



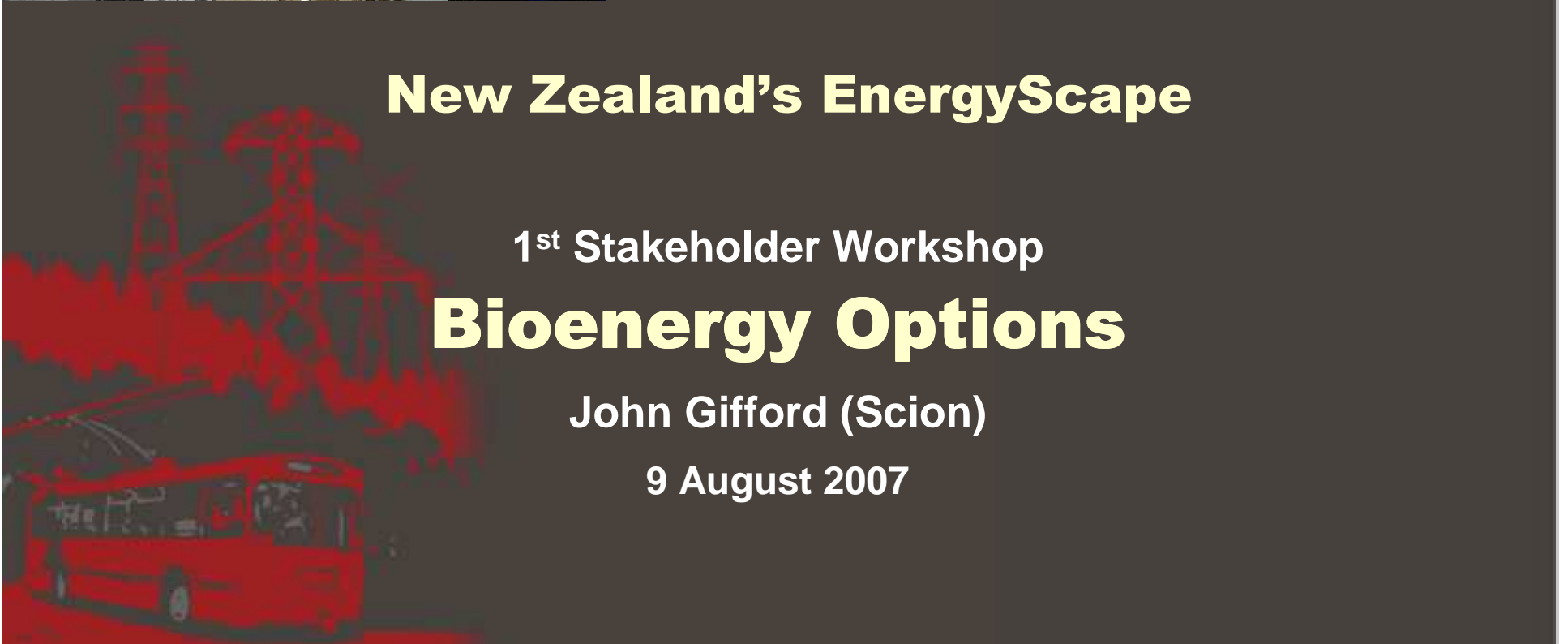
New Zealand's EnergyScape

1st Stakeholder Workshop

Bioenergy Options

John Gifford (Scion)

9 August 2007



FRST RFP / Contract

2000 2005 2030 2050

- Stationary and transport uses of Bioenergy and Biomass
- Include fuel life-cycle analysis with costings and risks
- Maps of potential and existing land use
- Identify the international research and possible NZ links

Overview of Programme

2000

2005

2030

2050

Stage

1. Situation Analysis

2. Integration

3. Options Assessment

4. Amalgamation

- § Resource assessment
- § Review Conversion technologies
- § Define Energy products

- National and International Peer Review

- Costings of options
- Maps of areas available for energy crop / feedstock production
- International activities
- Initial Energy Pathway options

- § Decision support framework: LEAP-EERA
- § Critical interdependencies
- § Integration of demand (Renewables and non-renewables)

- § Development of bioenergy scenarios

- § Link to key end-user strategies

- § End-user/stakeholder critique + analysis

- § Decision support framework
- § NZ priorities

- § Options criteria to employ?
- § Critical market and project uncertainties

- § Potential options for bioenergy systems

- § Potential for bioenergy for New Zealand

- § Barriers to uptake / uncertainties

- § Critical international leverage

- § Opportunities and uncertainties for bioenergy deployment in New Zealand

- § Framework to review options

- § Impact of investment spend on creating bioenergy options

- § Mechanism to incorporate

- § International learnings

Timing

Sept. 07 44%

March 08 30%

April. 08 26%

June 08

New Zealand's EnergyScape



Collaborators

2000 2005 2030 2050

- CRL - Combustion and Gasification
- NIWA - Algae
- Landcare - Agricultural crop & residues, Land Use
- Crop & Food - Horticultural crop & residues
- Waste Solutions - Effluents, Anaerobic Digestion
- Process Developments - Plant costs, case study

Scion – Forests, Residues, SRF, Pyrolysis, Enzyme – Ethanol, Municipal wood waste, wood processing waste, Land use, Resource maps, Project management

International Programmes; IEA – 21 countries, \$ millions of R&D, NZ in two tasks (of 13) and on Executive Committee

BIOENERGY What is it ?

2000 2005 2030 2050

Organic, Variable, Purpose Grown or Residual, Low energy density, Renewable

Supply Chain



Grow

Extract

Transport

Convert

Distribute

End use



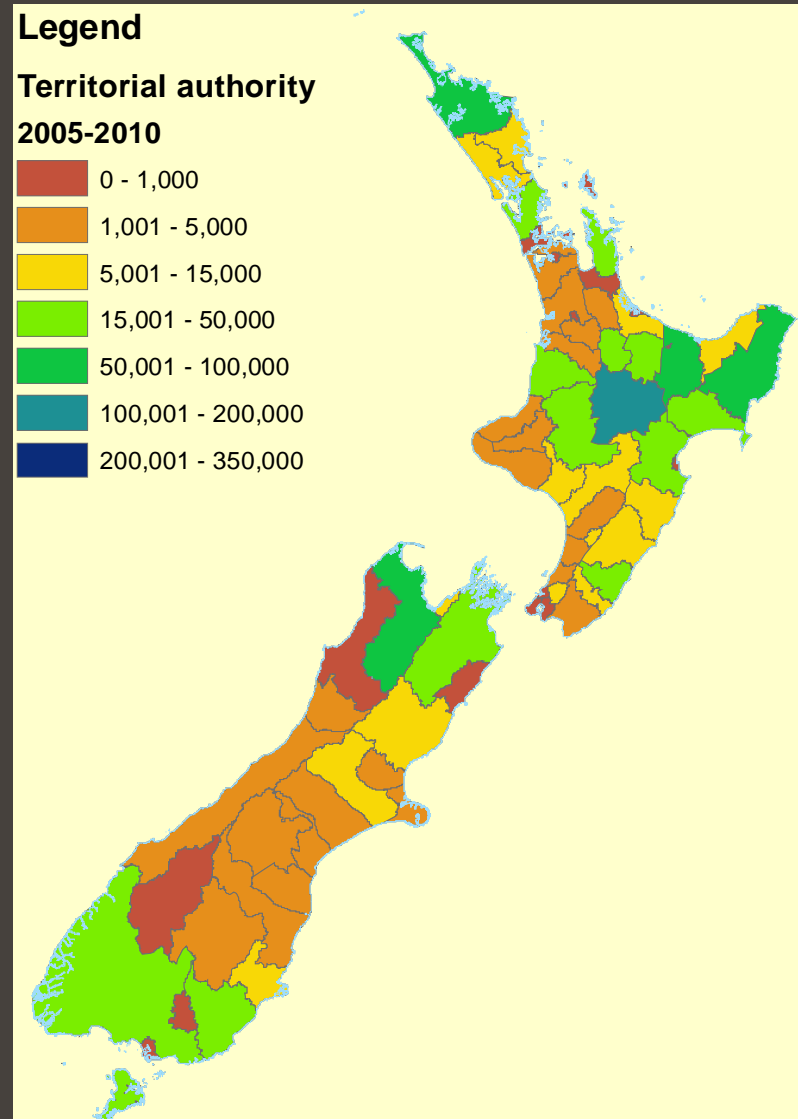
Reuse

New Zealand's EnergyScape



Forestry Residues by Territorial Authority

2000 2005 2030 2050



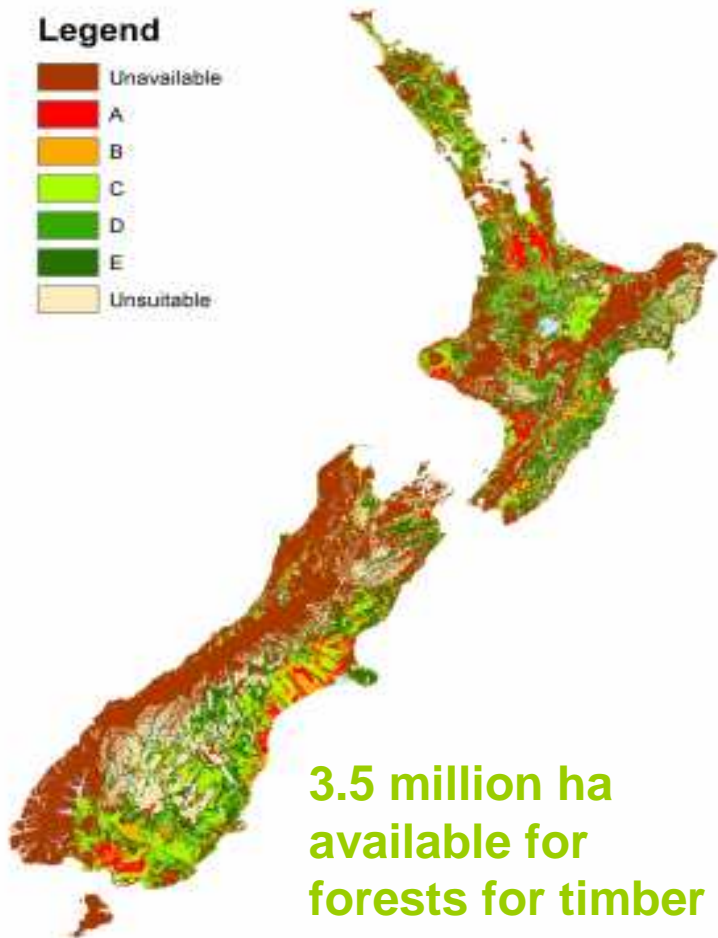
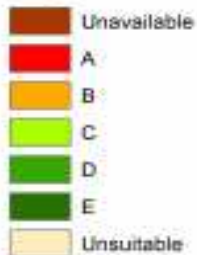
New Zealand's EnergyScape



New Zealand land area suitable for different energy crop types (Landcare Research)

2000 2005 2030 2050

Legend



**3.5 million ha
available for
forests for timber
and energy**

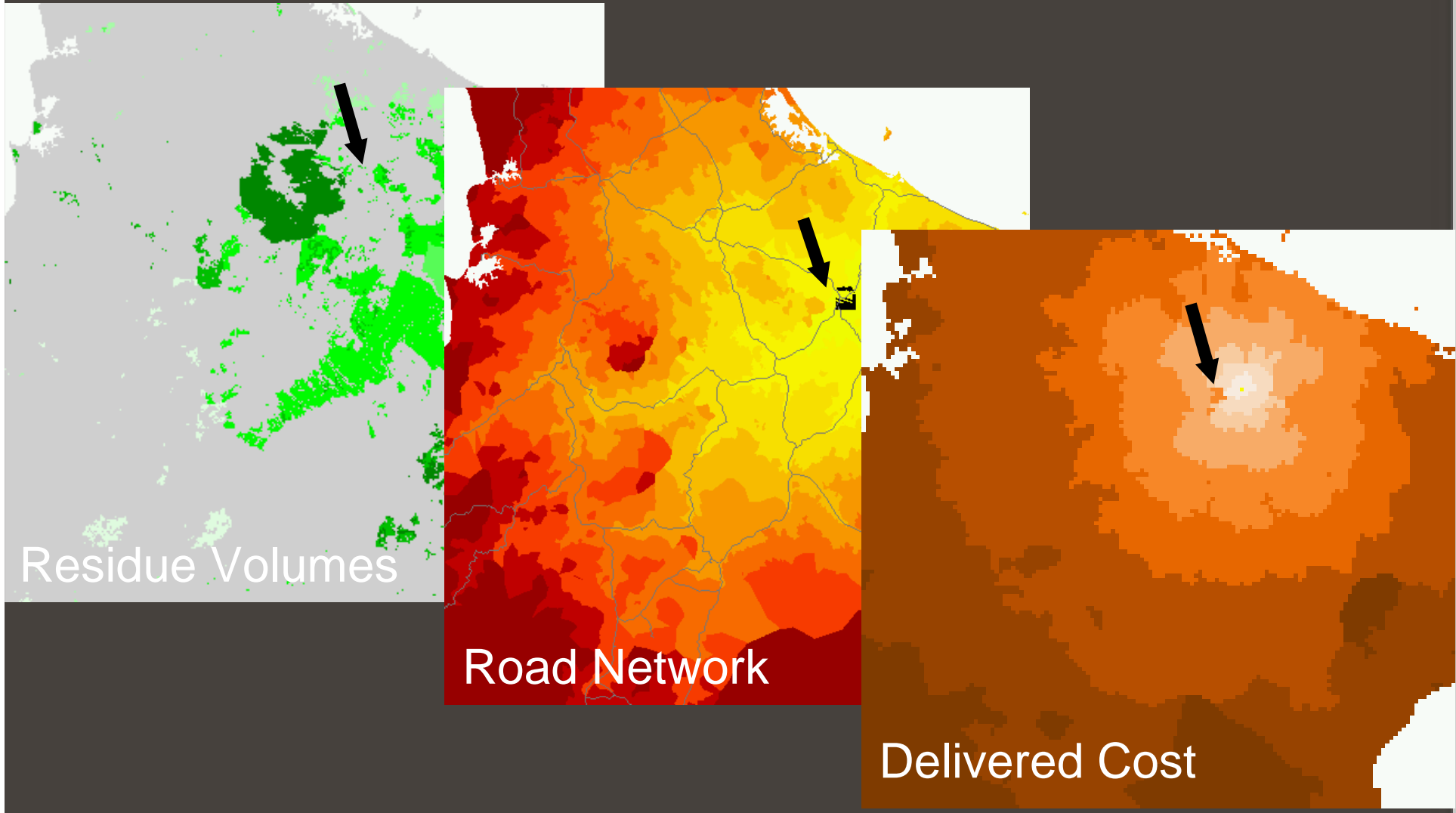
Category	LUC class	Total area (ha)	Description
A	I, II	1,336,900	Highly Suitable for cropping or pasture.
B	III _s , III _c	1,038,700	Some cropping possible, also suitable for pasture.
C	III _e , III _w , IV	3,675,100	More suitable to pasture. Some cropping in rotation possible.
D	V	180,400	Unsuitable for cropping. Suitable for pasture
E	VI	5,432,900	Unsuitable for cropping. Moderate limitations under perennial pasture.
F	VII, VIII	3,674,900	Unsuitable for cropping or pasture.
Unavailable	Urban areas and areas still under natural land cover	11,385,600	Land not available for farming (e.g., urban, indigenous forest)

New Zealand's EnergyScape



GIS Model

2000 2005 2030 2050

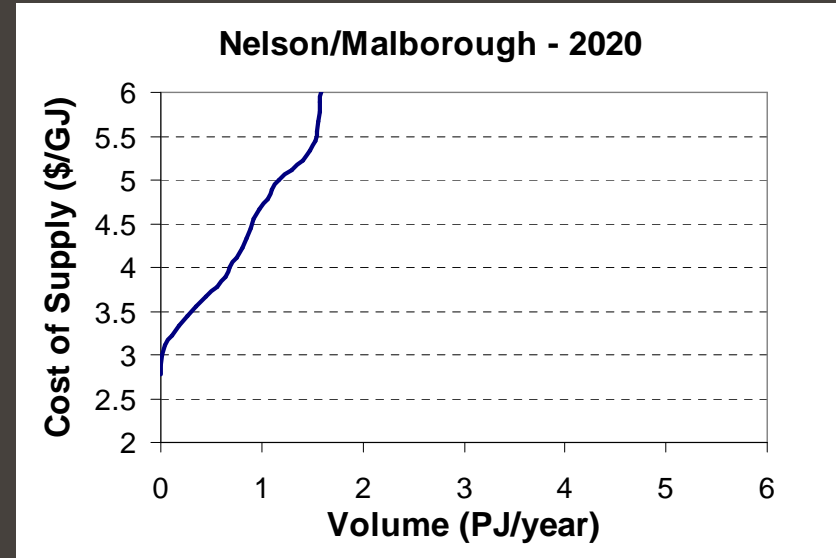
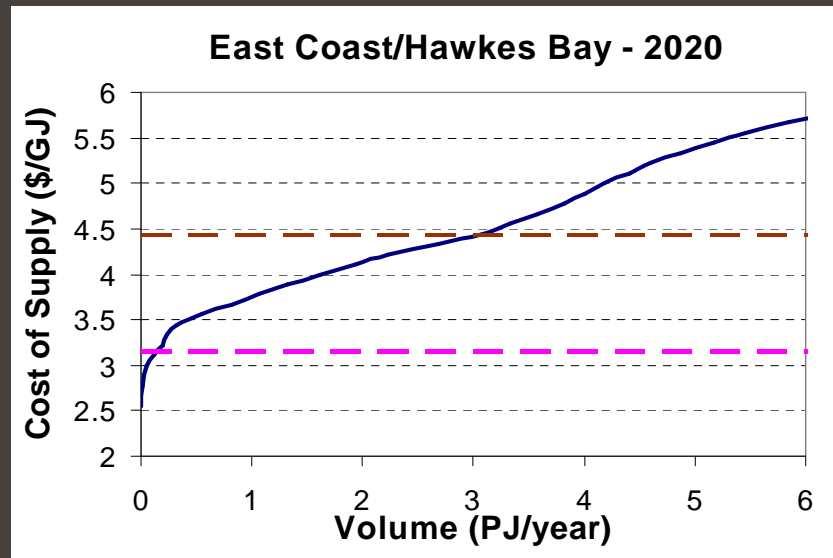
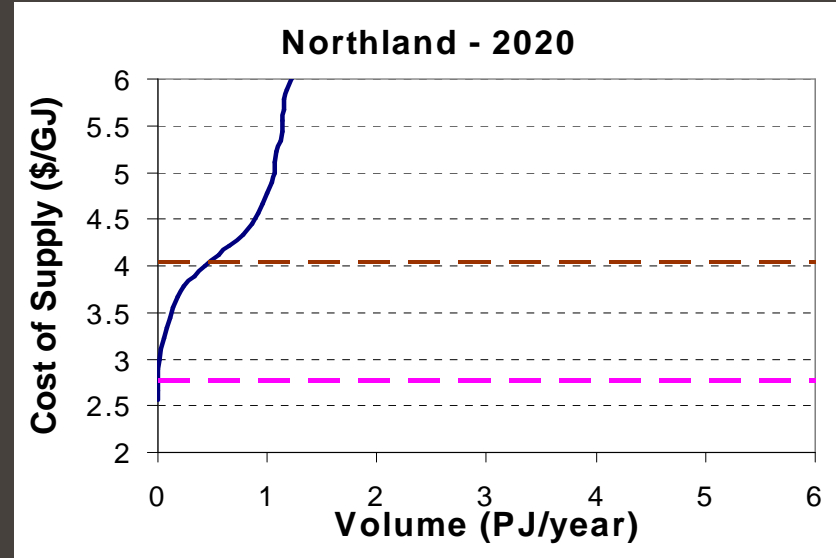
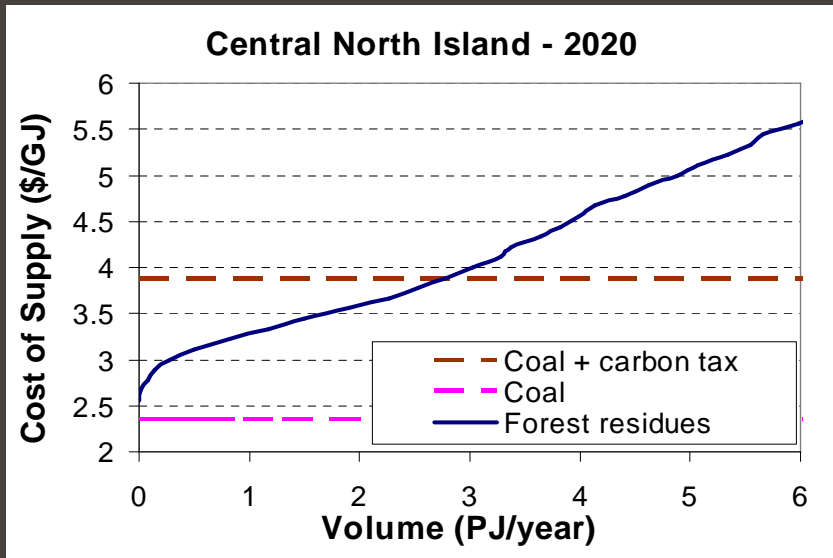


New Zealand's EnergyScape



Regional Comparison - GIS Model

2000 2005 2030 2050



New Zealand's EnergyScape



Conclusions

2000 2005 2030 2050

- Complex
- Huge Potential – for energy and environmental outcomes
- No silver bullet technology
- Co-products and by-products will be important to economic success



Further Questions?