

24 JUNE 2015

Welcome and introduction

DISTRIBUTOR WORKSHOP

COMPETITION • RELIABILITY • EFFICIENCY



24 JUNE 2015

ELECTRICITY MARKET STRUCTURE AND OPERATION

DISTRIBUTOR WORKSHOP

COMPETITION • RELIABILITY • EFFICIENCY



PURPOSE OF DISTRIBUTOR WORKSHOP

In this workshop, we will cover

- What is the electricity market and how does it work
- Who is a distributor
- What is a distributors obligations in the Code
- Why do distributors have obligations in the Code
- What happens when a distributor fails its Code obligations

DISCLAIMER

This workshop provides general information to help participants understand how the electricity market functions under the Electricity Industry Participation Code 2010 (Code). It reflects the Authority's view.

The information presented at this course is not intended to be definitive and should not be used instead of legal advice.

Requirements of the Code and service provider systems change over time, and participants should ensure that they review the latest copy of the Code and functional specifications.

If there is any inconsistency between information presented and the Code, the Code takes precedence.

INTRODUCTION

- "Rules are made to be broken"
- "How were we meant to know"
- "We only need to know how our systems function"
- "We are network owners and not part of the NZEM"
- "The market is too complex"

DEVELOPMENT OF THE NZEM

- April 1987: Electricity Corporation of New Zealand (ECNZ) established
- May-July 1992: Major electricity supply shortage, leading to an enquiry that recommended establishing a wholesale electricity market
- July 1994: Transpower separated from ECNZ as a stand-alone SOE
- July 1994: Information Disclosure Regulations introduced (revised for FRC in April 1999)
- February 1996: Contact Energy split from ECNZ and commenced operations as an SOE generator in competition with ECNZ
- October 1996: Wholesale electricity market commenced with industry self-governance regime
- September 1998: Privatisation of Contact Energy

DEVELOPMENT OF THE NZEM

- 1 April 1999: Start of full retail competition
 - ECNZ split into three competing state-owned generators (Meridian, Mighty River Power and Genesis)
 - Separation of ownership of electricity lines and supply businesses
 - Industry self-governance regime (MARIA and NZEM Rules)
- November 1999: Industry self-governing arrangements for grid security introduced (MACQS)
- July-September 2001: Second major electricity supply shortage
- January 2002: Establishment of Electricity Complaints Commission
- March-June 2003: Third major electricity supply shortage
- March 2004: The Electricity Commission was established on 1 Oct 2003 and took over responsibility for the market on 1 March 2004
- April 2004: New regulatory framework for transmission investment and pricing

DEVELOPMENT OF THE NZEM

- August 2007: Electricity Governance (Connection of Distributed Generation) Regulations
- April 2008: Electricity (Disconnection and Low Fixed Charges) Amendment Act
- 1 May 2008: Global reconciliation commenced, AMI roll outs commenced
- May-July 2008: Fourth major electricity supply shortage
- December 2009: Ministerial Review of Electricity Market
- April 2010: Electricity and Gas Complaints Commission (EGCC) Scheme
- June 2010: ASX introduces New Zealand electricity futures and options
- November 2010: Electricity Authority commences

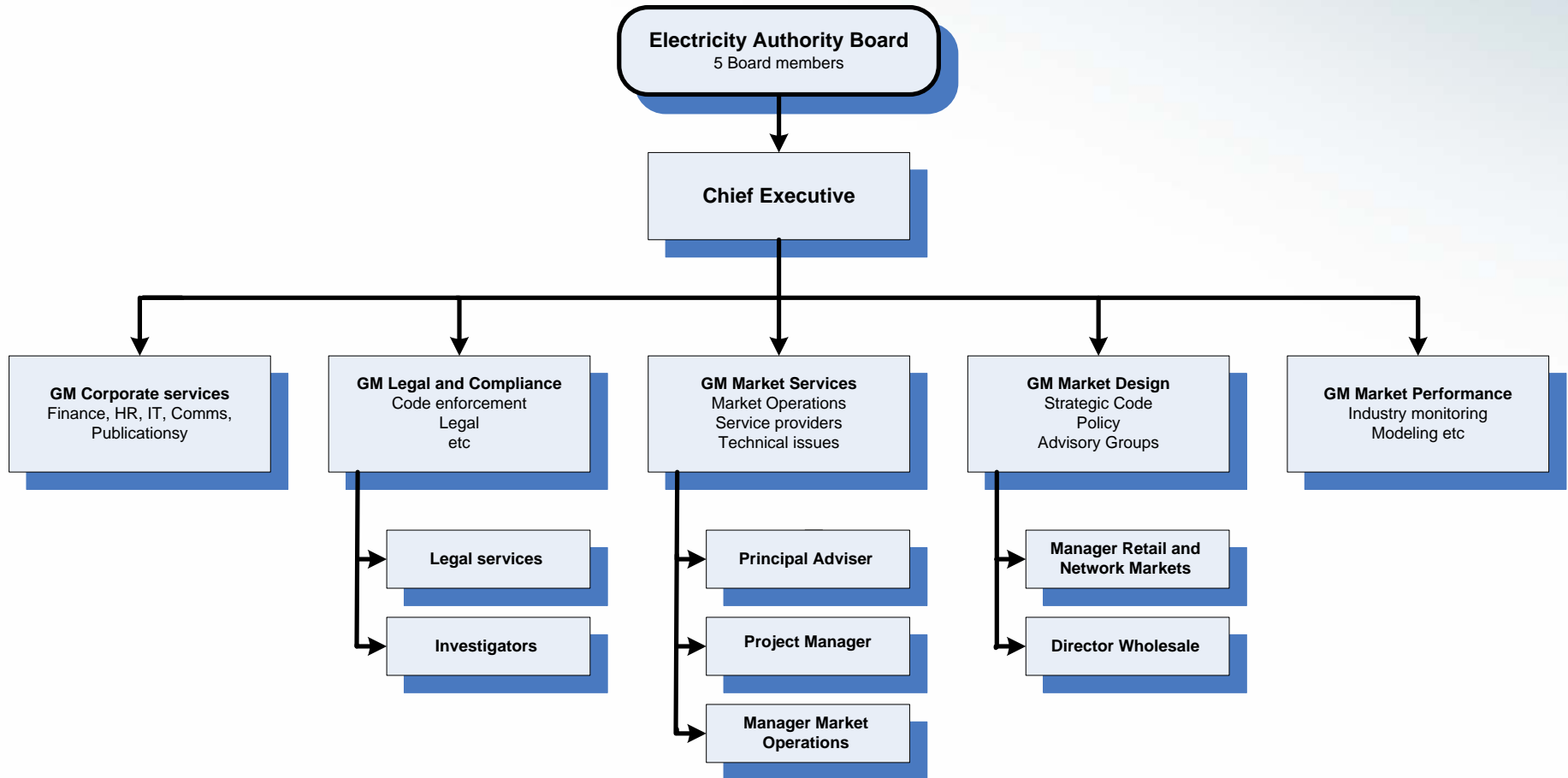
DEVELOPMENT OF THE NZEM

- xxx: Changes to Part 12A implemented
- xxx: Dispatchable demand implemented
- xxx: Revisions to Part 6 implemented
- 29 August 2013: New Part 10 and registry implemented
- 1 November 2014: Regulated EIEPs 1, 2 and 3 implemented
- March 2015: New Part 14 implemented
- xxx: Retailer and direct purchaser default processes implemented

THE ELECTRICITY AUTHORITY

- Is an independent Crown entity
 - Responsible for the efficient operation of the New Zealand electricity market
 - Is the electricity market regulator
- Regulates the electricity market by
 - Developing and setting the market rules (Code)
 - Enforcing certain parts of the Electricity Industry Act, certain regulations under the Act and the market rules (Code)
 - Monitoring the market's performance

ELECTRICITY AUTHORITY STRUCTURE

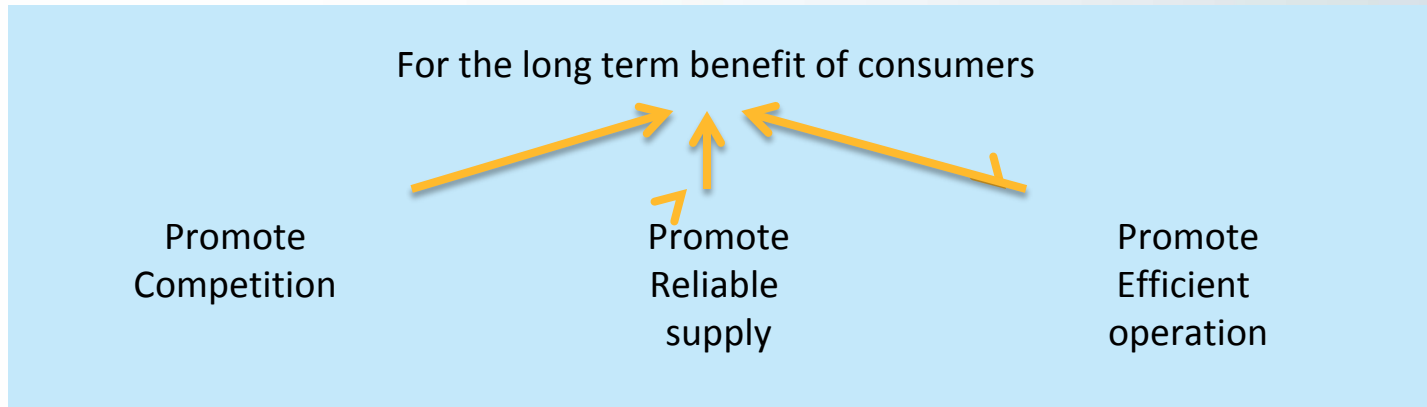


THE ELECTRICITY AUTHORITY

- Is a third tier legislator
 - Sets policy
 - Makes market rules (Code) that is enforceable
 - Regulates and operates the electricity market
- Monitors and assess market performance
 - Focus on competition, reliability and efficiency and long term benefit to the customer
 - Publishes information
 - Ad-hoc reports following market events
 - Publishes market information on its web site www.ea.govt.nz (EMI data source)

Our objective is specified in s15 of the Act

Statutory Objective



How



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

THE ELECTRICITY AUTHORITY

- Contracts Market Operations Service Providers (MOSPs)
 - To manage operational aspects of the electricity market and the electricity system
- The Authority has foundation documents
 - Make key strategic statements as to how the Authority will approach its decision making
- Stakeholder participation
 - Consultation charter
 - Advisory and technical groups
- The Authority also
 - Appoints and services the Security and Reliability Council
 - Investigates and makes decisions on undesirable trading situations

CONSULTATION CHARTER

- The Act requires the Authority to develop, issue and make publicly available a consultation charter
- This consultation charter must include guidelines, not inconsistent with the Act, relating to the processes for
 - amending the Electricity Industry Participation Code (Code)
 - consulting on proposed amendments to the Code
- Further information available at <http://www.ea.govt.nz/dmsdocument/14242>

CHARTER ABOUT ADVISORY GROUPS

- The Act requires the Authority to
 - appoint an advisory group called the Security and Reliability Council (SRC) to provide independent advice to the Authority on
 - the performance of the electricity system and the system operator
 - reliability of supply issues
 - establish one or more other advisory groups to provide independent advice on the development of the Code and market facilitation
- Make publicly available a charter on
 - how it will establish and interact with the advisory groups
 - when and how it will consult advisory groups on material changes to the Code
 - how advisory groups must operate, including provisions concerning procedure.

CHARTER ABOUT ADVISORY GROUPS contd

- Make publicly available a charter on
 - how it will establish and interact with the advisory groups
 - when and how it will consult advisory groups on material changes to the Code
 - how advisory groups must operate, including provisions concerning procedure
- More information available at <http://www.ea.govt.nz/dmsdocument/9036>

THE ELECTRICITY AUTHORITY

- Contracts with Market Operations Service Providers (MOSPs) to manage operational aspects of the electricity market and the electricity system
- The Authority also
 - Manages the Rulings Panel
 - Investigates and makes decisions on undesirable trading situations

THE ELECTRICITY AUTHORITY

- Seeks to be transparent in its accountability processes and publishes various documents
- Uses a consultative approach to developing plans and publish both statutory and management planning and reporting documents
 - Statement of Intent (SOI)
 - Statement of Performance Expectations (SPE)
 - Annual Report
 - The Authority Work Programme

STATEMENT OF INTENT

- The Statement of Intent (SOI) is a formal public accountability document that outlines strategic intentions for a 4-year period
- May be updated at any time but at least every 3 years
- Required under sections 139 and 141 of the Crown Entities Act 2004
- Available at <http://www.ea.govt.nz/about-us/strategic-planning-and-reporting/statement-of-intent/>

STATEMENT OF PERFORMANCE EXPECTATIONS (SPE)

- Formal public accountability document published annually
- Outlines planned work and financial information for a 1-year period
- Includes relevant historical and forecast comparison information
- The SPE is required by section 149E of the Crown Entities Act 2004
- Available at <http://www.ea.govt.nz/about-us/strategic-planning-and-reporting/statement-of-performance-expectations/>

ANNUAL REPORT

- Is the Authority formal report to Parliament on results for the past financial year
- Contains information required by sections 150–155 of the Crown Entities Act
- Available at <http://www.ea.govt.nz/about-us/strategic-planning-and-reporting/annual-report/>

AUTHORITY WORK PROGRAMME

- Internal Work Programme addressing project workload
- Supports effective management of SOI and SPE deliverables
- More detail about projects being carried out and planned to be carried out in future years
- Published quarterly reports against this internal Work Programme
- Available at <http://www.ea.govt.nz/about-us/strategic-planning-and-reporting/our-work-programme/>

ELECTRICITY LEVY

- Authority is funded from a levy on participants
- Levy is prescribed in the Electricity Industry (Levy of Industry Participants) Regulations 2010
- Levy rates are set based on
 - costs of the Authority
 - costs of the Energy Efficiency and Conservation Authority (EECA) electricity efficiency programmes
 - quantity of electricity generated, purchased and conveyed, plus the number of consumer connections
- Levy is directly charged to industry participants. They may pass this cost on to consumers

RELEVANT LEGISLATION/DOCUMENTS

- Acts
 - Electricity Act 1992, Electricity Industry Act 2010 (Act)
- Regulations
 - Electricity Enforcement Regulations, Electrical Safety Regulations, Electricity Industry Levy of Industry Participants Regulations 2010, Low fixed charge regulations
- Electricity Industry Participation Code 2010
- Documents incorporated into the Code
 - EIEPs. Functional specifications, and others
- Guidelines, information papers

RELEVANT LEGISLATION/DOCUMENTS

- **Acts**
 - Electricity Act 1992, Electricity Industry Act 2010 (Act)
- **Regulations**
 - Electricity Enforcement Regulations, Electrical Safety Regulations, Electricity Industry Levy of Industry Participants Regulations 2010, Low fixed charge regulations
- **Electricity Industry Participation Code 2010**
- **Documents incorporated into the Code**
 - EIEPs. Functional specifications, and others
- **Guidelines, information papers**

Mandatory compliance

SECTION 7 OF THE ACT SETS OUT WHO ARE PARTICIPANTS

- Transpower:
- a distributor:
- a retailer:
- any other person who owns lines:
- a person who consumes electricity that is conveyed to the person directly from the national grid:
- a person, other than a generator, who generates electricity that is fed into a network:
- a person who buys electricity from the clearing manager:
- a market operation service provider:
- a metering equipment provider:
- a metering equipment owner:
- an ancillary service agent:
- a person that operates an approved test house:
- a load aggregator:
- a trader in electricity:
- any other industry service provider identified in regulations made under section 109.

PARTICIPANT OBLIGATIONS

- Participants may have
 - no obligations under the Code but are still required to be registered
 - enduring obligations under the Code until another participant relieves them of that obligation

PARTICIPANT IDENTIFIERS

- Each participant that interfaces with market systems requires a unique 4 character identifier
- Provides access and traceability in market systems
- There are rules around participant identifiers
 - Participants that require an identifier must apply to the Authority
 - The Authority may change an existing participant identifier
 - Unwise to mix MEP and trader or distributor
 - Should not mix trader and distributor
- Participant identifiers are published at <http://www.ea.govt.nz/dmsdocument/8900>

WHERE TO GET OPERATIONAL GUIDANCE

- **Lot of information on the Authority's web site**
 - MOSP functional specifications, web sites and user manuals
 - Operating procedures for processing alleged breaches
 - Guidelines for distributor audits
 - Unmetered load guidelines
 - Balancing area guidelines
 - Guidelines for metering, reconciliation and registry arrangements for embedded networks (or 'secondary networks guidelines')
 - Calculation and the use of loss factors for reconciliation purposes
 - Guideline for the connection of small scale distributed generation (equal to or less than 10 kW) to a local network
 - Guideline for a connection of distributed generation (greater than 10 kW) to a local network

WHERE TO GET OPERATIONAL GUIDANCE

- Information sheet on distributed generation
- Improving transparency of consumers electricity charges
- Distribution pricing principles and information disclosure
- Electricity information exchange protocols (EIEPs)
- Model arrangements for electricity distribution services
- Vulnerable consumers and medically dependent consumers
- How to be a generator
- How to be a retailer
- Metering equipment provider guideline.
- Advanced metering infrastructure policy and guidelines
- Domestic retail contracting arrangements
- Reconciliation participant certification and audit requirements

COMPLIANCE PROCESS

COMPLIANCE PHILOSOPHY

- The Authority monitors and enforces compliance with the Code, various regulations, and the Act
 - The Authority takes a pragmatic approach and ensures a good compliance process is always followed
 - Work is carried out primarily by the Authority's compliance team, with breach allegations being considered by a committee of the Board
- Compliance philosophy is to encourage continuous improvement by
 - Ensuring that minor breaches are fast-tracked, more serious breaches are formally investigated and the most severe and complex cases are referred to the Rulings Panel
 - Encouraging industry participants to learn when things go wrong and take action to avoid any recurrence
 - Encouraging settlement agreements between parties

REPORTING OF CODE BREACHES

- The Electricity Enforcement Regulations state

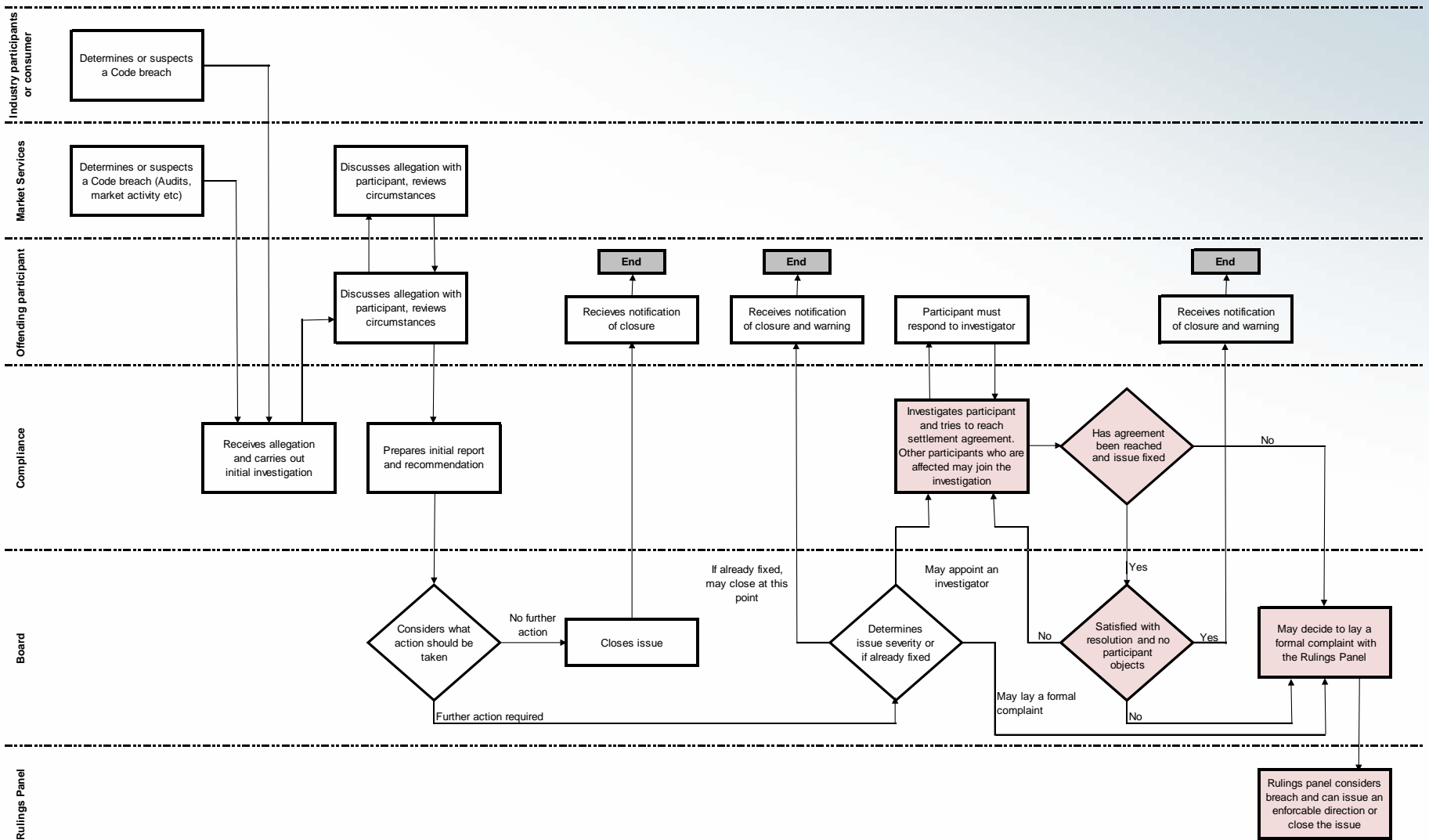
7 Mandatory reporting of common quality or security breaches

- (1) If an industry participant believes on reasonable grounds that it or another industry participant has breached a provision of Part 7, 8, 9, or 13 of the Code that is about common quality or security.....the industry participant must report the alleged breach to the Authority as soon as practicable.....

8 Mandatory reporting of other breaches

- (1) An industry participant that believes, on reasonable grounds, that another industry participant has breached the Code must report the breach or possible breach to the Authority as soon as possible.

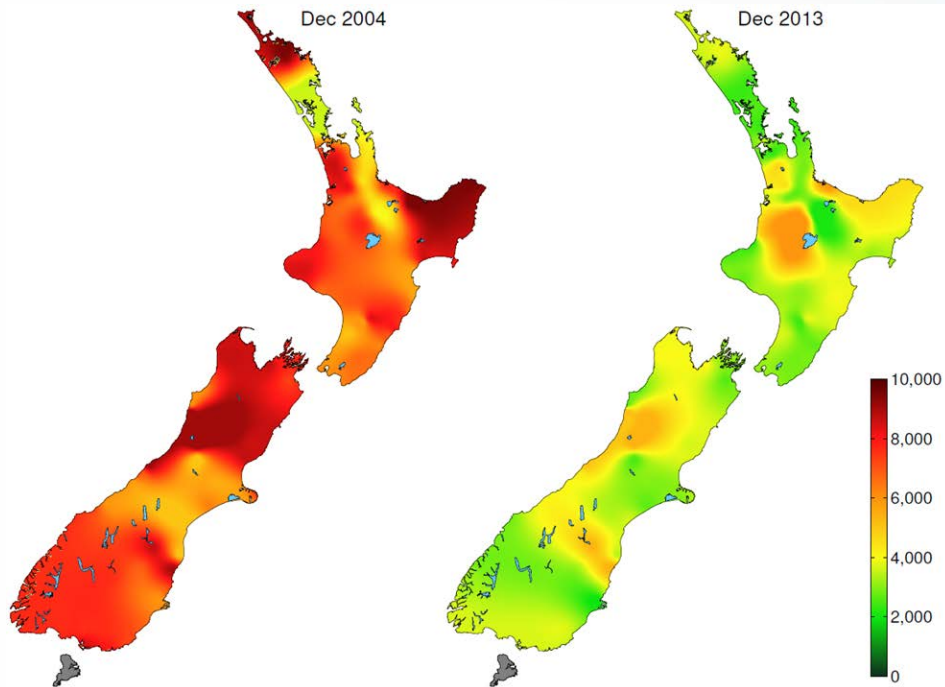
COMPLIANCE PROCESS



ELECTRICITY MARKET OVERVIEW

COMPETITION • RELIABILITY • EFFICIENCY

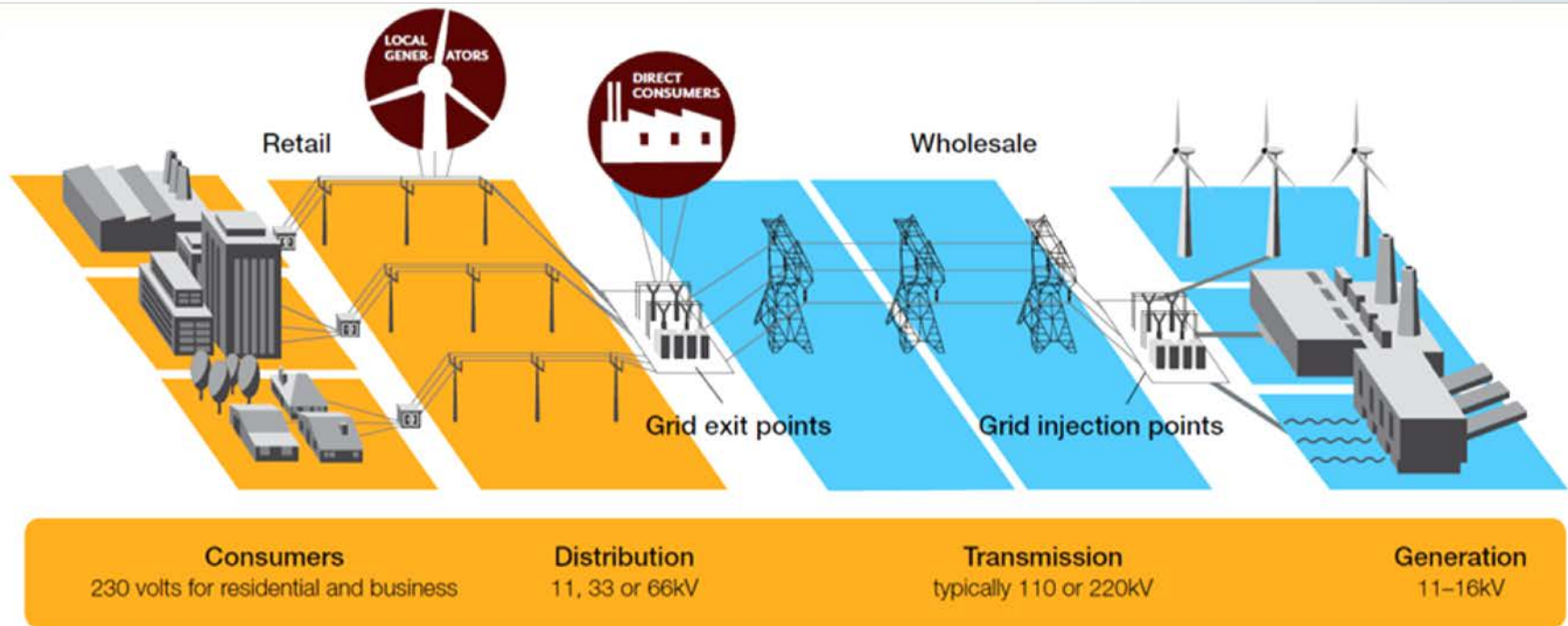
Retailers - retail competition



Herfindahl-Hirschman Index. This index is the sum of the squares of the market shares of every retailer in a market. For example, if there are two retailers and one has 80% market share and the other has 20% then the HHI = $80 \times 80 + 20 \times 20 = 6,800$

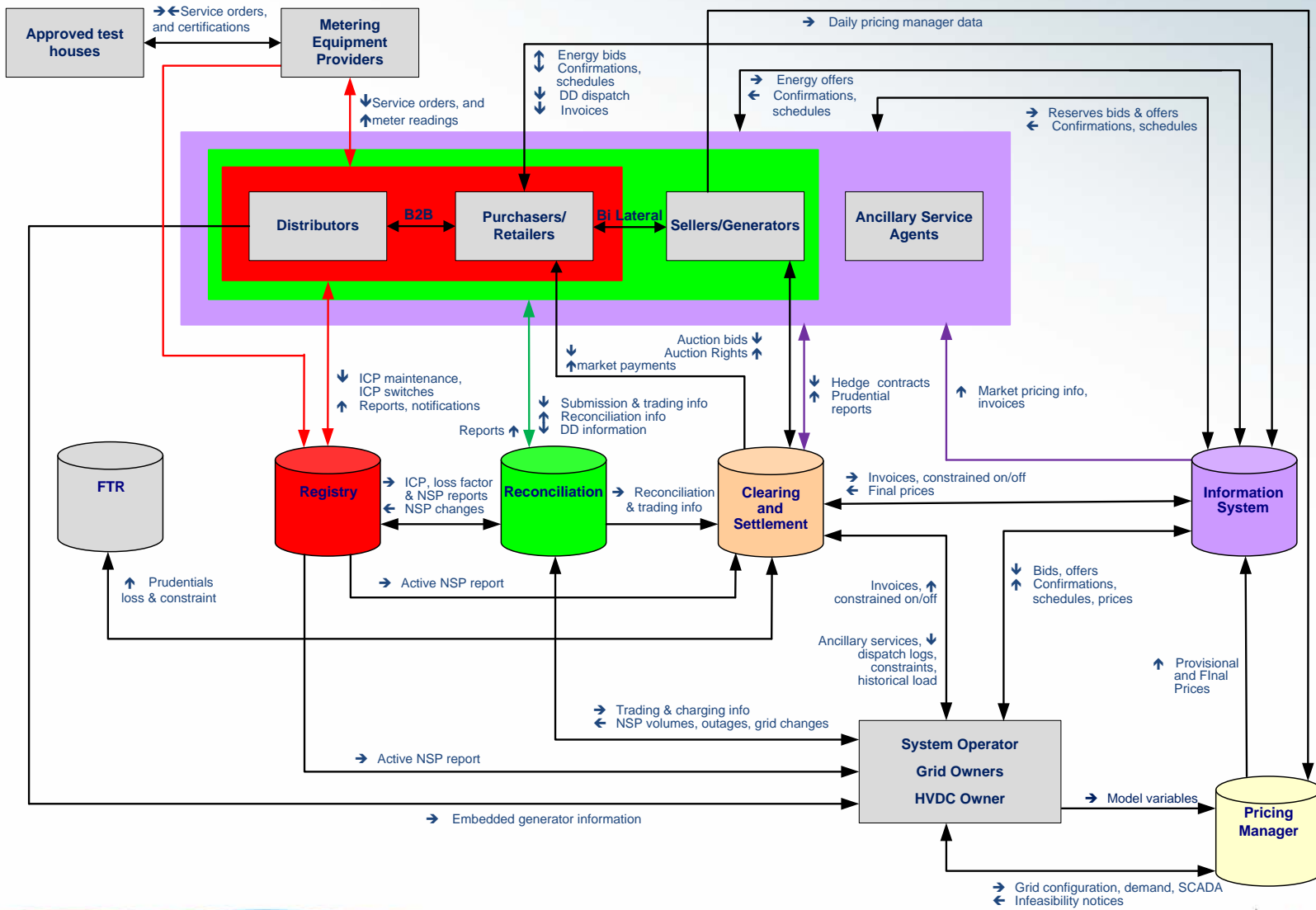
- Increasing number of retailers
 - 8 new entrants in last 18 months
 - 21 type 1 retailers buying from the clearing manager
- New entrants exploring innovative offerings

INDUSTRY PHYSICAL STRUCTURE

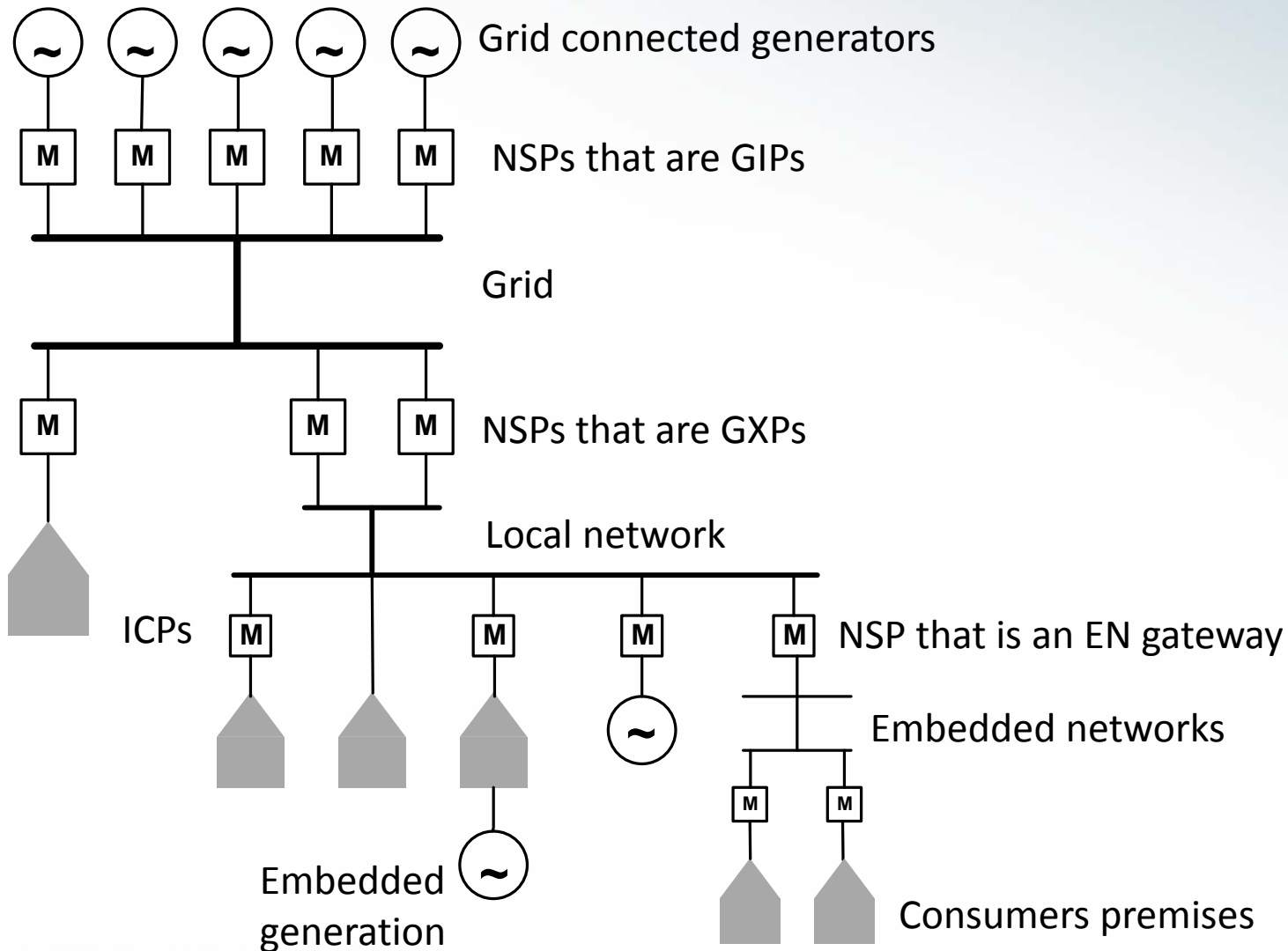


Source: 2011 Electricity Authority *Electricity in New Zealand*.

PARTICIPANT STRUCTURE



PHYSICAL NETWORK CONNECTIONS



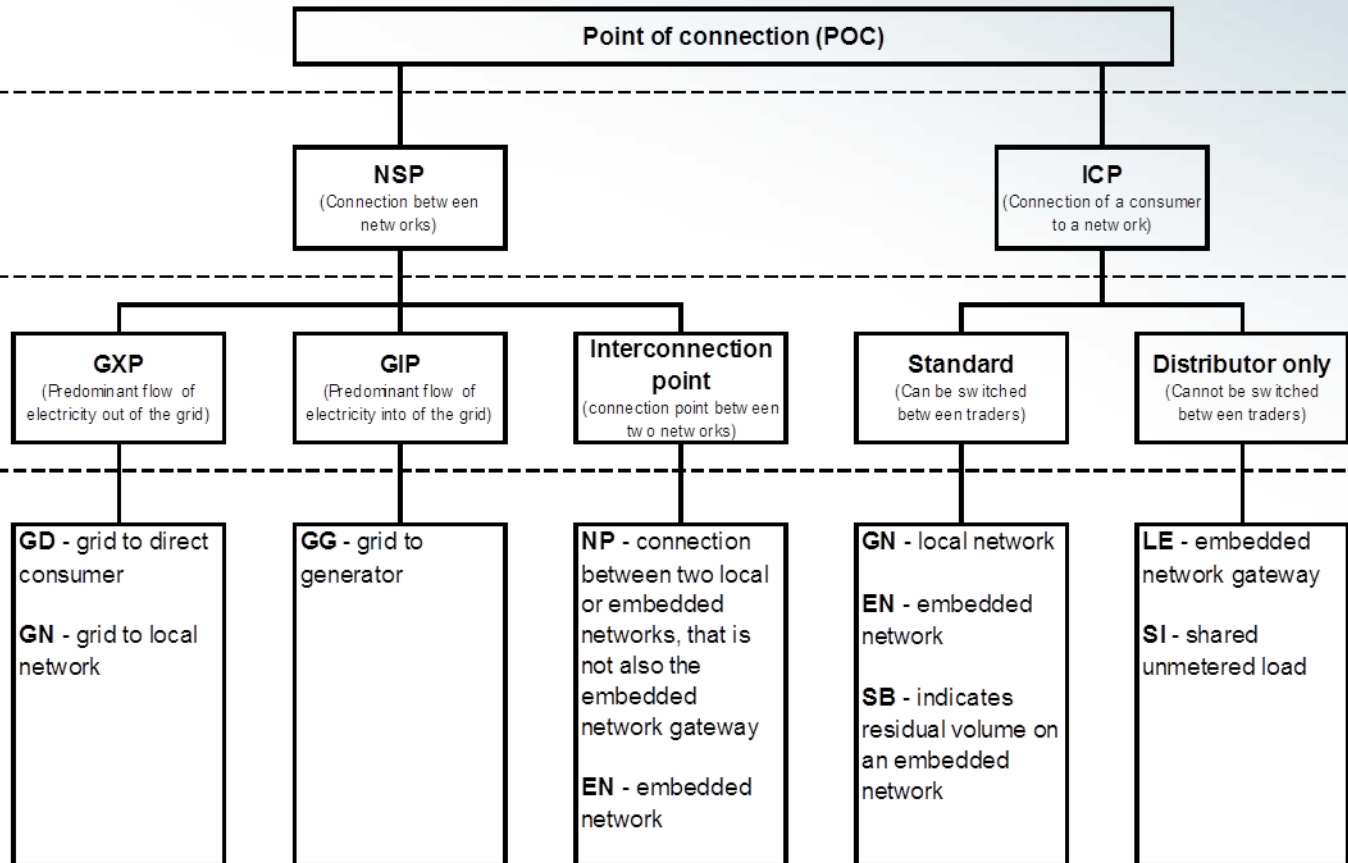
POINT OF CONNECTION (POC)

Parent term to indicate that there is a change of ownership of cables

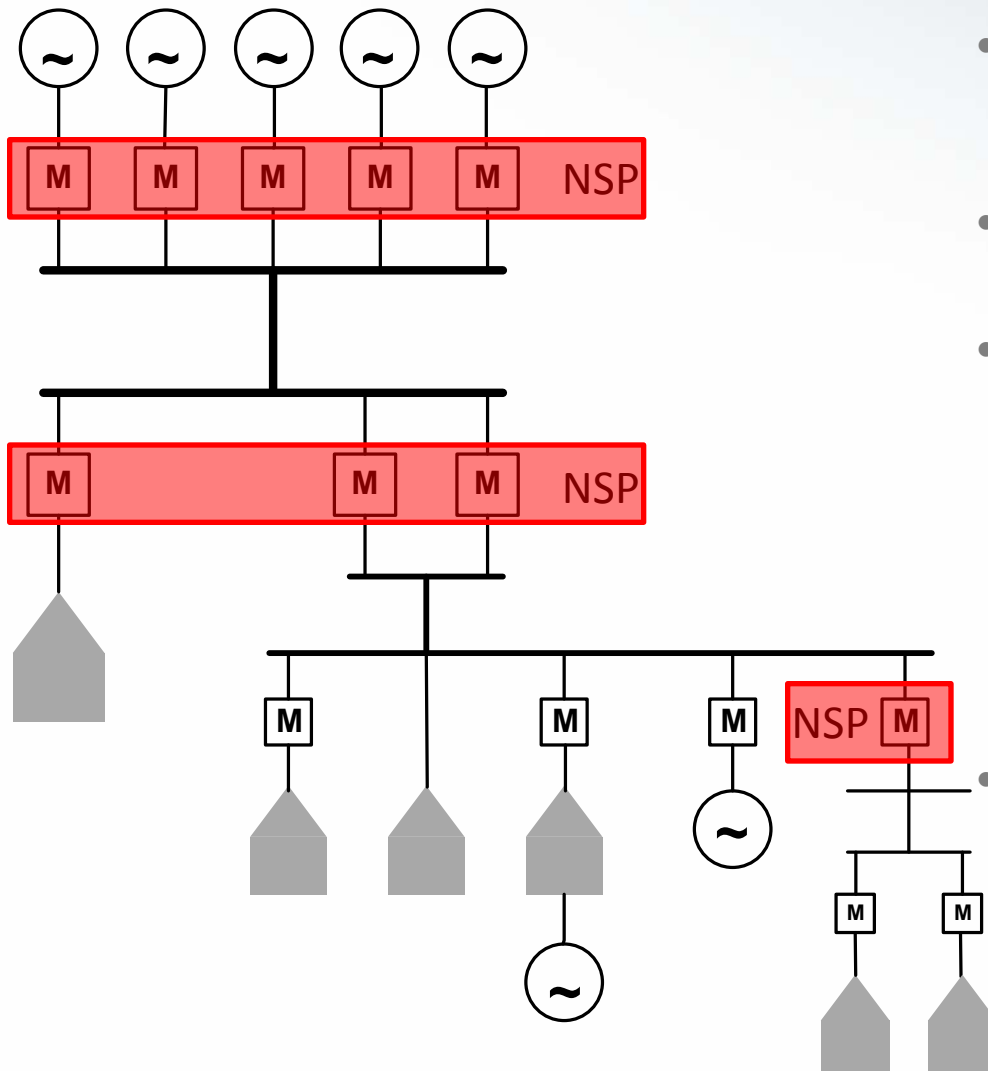
Indicates if connection is between networks or is a consumer connected to a local or embedded network

Type of connection. Describes what the connection is

Reconciliation type that applies to the type of connection. This indicates to market system how the POC should be reconciled

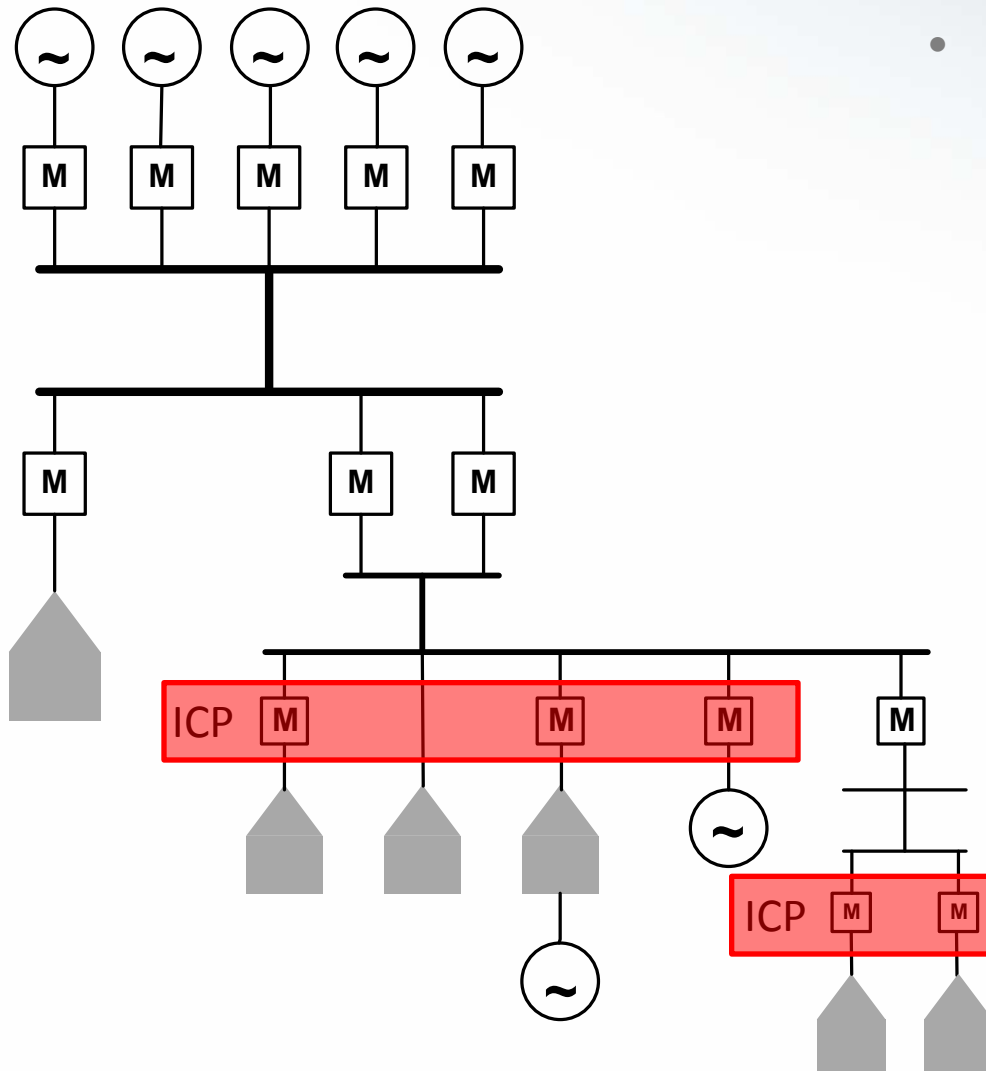


POINT OF CONNECTION (POC)



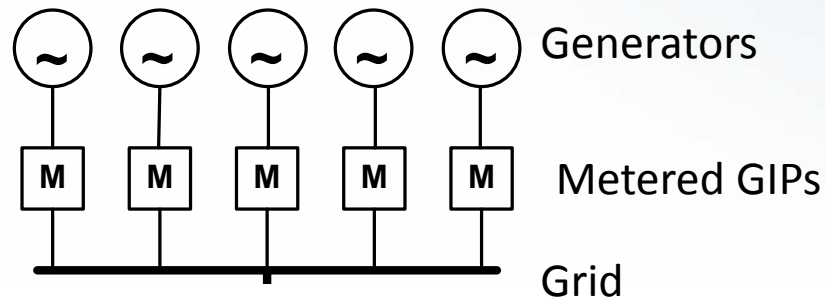
- “Point of connection” means a point at which electricity may flow into or out of a network
- Variety of different type of points of connection
- Connections to the grid or between networks are known as network supply points (NSPs)
 - NSPs comprise
 - 3 letter bus code
 - 3 number voltage reference
 - 1 number connection reference
 - Connecting asset owner participant identifier
- A schedule of current and historic NSPs are published in the NSP table on the Authority's web site (EMI reports)

POINT OF CONNECTION (POC)



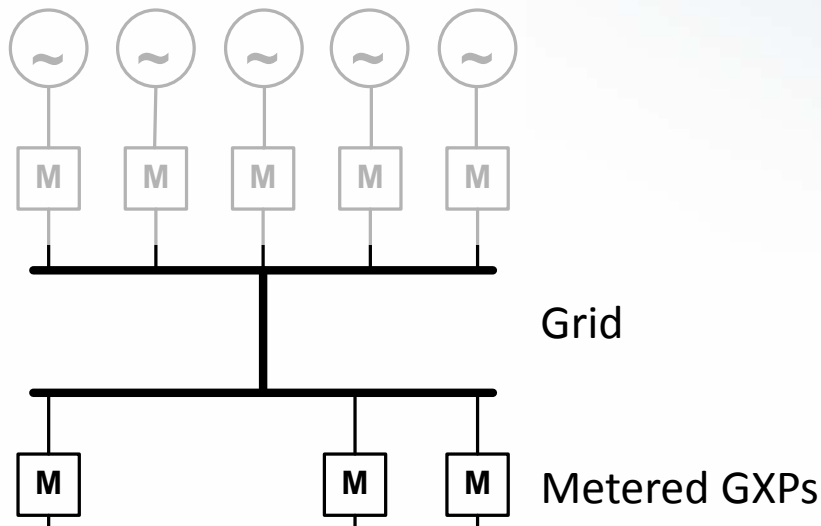
- Connections from non grid networks to customers are known as installation control points (ICPs)
 - each ICP should have an ICP identifier in the registry
 - ICPs comprise a unique 15 character code

PHYSICAL NETWORK CONNECTIONS



- Grid connected generators are large and connect to the transmission grid at grid injection points (GIPs)
- There are 47 GIPs
- There are 8 participants that are responsible for GIPs
- Generator is responsible for the provision of metering
- Electricity flow through a GIP maybe X or I

PHYSICAL NETWORK CONNECTIONS

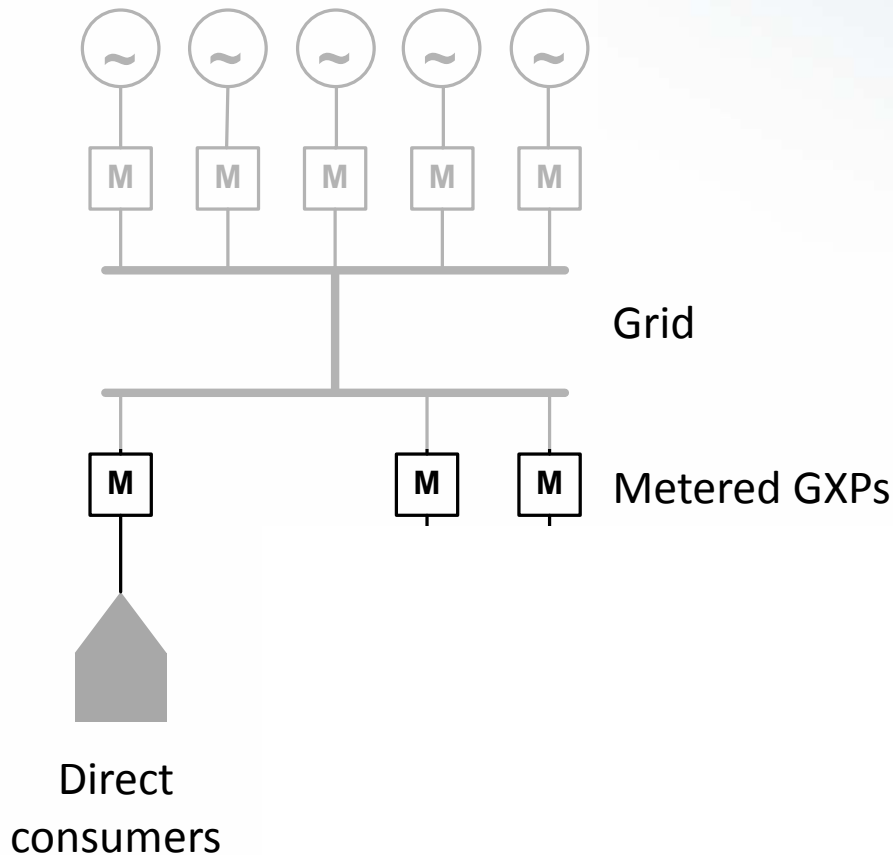


- The grid conveys electricity from grid connected generators to grid exit points (GXPs)
- Local networks (GN) and direct consumers (GD) connect to the grid
- There are 193 active GXPs
- All points of connection, including historic are available at

http://www.emi.ea.govt.nz/Reports/DataReport?reportName=R_NSPL_DR&categoryName=Wholesale&reportGroupIndex=7&reportDisplayContext=Gallery#reportName=R_NSPL_DR

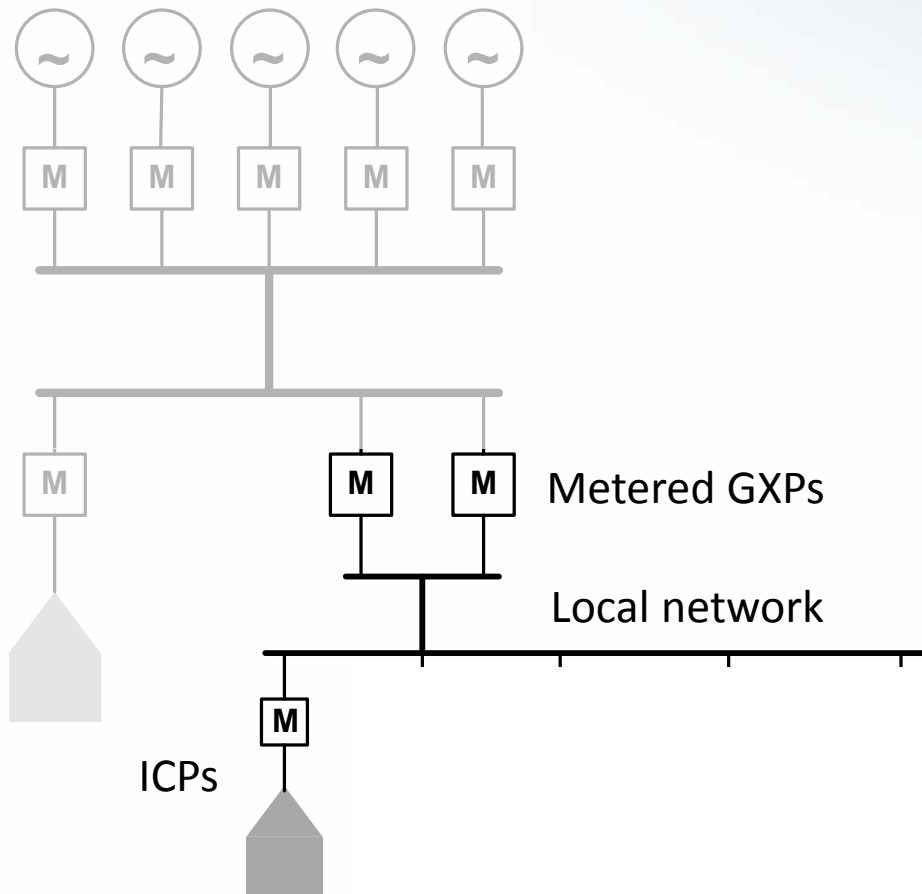
- Electricity flow through a GXP maybe X or I

PHYSICAL NETWORK CONNECTIONS



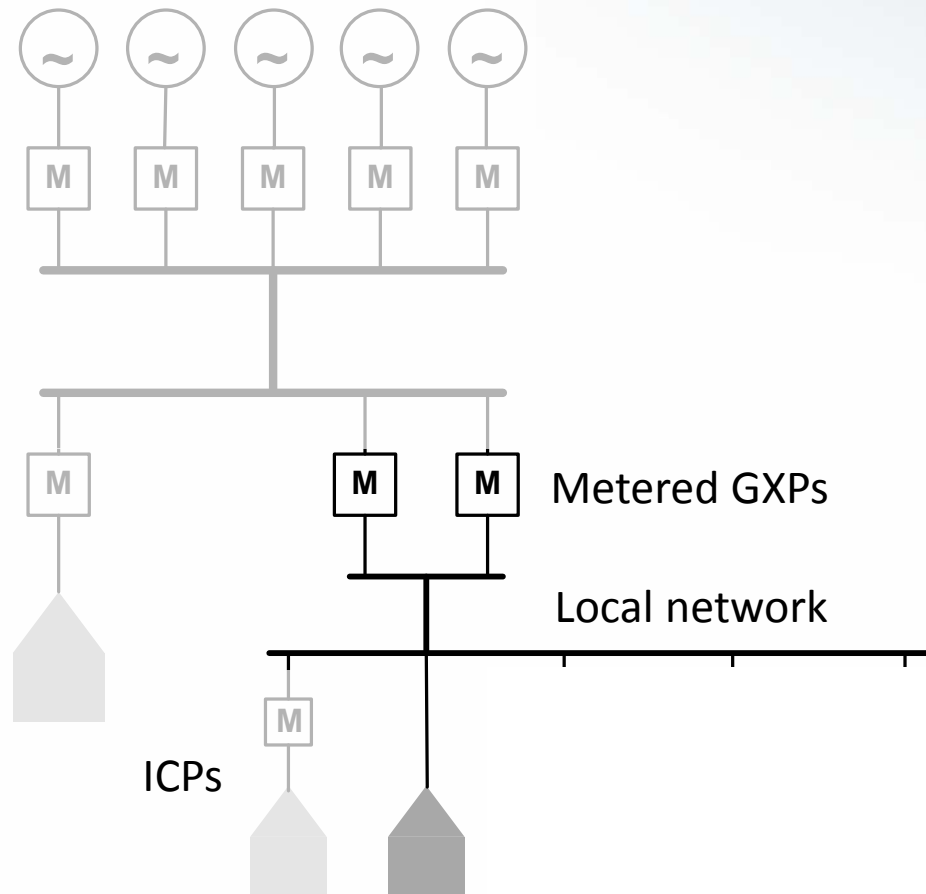
- Direct connected consumers connect to the grid. There is no interconnecting network
- There are 25 GD GXPs (*ignoring those that duplicate GIPs*)
- There are 16 GD participant identifiers
- Direct connected consumers may choose to buy or sell from a trader, or become a trader themselves.
- Some direct consumers have substantial industrial cogeneration
- Electricity flow through a GIP maybe X or I

PHYSICAL NETWORK CONNECTIONS



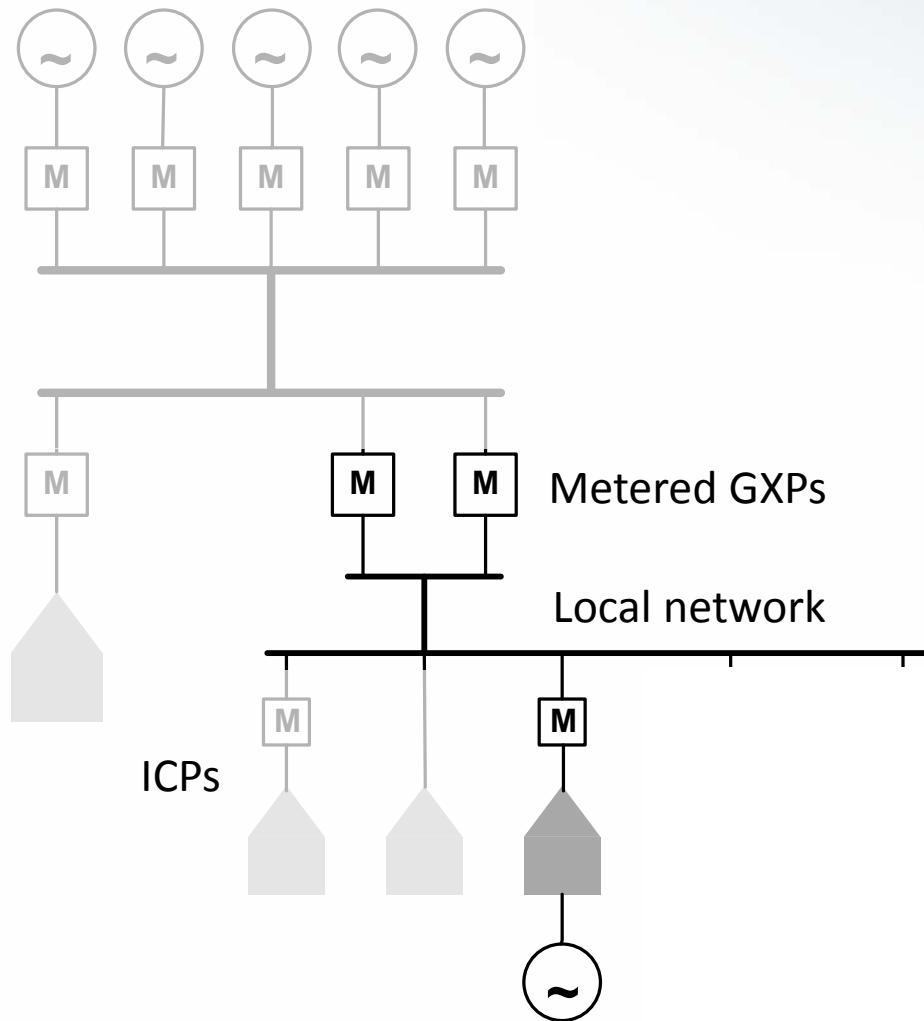
- Local networks connect to the grid and convey electricity to points of connection on their network
- There are 32 local network participant identifiers that contain ICP identifiers
- At 31 May ICP identifier count was
 - New - 1,499
 - Ready - 2,369
 - Active - 2,044,572
 - Inactive - 49,225
 - Decommissioned - 199,070
 - Distributor only - 403

PHYSICAL NETWORK CONNECTIONS



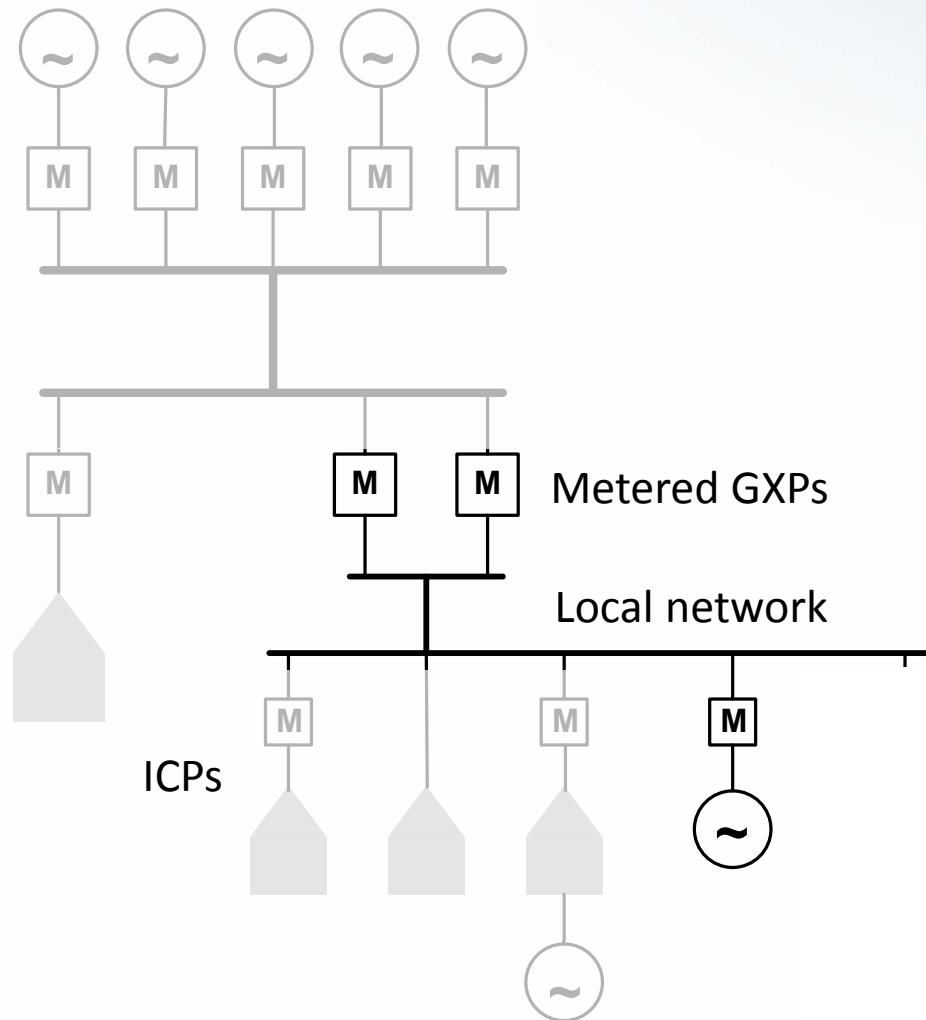
- Unmetered load is permitted in the Code provided load is below 3,000kWh/yr, and some certain types below 6,000kWh/yr

PHYSICAL NETWORK CONNECTIONS



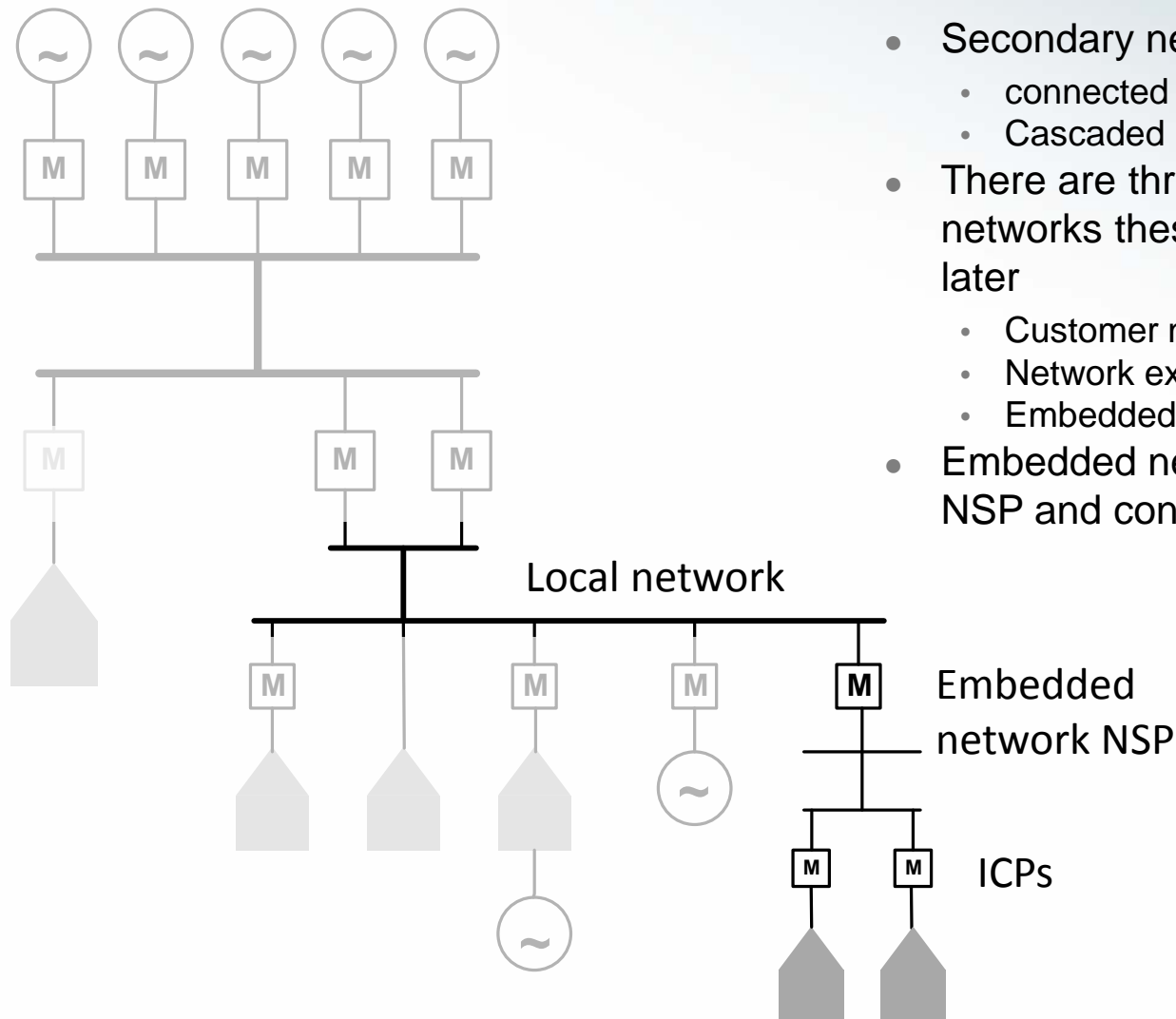
- Consumers sites may contain embedded generation that may inject surplus electricity into a local network
- Requirements of Part 6 applies for all new connections
- Approx 5,999 ICP identifiers have generation attached
 - 94% are photovoltaic
 - 93% <10kW
 - <10kW photovoltaic energy conveyed in April 2015 was 1.17 GWh (0.036% of all generation)

PHYSICAL NETWORK CONNECTIONS



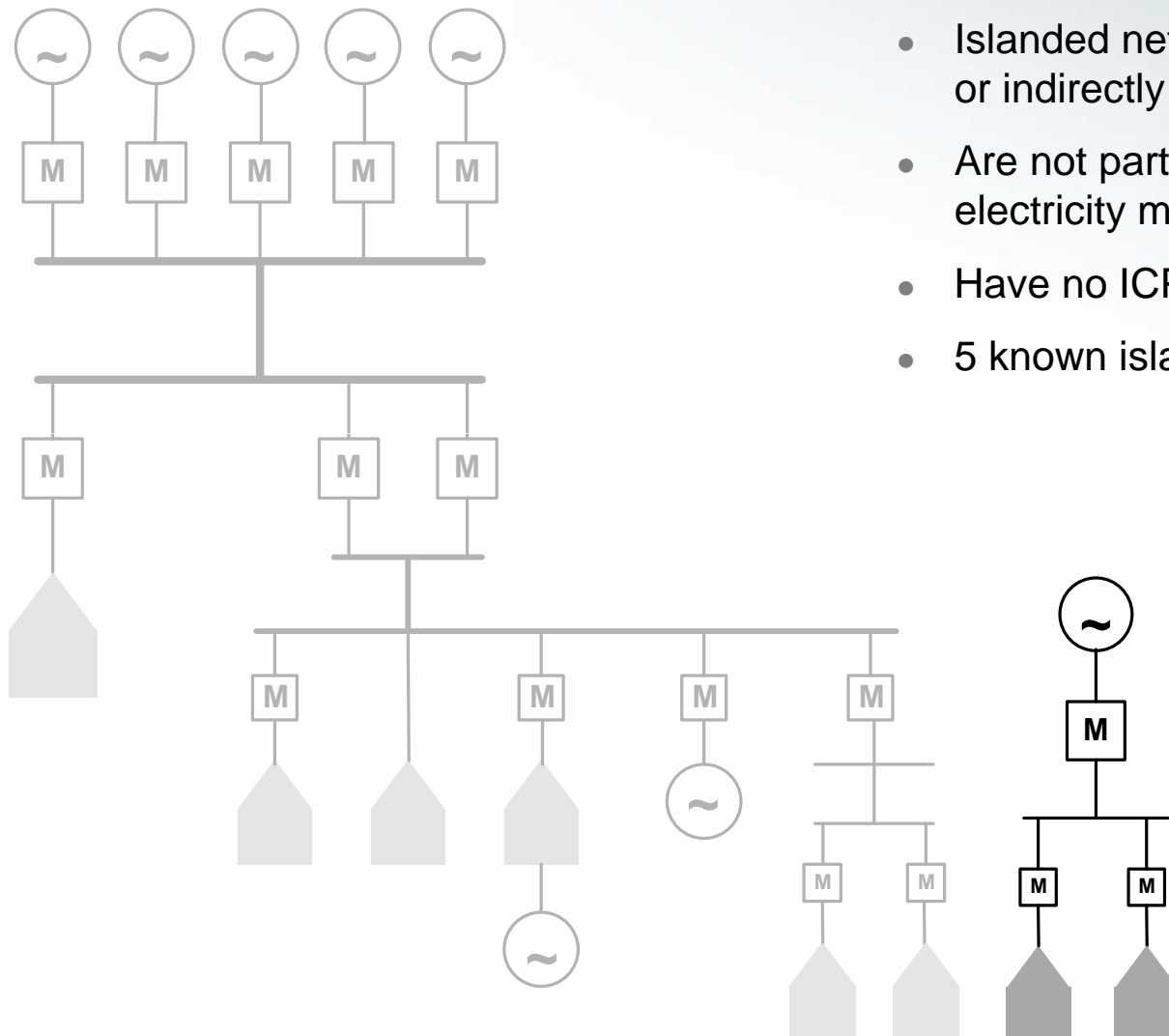
- Embedded generation may be directly connected to a local network and not embedded behind a consumer
- Requirements of Part 6 applies for all new connections

PHYSICAL NETWORK CONNECTIONS



- Secondary networks may be
 - connected to local networks
 - Cascaded
- There are three type of secondary networks these will be discussed later
 - Customer networks
 - Network extensions
 - Embedded networks
- Embedded networks will have an NSP and contain ICPs

PHYSICAL NETWORK CONNECTIONS



- Isolated networks are not directly or indirectly connected to the grid
- Are not part of the competitive electricity market
- Have no ICP identifiers
- 5 known isolated networks

THREE STAGES IN THE NZEM

- What happens before an event
 - Contracts
 - Switching (responsibility for a point of connection)
 - Bids, offers, schedules
- What happens during an event
 - Despatch
 - Measurement
- What happens after an event
 - Settlement

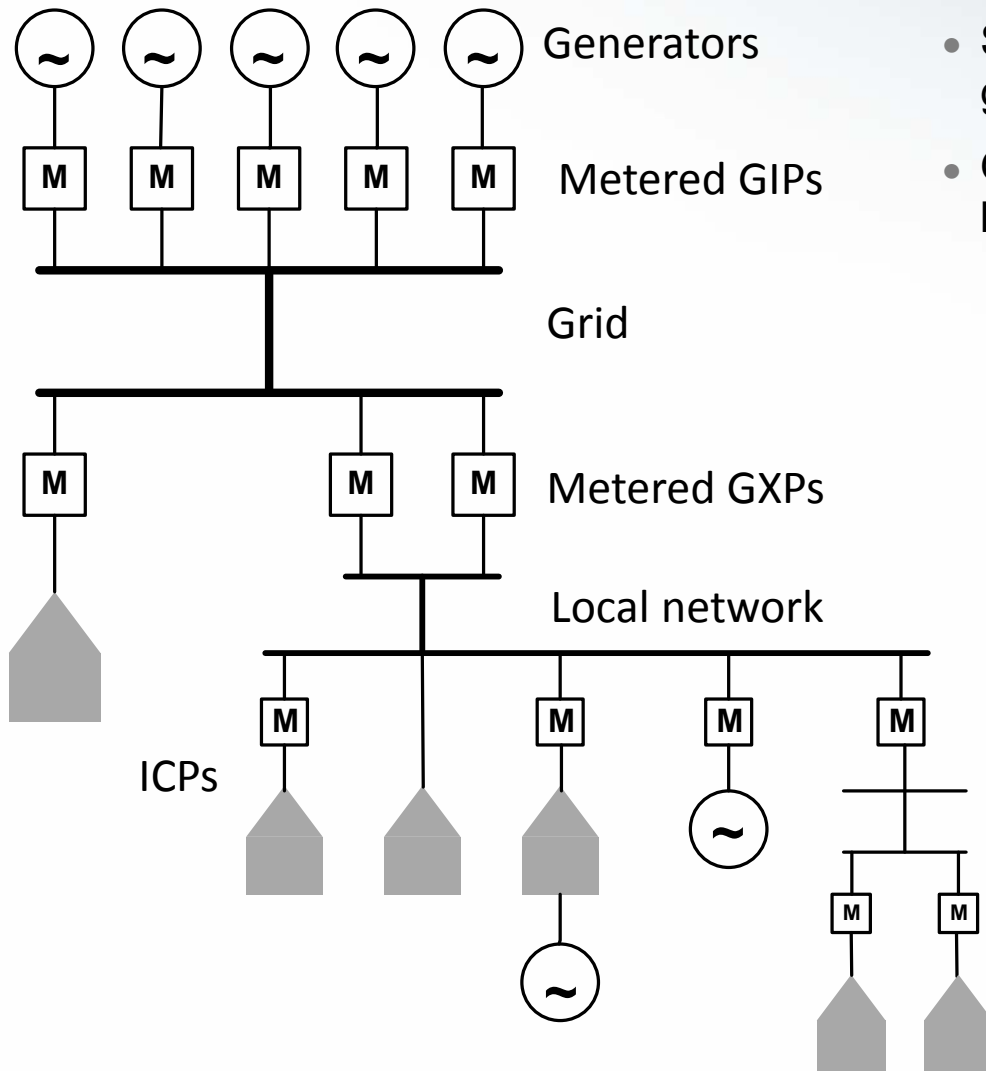
GENERATORS

- Five types
 - Standard grid connected generators
 - Industrial co-generators
 - Intermittent generators
 - Embedded generators
 - Islanded generators
- All generation that is injected into a network must ultimately be sold to the clearing manager
 - Self consumed consumption is OK
 - Net metering is not OK

SYSTEM OPERATOR

- Co-ordinates and manages electricity supply and demand in real time
 - avoids fluctuations in frequency or disruption of supply
 - continuous balance between generators and consumers
 - assembles generation offers into a price stack
 - models electricity flow demand
 - dispatches generation and dispatchable demand
- Determines the optimal combination of generators and reserve providers for each half-hour trading period

GENERATION = CONSUMPTION



- System operators dispatches generation
- Generators (except unoffered) must have cleared offers to generate
 - Gate closure period
 - Variation from dispatch instruction (+/-1MW, +/-5MW)
 - Not requiring dispatch <1MW
 - May require dispatch >1MW and <10MW
- Will be required to be dispatched >10MW
- Dispatch instruction transmitted via market system and must be complied with

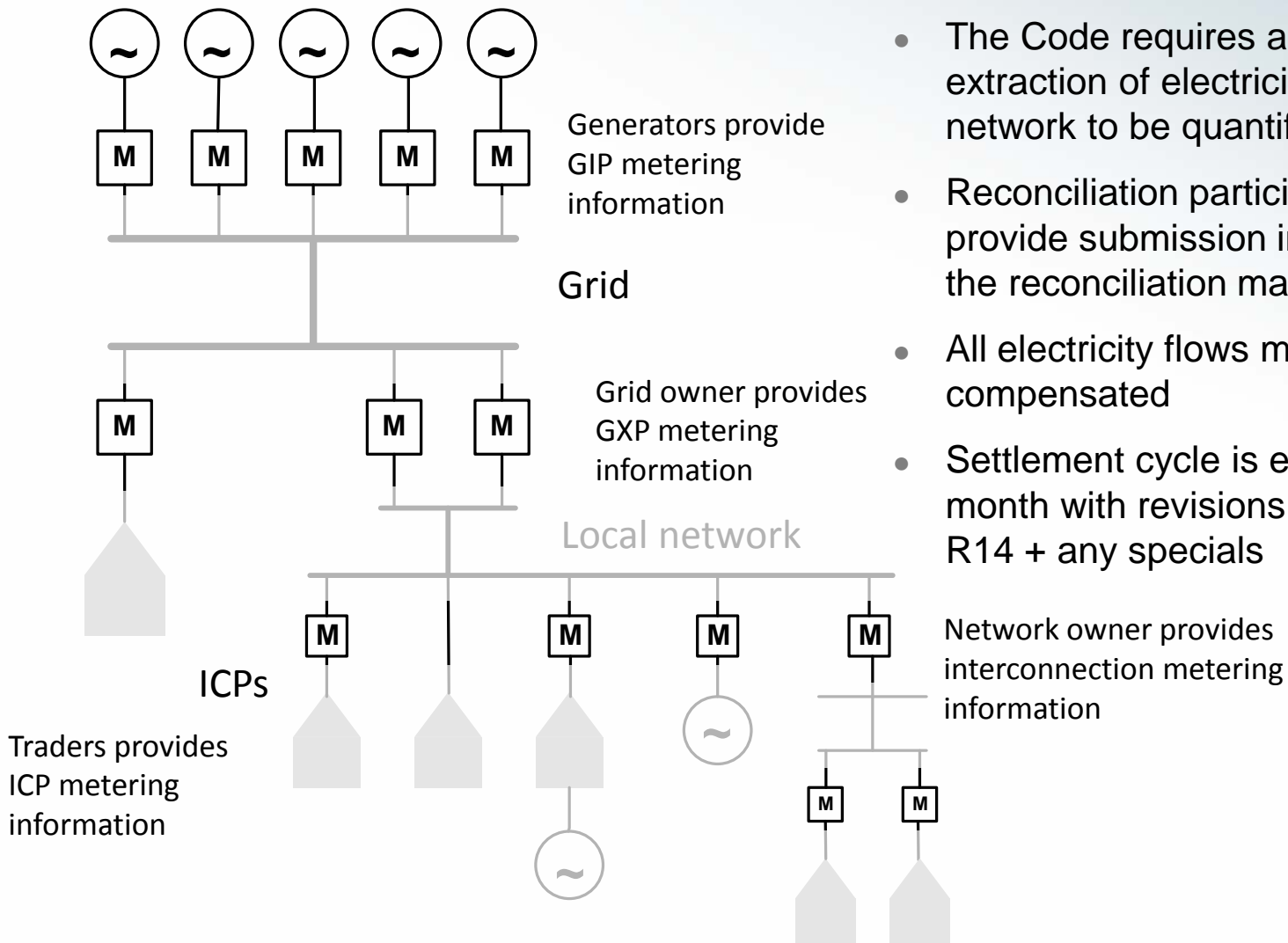
SETTLEMENT IN THE ELECTRICITY MARKET

- The electricity market has a number of stages of settlement cycles
- Market settlements
 - Physical settlement - reconciliation manager allocates physical volumes of electricity to traders
 - First stage financial settlement – clearing manager invoices for physical volumes of electricity, FTRs and related charges, dispatchable demand, and revisions/wash-ups
 - Second stage financial settlement – settlement for bilaterals between parties
- Trader settlements
 - Traders invoice consumers
 - Metering equipment providers invoice retailers for lease of metering
- Distributor settlements
 - Distributors invoice direct supply customers
 - Distributors invoice traders for use of networks charges

SETTLEMENT IN THE ELECTRICITY MARKET

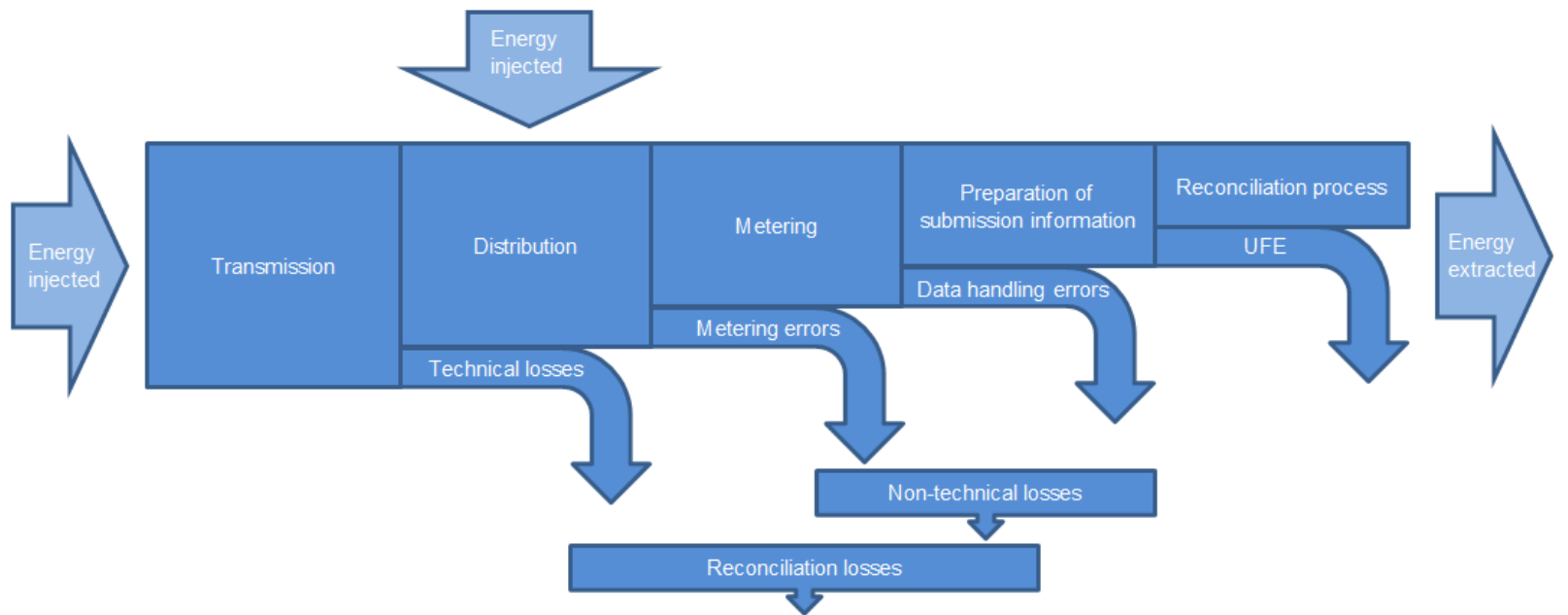
- The electricity market has a number of stages of settlement cycles
- Market settlements
 - **Physical settlement** - reconciliation manager allocates physical volumes of electricity to traders
 - First stage financial settlement – clearing manager invoices for physical volumes of electricity, FTRs and related charges, dispatchable demand, and revisions/wash-ups
 - Second stage financial settlement – settlement for bilaterals between parties
- Trader settlements
 - Traders invoice consumers
 - Metering equipment providers invoice retailers for lease of metering
- Distributor settlements
 - Distributors invoice direct supply customers
 - Distributors invoice traders for use of networks charges

PHYSICAL SETTLEMENT - RECONCILIATION

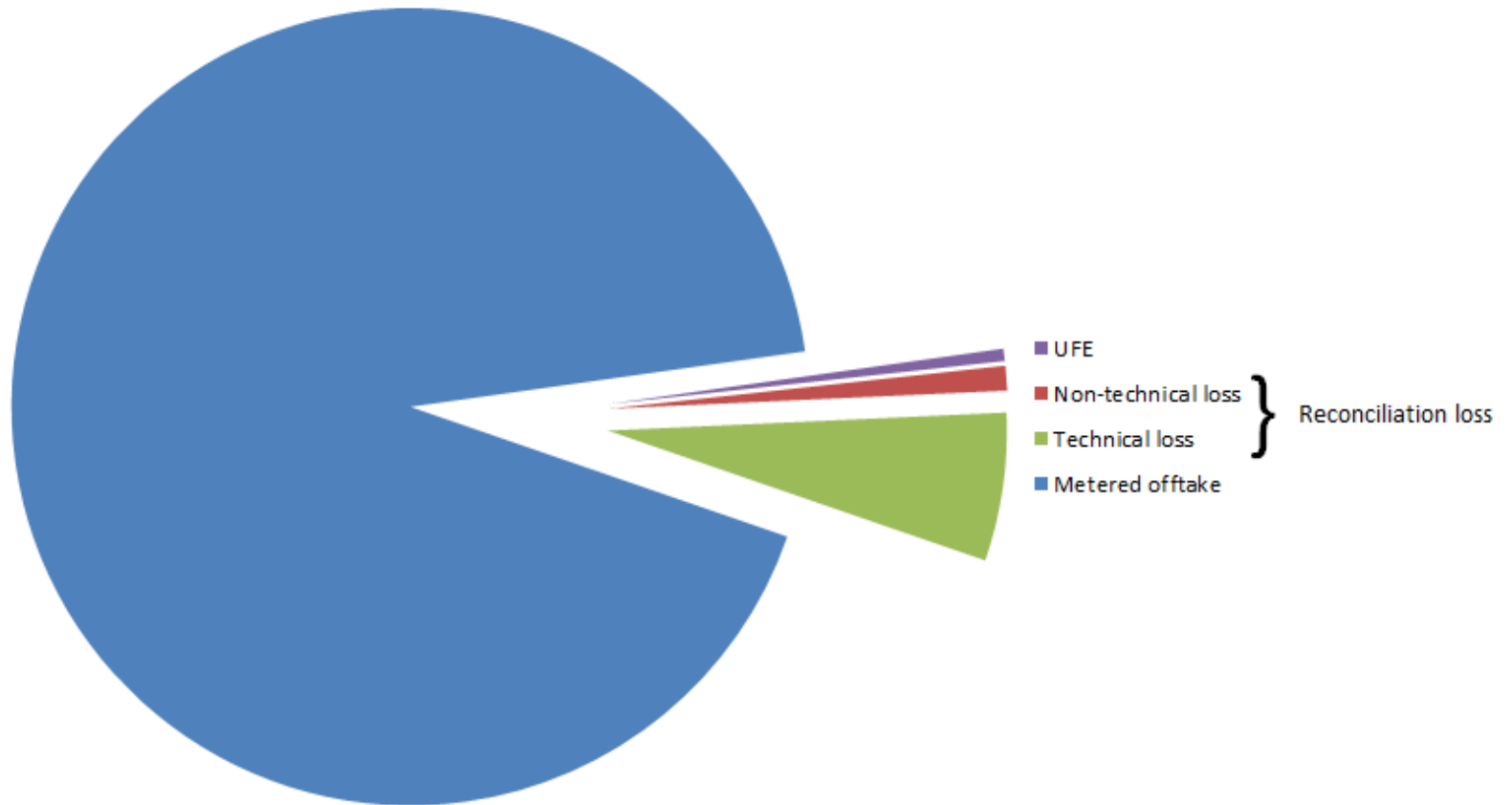


- The Code requires all injection and extraction of electricity from a network to be quantified
- Reconciliation participants must provide submission information to the reconciliation manager
- All electricity flows must be loss compensated
- Settlement cycle is each calendar month with revisions R1, R3, R7, R14 + any specials

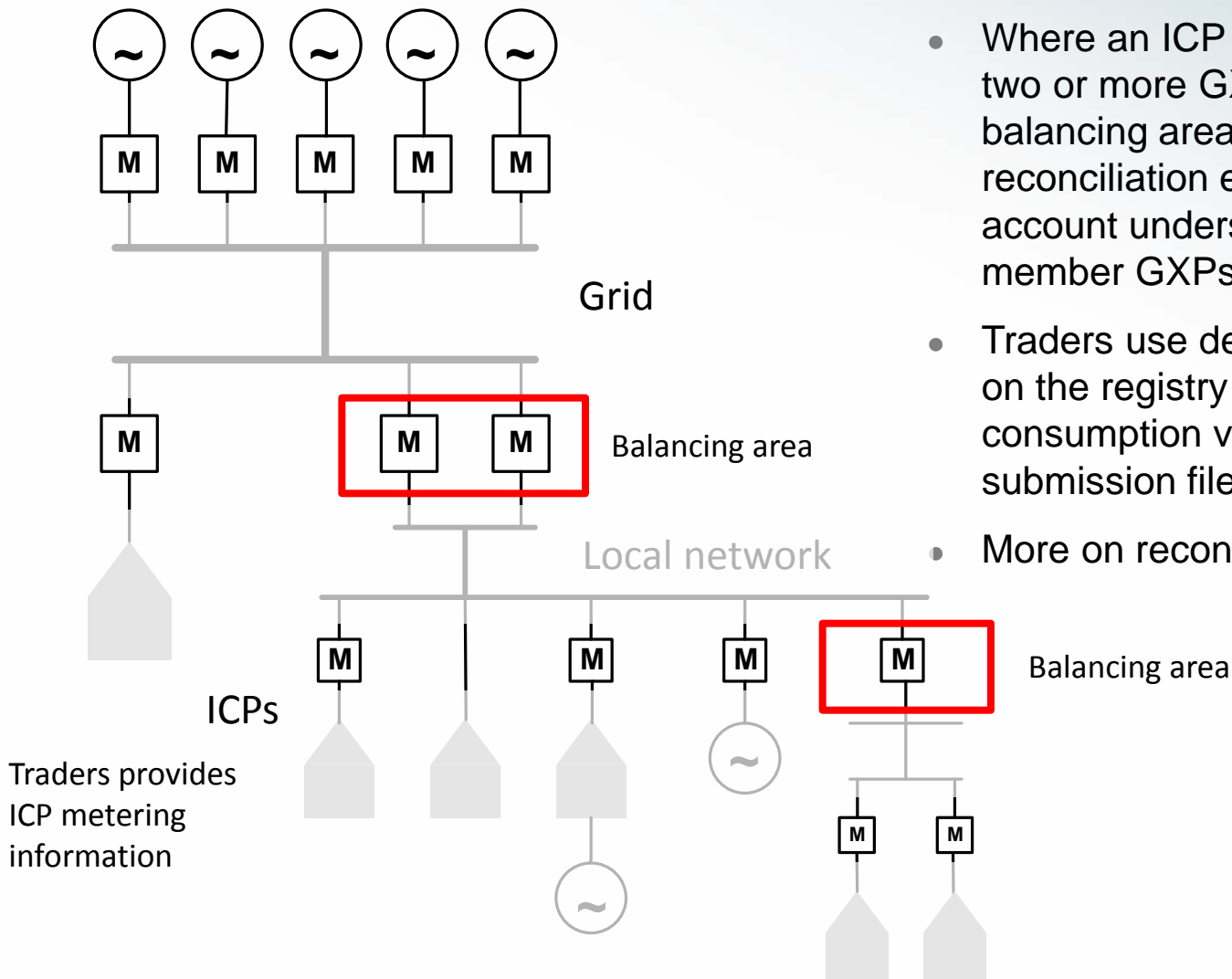
NETWORK LOSSES



NETWORK LOSSES

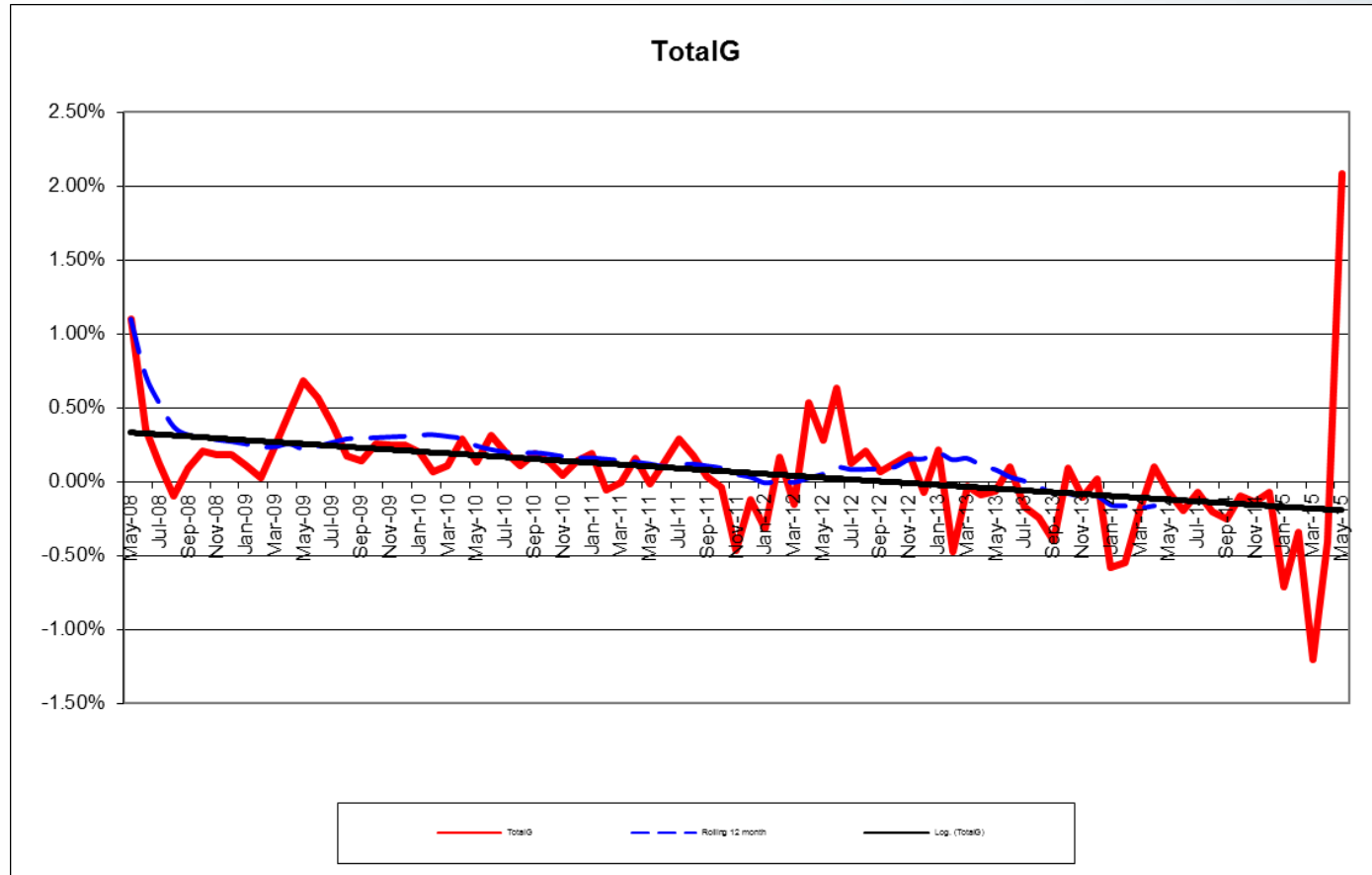


PHYSICAL SETTLEMENT - RECONCILIATION



- Where an ICP may be supplied by two or more GXP's, the concept of balancing areas is used so that the reconciliation equation takes into account unders and overs on member GXP's
- Traders use dedicated ICP status on the registry to aggregate consumption volumes in their submission files
- More on reconciliation later

PHYSICAL SETTLEMENT - RECONCILIATION



SETTLEMENT IN THE ELECTRICITY MARKET

- The electricity market has a number of stages of settlement cycles
- Market settlements
 - Physical settlement - reconciliation manager allocates physical volumes of electricity to traders
 - First stage financial settlement – clearing manager invoices for physical volumes of electricity, FTRs and related charges, dispatchable demand, and revisions/wash-ups
 - Second stage financial settlement – settlement for bilaterals between parties
- Trader settlements
 - Traders invoice consumers
 - Metering equipment providers invoice retailers for lease of metering
- Distributor settlements
 - Distributors invoice direct supply customers
 - Distributors invoice traders for use of networks charges

Market Operation Service Provider (MOSP) roles at NZX

NZX's roles in the electricity markets

John Andrews
Senior Energy Analyst
NZX



WITS

extended reserves manager

clearing manager

reconciliation manager

pricing manager

stress test register

Other Authority MOSP roles:

- System operator (Transpower)
- Registry (Jade)
- FTR manager (EMS)

NZX purchased roles which had operated some roles since the start...

OTHER NZX WEBSITES

NZX MARKETS

NZX.com is the face of NZX for our customers, from listed issuers, to retail investors, brokers, and anyone else with an interest in the New Zealand securities market.

<https://www.nzx.com/>

CLEARING HOUSE

The Clearing House manages trading risks, providing a new era of transparency and efficiency in New Zealand's capital markets.

<http://www.nzclearingcorp.com/>

DERIVATIVES

NZX Dairy Derivatives offers global risk management to international commodity buyers and sellers.

<http://www.nzxfutures.com/>

AGRI

NZX Agri delivers valuable news and information, articles and analysis of New Zealand's agricultural industry.

<http://agrihq.co.nz/>

<http://www.profarmer.com.au/>

ENERGY

NZX Energy operates the New Zealand day-to-day wholesale electricity market.

<http://www.nzxgroup.com/who-we-are/business-overview>

SMARTSHARES

Smartshares are exchange traded funds that can be bought and sold on market. Essentially they are shares designed to mirror the performance of a particular sharemarket index.

<http://www.smartshares.co.nz/>

CLEAR GRAIN EXCHANGE

Clear Grain Exchange offers buyers and sellers of grain an independent, secure online exchange environment to transact business.

<https://www.cleargrain.com.au/>

FUND SOURCE

FundSource is New Zealand's leading investment research house, supplying analysis to financial planners and fund managers since 1987.

<http://www.fundsource.co.nz/>

SUPERLIFE

Fund manager SuperLife is a provider of superannuation, KiwiSaver and managed investment products.

<http://superlife.co.nz/>

[com/](#)

s valuable news
articles and
Zealand's
try.

[z/](#)

[mer.com.au/](#)

EXCHANGE

ange offers
s of grain an
ure online
ment to

ENERGY

NZX Energy operates the New Zealand day-to-day wholesale electricity market.

<http://www.nzxgroup.com/who-we-are/business-overview>

SMARTSHARES

Smartshares
traded funds
and sold on m
they are shar
mirror the per
particular sha

<http://www.smartshares.co.nz/>

FUND SOURCE

FundSource is New Zealand's leading investment research house, supplying analysis to financial planners and fund

SUPERLIFE

Fund manage
provider of su
KiwiSaver an
investment p



pricing manager

Every GXP/GIP

Every trading period

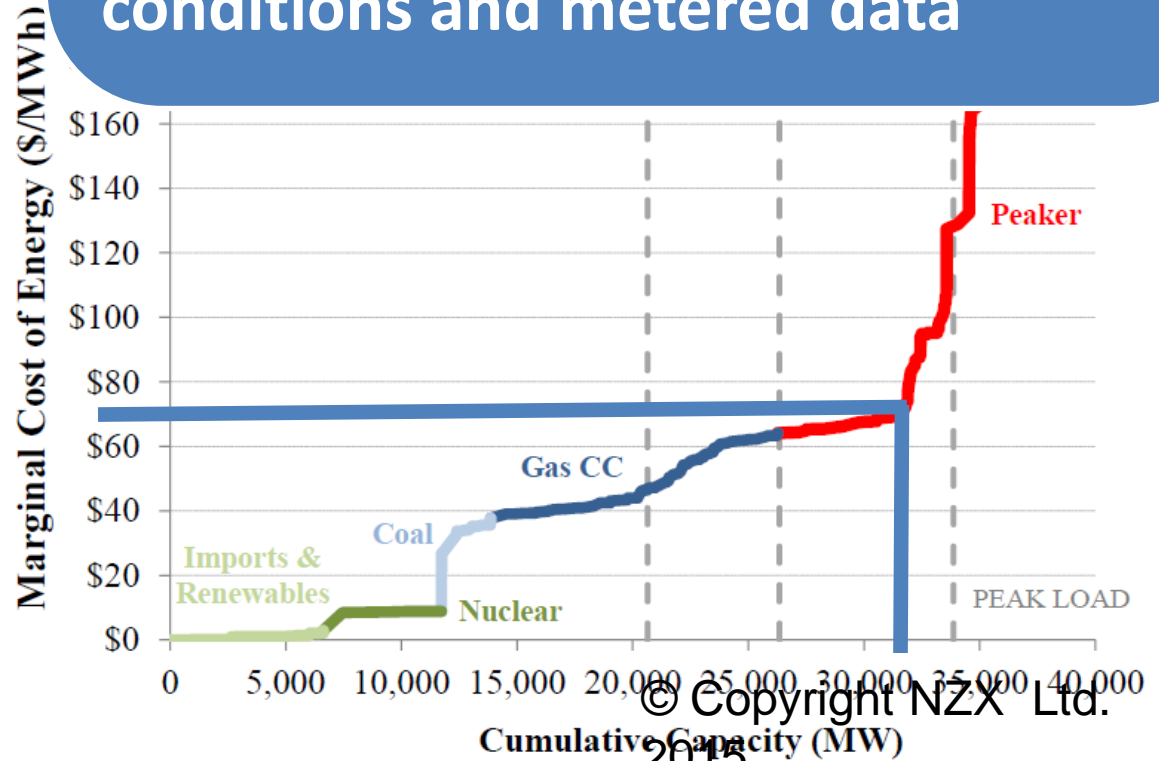
Every day

Over 12,000 spot prices per day

-Calculates and publishes prices every day

-Interim or provisional, then final

-Uses generator's offers, system conditions and metered data





reconciliation manager

Enormous volumes of data

Network configuration and detailed data

Complex processing and algorithms

Plenty of phone calls and emails

-From the submitted volume data and grid meter data, to reconciled data for billing.

-Each month by BD 7, plus the 4 washup months by noon on last business day

(Also network billing as required)



clearing manager

\$250M to \$1.2B
settlement days

\$300M security

\$10M cash
(Down from \$100M)

AML/CFT

Security register

-Price x quantity = dollars.

-Data on BD 7, invoices and statements on BD 9. Settlement on 20th

-Invoices include:

Spot, Ancillary services, MRDA, Con-
on, Dispatchable demand, FTR, HSA,
Extended reserves, Under Freq.
Events, Washups and GST

-Prudential each day, plus FTR info



extended reserves manager

(new role, preferred supplier currently)

- Optimised procurement schedule for extended reserve demand units to enhance AUFLS**
- New role to collect, clean and process data to choose configuration, and publish then repeat as required**
- SO to use and manage from this schedule**
- CM to pay and allocate costs**

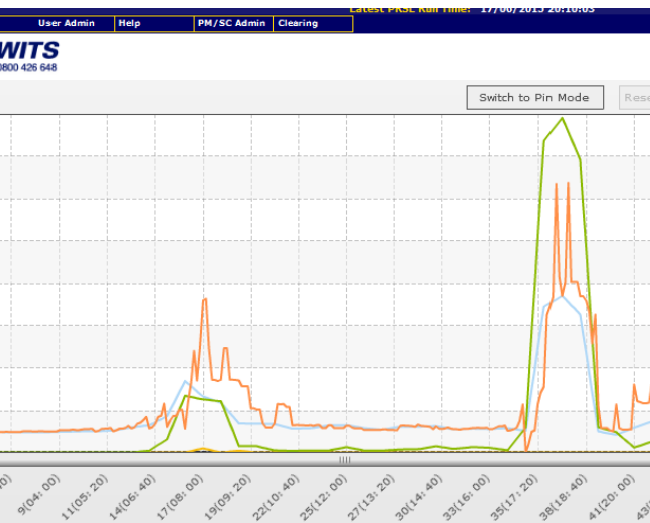


Stress test register

-Collect and process information to ensure retailers and major users are able to meet obligations in times of stress (i.e. high prices)



Wholesale Information Trading System (WITS)



-Data portal between SO and generators, retailers, market.

-Offers, bids, schedules, prices, invoices, other market data.

-Two versions- market and public

-High reliability, proven and tested

-Not fancy or flash!



A few other things we do..

- Work with the Authority on Code changes and provide skills or services if required
- Consulting in NZ and overseas
- Services to participants outside to MOSP roles
- Training and advice

Training: Electricity Industry Masterclass

-Understanding Electricity Markets course is 2 days of new concepts, new ideas and new views

-Attended by staff from many participant's legal, accounting, finance, engineering, trading, operations, graduates and even senior management

-Always receives good reviews. A cost effective way to get staff engaged and understanding the industry quickly



We're here to help

Operations team : 10

Energy Dev team : 14

Entire rest of company to
support us!

-Our roles are to operate, deliver, inform, provide, facilitate

-We're tasked with ensuring a smooth, secure, successful operation

-Always happy to help, explain, provide info, talk through, listen

-We need to know who you are and how we can work with you



Thank you

We look forward to working with you

john.andrews@nzx.com



Reconciliation manager

rm@nzx.com

+64 4 498 0044

Pricing manager

managerp@nzx.com

+64 4 498 0028

Clearing manager

cmanager@nzx.com

+64 4 495 2801

www.nzx.com

Level 1, NZX Centre
11 Cable Street
PO Box 2959
Wellington 6140
New Zealand

SETTLEMENT IN THE ELECTRICITY MARKET

- The electricity market has a number of stages of settlement cycles
- Market settlements
 - Physical settlement - reconciliation manager allocates physical volumes of electricity to traders
 - First stage financial settlement – clearing manager invoices for physical volumes of electricity, FTRs and related charges, dispatchable demand, and revisions/wash-ups
 - **Second stage financial settlement – settlement for bilaterals between parties**
- Trader settlements
 - Traders invoice consumers
 - Metering equipment providers invoice retailers for lease of metering
 - Distributor settlements
 - Distributors invoice direct supply customers
 - Distributors invoice traders for use of networks charges

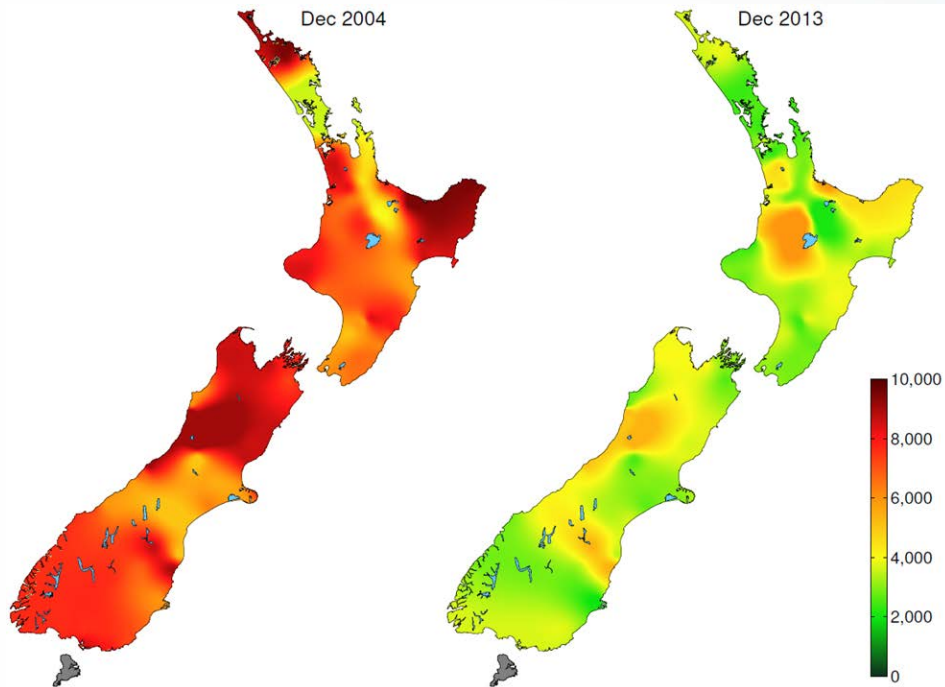
SETTLEMENT IN THE ELECTRICITY MARKET

- The electricity market has a number of stages of settlement cycles
- Market settlements
 - Physical settlement - reconciliation manager allocates physical volumes of electricity to traders
 - First stage financial settlement – clearing manager invoices for physical volumes of electricity, FTRs and related charges, dispatchable demand, and revisions/wash-ups
 - Second stage financial settlement – settlement for bilaterals between parties
- Trader settlements
 - Traders invoice consumers
 - Metering equipment providers invoice retailers for lease of metering
- Distributor settlements
 - Distributors invoice direct supply customers
 - Distributors invoice traders for use of networks charges

TRADERS

- Traders are retailers, generators and direct purchasers who buy and sell electricity from/to the NZEM
 - Retailers - 3 types
 - type 1 - 21 (both retail and buy from the electricity market)
 - type 2 (retail but do not buy from the electricity market)
 - type 3 (retail on an islanded networks)
 - Direct purchasers and on-sellers = 9 identifiers
 - Generators = 20
- Retailers
 - Most (but not all) consumers have choice of retailer
 - No retailer of last resort
 - Trader default process
 - MVDC and VC requirements
 - No regulated tariffs apart from low fixed charge

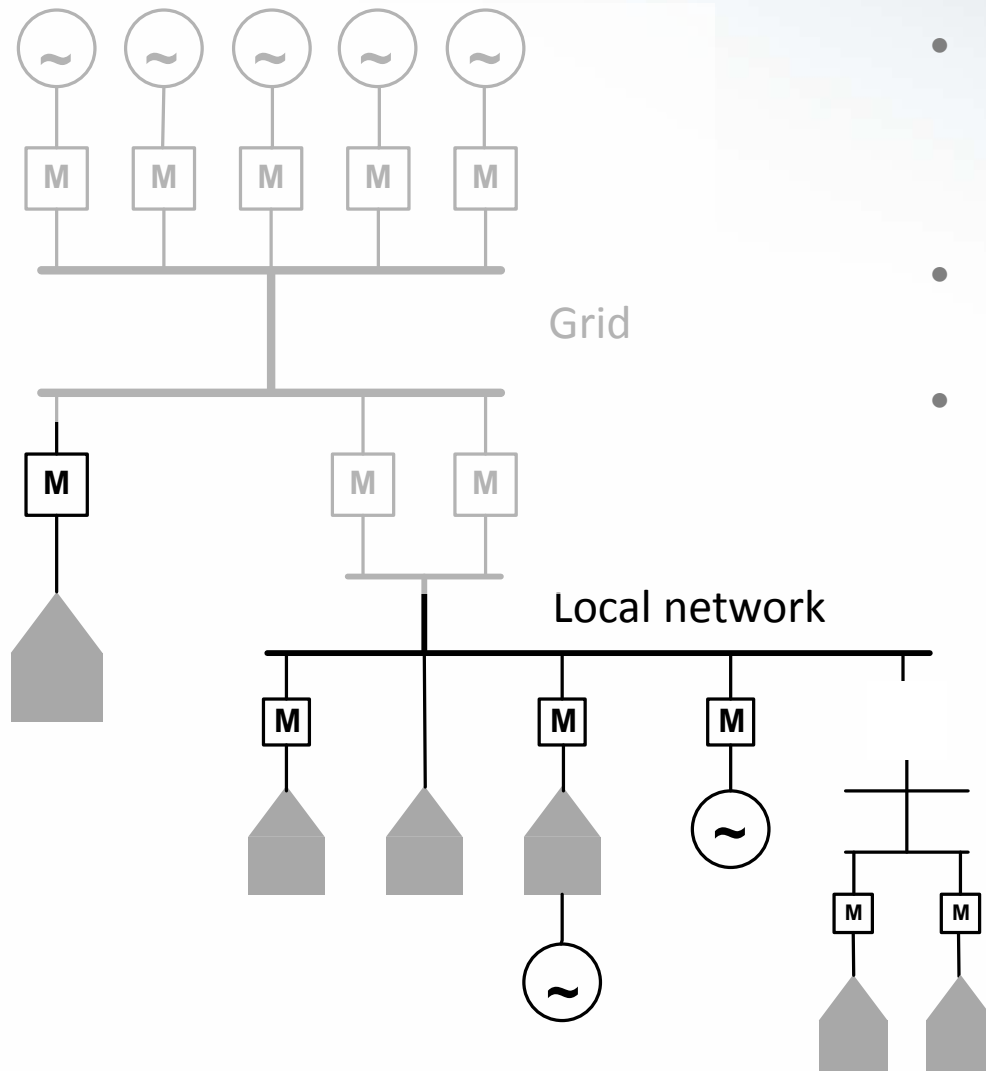
Retailers - retail competition



Herfindahl-Hirschman Index. This index is the sum of the squares of the market shares of every retailer in a market. For example, if there are two retailers and one has 80% market share and the other has 20% then the HHI = $80 \times 80 + 20 \times 20 = 6,800$

- Increasing number of retailers
 - 8 new entrants in last 18 months
 - 21 type 1 retailers buying from the clearing manager
- New entrants exploring innovative offerings

TRADERS INVOICE CONSUMERS



- Traders invoice consumers where they buy or sell electricity to the clearing manager on the consumers behalf
- Electricity conveyed may be measured at NSPs or ICPs
- Traders must also manage
 - consumer credit
 - medically dependent consumers
 - contract periods
 - where conveyance UOSA, invoice distributor charges to consumer
 - consumer switching
 - MEP switching
 - distributor switching

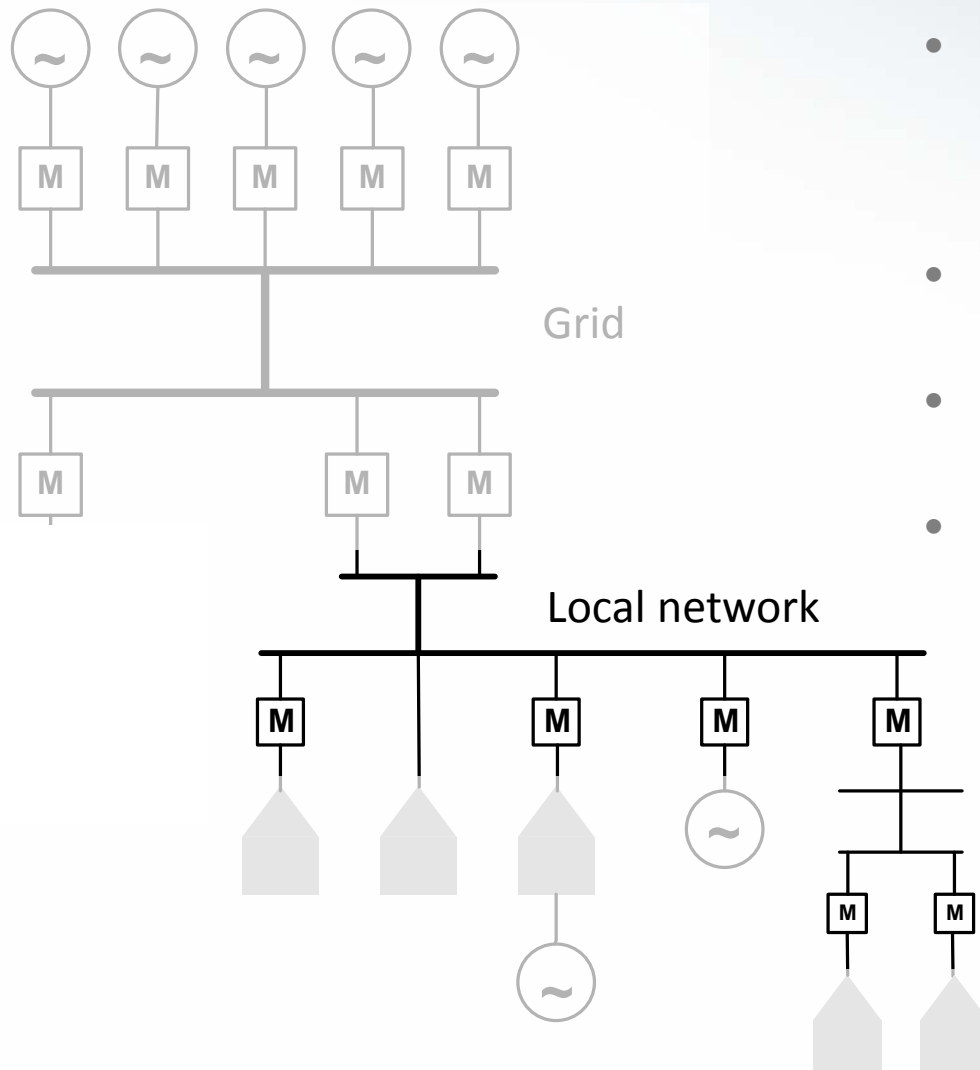
COST TO TRADERS OF ANSWERING QUERIES

- The cost of an error in distributor registry information is usually carried by traders
- Assumption - if
 - there are approx 2,044,572 active ICPs at 31 May 2015
 - approx 24,534,864 invoices are issued each year
 - there is a 1% query rate, that takes 60 minutes per query, to resolve
- Then traders would need to have 128 FTEs answering queries

SETTLEMENT IN THE ELECTRICITY MARKET

- The electricity market has a number of stages of settlement cycles
- Market settlements
 - Physical settlement - reconciliation manager allocates physical volumes of electricity to traders
 - First stage financial settlement – clearing manager invoices for physical volumes of electricity, FTRs and related charges, dispatchable demand, and revisions/wash-ups
 - Second stage financial settlement – settlement for bilaterals between parties
- Trader settlements
 - Traders invoice consumers
 - Metering equipment providers invoice retailers for lease of metering
- Distributor settlements
 - Distributors invoice direct supply customers
 - **Distributors invoice traders for use of networks charges**

TRADERS INVOICE CONSUMERS



- Where a trader invoices line charges on behalf of a distributor, the trader must report invoicing information
- The UOSA should specify billing methodology
- EIEPs may be used for the interaction
- More on EIEPs later

MARKET OPERATIONS SERVICE PROVIDERS

- Authority contracts a range of market operation service providers (MOSPs) to operate the electricity markets
 - Clearing manager (*manages financial clearing of electricity market*)
 - FTR manager (*manages allocation of FTRs*)
 - Pricing manager (*calculates provisional, interim and final price*)
 - Reconciliation manager (*allocates physical volumes of electricity to participants*)
 - Registry manager (*manages a central database of information that enables reconciliation and switching*)
 - System operator (*manages dispatch process, reserves and security*)
 - WITS manager (*wholesale Information*)

Market Operation Service Provider (MOSP) roles at NZX

NZX's roles in the electricity markets

John Andrews
Senior Energy Analyst
NZX





COMPETITION • RELIABILITY • EFFICIENCY

