Centre for Sustainability
Kā Rakahau o Te Ao Tūroa

Future Proofing New Zealand's Food Systems

Identifying energy-related risks and opportunities

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This project:
– scoping the food/energy nexus

- Investigate energy use throughout the food value chain
  - Production
  - Processing
  - Post-processing
- Desktop study to update and quantify the current situation
- Engage stakeholders to assess the need for further research

Outline

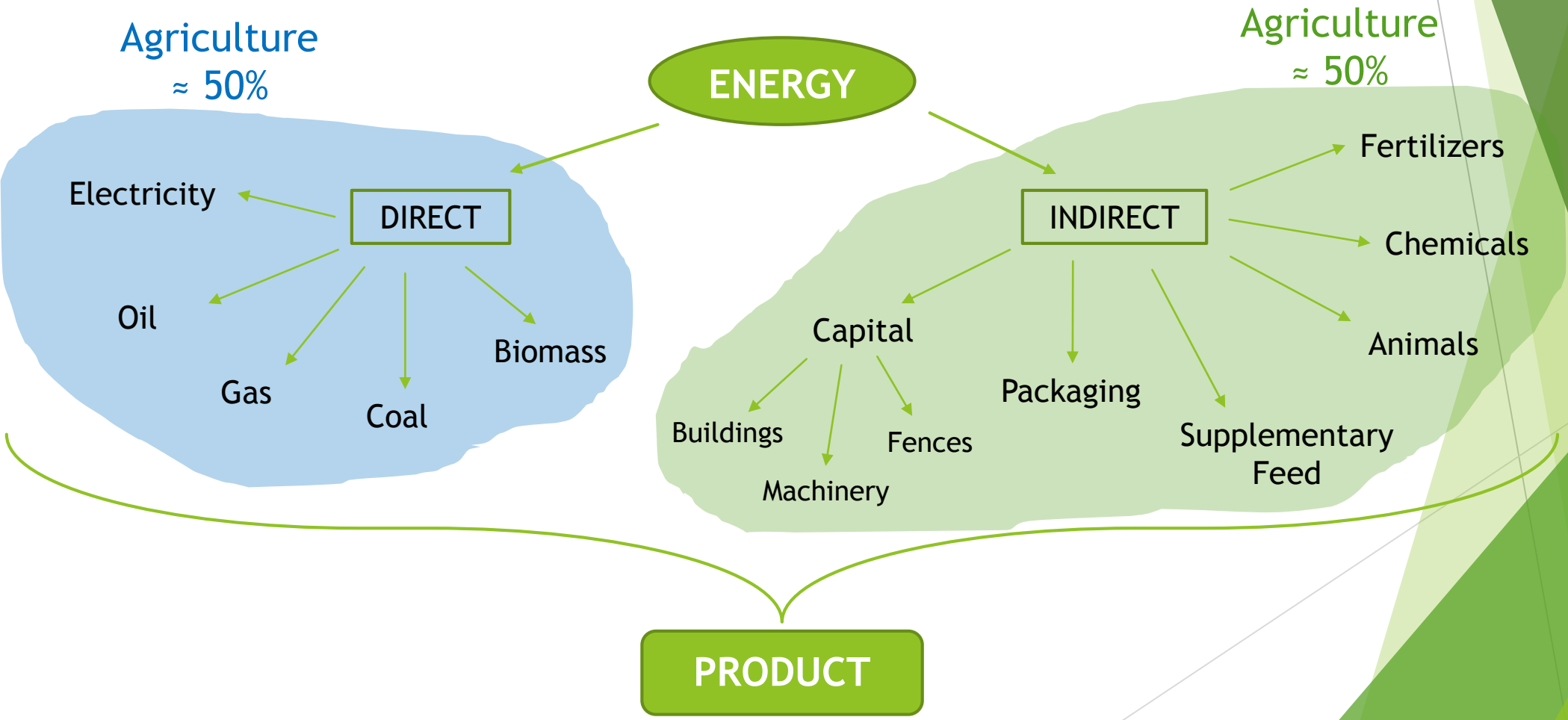
- New Zealand context
- What is energy?
- Energy in production, processing and distribution sectors
- Risks & opportunities
- The future of food systems

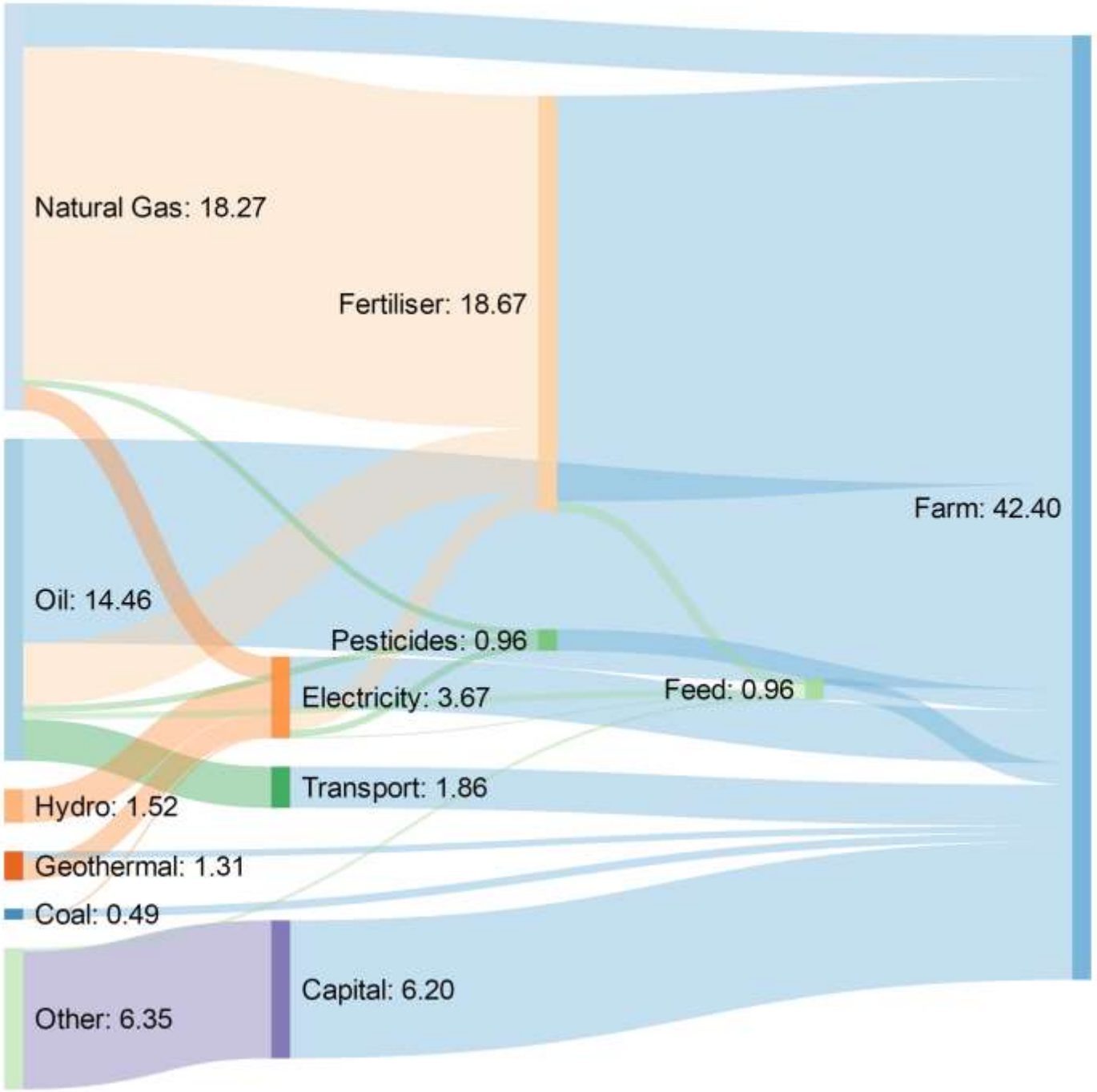
The New Zealand context:

BUT…

- Annual export value: $65 Billion NZD
- Half of exports related to primary food industries
- World leading food production system
  - Favourable climate and good soils
  - Predominantly pasture based
  - Relatively low input
- Long distance to markets
- Environmental degradation
- Agriculture alone is responsible for half of New Zealand's greenhouse gas emissions
- Emerging markets for 'sustainable' foods

What is energy?

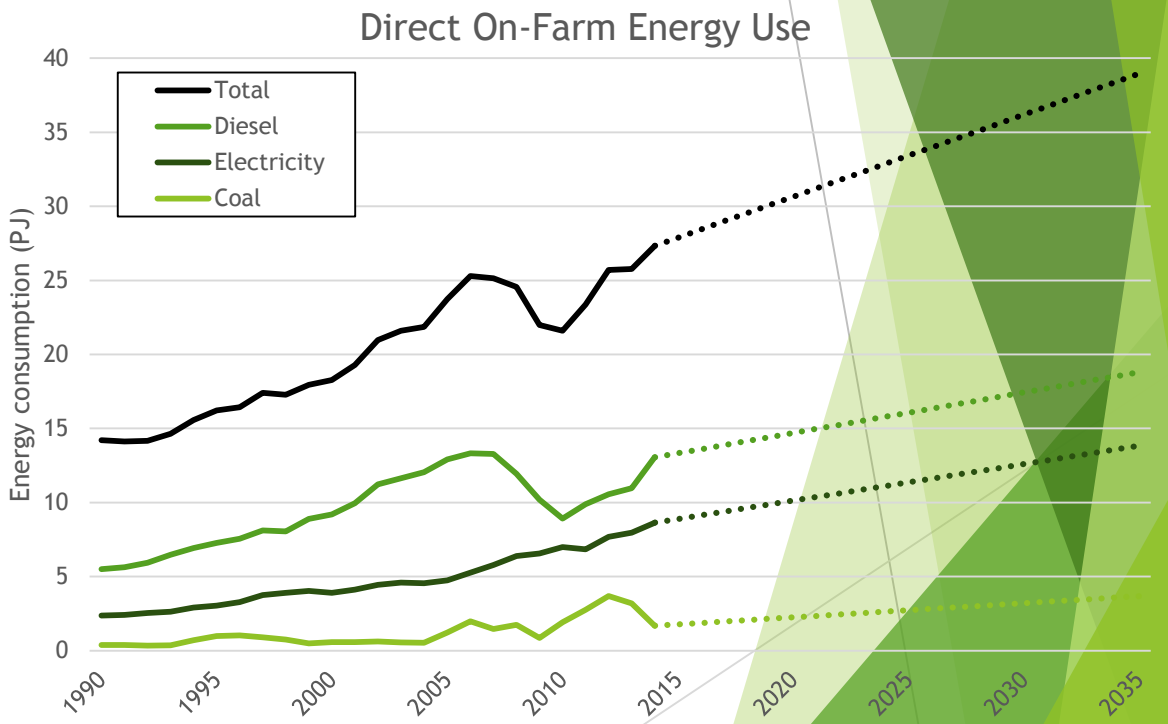



Natural Gas: 18.27
Fertiliser: 18.67
Farm: 42.40
Oil: 14.46
Pesticides: 0.96
Electricity: 3.67
Feed: 0.96
Transport: 1.86
Hydro: 1.52
Geothermal: 1.31
Coal: 0.49
Other: 6.35
Capital: 6.20

Food supply sectors

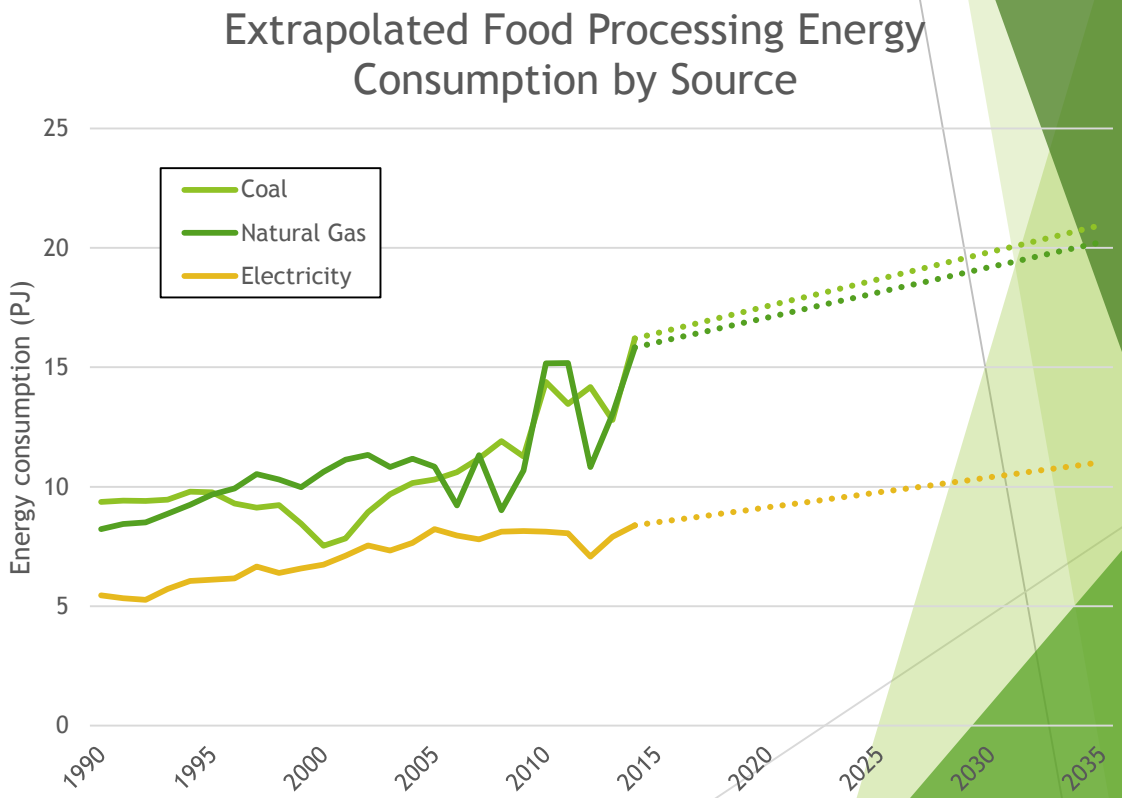
On farm energy use

- Direct energy inputs make up 4-9% of total expenses
- 10% of New Zealand's primary energy use
  - Half indirect
- Increasing electricity and diesel use
  - Growth in irrigation stressing the electricity networks
- 85% of all energy used in farming is non-renewable



Processing energy use

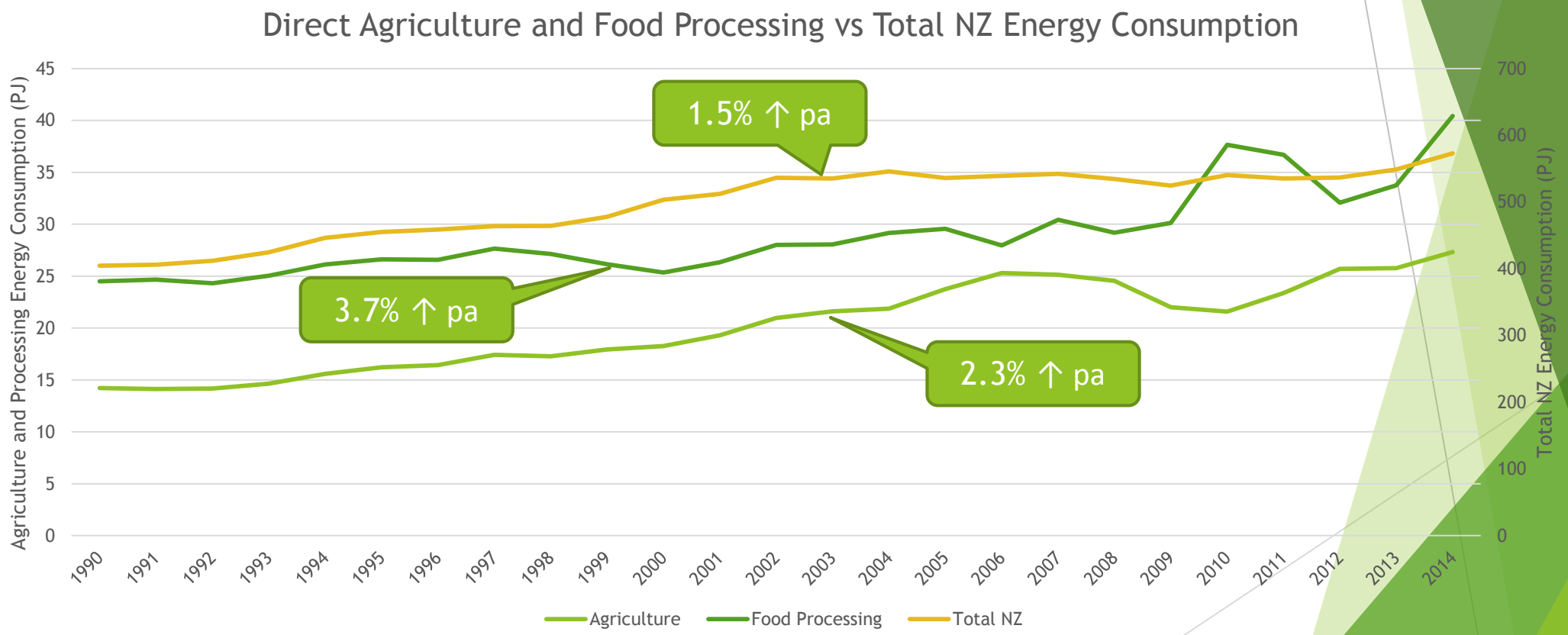
- Direct energy inputs make up 5-15% of total expenses
- 10% of New Zealand's primary energy use
  - Dairy and meat processing sectors make up over 70% of this.
- Most process heat comes from the use of coal and gas.



Distribution energy use

- New Zealand's economy is particularly reliant on international shipping due to our geographic isolation.
- Almost exclusively driven by fossil fuels, primarily diesel and heavy fuel oils for shipping.
- Around 70% of NZ food exports require some form of climate control during distribution

Energy use in New Zealand's food production



- Direct energy use increasing throughout New Zealand

Risks & Opportunities

- Building resilience through identifying and adapting to risks
  - Market access barriers
  - Environmental Issues
  - Climate change
  - Physical limitations

- Load shifting
- Fuel Switching
- Demand reduction
- Energy Production
- Packaging
- Waste

The future of food systems?

- Lack of understanding around energy thinking
- Waste streams exist throughout every stage of the food supply system.
- Conflict between productivity, profitability and sustainability
- Majority of energy used is from fossil fuels
- Need to decouple food production from finite resource inputs

Thank you

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