



Status of Bioenergy from woody Biomass in NZ

**Brian Cox
East Harbour Management Services**

**Bioenergy Association Woody Biomass Workshop
7 September 2004**

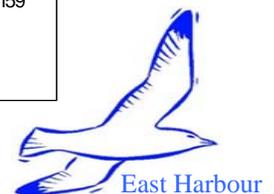
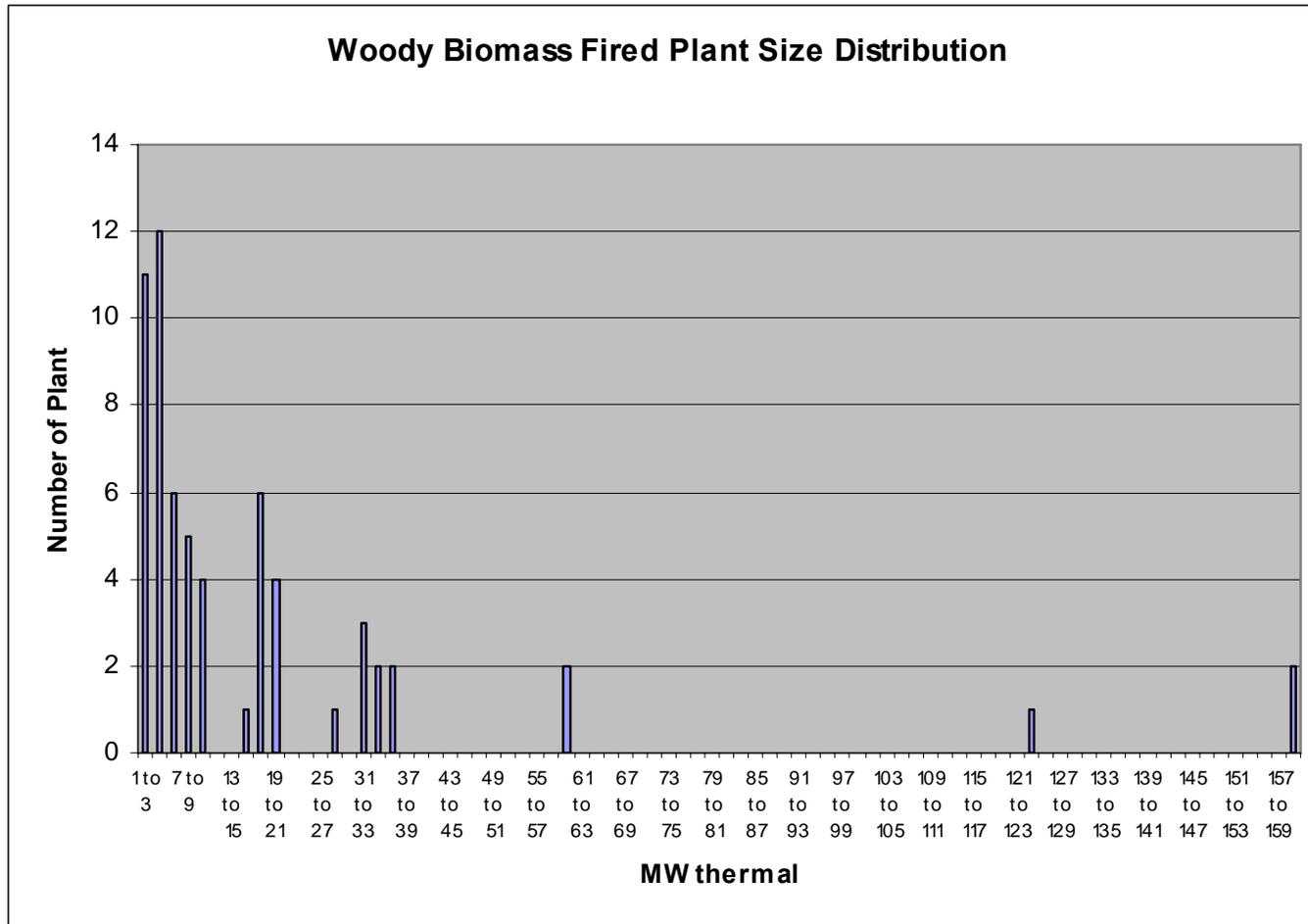


Drivers for Bioenergy

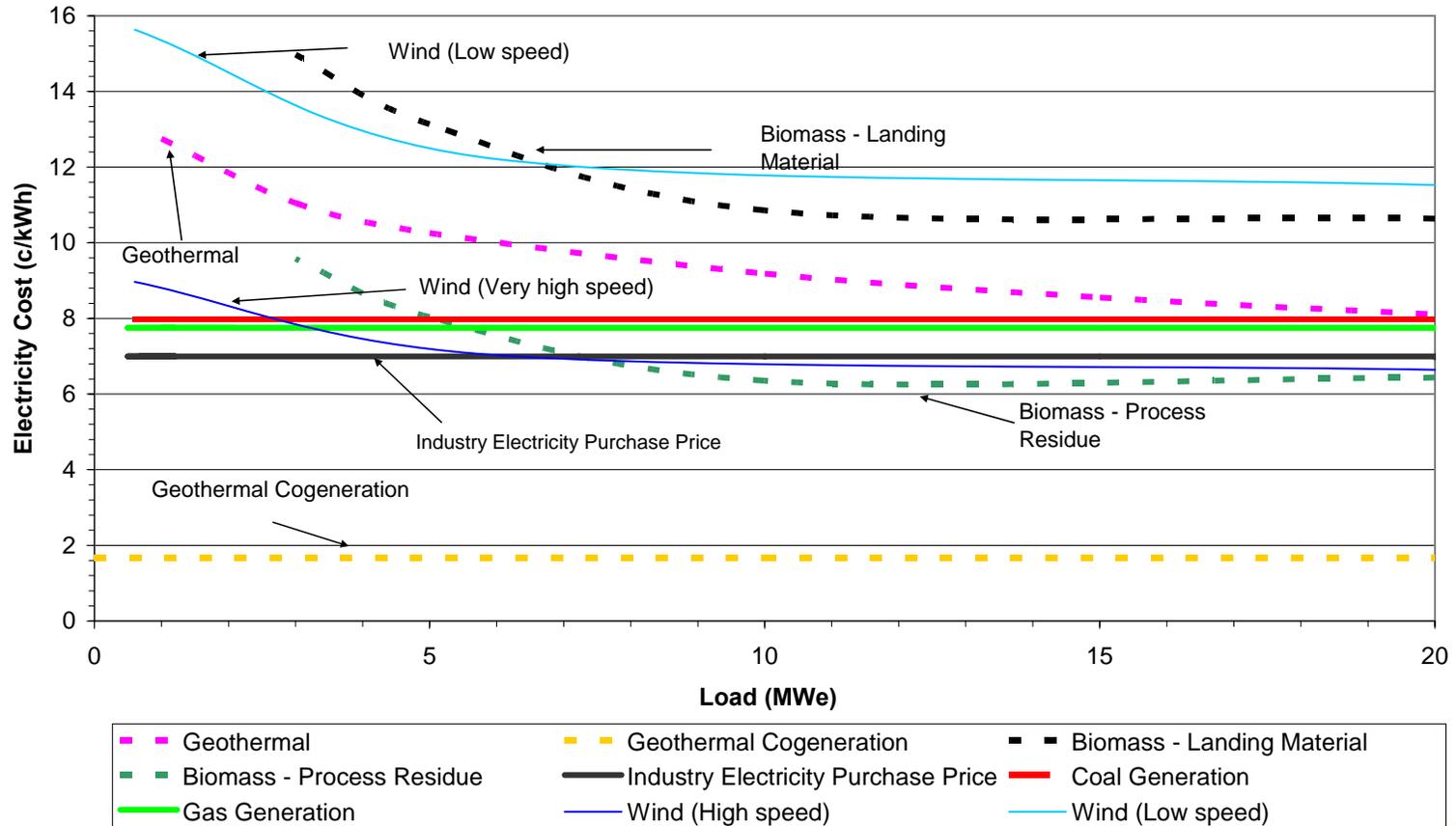
- Post Maui opportunities
 - Multiple energy sources
 - Increased energy costs
- Industry is moving to integrated energy solutions
 - Paradigm shifts in thinking about energy
- Requirements for heat
 - Growth in wood processing
 - Waste disposal costs
 - Heat first
- High spot market prices



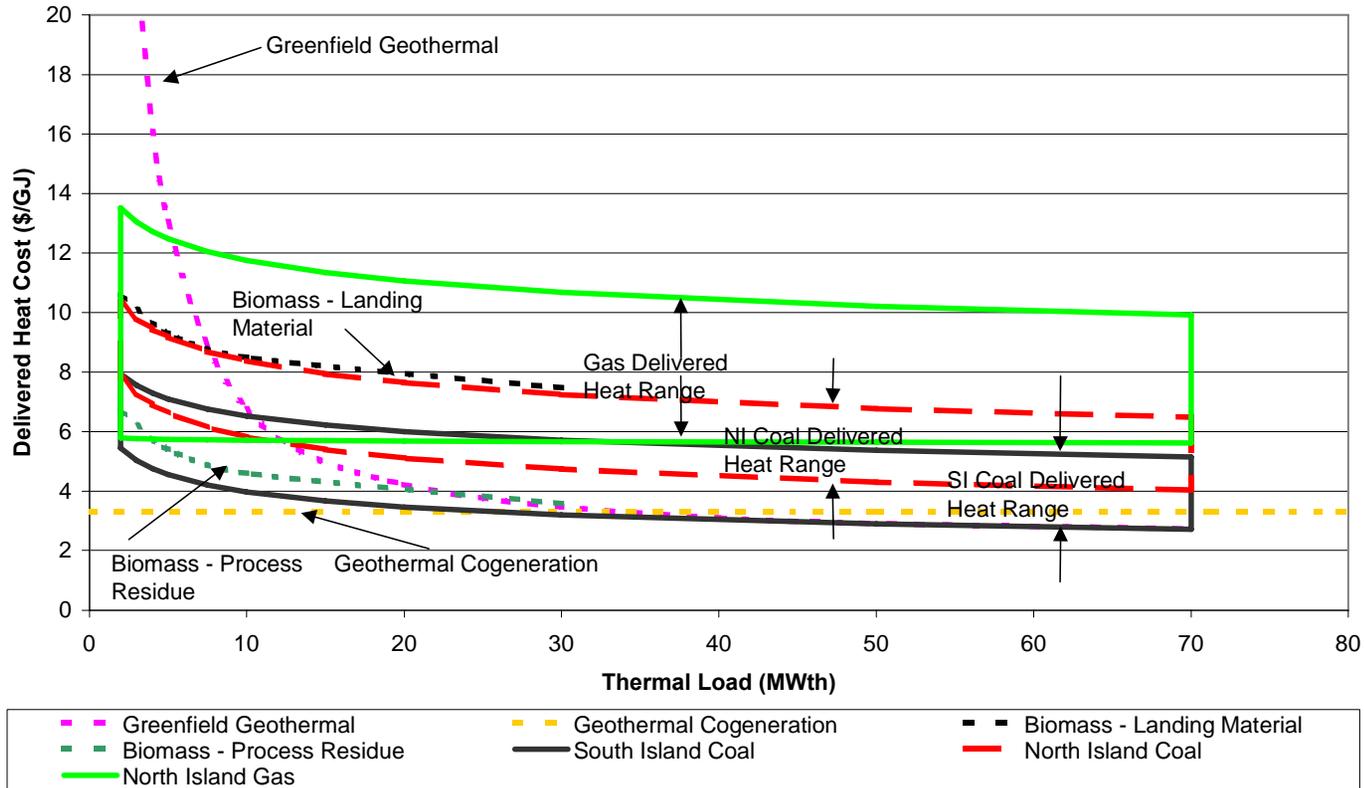
Size of Heat Plant



Comparative Costs of Electricity

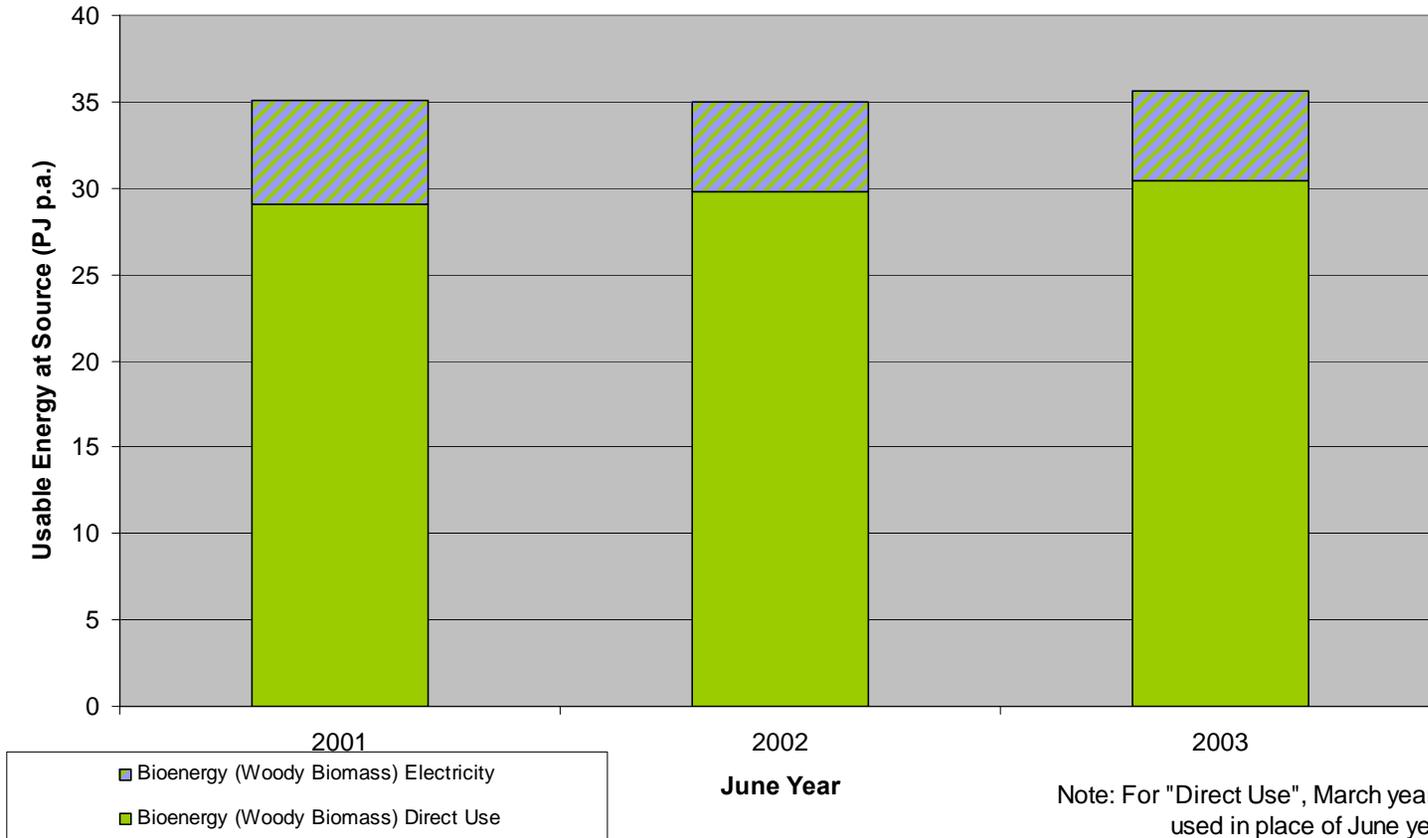


Delivered Heat Costs



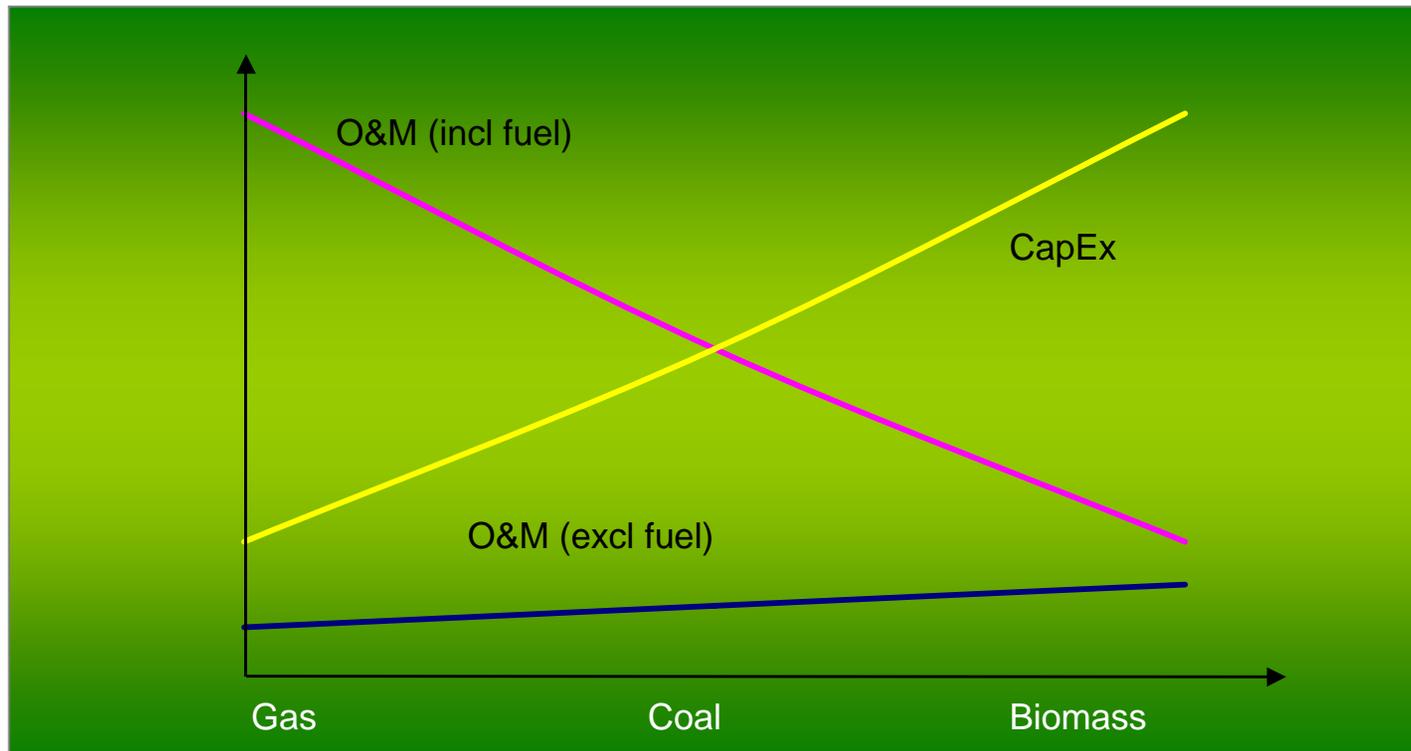
Growth in Bioenergy from Woody Biomass

New Zealand's Woody Biomass Energy Supply



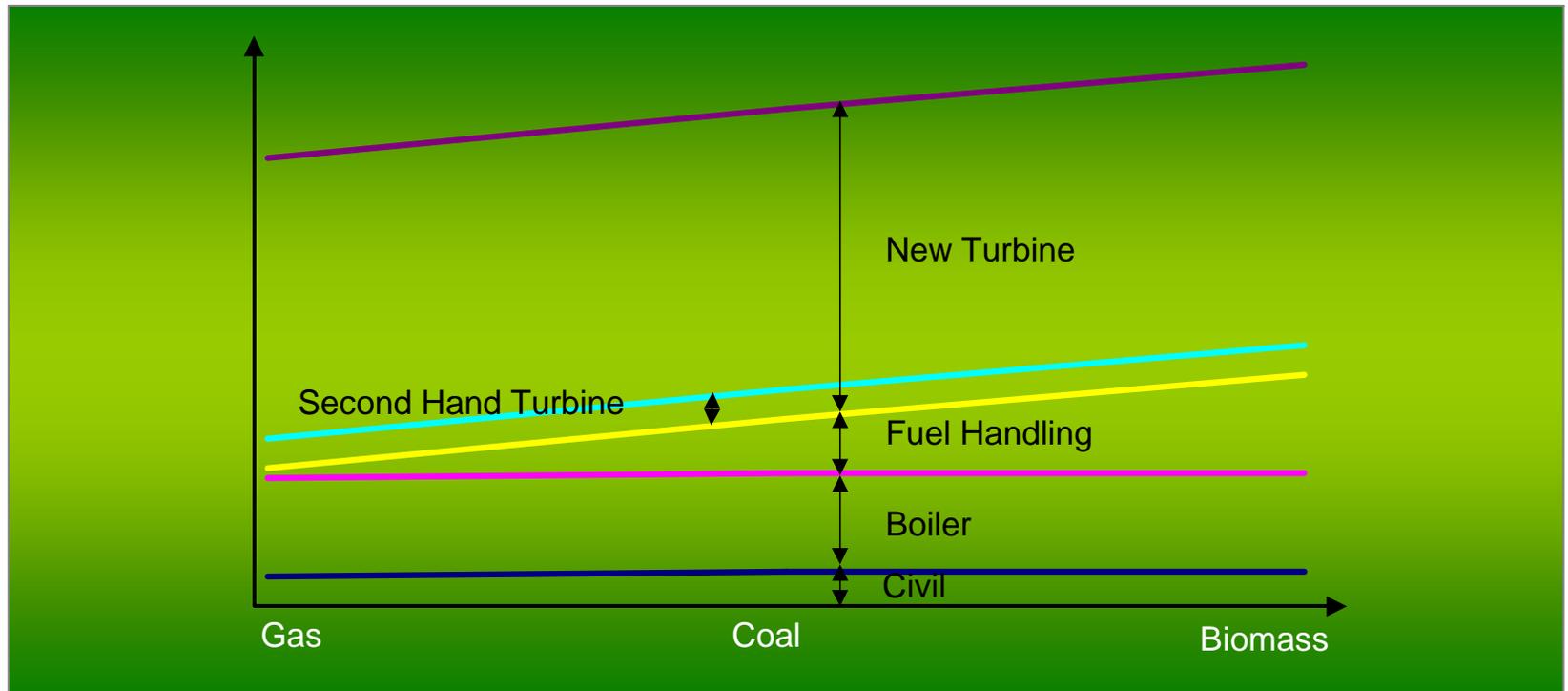
Capital Cost vs Fuel cost

Relationship Between Costs and Fuel Type

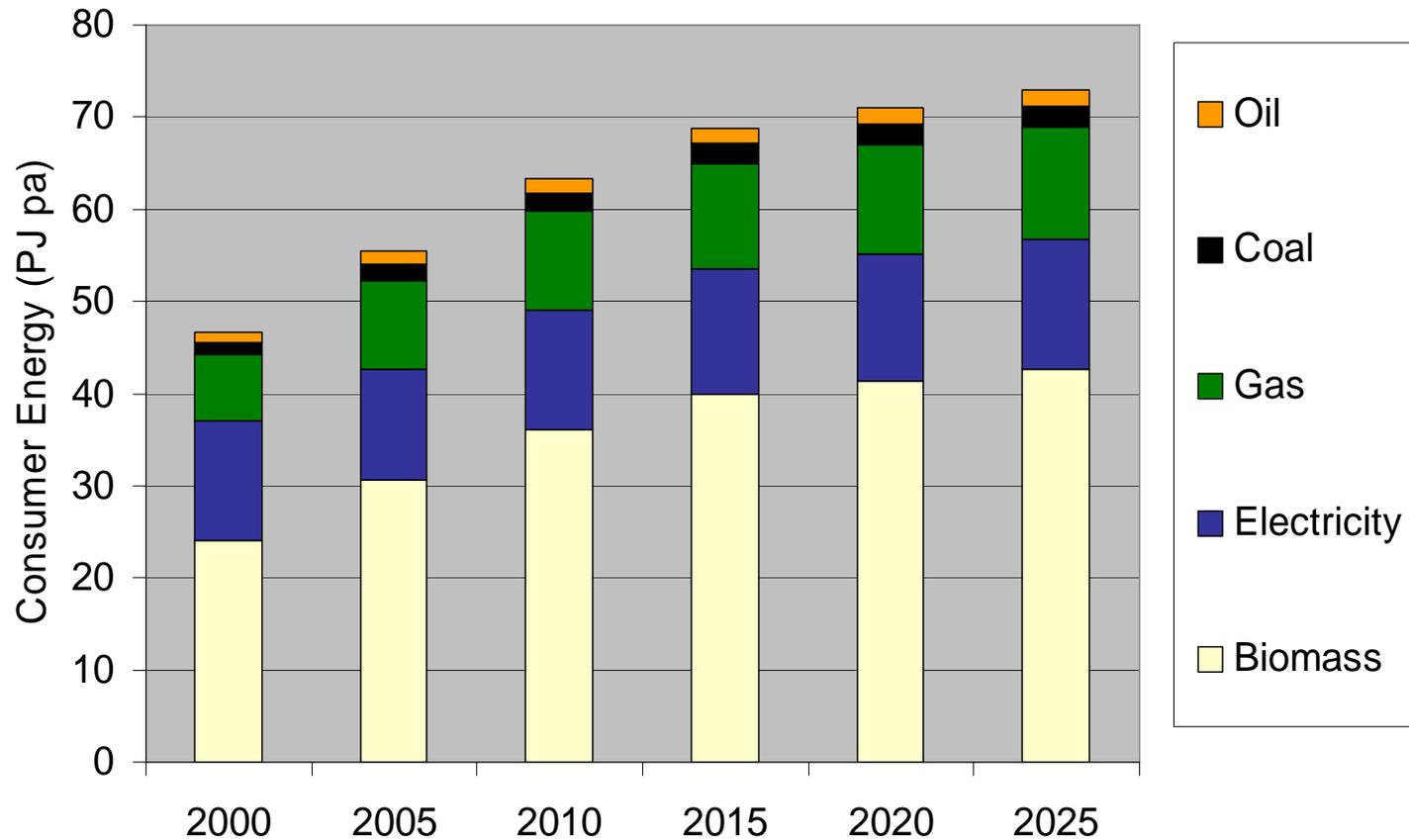


Cost of Cogeneration Plant

Approximate Split of Capital Costs



Wood Processing Consumer Energy



Data source: Ministry of Economic Development, 2003



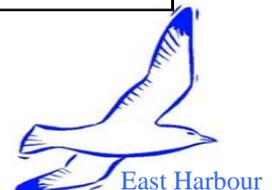
Woody Biomass as Fuel

- 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

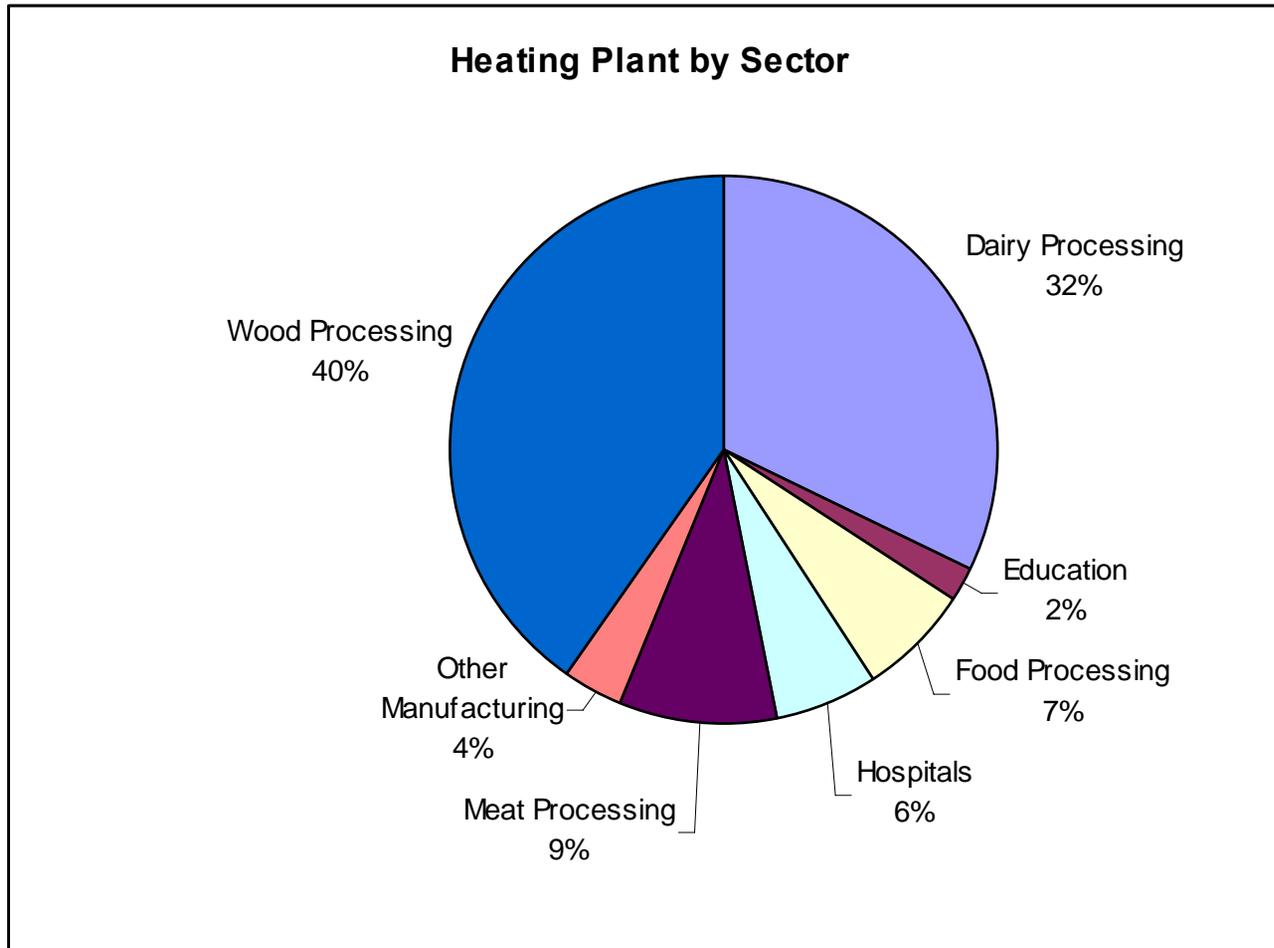


Other Renewable Energy Forms

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



Heat Plant in NZ



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



Heat Plant Opportunities

- Most people focus on electricity and forget heat
- Heat opportunities are local
- Bioenergy, geothermal and solar heat is economic now
- Heat and cooling information is poor
- Few published role models or case studies



Electricity Generation from Bioenergy

- Currently only economic if on-site wood waste
- Economics depend on avoiding waste disposal costs
- Coal is a good supplementary fuel for bioenergy plant
- Cogeneration of heat and electricity improves economics



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



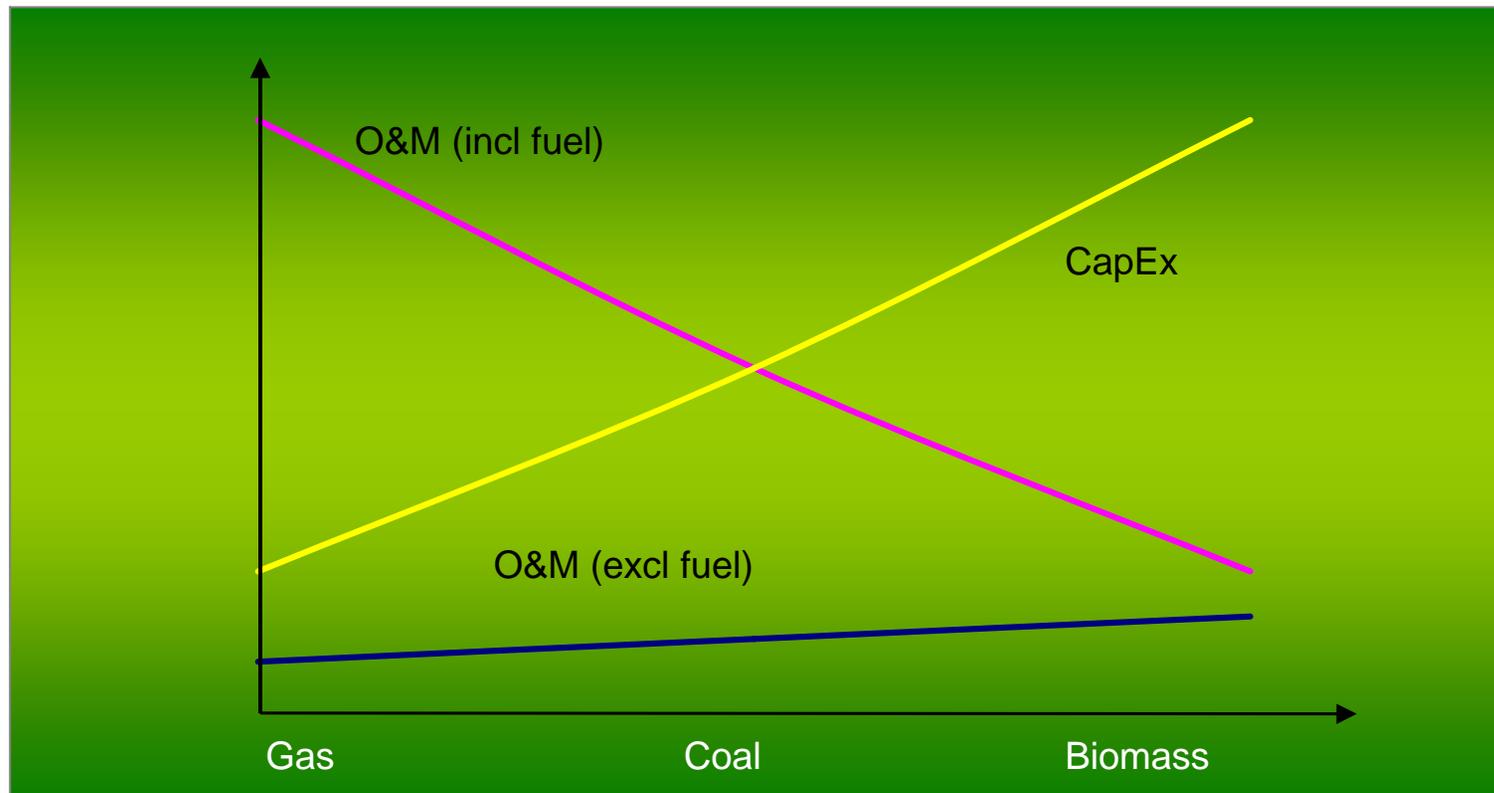
Bioenergy Investment Transition

- **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
 - ?



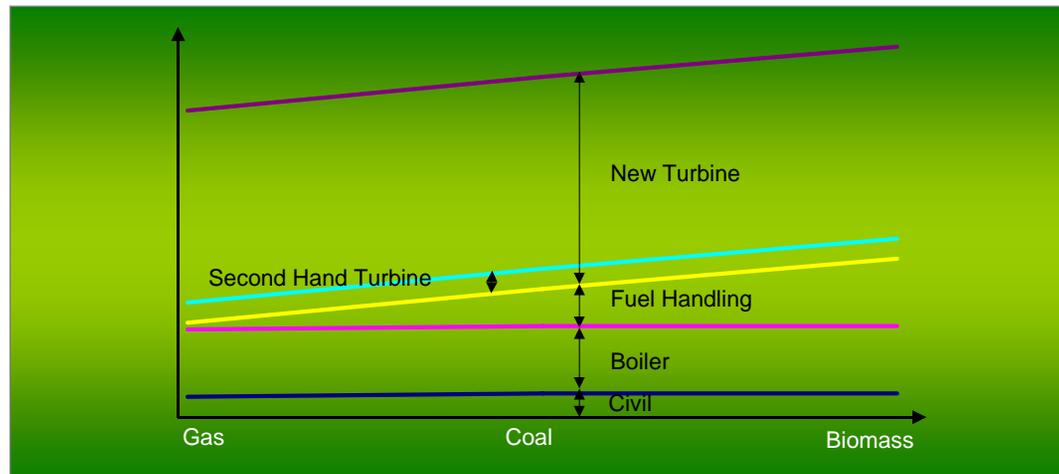
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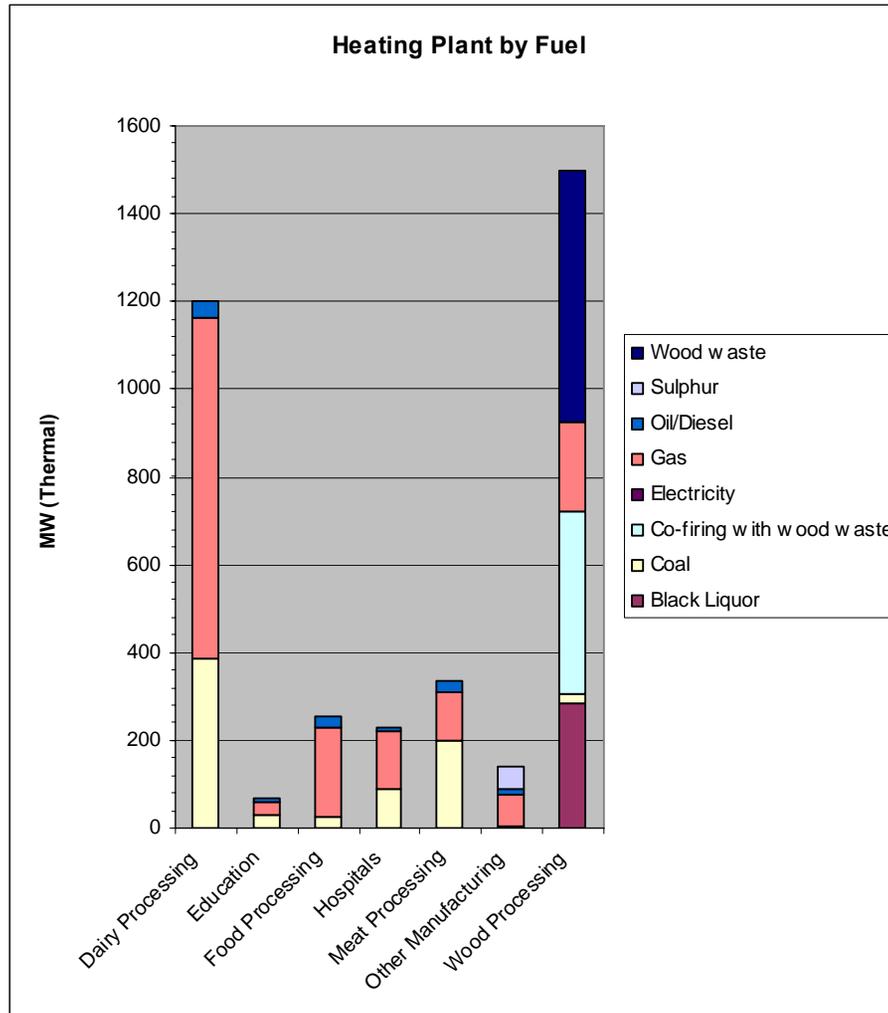


Cost of Cogeneration Plant

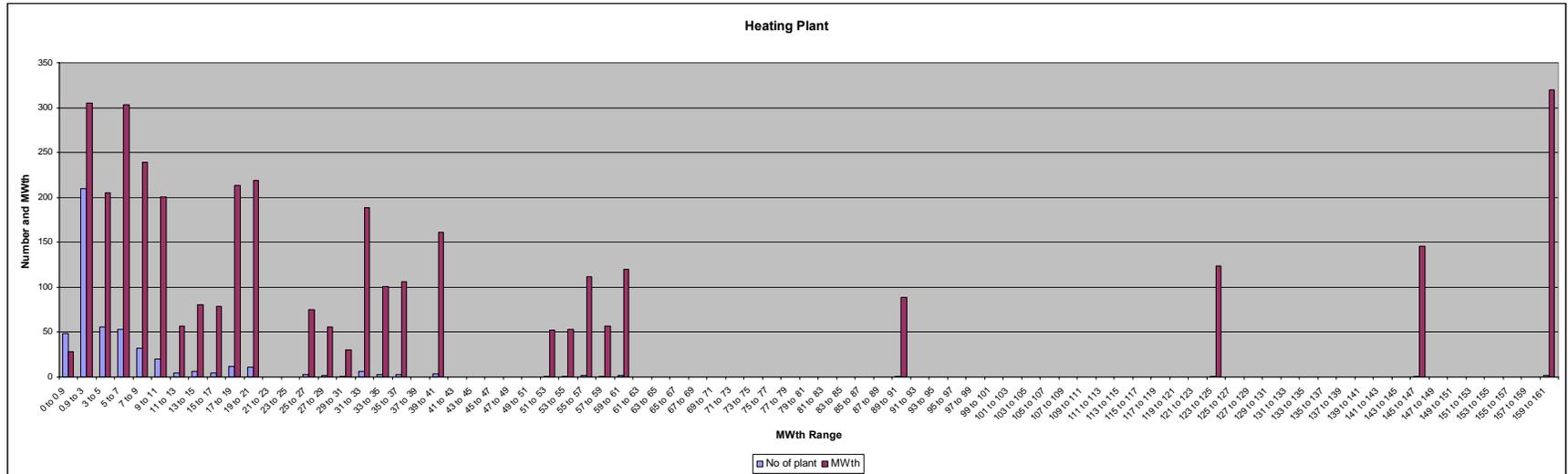
Approximate Split of Capital Costs



Heating Plant by Fuel

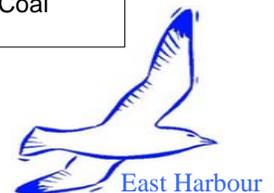
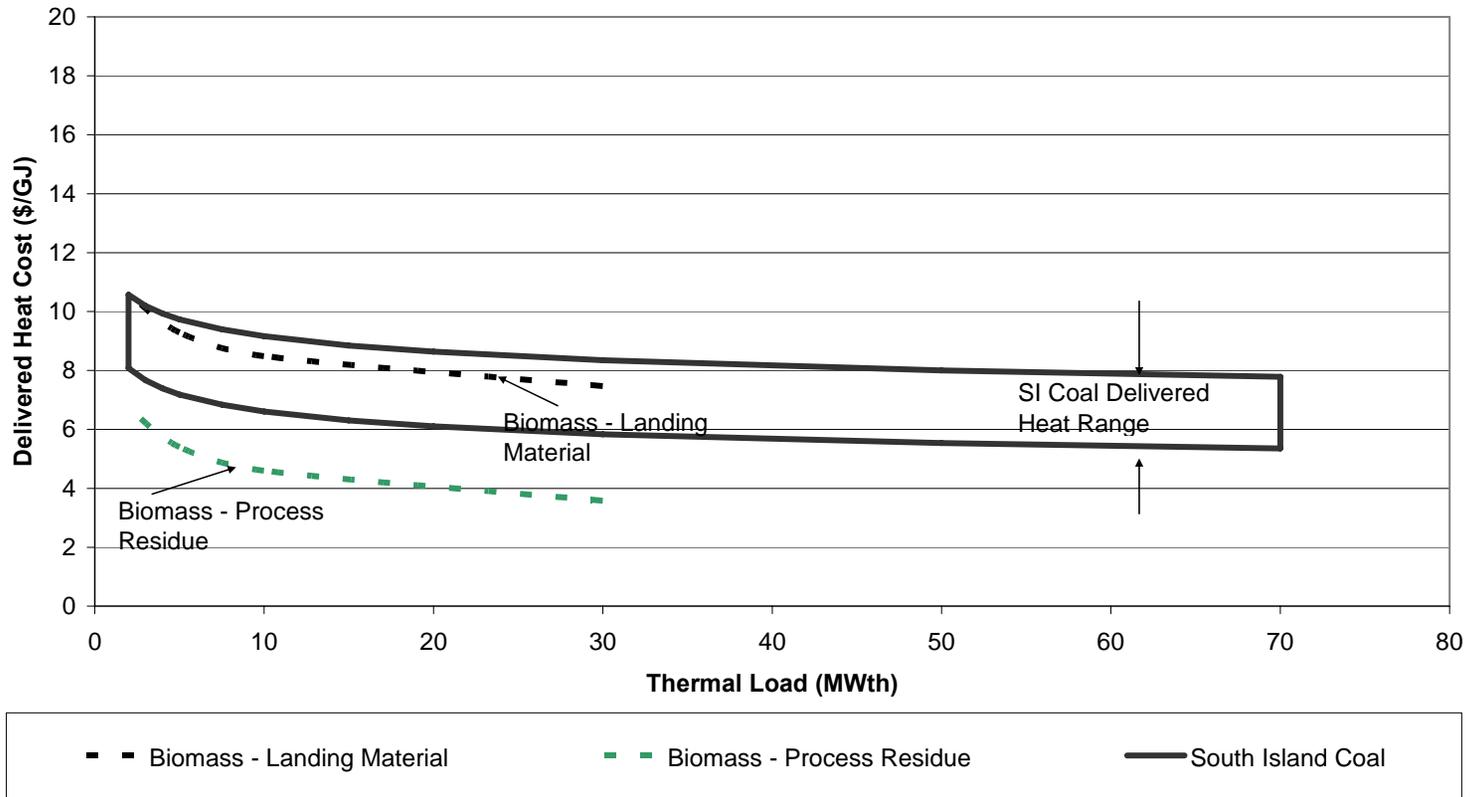


Bioenergy Plant Size



Heating Costs Post 2007

Heating Costs with Price Increases and \$10/t Carbon Dioxide Charge



Strategy–Vision

‘Meet future energy demand’
‘Encourage further major industrial investment’

- Southland energy riches utilised for improved well-being and economic growth
- Starting point
 - improve current energy use
 - prepare for more substantial future new investments
- Use of fossil fuel energy for premium niche opportunities to firm renewable energy sources
- Undertaking regional action to smooth the way for large transmission and electricity generation opportunities
- Ensure future secure energy supply



Strategy—Action Plan

- Requires an Energy Awareness Programme
- Energy Sector Skills and Training Programme
- Regional/District Plan Reviews
- Residential Energy Efficiency Programmes
- Commercial/Industrial initiatives
- Energy Generation Opportunities
 - Gas
 - Wind
 - Coal and lignite
 - Hydro
 - Bioenergy
- Transmission Network issues
- Future Energy R&D Opportunities



Heating Cost From Various Fuel Types

Heating Costs, No Price Increases or Carbon Charge

