







Painting by Numbers: a 2050 Picture of Electricity Demand

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DETA's
10 Year
Goal

- To support the removal of **2MT CO₂** of emissions annually

Focused
on four
core
offerings

- Decarbonisation Strategy
- Project Development
- Project Implementation
- Sustainability Strategy & Development


Top 5
sectors

- Agri Sector – Dairy & Meat
- Industrial Process - Food & Beverage
- Buildings & Infrastructure
- Government – strategic advice
- Transport

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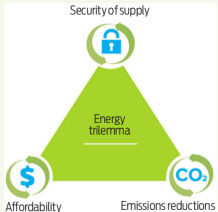
Question

Q: What decarbonisation solution will have the largest impact on electricity demand between now and 2050???



Why Transition to Decarbonisation?

- NZ has committed to **net zero emissions** by 2050
- Over 40% of GHG emissions come from **energy use**
- Electrification of **industry** and **transport** will have a huge decarb impact
- But how do we do this while maintaining **security of supply** and **affordability**?

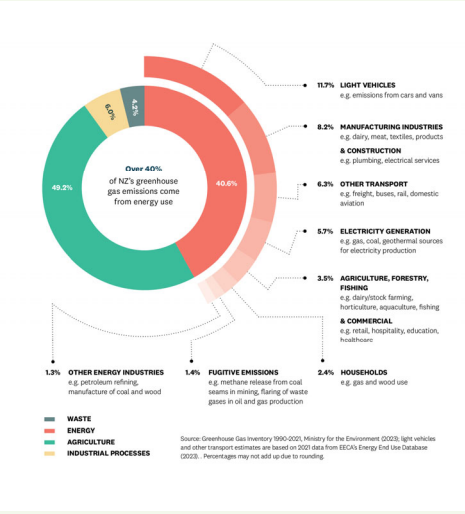


Security of supply

Affordability

Emissions reductions

Energy trilemma

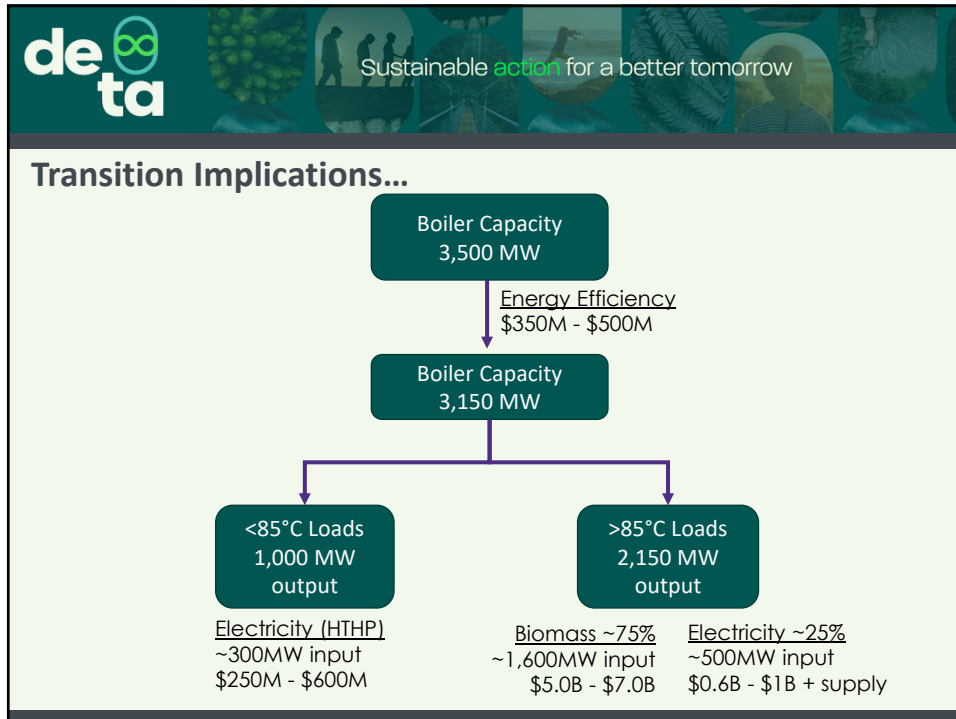


Over 40% of NZ's greenhouse gas emissions come from energy use

| Sector | Percentage | Examples |
|---|------------|--|
| Light Vehicles | 11.5% | e.g. emissions from cars and vans |
| Manufacturing Industries & Construction | 8.2% | e.g. dairy, meat, textiles, products; plumbing, electrical services |
| Other Transport | 6.3% | e.g. freight, buses, rail, domestic aviation |
| Electricity Generation | 5.7% | e.g. gas, coal, geothermal sources for electricity production |
| Agriculture, Forestry, Fishing | 3.8% | e.g. dairystock farming, horticulture, aquaculture, fishing |
| Other Commercial | 2.4% | e.g. retail, hospitality, education, healthcare |
| Households | 2.4% | e.g. gas and wood use |
| Fugitive Emissions | 1.4% | e.g. methane release from coal seams in mining, flaring of waste gases in oil and gas production |
| Other Energy Industries | 1.3% | e.g. petroleum refining, manufacture of coal and wood |

Legend: WASTE (grey), ENERGY (red), AGRICULTURE (green), INDUSTRIAL PROCESSES (orange)

Source: Greenhouse Gas Inventory 1990-2020, Ministry for the Environment (2020), light vehicles and other transport estimates are based on 2020 data from EDC's Energy Fuel Use Database (2020). Percentages may not add up due to rounding.



Regional Electricity Transition Accelerator

- EECA project aimed at understanding **localised opportunities** and **barriers** faced by industry when seeking to **reduce emissions** from process heat
- RETA output is **regional level decarbonisation pathways**
- DETA involved in process heat demand-side assessment of the sites
- Value of the RETA's
 - **Collaborative project** considering everything from demand to supply
 - Taking **regional context** into account

RETA Decarbonisation Pathways


Building on RETA...

D RETA Decarbonisation **Tool**

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DETA Energy Futures Project

- **Purpose:** Develop a granular view of decarbonisation and growth, using 2050 as a starting point
- **Method:**
 - Collaborate with industry
 - Use customer-level assumptions (bottom-up approach)
 - Include assumptions at a sub-regional level (not regional or national averages)




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Approach to Painting 2050



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graph LR
    Workshop[Workshop] --> Research[Research]
    Research --> Analysis[Analysis]
    Analysis --> ModelDevelopment[Model Development]
    IndustryEngagement[Industry Engagement and Collaboration] <--> Workshop
    IndustryEngagement <--> Research
    IndustryEngagement <--> Analysis
    IndustryEngagement <--> ModelDevelopment
  
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Focus Areas for Industry


Initial Workshop highlighted key technologies that were important in the region:

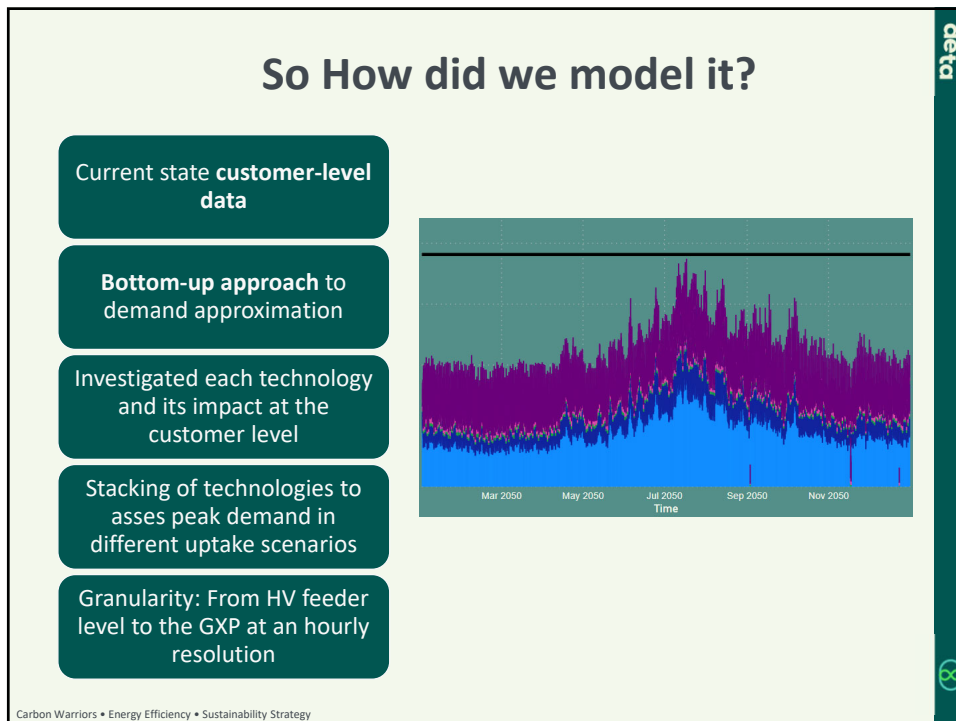
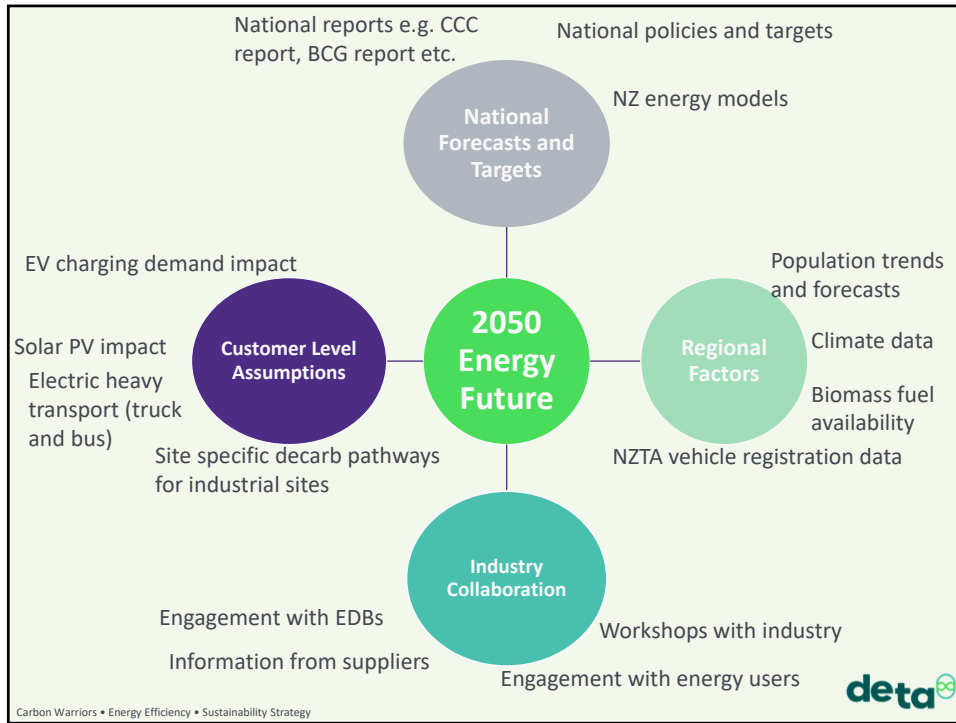
- EV uptake
- Process heat electrification
- Distributed Energy Resources (DERs)
- Growth
- Residential Gas Transition

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Research and Analysis

- RETA clearly showed huge differences between regions
- Necessary to use customer level assumptions
- For the Deta Energy Futures project we combined:
 - National trends and targets
 - Regional information
 - Customer specific and technology specific assumptions
 - Industry collaboration






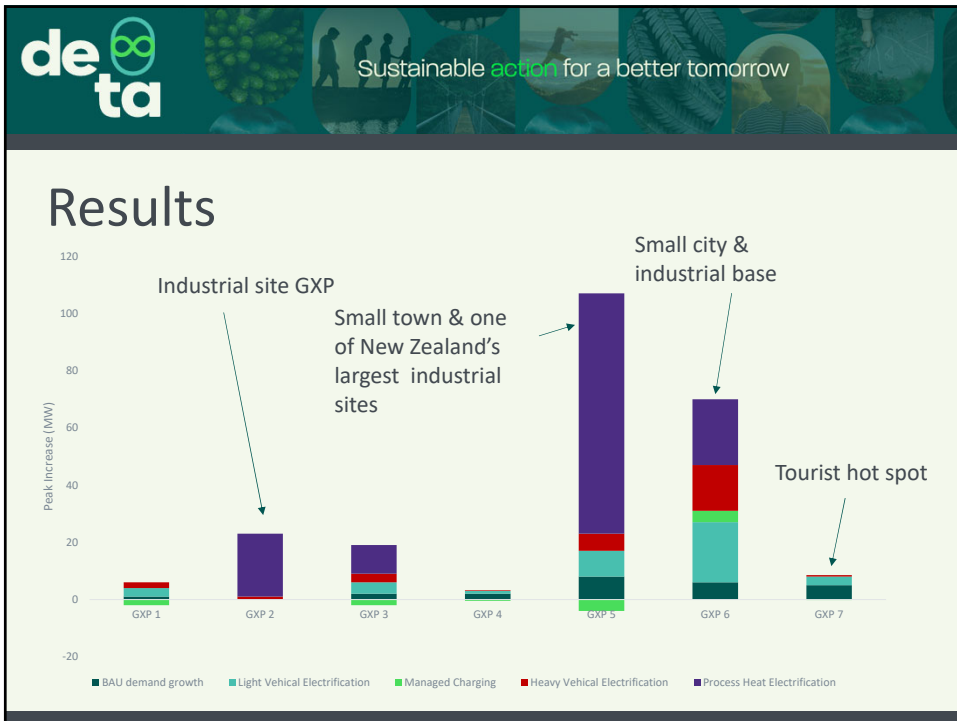
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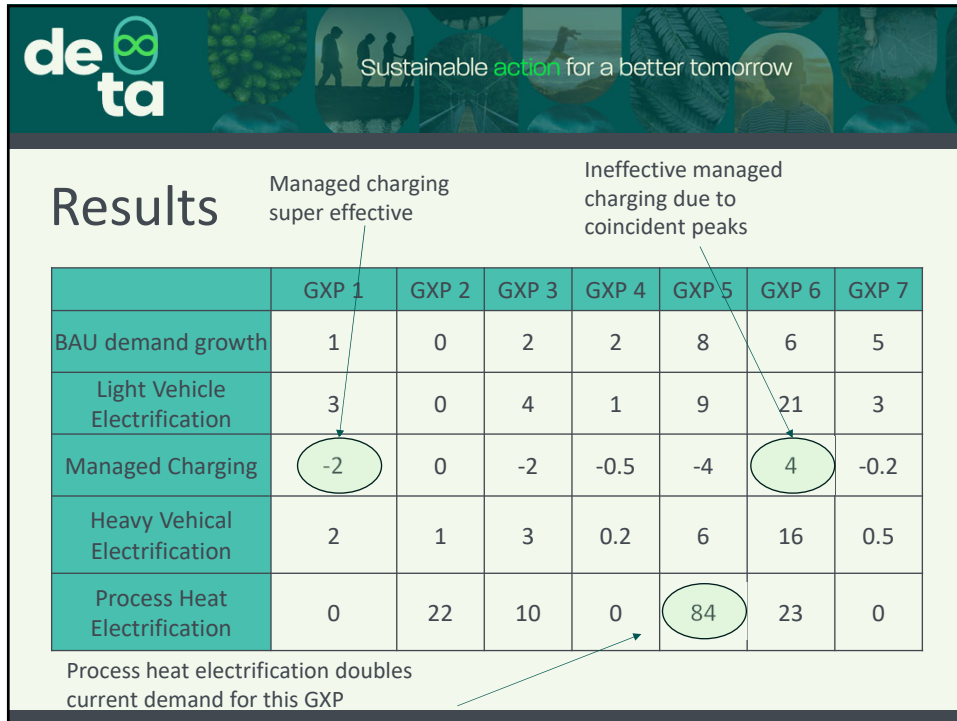
Question

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A: It Depends!





- The results show **'trigger points'** at which infrastructure upgrades will be needed
 - Novel approach to network planning
- Seeing the tomorrow picture means that **upgrades made today can be done to meet the long-term** needs of the network
 - Useful for CAPEX forecasts
- Opportunity to be ahead of the game and **identify possible non-traditional solutions** to demand changes



Collaboration is key

- Painting the picture of future demand requires cross industry collaboration and discussion

Customer-specific approach

- There is real value in capturing decarb impact with a customer centric approach

What has the biggest decarbonisation impact? It depends!

- There is diversity of impact within regions

What Next?

- What do other years look like building up to 2050?
- Now that we can visualize 2050, what steps need to be taken to achieve it?

Carbon Warriors • Energy Efficiency • Sustainability Strategy

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Thank You

Our Mission

Remove

2

million

CO₂

emissions

BY 2030