Rotorua Energy Study

Rotorua Energy - Workshop

13 December 2006

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- ***Identification of potential sources of untapped energy***
  geothermal,
  hydro
  biomass.
- ***Optimising energy use and security of supply***
- ***Limitations of current networks and deficiencies***
- ***Perceived barriers and challenges to new energy opportunities***
- ***Risk, economic viability, environmental impact, resource planning, legislation***

Rotorua Energy Study

- **a study to identify;**
  - Rotorua District's comparative advantages/disadvantages in the energy market,
  - Opportunities for additional utilisation of local energy sources
- **Historical background to energy generation and consumption**
- **Energy demand forecasts**
- **Produce an "easy to read" booklet for potential investors to use as a source of information for decision making.**

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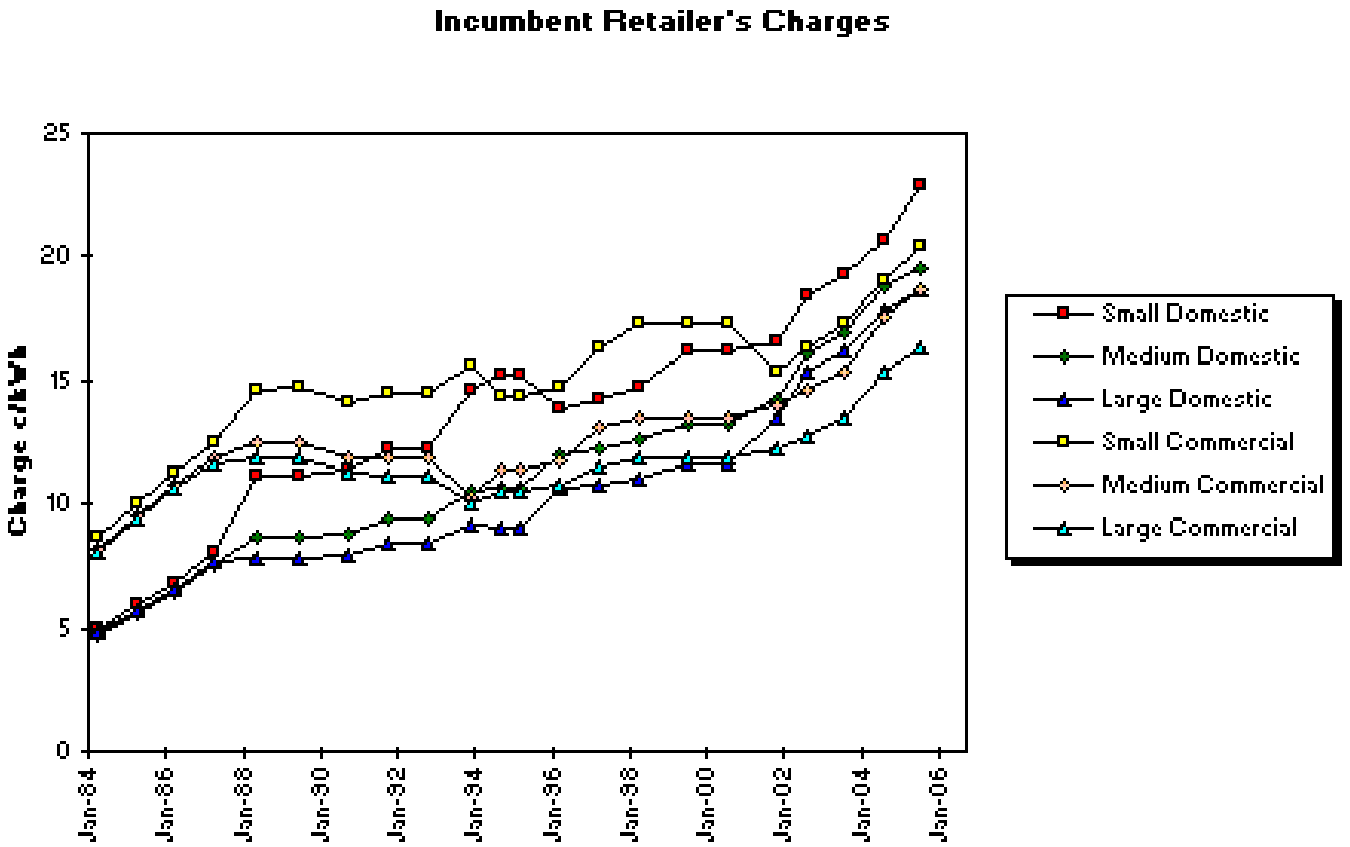
Rotorua Energy Study



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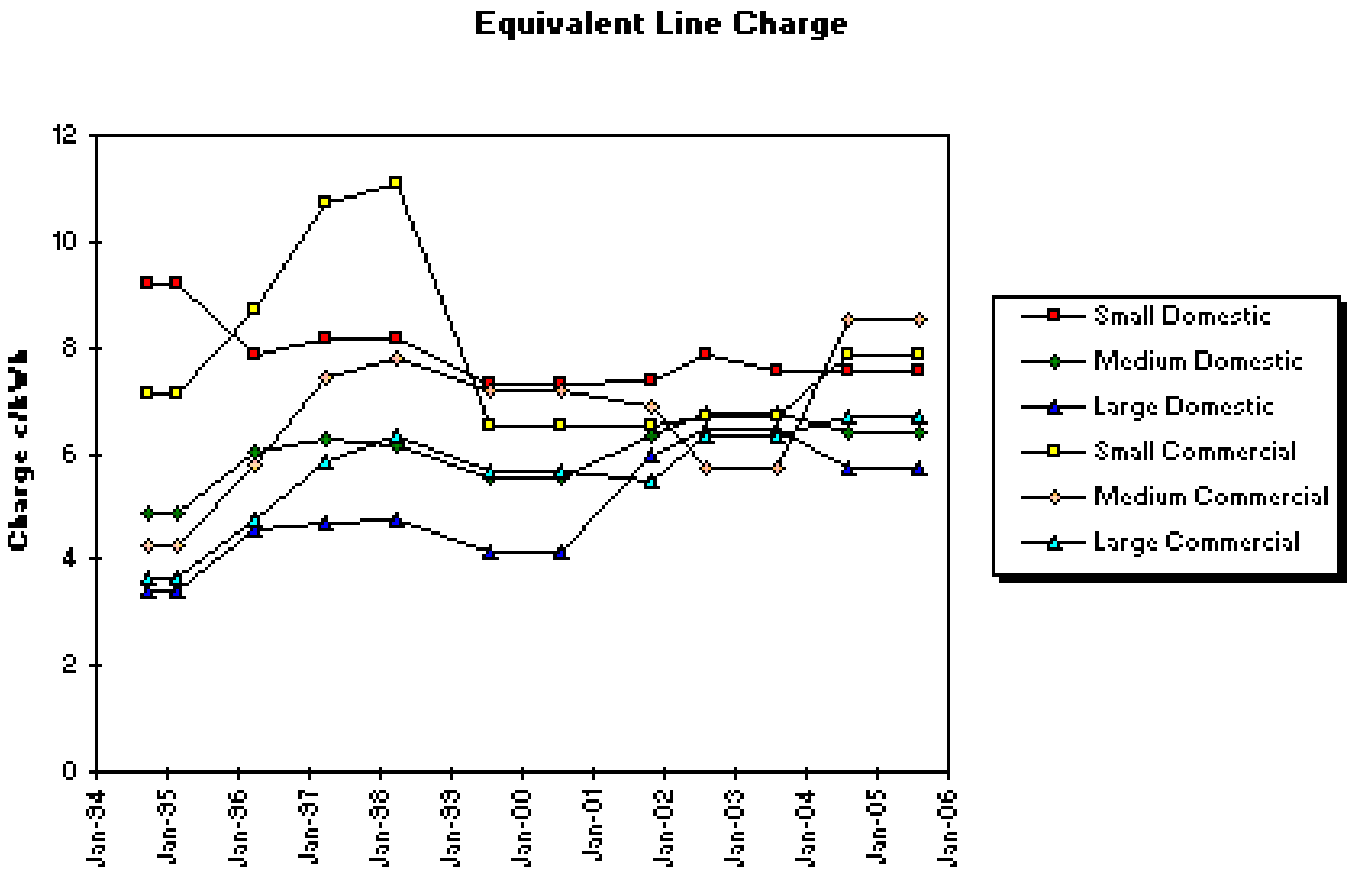
Rotorua Energy Study



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Air Envelope - Rotorua LAMA

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Rich Foresters Throwing $$ Away

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Residues Turned into a Valuable Commodity

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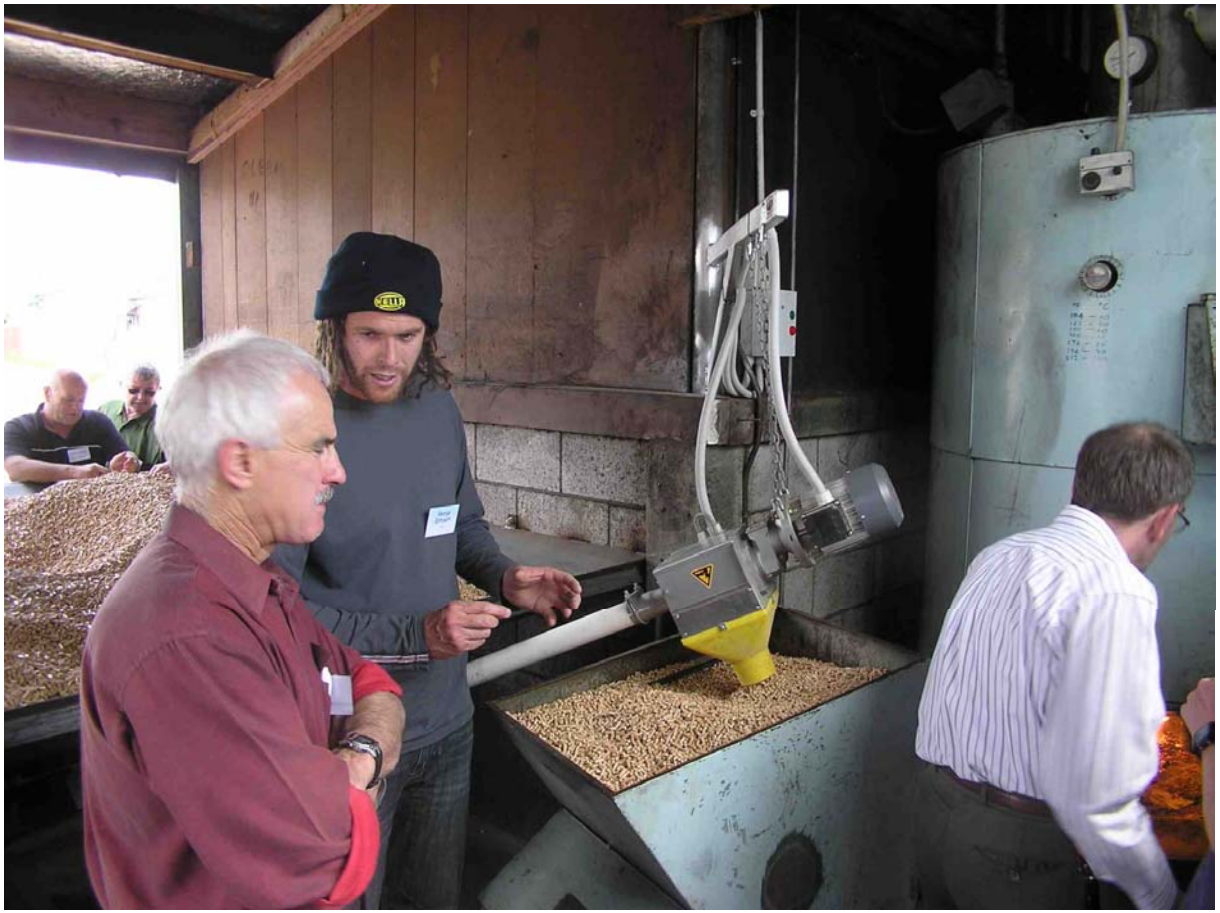
Focus on Forest Residues

- We can extract energy from
  - Wood processing residues
  - Forest harvest residues
  - Purpose grown tree crops
- Forest residue is the untapped resource we need to focus on
- Forest residues are currently turned into waste
- We already collect the biomass
  - The collection cost is sunk
  - The next steps are easy
  - We have the technology

Making Woody Biomass More User Friendly

- Pellets
  - Has all the good characteristics of coal
- Chipping and hogging in the forest
  - Already economic
  - Ease of handling and transport
  - Reduced transport costs

Wood Pellets in Schools



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Other Forms of Local Energy

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Drivers for Self Sufficiency in Energy

- High prices of energy
  - Multiple future energy sources
  - Increased energy costs
- Replacement for petrol and diesel transport fuel
  - Paradigm shifts in thinking about energy
- Requirements for heat
  - Growth in wood processing
  - Waste disposal costs
  - Heat first
- High spot electricity market prices
- Increasing coal costs

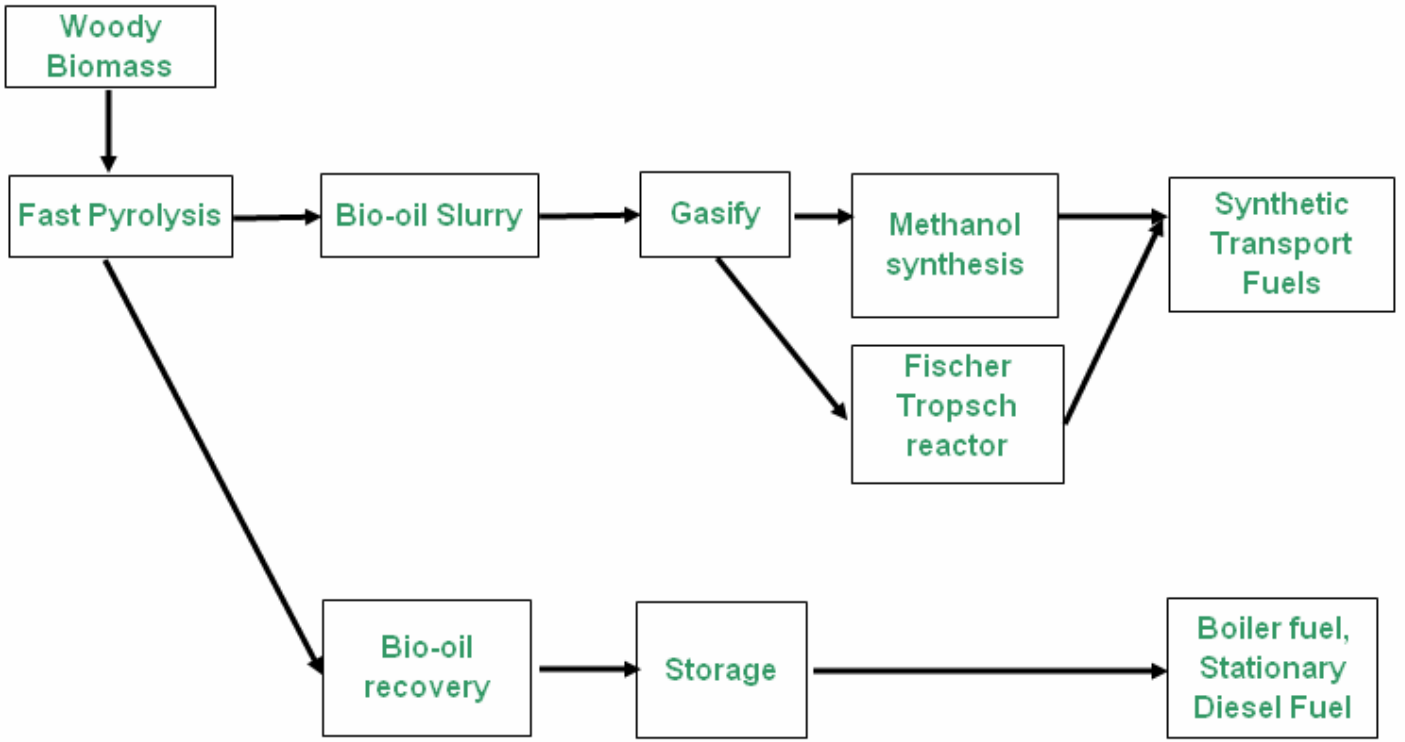
Woody Biomass as Fuel

- 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

Transport Biofuel

- Peak oil driving need for diesel and petrol replacements
- Govt policy to introduce blended
  - ethanol in petrol
  - Biodiesel in diesel
- Initially supply probably principally by import
- Import to be replaced by indigenous supply
  - Tallow
  - Woody biomass
- New technologies
  - Pyrolysis
  - Cellulose ethanol
- Opportunities for forest owners

Bio Fuel Projects



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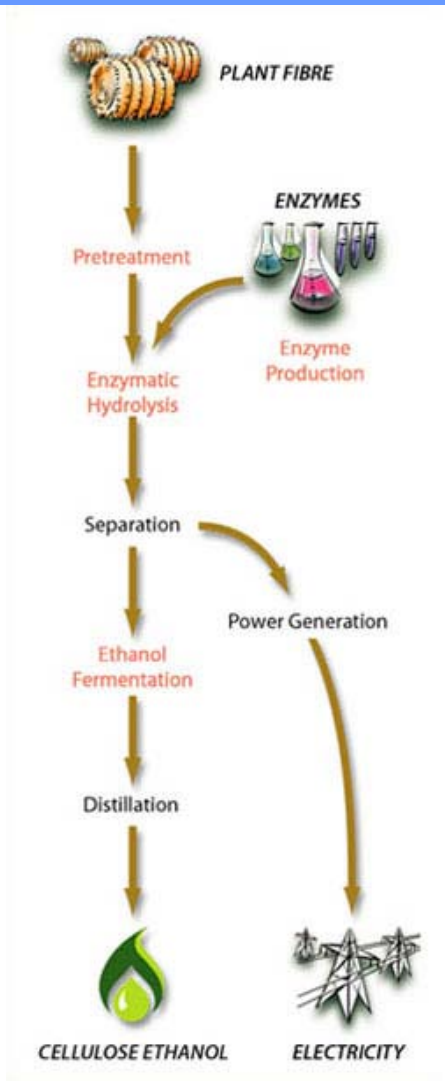
Iogen Cellulose to Ethanol Opportunity



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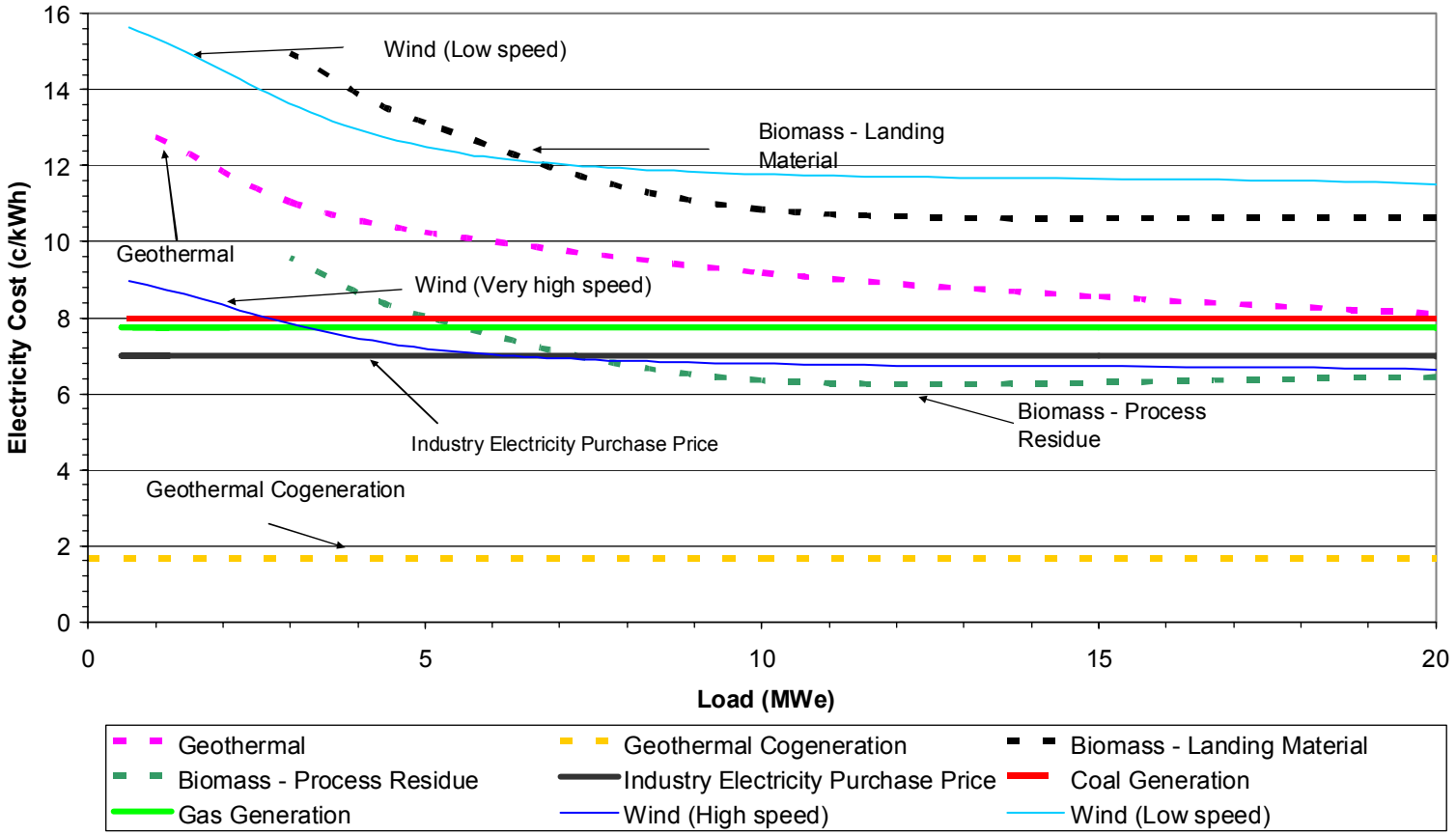
Comparative Costs of Electricity



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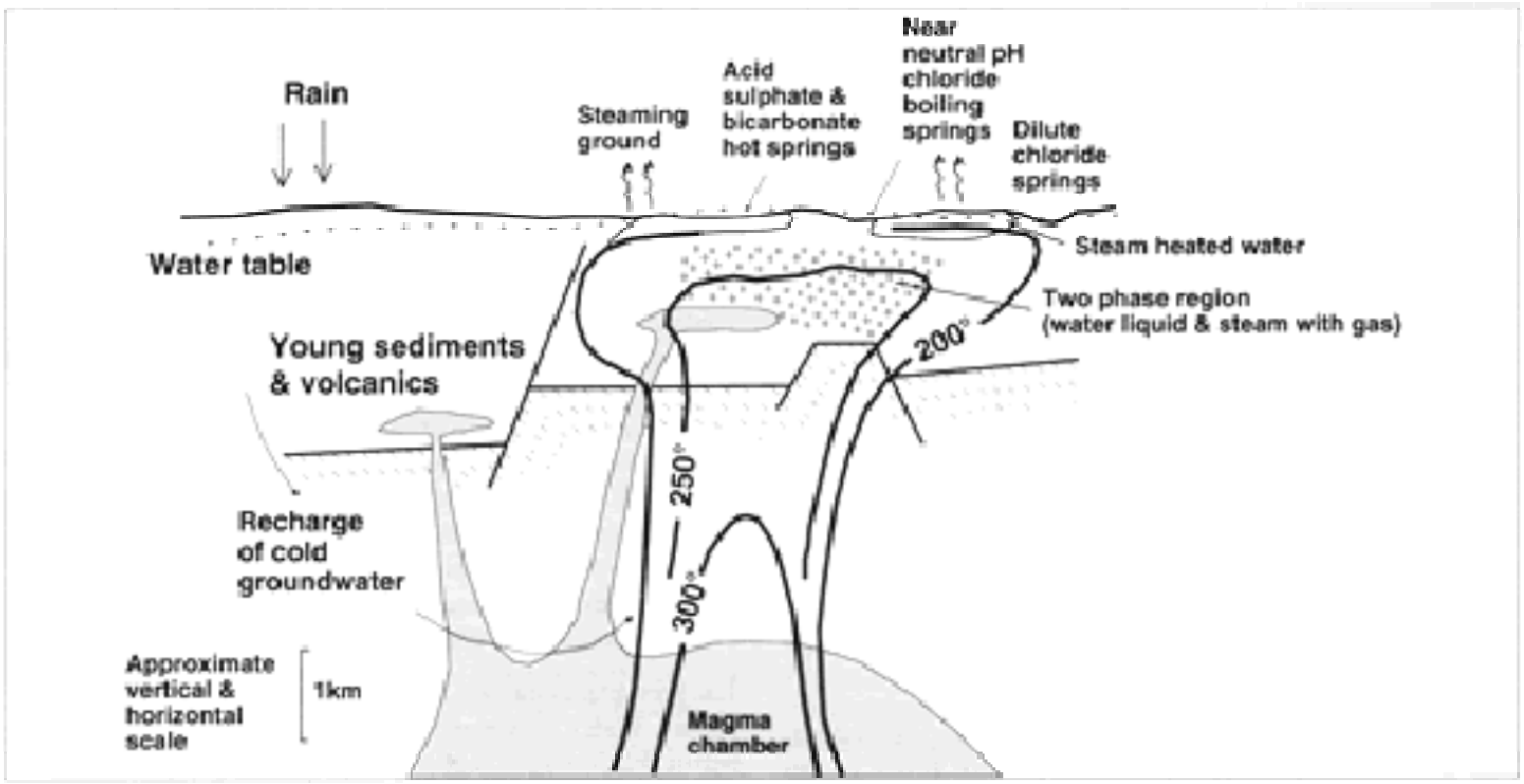
Deep Geothermal



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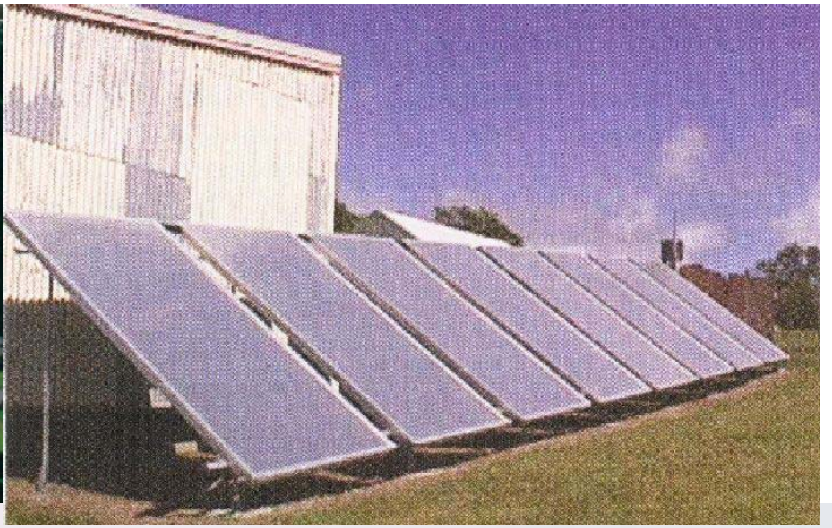
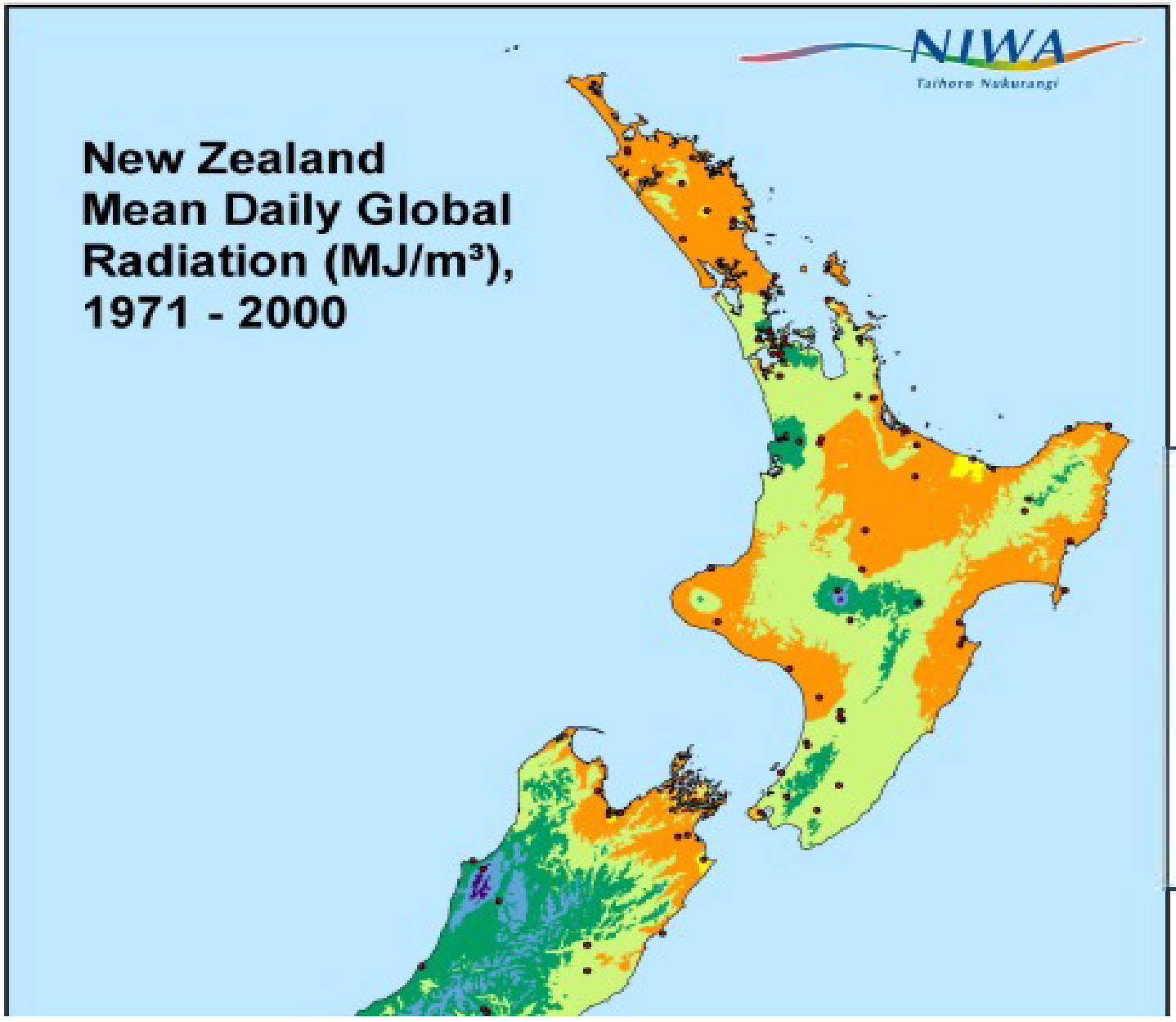
Solar



Community amenity facilities

School /community pool

Farm hot water



Relative Radiation Values

	$MJ/m^2/yr$
Kaitaia	5288.1
Paraparaumu	5035.1
Gisborne	5385.9
Christchurch	4898.0
Invercargill	4651.9
Bay of Plenty	5192.5
Sydney	6150.3
Melbourne	5301.6
Germany	3609.0

Commercial and Industrial Solar Applications

- Motels / Hotels
- Resthomes
- Motor camps
- Institutions (hospitals, hostels, prisons etc)
- Industrial hot water (freezing works, dairy factories

- Often used as a preheater to other heat generators
- Heat from solar can be supplied at 4-5c/kWh cf coal and gas at around 4c/kWh

Barriers to Using Energy Opportunities

- Alternative energy sources are still cheaper
- Few role models
- Unknown cost structure
- No leaders
- No entrepreneurs

No drive from community to gain value

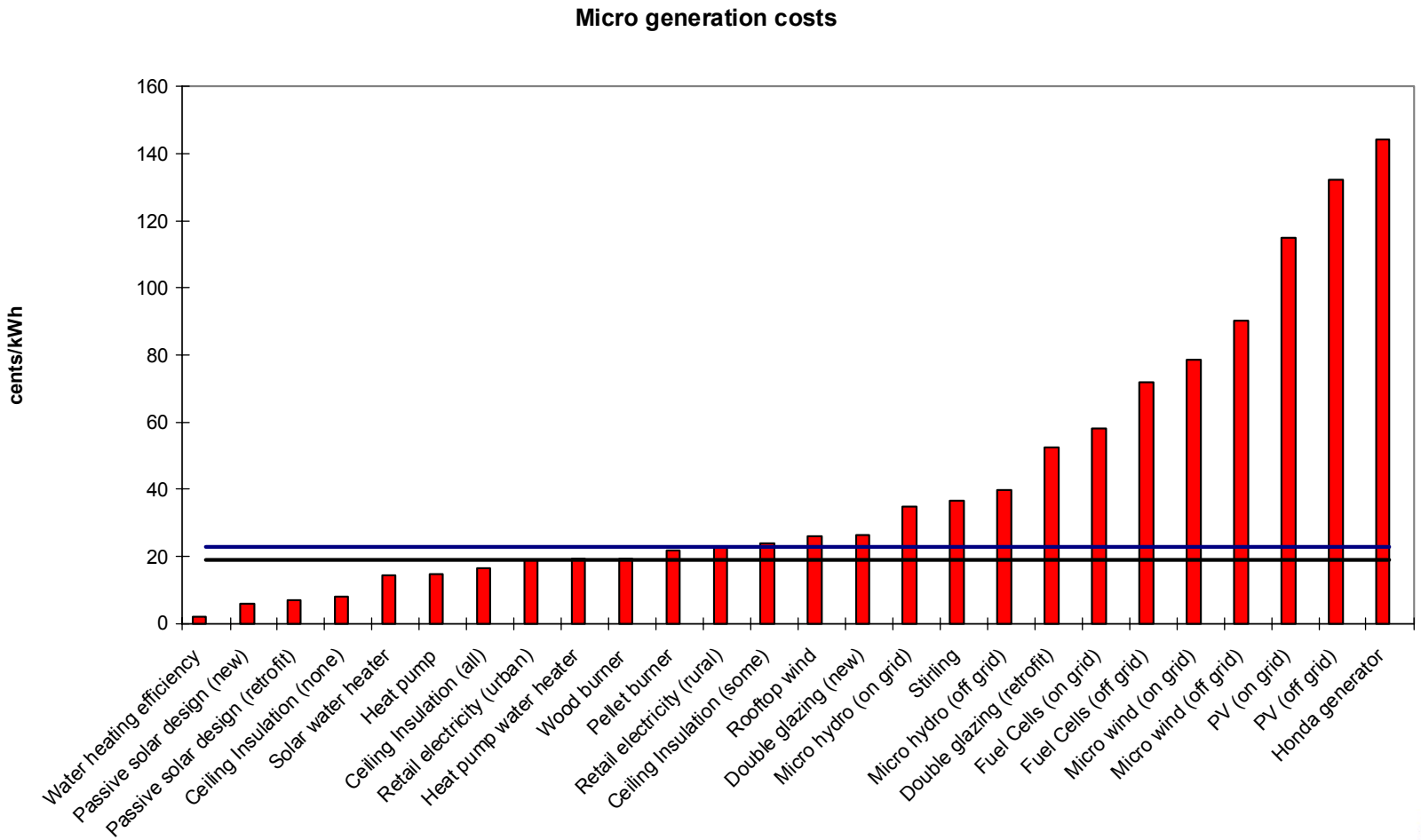
Sustainable Supply

- Secure, affordable and environmentally responsible
- Thinking smarter about what we already know
- Using fossil fuels as a transition to long term sustainable supply
- Balancing long term with short term goals
- National/Regional vs local interests
- Post 2007 climate change will change relative costs of options
- Increased use of local energy for local needs

Demand Management

- Increasing use of demand management as a supply side tool requires
  - Smart time of use metering
  - Recognition of energy costs
  - Improved energy efficiency
    - double glazing, building insulation
  - On-site energy production
    - Geothermal, Solar water heating, electricity generation
- Requires assistance to obtain scale
  - Market transformation
  - Demonstration and experience

Microgeneration



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Local Supply Options

- Bioenergy
  - Anaerobic digestion
  - Heating
  - Electricity
- Geothermal heating
- Solar
  - Hot water, electricity
- Small hydro
  - Embedded generation

Small hydro

Water pumping

On-site electricity

Combined irrigation and electricity

Investment Criteria

- Take up of opportunities depends on
  - Cost of conversion of natural resource into usable energy
  - Relative economics between options
  - Acceptable external affects
  - Long term access to natural resources
  - Community attitudes
  - Investor confidence
- Investor confidence depends on
  - An appropriate financial return
  - Investment risk
  - Resource consent conditions
- If any of these are missing, opportunities will not proceed

Energy Supply Resilience

- Regional/District plans can facilitate or hinder energy infrastructure
- Need capacity for handling intermittent supply
- Benefit of community owned electricity network companies
- Inability of lines companies to directly manage investment in renewable energy
- Need for District Energy Plans

Barriers to Action

- High upfront costs
  - energy facilities; high capital cost but long term (30-100yr) operation
- Inadequate information on options
  - e.g. farm digesters, solar water pumping
- Inadequate push for demand side improvements
  - Inadequate data, technical information, handbooks, case studies
- Inadequate transfer of knowledge and experience
  - No applied research since NZERDC and LFTB
  - No applied R & D programme
- Cost of investigations
  - High cost of investigations before decisions can be made
    - High risk if likely to not get resource consent

Identify what Rotorua Community Can do?

- Leadership
  - Capture by minority vocal community interests
  - Regional vs individual interests
  - Role of Government
  - Adjudication of competing regional interests
  - Look after the local energy interests – no one else will
- Community owned schemes
  - Addition to local water supply scheme
- Examples
- Case studies
- Information
- Technical Assistance