

The Place for Bioenergy in the NZ Energy Market

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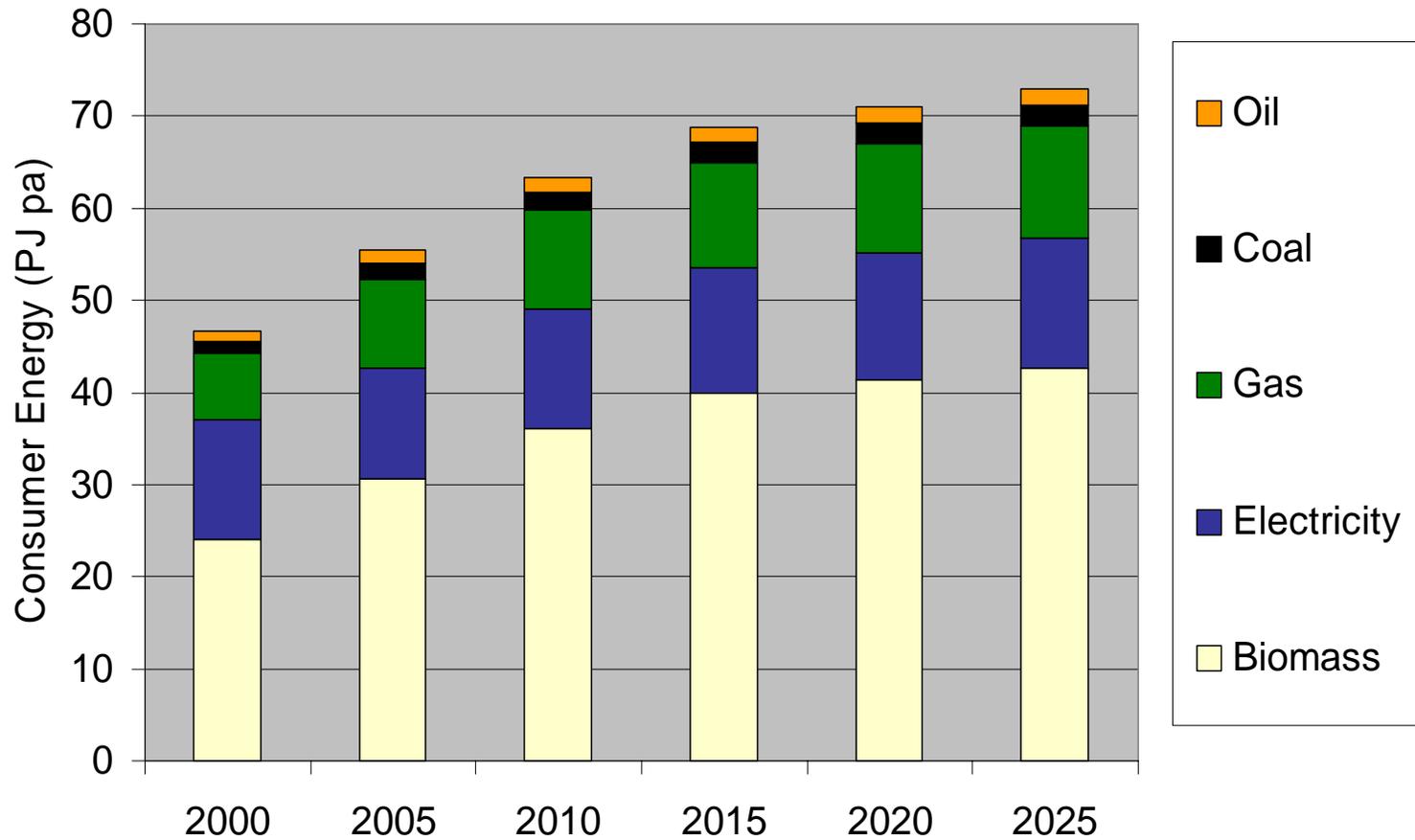
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Major Transition Period

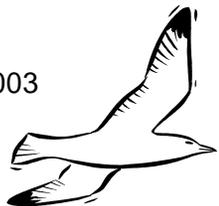
- **Era of cheap Maui energy has ended**
 - Maui was a large, plentiful and cheap gas field
 - Energy intensive industries were driven by Maui
- **New and replacement energy at a premium**
 - new gas, coal, geothermal, wind and hydro
 - new projects are more tightly constrained
 - many generation options in the longer term
- **Steep learning curve for energy market players**
 - new forms of contract
 - structural rigidities
 - customers incentivised to manage energy costs
 - opportunities for new players / activities



Wood Processing Consumer Energy



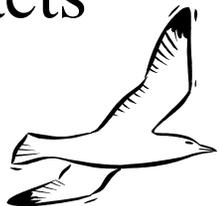
Data source: Ministry of Economic Development, 2003



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The Electricity Market

- Disjointed & fragmented (generation & distribution)
- Supply driven (generators with 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 on covering own contracted position
- Customers learning how to manage energy contracts
- Customers becoming cost conscious



Electricity Price Drivers

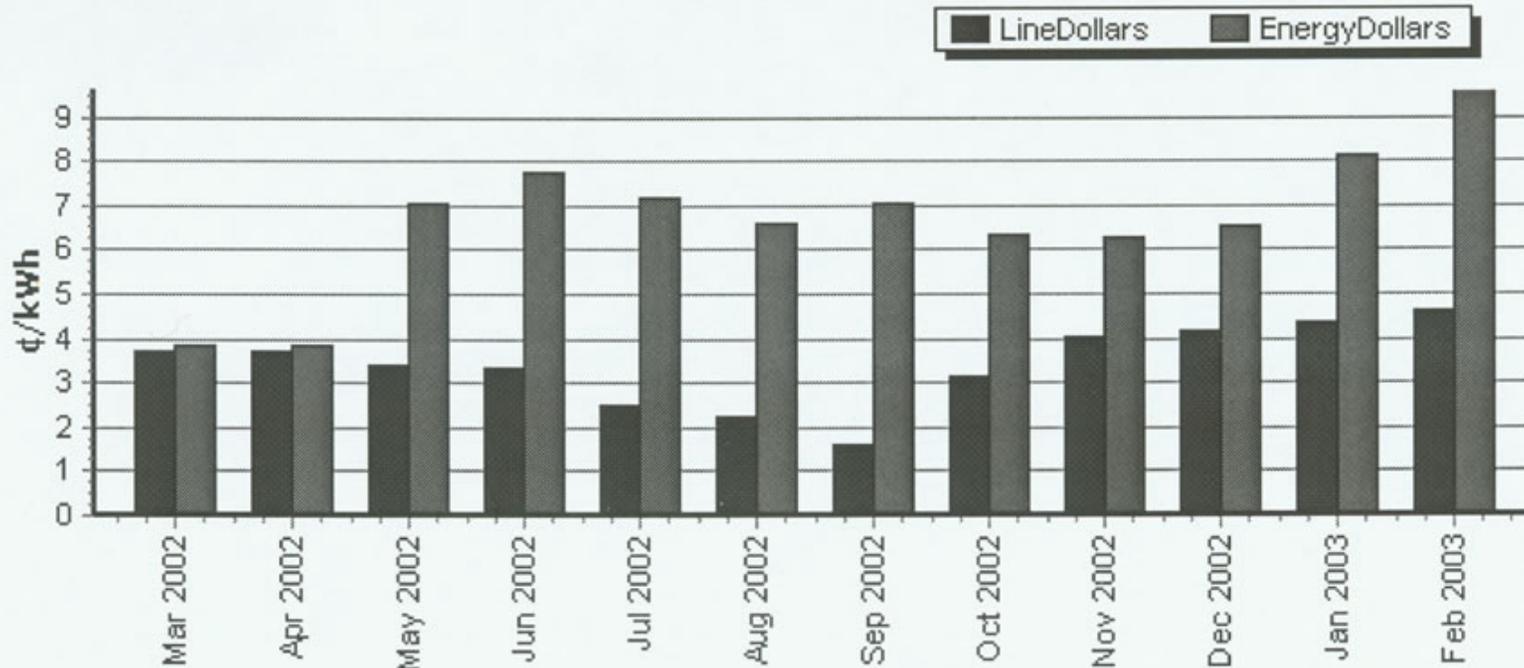
- Depletion of Maui gas field
- Generators covering only own contracted position
- Lack of balanced (fuel) portfolios of new generation
- No generation cap
- Large number of customers on spot price
- Inelastic market response to high prices
- Lack of depth in the energy market
 - few players
 - lack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



Network and Energy Costs

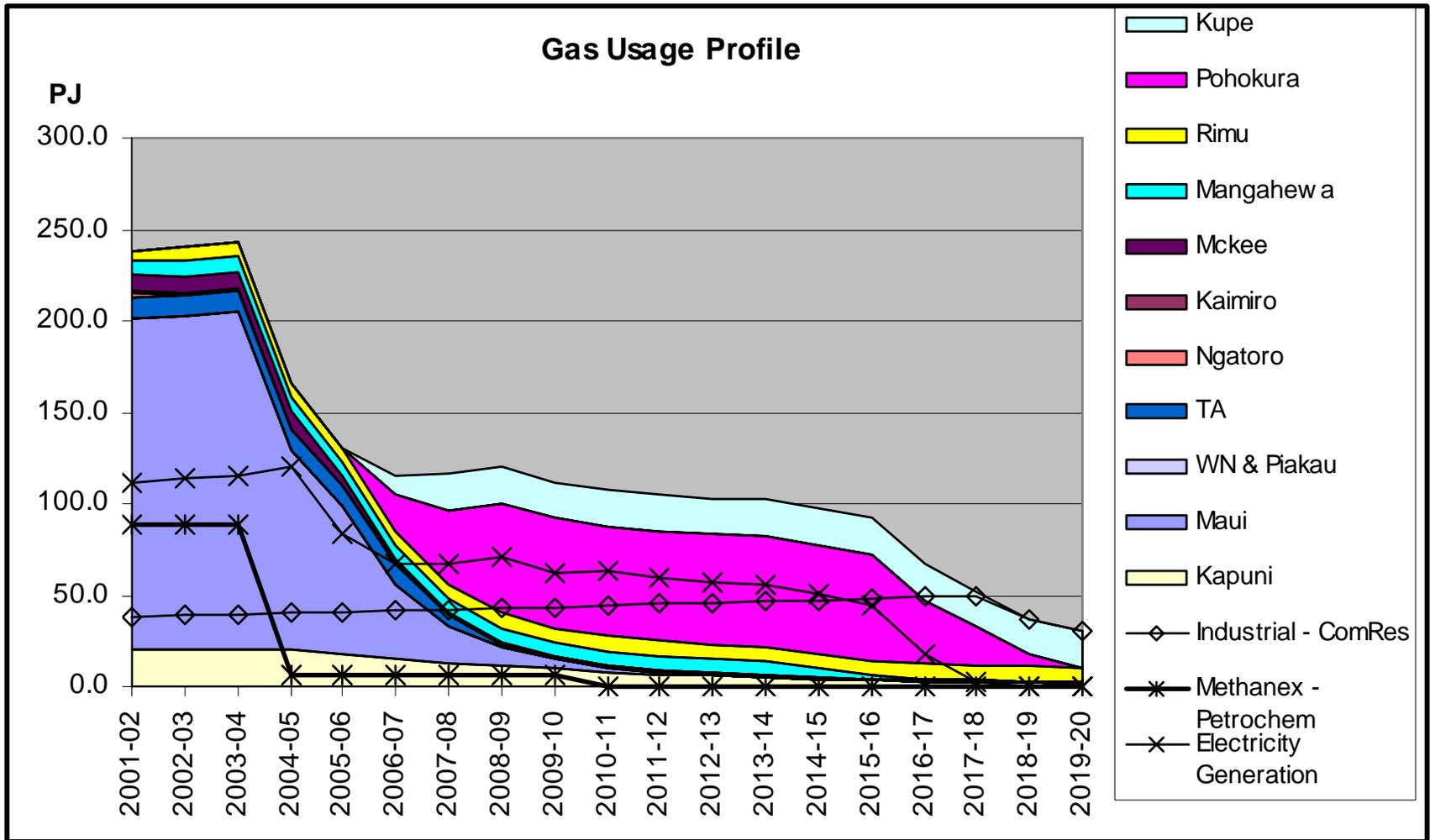
Period: From Mar 2002 To Feb 2003

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



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Gas Sources

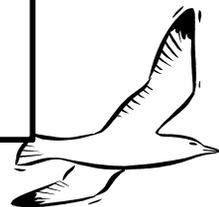
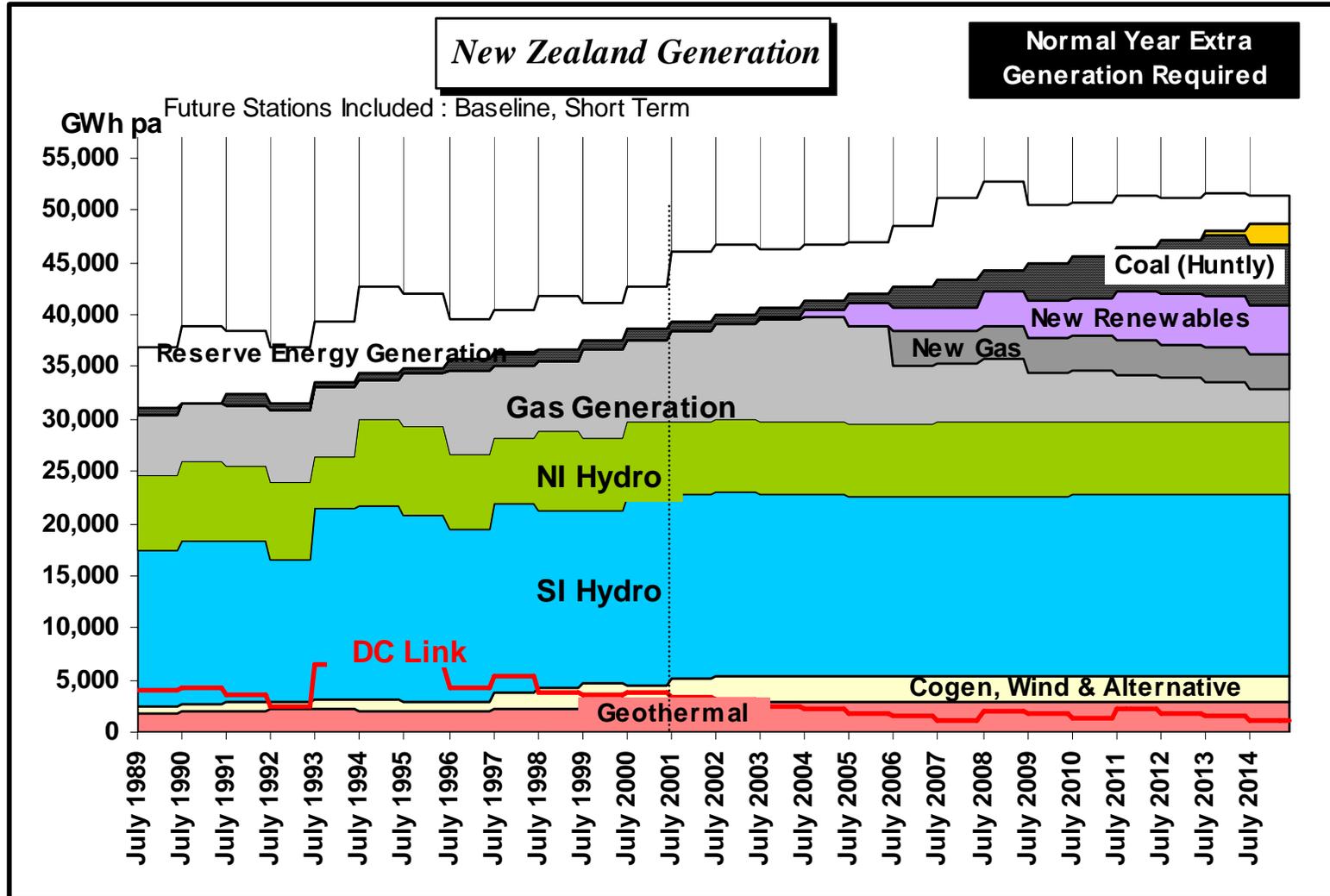


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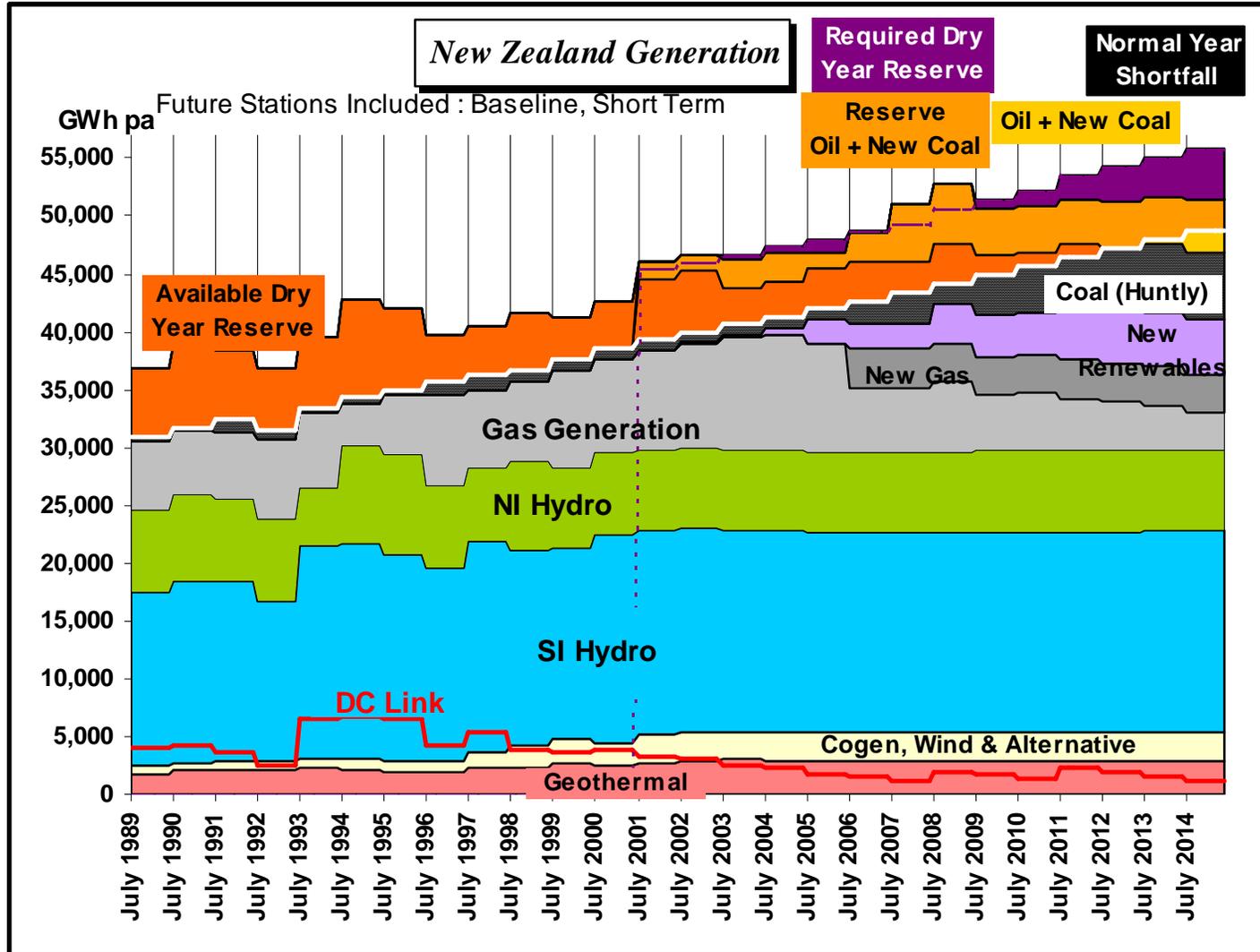


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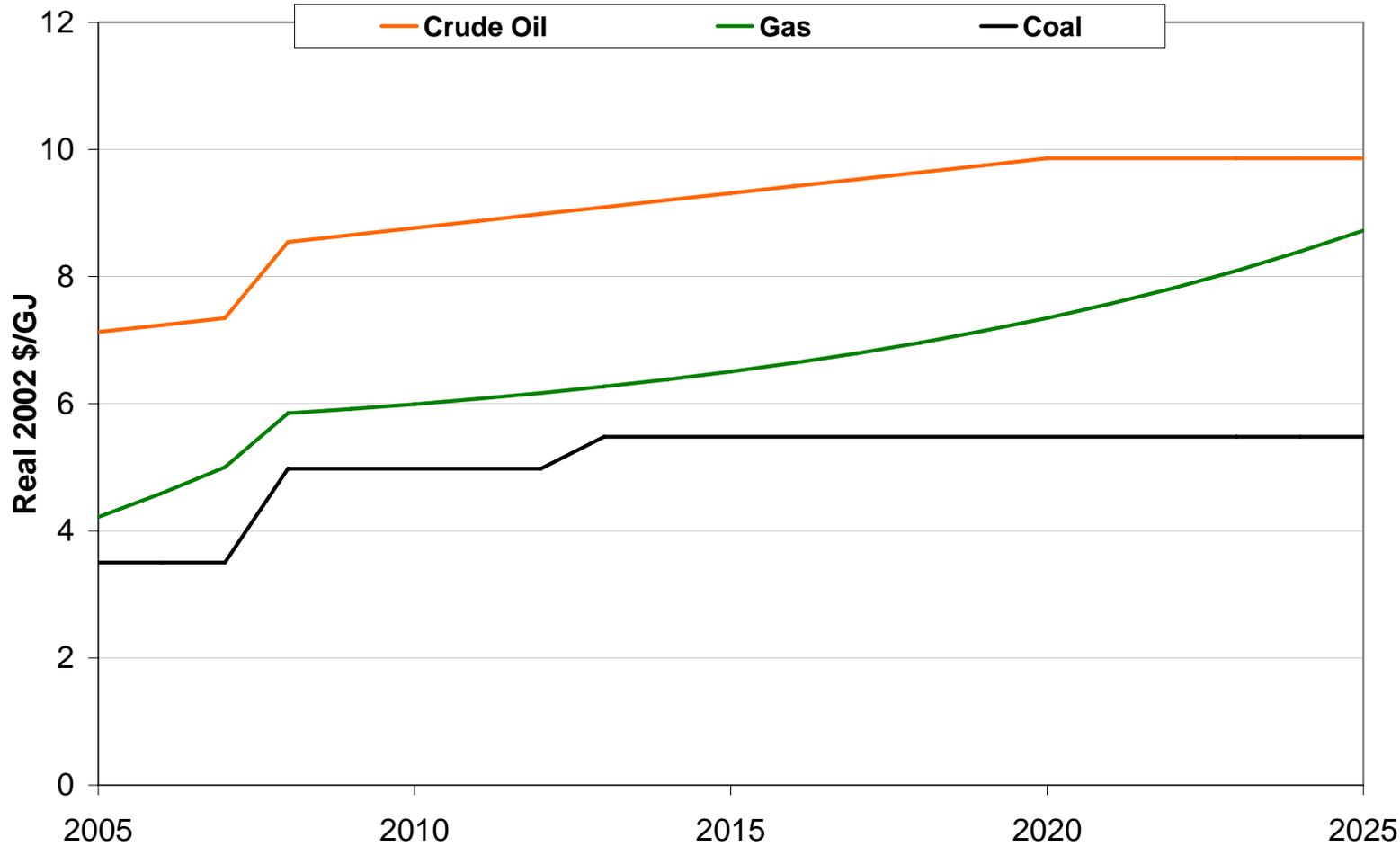
Average Year Electricity Generation



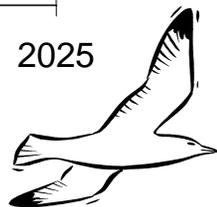
Dry Year Electricity Generation



Gas/Coal Prices

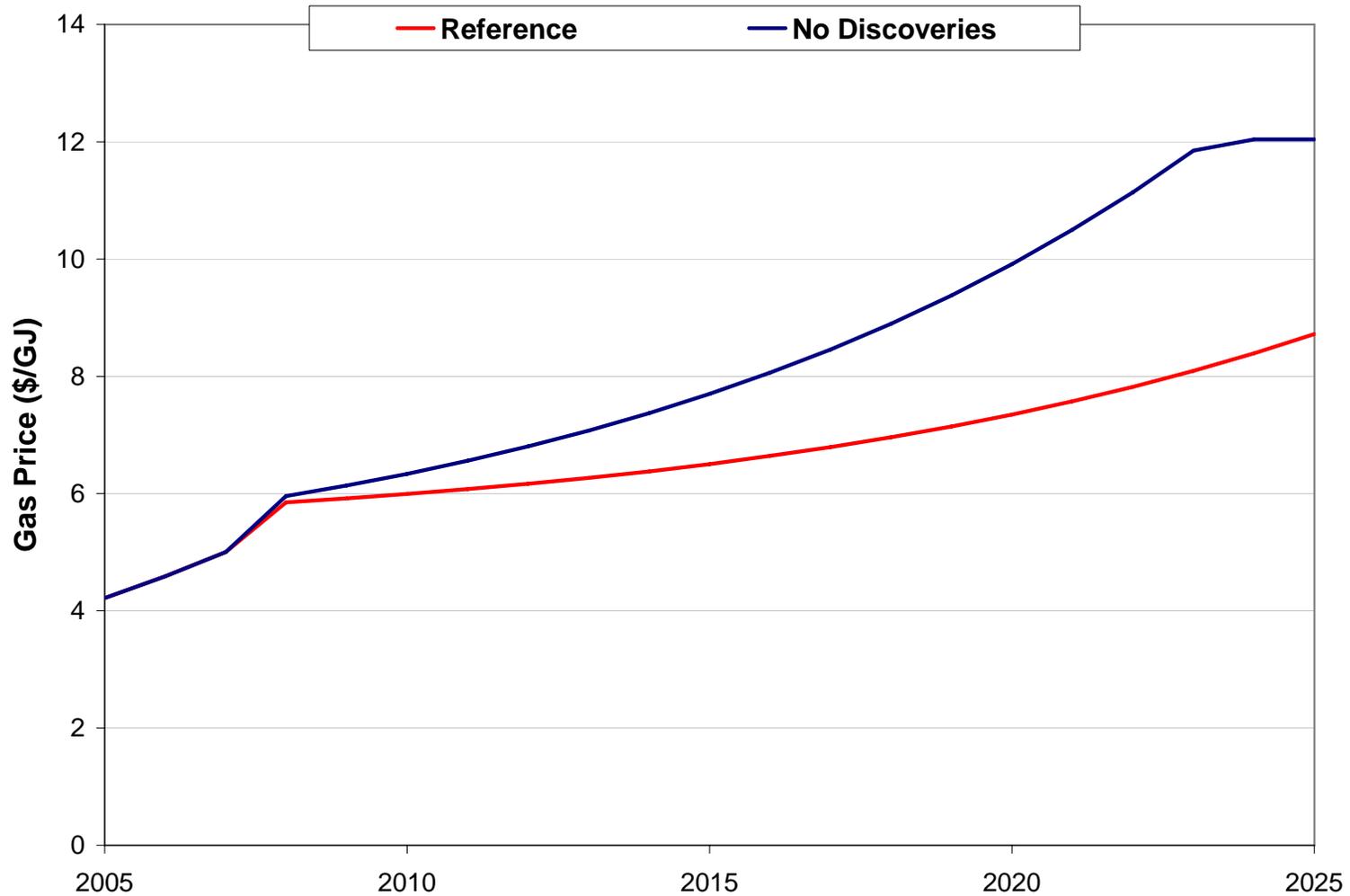


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Gas Price If No New Discoveries

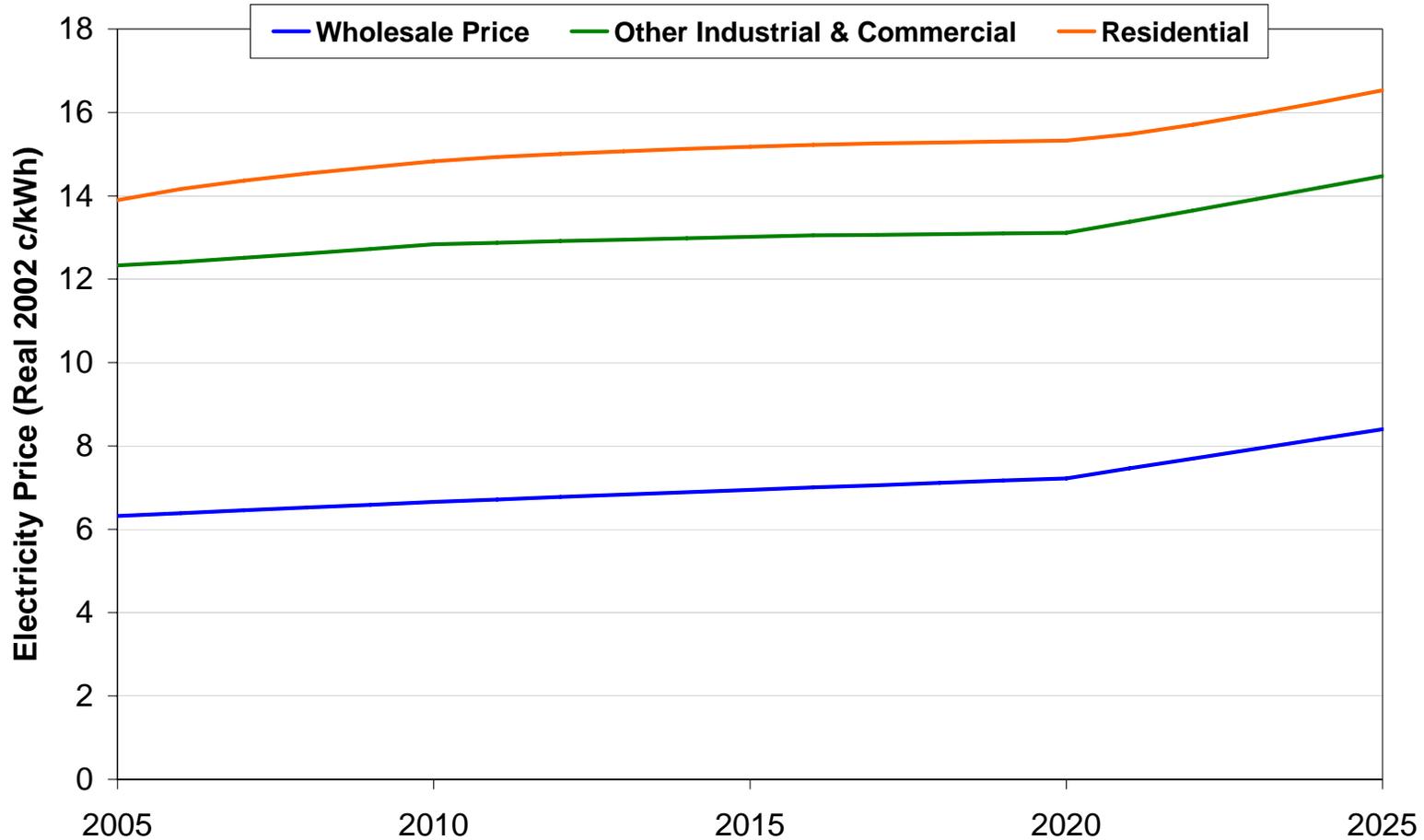


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Delivered Electricity Prices

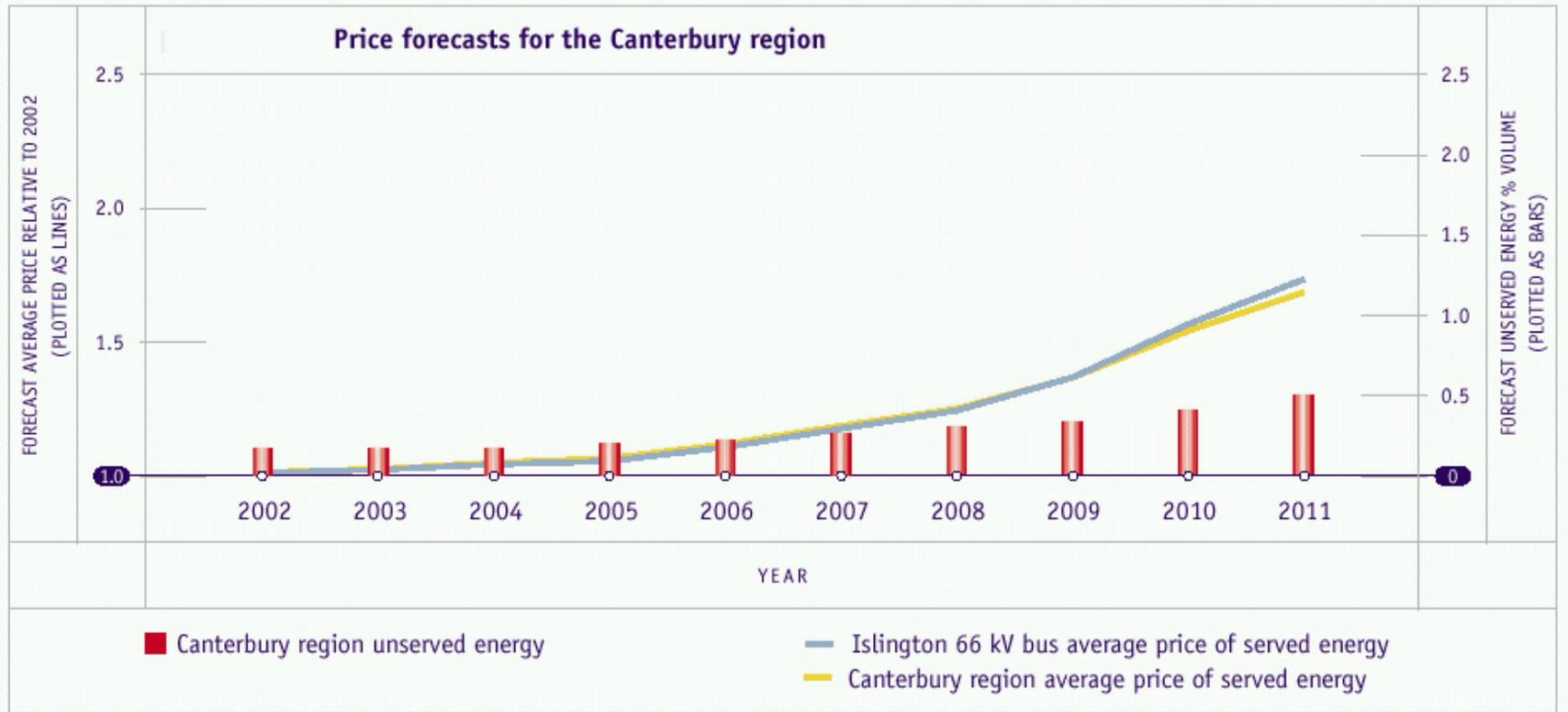


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Price Forecast Canterbury



Transpower



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Electricity Generation Options

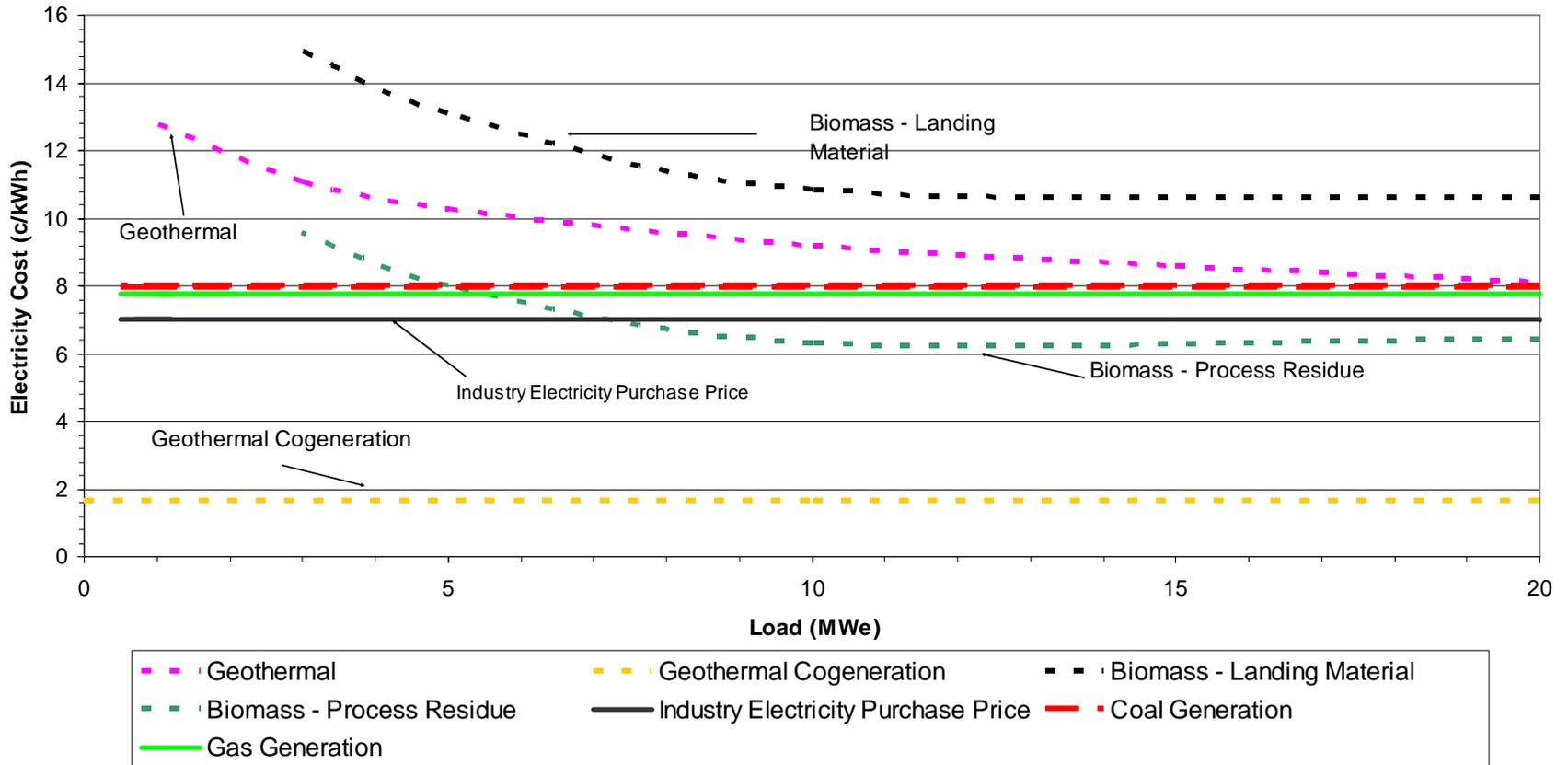
		<i>C/kWh</i>	<i>MW</i>	<i>GWh/yr</i>
Gas (<i>C charge</i>)	2005 - 25	6.5 - 8.5	800	5,000
Wind	2005-25	6.2 - 6.5	680	2,340
		8.5	600	1,800
Geothermal	2005-25	4.0 - 6.2	630	5,000
Project Aqua (<i>ex transmission</i>)	2008-12	4.5	570	3,200
Other hydro	2005-25	4.5 - 8.5	500	2,350
Cogeneration		4.6	350	1,700
LNG (<i>C charge</i>)		9.3-11.6	no limit	no limit
Coal (<i>C charge</i>)	South Island	7.6-8.6	very large	very large
	North Island	9.8-10.9	very large	very large

Source: Ministry of Economic Development



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Cost of Electricity From Biomass



Energy Efficiency Options

- Making better use of existing energy
- Efficiency may reduce cost of energy and increase demand
- Cost effective when installing new plant or replacing plant
- May also involve changing work practices
- May also produce improved product quality
- Capital expenditure can be a barrier → operating cost
- Demand management



The Heat Market

Constrained by industry's continual focus on electricity



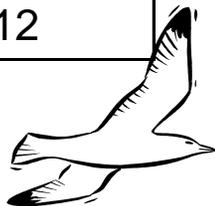
Bioenergy

- Fuel most within control of wood processors
- Uses waste materials
 - Forest residue
 - Process waste
- May require backup from coal, gas, forest residue or imported fuel
- Need to focus on fuel handling and processing
- Economics improved when biomass processed to be homogenous fuel

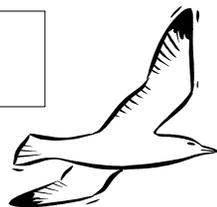
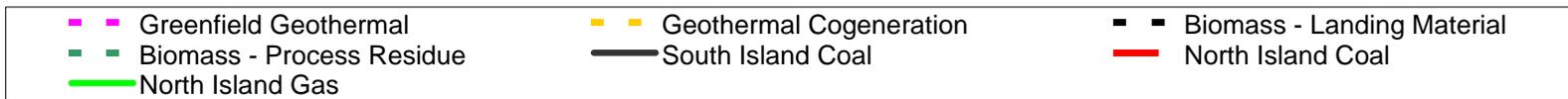
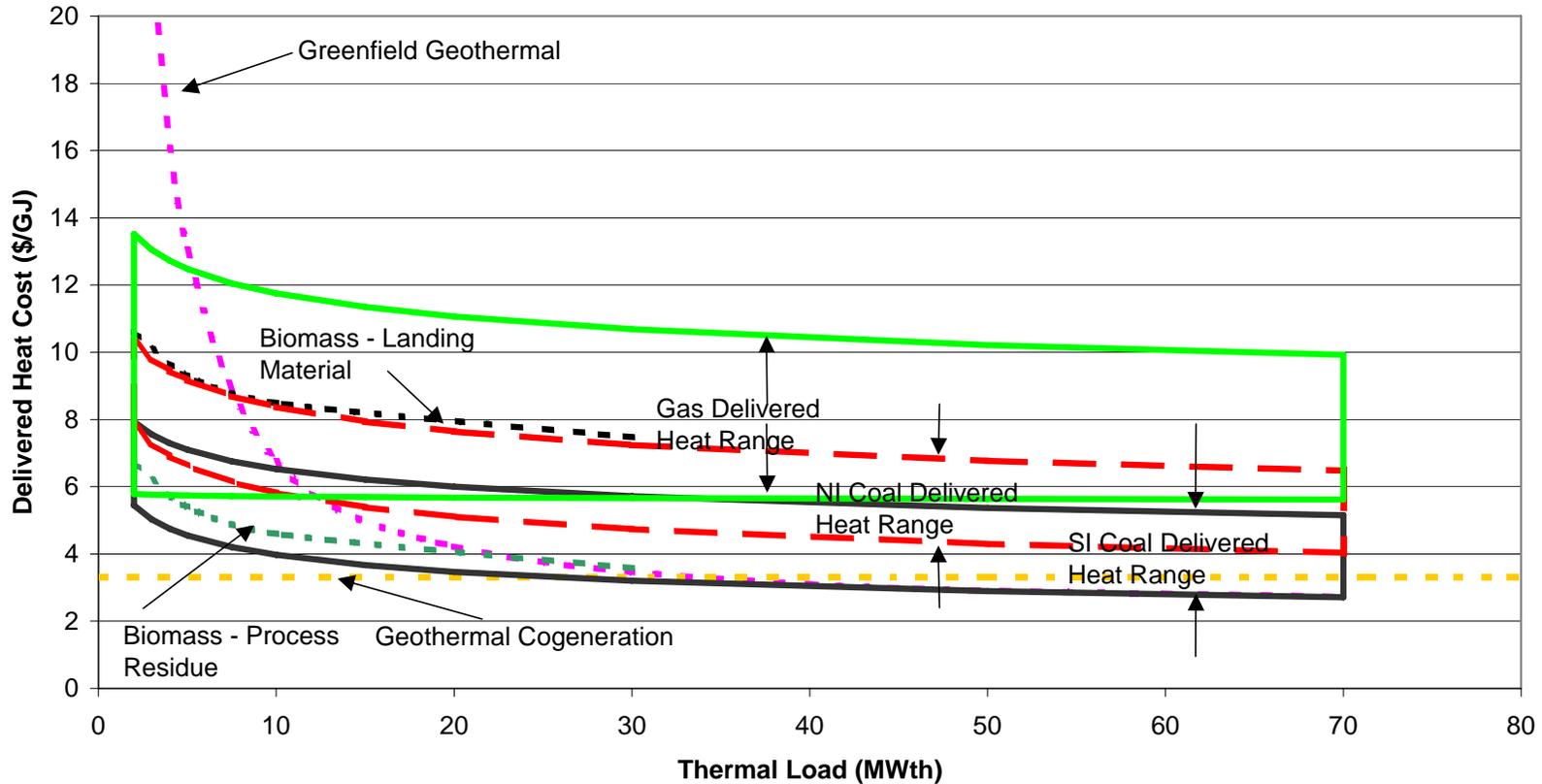


Renewable Technologies

Resource	Electricity	Heat	Uses	Electricity c/kWh
Biomass (Process Waste)	Yes	Yes	Combined heat and electricity	9 - 11
Biomass (Forest Residue)	Yes	Yes		16 - 25
Biomass (Liquid Waste)	Yes	Yes		7-17
Wind	Yes	No	Water pumping	7 - 22
Solar Thermal	Yes	Yes	Hot water, kiln drying	7 - 10
Solar Photovoltaic (PV)	Yes	No	Niche off-grid electricity	> 31
Hydro	Yes	No	Irrigation	8 - 15
Geothermal	Yes	Yes	Minerals	7-12



Cost of Biomass Heat



Bioenergy Trends

- 6% (30 PJ) of total consumer energy (546 PJ) is provided by bioenergy (2003)
- Process heat = 34% of NZ energy demand (Excl. Comalco)
- Bioenergy growth projected at 1.9% p.a. over next 20 years (= 1 * 15 MWth boiler p.a.)
- Consumer energy expected from bioenergy;
 - 36PJ by 2012,
 - 41PJ by 2020
- Forest residue as fuel currently adds 5c/kWh to cost of electricity generation
- Use of biomass waste for energy is;
 - economic today for heat
 - close to economic for electricity generation



The Position of SRC

- Perceived as being uneconomic
- No up-to-date cost data
- No effective advocacy
- Not even on the radar screen of expensive photovoltaics
- Uptake will follow uptake of vast quantities of forest residue
- Little knowledge on forest residue – even less on SRC



Distributed Generation (DG)

- 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



Market Changes

- Government appointed Electricity Commission
 - Central coordination
 - Limited to electricity
 - Reserve generation to cap prices at 20 c/kWh
- Network companies
 - under price control
 - can invest in generation
- Renewed interest in distributed generation
- Strong Govt support for renewable energy
 - Additional funding and EECA strengthened
 - NEECS
- Government climate change policies will affect decision making
- Carbon tax post 2007 will increase the cost of fossil fuels



Transition Investment Responses

- **Energy management**
 - Getting better value out of what we have today so as to prepare for tomorrow
 - Reduce energy demand
- **Investment in heat plant**
 - Based on current on-site waste
 - Transition through forest residue
- **On-site cogeneration**
 - Distributed generation
 - Bioenergy based on process wood waste
 - Embedded
- **Prepare for future electricity generation**
 - Focus on reducing fuel cost
 - Evaluate forest residue

