

Regulation of the NZ electricity market

Presentation to EMAN 410 Students, University of Otago

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Overview

- ❑ Current regulatory arrangements for electricity
- ❑ Overview of NZ electricity markets
- ❑ Competition in NZ electricity markets
- ❑ Key areas for further market development

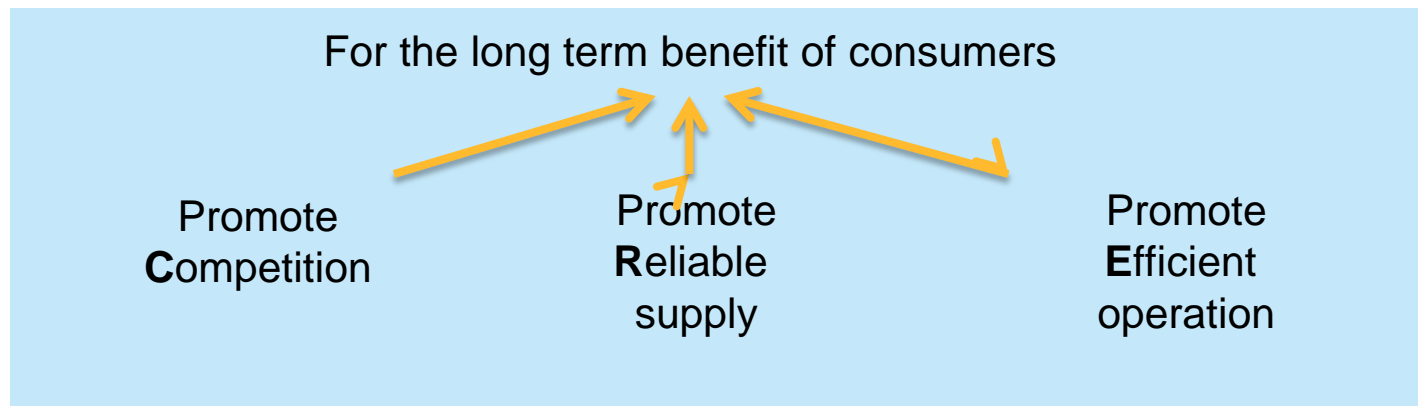
Current regulatory arrangements

The core functions of the Electricity Authority

- ❑ Develop the market rules (called the Electricity Industry Participation Code)
- ❑ Enforce the Code, the Electricity Industry Act and the regulations under the Act
- ❑ Contract with service providers to run the market and the electricity system
- ❑ Monitor and assess market performance
 - The focus here is on competition, reliability and efficiency
 - Regular annual reports
 - Ad-hoc reports as market events occur

Our objective is specified in s15 of the Act

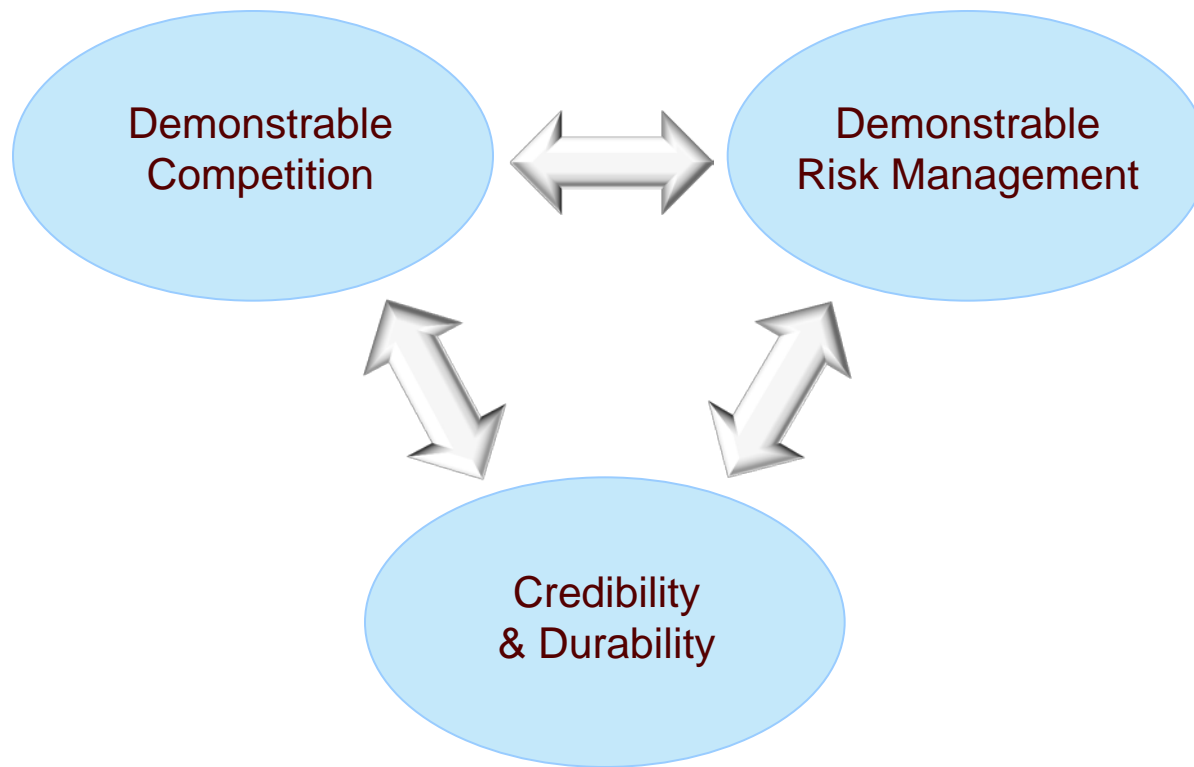
Statutory
Objective



How

Reducing barriers	Facilitating consumer participation	Providing efficient price signals	Promoting flexibility & resilience	Fit-for-purpose market services	Increasing compliance with the rules
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Demonstrable competition and risk management feed on each other and are strategic imperatives



The EA does not have any social or environmental policy role

	Electricity Authority	Other agencies
Competition	Develops pro-competition market rules	<u>ComCom</u> : prosecutes anti-competitive conduct through the courts and regulates natural monopoly segments through price control and information disclosure
Reliable supply	Develops market rules that encourage efficient levels of security and reliability	<u>ComCom</u> : approves grid investments and regulatory asset base for all lines companies
Efficient operation	Develops market rules to cover any other efficiency issues not already addressed above, including: Transmission pricing methodology Distribution pricing principles	<u>ComCom</u> : approves grid owner's total allowable revenue, price/quality control regime applies to non-consumer owned distributors
Social policy		<u>EGCC</u> : resolves consumer disputes about retailers <u>MBIE (Energy team)</u> : low-fixed charge regulations <u>Ministry of Social Policy/WINZ</u> : generic income support, assist medically-dependent and vulnerable consumers
Environmental		<u>EPA</u> : emissions trading scheme, carbon-related policies <u>EECA</u> : programmes encouraging efficient use of electricity <u>Councils</u> : resource consents

Overview of NZ electricity markets

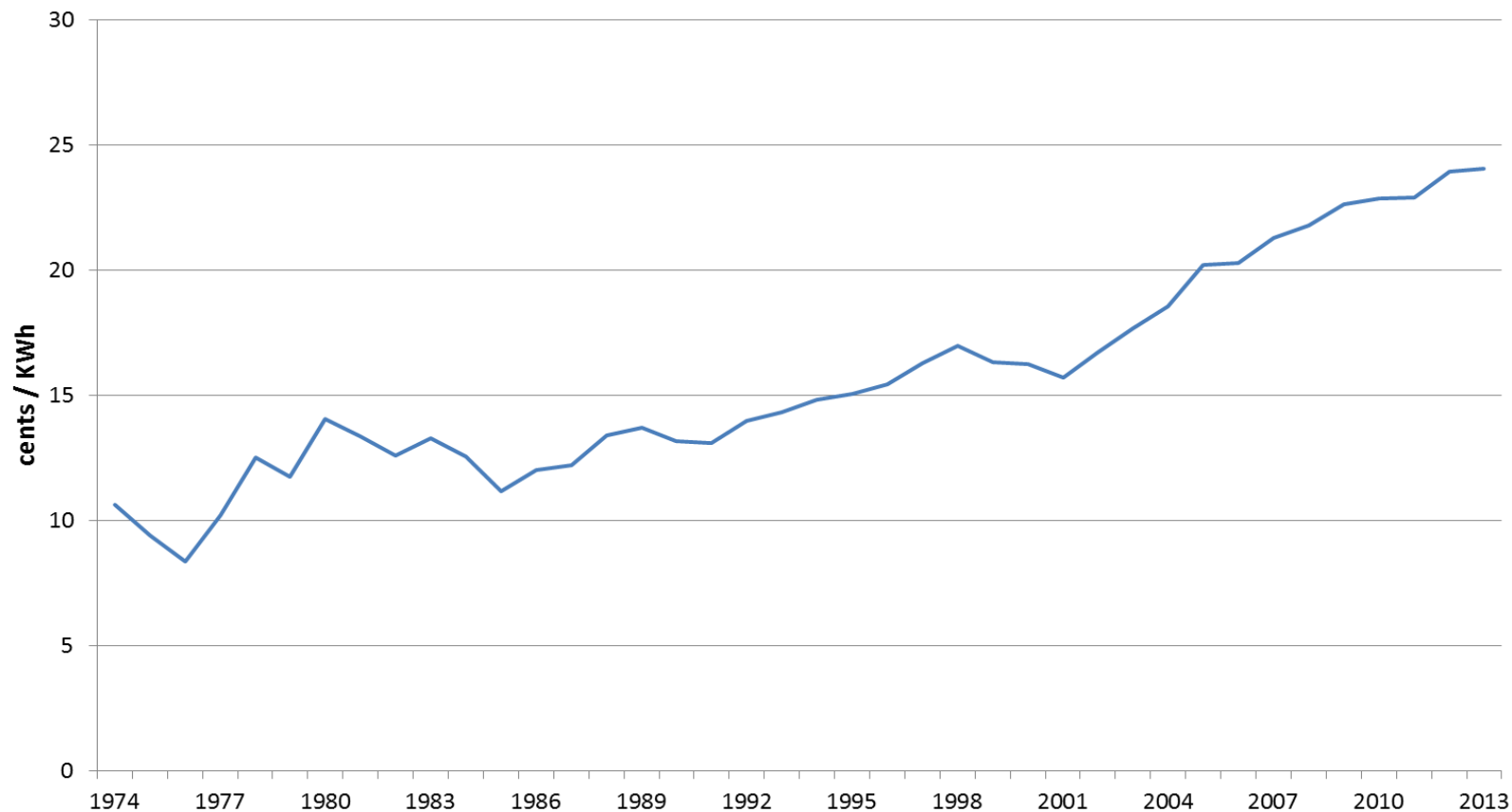
The retail, metering and distribution markets are the most visible parts of the electricity system to consumers

- ❑ The metering and retail markets sit on the distribution system
 - Distribution lines deliver electricity to consumers
 - Except for large consumers directly connected to the transmission system
- ❑ Metering services to consumers are provided by retailers and distributors
- ❑ Retailers handle all of the commercial arrangements with consumers
 - Except for two regions: The Lines Company in the King Country area and Main Power in North Canterbury & Kaikoura, which charge consumers directly for distribution services



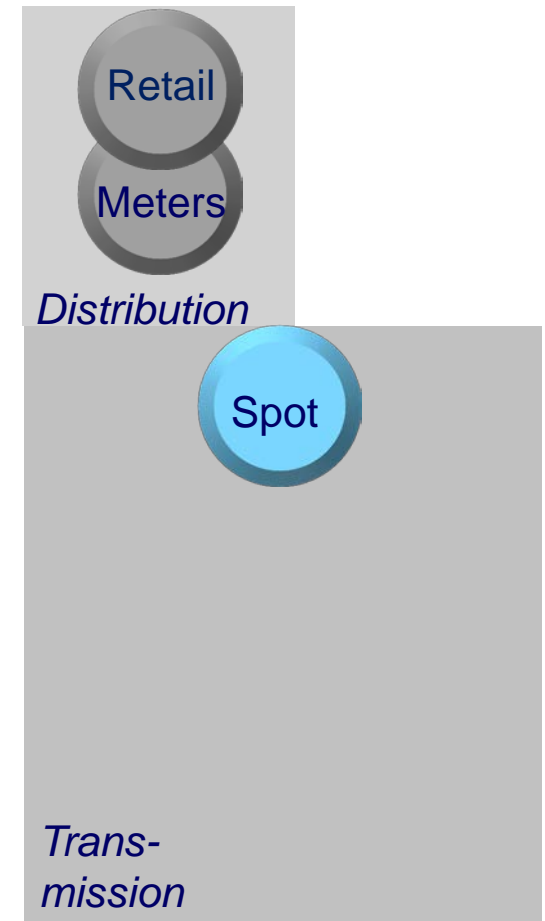
Average residential tariffs in 2012 dollars (excl GST)

Residential consumers pay about \$3 billion per year for electricity, and other consumers pay another \$3b



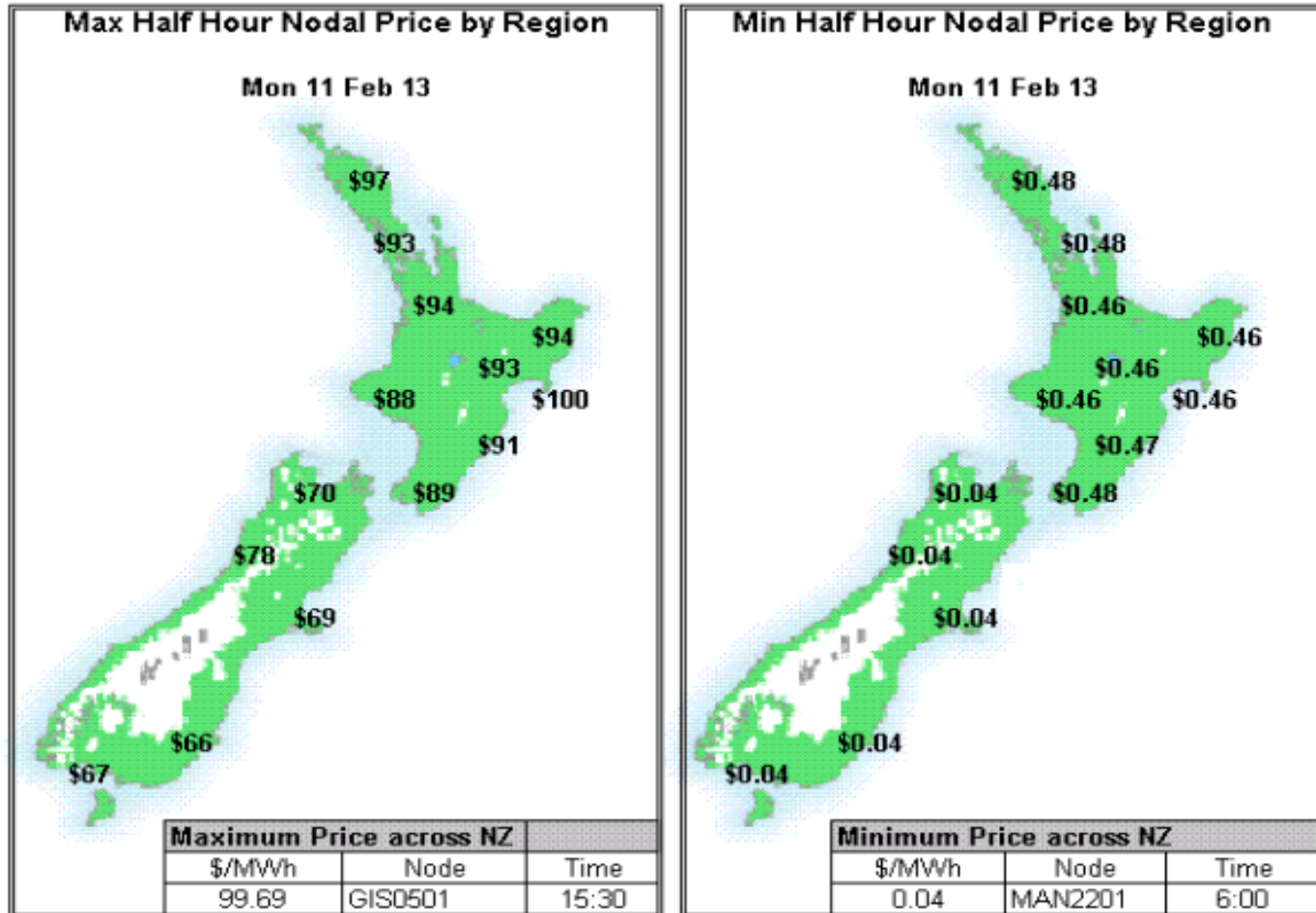
The spot market sets half-hourly prices at 250 locations on the national grid

- ❑ The spot market determines the wholesale prices paid to generators and the wholesale prices paid by retailers and large consumers
- ❑ Spot prices are determined by choosing generation with the lowest offer prices up to the level where generation equals demand
 - All generators at a location receive the same price
 - All purchasers at a location pay the same price

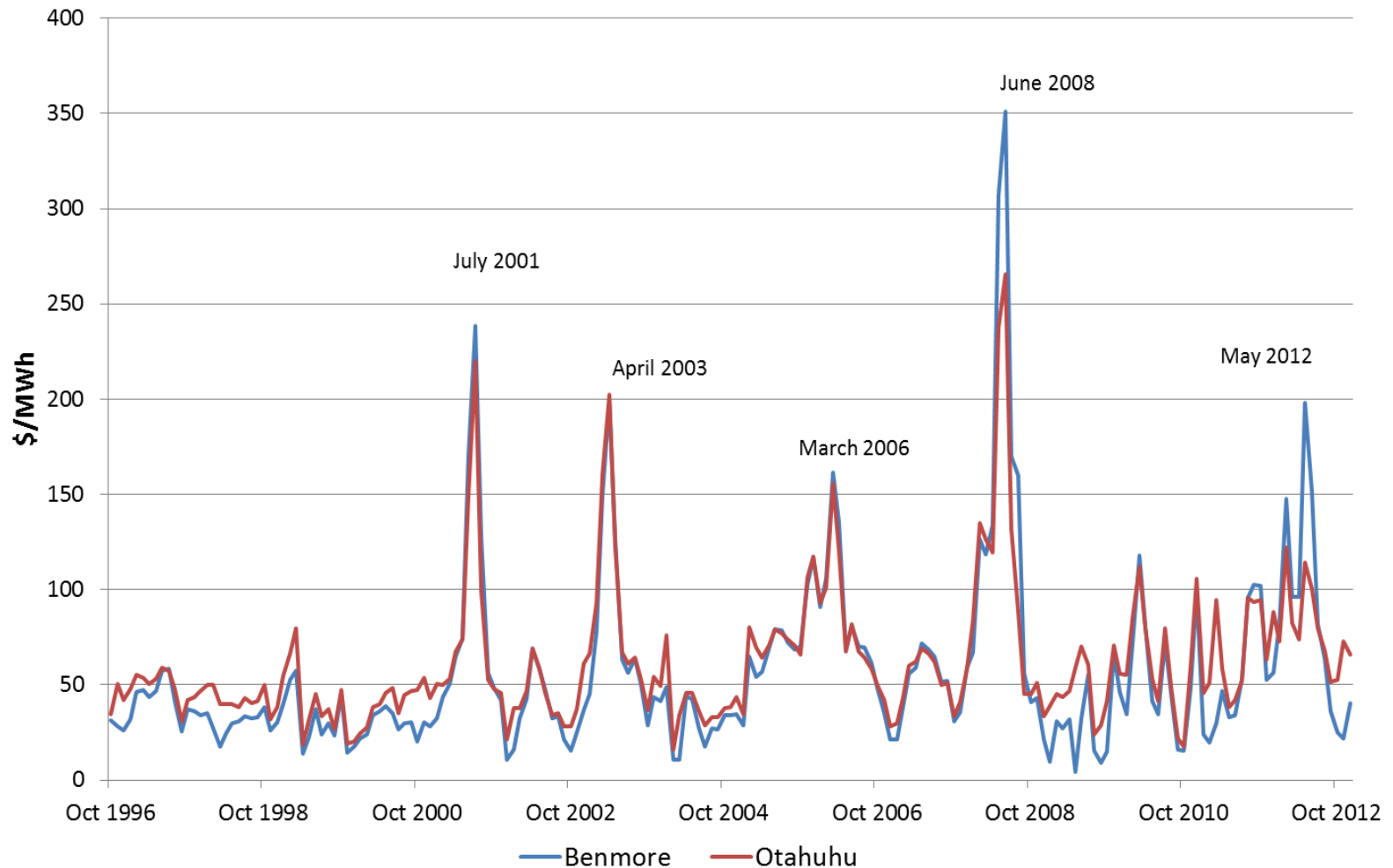


A selection of spot prices around NZ on 11 February 2013

The spot market transacts \$2 - \$3b per year

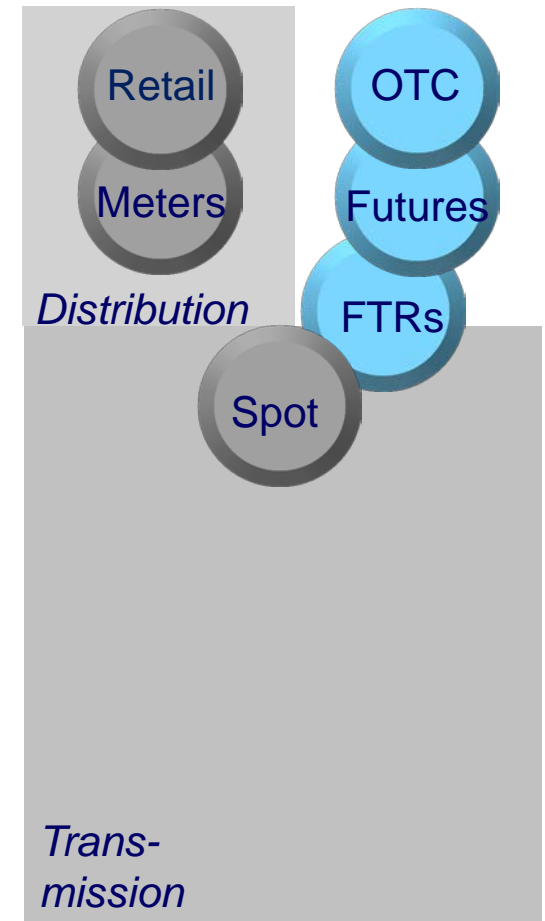


Monthly average spot prices at Otahuhu & Benmore since 1996

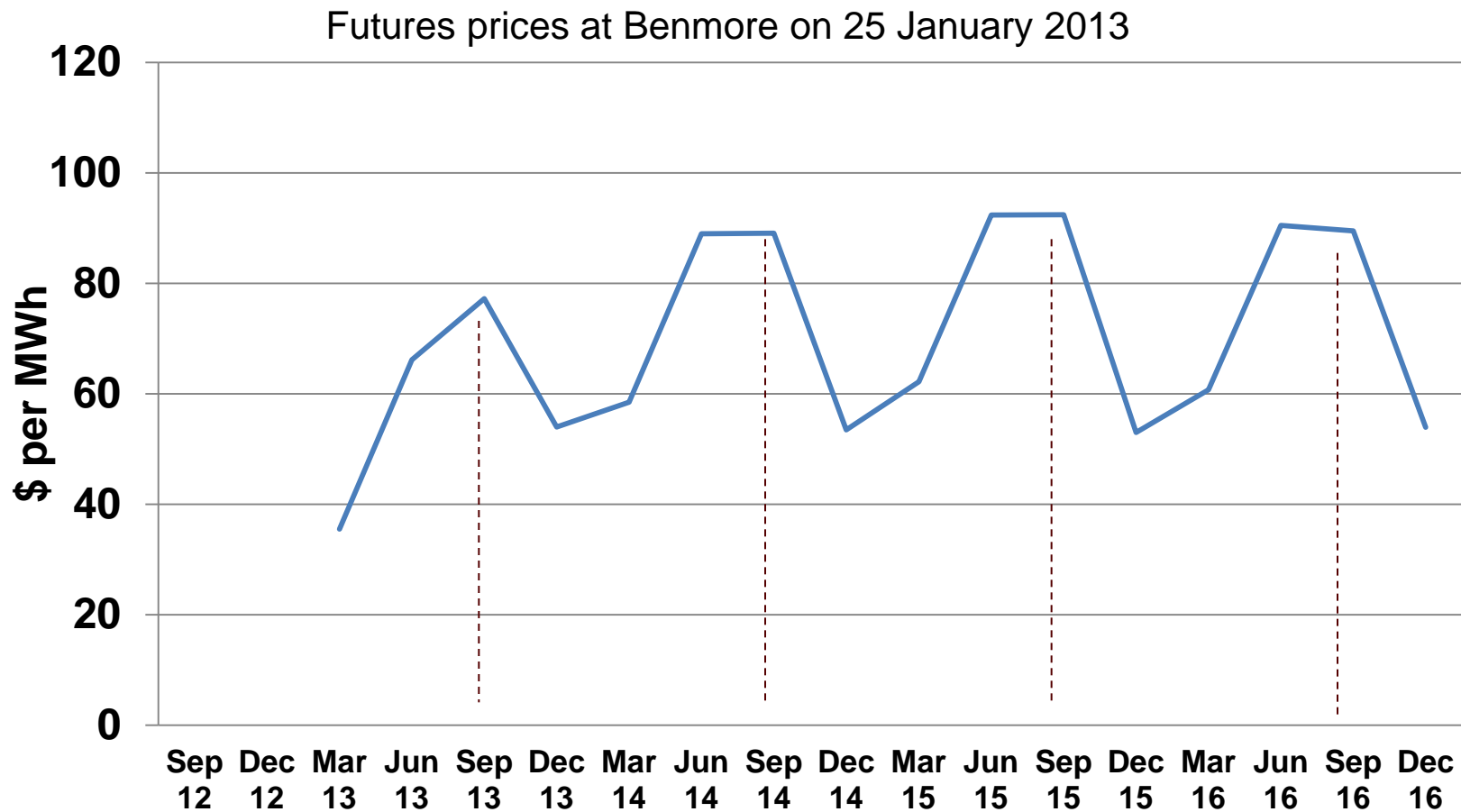


Generators, retailers, banks and large consumers buy and sell hedge contracts

- The hedge market comprises several sub-markets
 - The OTC (over-the-counter) market for bilateral contracts: parties approach one another – or via a broker – for tailored hedge contracts at any location
 - The futures market: parties buy or sell highly standardised contracts through the market operator (ASX Limited) at Otahuhu or Benmore
 - The FTR (financial transmission rights) market started in June this year
 - FTRs provide a hedge against the price in one location varying relative to the price in another location

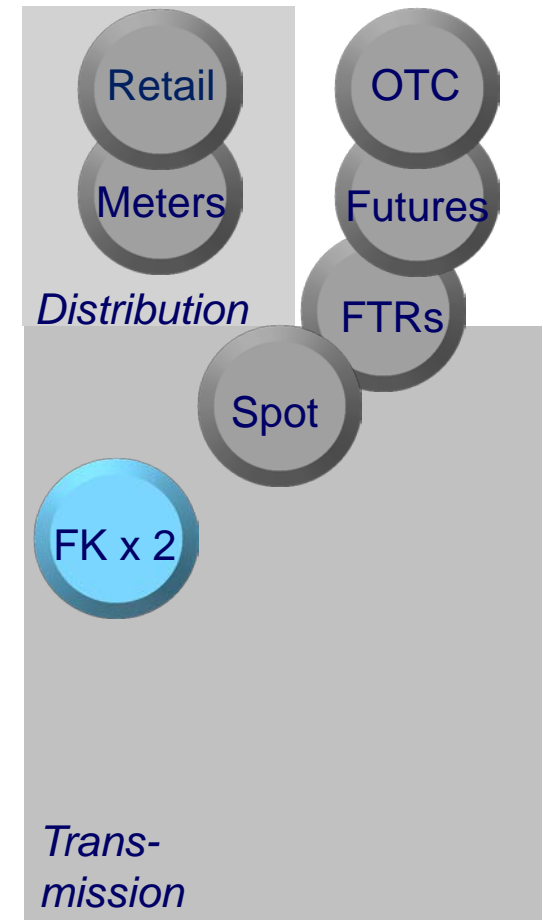
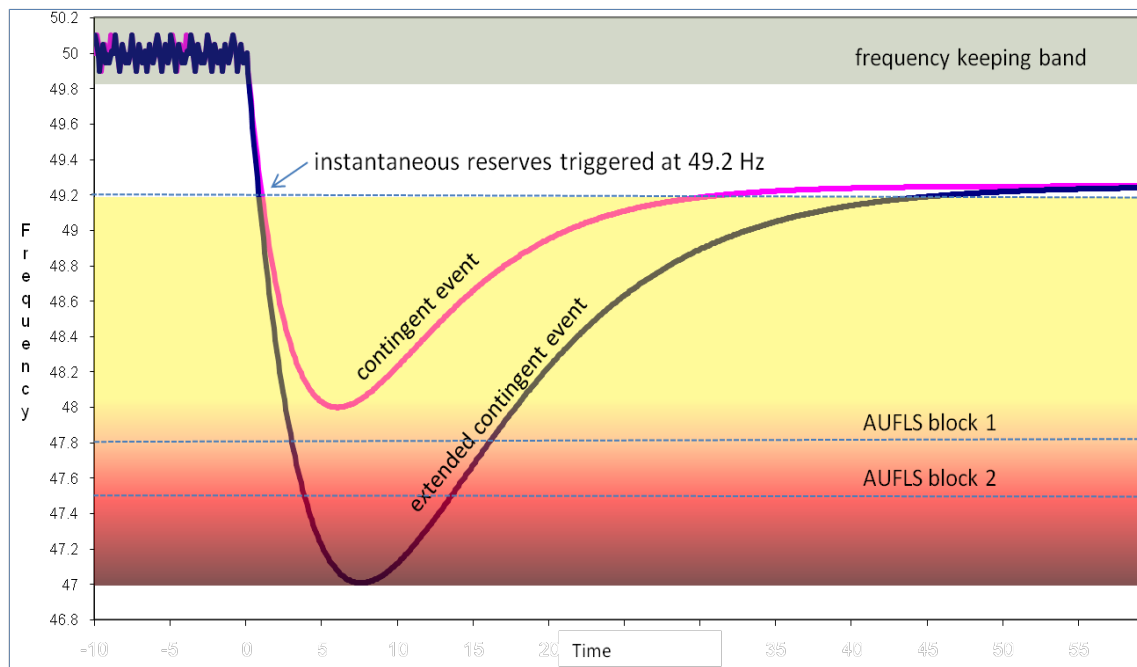


Futures prices are set for four years ahead at BEN and OTA

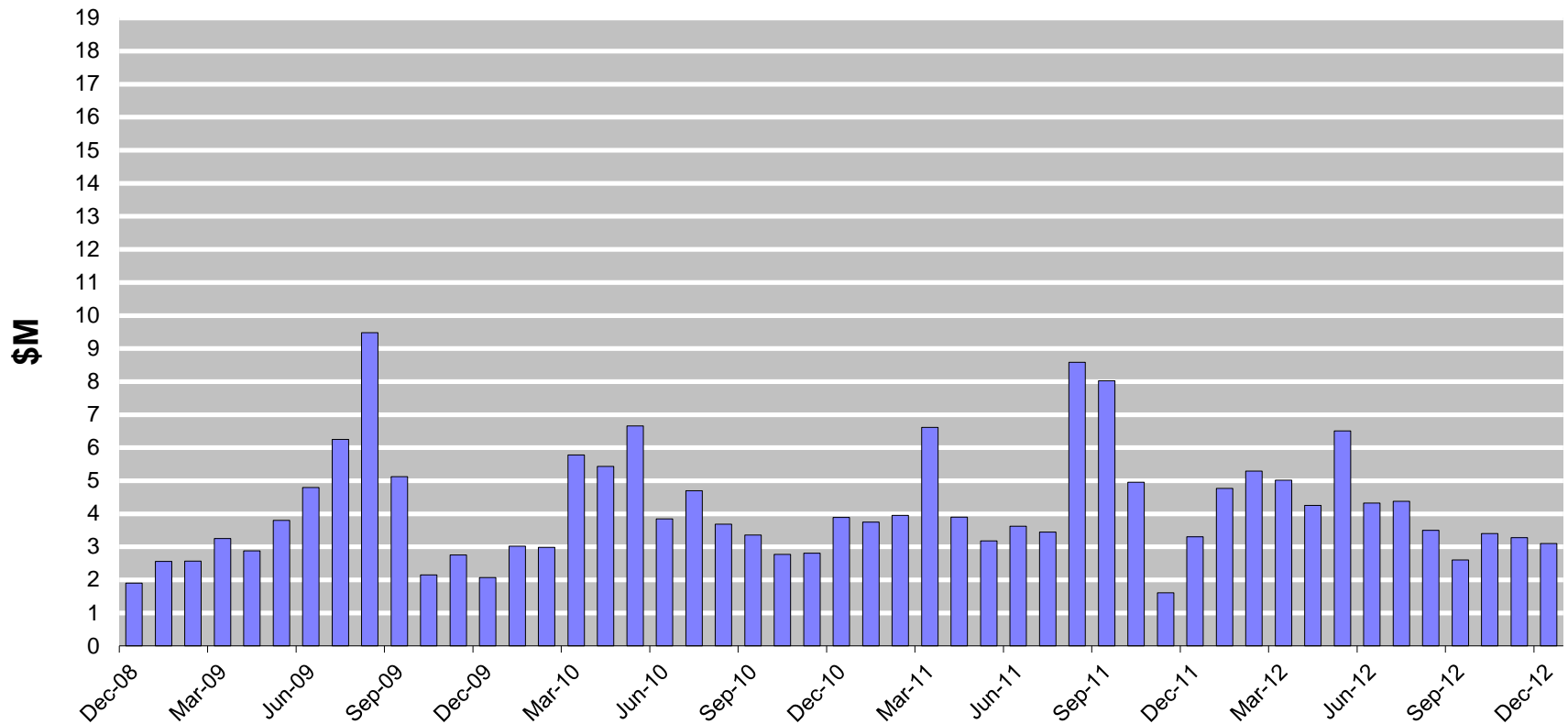


There are two frequency keeping (FK) market in NZ

- ❑ The FK market is needed because frequency on the grid fluctuates due to minute-by-minute fluctuations in electricity demand (normal operations)
 - FK is where a generator uses its plant to keep system frequency within a narrow frequency band
 - Generators compete via tenders to provide FK services on a half-hourly basis

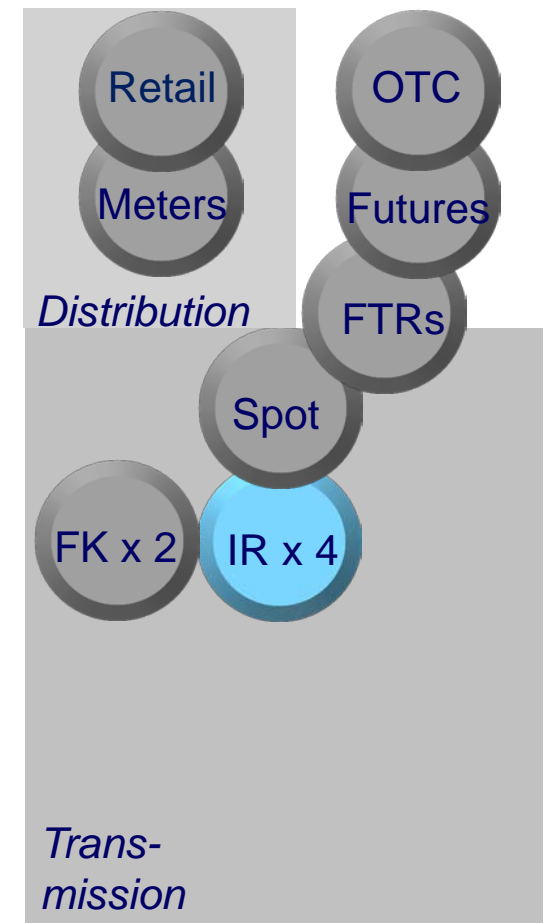
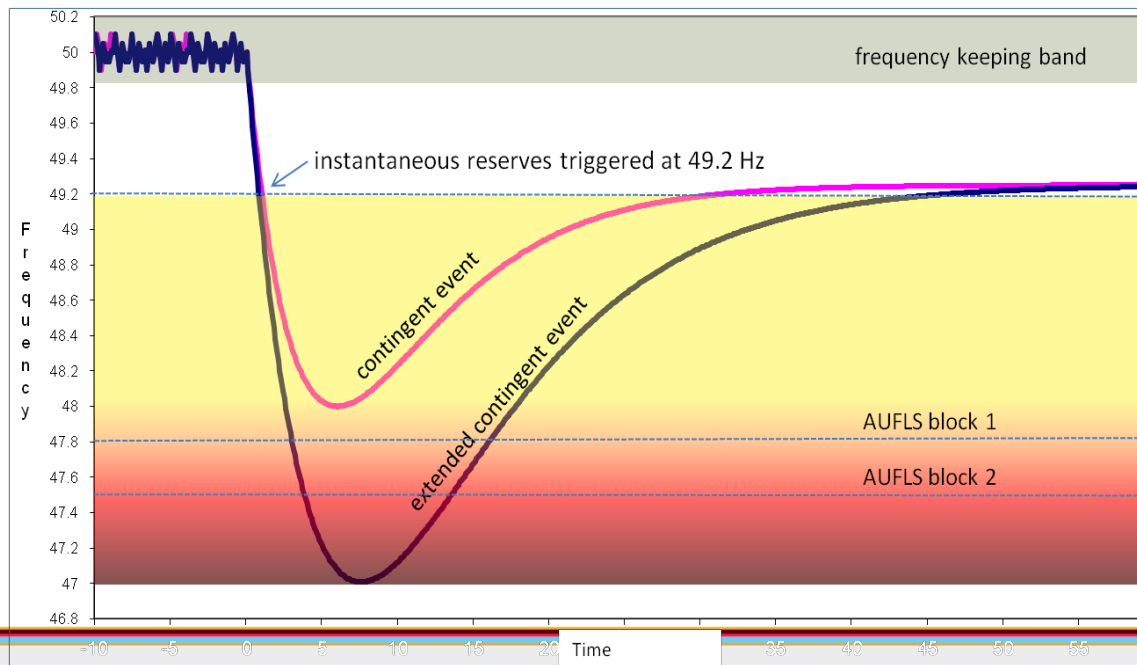


Frequency keeping costs vary considerably and were about \$50m in 2012

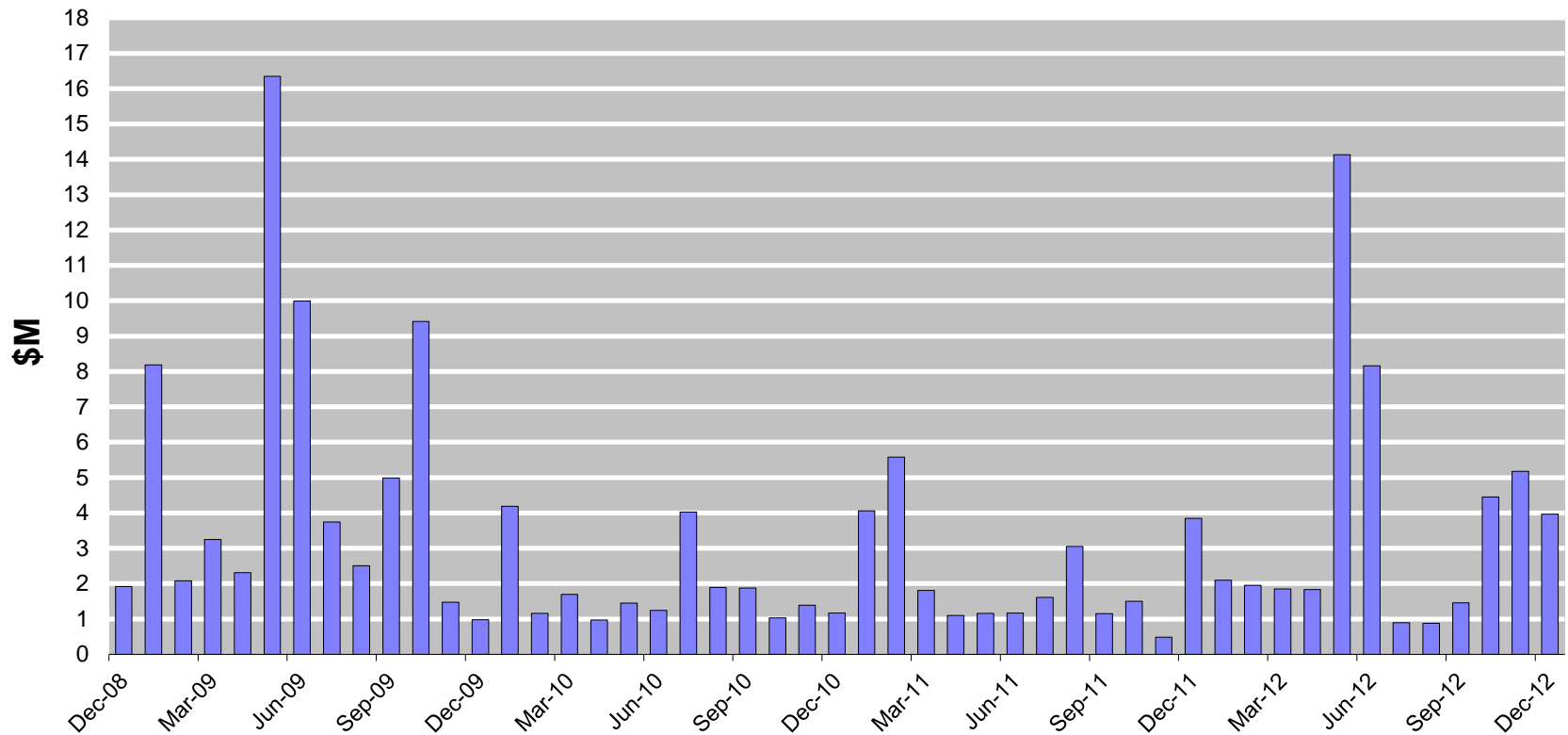


There are four instantaneous reserve (IR) markets in NZ

- ❑ The IR market is needed because frequency can fall sharply when a large generator or HVDC pole trips (called contingent events)
 - The decline in frequency needs to be arrested very quickly by rapidly increasing generation or cutting load
 - Generators offer spare capacity into the reserves market and large consumers offer to have some of their load immediately cut-off if a contingent event occurs

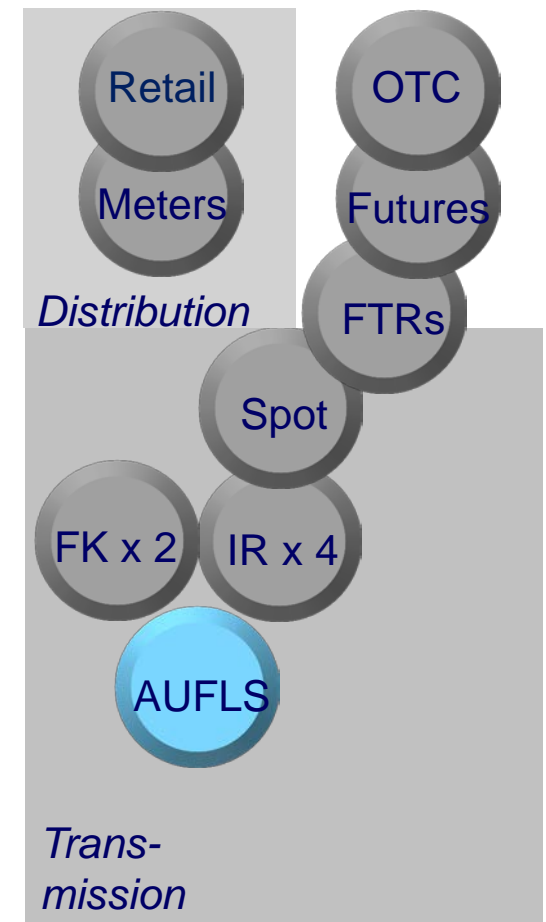
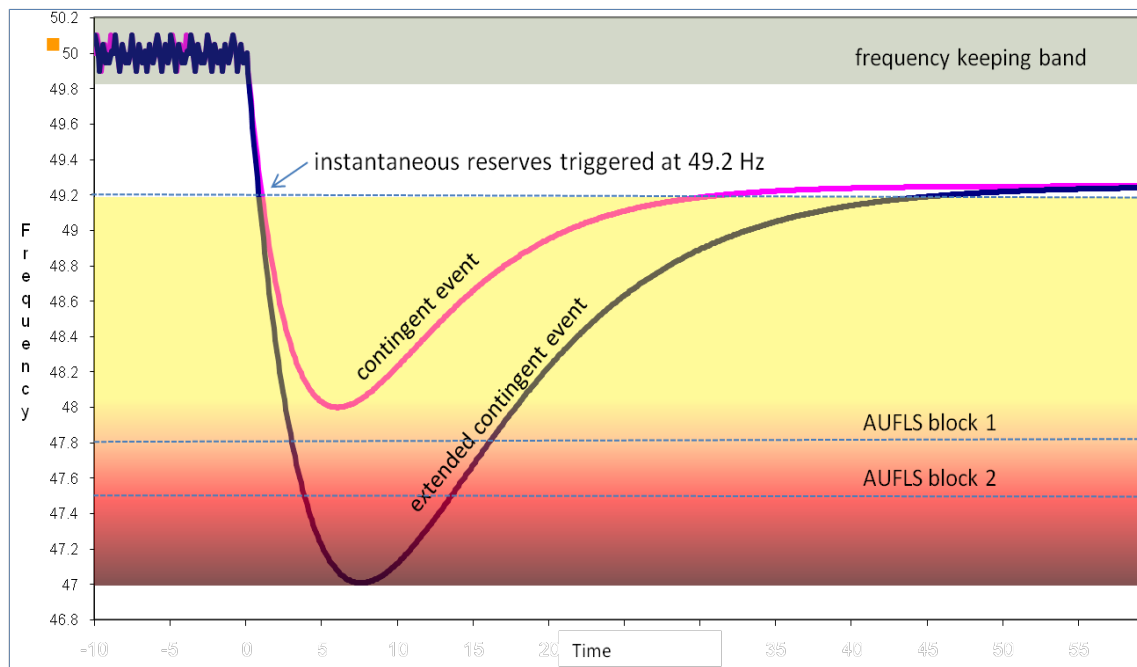


Instantaneous Reserve costs vary greatly and were about \$46m in 2012



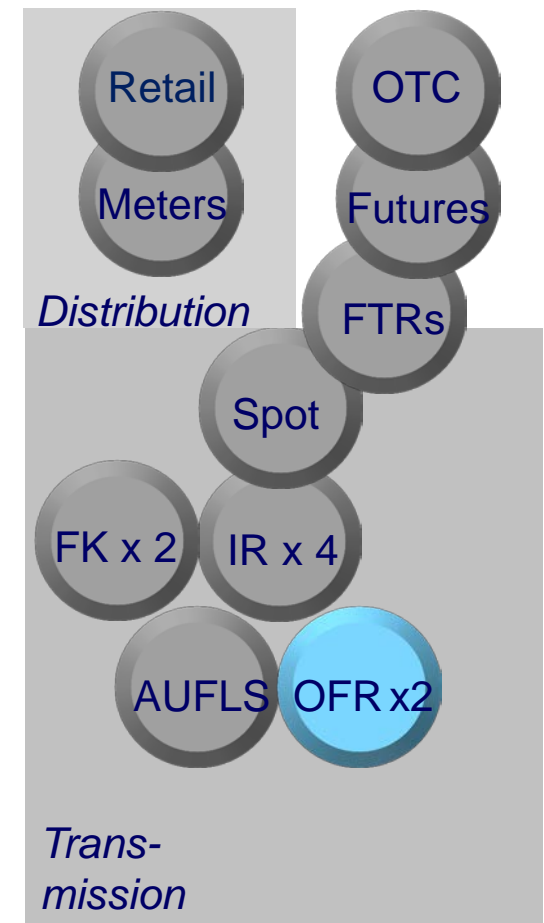
Automatic Under Frequency Load Shedding (AUFLS) arrangements

- ❑ AUFLS are needed to cover situations when very large events occur
 - An extended contingent event (ECE) occurs when multiple large risks occur at the same time ... this very low risk is covered by AUFLS
 - Providers of AUFLS must have relays in place that activate automatically when frequency falls to prescribed levels



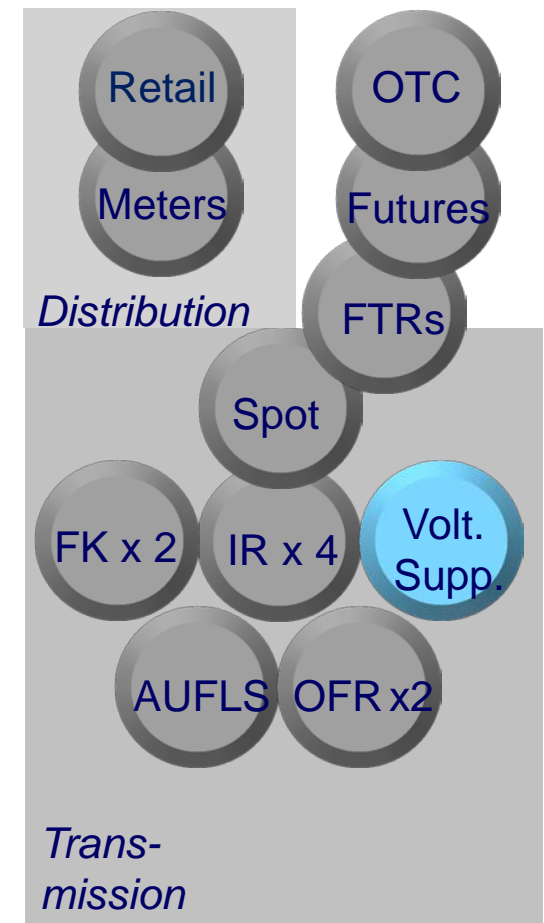
There are two over-frequency reserve (OFR) markets in NZ

- ❑ The OFR market deals with the opposite situation handled by the IR market
 - OFR deals with the situation where frequency rises sharply above the normal band ... generators providing OFR are automatically cut-off from the system
 - The system operator contracts annually with SI generators to provide OFR, and when its needed the system operator calls for bids on a half-hourly basis
 - The system operator began purchasing OFR for the NI in November 2010



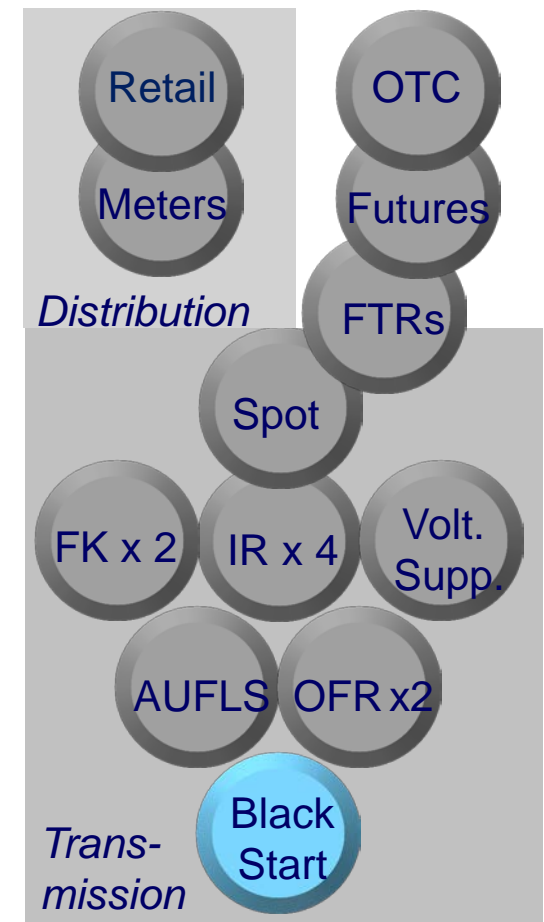
The voltage support market is needed to maintain voltage across the transmission system

- ❑ Voltage in the AC system is like the pressure in a water pipe required to cause flow.
- ❑ Voltage must always be kept in a narrow range
 - Transpower has capacitors and condensers in place to control the voltage as it reduces or increases according to demand and distance of flow
- ❑ As with FK and IR, some dynamic control is required to keep voltage continuously in balance
 - Some of this is provided by generators as a condition of connection to the grid
 - And some of it is provided by new transmission technology called Statcons, investment in which is controlled by the Commerce Commission



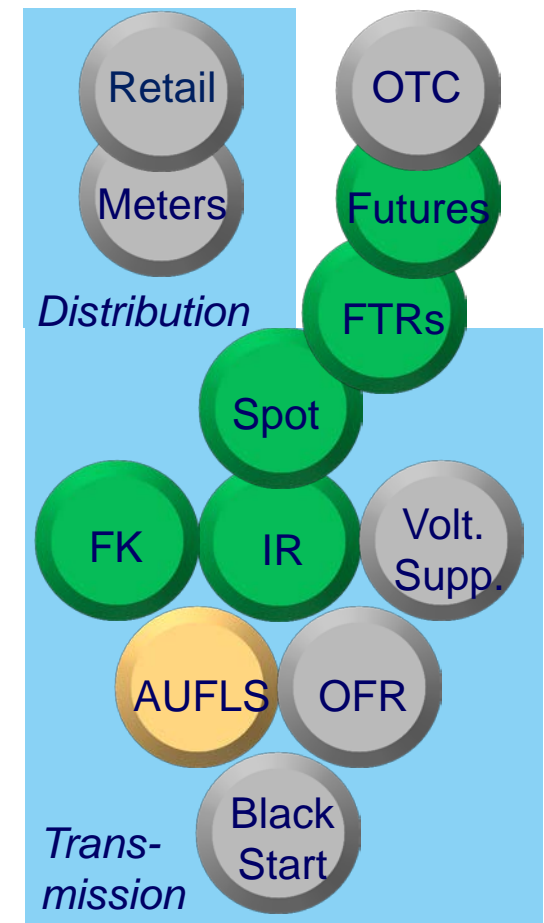
The 'black start' market

- ❑ The electricity system goes into cascade failure if AUFLS fail to arrest the decline in frequency or if voltage collapses
- ❑ Many generators use electricity to start up. Hence, some generators need to be capable of starting up while the grid is dead ... called 'black start' generators
- ❑ The system operator contracts with parties to provide black start services

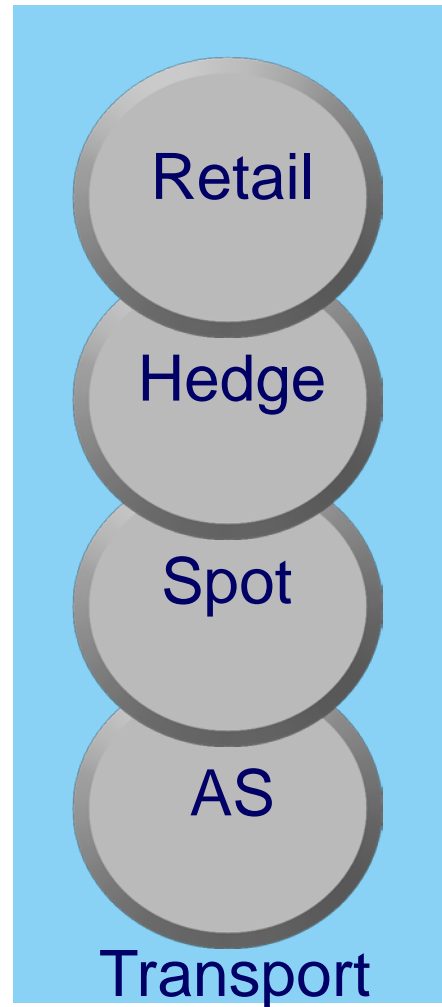


The electricity market comprises a mix of market arrangements

-  Centralised trading markets
-  Commercial bilateral contract markets
-  Regulated bilateral contract markets
-  Mandated provision (no market)



Simplify the suite of electricity markets to five broad markets



Competition in the NZ electricity market

We monitor competition with the following metrics

Structure

- ☐ Seller and buyer concentration indicators
- ☐ Barriers to entry indicators

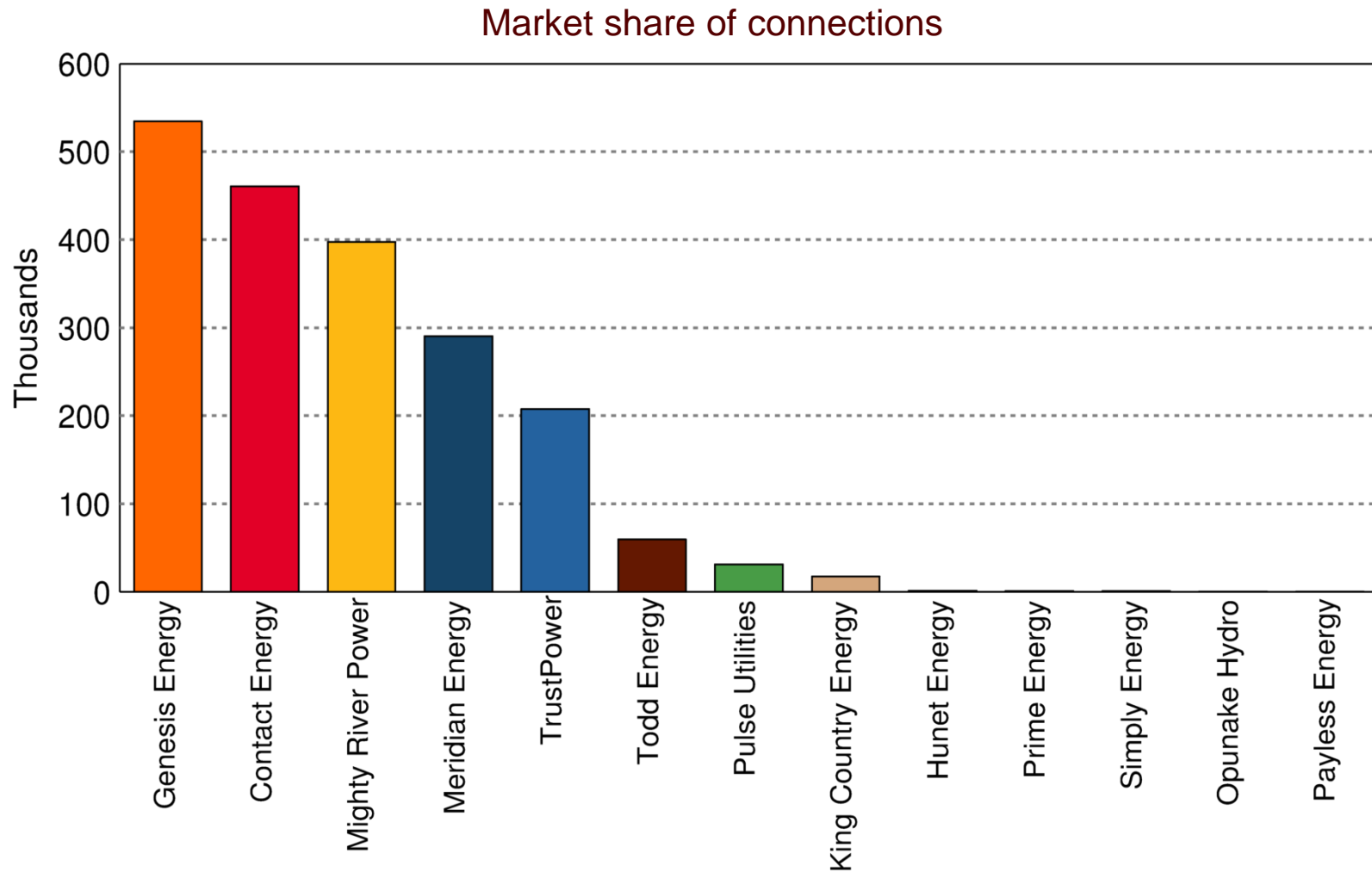
Conduct

- ☐ Price vs. cost indicators
- ☐ Output withholding indicators, curious bids and offers
- ☐ Competitive marketing activity

Performance

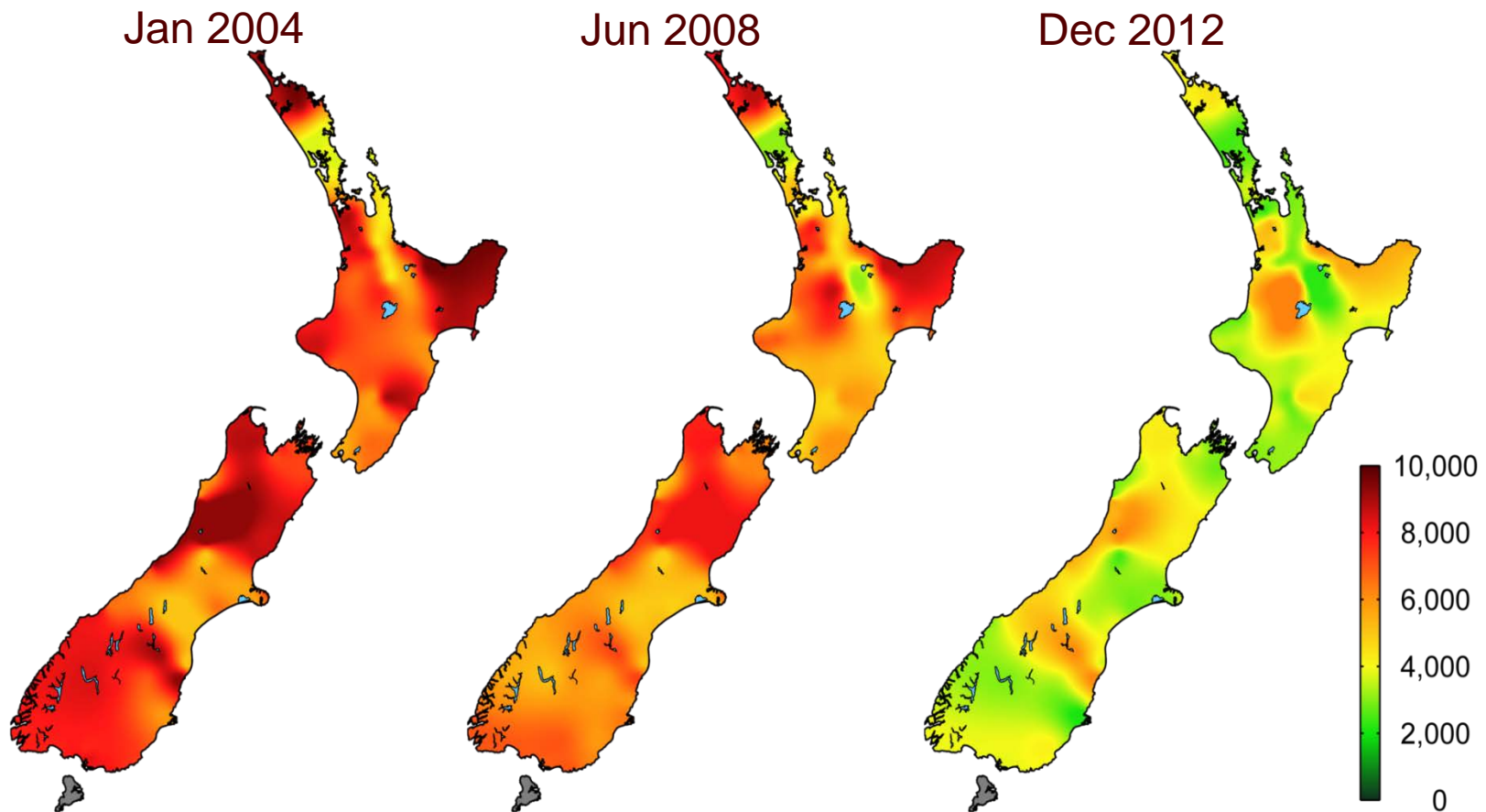
- ☐ Static efficiency indicators
- ☐ Dynamic efficiency/innovation indicators

New Zealand has 14* independent electricity retailers

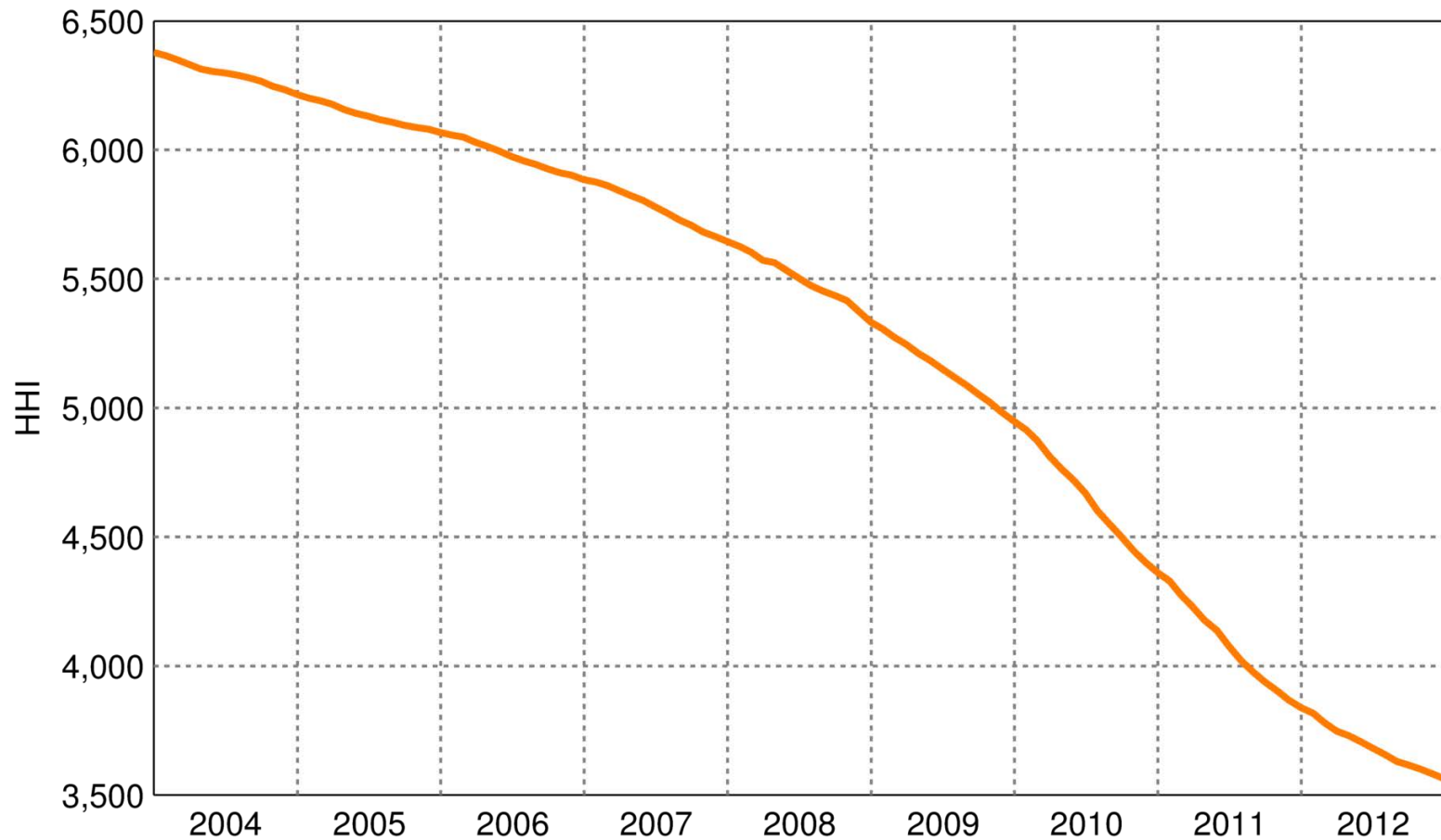


*K-Power is not shown as it contracts out the management of its ICPs in the registry

Retail market concentration (HHI) has declined rapidly

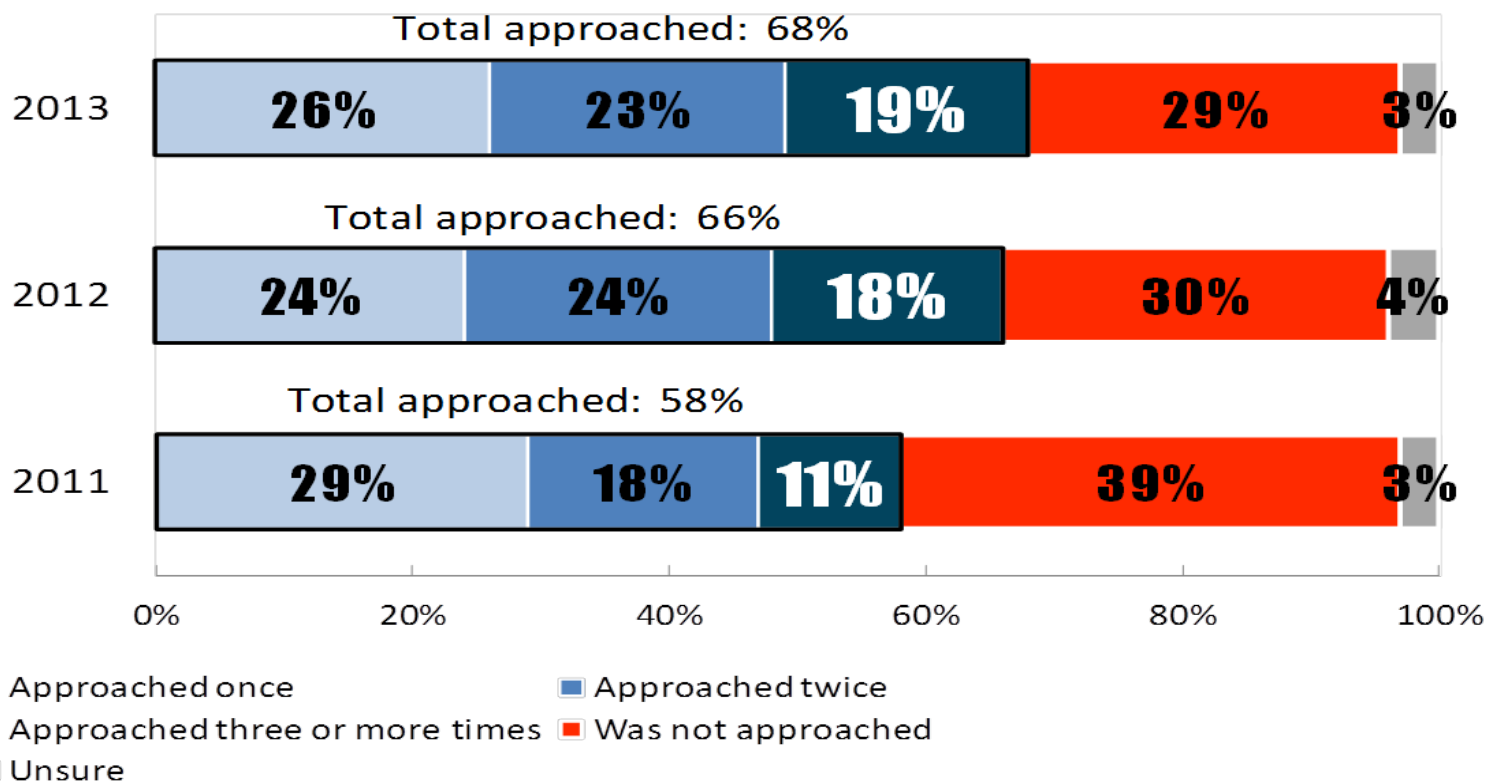


Weighted-average of regional HHIs declining steadily



Big increase in competition for customers

Question to respondents: how many different power companies have approached you in the last two years to switch to them?



Retail

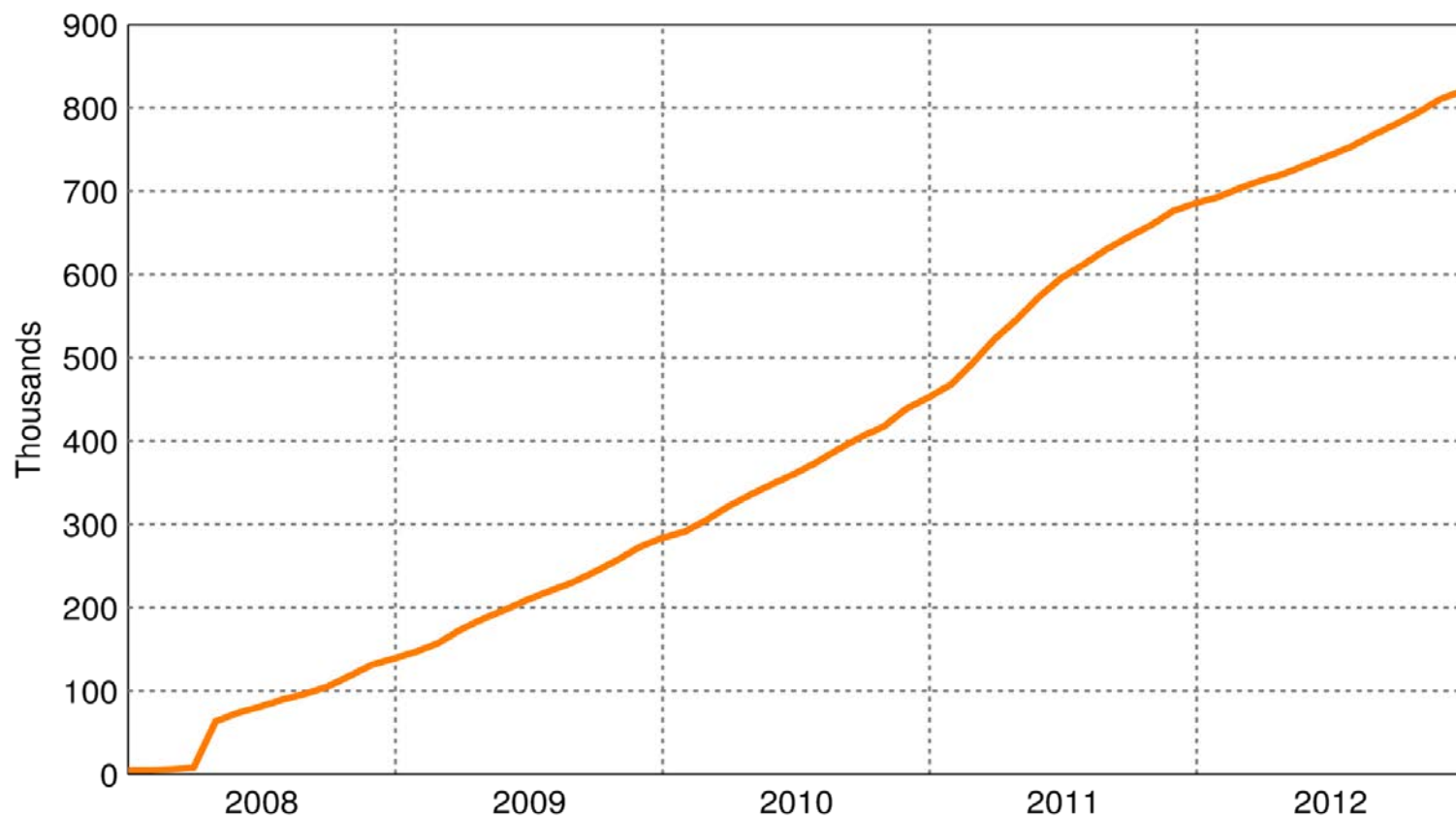
Hedge

Spot

AS

NZ retailers far more innovative than offshore counterparts

Roll-out of smart meters has occurred at pace and now seeing innovative information and pricing offers



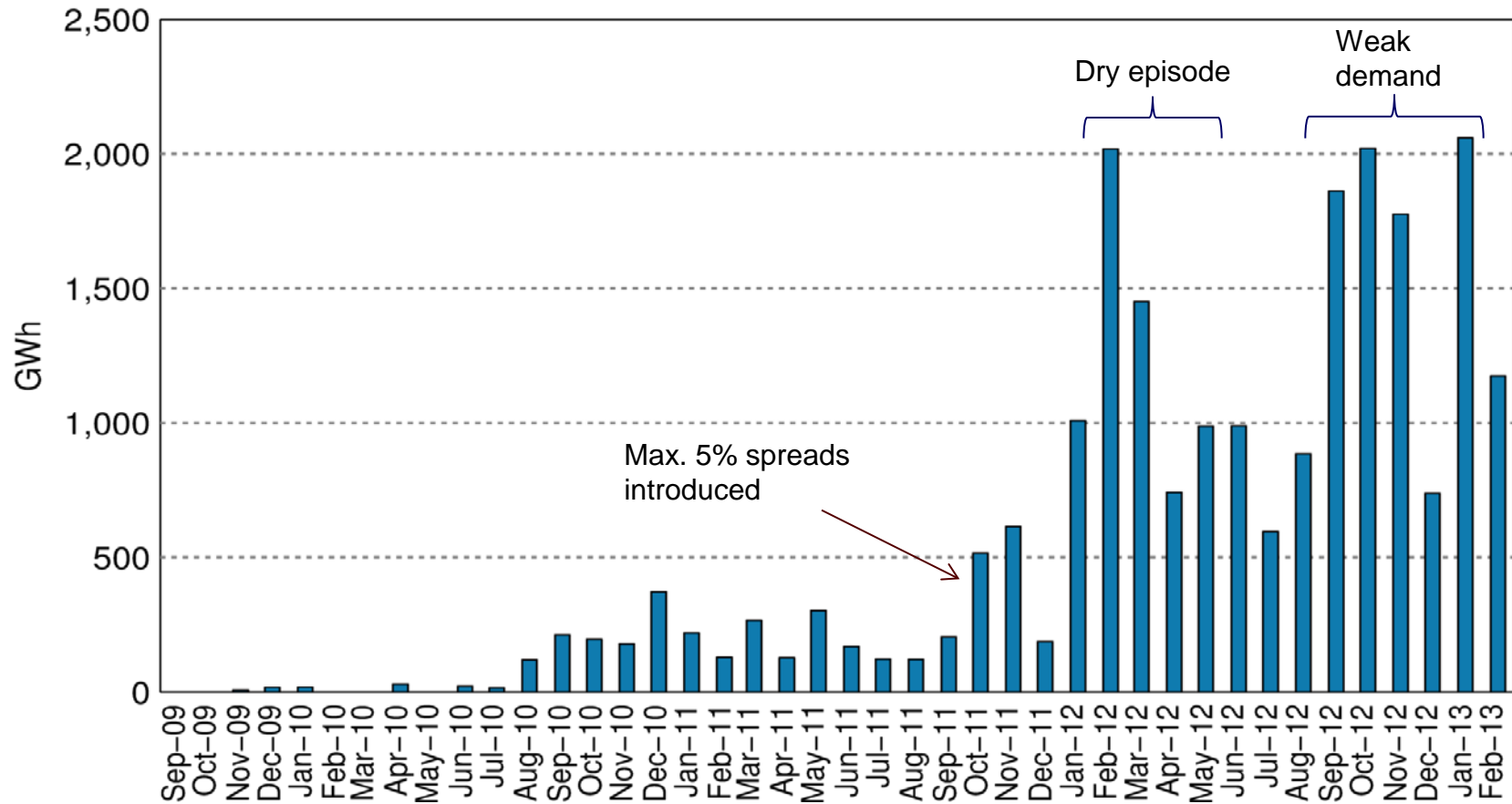
Futures trading activity increased 500% c.f. 2011

Retail

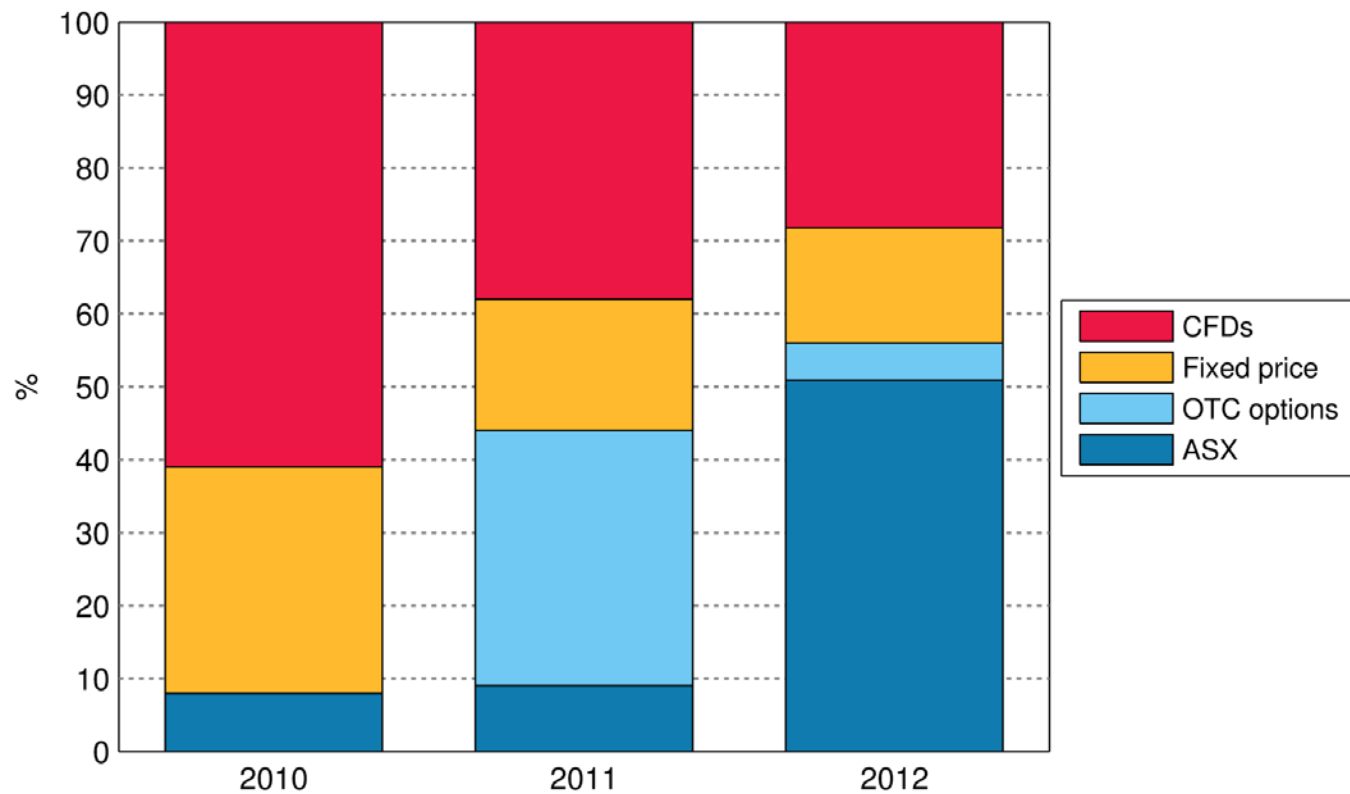
Hedge

Spot

AS



Futures accounted for 50% of hedge contracts in 2012



Retail

Hedge

Spot

AS

Retail

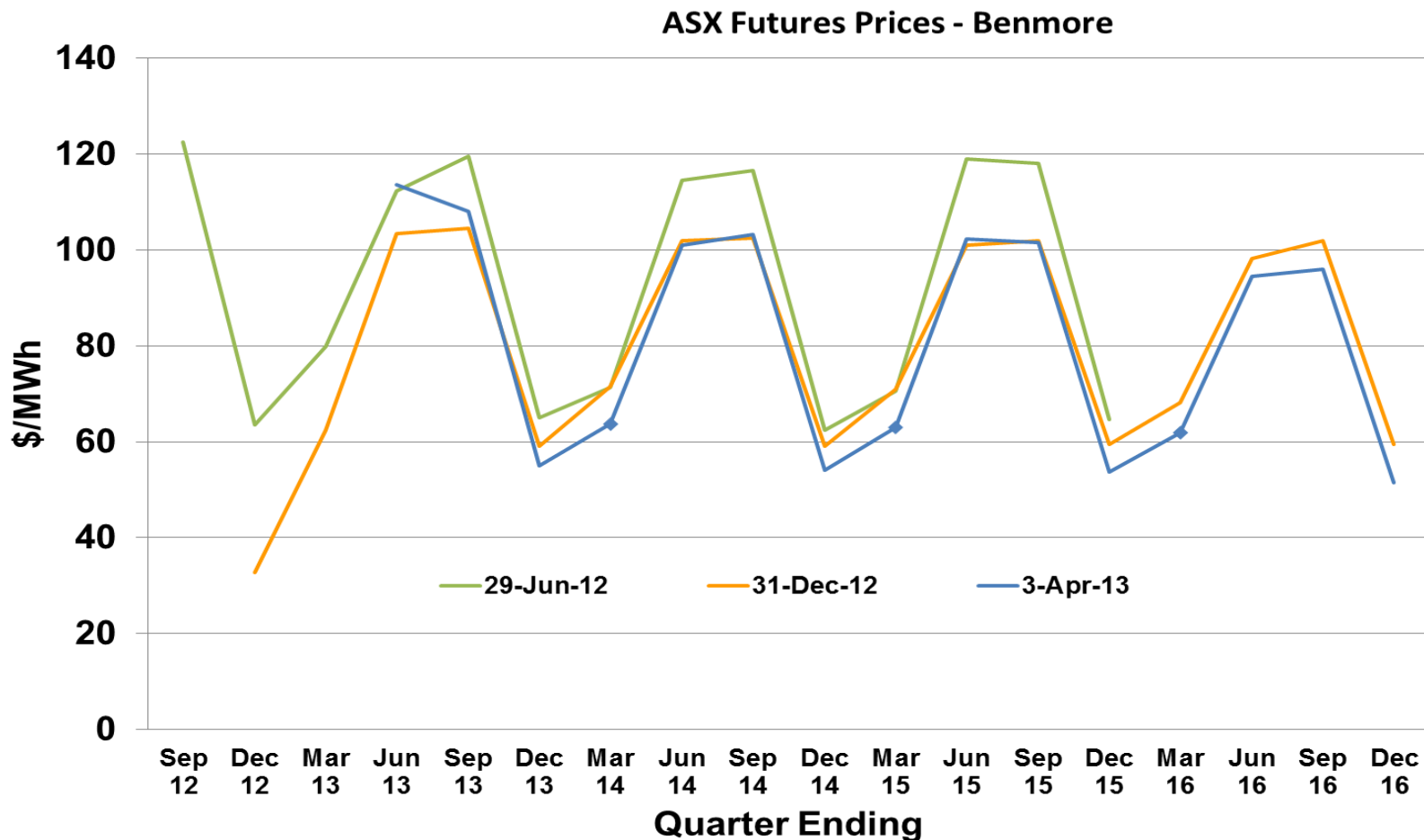
Hedge

Spot

AS

Competition in the futures market has reduced prices

Average futures price has fallen by more than 20% over last 12 months



There are few barriers to entry in generation

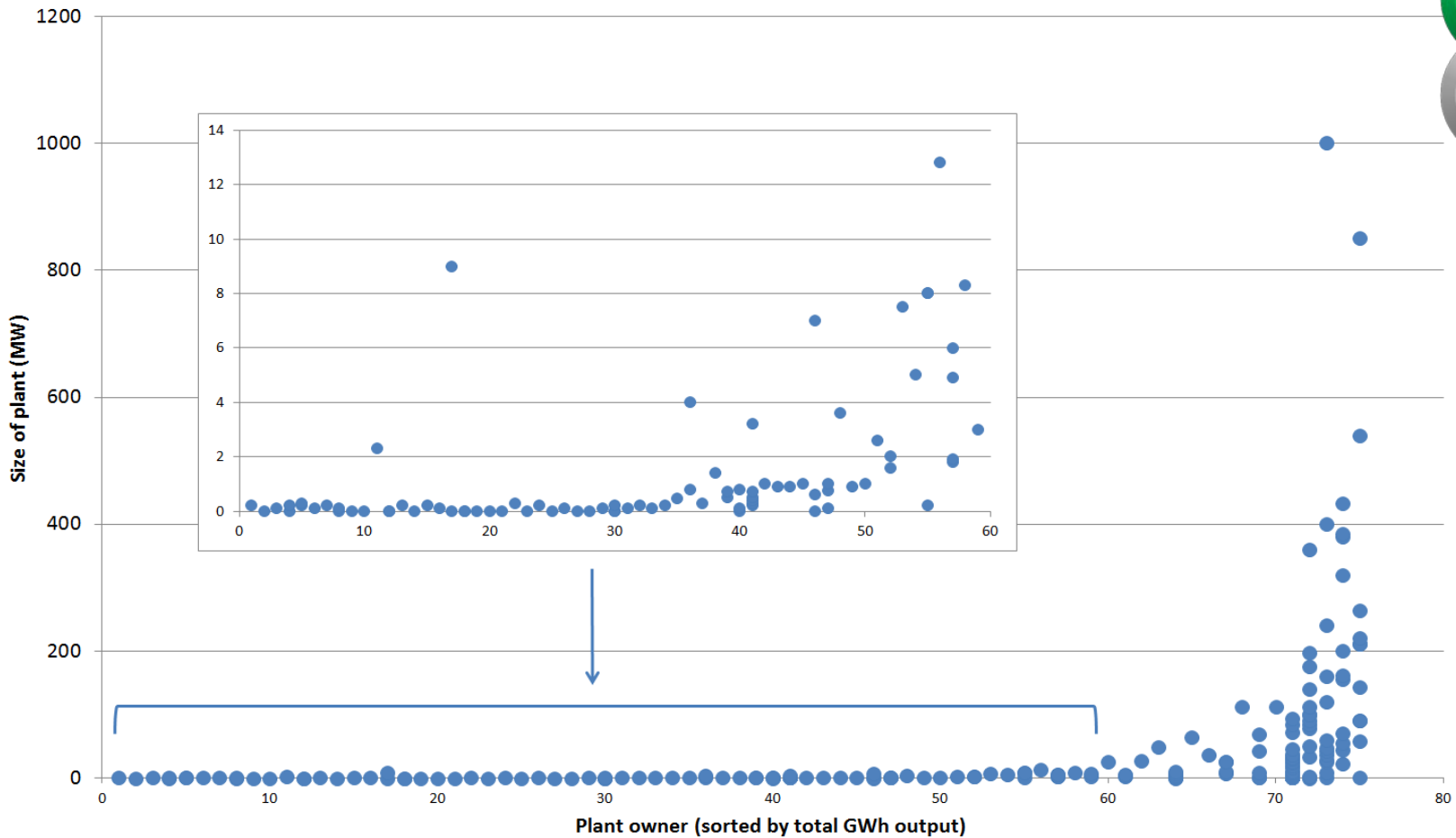
Retail

Hedge

Spot

AS

There are 75 generating entities in NZ (13 are grid-connected)



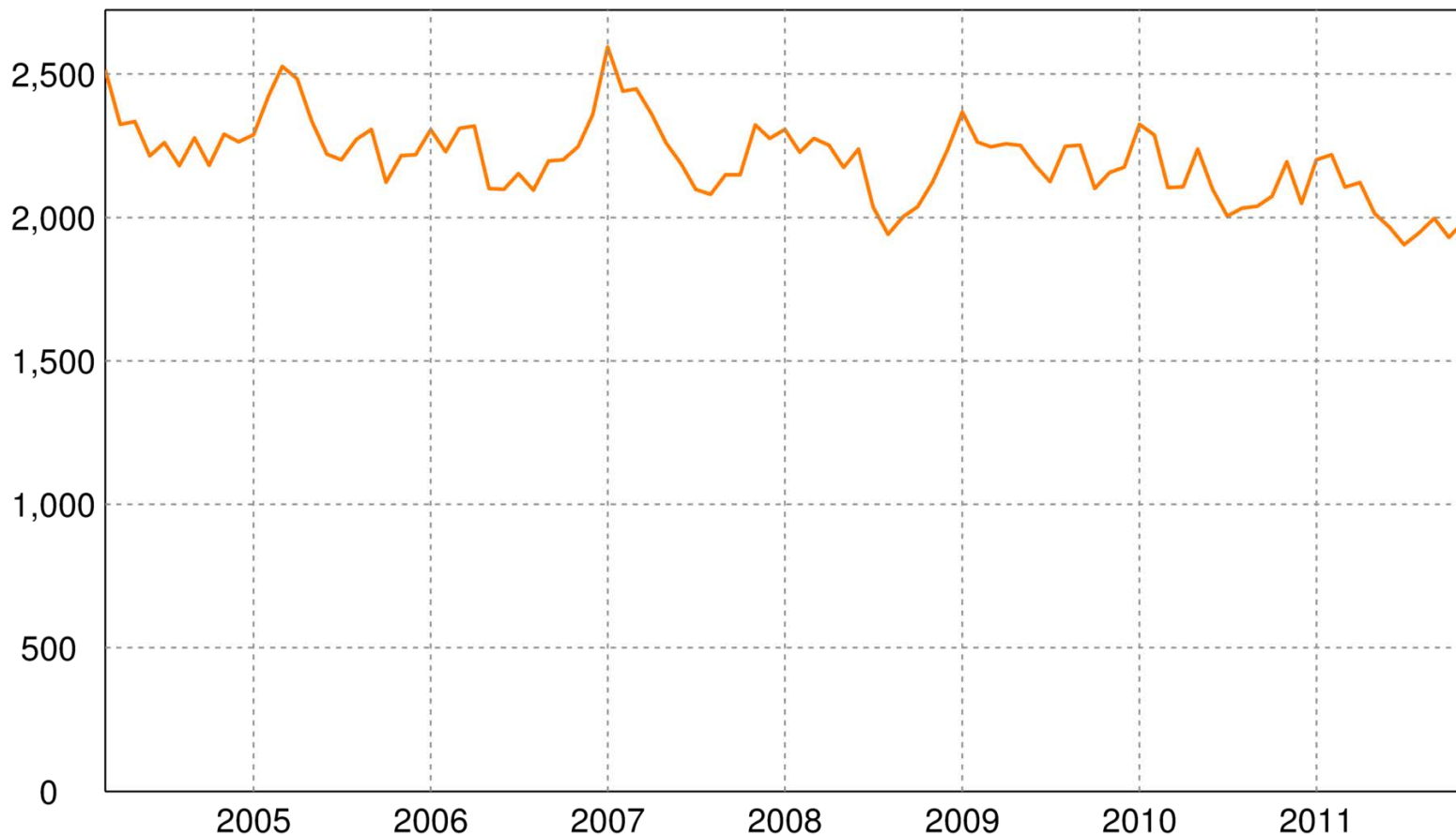
HHI is reasonable and declining for generation (by parent company)

Retail

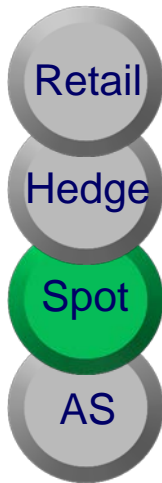
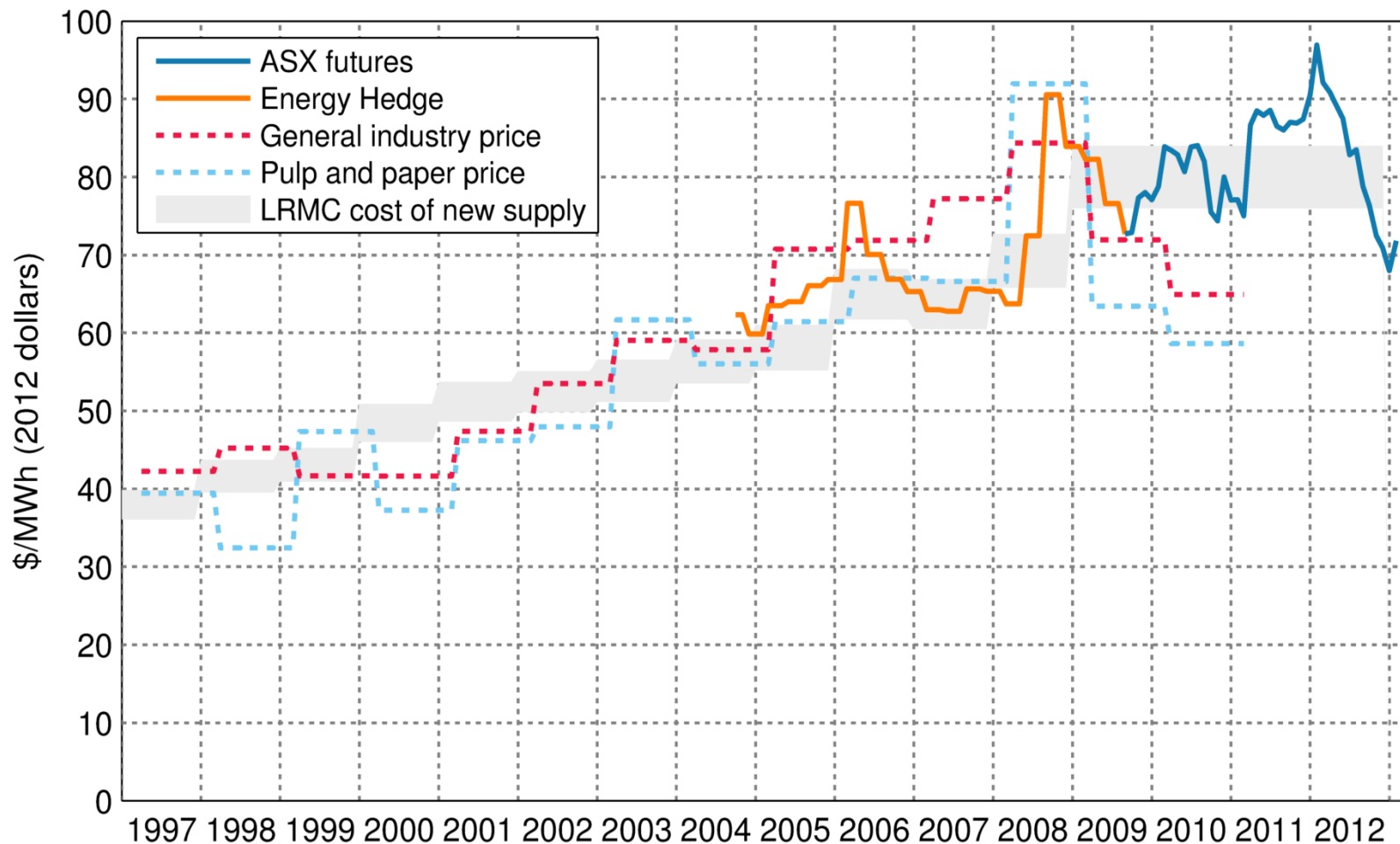
Hedge

Spot

AS



Competition in generation: Wholesale prices largely in line with LRMC



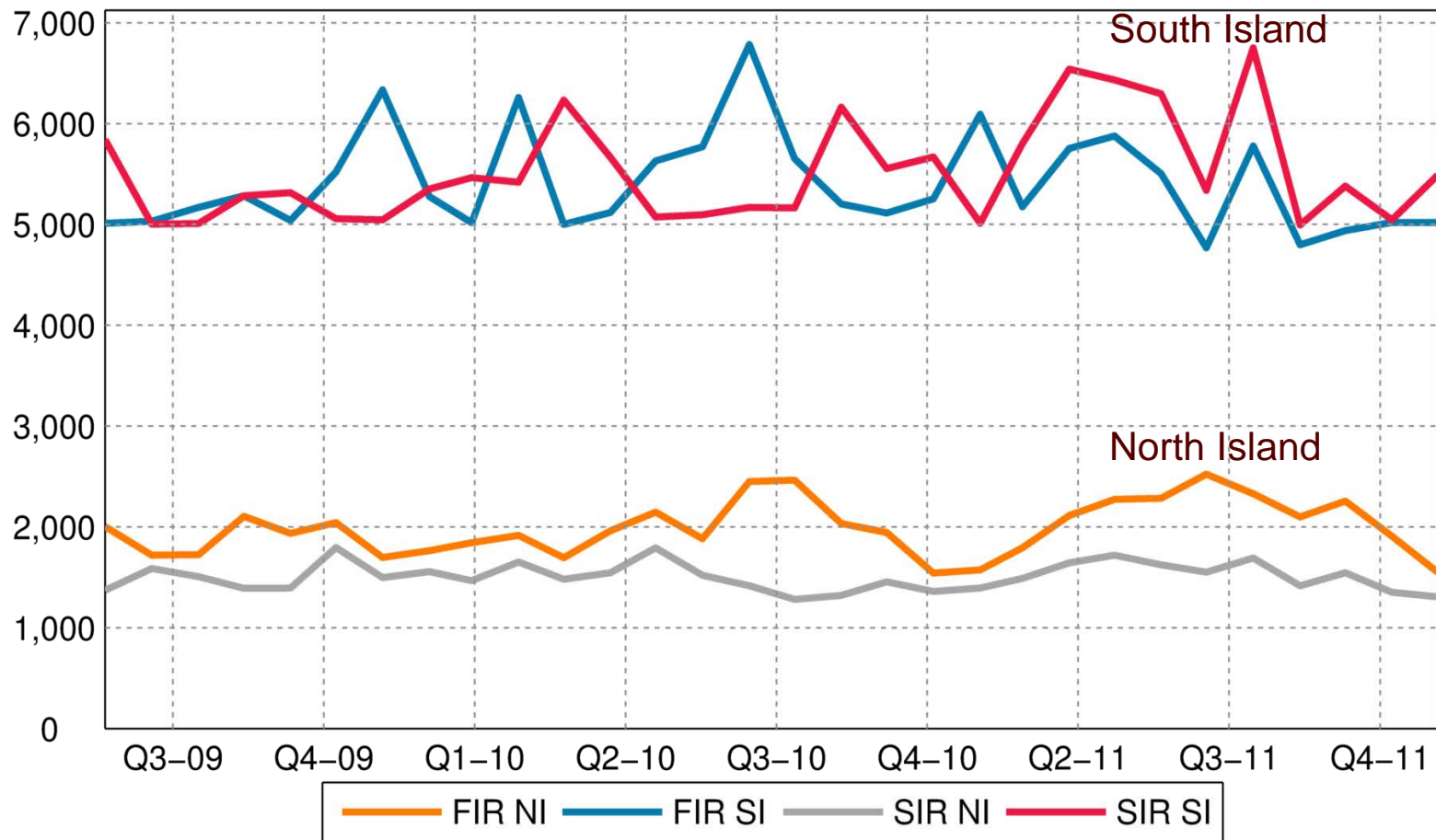
HHI for IR market is okay in the North Island

Retail

Hedge

Spot

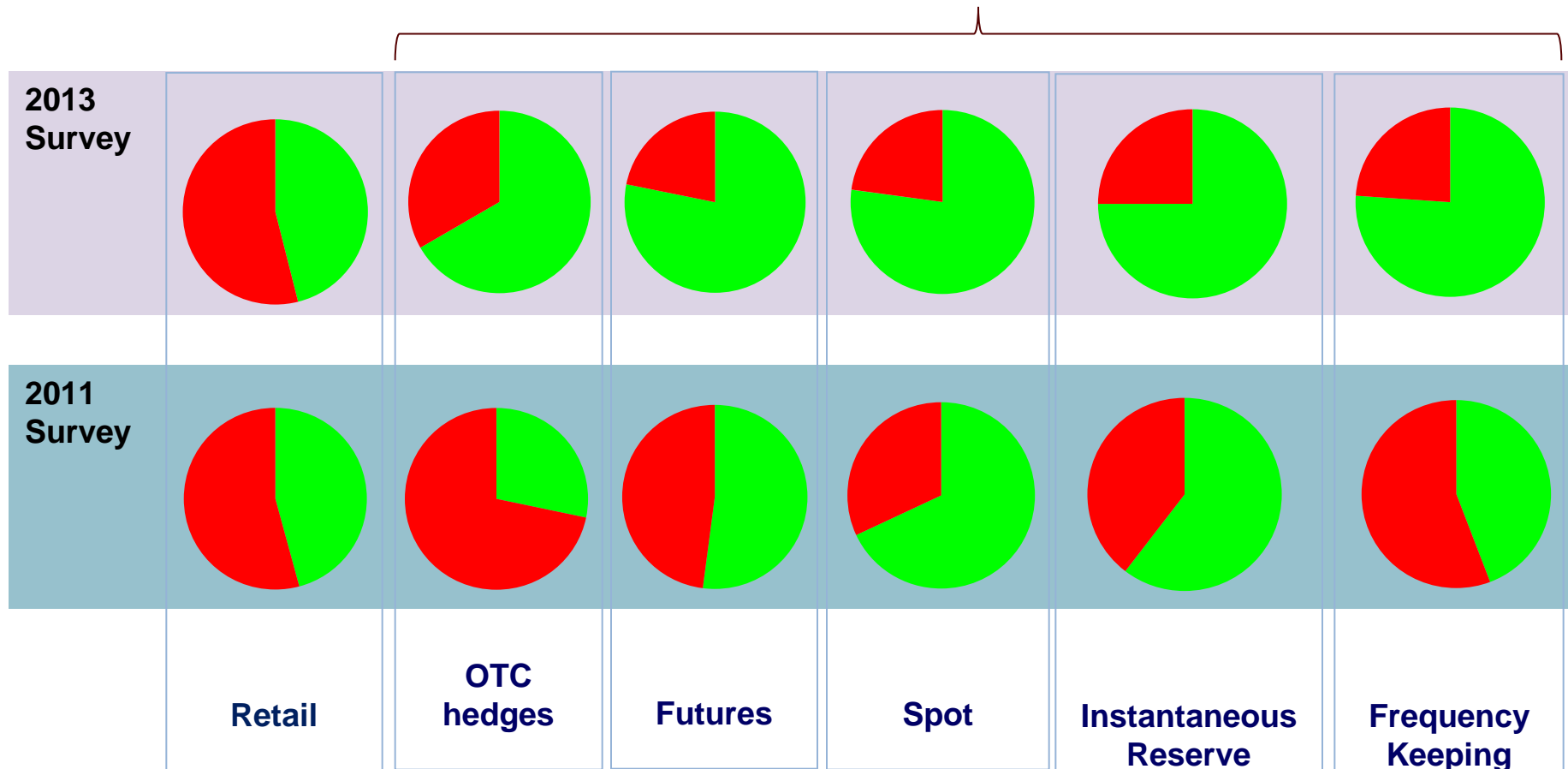
AS



Perceptions about competition have improved markedly

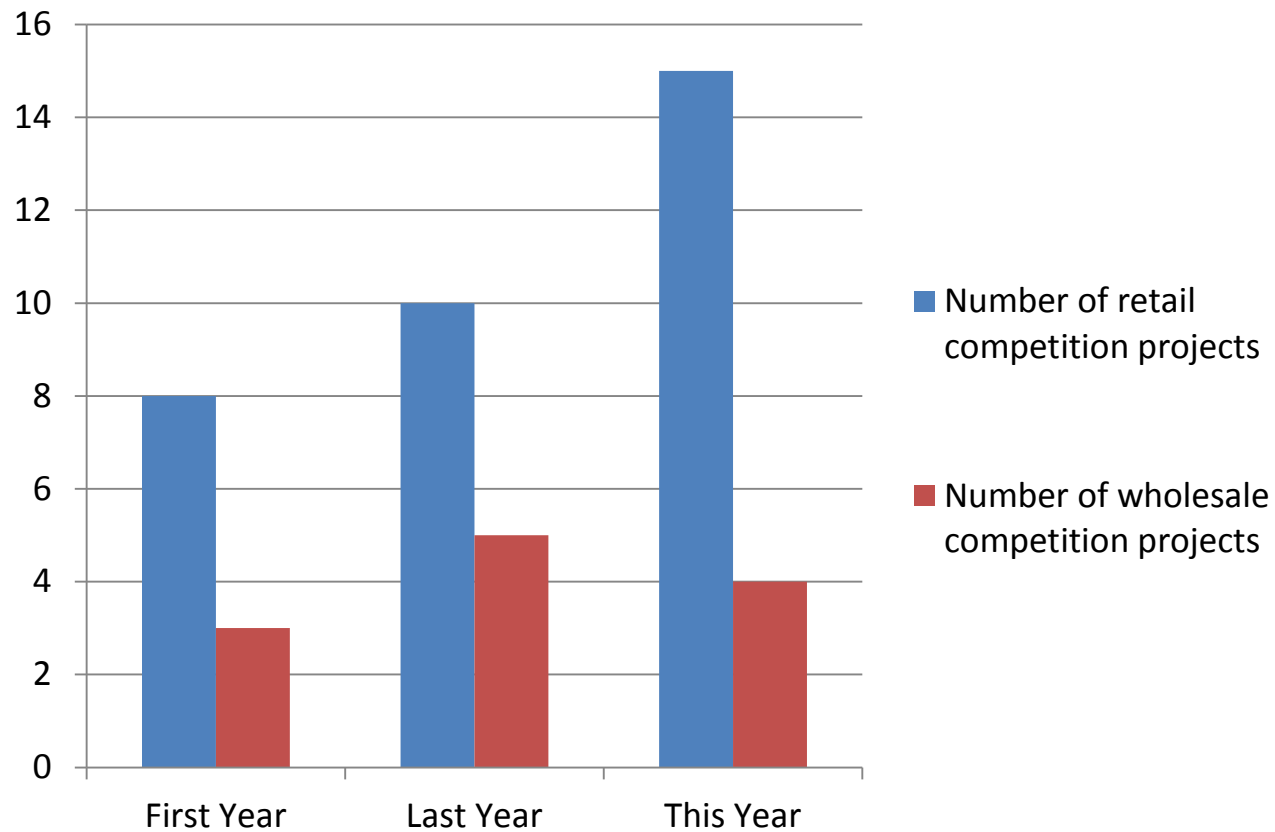
Survey statement: prices in [this] market reflect the outcomes expected in a workably competitive market

Wholesale market

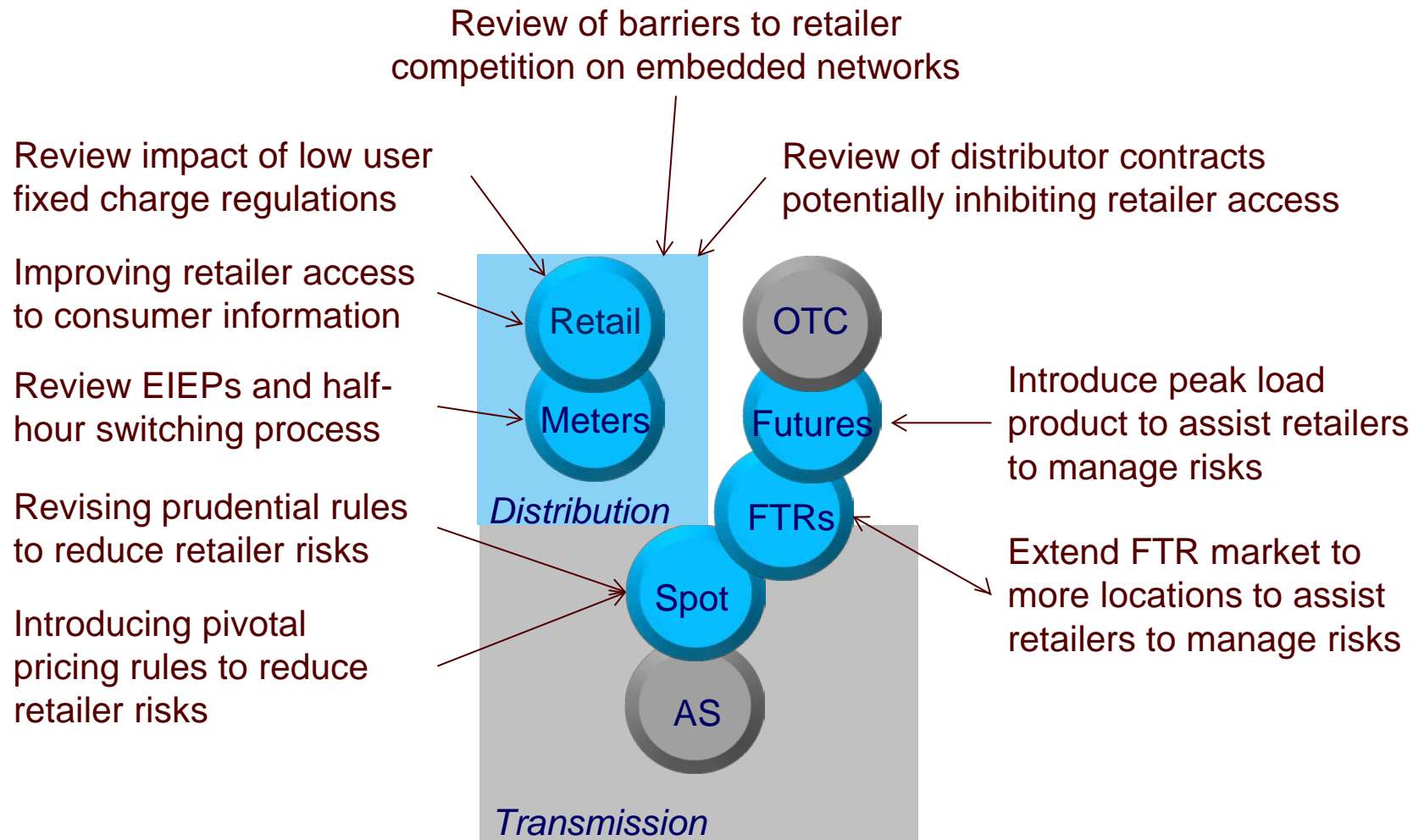


Key areas for further market development

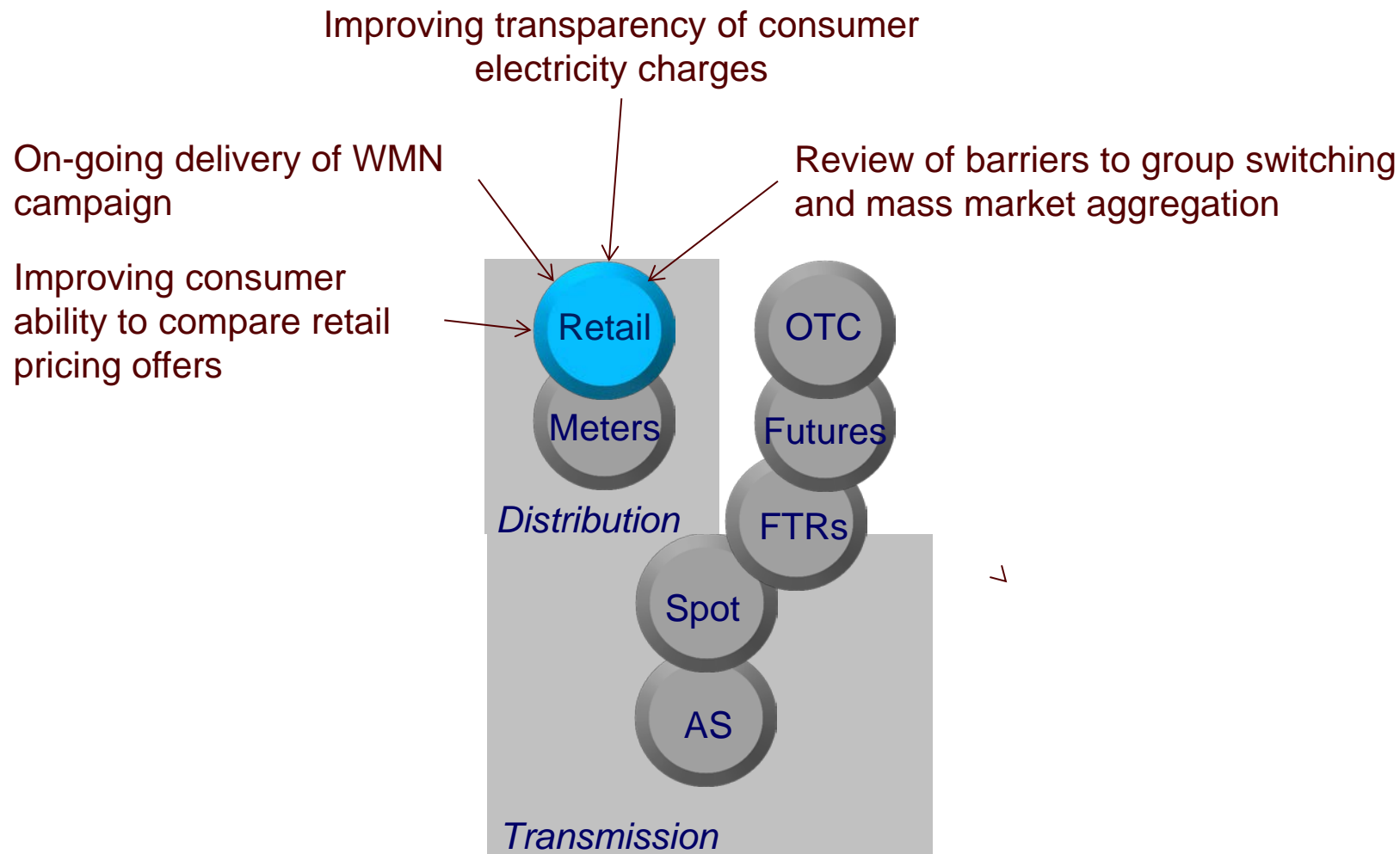
Greater focus in our work programme on initiatives that promote demonstrable retail competition



Reducing barriers to retailer expansion



Reducing barriers to consumer choice



Questions

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