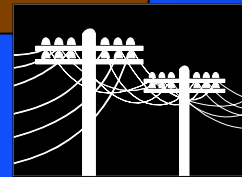
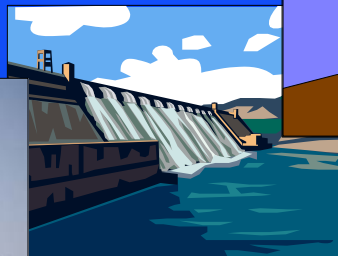
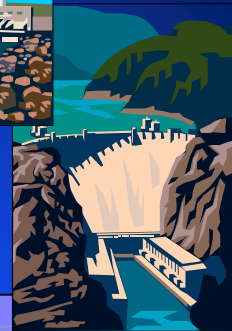
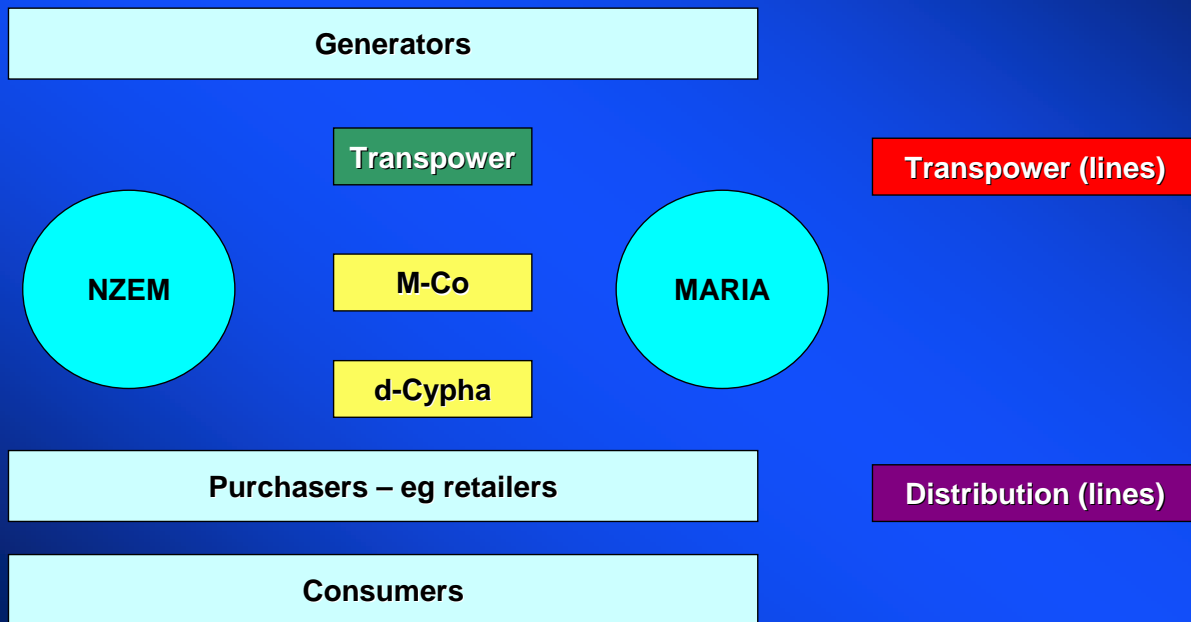


The New Zealand Electricity Market (NZEM)

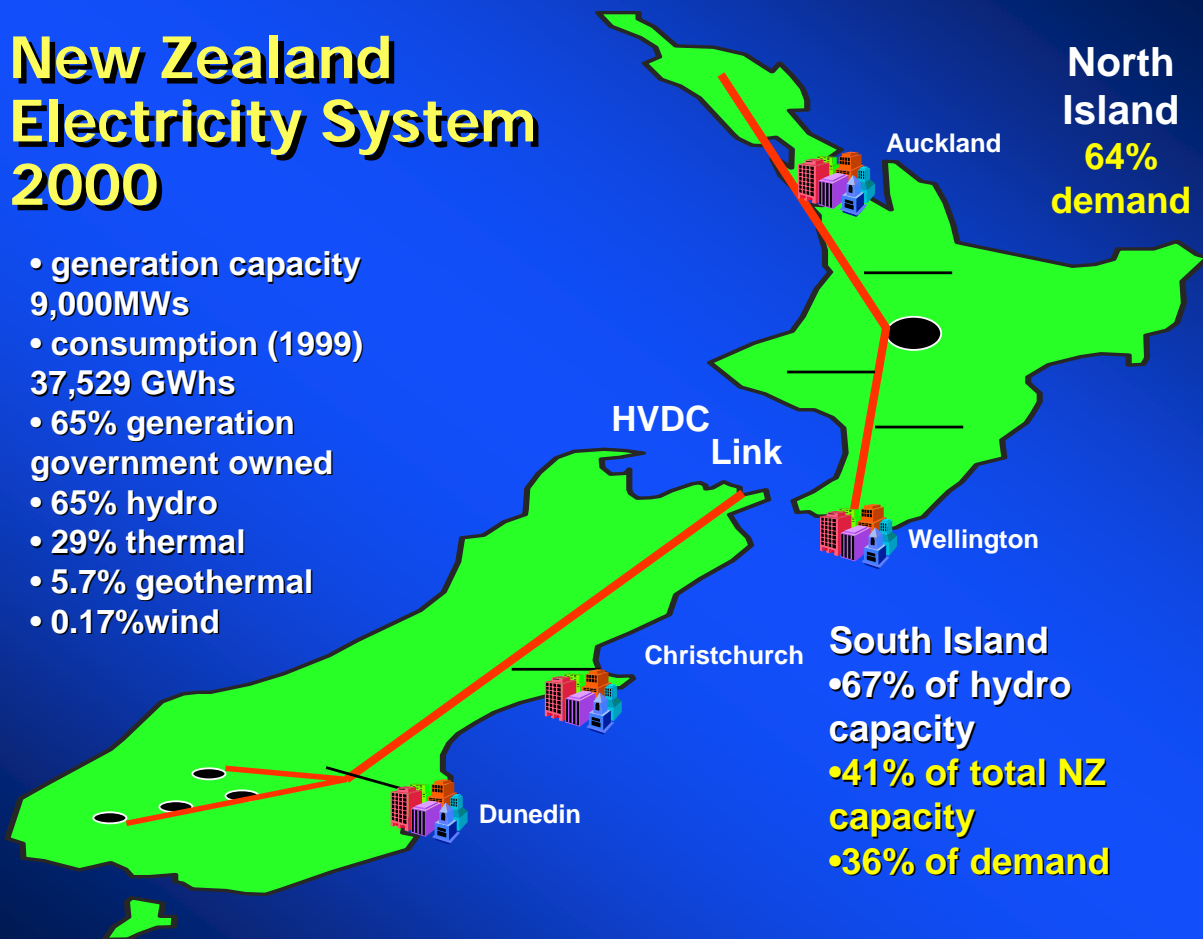


Composition of the New Zealand Electricity Market 1999



New Zealand Electricity System 2000

- generation capacity 9,000MWs
- consumption (1999) 37,529 GWhs
- 65% generation government owned
- 65% hydro
- 29% thermal
- 5.7% geothermal
- 0.17%wind

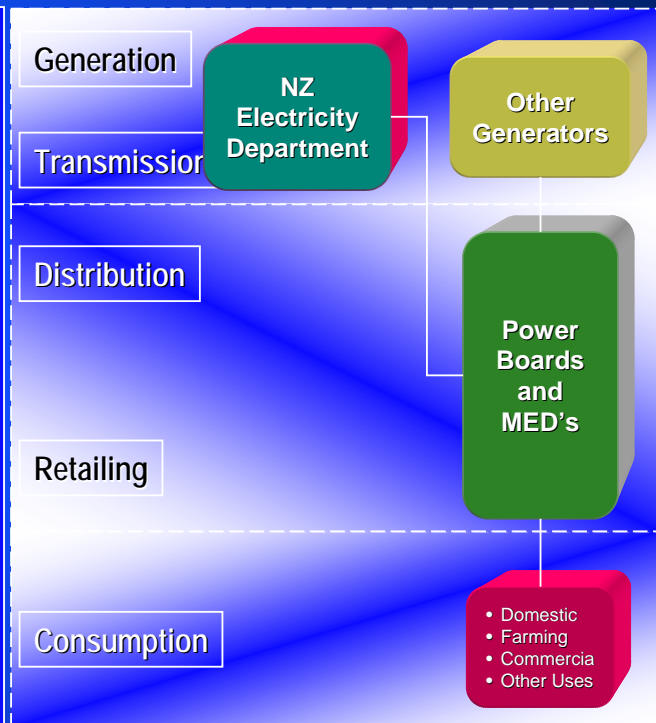


New Zealand Electricity System

- high dependency on hydro, in South Island, population in the North Island
- limited storage
- dependency decreasing: 500 MWs of new, gas private capacity in North Island
- transmission costs high:
 - low population density;
 - location of resources far from load;
 - two islands connected by HVDC link

Before 1987

- **production, pricing, transmission:**
 - a single government department
- **distribution:**
 - 55 companies local government owned
- **“gold plating:”**
 - overstaffing
 - excess investment
 - Annual approval of wholesale price



Why Change?

- **Arguments Against Change:**
 - “if its not broken why fix it”
 - “the lights will go out”
 - “we are ok, who is complaining”
 - what about environment
- **Arguments in Favour of Change:**
 - electricity a major consumer of capital
 - subsidies kept prices down, a cost to every business
 - electricity should compete with other energy
 - competition, reduce costs, reduce pollution

Steps in the Deregulation Process

1987: Ministry of Energy corporatised:

- normal company with government shares
- 1996 State Owned Enterprise law, (SOE) - ECNZ
- internal split into generation and transmission businesses, directors from private sector
- “no privileges, no handicaps”

1992: Drought, power crisis; Committee of Inquiry:

- prices did not warn: water increasing in value
- correct information from a competitive market

1993: ESA reform

- lose government guarantee
- corporatised

Development of the Market

1993: generators, transpower and retailers:

- set up EMCO
- contract to administer market for trading electricity

1994: Transpower

- split from ECNZ as separate SOE

1995-6: ECNZ split into 2 companies:

- Contact Energy created
- Short-term pricing from ECNZ to EMCO.

1996: private investors enter generation

- combined cycle gas

Introduction of the Market

1996: 1-10 competitive market place

- market begins operation
- competitive generation and
- real-time (half-hour) spot pricing

1998: Electricity Reform Act

- Lines and Energy split separate companies

1998: Contact sold

- Edison Mission takes strategic shareholding

1999: ECNZ split into 3 SOE's

- Contact now largest company (30 %)

How the Market functions

Voluntary

- No company obliged to join NZEM, but all have
- Pool by-pass possible using MARIA Rules

“Physical pool”

- generators offer into the “pool,” retailers buy
- M-Co administers & clears transactions
- d-Cypha reconciles inputs and outputs with contracts

“Financial Pool”

- buyers and sellers hedge risks on voluntary basis

How the Market functions

(Continued)

248 "NODES" (entry/exit points) 1/2-hour pricing

- market sets prices received and paid

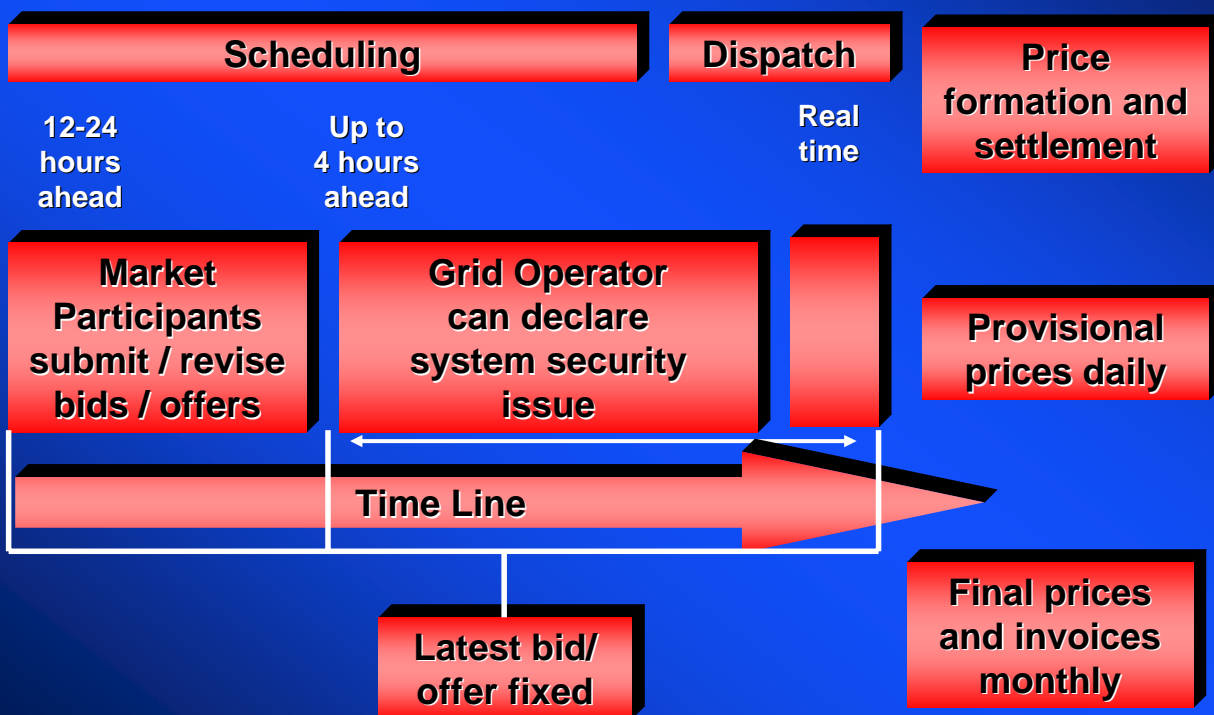
Electricity is a Commodity:

- PRICE = energy + losses + constraints
(at grid connection point i.e. node)
- if no constraints or losses there would be the same price at each node

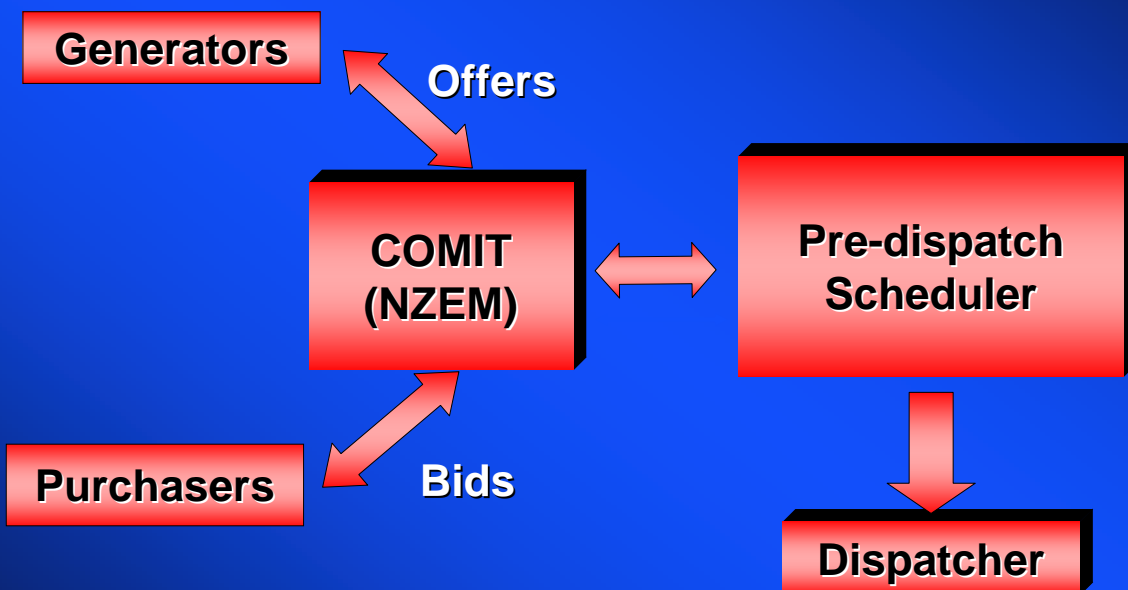
Marginal price

- set by the last-dispatched generation (sub)-unit

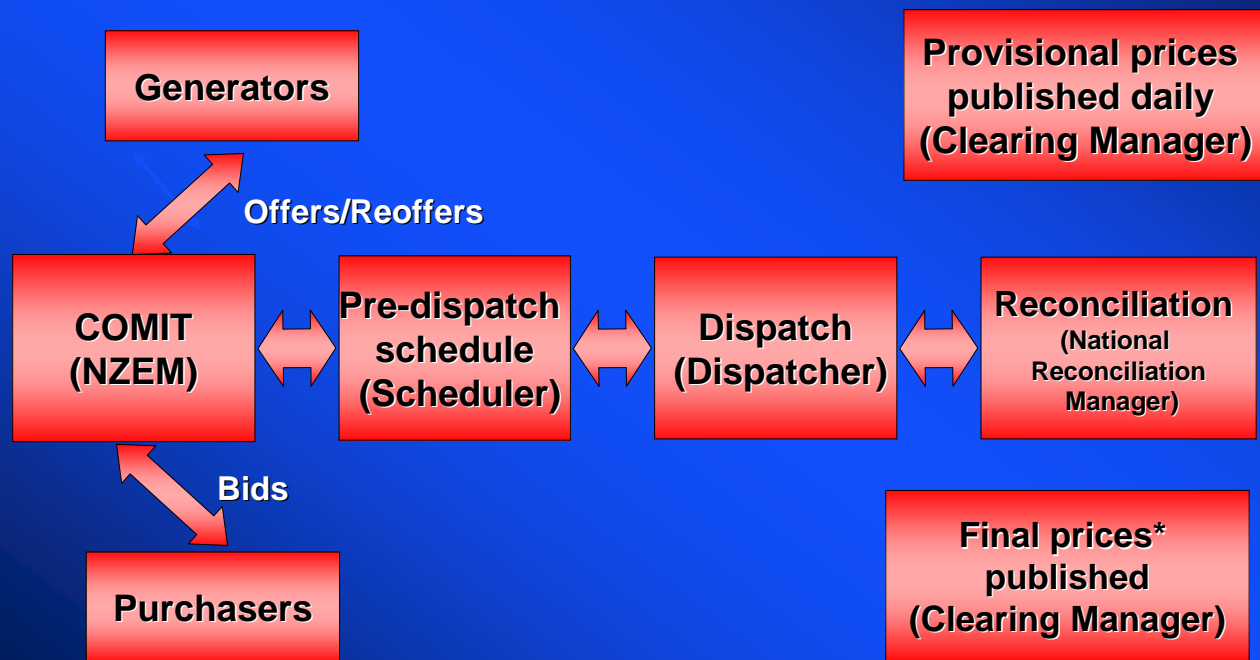
Scheduling Dispatch and Pricing



Interaction of Price Setting and Dispatch



Interaction of Price Setting Dispatch Reconciliation



*In 1999 provisional and final prices merged

Market Services

MCO

PROVIDES:

- Market Administration
- Change Process Management
- Secretariat to MSC
- Information & Trading System
- Clearing & Settlement

Transpower

PROVIDES:

- Grid Ownership
- Grid Operator*
- Scheduler
- Dispatcher
- Reconciliation Manager

* System security responsibility - shifted from Transpower to participants under MACQS

Governance of the Market

NZEM is a voluntary market

- All agree to be governed by NZEM Rules
- Pool by-pass possible under MARIA

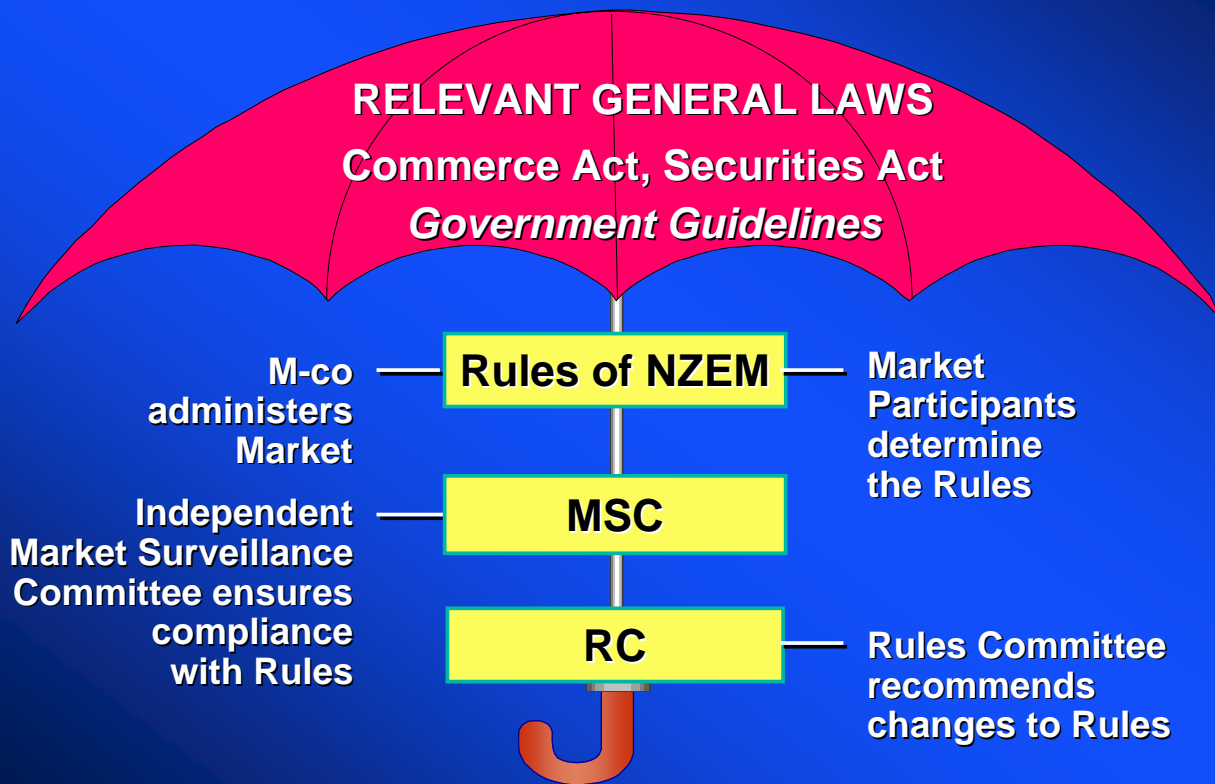
There is no Government regulator

- no specific electricity MARKET law

Flexibility

- light-handed regulatory framework flexible
- Government tells industry the OBJECTIVE allows industry to work out the DETAILS

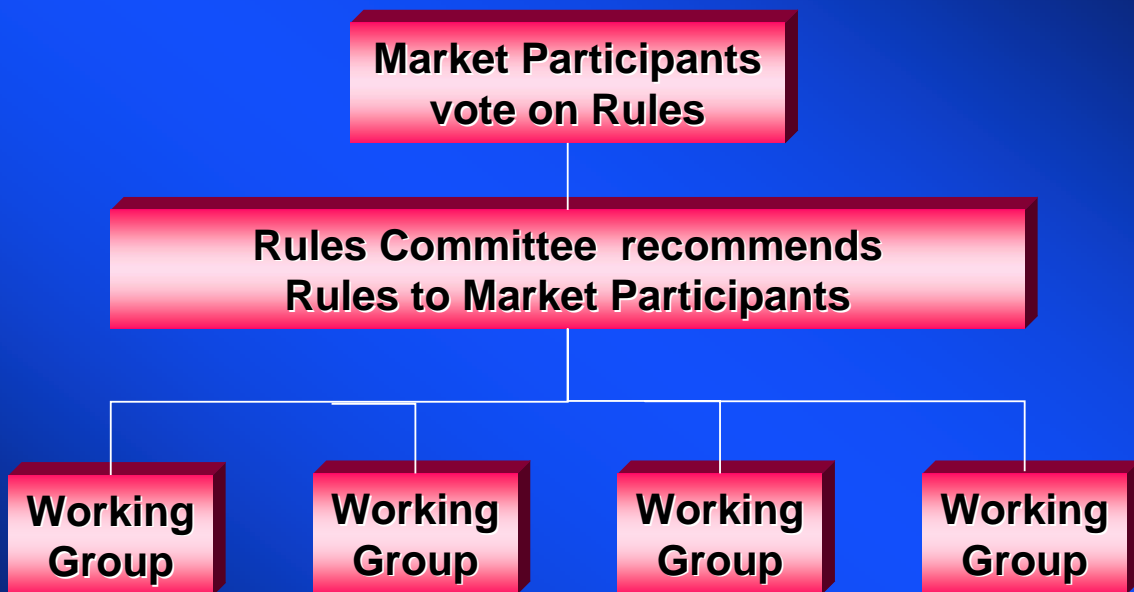
Governance of the Market



Areas covered by the NZEM Rules

- Rules Structure (Governance)
- Information disclosure requirements
- Dispatch rules
- Clearing and Settlement rules
- Fees structure
- Service provider contracts

Rule-making Process



Rule Change Process Strong

- same as rule making process
 - Market Participants have right to take direct action by consensus
- no regulator to go through
- lessons can be learned and actions taken quickly
- “buy-in” by market participants
- anyone who objects can leave

Retail Competition

Government wanted individual customers to be able to transfer from one company to another

- “PROFILING” allows
 - wholesale settlement,
 - customers with similar load characteristics can switch from company to company
 - minimal administration, cost
- “profiling” is now used in at least six countries including NZ, UK, Norway and parts of US

Lines and Energy Split

The Electricity Industry Reform Act 1998

- **further split of ECNZ**
 - three new state owned generation businesses instead of one,
 - total of four, Contact soon sold
- **compulsory split of lines and energy**
 - institutionally separate
 - prohibition on cross ownership
- **controversial: two steps, most problems**

Electricity Market Review

New Government 1999

- problems with 1998 reforms: complaints
- independent government review committee
- lawyer, former Commerce Commission chair, expert from Australia
- consultative process, reported June 2000
- minimal change recommended

Guiding Principles:

The commission recommended

- evolution of self-regulatory arrangements
- aim to ensure electricity: delivered in efficient, fair, reliable and environmentally sustainable manner to all classes of consumer
- satisfaction of consumers' needs in a fashion that is least-cost to the economy and consistent with sustainable development

Measures

- Governance Board: amalgamation of MARIA, NZEM and MACQS contracts
- revised rules consistent with guiding principles (i.e. not much change)
- Commerce Commission oversight of transmission pricing methodology
- contestable service provision (e.g. M-Co)
- alternative market arrangements allowed
- new consumer complaints system
- additional reporting requirements

Results of Reforms

- prices
 - wholesale prices fallen for 12 years
 - tax and dividends paid to the government
 - huge saving in investment
- generation
 - shifting close to market - lower costs
 - bought retail businesses, privatisation
- transmission
 - regional network operators,
 - competition from distributed generation
- retail
 - consumer choice
 - vigorous competition

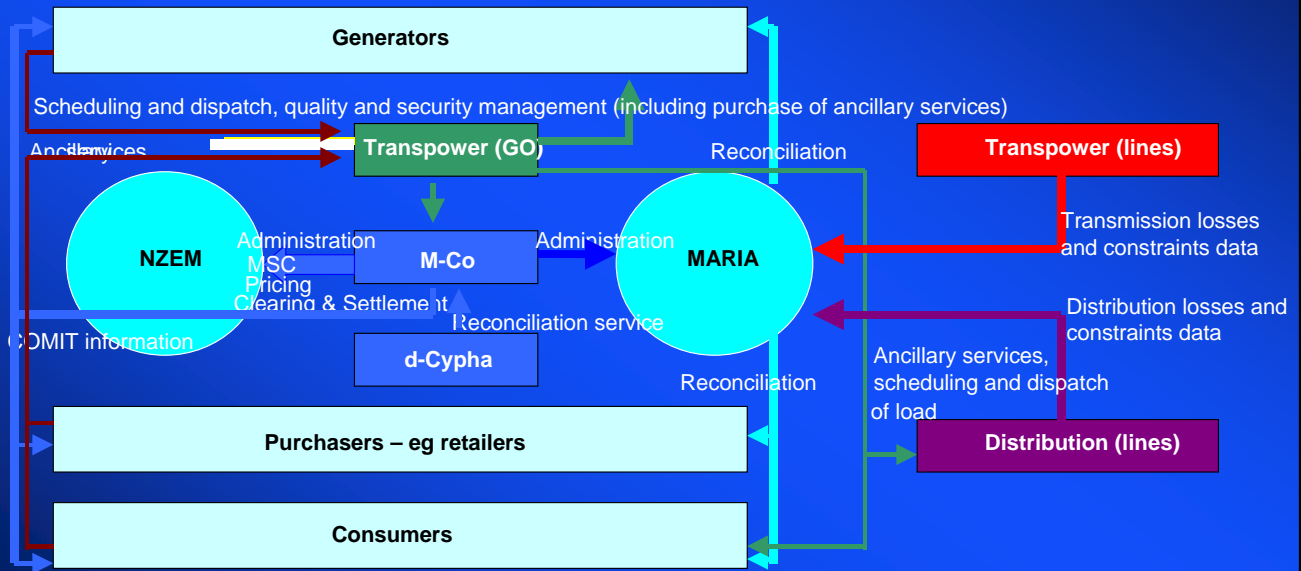
Future: Competition from Distributed Generation

Economies of Scale Reducing

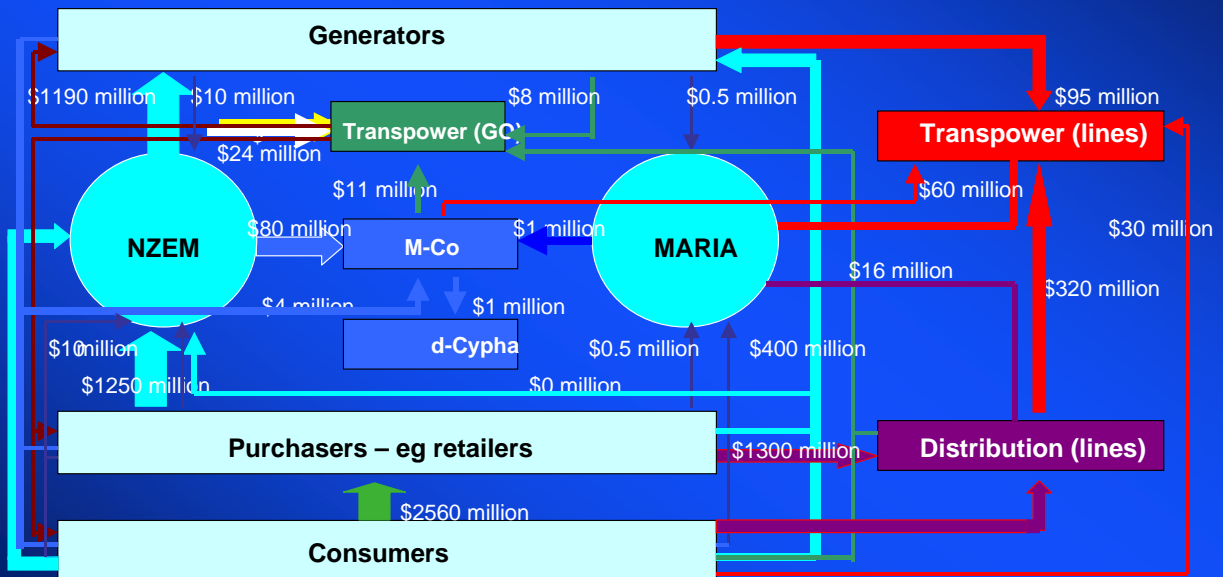
Alternative Energies are becoming competitive

- between 1980 and 1990 the marginal cost of alternative energies almost halved
- in the ensuing 15 years they are anticipated to halve again
- e.g. gasification of municipal rubbish (clean, cheap, no emissions) could provide 30% of municipal power
- will reduce the value of large scale generation and transmission lines
- Trading of carbon rights can keep coal in business

Wholesale Market Services in the New Zealand Electricity Market 1999



Cash Flows in the New Zealand Electricity Market 1999



Splits of NZEM and MARIA fees between injection and offtake parties approximately equal (based on energy volumes traded or reconciled)

Conclusions

- market is working well; evolution continues:
 - split of ECNZ reduced the value of the generation, potentially monopoly rents go to consumer
 - Valuation of lines businesses caused problems, led to demands for regulation of line charges
 - Review was a response to the demands but little change was recommended
 - Recently a drop in transmission charges as a result of new methodology
 - vigorous retail competition for customers
- government exposure to industry reduced

A D Jenkins Ltd

David Butcher & Associates

Material Supplied by:

M-Co

Transpower

NZ Minister of Energy