

Overview of EECA's dairy sector activities

29 October 2018



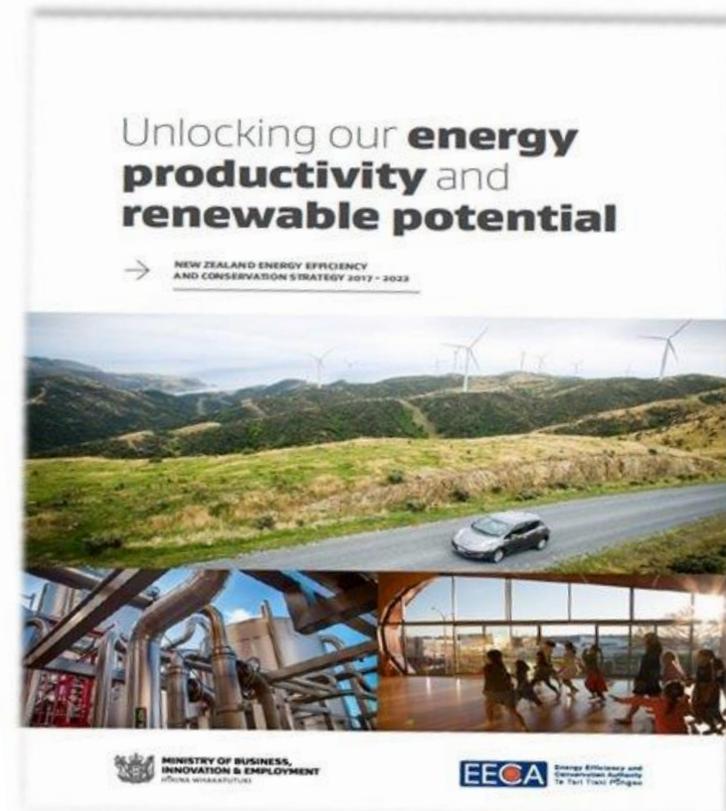
Energy Efficiency & Conservation Authority

- Government Agency with its own Board
- Reports directly to the Minister of Energy & Resources, Dr Megan Woods
- Annual budget of about \$42million, including \$14m recovered from energy levies on electricity, natural gas and petroleum fuels
- Funding from levies targeted to specific areas (e.g. electricity levy funding targets electricity energy efficiency)
- About 90 staff, mainly in Wellington with Auckland and Christchurch offices

Overarching Strategy - NZEECS

🌀 New Zealand Energy Efficiency and Conservation Strategy 2017-2022

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



EECA's Strategy



Our purpose

Mobilise New Zealanders to be world leaders in clean and clever energy use

Our strategic principles

 **Focus on impact**
Pursue high-impact change with agility and at pace.

 **Understand the customer**
Focus on those it is important to influence and influence them based on what they care about.

 **Define the problem**
Identify what's blocking progress and tackle it head on.

 **Join the dots**
Work with and connect people and organisations who can be part of achieving our purpose.

 **Display leadership**
Be proactive, have a fact-based point of view, own it.

Our strategic focus areas

 **Productive and low-emissions business**
Mobilise decision makers and technical experts to accelerate action.

 **Efficient and low-emissions transport**
Switch the fleet to low-emissions technology while ensuring that any remaining fossil-fuelled vehicles are as efficient as possible.

 **Energy efficient homes**
Optimise New Zealanders' use of renewable energy through energy efficient homes, technologies and behaviours.

 **Government leadership**
Equip the public sector to innovate and lead the transition to clean and clever energy use.

 **Engage hearts and minds**
Foster a society in which sustainable energy is expected and demanded.

Our desired outcome

A sustainable energy system that supports the prosperity and wellbeing of current and future generations



Productive and low-emissions business

Mobilise decision makers and technical experts to accelerate action.



Key EECA activities relevant to dairy sector

- Direct engagement through EECA's business team
 - Range of tools and programmes
- Energy Transition Accelerator 2050 (ETA2050)
 - Tailored programme to assist NZ's most GHG intensive businesses to transition to having lower emissions (this is the pilot year of this programme)
- Process heat in New Zealand (PHiNZ)
 - Joint project with MBIE that seeks to reduce GHG emissions from process heat
 - Currently formulating an action plan of policies and programmes to achieve this (by end-2019)

EECA Business



- Direct Engagement (**most milk processors in this category**)
 - Large Energy Users (“Top 200”): Energy Spend > \$2M p.a.
 - Account Director & 8 Account Managers
 - Technology Innovation Manager
- Indirect Engagement – “Next 1,000” Large Energy Users
 - Businesses with energy spend > \$200k p.a. (“Next 1000”)
 - Channel Management team of two
 - EECA registered Programme Partners
- LEVCF
 - LEV Contestable Fund Manager and Relationship Manager – Transport
- Direct Marketing & Comms support

Funding programmes

- Energy Management Plan
- Energy Audits
- Energy Systems Optimisation
- Feasibility Studies & Business Cases
- Monitoring & Targeting
- One2five Diagnostic & Benchmarking
- Industrial Design Advice
- Commercial Building Performance Advice
- Energy Graduate
- Technology Demonstration
- Crown Loans

Criteria varies but generally EECA will fund up to 40% of the cost up to a capped limit.



Crown loans

Enabling the public sector to invest in energy efficiency and renewables.



Energy audits

An energy audit evaluates how energy is being used, and identifies energy and cost-saving opportunities.



Energy graduate support

Employ a graduate to focus on improving your current energy management practices.



Energy management plan

Integrating energy management into business management.



Feasibility studies and business cases

Evaluate energy efficiency and renewable energy project opportunities.



Industrial systems design advice

Expert review of the energy efficiency of planned new heating or cooling systems..



Support for large energy users

We work with large energy users to develop long term energy management plans.



Systems optimisation

Recalibrating existing equipment can significantly reduce costs and better meet staff and production needs.



Technology demonstration projects

Co-funding to demonstrate the potential of new or under-utilised technologies.

Technology Demonstration

- Projects involving new or underutilised technologies or processes
- Funding is provided to early adopters of the technology or process
- Capital funding up to 40% of project cost – maximum \$250k/project
- Agreement to demonstrate/share learnings
- 15 new projects in 2017/18, including:
 - Fonterra Brightwater biomass co-firing project
 - Synlait Milk electrode boiler project

NZ's dairy processing emissions



- In 2016 energy use accounted for 39.8% of NZ's GHG emissions, a total of 31.3 Mt
- Supplying process heat accounted for 28% of energy emissions, about 8.3 Mt
- The dairy sector was responsible for 25% of process heat emissions, about 2.1 Mt.
 - This does not include the ~85% of dairy emissions that are biological in origin (methane and nitrous oxide)
- Of the processing emissions, more than 80% are associated with making milk powder

NZ's dairy processing energy and GHG emission profile



Figure 1: Fuel demand in the dairy manufacturing sector, 2016

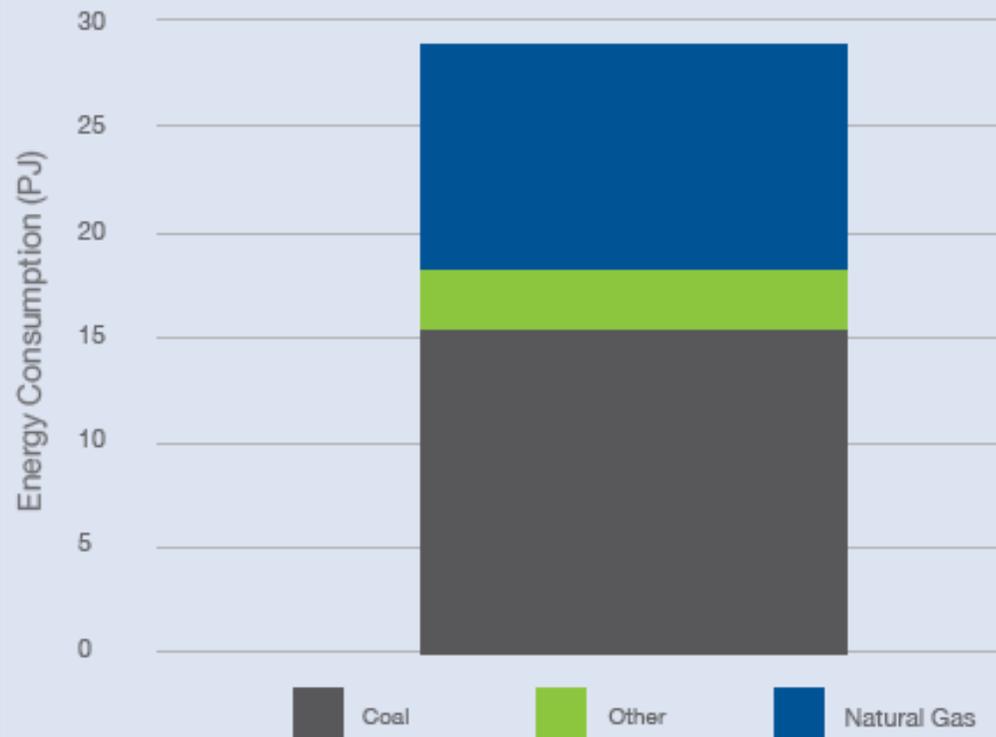
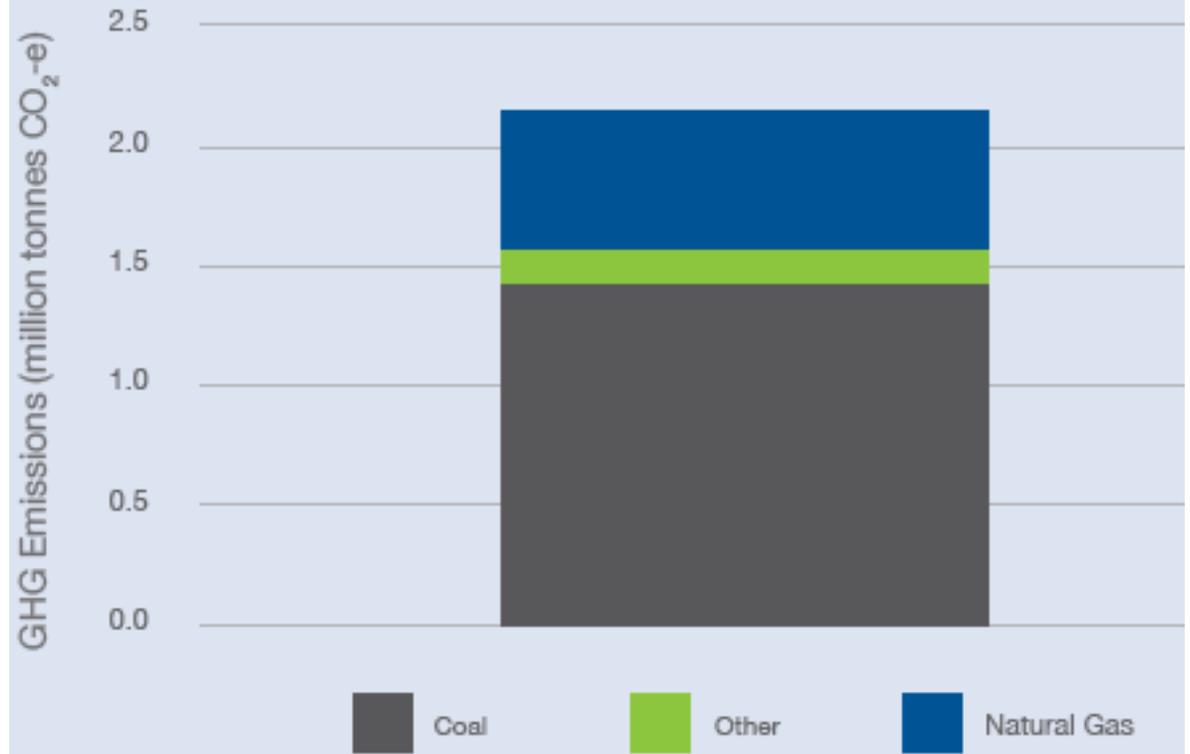


Figure 2: GHG emissions in the dairy manufacturing sector, 2016



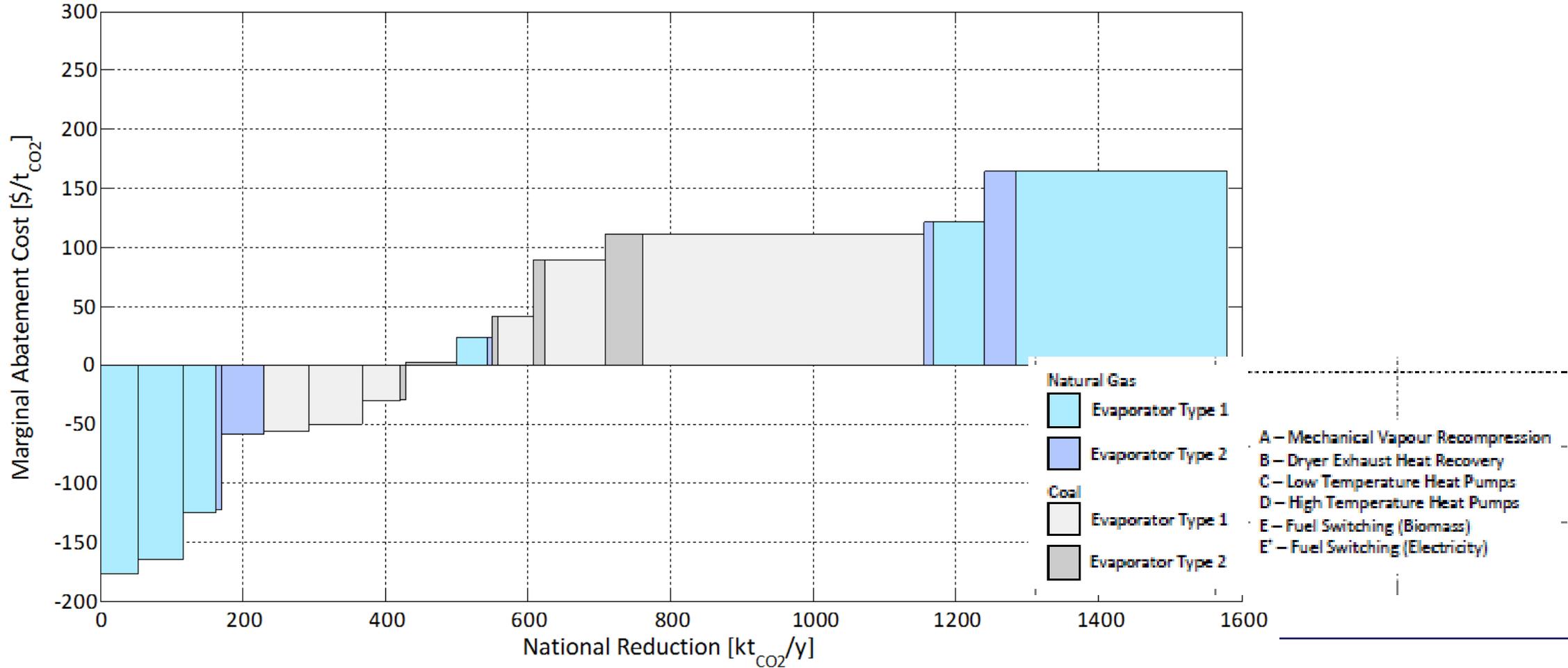
Mitigation options



- EECA commissioned the University of Waikato's Energy Group to assess the potential mitigation options for process heat – including the dairy sector
- Main dairy sector opportunities relate to:
 - Heat recovery (from refrigeration systems and spray dryer exhausts)
 - Extending the use of mechanical vapour recompression; including to eliminate using steam in evaporators
 - Switching to lower emission fuels – biomass and electricity
- Work to be published soon

Milk powder MAC curve

(Draft subject to review)



Fonterra roadmap



ROAD MAP TO TRANSITION TO A LOW EMISSION FUTURE



A Fonterra and Ministry for the Environment initiative, with support from the Ministry of Business, Innovation, & Employment, Energy Efficiency & Conservation Authority, and Transpower, to help build the foundations towards meeting Fonterra's long-term emission reduction targets.

New Zealand's large industrial users of fossil fuel for thermal energy, such as Fonterra, are able to transition to a low emission, 100% renewable energy future in a cost effective manner. This results in generating value for all New Zealanders and contributes to New Zealand meeting its 2030 climate change target to reduce greenhouse gas emissions by 30 percent below 2005 levels by 2030.

Vision
Outputs
Enablers / Activities / Timeline
Problem Definition / Opportunity

Identify areas where Government can collaborate with industry to assist with greater emission reduction	Identifies actions to reduce emissions, improve energy efficiency, and reduce costs. Creates action that builds the foundation for large energy users, such as Fonterra, to transition off coal and onto renewable sources of energy.	Show leadership in climate mitigation and sustainability action. Fonterra demonstrates what action could be taken by industrial users to reduce emissions.	Build resilience against rising energy and carbon costs Create value for all New Zealanders by transitioning to a low emission future
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Building the Foundation Now - December 2017	Steps to a lower emission future 2018-2019	Driving industry action Post-2019
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Case Study: Social good benefits of electrifying process heat

To undertake an assessment and produce a report by December 2017 that summarises the public good benefits associated with electrification of processing heat. This will be used to assist the Government with considering wider benefits than GHG abatement when considering regulations & work programs. (Publicly available)

Review barriers for the uptake of renewable energy for process heat users

Barriers faced by process heat users to increase their use of renewable energy or improve the efficiency of their plant will be assessed under the Process Heat in New Zealand (PHINZ) action plan. This will help build the evidence base and identify the role of Government and potential target areas by December 2019.

Demonstration site for wood biomass co-firing at scale

To convert a Fonterra site to enable co-firing of wood biomass with coal. This work stream includes Fonterra developing a co-firing strategy for existing coal boiler assets and a position on future new coal boilers.

Roadmaps for energy efficiency and large scale electrification of dairy processing

- Identify a range of optimised energy efficient solutions for existing dairy plant processes and capture this in a roadmap to improve energy efficiency.
- Assess the technical and economic feasibility of large scale dairy electrification by December 2017. This report is to assess and summarise how large scale electrification of dairy processing could occur.

Explore new sources of capital and alternative financing models

Explore opportunities for new sources of capital and alternative financing models, to support investment in projects that help accelerate the transition to a low emission economy.

Demonstration site for large scale electrification

To undertake electrification of processing improvements at a Fonterra site and to install NZ's first boiler that operates on electricity to generate thermal energy at a Fonterra site.

Identifying the social good benefits associated with electrifying process heat could prompt Government and industry to consider benefits beyond GHG abatement when considering regulations and investment decisions.

Engaging with large energy users in transitioning to a low emission future may generate wider benefits beyond GHG abatement, including:

- Assist in establishing a market & supply chain for bioenergy; Demonstrations could verify technology for other users who cannot afford to take a risk; If Fonterra can reduce emissions in a cost-effective manner, it could help convince other large energy users to reduce emissions.

Renewable electricity is a future thermal energy source and possible alternative energy source to existing emissions intensive sources. However, it is an expensive option compared with current alternatives.

It is envisaged that large scale electrification of dairy processing will assist with lowering total energy use (therefore improving energy intensity), as well as reducing emissions from dairy processing (due to lower energy use, and use of electricity which is a predominantly renewable in NZ).

To leverage NZ's renewable advantage, it is proposed that Government review the barriers faced by process heat users to increase their use of renewable energy or improve the efficiency of their plant. This report would summarise these barriers and form part of an evidence base for any recommendations as part of the Industrial Heat plan, Process Heat in New Zealand (PHINZ).

This would provide industry with greater certainty of costs and timeframes when considering renewable process heat investments.

The upfront and fuel costs of transitioning from current fossil fuel energy sources to low emission alternatives such as biomass and electricity are a significant barrier to any large-scale transition.

Identifying alternative investment approaches will assist large fossil fuel users' transition to low emission energy sources. It will help bridge the gap between fossil fuel energy sources and existing renewable solutions to deliver a low emission energy future in time.

Fonterra, like other industrial users, has a significant installed base of coal boilers that typically have a lifespan of 40+ years. It is unlikely that all boilers will be replaced in the short-medium term as some have recently been installed.

Therefore it is important for companies to develop a strategy to minimise emissions from these boilers while they remain using coal to ensure these assets do not become stranded & maximise their use while they remain operational.

Synlait targets



SYNLAIT COMMITS TO A SUSTAINABLE FUTURE WITH BOLD TARGETS

Synlait Milk (NZX: SML; ASX: SM1) has committed to reducing its environmental impact significantly over the next decade by targeting key areas of their value chain.

The commitments were revealed at Synlait's annual conference in Christchurch on Wednesday 27 and Thursday 28 June to staff, dairy farmers and partners:

- Reducing greenhouse gas emissions (GHGs) by 35% per kilogram of milk solids on-farm (consisting of -50% nitrous oxide, -30% methane and -30% carbon dioxide) and 50% per kilogram of milk solids off-farm by 2028
- Reducing water consumption by 20% per kgMS both on-farm and off-farm by 2028
- Reducing nitrogen loss on-farm by 45% per kgMS by 2028
- Significantly boosting support for best practice dairy farming through increased Lead With Pride™ premium payments, including a 100% PKE-free incentive
- Never building another coal-fired boiler and working hard to address existing coal infrastructure
- Commissioning New Zealand's first large-scale electrode boiler in January 2019 to provide renewable process heat to the upcoming advanced dairy liquids facility in Dunsandel
- Joining a global movement of organisations focused on serious sustainability progress by becoming a Certified B Corporation and adopting several of the United Nation's Sustainable Development Goals
- Establishing a social investment fund to boost support for communities, organisations and initiatives aligned to Synlait's sustainability goals

Recent significant projects



- Fonterra and Synlait have both received technology demonstration co-funding for projects under construction
- Fonterra: Co-firing biomass at its Brightwater factory
- Synlait: NZ's first installation of a large electrode boiler (nominally 6 MW, upgradeable to 12 MW) at its Dunsandel factory

Questions
