

# **Managing Within The New Zealand Energy Market**

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**East Harbour**

# Energy Observations

Major transition period:

- **Era of cheap energy has now gone**
  - especially with depletion of Maui gas field; very large, plentiful, and cheap
  - number of energy intensive industries were set up to take advantage of cheap energy
- **New and replacement energy is much more expensive**
  - new gas, coal, geothermal, wind and hydro
  - more constraints on new projects than in the past
  - but we have many generation options in the longer term
- **Energy market players on a step learning curve**
  - new forms of contract
  - structural rigidities
  - customers incentivised to manage energy costs
  - opportunities for new players / activities



# The Energy Market

- Disjointed and fragmented (generation & distribution)
- Supply driven ( generators with a retail hedge)
- Lack of liquidity in electricity contracts
- Lack of availability of firm price contracts
- Many contracts have a % based on spot price
- Minimal retail competition
- Generators focused only on covering own contracted position
- Customers learning how to manage energy contracts
- Customers becoming cost conscious



# Electricity Price Drivers

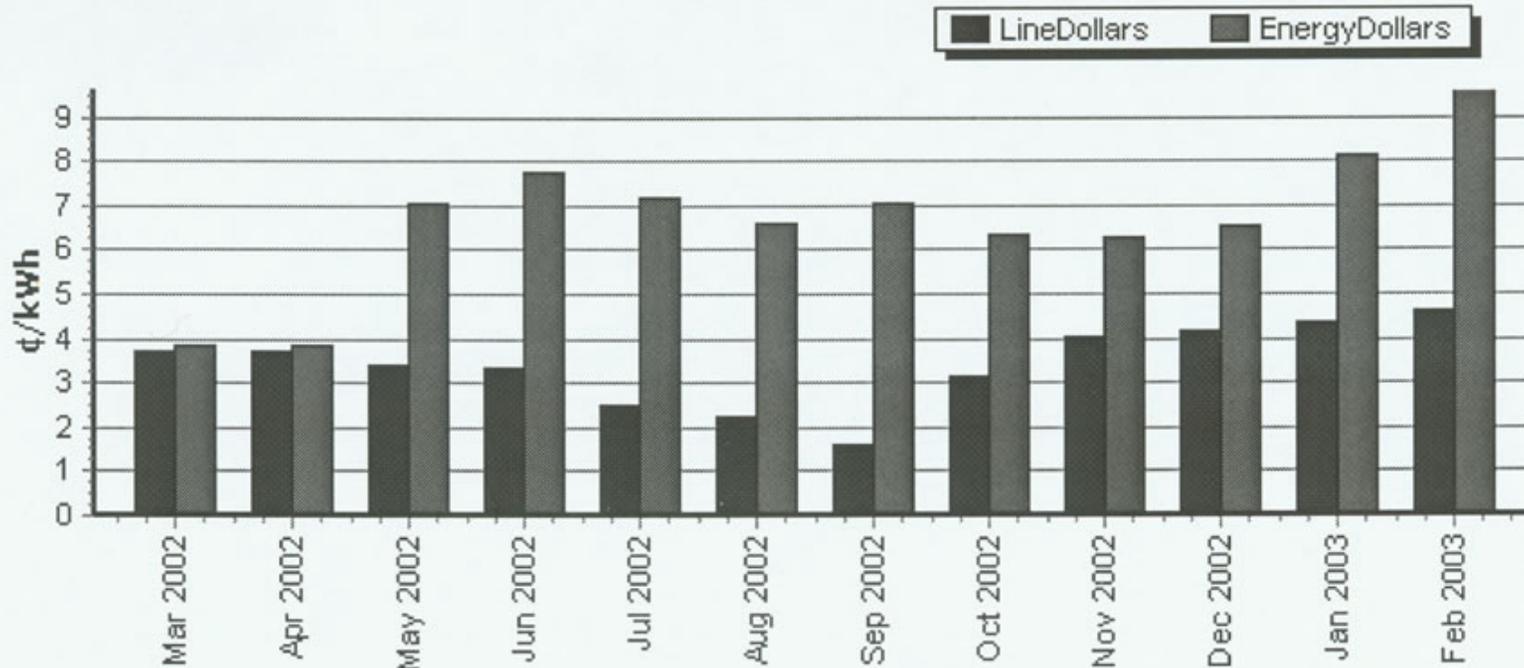
- Depletion of Maui gas field
- Generators covering only own contracted position
- Lack of balanced (fuel) portfolios of new generation
- No generation cap
- Large number of customers on spot price
- Inelastic market response to high prices
- Lack of depth in the electricity market
  - few players
  - lack of competition
  - highly contracted positions



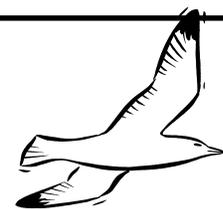
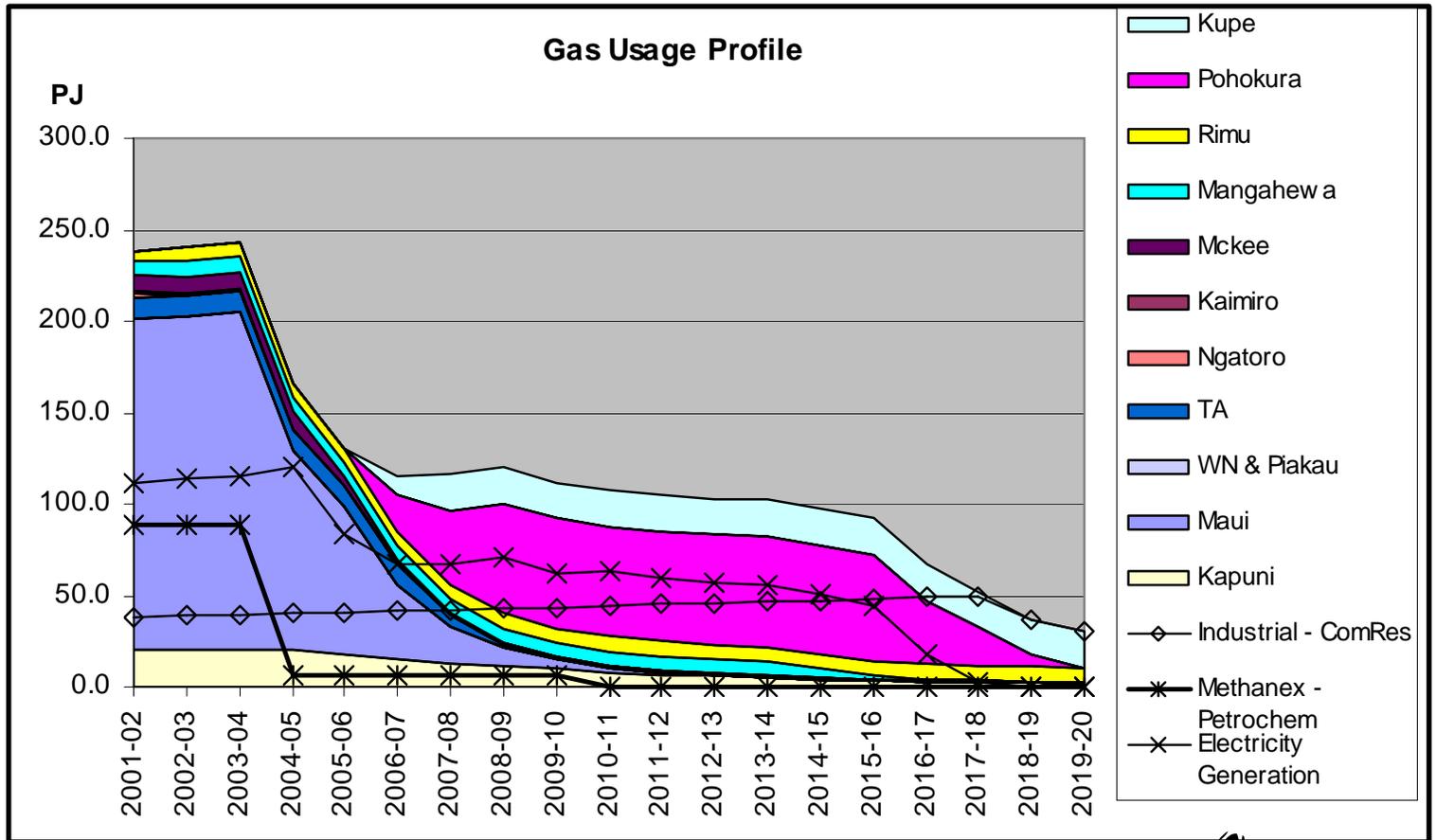
# Network and Energy Costs

Period: From Mar 2002 To Feb 2003

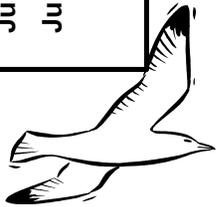
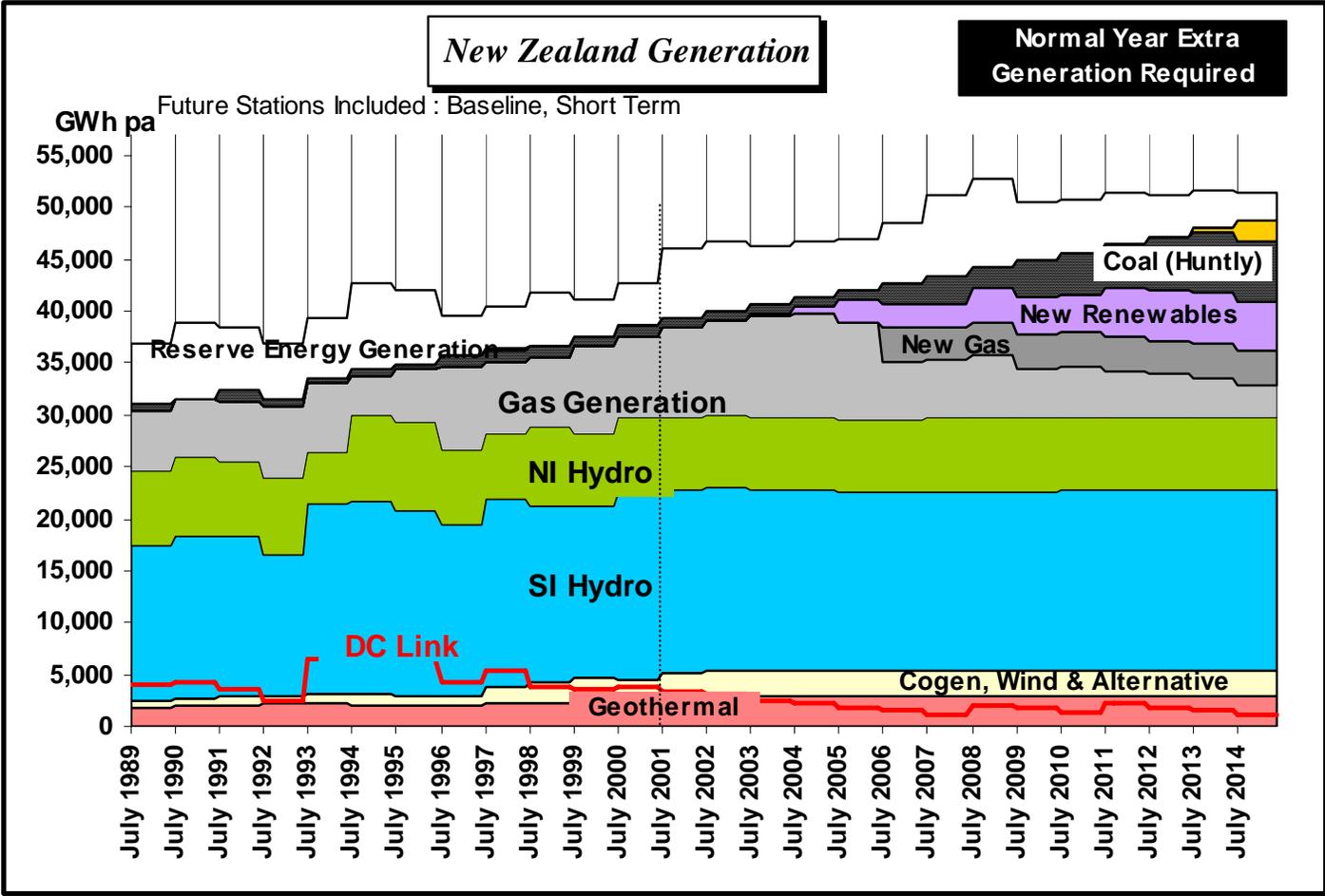
Historical unit prices in ¢ per kWh (line and energy)



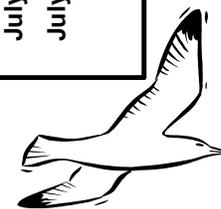
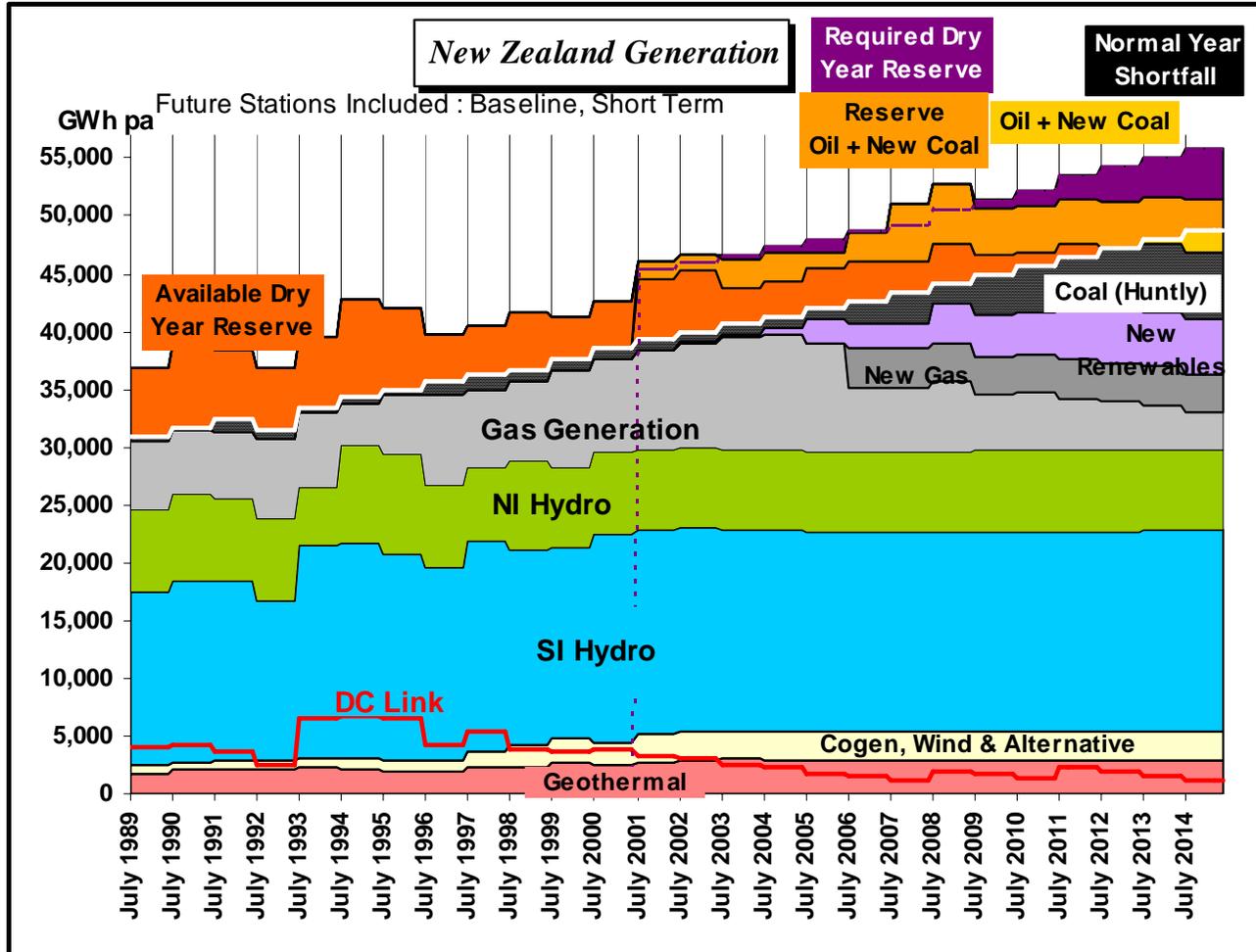
# Gas Sources



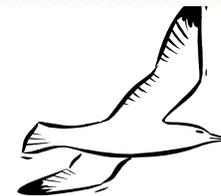
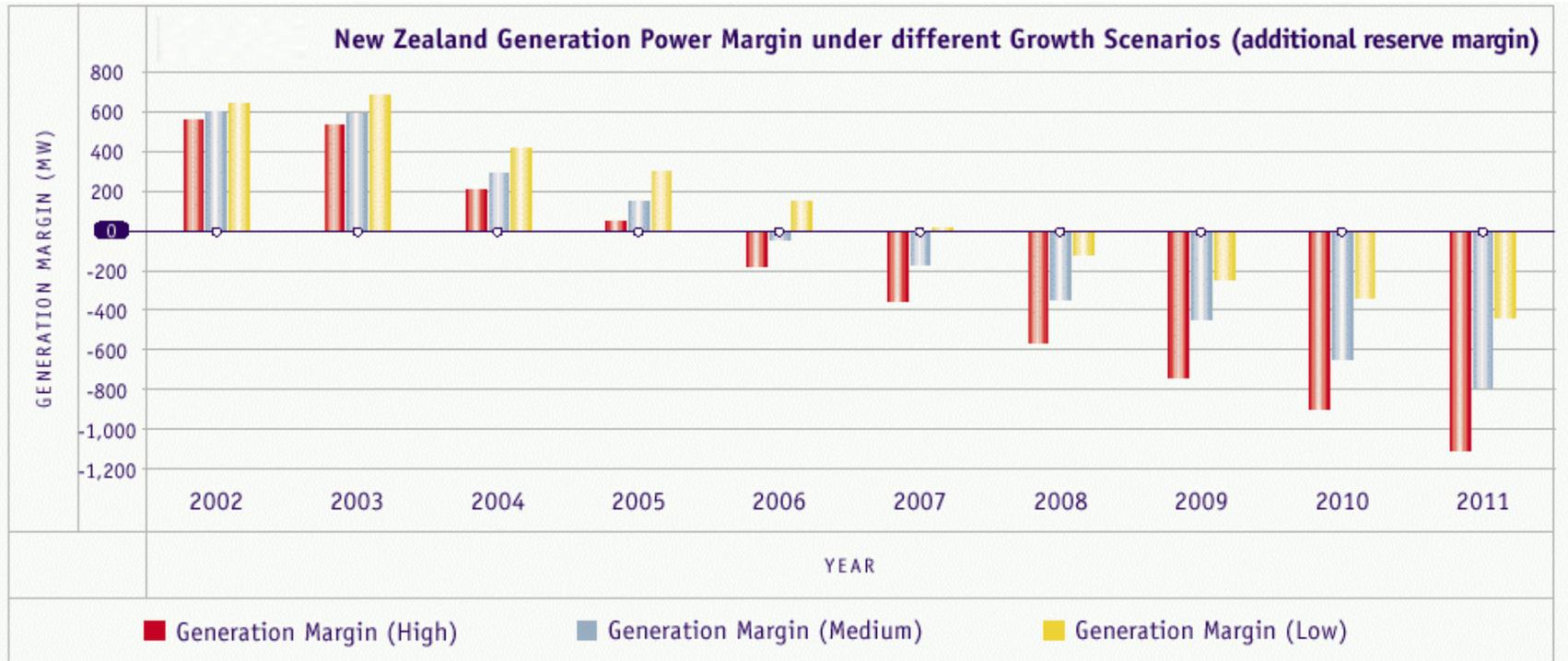
# Average Year Electricity Generation



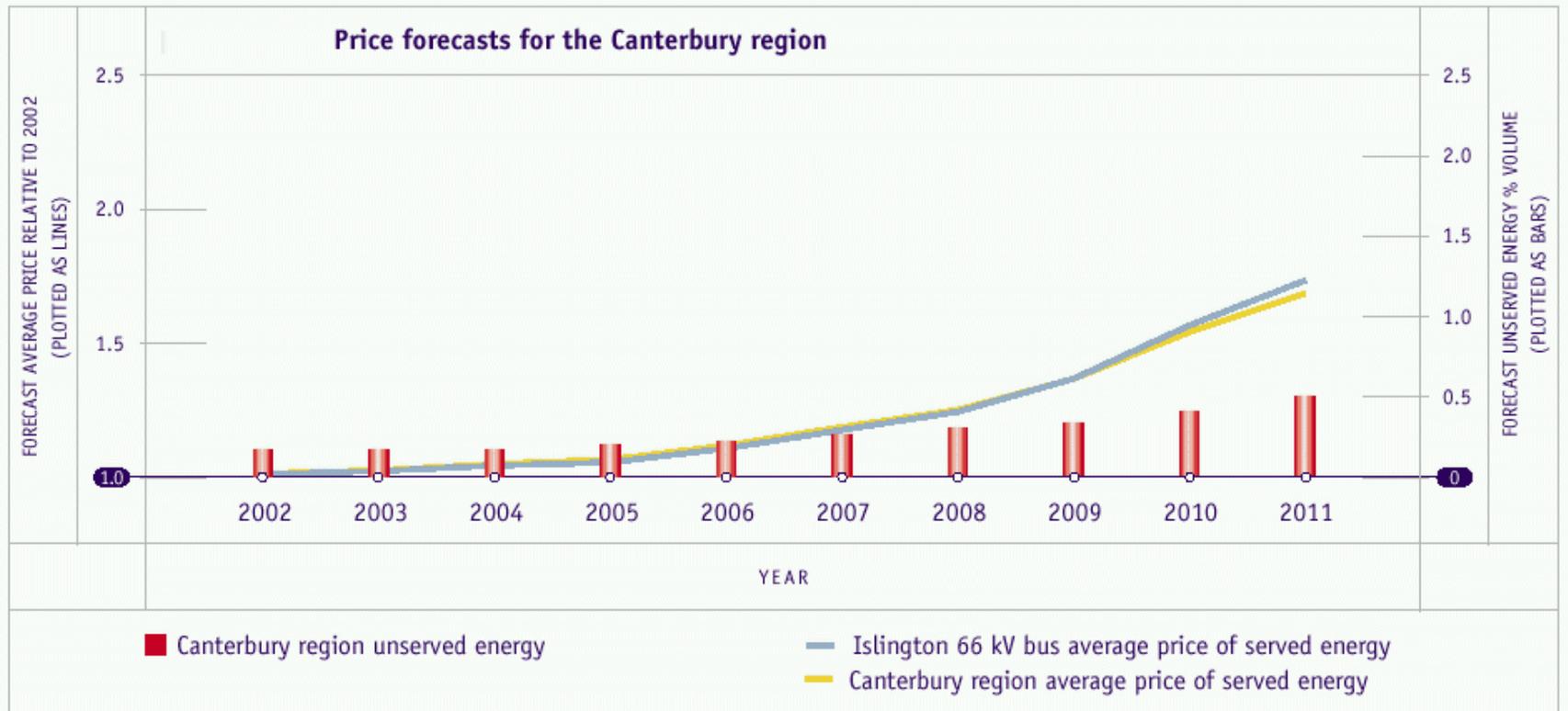
# Dry Year Electricity Generation



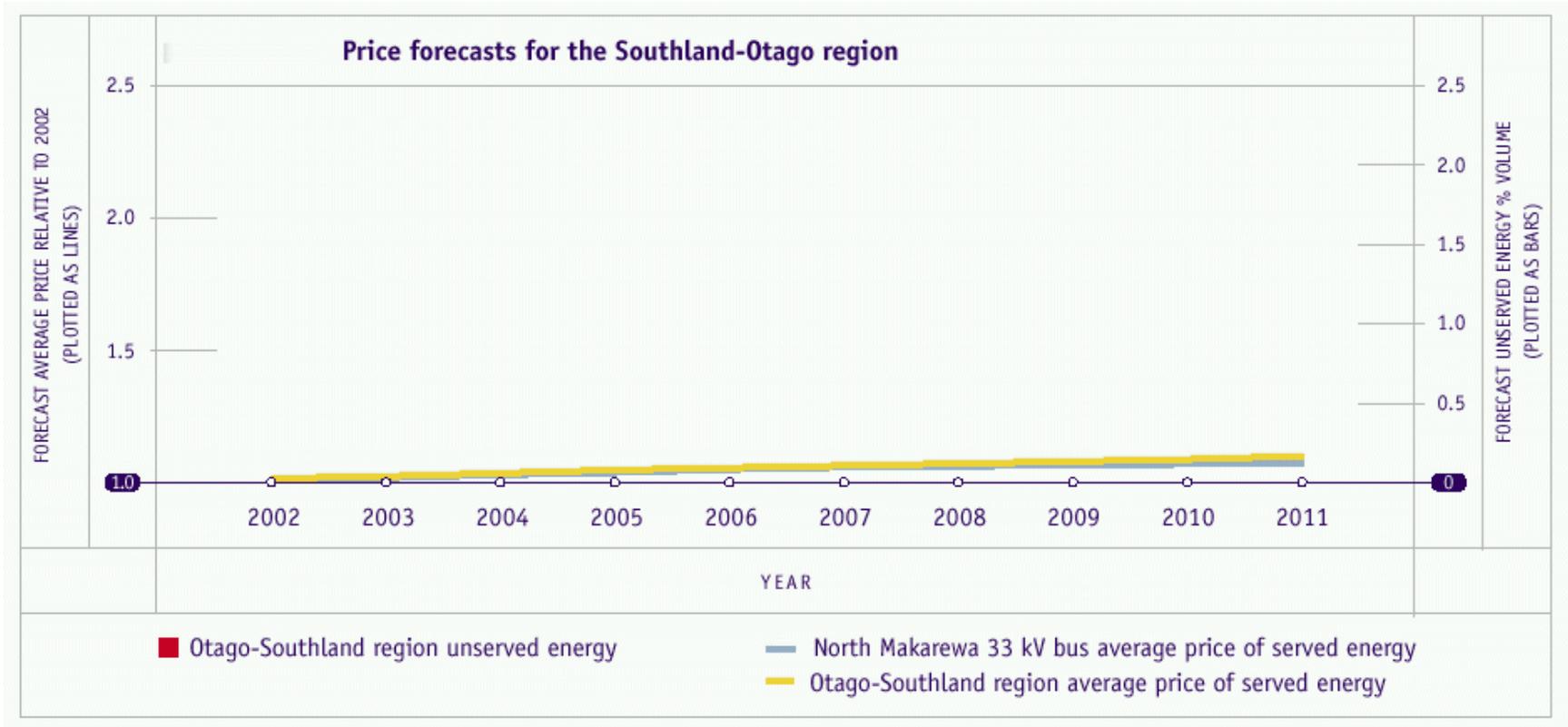
# Electricity Generation Margin



# Price Forecast Canterbury



# Price Forecast Southland-Otago



# Distributed Generation

- Distributed generation is local generation to meet capacity, reliability, and security requirements
- DG has national and local benefits but driven by local needs
  - Embedded has less complexity
  - Difficulty of finding a purchaser for energy
- Distributed generation allows paradigm shifts in thinking about solutions for meeting consumer energy capacity and reliability requirements



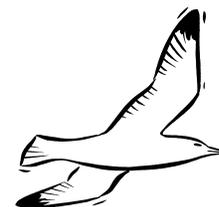
# Demand Management Options

- Education on energy contracts
- Education on energy management
- Energy audits
- Peak lopping
- Energy management programmes
  - Peak reduction
  - Energy demand reduction
- Solar water heating programme



# Generation Technology Options

- Bioenergy
  - Process residues
  - Forest residues
- Anaerobic digestion
- Wind
- Diesel standby
- Hydro
  - Energy
  - Peaking
  - Wind firming
- Coal /lignite
  - Steam turbine



# Electricity generation options

|   |              | <i>C/kWh</i> | <i>MW</i>  | <i>GWh/yr</i> |
|---|--------------|--------------|------------|---------------|
| <b>Gas</b> ( <i>C charge</i> )                    | 2005 - 25    | 6.5 - 8.5    | 900        | 7,500         |
| <b>Wind</b>                                       | 2005-25      | 6.2 - 6.5    | 650        | 2,150         |
|   |              | 8.5          | 600        | 1,800         |
| <b>Geothermal</b>                                 | 2005-25      | 6.2          | 600        | 5,100         |
| <b>Project Aqua</b><br>( <i>ex transmission</i> ) | 2008-12      | 4.5          | 570        | 3,200         |
| <b>Other hydro</b>                                | 2005-25      | 8.5          | 280        | 1,350         |
| <b>Cogeneration</b>                               |              | 5.0 - 8.5    | 350        | 1,700         |
| <b>LNG</b> ( <i>C charge</i> )                    |              | 9.0-9.8      | no limit   | no limit      |
| <b>Coal</b> ( <i>C charge</i> )                   | South Island | 7.5-8.6      | very large | very large    |
|   | North Island | 9.4-10.9     | very large | very large    |

Source: Ministry of Economic Development



# Market Changes

- Government appointed Electricity Commission
- Network companies under price control
- Network companies can invest in more generation
- Electricity Commission contracting for reserve generation
  - Likely to:
    - cap prices at  $< 15-20$  c/kWh
    - limit demand response
    - constrain innovation
- Renewed interest in distributed generation
- Strong Govt support for renewable energy and demand management



# Portfolio of Investment Responses

- **Energy management**
  - Appropriate energy contracts
  - Energy audits
  - Integrated energy solutions
- **Manage the peaks**
  - Network connection costs
- **Reduce energy demand**
  - Energy use improvements
  - Install solar water heating
  - Staff training
- **On-site generation**
  - Distributed generation
  - Bioenergy based on process wood waste
- **Prepare for the future**
  - Monitor wind
  - Evaluate forest residue

