# The Role of Heat Pumps in Decarbonisation online conference

**Thursday 28 October, 2021, Hosted online by**

| | |
|---|---|
| Martin Atkins<br>University of Waikato | Decarbonising Process Heat |
| Don Cleland<br>Massey University | Matching Heat Pumps to Heating & Cooling Profiles in the NZ Food Processing Sector |
| Adrian Dickison<br>BECA | Heat Pumps, kWh and Ca$h : Tips, tricks and applications |
| Vincent Brockerhoff<br>SKOPE | 2 Door Cooler Energy History |
| Sam Lowrey<br>University of Otago | Refrigerative Dehumidifier Research |
| Richard Love<br>Massey University | Condensing Temperature Tradeoffs in Heat Recovery from Refrigeration |
| Tim Walmsley<br>University of Waikato | Efficient Industrial Process Electrification Through Integrated Heat Pumping |
| Jack Young<br>Energy NZ | Creating a Business Case for Industrial Heat Pumps |
| Mike Odey<br>Mike Odey | An Example Processing Plant Hot Water Supply Ammonia Heat Pump Modelled for New Industrial Plant Integration |
| Patrick Dempsey and Jack Ballagh<br>Fonterra | Heatpump Project – Hoiho 7 $MW_{th}$ |
| Zhifa Sun<br>University of Otago | Industrial Heat Pump Drying Processes |

# Decarbonising Process Heat


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**University of Waikato**

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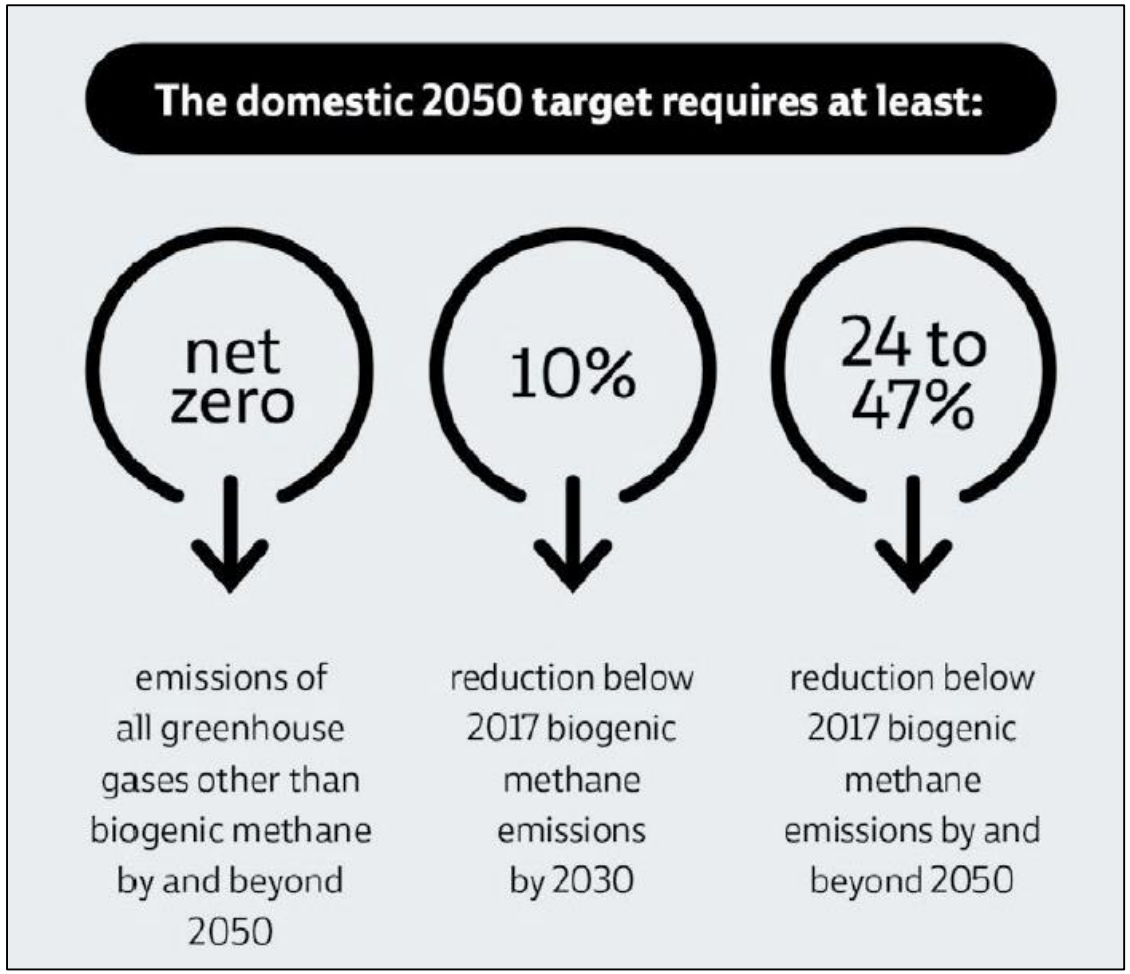
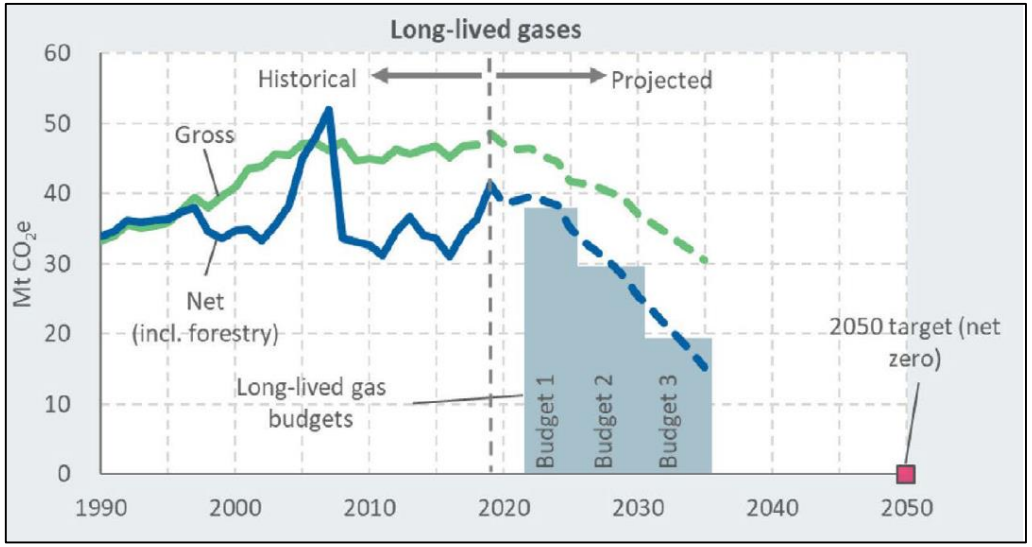
THE UNIVERSITY OF WAIKATO
*Te Whare Wānanga o Waikato*

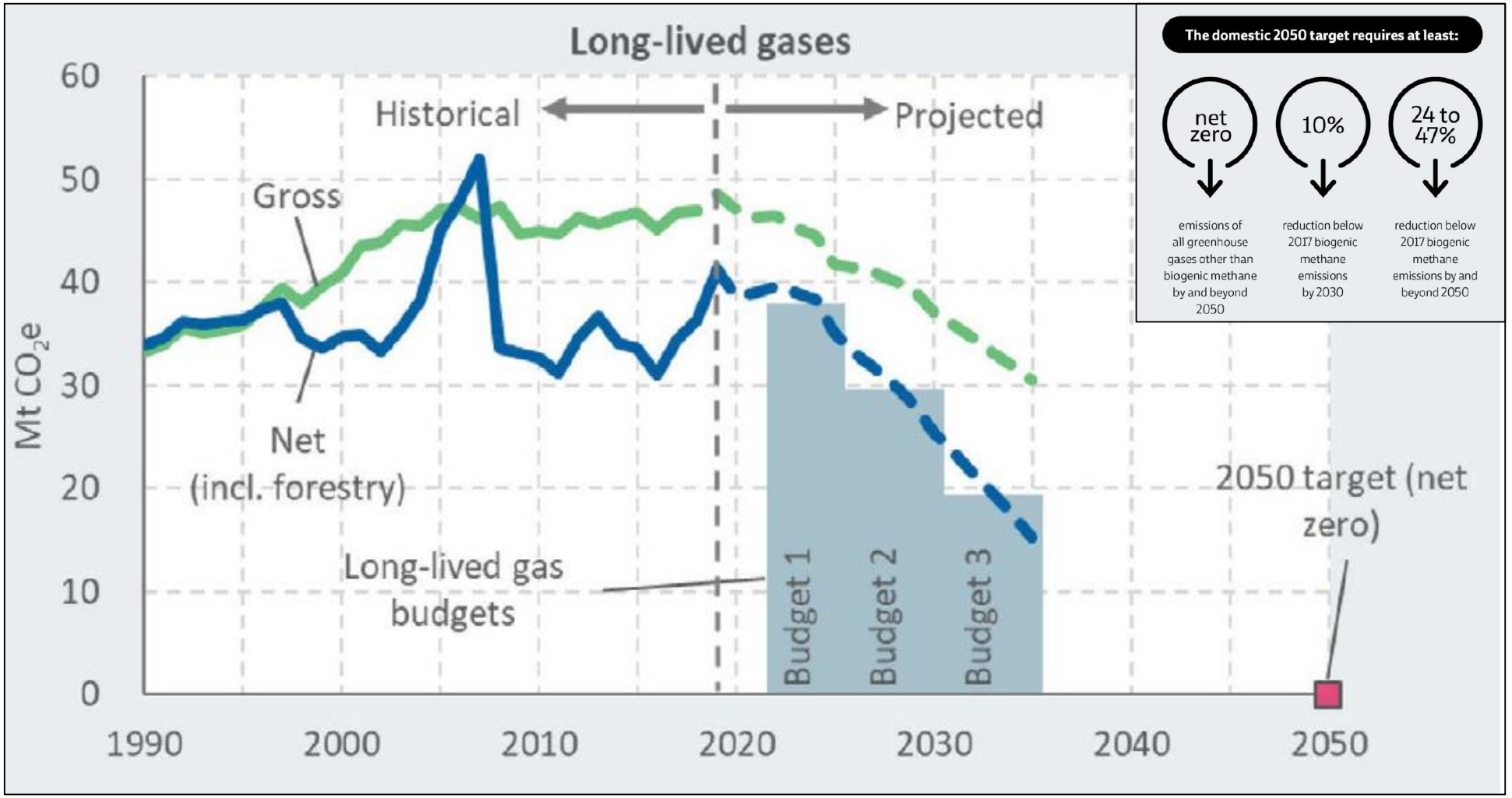
# Targets, Carbon Budgets, and Emissions Pathways




Climate Change Commission, 2021

# Targets, Carbon Budgets, and Emissions Pathways




Climate Change Commission, 2021

# Why Process Heat? (Heat, Industry & Power)

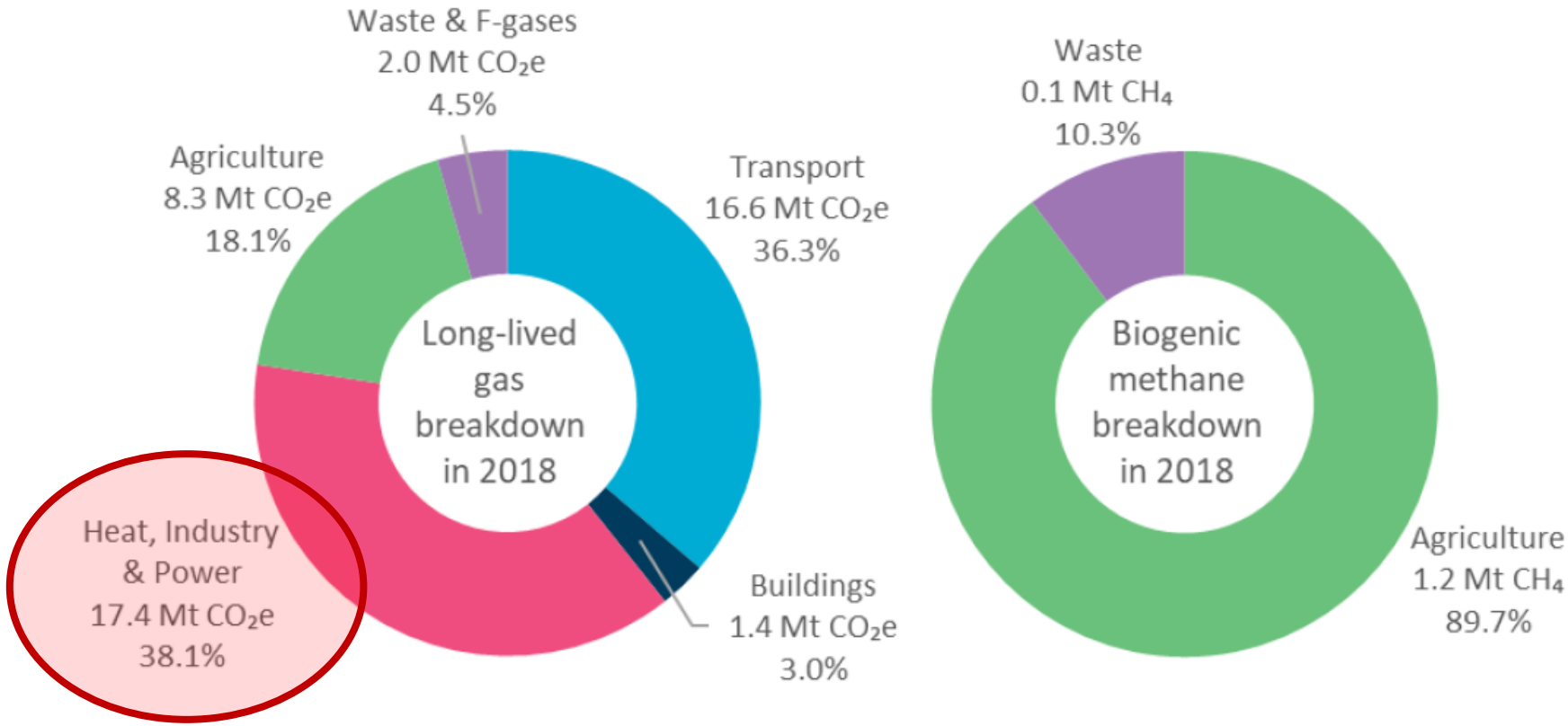
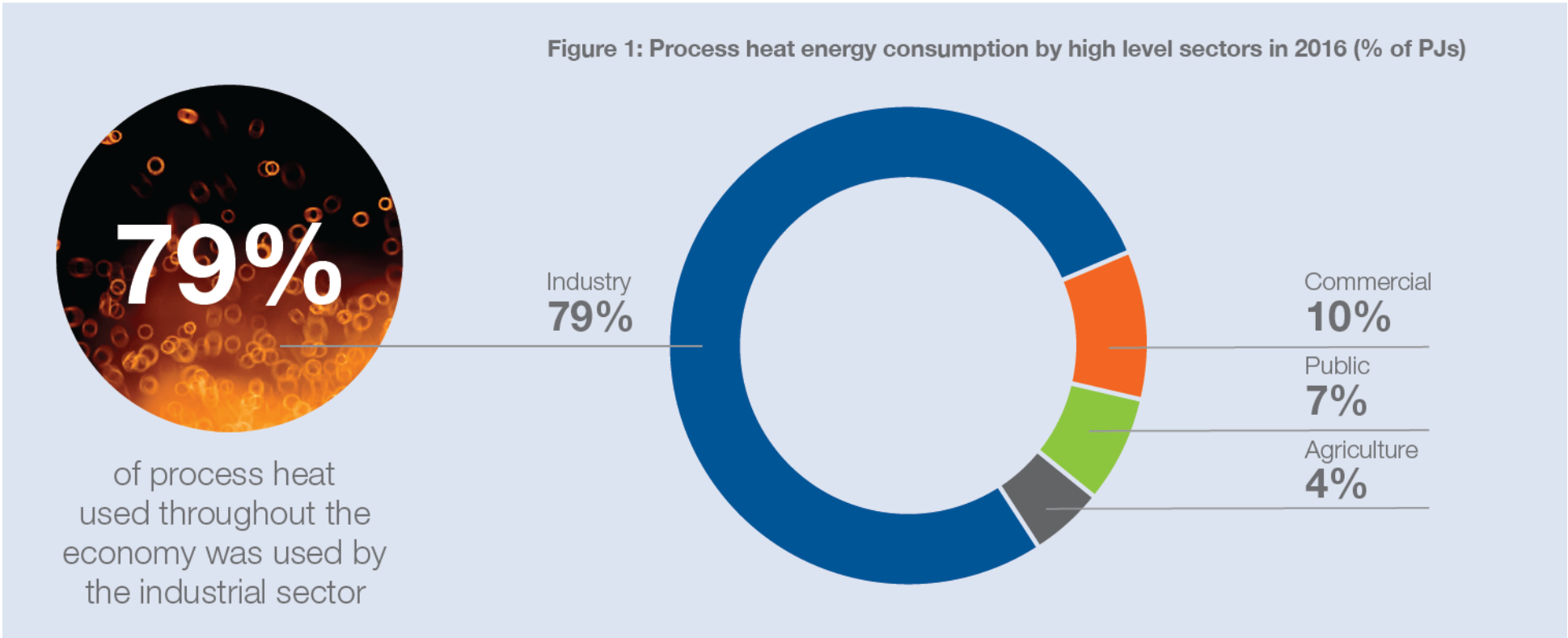



*Figure 2.1: The sources of gross long-lived greenhouse gases and biogenic methane in 2018 broken down by sectors. Note: building emissions relates to their energy use, but not construction. Emissions are presented differently to the New Zealand Greenhouse Gas Inventory, see Evidence Report for info.*

Source: New Zealand's Greenhouse Gas Inventory.

# Process Heat in NZ

Process Heat in New Zealand

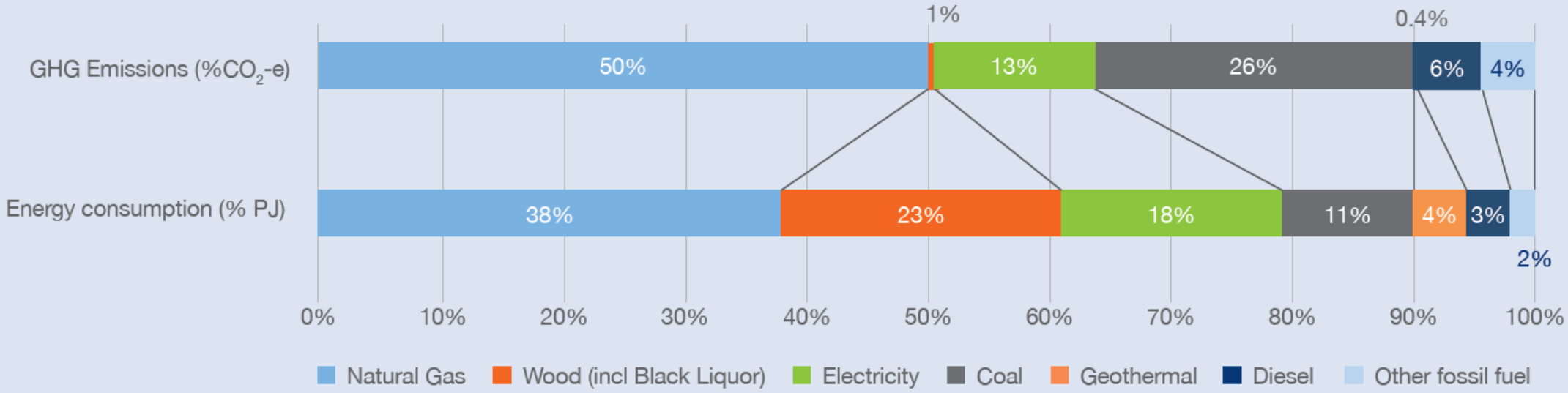



Process Heat in New Zealand Fact Sheet, MBIE 2018

# Process Heat in NZ

Process Heat in New Zealand

**Figure 2: Energy consumption and GHG emissions from process heat in 2016 – by fuel type**

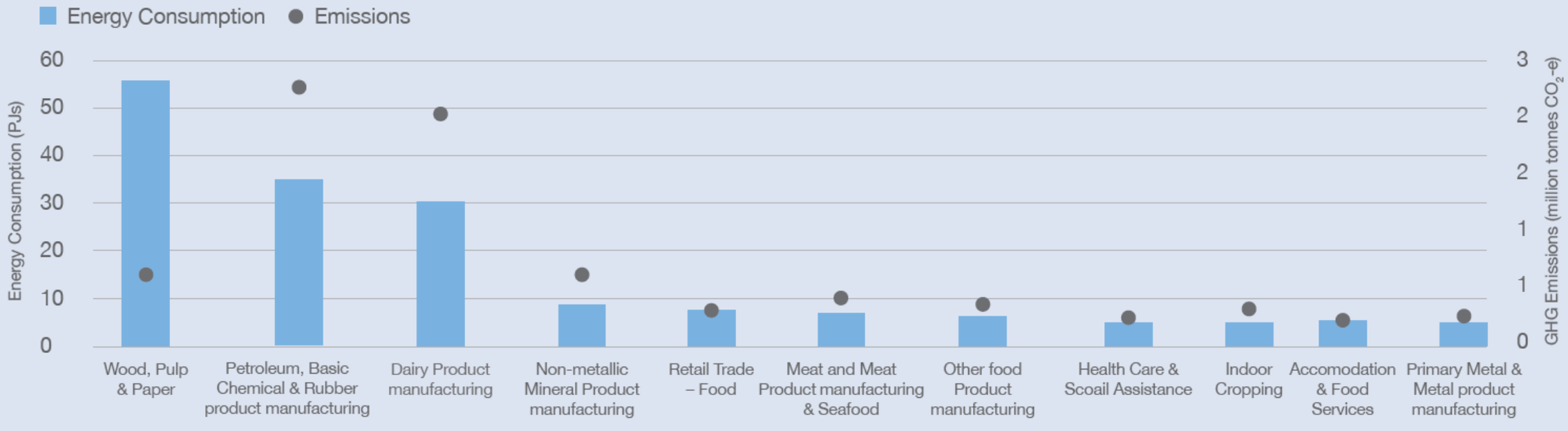



Process Heat in New Zealand Fact Sheet, MBIE 2018

# Process Heat in NZ

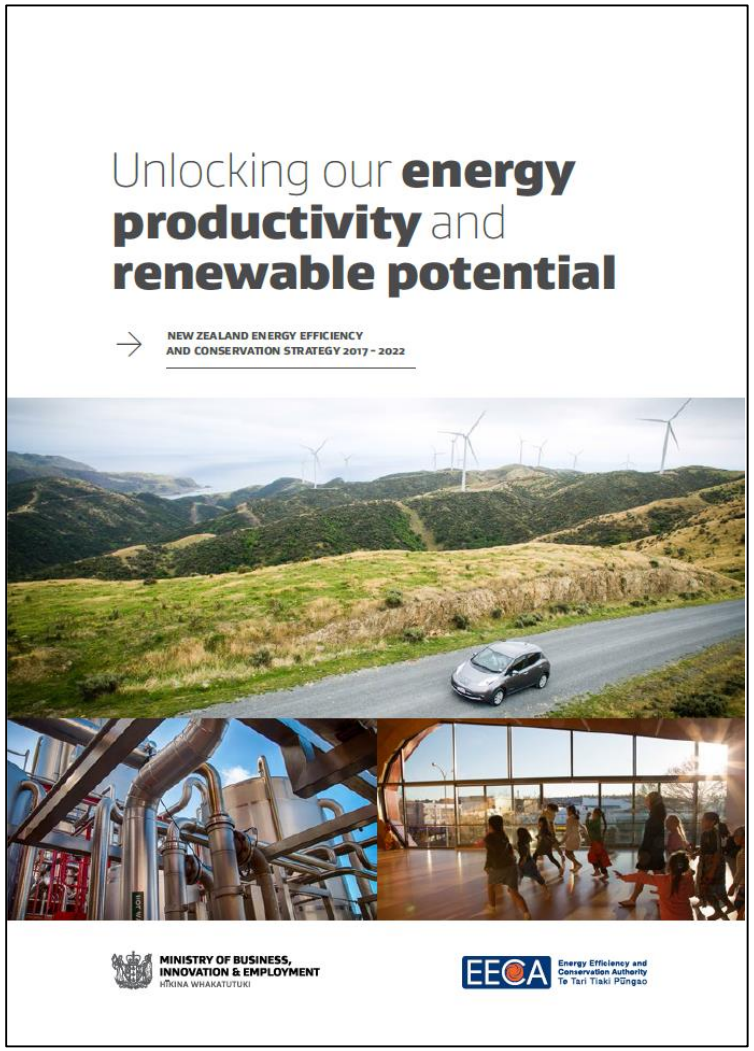
Process Heat in New Zealand

**Figure 3: Energy consumption and emissions from process heat in 2016 – Largest consuming[11]**




Process Heat in New Zealand Fact Sheet, MBIE 2018

# New Zealand Energy Efficiency and Conservation Strategy




## 2017 – 2022

## Three Target Areas

- Process Heat
- Transport
- Electricity

## Unlocking our energy productivity and renewable potential

Energy Efficiency and Conservation Strategy 2017-2022

### Goal: New Zealand has an energy productive and low emissions economy

Develop and implement a process heat action plan, with policies and programmes to improve efficiency of existing process heat plant, and encourage investment in efficient and renewable plant.

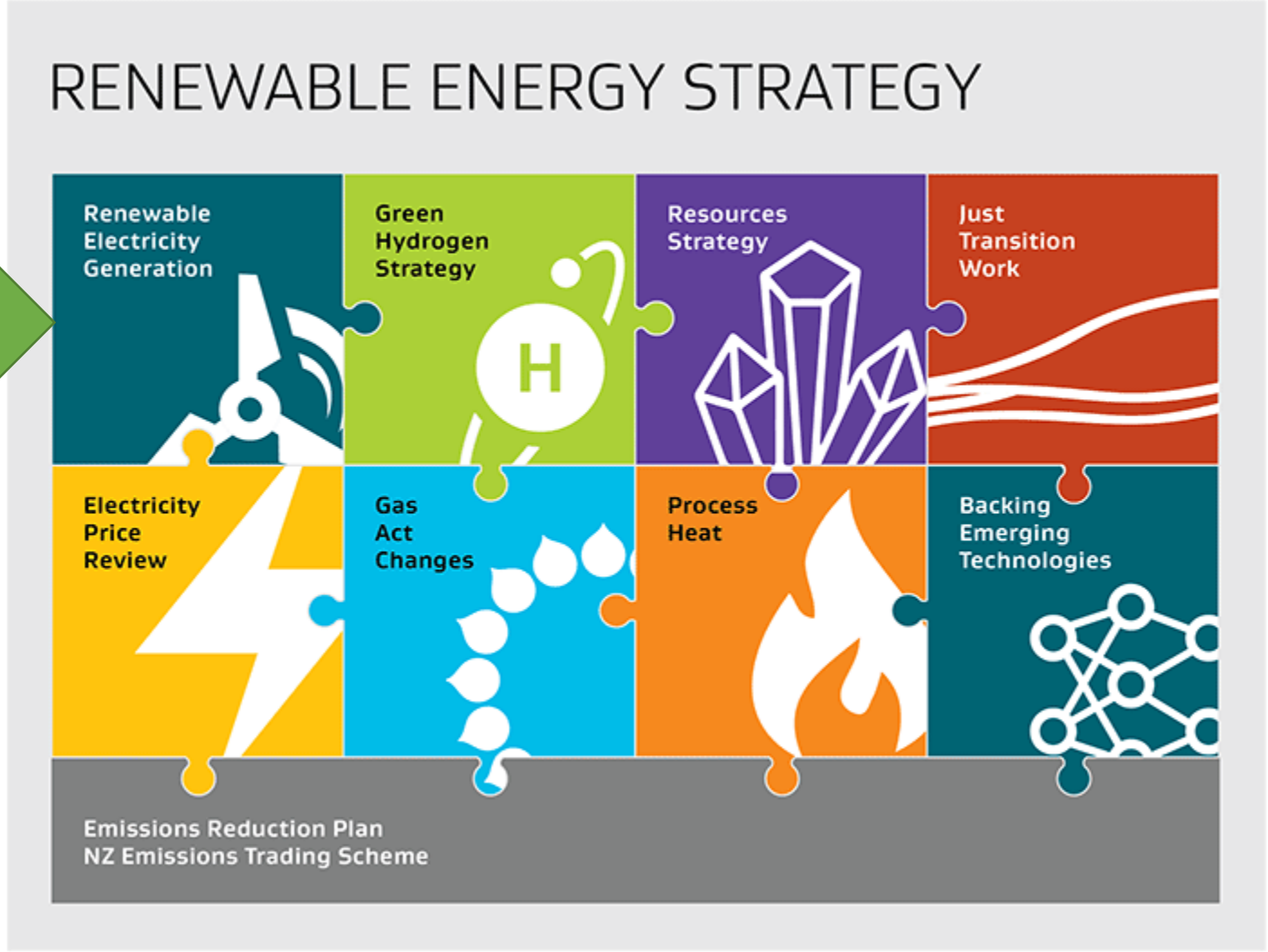
**MBIE, EECA**

| | | | |
|---|---|---|---|
| **PRIORITY AREAS**<br>Where will we focus? |  <br>Renewable and efficient use of **process heat** |  <br>Efficient and low-emissions **transport** |  <br>Innovative and efficient use of **electricity** |
| **TARGETS**<br>How will we measure success? | Decrease in industrial emissions intensity of at least **one per cent** per annum on average between 2017 and 2022 | Electric vehicles make up **two per cent** of the vehicle fleet by the end of 2021 | **90 per cent** of electricity will be generated from renewable sources by 2025 |

**Business as Usual**

# Several Policies Impact Decarbonisation for Process Heat

**NZ Battery Project**



# EECA – Energy Transition Accelerator (ETA)

- A flagship programme run by EECA for large energy-using businesses and public sector organisation committed to reducing carbon emissions.
- Development of long-term pathway to emissions reduction by identifying technically and economically viable decisions and investments.
- Includes:
  - assessment of **stationary energy** use and related emissions across company sites
  - identification of **new technology and process change** opportunities
  - identification of **energy efficiency and heat recovery** opportunities
  - assessment of sustainable **fuel switching** options for fossil fuel assets such as boilers
  - an initial **emissions reduction pathway** supported by a financial assessment of the options.

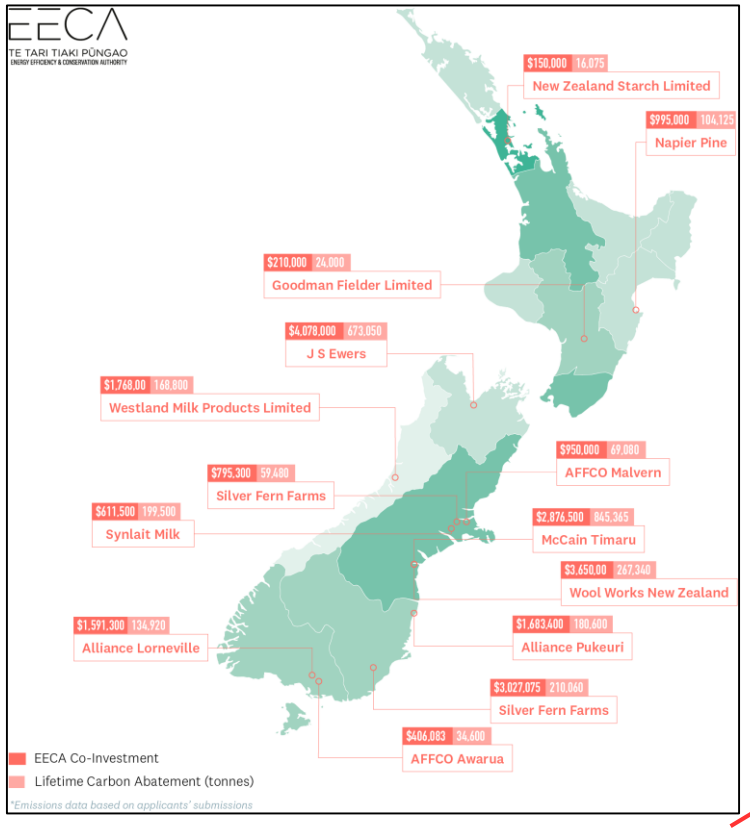
https://www.eeca.govt.nz/co-funding/energy-transition-accelerator/

# Push for Decarbonisation of Process Heat

## RMA Changes & Coal Boiler Ban

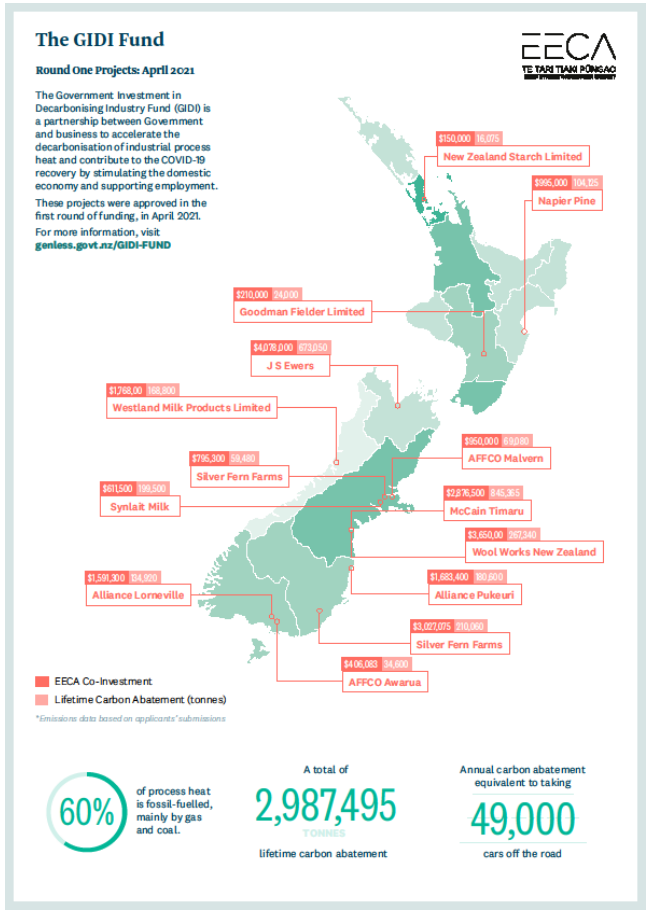

## Climate Budgets & Advice


## Government Investment in Decarbonising Industry

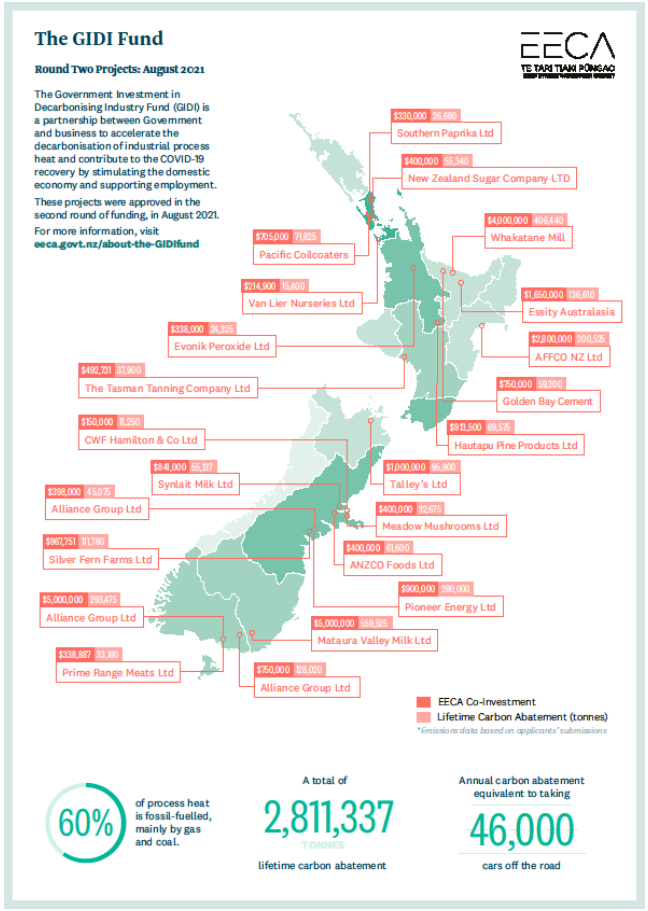


# Government Investment in Decarbonising Industry (GIDI)

## Round 1




## Round 2




**The impact of GIDI co-funding**

| 39 | $56.5m | $85m | 6.6m |
|---|---|---|---|
| projects approved | government funding | applicant funding | tonnes lifetime emissions savings |

14 Projects include **Heat Pumps**
8 Projects in Meat Sector

$19.2 Million GIDI Funding
≈$28.8 Million of Industry Funding


Thank You
Questions?