



Using bioenergy for industry decarbonisation involves thinking smart









SETTING THE SCENE...

SOUTH ISLAND THERMAL FUEL TRANSITION PROJECT

▶ 437 boilers identified with capacity >500kW:

- TOTAL installed capacity of 1,800 MW!
- ▶ 69 renewable (wood or electricity) boilers:
 - ▶ 343 MW total
 - Mainly wood boilers in the wood processing industry (Daiken, Nelson Pine, sawmills, etc)

▶ 368 non-renewable boilers:

▶ 1,458 MW total capacity!









SOUTH ISLAND TRANSITION IMPLICATIONS...







HOW do we do it? Decarbonisation Roadmap

- Strategically aligned plan to take us to 2050.
- Defining
 - WHAT are we aiming for?
 - HOW we get there what projects should we be working on now?







WHY - Strategy and Leadership





1.5

MC Cause

our sustainability strategy Planet-friendly Practices





THINKING OUTSIDE THE BOX –

WHAT DO OUR PROCESSES LOOK LIKE IN THE FUTURE?

Changing product preferences:

- Are we going to be drying as much milk powder in 2050? What about UHT?
- Impact of move towards plant based meats?
- Reduced steel and concrete use for construction?
- Move towards online learning rather than on campus?







THINKING OUTSIDE THE BOX –

WHAT DO OUR PROCESSES LOOK LIKE IN THE FUTURE?

New technology/upgrades available:

- Reverse Osmosis technology for milk concentration
- Electric steriliser technology in the meat industry
- Move towards 'Industry 4.0' and digitisation
- Advanced heat recovery and pinch analysis for heat recovery optimisation

SOME OF THIS TECHNOLOGY IS AVAILABLE NOW!







- WHY Strategy and Leadership
- WHAT -
 - 1. Improving our process
 - 2. Reducing our energy demand
 - 3. Changing our energy source





Case Study: New Dairy Factory

Tetra Pak engaged support to assist with tender response:

Focus on enhancing design <u>beyond</u> base specification
Consider wider project scope to identify opportunities











- WHY Strategy and Leadership
- WHAT -
 - 1. Improving our process
 - 2. Reducing our energy demand
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GET THE BASICS RIGHT:

- Steady state operation minimise operational yar -
- Consider scheduling run harder for less -
- All the 'normal' energy efficiency -
- Typically 5-10% jp
- Requires







WHY - Strategy and Leadership

WHAT -

- 1. Improving our process
- 2. Reducing our energy demand
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GET THE FUEL SOURCE RIGHT:

- Available today – WITH CONSTRAINTS:

- High Temperature Heat Pumps <85°C at the moment
- Biomass conversion or replacement
- Electrode
- Biogas/Waste to Energy
- Geothermal

Developing technology/fuel source:

- Renewable diesel/LPG
- Hydrogen

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- Looking at biomass differently...
 - Use pellets some of the time (peak season), but wood chip most of the time...
 - Vary moisture content (calorific value) requirements throughout the year...
- Looking at electricity differently...
 - Use electrode for peak loads & biomass for baseload
 - Use biomass in winter, electrode in summer
 - Use HTHP to reduce coal boiler load to allow boiler conversion to biomass
- Looking at coal differently...
 - Use coal to cover peak loads and provide redundancy?
- Looking at liquid fuels differently...
 - Emerging use of renewable LPG/diesel as peak lopping?







NET ZERO – CAN WE DO IT?







CASE STUDY – J S Ewers

- Total installed boiler capacity 30MW
- Actual load needed 20MW (in 2017)
- Made efficiency improvements
 - Thermal screens on glasshouse
 - Installed a ring main and buffer tank:
 - Share load between boilers
 - Get boilers operating in their most efficient operating points
 - Transfer excess heat between glasshouses
 - Started renewable fuel transition by using coal and wood pellets in existing boilers

FINAL SOLUTION

- Actual load required 9MW
- Installation of a 10MW Biomass boiler
- Lower overall programme capital cost (>40%)



CASE STUDY – Meat Processing Plant

- Total installed boiler capacity 26MW
- Actual thermal load needed 17MW
- Actual electricity load needed 4MW
- Efficiency improvements already made
 - Reduced load by improving efficiency
 - HTHP installed for hot water generation
- Biomass not enough available locally (operating cost a barrier)
- Electricity supply side upgrade too expensive for all load
- **FINAL SOLUTION** Staged approach to hybrid solution:
 - Medium sized (~12MW) electrode boiler
 - Then convert existing boiler to biomass (from coal) + planting biomass resource NOW

WHAT ARE WE FINDING – Key Takeaways

- 1. Senior leadership <u>buy in</u> is essential!
- 2. This is a <u>programme</u> of work, not a project
- 3. The immediate challenge is <u>strategic</u> and <u>economic</u>, not technical
- 4. We need to <u>change our thinking</u> to do what needs done!

THANK YOU

ANY QUESTIONS?

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