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***NZ metering arrangements - lessons for Australia?***

***Robert Reilly***

***AEMC Public Forum***

***Melbourne***

***3 October 2012***

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## *“Lessons” from abroad*

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*“... the strangers came and tried to teach us their ways,  
And they scorned us just for being what we are,  
But they might as well go chasin’ after moon beams,  
or light a penny candle from a star” –*

Galway Bay



# ***NZ METERING MARKET***

## *NZ Metering Market Structure*

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- Metering market split between Vector (AMS) (45%), retailers (40%) and distributors (15%)
  - Metering is a contestable service
    - Retailers can choose with whom they contract
    - Prices are unregulated
    - Access to metering data is unregulated
    - High Court confirmed that metering is not a local monopoly because meters are “sufficiently substitutable”

Note: See Clifford D, Richardson M, Commerce Commission v Bay of Plenty Electricity Limited [2007] CIV 2001-485-917

## ● **Market features**

- Multiple meter owners
- No single owner on any network
- Metering protocol limits churn of non-AMI meters
- Approximately 2 million metering installations
- High stranding risk due to AMI roll-out
- Approximately 780,000 AMI metering installations already installed
- Competition among metering services providers
  - Meters
  - Test houses
  - Meter reading and data management

## ● Meter reading

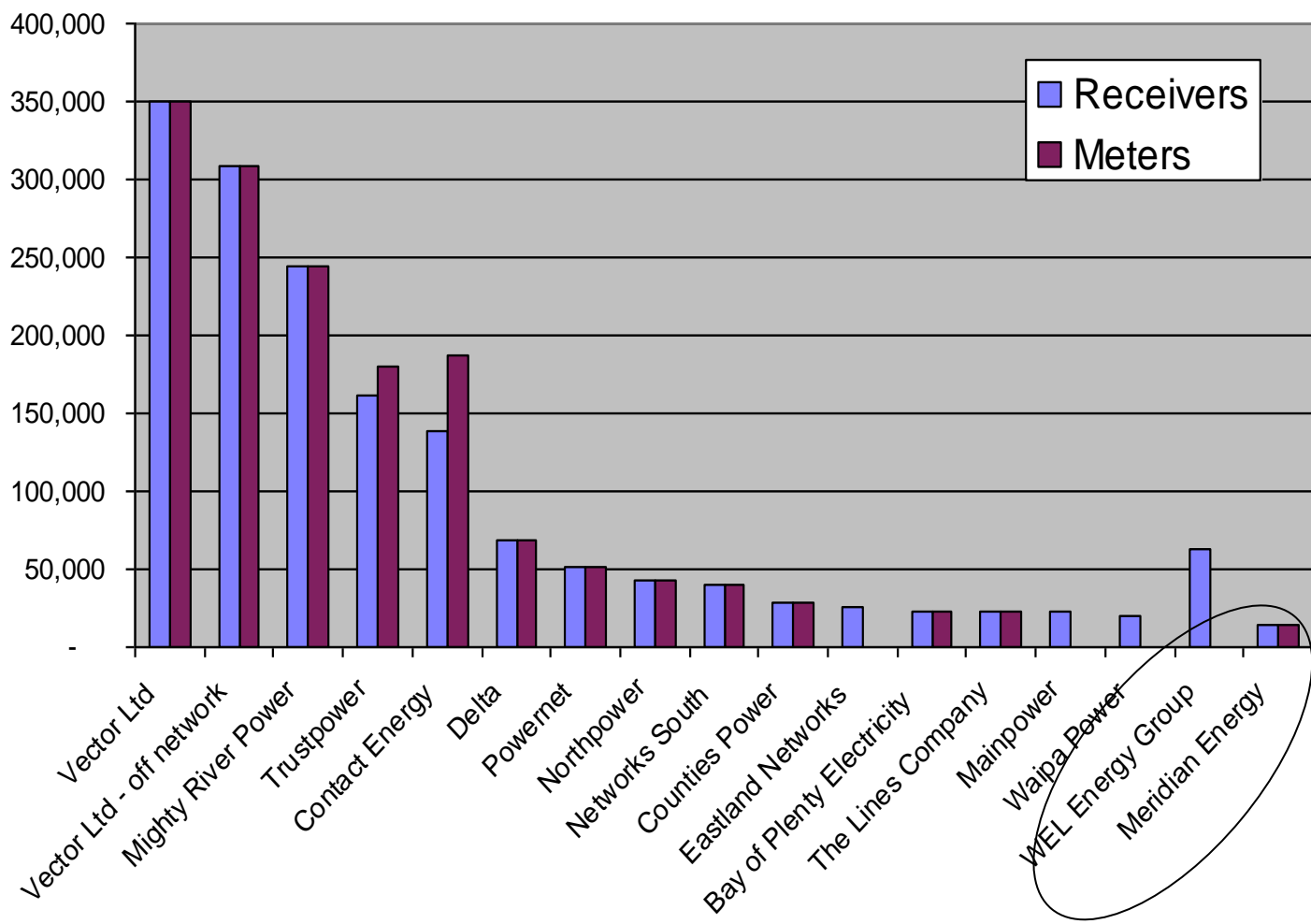
- Most non-half hour meters are read monthly or bi-monthly
  - Remote areas may be 3 times a year
  - Consumers invoiced monthly
- AMI meters read remotely when required
  - AMI operators provide meter reading and data handling services

## *Contestability in NZ metering market*

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- In 1999 - 39 companies who owned meters and had their own meter reading, meter maintenance and data management services
- Companies were free to sell their metering assets
- Major 3<sup>rd</sup> party metering company - Vector
- Specialist metering and data handling companies have evolved which
  - have the ability to invest in new technology
  - provide retailers with national coverage
- Pricing of non-half hour metering services is competitive,

# Receiver and Meter Ownership – out of date statistics (2005)



Source: Enermet

“Untidy” Arrangement





## *Retailer metering protocol*

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- Metering protocol established in 1999 among meter owning retailers has limited meter switching (retailers owned  $\pm 80\%$  of meters)
  - Retailers (except one) provided access to existing meters on site on commercial terms (see Commerce Commission v Bay of Plenty Electricity)
  - Standard tariffs developed by each retailer for standard service
  - No agreements (collusion) on prices
  - Some retailers provided meter reading services

## *Benefits of contestability in NZ metering market*

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- National market
- Economies of scale in purchasing
- Efficient use of specialist skills
- Competitive pricing
- R&D capability
- Investment in new technologies
- Innovation in metering and data management services

## *Disadvantages of contestability in metering*

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- Retailers can switch metering suppliers
- Metering assets can be displaced – stranded assets
- Proprietary systems can raise barriers to access to raw meter data
- Non standard communication protocols can increase the costs of information exchange
- Multiple AMI systems on a network can inhibit smart grid development
- Multiple load controllers on a network can affect system security

## *Metering protocol - Meridian rocks the boat*

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- In 2005 Meridian replaced its 6,000 meters and relays in Central Hawkes Bay with “Arc” smart meters as a trial of AMI
- Subsequently, Arc replaced 120,000 meters in Christchurch on behalf on Meridian – displaces meters owned by other meter owners

### **Result:**

- Other retailers move into AMI deployment
- Vector’s, retailers’ and distributors’ metering assets under stranding threat
- 14 Distributors (8 with meters) band together and establish “Smartco” to compete on metering services and provide smart grid capability



# *ADVANCED METERING*

## *AMI Roll-out not regulated*

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- Regulation of roll out is not considered necessary
  - “Timeframe is acceptable”
  - “Competition means potential is being realised where it is economic...”
  - “Financial risk is not being met by consumers”
  - “There is a high level of compliance with AMI Guidelines”

Note: Electricity Commission, *Advanced Metering Infrastructure in New Zealand, Roll-out and requirements*, page A, December 2009

## *New Zealand advanced metering roll-out*

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“Traders are projecting about 1.3 million (advanced meters) will be installed by [December] 2012.”

By 2015, some 1.55 million are expected to be in use”

Source: **Electricity Authority** – Electricity in NZ 2011

“Vector’s Advanced Metering Services (“AMS”) is in the middle of a deployment programme for **Genesis** and **Contact**, and is roughly halfway through installing 500,000 smart meters for Genesis customers.

It has been selected to deploy a further 150,000 meters for Contact.

Vector expects to have more than 500,000 smart meters installed across the country by next year”.

- Source: **Energy News**, 21 August 2012



### **AMI features that drive roll-out by retailers**

- Reduce meter reading costs
- Enable remote connection and disconnection
- Eliminate estimated bills and provide flexible billing options
- Reduce costs of load research and tariff sculpting
- Decrease losses due to theft, fraud and vacant premise consumption
- Provide increased and relevant information to electricity users
- Increase accuracy of the settlement process
- Improve cash flow
- Provide ability to offer more products and services

Note: A comprehensive review of benefits to retailers, distributors and consumers can be found at:

Strata Energy Consulting, *Report on international experience with smart meters (energy)*, prepared for the Parliamentary Commissioner for the Environment, pp18-20. May 2008.

### **AMI features that drive distributors' interest in the AMI roll-out**

- ❖ Improve the quality and reliability of the overall electricity network
- ❖ Better management of network and reduced capex and opex

Note: Systems other than AMI are being investigated by distributors for improving network operation and information exchange

- Category 1 metering installations deemed compliant in 1999 must be certified by 1 April 2015
- Approximately 1 million meters had to be re-certified – or replaced by 1 April 2015

- AMI has the potential to deliver benefits through demand side participation (DSP)
- DSP is not driving AMI installation and
- AMI is not driving DSP in NZ



NZ Electricity Market

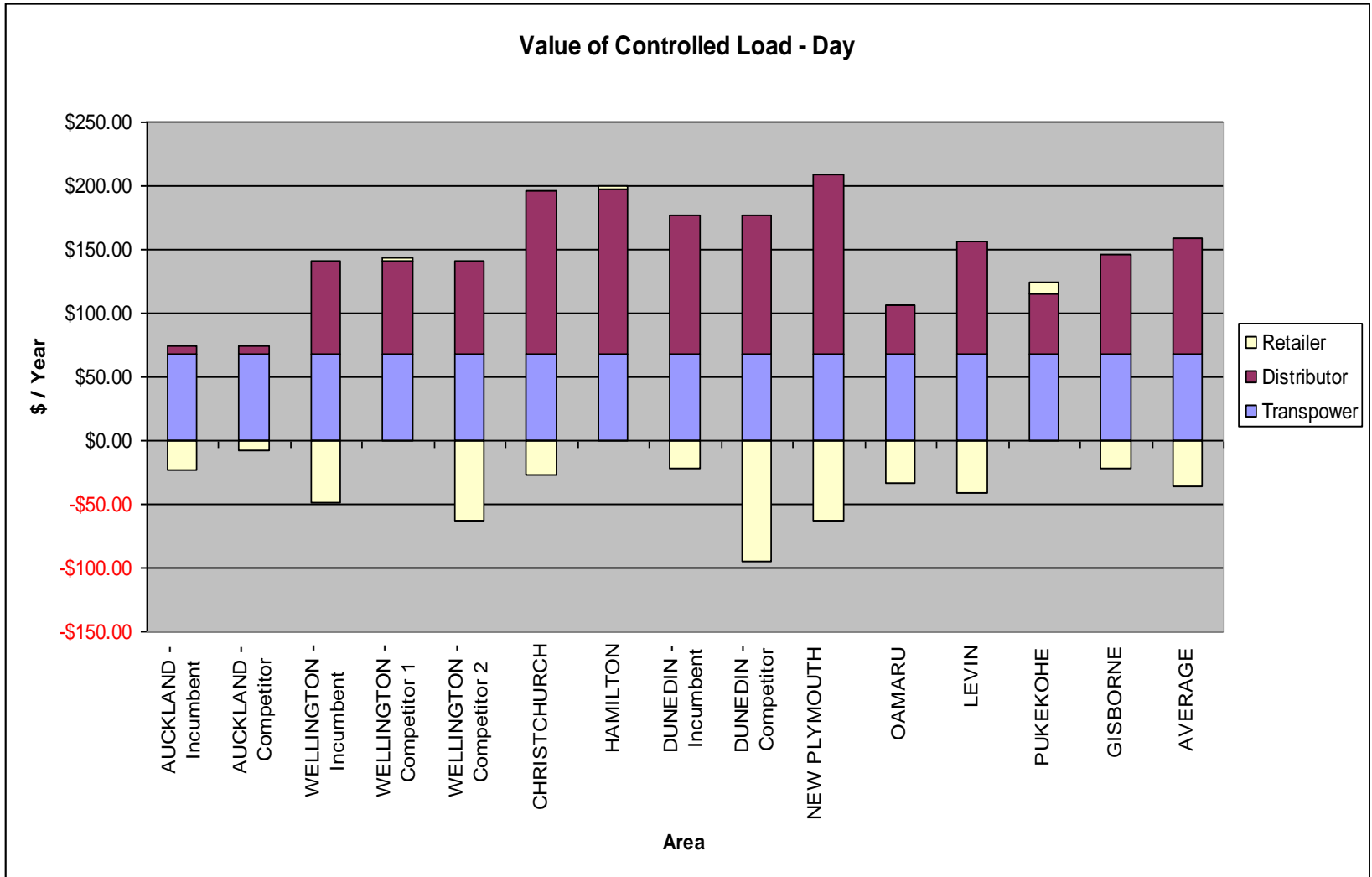
# ***DEMAND SIDE PARTICIPATION***

# *Issues for DSP in New Zealand*

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- Low incentives to invest in demand response
  - Complex ownership of ripple control assets
  - Retailer control of AMI meter access
  - Structural barriers to entry for load aggregators
    - high hurdles for metering (proof of operation)
    - currently excluded from spot market and frequency keeping market
    - demand dispatched in spot market will not receive market price
- Muted price signals
  - Bundled tariffs combine line and energy charges
  - Profiling averages energy usage
- Value of demand response?

# Value of controllable load determined by Distributors– varies across networks



Source – Electricity Commission VPWP report 2007

## *Major issue – lack of consumer involvement*

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- AMI has not resulted in significant consumer involvement in the mass market
  - No significant consultation
  - No choice of meter functionality
  - Can opt out of having AMI meter installed
  - Publicity about AMI has largely been negative
    - higher bills
    - “health hazard”



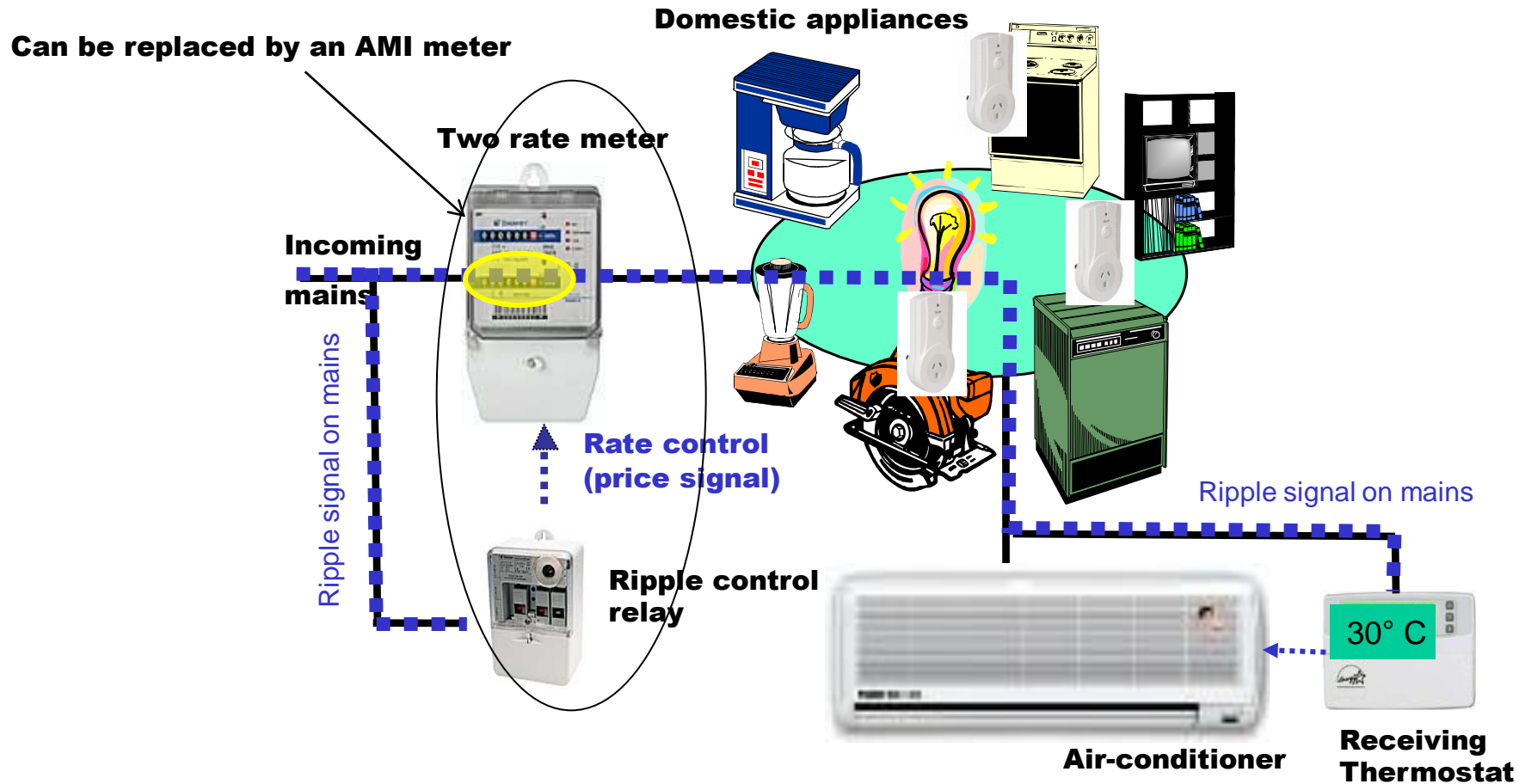
## *AMI focus on infrastructure – not products?*

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- It may be too early to expect major benefits from AMI
  - Market is still evolving
  - Focus is on infrastructure
  - Products still to be developed
  - Trials being conducted

- WEL networks
  - owns ripple transmitters and receivers in its network
  - does not own meters
- WEL will install 40,000 “smart boxes” across its networks by 2013
  - full AMI functionality
  - installed next to existing meters
  - certified metering installations
  - facilitate DSP initiatives
    - Solar hot water
    - “SWITCHit” relays in consumers’ premises
    - Photo voltaic Panels
  - facilitate smart grid deployment
  - <http://www.welsmarthomes.co.nz/> for more details

# Ripple control of appliances - SWITCHit



Simple demand response using ripple



# ***EXISTING METERING RULES***

- Existing Part 10 of the Code
  - has few obligations on metering equipment owners
  - has inadequate or unclear monitoring requirements
  - does not allow consumers to contract with multiple parties for separate services
  - does not envisage multiple parties interacting with a single metering installation (electricity, gas, water, home area networks, load management)
  - has not kept pace with changes in the metering market

- New technologies have introduced cyber security threats to metering data integrity
- Certification of and information about load management and other control devices is inadequate
- Information about metering installations is not readily available and much of it is inaccurate
- Retailers have initiated large scale roll outs of AMI systems
- Distributors are exploring smart grid technologies
- Control of access to metering data from AMI systems is not clear

## *Addressing the issues*

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- New policies and guidelines address the issues raised by advanced metering infrastructure (AMI)
- A new Part 10 plus associated changes to Parts 11 (Registry and Switching) and Part 15 (Reconciliation of the Code) has been developed over the last 4 years will come into force in June 2013
- These amended parts of the Code will address most of the issues not fully managed by guidelines

- Guidelines deal with
  - Open access provision
  - Standard pricing for common services
  - Data access – consumer and participants
  - Data management
  - Metrology
  - Information exchange protocols only
  - Minimum functionality
  - Security
  - Connection and disconnection
  - Multiple load control operators on a network



- The new Part 10 establishes rules that
  - Identify the party responsible for ensuring there is a metering installation for points of connection (**reconciliation participant**) – retailer for most points
  - Establish a new participant, the **metering equipment provider (MEP)** as the party responsible for managing compliance with the Code for records, access and accuracy
  - Set out the audit and security requirements for ensuring market confidence
  - Include requirements to improve demand-side participation
  - Set out responsibilities for livening and energising



# ***CONSUMER SWITCHING***

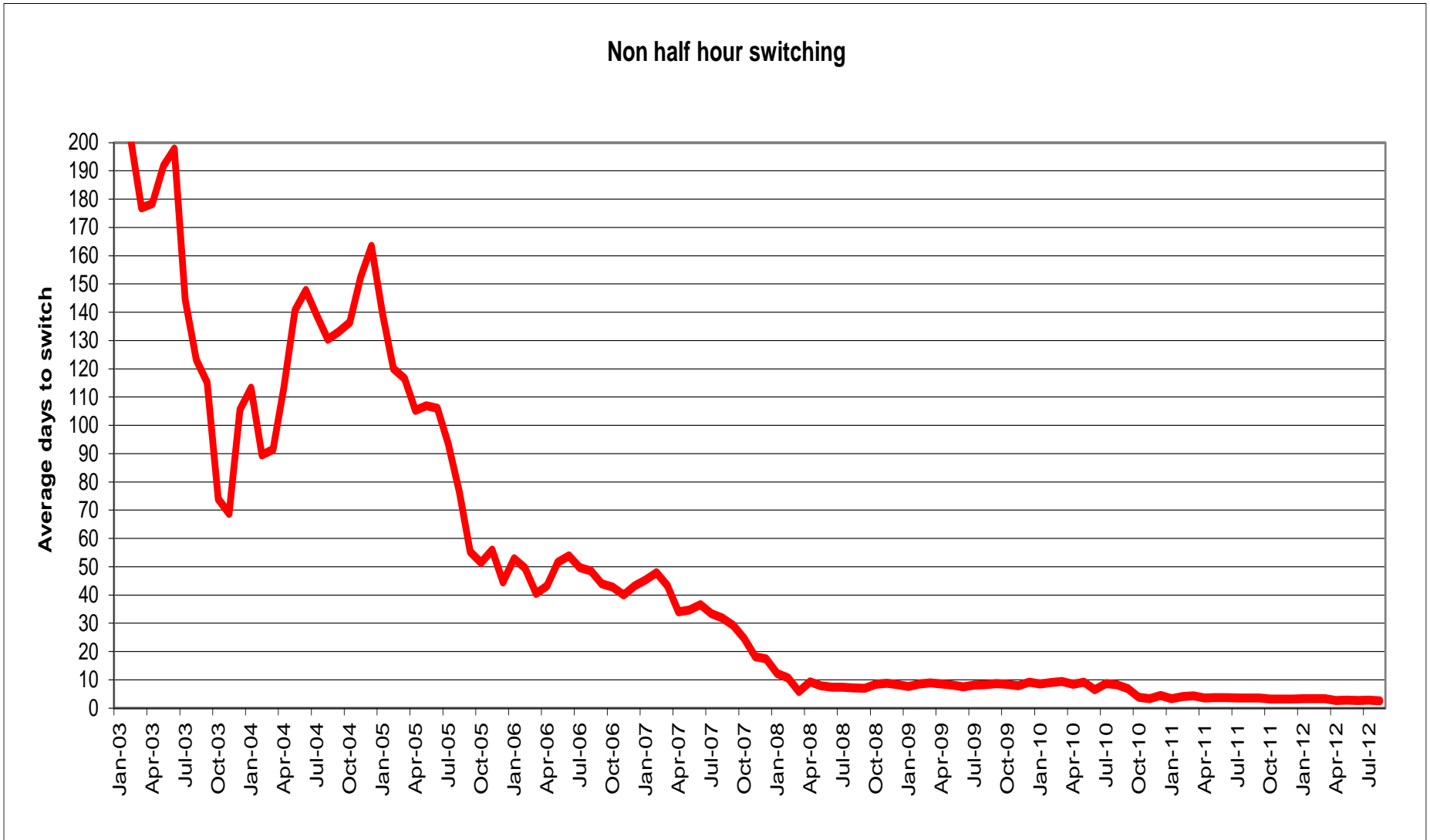
## Issues

- In 2007 /2008 the Regulator considered that
  - average switching times (45 days) were too long
  - switching numbers were too low

## Remedies

- Rules amended to impose a maximum period of 10 business days (regulatory)
- Publicity campaign to advertise price comparison website and stimulate competition (non-regulatory)

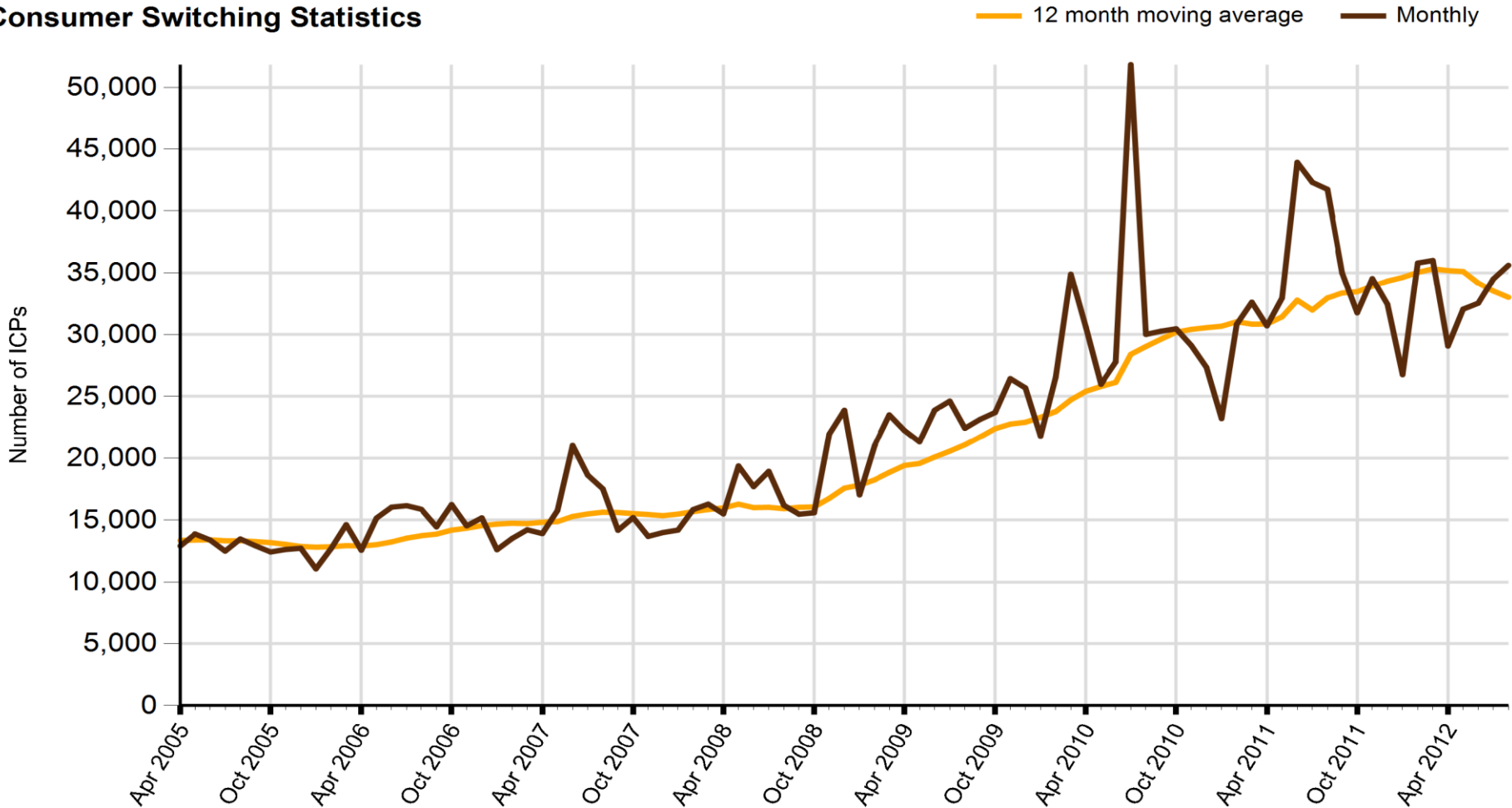
# *NZ average time for consumer to switch Jan 2003 to July 2012*



Source: Electricity Authority

# NZ Consumer switching statistics

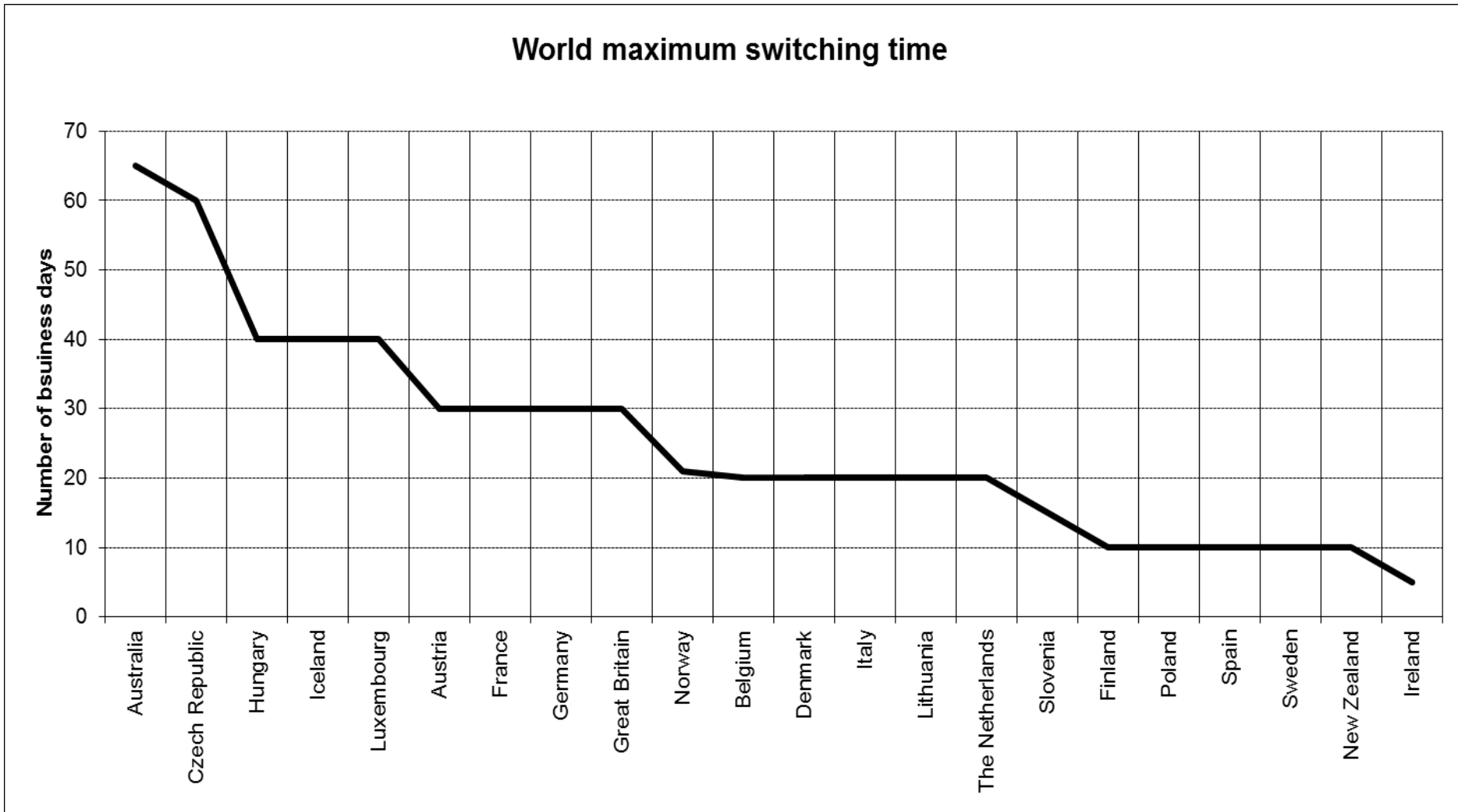
## Consumer Switching Statistics



Source: Electricity Authority



# International maximum switching times



Source: Electricity Authority

## Summary

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- The New Zealand contestable metering arrangements are in a state of flux
- Large scale installation of AMI is well advanced
- Issues relating to access, meter churn and duplication of infrastructure have arisen
- Participants have incentives to agree on standards, access arrangements
- The benefits of DSP are not yet being pursued
- Risks are being carried by participants
- Consumers
  - not currently informed about or involved in AMI
  - are switching retailers based on information on pricing
  - not being charged for the cost of AMI
- AMI Regulation is lagging deployment but AMI Guidelines being followed

## *Lessons?*

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- Competition in metering services leads to innovation and complexity on standards, information exchange and functionality
- Market participants can resolve most access issues on a commercial basis
- Guidelines can provide a low cost framework
- Regulation required to protect consumer and market participant from security and data integrity risks
- Regulator can encourage competition
- Informed consumers will take advantage of competitive situations and react to publicity (+ and -)





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## APPENDIX

### *NZ metering arrangements - lessons for Australia?*

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NZ Electricity Market

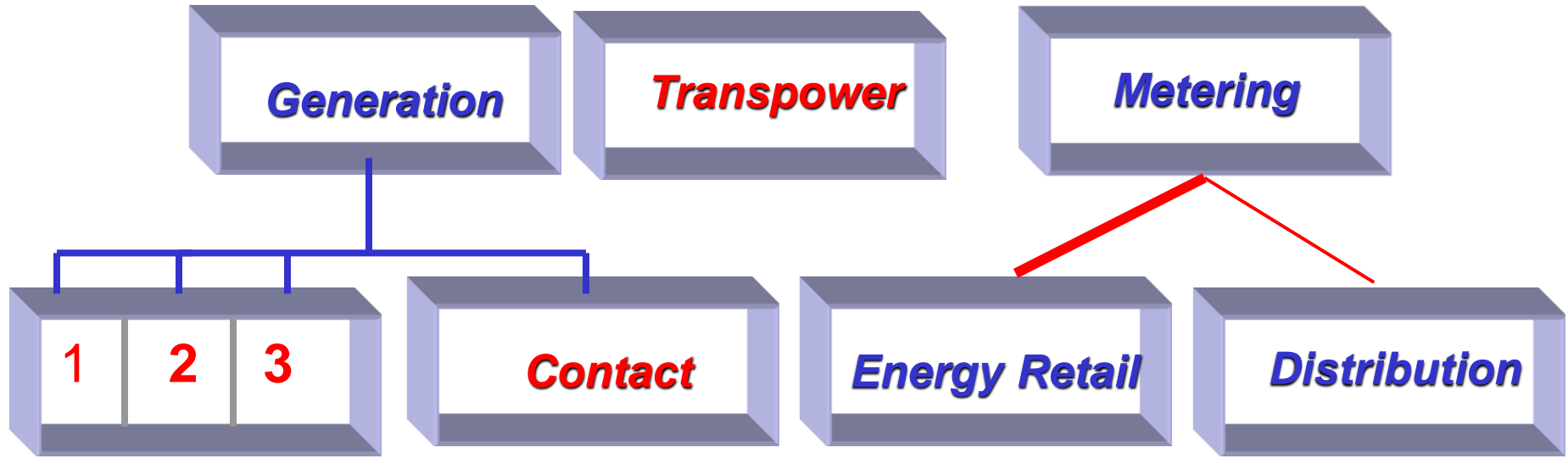
# ***HISTORICAL DEVELOPMENT***

- Prior to 1999 - metering under the control of the electricity supply authorities
- 1999 - full retail competition and the separation of energy and lines functions
  - New metering categories introduced to reduce the costs of metering for retail competition
  - Category 1 and category 2 meters deemed compliant with the metering rules

# New Zealand Electricity Market

## Market Restructure 1999

### Full Retail Competition



**1 MRP: 2 Genesis: 3 Meridian**

**ECNZ Split**

Regulation

**NZEM**  
New Zealand Electricity Market

**Line and Energy Split**

**MARIA**  
Metering and Reconciliation Information Agreement

— Meter ownership



- 4 power companies sell their networks
- Other 35 sell energy businesses and most sell their metering installations with the energy business
- The available 35 energy businesses and most of the metering is purchased by 6 generators
- Energy market and metering ownership dominated by these 6 generator/retailers
  - **Metering market split between retailers and distributors**
  - **Metering is a contestable service**
  - **Metering protocol among retailers controls non-AMI meter switching**

## *Vector becomes major meter owner*

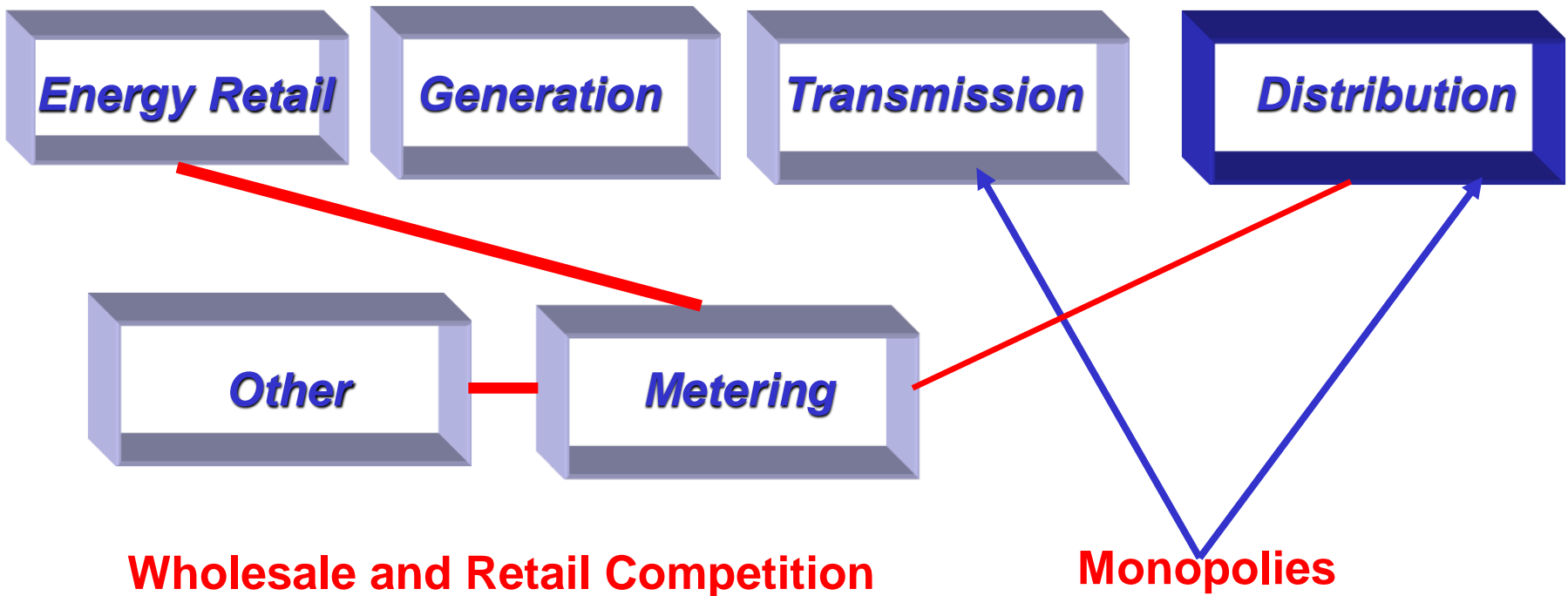
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- 2001 AGL exits the energy market but stays in the metering market and buys meters from 2 major retailers
- AGL subsequently exits the NZ market and AMS (Vector subsidiary) eventually acquires its metering assets
- Vector (AMS) now competes with retailers and distributors in the metering market

- Electricity Commission replaced by Electricity Authority
- Commerce Commission takes on more responsibility
- Electricity Industry Participation Code enacted
- Consultations on Proposed new Part 10 of the Code

# New Zealand Electricity Market

## Market Structure 2010 - 2012



Regulation



— Meter ownership





## ● Objective

- To promote **competition** in, **reliable supply** by, and the **efficient operation** of, the electricity industry for the long-term benefit of consumers

## ● Functions

- Physical and financial trading aspects of the electricity market
- Electricity Industry Participation Code (Code) development
- Code enforcement
  - Industry participants – including generators, distributors, retailers
  - industry service providers – including meter owners, load aggregators, test houses

- Code contains 17 parts
- Parts that relate to metering, connection point switching and reconciliation of metering data
  - Part 10 - Metering arrangements
  - Part 11 - Registry information management and switching
  - Part 15 - Reconciliation



# ***AMI GUIDELINES***

## ● Guidelines

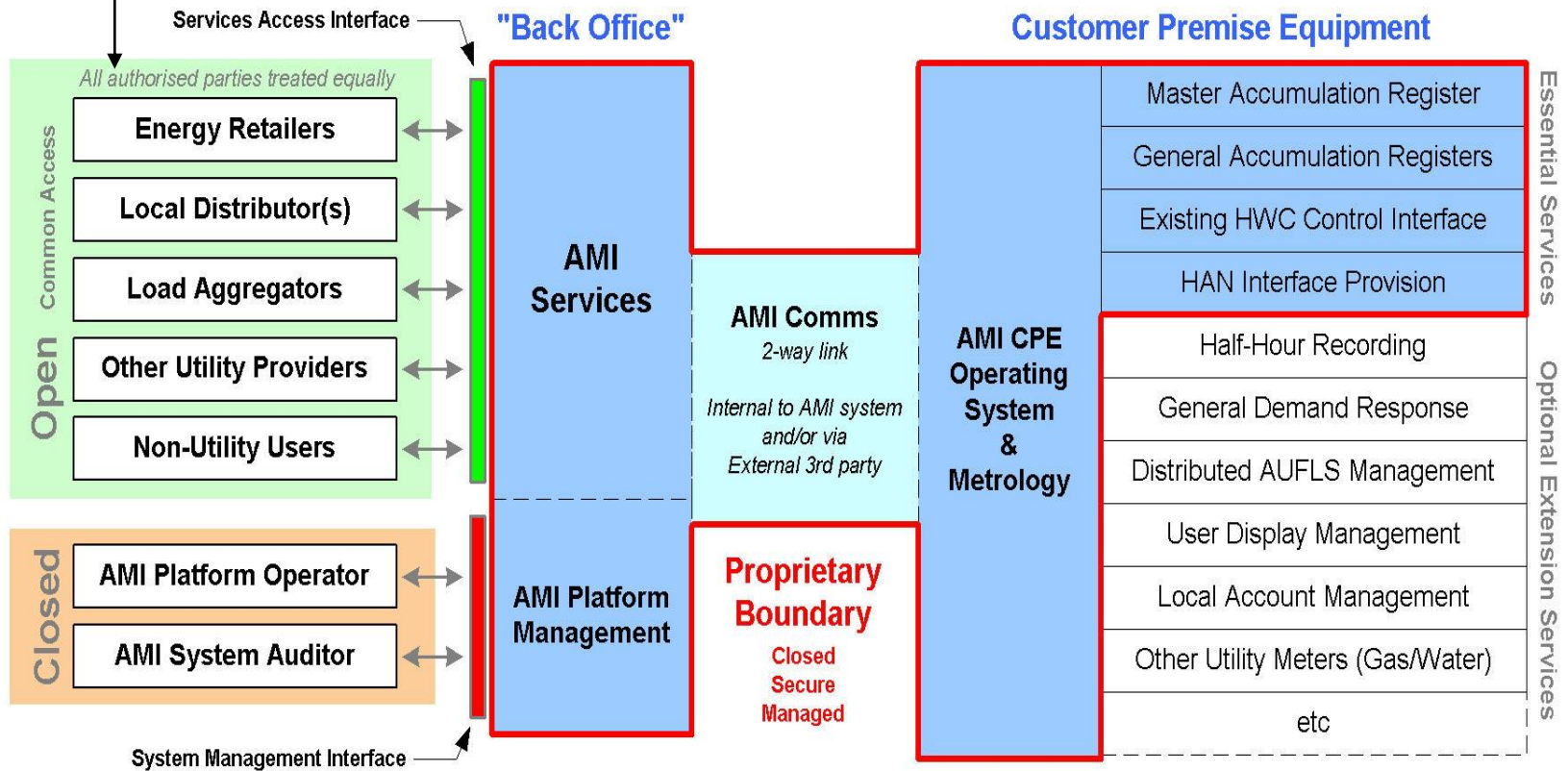
- based on AMI Policy
- not legally binding
- need to be read in conjunction with the Electricity Industry Participants Code (Code)
- A new version of Part 10 of the Code will apply from June 2013

# Generic AMI system

## Defining Open AMI Infrastructure

*The Encapsulation Model*

Requires Customer Agreement



## ● **Open access to services**

- Users have access via services access interface
- Standard terms and conditions for the use of common attributes on AMI systems
- Tailored terms and conditions for non-standard services

## ● **Data Access**

- Data ownership not covered
- Consumer has access to consumption data
- Data Management minimum requirements to enable allow open access
- Metrology layer specified with processes to ensure security and integrity of the measurement parameters.
- Information exchange protocols only
- Communication protocols not prescribed

## ● Investment

- Minimum functional requirements for AMI are recommended in guidelines.
- The principle of "no go back" ie no reduction in technology at installations not yet covered
- Meter churn not yet covered



## ● **Security**

- Data integrity to be assured by participants.
- System protection from viruses, data tampering etc

- **Multiple load control operators on network**
- Potential loss coordination of interruptible load in system emergencies
- Provision has been made in the Model Use of System Agreement for agreement between distributors and retailers on the use of load control
- If security of supply is endangered, the Electricity Authority will consider regulation.

## ● **Disconnection and reconnection**

- AMI operators to
  - be consistent with guidelines on arrangements to assist medically dependent and vulnerable consumers when disconnecting.
  - provide for consumer involvement in reconnection, to avoid potential damage or injury