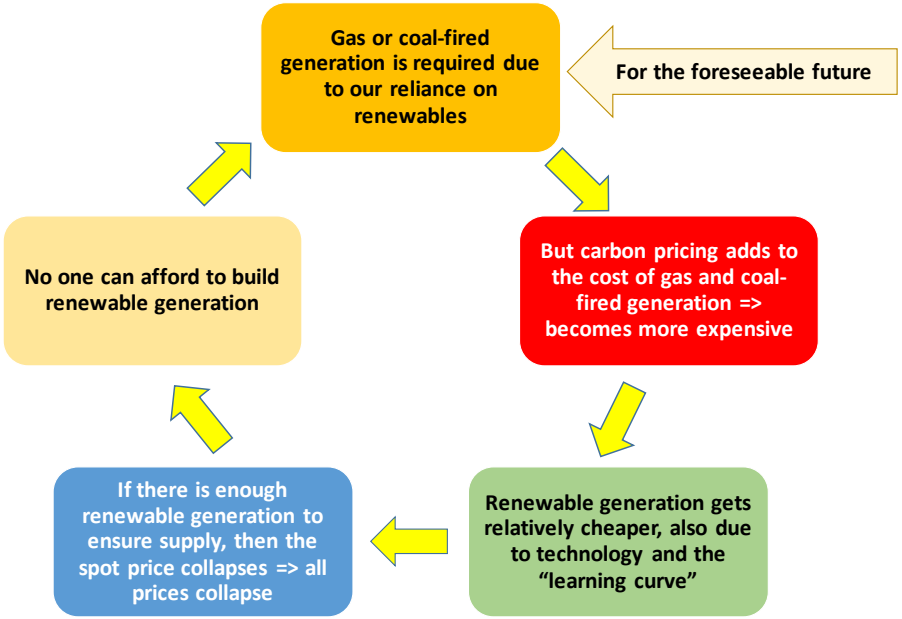
- But will **consumers** "rush" to solar?
  - Demand elasticity will increase over time with access to technology and experience, demand response programs
  - A lot depends on if & when PV and batteries become fully competitive with grid-scale

Implications for Thermal Sector

- Rankine units are an attractive option
  - sunk costs – they're already there!
  - coal stockpile gives security for long dry periods
  - but they won't last forever

- Thermal sector consolidating to those who have the best fuel strategies
  - close stations that don't run enough (TCC?)
  - flexible operation (peakers)
  - access to gas at competitive prices (Genesis, Nova)

Supply Paradox



Uncertainty & Competition => Innovation

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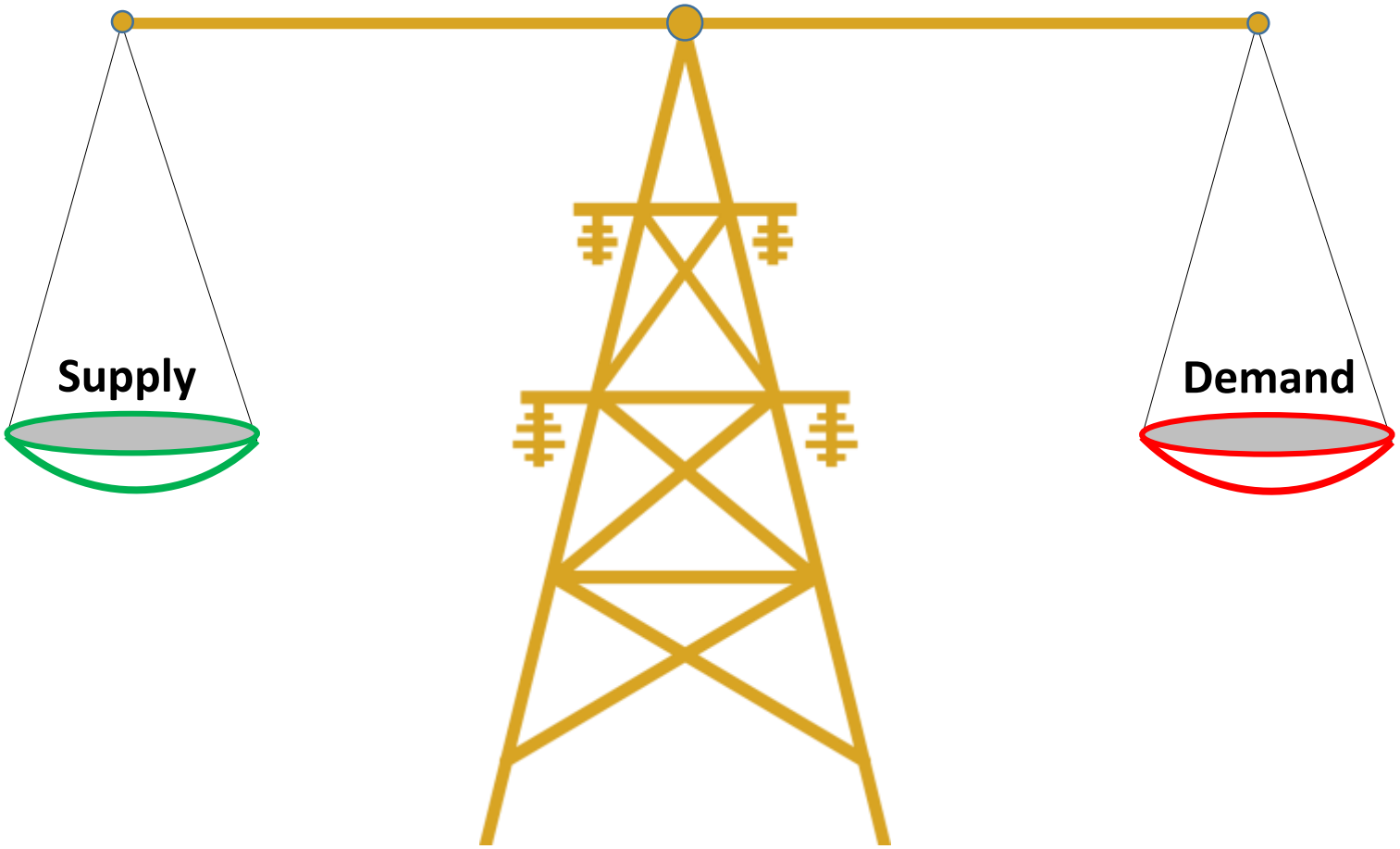

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