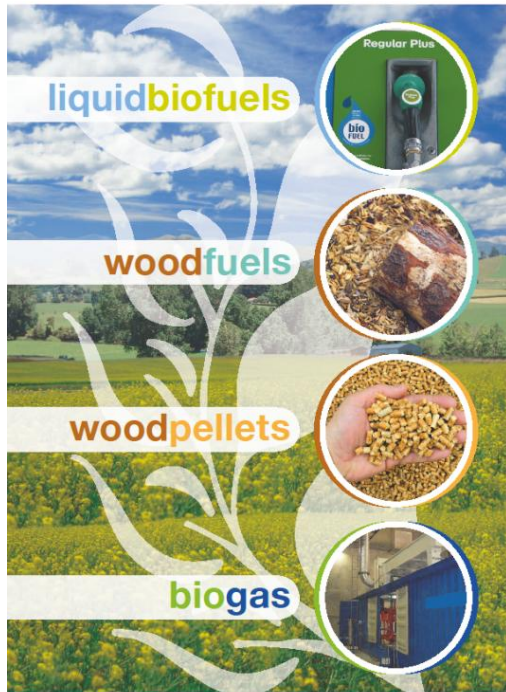




NZ Bioenergy Strategy and the key science/research role



Brian Cox









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17th November 2010

www.bioenergy.org.nz



The NZ Bioenergy Strategy – the Developers

<p>BANZ</p> 	<p>NZTE</p> 	<p>NZIF</p> 
<p>FOA</p> 	<p>NZFFA</p> 	<p>NZBIO</p> 
<p>FICA</p> 		<p>FFR</p> 

Multiple national economic benefits are realised via bioenergy:

- By extracting additional value from existing wood, organic wastes, and diversified land use
- Leading to economic growth from new energy crops
 - Economic and employment value from under-utilised land
 - Increased value to forest owners from bioenergy and biomaterials
- Waste reduction - > value of energy + byproducts
 - Municipal
 - Clean integrated solutions for rural applications
 - Food processing
- Benefiting from O'seas climate change commitments

a \$3-5billion industry (transport fuel, wood energy, waste-to-energy)

The Bioenergy Strategy Vision

By 2040, bioenergy supplies more than 25% of the country's energy needs, (including 30% of the country's transport fuels), and export of wood fuel and biofuels

How? – Builds on New Zealand's capability and expertise in growing and processing wood-crops and converting organic by-products to energy

Maximise current feedstock potential

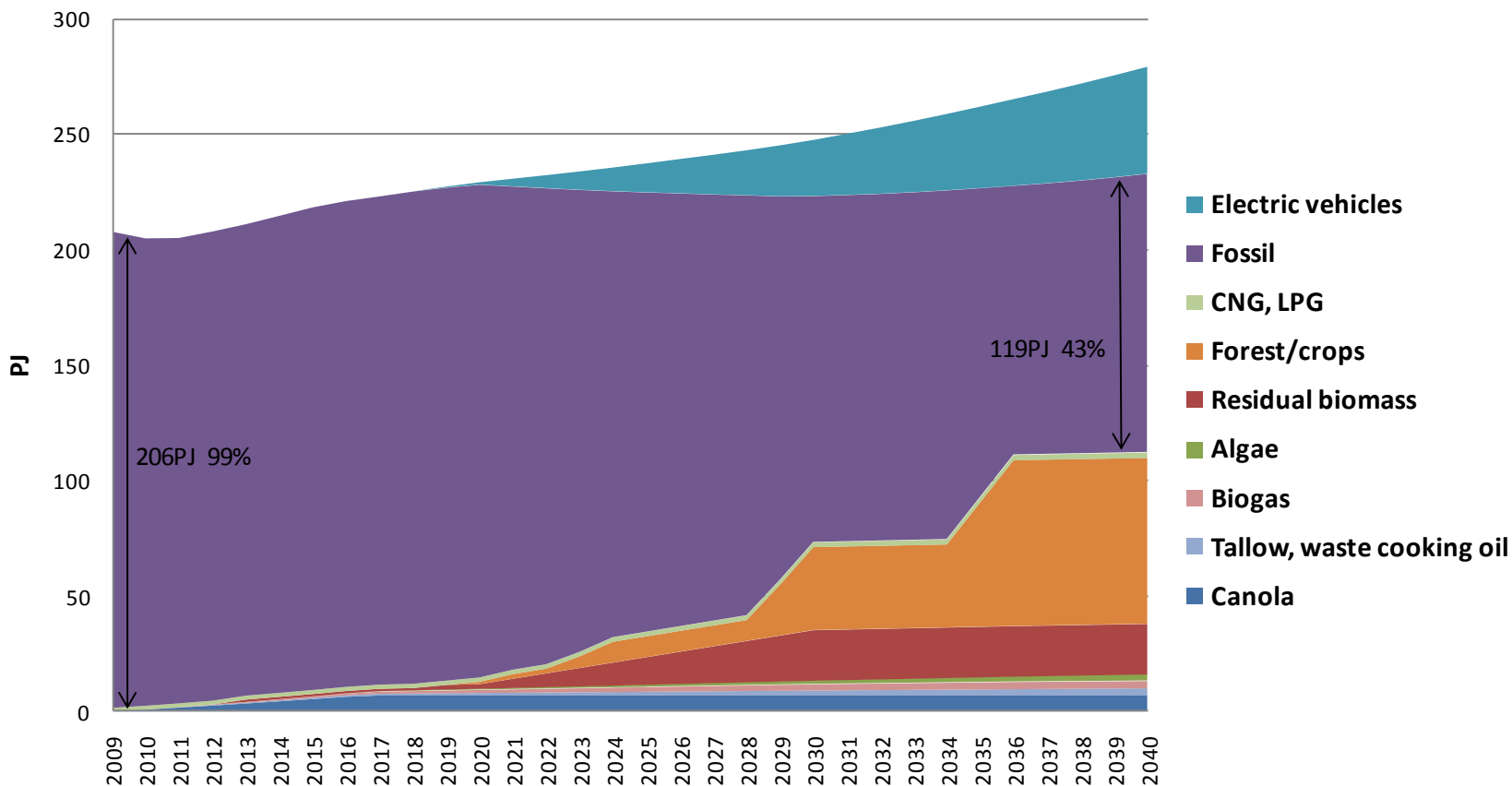
- Expansion of wood fuel for heat:
 - Forest harvest and processing residues
 - 60% increase in biomass use to produce heat
- Biogas – municipal, dairy waste, food processing residues
- Liquid biofuels
 - biodiesel – used cooking oil, animal fats, canola, forest residues
 - bioethanol – whey, black liquor, forest residues
 - Export of biofuel production capability/skills
- Utilising organic waste
- Export of wood pellets/chips

Realising new feedstocks potential

- Stimulate production of value added bio-materials
- Use of clean technology for processing waste - biogas
- Bio-oil from forest residues and black liquor
- Volume transport fuels production from lignocellulose
- Development of algae knowhow

The transport biofuel challenge

Transport Fuel Scenario



The biofuel market

- Bioethanol
 - Includes Bioethanol
- Biodiesel (*via trans esterification*)
 - Often blended with diesel
- ‘Drop-in’ Biodiesel
 - Same structure as mineral diesel
 - Can be used 100% as drop in
- Bio Oils
 - Used directly as a bunker fuel

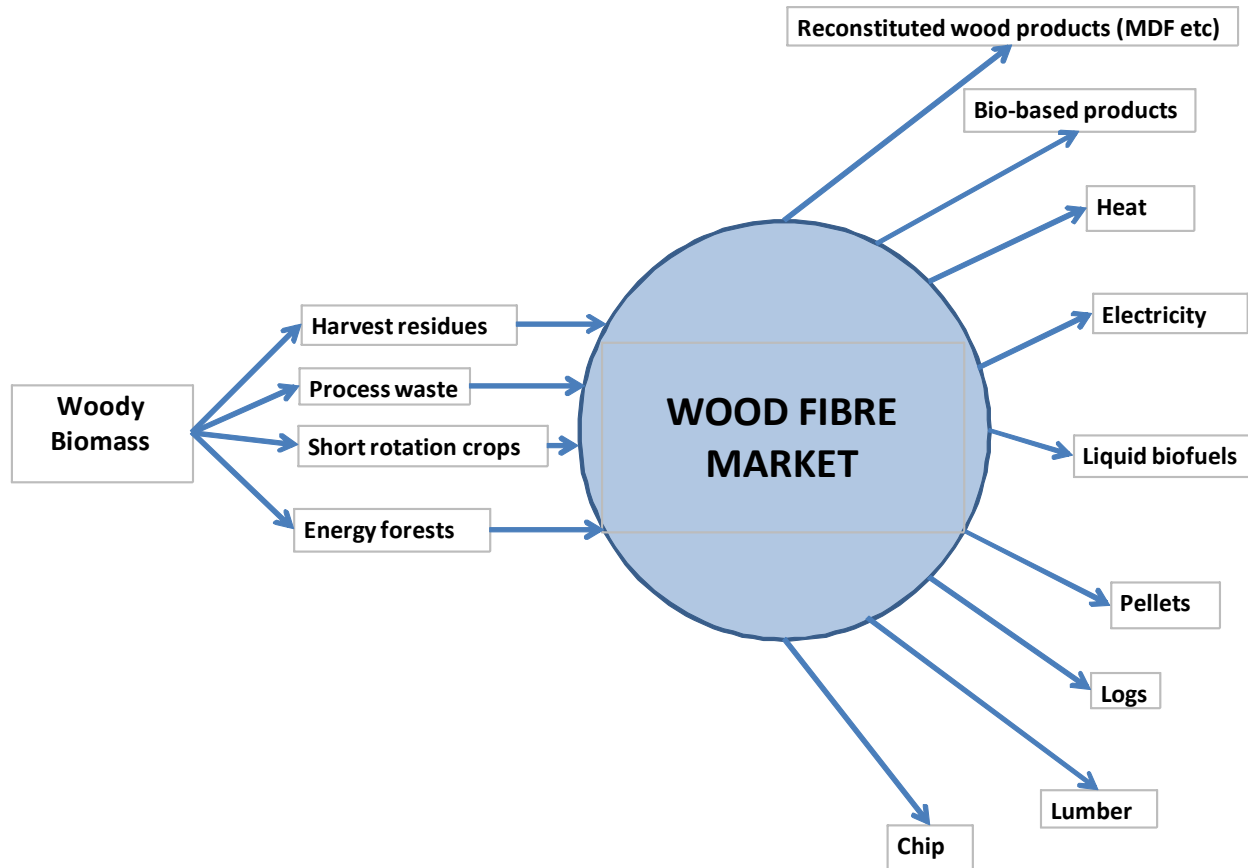
Bioenergy delivering national benefits

- Maximising wealth from natural resources
- Extracting additional value from existing wood, organic wastes, and diversified land use
- Maximising land value and opportunities
- Develop employment opportunities
- Economic growth from new energy crops
- Turning organic wastes into resources
- Cashing in on o'seas climate change commitments

Strategy Success relies on

- Aspirational/Inspirational leadership by Government
- To be clearly defined as part of an overarching forest industry
- Greater technology capability to assess wood-to-energy conversion technologies
- Linked to waste minimisation, land use and biomaterials strategies
- Support for existing SME players and new investors
- Encouragement to existing corporate players to grow
- Valuation of investor and national benefits

Changing our thinking about wood



The bioenergy strategy will

- Provide additional revenue streams for forest and other land owners
 - Greater value from existing forestry
 - Economic growth from improved land use
 - Increase business resilience and wealth obtainable from diversified land use
- Use bioenergy as a leader into the wealth potential of the wider bio-economy
 - Production of value added bio-materials
- Increase the utilisation of residue for production of energy so that waste is eliminated
 - Reduce environmental impacts to air, soil and water
 - Enhance the quality of New Zealand's 'Green Image'

Phased delivery

FOUNDATION BUILDING PHASE: to 2015

- Extend current initiatives
- Continue research, but directed also to crops and biodiesel, including feedstock supply chain
- Establish business case for liquid biofuels
- Secure Government and investor support

DEVELOPMENT PHASE: 2015 to 2020

- Extensive planting of fuel crops and new energy forests
- First liquid bio-fuel plants committed
- Attract investors

EXPANSION PHASE: 2020 to 2040

- Progressive:
 - Fuel crop harvest increases
 - Introduction of regionally located liquid biofuel production plants
 - Reduction in CO₂ emissions

Delivering the Strategy

- Immediate action
 - Need to engage wood/forestry sector at all levels
 - Landowners need to see the value proposition
 - Signals to ensure investors have confidence
 - Extension of BAU for current technologies
- Longer term action
 - Need a community of interest and Government support
 - Need visible signs of success, eg Solid Energy, Flotech, Lanzatech
 - Need to develop science capability

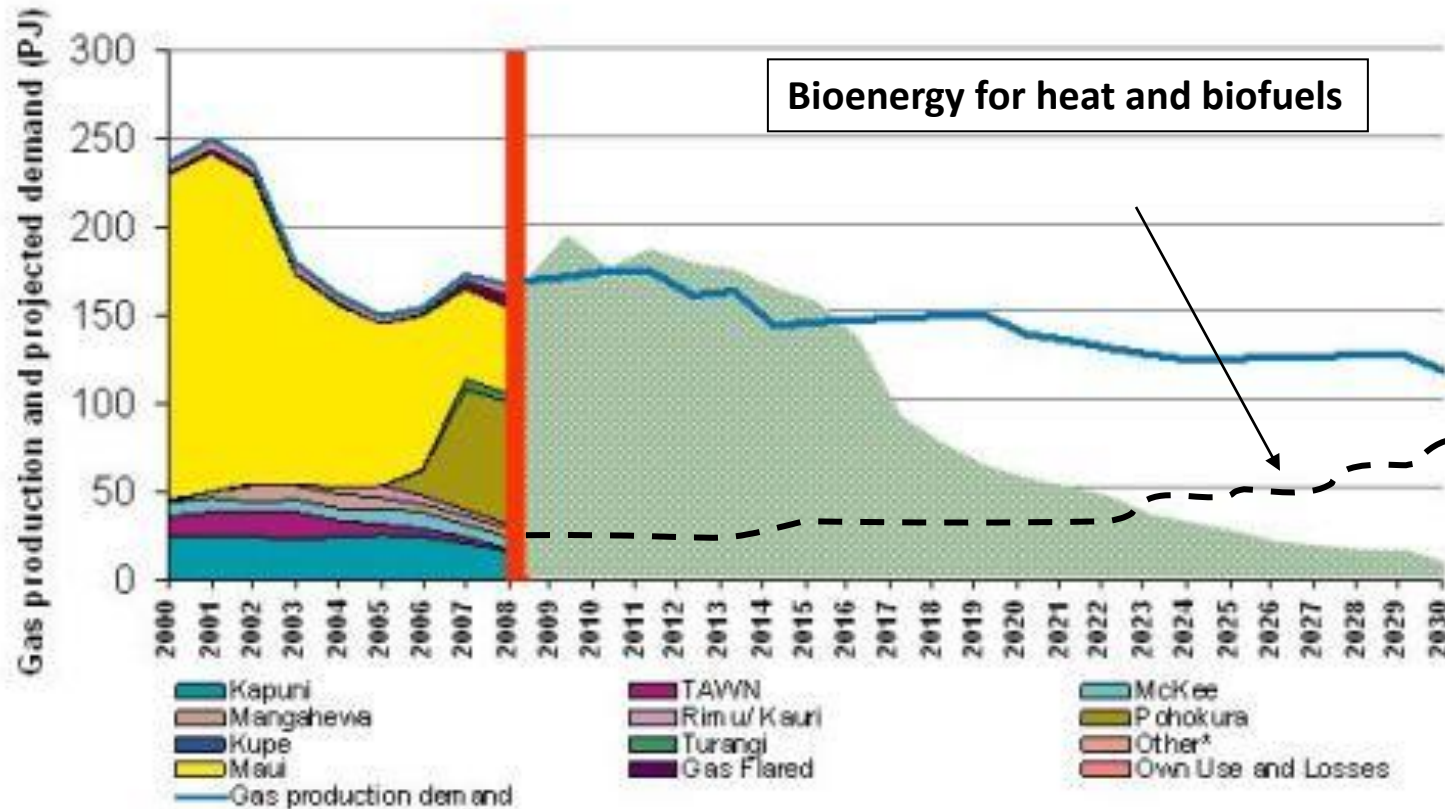
...a challenge, but not beyond our reach

Immediate opportunities

- Export:
 - products (eg pellets to EU and Asia),
 - skills (eg biodiesel/bio-oils ‘know how’ to Pacifica/Australasia, biogas skills worldwide),
 - technology (eg gas compression and generation systems, worldwide)
- Technology commercialisation:
 - Invest, collaborate internationally, apply
- Business development :
 - Develop skills, motivate, engage and demonstrate

Bioenergy in context

New Zealand's historical and projected gas production



*Others includes Kaimiro, Ngatoro and Fadnor

Our Future

NEW ZEALAND BIOENERGY STRATEGY

SEPTEMBER 2010



“Economic growth and employment built on New Zealand’s capability and expertise in forestry, wood processing and bioenergy production - leading to new business opportunities which by 2040 supply more than 25% of the country’s energy needs, including 30% of the country’s transport fuels”.

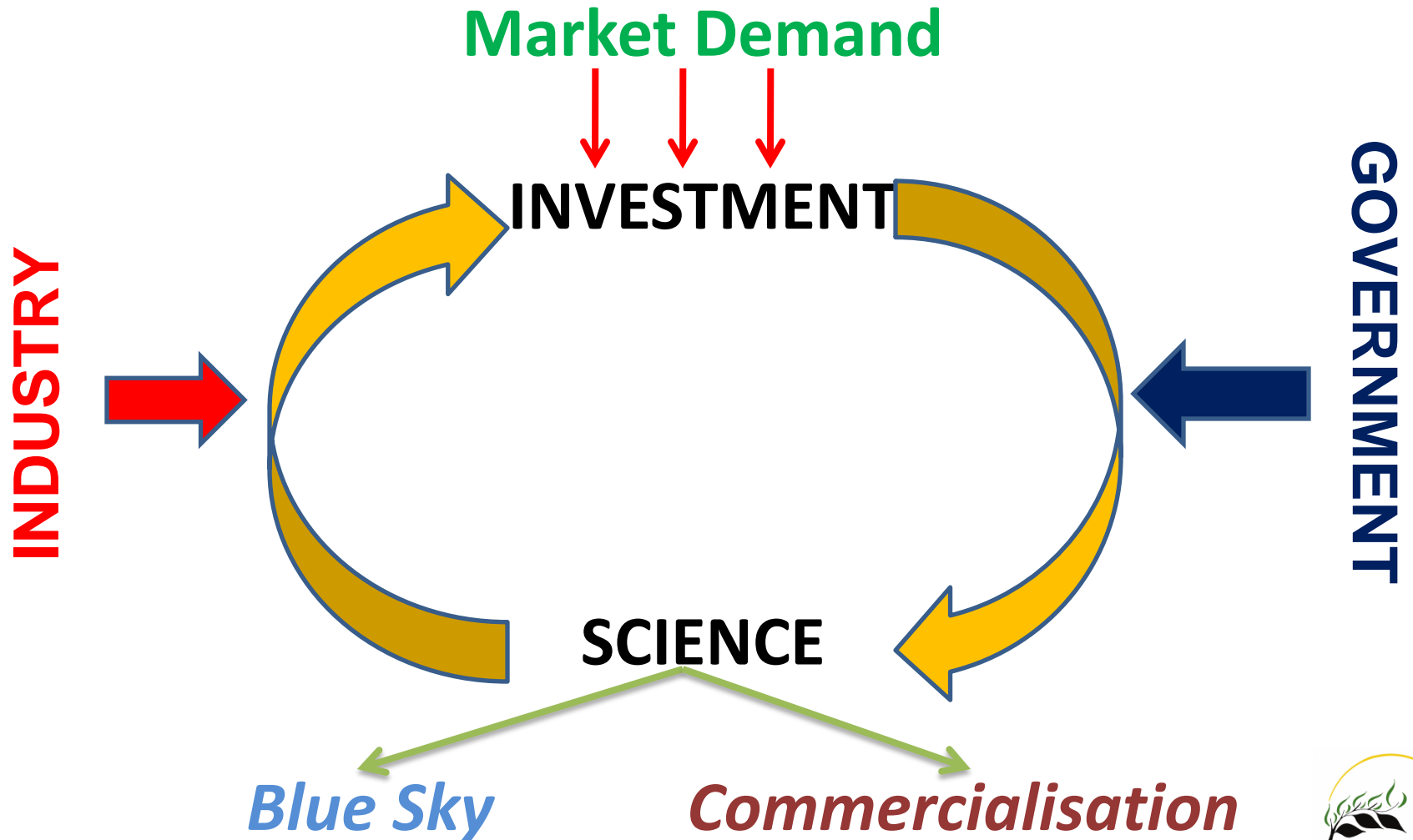
Our future?

- a \$3-5billion industry (transport fuel, wood energy, waste-to-energy)
- 25% energy needs sourced from bioenergy
- 30% of transport fuels from wood

The challenges

- What comes first
 - Investors or the science
- Lack of corporates in the bioenergy sector
- The challenges of commercialisation
- International transfer of knowledge
- Economics drive demand
 - A great idea but who wants it
- Short & long term thinking

Fitting it all together



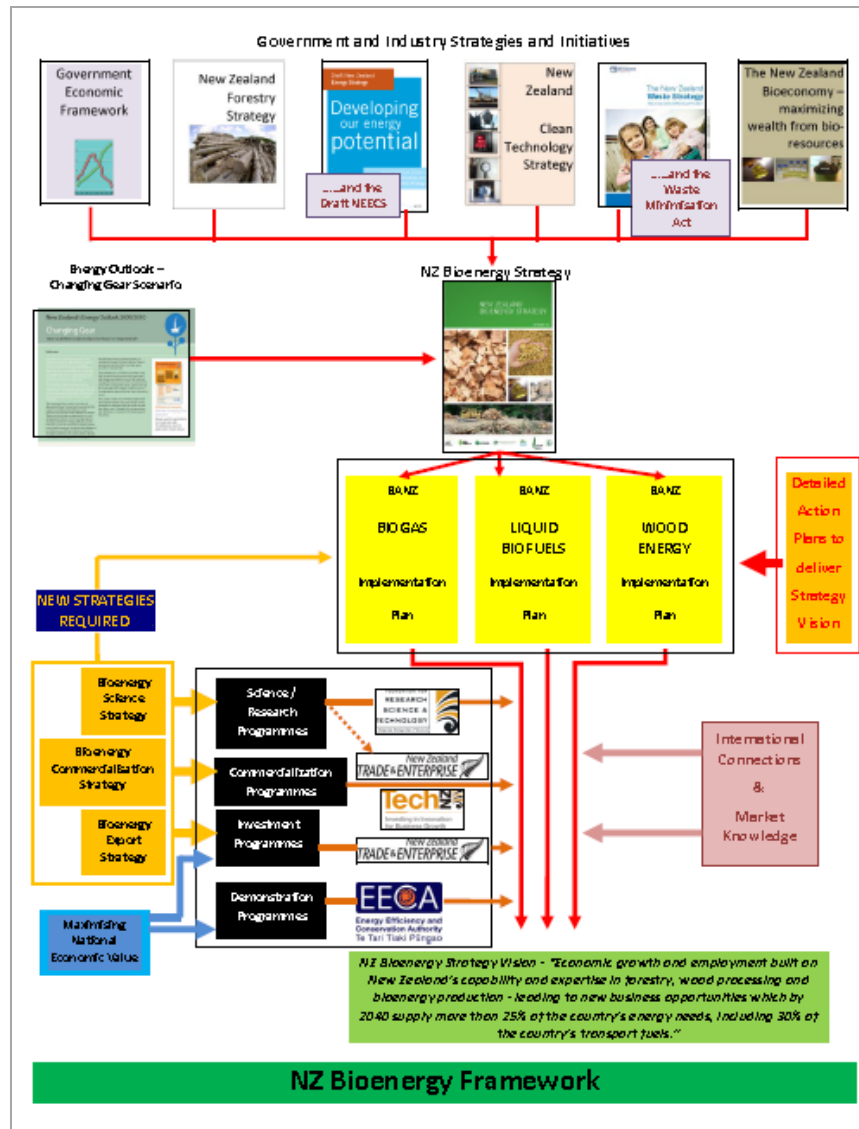
Integration of science and investment

- Science is a key part of the Strategy success
- Strategic investment in future blue sky research directions is essential
- Priority for research and development should be on commercialisation activities in the Foundation Building Phase (Phase 1)
- Research focus on:
 - products, methods and technologies
 - Innovation and application
 - commercialisation

The tools available

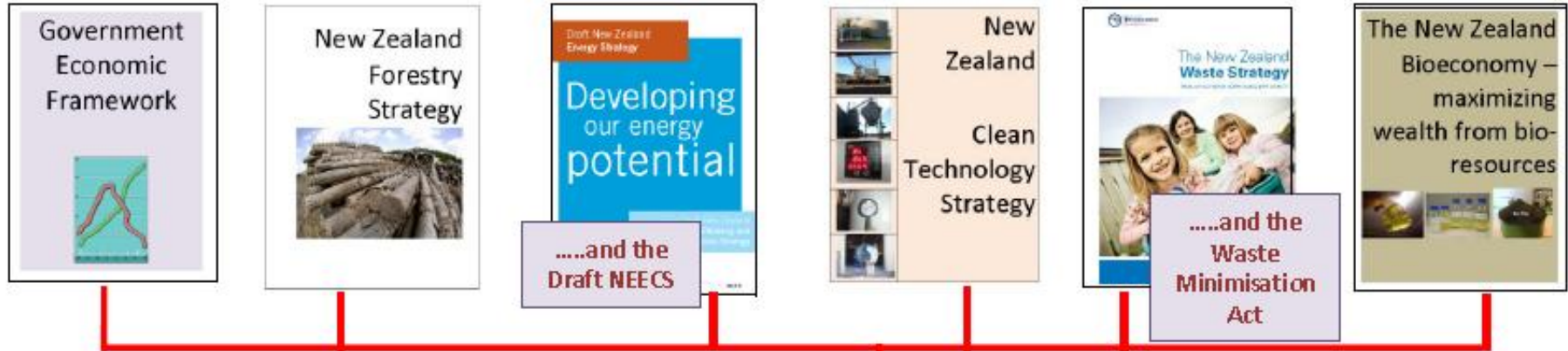
- Training and skills development to build capability
- Close collaboration between research and NZ bio-industry is essential
- Make sure we are all part of the same plan working to the same goal – need co-ordination
- Opportunities for international partnerships

Bioenergy Framework



Bioenergy Framework – part 1

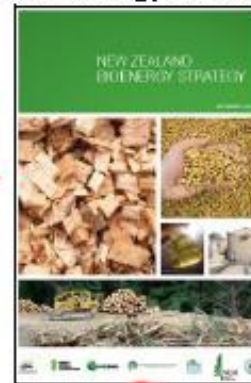
Government and Industry Strategies and Initiatives



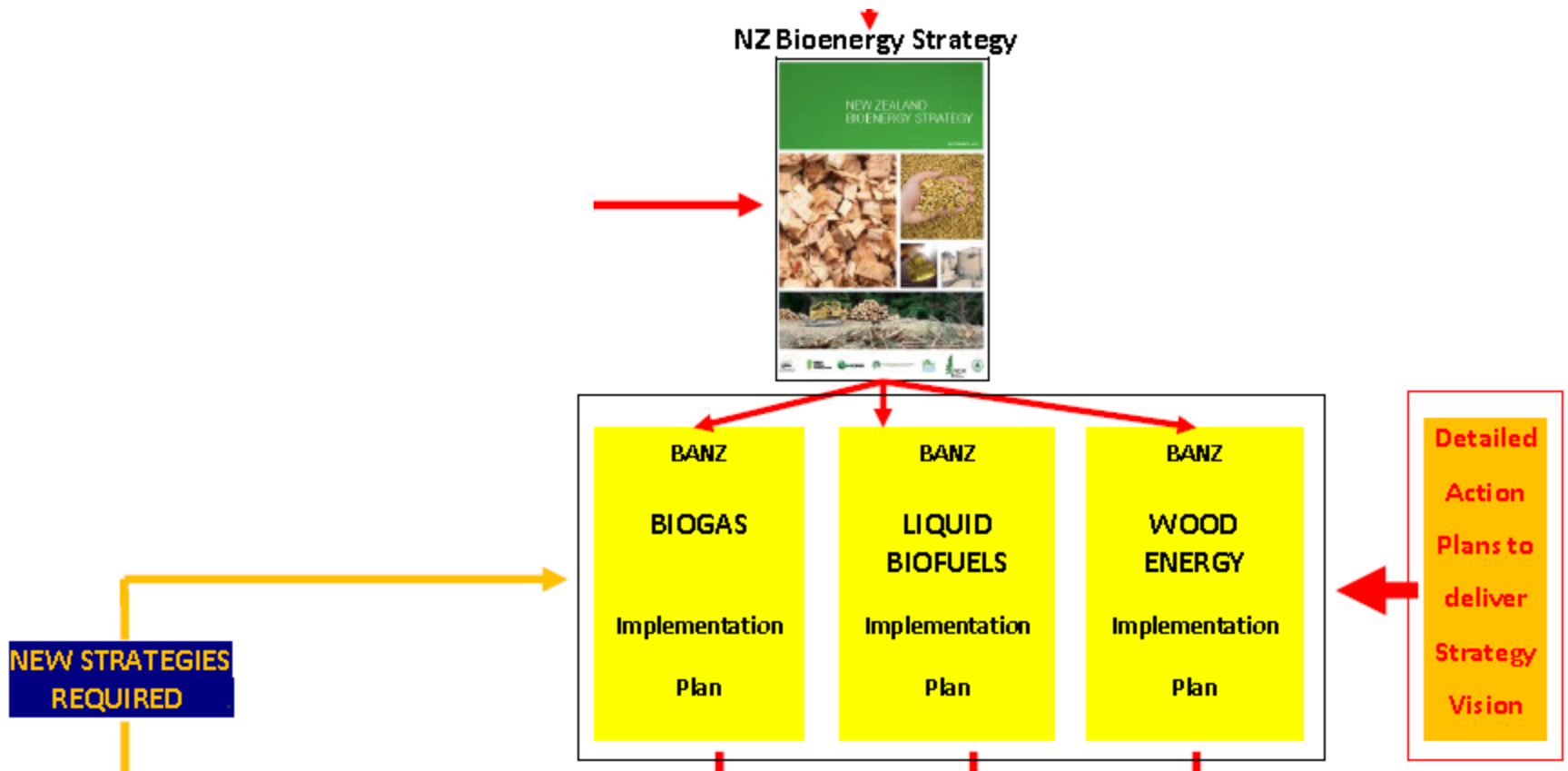
Energy Outlook – Changing Gear Scenario



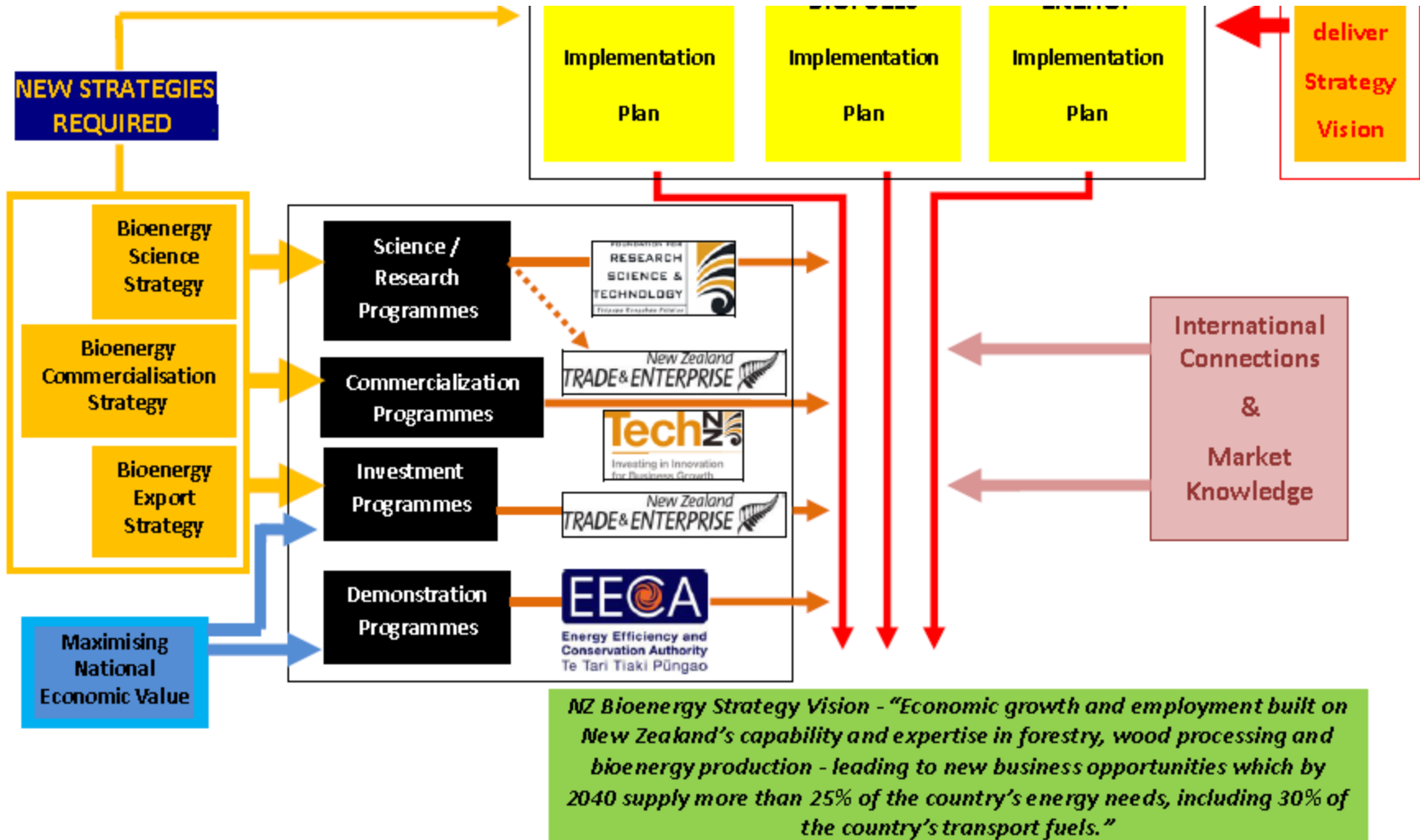
NZ Bioenergy Strategy



Bioenergy Framework – part 2



Bioenergy Framework – part 3



Developing a bioenergy science plan

- Who?
- What?
- When?
- Why?

- Blue sky -----→
- Commercialisation ----→