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Bioenergy – the future, naturally

Brian Cox Executive Officer, Bioenergy Association of New Zealand

Bioenergy Association

- Represent all leading NZ bioenergy industry players
- 3 Interest Groups
  - Biogas
  - Liquid Biofuels & Co-products
  - Wood Fuels
- Membership based organisation
  - No external funding ie no levy
- Member services
  - Assisting members grow their business
  - Promotion of member's products and capabilities
- Quality Framework –
  - Accreditation of Wood Fuel Suppliers
  - Registered Wood Energy & Biogas Advisers
  - Training and Technical Guides
  - Workshops and conferences
- Advocacy
  - Portal to information on bioenergy
  - Promotion of the benefits of bioenergy

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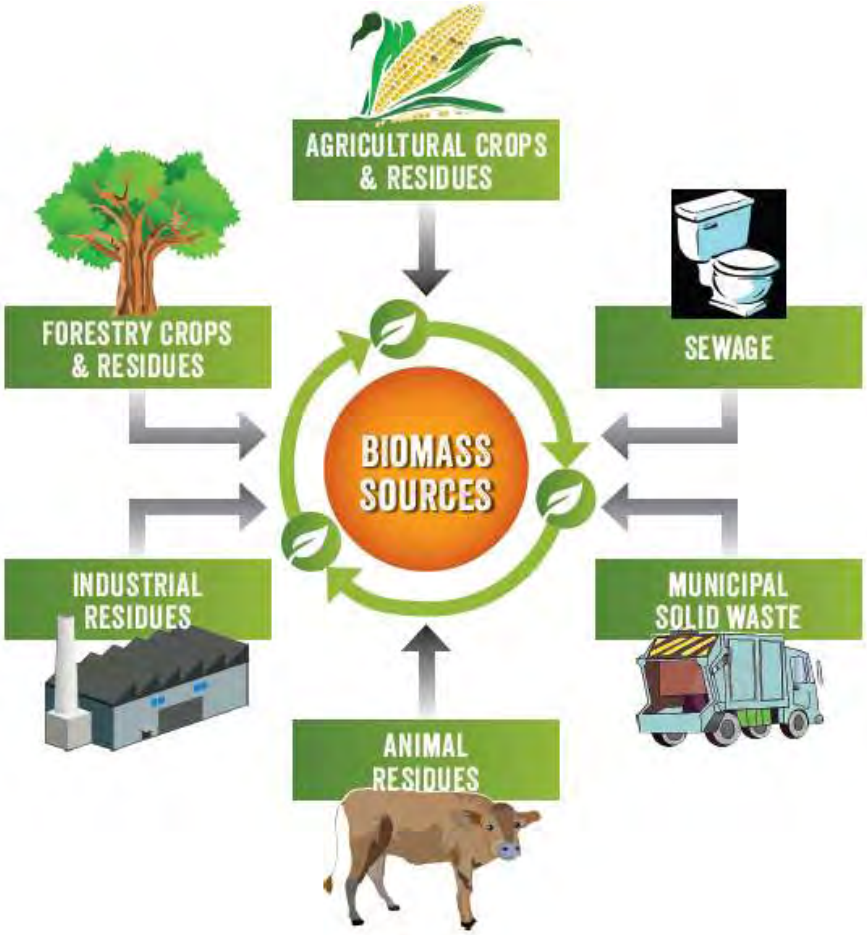
Natural resources to riches



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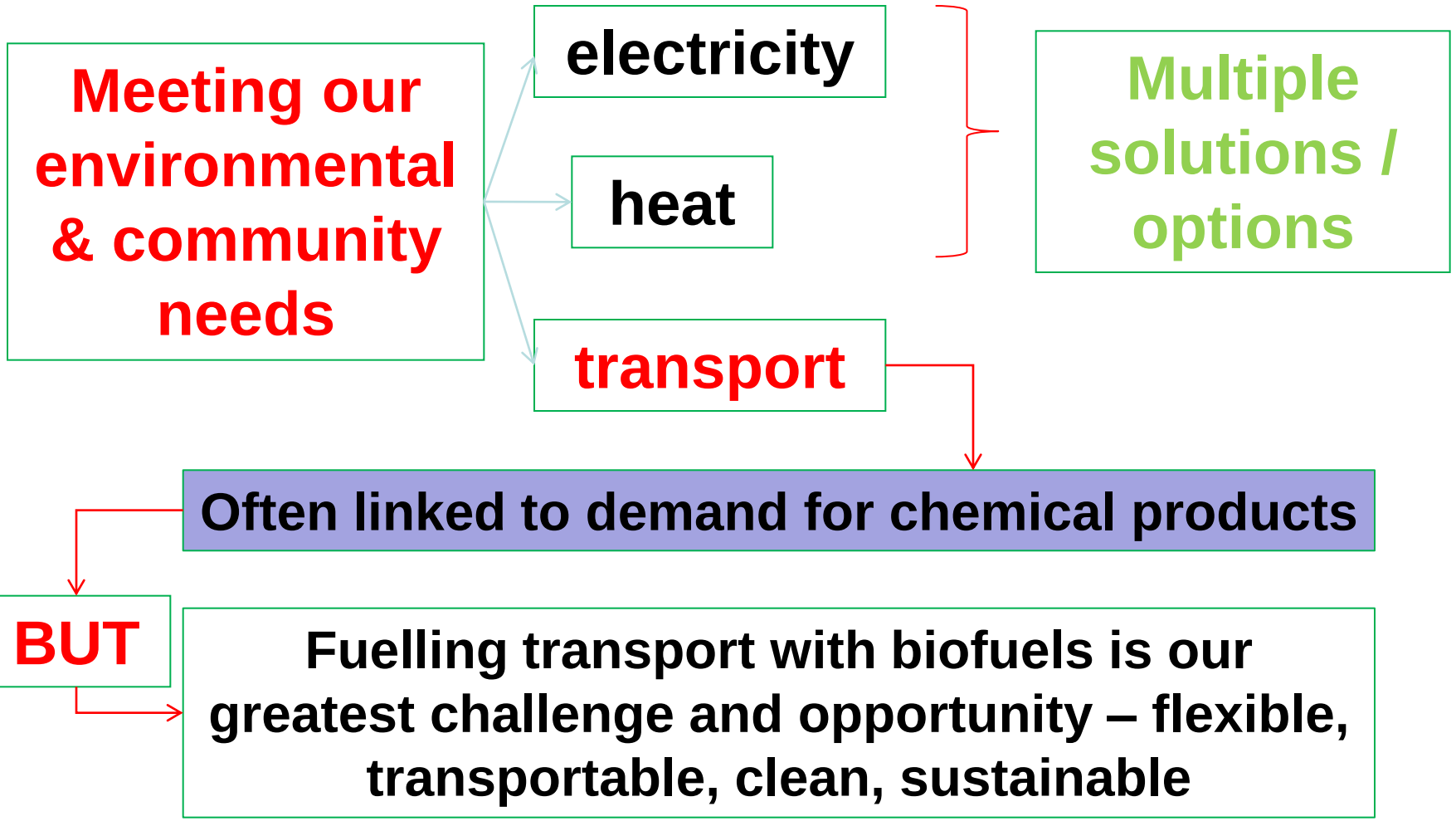
The bioenergy opportunity



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Key messages

- The use of natural, renewable resources to produce economic, employment and environmental benefits for the New Zealand community
  - Linked to additional value from forestry and land use
  - The value of current biofuels to provide a platform for future growth
  - Integrated land use and energy
- Bioenergy provides heat, electricity and fuel for transport
- A platform for achieving environmental benefits
- There are some easy wins and a credible path towards;
  - The '50 by 50' emissions target
  - Broadening the Business Growth Agenda
  - Future energy security and 'energy resilience'
  - Reducing international trade risk
- Bioenergy expertise is among the best in the world and uses proven technologies.

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Bioenergy will take New Zealand into a post petroleum era

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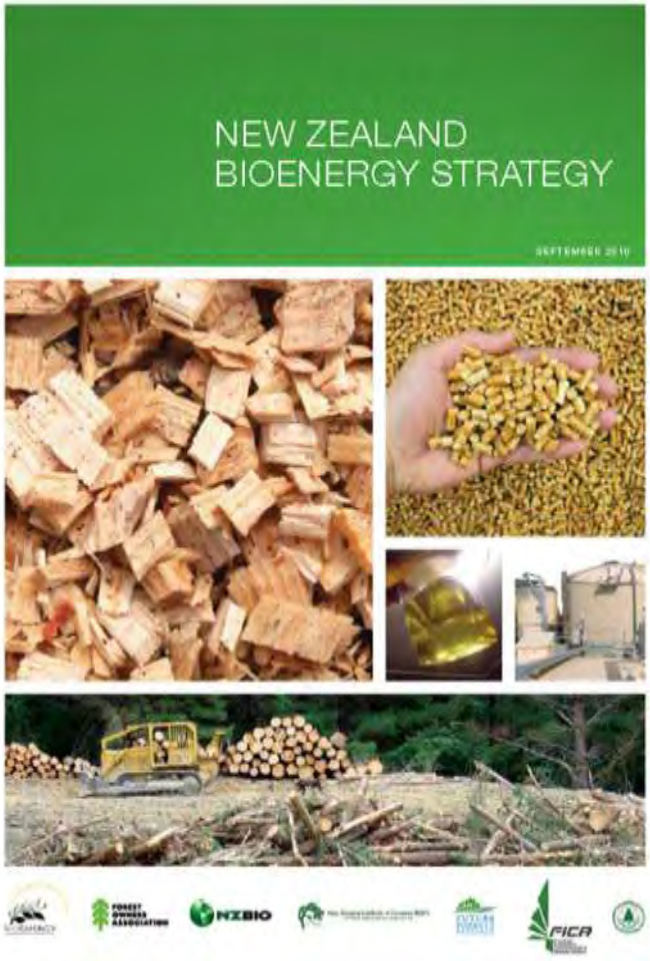
Wasted natural resources – could provide economic growth and employme

Achieving economic, employment and environmental benefits via bioenergy



This Strategy will realise :

- economic growth, employment and regional prosperity;
- Supplies 25% of the country's energy needs,
- Supplies 30% of transport fuels, by 2040;
- based on existing capability in forestry, wood processing and converting organic by-products to energy
- Takes NZ into a post petroleum era

A $6 billion sector

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Bioenergy in New Zealand

- Biogas
  - production comparable to Europe per capita
  - 4.6PJ across NZ cf 5.5PJ residential natural gas consumption
- Wood fuel : Currently supplies 10.4% of all NZ's energy
  - Well established conventional heat technologies in the wood processing sector
  - Number of demonstration projects (schools, hospitals, rest homes)
  - Establishing wood fuel market (quality, reliability, price)
  - Heat market is platform for new advanced biofuel technologies
  - Potential to do much more, with a huge untapped resource
  - Further growth hindered by wood energy often not being considered
- Liquid biofuels
  - Current bioethanol and previous biodiesel supply could have provided foundation for future advanced biofuels market
  - Forestry and wood processing sector driving R&D – Woodscape, Norske Skog PGP project
  - Marine and rail bio-oil application under development

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New Zealand Bioenergy Benefits

- Multiple national and local benefits – and not just energy
  - National and regional economic growth (new factories, local jobs, etc)
  - Business growth and financial resilience (low cost renewable energy)
  - Environmental : reduced emissions to air, waste reduction, water clean-up
  - Clean, green, low carbon economy, countering 'food miles' etc
- Additional value for forest & land owners
  - 20% of wood is currently wasted (a major opportunity, especially Iwi)
- Economic growth from world leading fibre-growth abilities
  - Opportunities for bio-oil, bio-chemicals, bio-plastics etc ("Bio-materials")
  - Co-product with traditional farming = extra revenue stream for farmers
- BUT most national benefits are not realised
  - A "Rational Choice" for a company is not the same as a rational choice for NZ
  - Energy users don't care about non-cost benefits (jobs, energy diversity etc)
  - Limited added value processing minimises economic benefits, and employment

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Hedging international trade

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Bioenergy Policies

- Weakly supported by Government policies
  - NZ Energy Strategy and NZ Energy Efficiency and Conservation Strategy (NEECS) – who can remember them
  - Endorsement of Bioenergy Strategy
- Policy gaps
  - Not linked to Business Growth Agenda – where it is very relevant
  - Only ad-hoc links to non-energy policies (Climate change, air & water quality, waste minimisation)
  - Not integrated into transport strategy – which currently focuses on infrastructure
  - NEECS has a 8PJ target of new bioenergy by 2020 – but there are no policies to deliver this
  - There is a "50 by 50" carbon reduction goal – but no credible policies to deliver this
  - Government perceived as not being interested
  - Diffuse sector requires aspirational leadership by Govt – sector can then deliver

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Transport Biofuel

- Was a small but growing industry – now collapsed
- Users included vehicle fleets, fishing fleets, tourism ventures
- Based on a Government target that was never achievable
- '*conventional biofuels' :* waste cooking oil, whey from the dairy industry, rape seed oil (canola), tallow
- '*advanced biofuels'* sourced from **wood**
- Internationally advanced biofuels being driven by forestry and wood processing sector
- In NZ bio-oil for marine and rail applications likely to be easiest path to market

Liquid biofuels could deliver a third of the '50 by 50' target

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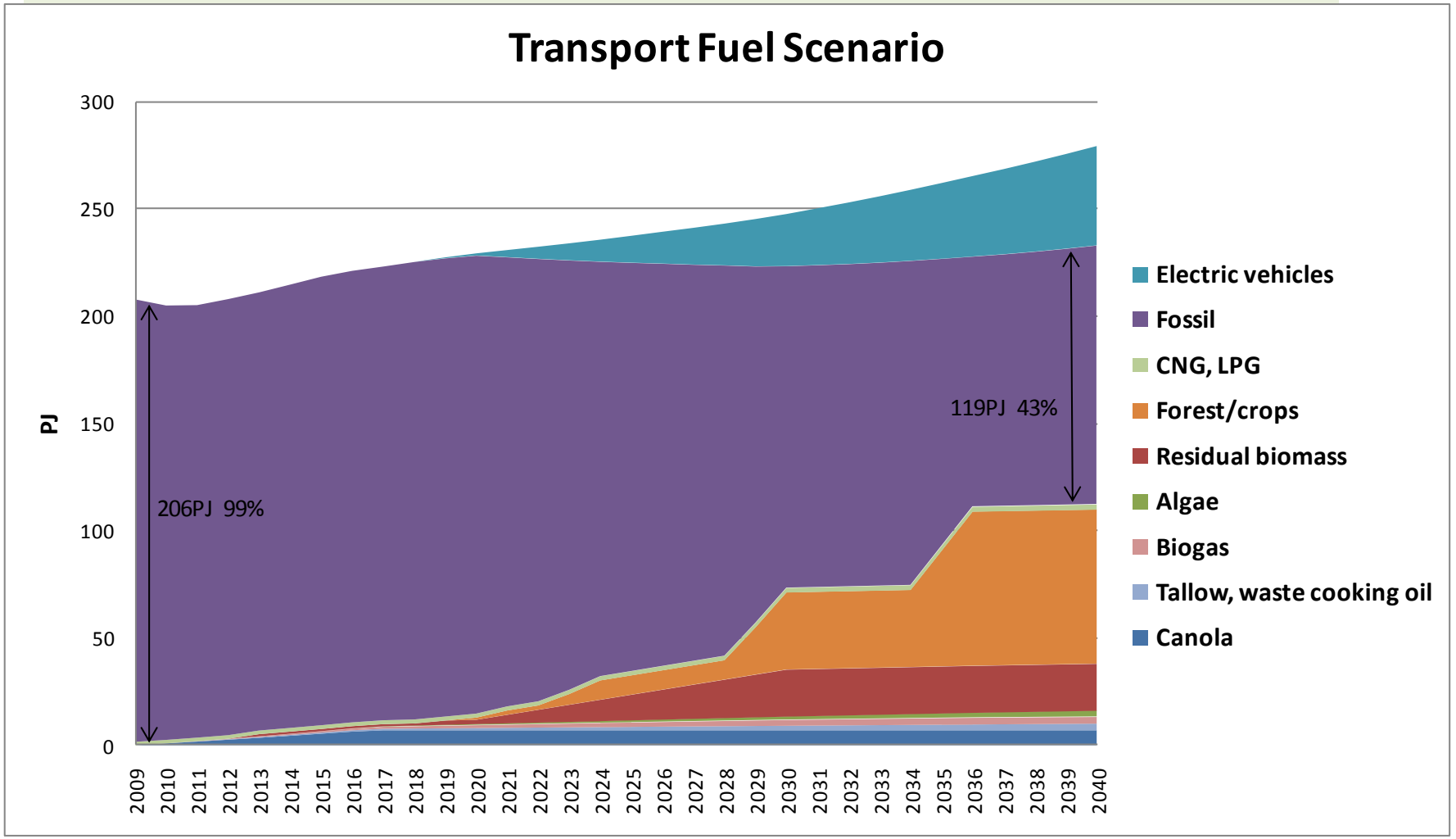
Transport biofuel opportunity



Biogas energy from biowaste and wastewater

- Increases revenue and reduces costs (Industry)
- Energy self-sufficiency for municipal wastewater treatment
- Best industry practice and is 100 % pure (Marketing advantage, exports)
- Reduces pressure on NZ landfills (GHG emission reduction)
- Reduces water & electricity consumption in dairy farming
- Investment payback in council digesters within 5-7 years
- Investment payback in dairy farm digesters within 7 years
- Reduces water pollution in areas with intense dairy farming

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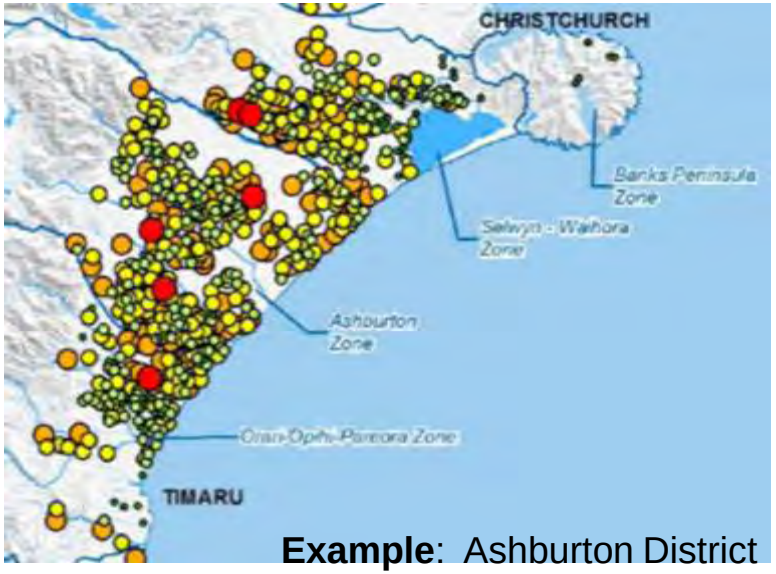
Energy from dairy farm eEffluent – extract value, reduce costs, add revenue



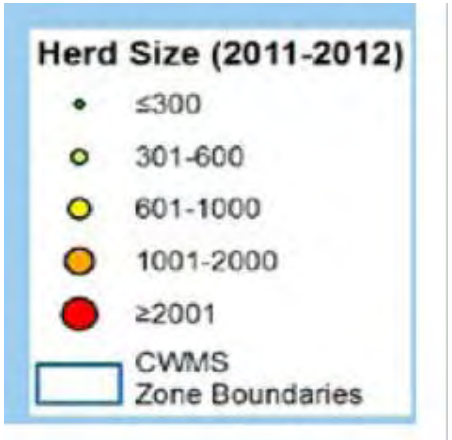
Example: Ashburton District

Dairy cows milked in 3 km radius from central co-digestion plant

National rural opportunities:
1.5 PJ/annum

2 million MWh electricity/annum

“Buy In” from Power Generators and Farmers (reduced water use)



Source: Spiire New Zealand

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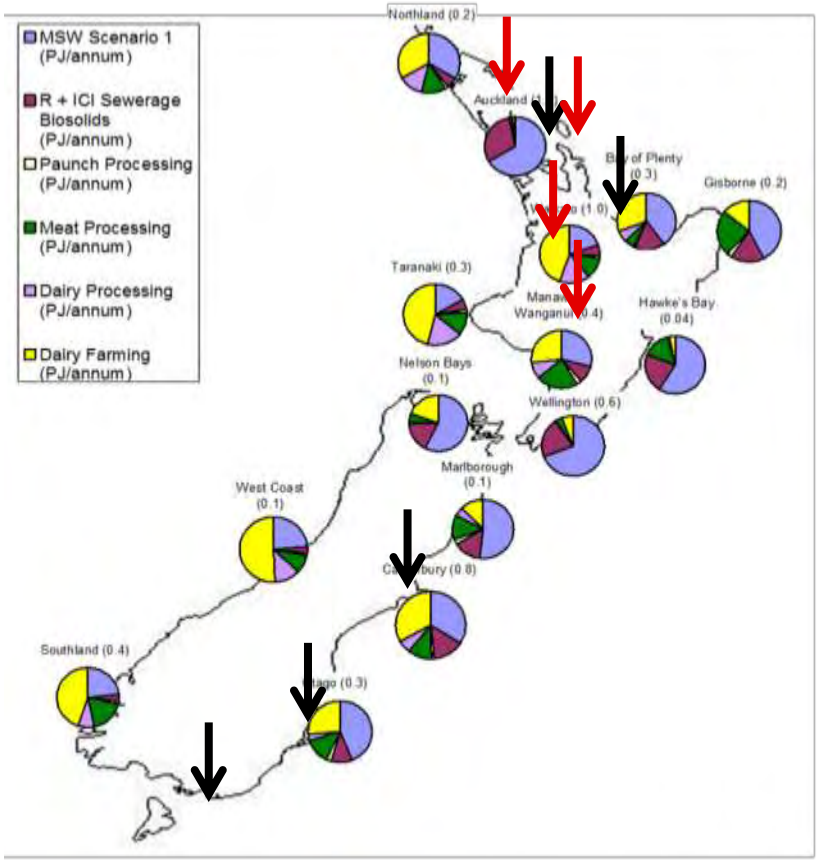
Energy from industrial biowaste – extract value, reduce costs, add revenue

National regional opportunities:
2 PJ/annum

"Buy in" from Councils and waste management

↓ Council WWTP digesters without biowaste digestion

↓ Council digesters where potential is partially used



Regional breakdown of current Nett methane biofuel production potential from major wastes in regional areas. The process energy required for methane production (power, heat) is already subtracted.
The estimated total recoverable methane energy value for each region is given in PJ methane/yr in parenthesis
Values were calculated using MSW Scenario 1 and biosolids processing from domestic sewage + ICI sewage.

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Wood fuel market

- The big opportunity is from wood fuel
- Based on proven conventional heat technologies
  - Adequate equipment suppliers and O&M capabilities - not R&D
  - Currently economic in many niche situations
  - Large green fields plant economic but fuel supply risk
  - Long experience of use of wood as fuel in NZ
- Forest harvest and wood processing residues often considered as waste and not a valuable resource
- Heat is ignored cf electricity
- Wood fuel supply quantities greater than many gas fields
  - Less risk - clearly seen and understood
  - But no royalties
- 830,000 to 3,000,000 additional hectares of land that could grow additional plantation forests

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Wood energy - size of the prize

Total NZ Boiler Capacity *(source BANZ Heat Plant Database)*	4,900 MW
Wood-Fired Boilers in the Wood Processing Sector	1,300 MW (27%)
Total Wood Fired Boilers outside WPS (approx)	80MW

- Wood is well used in Wood Processing Sector (WPS)
- But only 80MW of 3600MW outside the WPS – just 2.2%
- 3500MW switching potential !
- Woody biomass from logging residues could contribute up to 32 PJ of energy
- Roughly 28 PJ of current coal fuelled energy demand could be replaced by biomass. The resulting job creation would be at least 3,200 -7800 permanent jobs per year.

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Wood fuel market issues

- Despite wood residues being well used by wood processors residues have not been a traded commodity
  - Perceived as a waste stream rather than as valuable renewable energy
- Trading of wood residues is fledgling
  - Supply chain is emerging
  - Economic and environmental benefits are not quantified, so not understood
  - Contracts are poorly developed and incentives to improve value are lacking
- An under developed market
  - wood processors who use chip for their products eg MDF are concerned that fibre used as wood fuel will push up the price of chip for them
  - Perception that sources of wood fibre available from residues are limited
- Opportunities for additional and integrated land use
  - Woodlots and shelter trees additional to existing agriculture and horticulture
  - Additional revenue stream for land owners
  - Energy plus food and logs

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How to capitalise on the economic growth opportunity

- Public support statements
  - Paradigm shift in thinking from energy to economic growth, employment and environmental outcomes
  - Will encourage new thinking by forest and wood products sector, and investors

  (Eg Southern District Health Board move to wood fuel after questions from Minister)
- Govt procurement : mandated to be considered
  - Hospitals, schools, pools, libraries, prisons, barracks, car fleets etc
  - Provides role models
- Establish Funding to support the transition to Renewables
  - Accelerated depreciation
  - Reinstate, and ideally boost, the EECA wood energy programme
  - Establish a "Green Fund (suspensory loans) " to leverage private capital – would address a key barrier

This will enable bioenergy to under-pin economic growth for NZ

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