Fonterra’s decarbonisation journey

September 2022

Our pathway to 2030 – we have made three strategic choices

Continue to focus on New Zealand milk

Be a leader in sustainability

Be a leader in dairy innovation and science

Fonterra's Long Term Aspirations: To Lead in Sustainability - with a $1 billion investment now to 2030

WATER

2030
80% of manufacturing sites treating wastewater to leading standards.

2030
There will be an overall reduction of 15% water take across Fonterra manufacturing sites by 2030 from a 2018 baseline.

2025
100% of manufacturing sites will refresh their water improvement plans.

WASTE

2025
100% reusable, recyclable, or compostable packaging.

2025
Zero waste sent to landfill.

CLIMATE

2050
We aspire to be net zero emissions

2037
No more coal in our operations.

2030
30% reduction in absolute emissions from manufacturing operations from FY18 baseline.

2030
On-farm target development underway.

2025
Every Fonterra farmer has a tailored Farm Environment Plan with emissions reduction actions.

2024
Disclose our climate-related risks.

Today…
Decarbonising across our operations while working with farmers to understand their footprint and mitigation options

15,806 kt

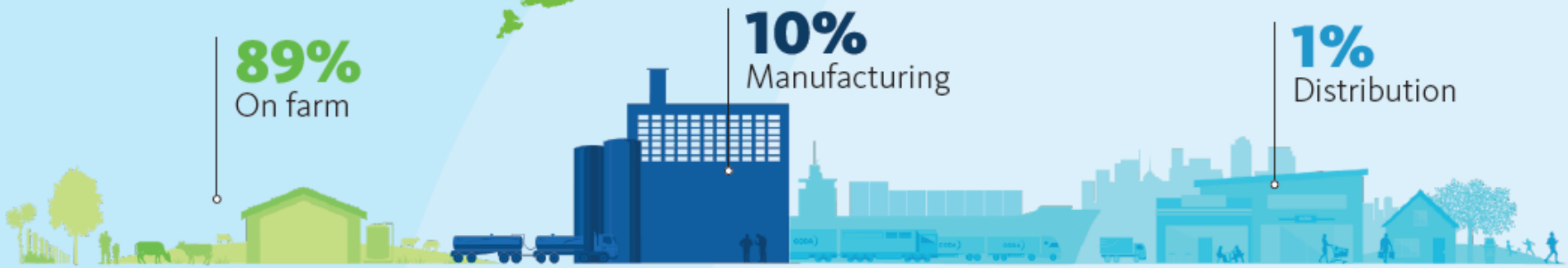
Fonterra's total gross New Zealand greenhouse gas emissions for FY18.

Fonterra represents approximately **20%** of New Zealand's gross greenhouse gas emissions.

New Zealand's dairy sector is one of the most carbon efficient in the world, **30–50%** more efficient than the global average.

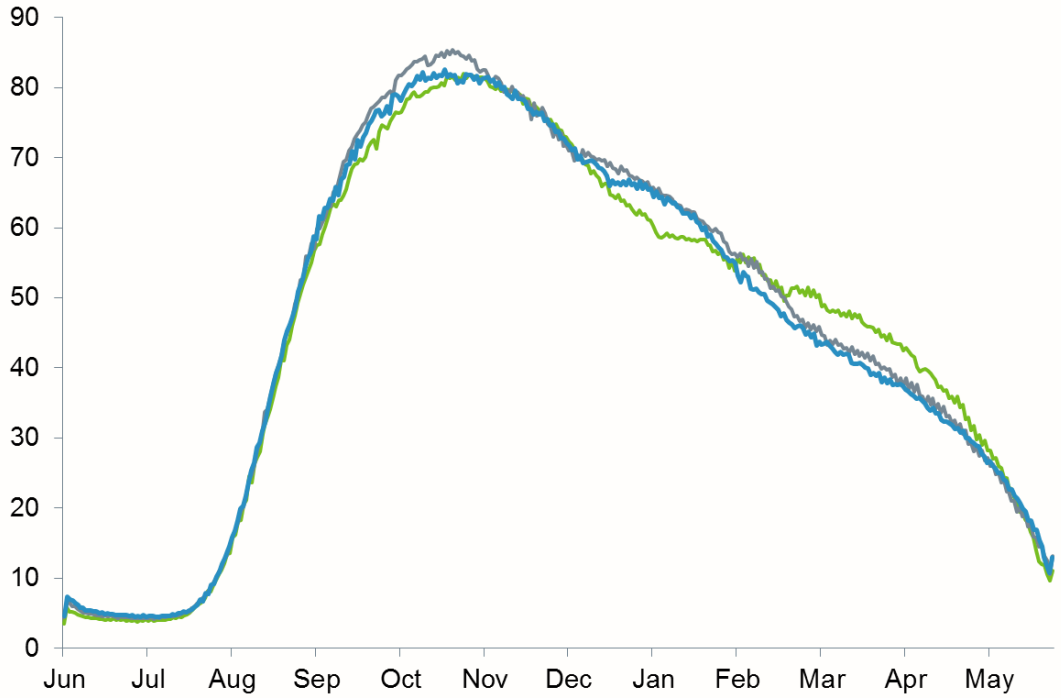
WE KNOW WE MUST DO MORE

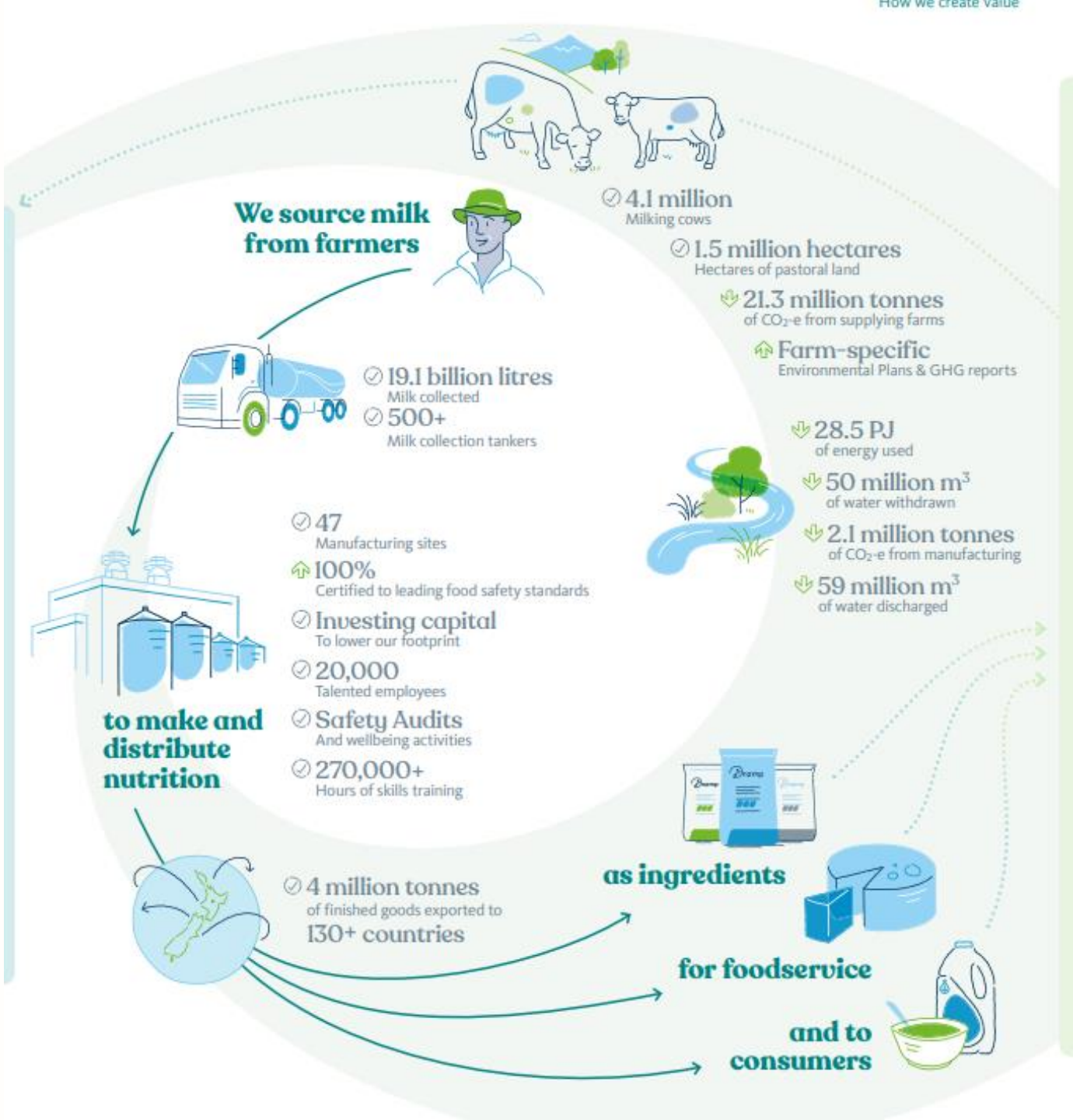
WHERE OUR EMISSIONS COME FROM:



Fonterra Overview

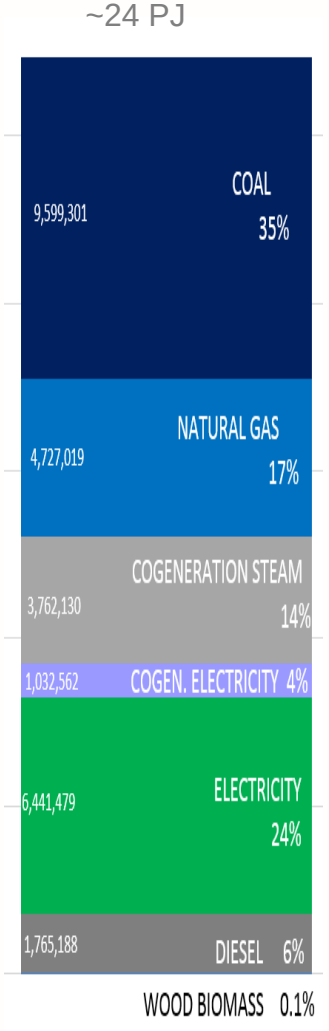
Volume (m litres/day)



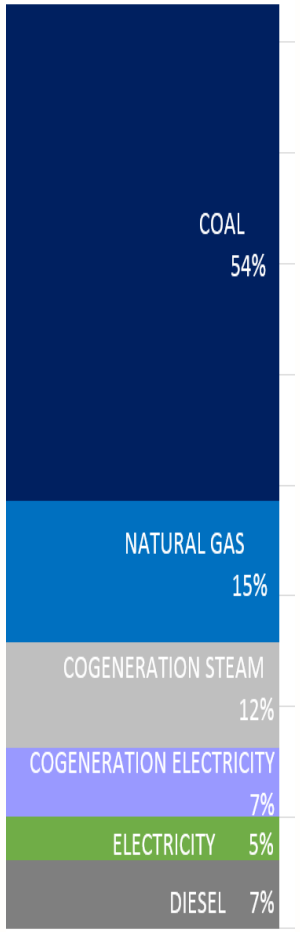


Overview of Fonterra's NZ Energy Supply & Emissions
(includes supply chain and milk collection)

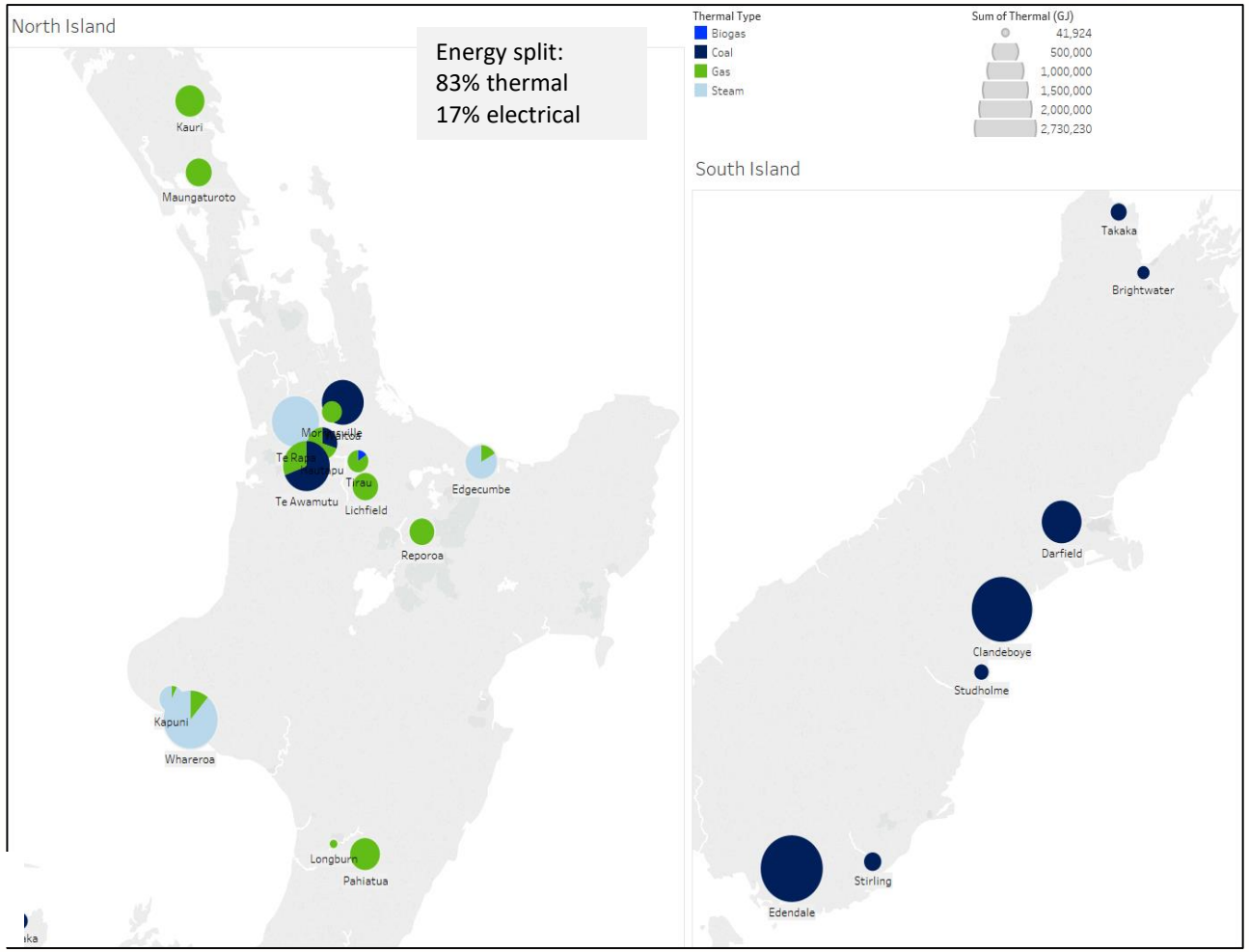
FY20 energy use
~24 PJ



FY20 Emissions
~1.7m tonnes CO_{2e}



Source and size of thermal energy supply for NZ manufacturing sites

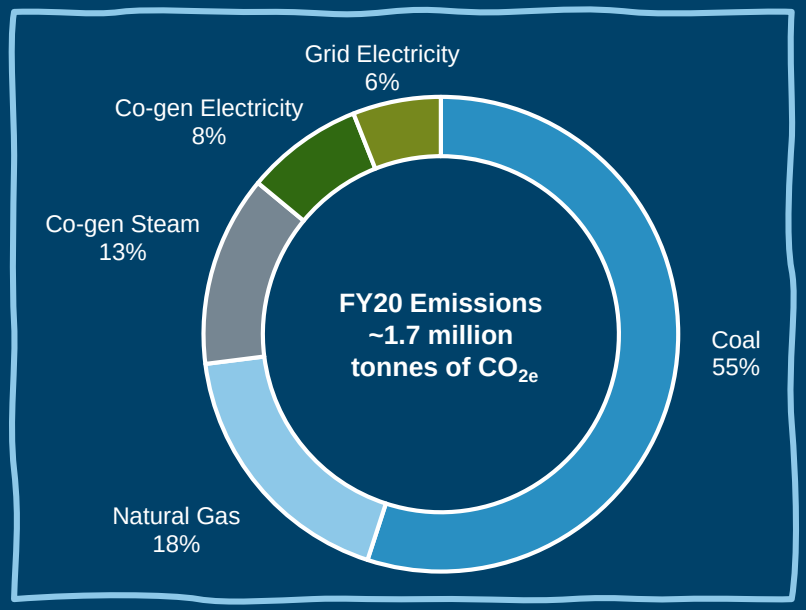


Fonterra has a national plan to transition from coal

Across Fonterra's 28 sites in NZ, there are nearly 100 boilers and air heaters, with greater than 1,300 MW of installed capacity.

Fonterra has a plan to transition the remaining 9 coal using sites (20 assets) by 2037 – this is a phased prioritised plan to manage a range of factors, including asset condition, fuel availability, resourcing (both internally & externally), and capital allocations across the business.

This plan is reviewed annually and timing and activities will change – including adoption of new technology as part of the decarbonisation plans.



2050: Net Zero Operations

- We will have reduced our manufacturing emissions as much as possible and will offset any emissions that remain.

2037: No Coal

- Continue to focus on fuel switching to renewable energy at our coal sites, including thermal demand reduction projects.
- Use learnings from transitioning away from coal to finalise a transition from natural gas on our way to 100% renewable energy for Operations.

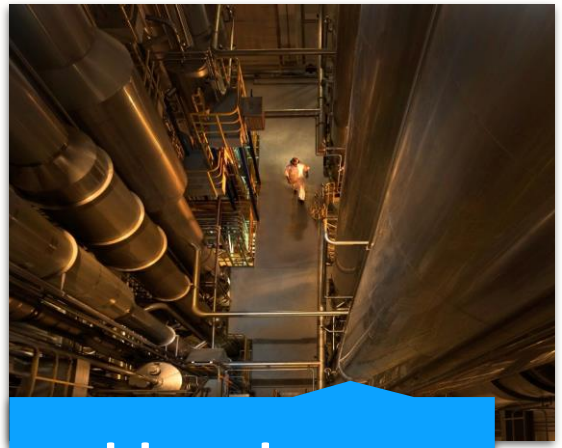
2030: 30% reduction in absolute emissions

- Continue to implement initiatives to fuel switch, reduce thermal demand by improving heat recovery and energy efficiency across manufacturing sites.
- Work with internal and external partners to develop a sequenced approach for transitioning New Zealand assets out of coal. This includes assessing wood biomass, electricity, and low emission alternatives and expanding our capability in innovative solutions through technology trials.
- Accelerate electrification of our light passenger fleet and install charging stations across our sites.

2020: 20% reduction in energy intensity

We hit our 2020 target to reduce energy intensity at our manufacturing sites by 20% from a 2003 baseline. Combined, that's enough energy saved to power all the households in New Zealand for 1.5 years and avoided emitting 3.3 million tonnes of CO2.

Overview of our approach for 30% by 2030 Emission Reduction & Transition off Coal use



Use Less

- Heat Recovery
- Heat Pumps
- New Technology
- Optimise
- Reduce
- Integrate

Emit Less

- Wood Biomass
- Biogas
- Emerging fuel options
- Repurpose
- Replace

Brightwater Co-firing

OVERVIEW

- In 2018, we converted the Brightwater 7MW coal boiler to co-fire with wood biomass
- Target for a 70:30 blend on energy basis
- Wood chip specification of ~35% moisture content - ~1,000 tonnes per annum
- Forecast to reduce initially reduce emissions by ~2,400 tonnes CO_{2e}/pa – actual ~1,700 tonnes CO_{2e}/pa
- Brightwater processes ~230,000 L milk a day (c.f. largest site processing ~13m L milk a day)
- Co-funding of $250k received from EECA's Technology Demonstration Fund

Te Awamutu Conversion to Wood Pellets

OVERVIEW

- In 2020, we converted the Te Awamutu 43MW coal boiler to operate on wood pellets
- Challenging construction at the start of COVID-19
- Forecast to reduce emissions by ~84,000 tonnes CO_{2e}/pa – and delivering this
- Co-funding of $200k received from EECA's Technology Demonstration Fund
- Wood pellets supplied from Natures Flame Taupo facility – made from local sawdust & shavings using geothermal energy - ~47,000 tonnes per annum

NEW ZEALAND ENERGY EXCELLENCE AWARDS 2021
LOW CARBON FUTURE AWARD WINNER

Stirling 11MW Wood Biomass Boiler

OVERVIEW

- We are currently building a new 11MW biomass boiler from Polytechnik at the site – forecast to be commissioned November 2022
- Forecast to reduce emissions by ~18,500 tonnes CO_{2e}/pa
- This will be our first 100% renewable thermal energy supplied site
- Wood chip (P45A M40 A1 as per BANZ Wood Fuel Specifications) to be supplied by Pioneer Energy via a walking floor truck into our top load system – forecast ~21,000 tonnes per annum

Waitoa 30MW Wood Biomass Boiler

OVERVIEW

- We recently announced that we will build a 30MW Bubbling Fluidised Bed (BFB) boiler at our Waitoa site
- Forecast to reduce emissions by ~48,000 tonnes CO_{2e}/pa – commissioning forecast November 2023
- This will replace one of the three boilers at the site
- Wood chip (P63 M60 A3 specification) to be supplied by Wood Energy NZ

Key things we are considering going forward

When engaging with the marketplace we need to ensure that biomass is not double counted

Competition with existing biomass users needs to be understood and managed for unintended consequences

If selecting a pellet or dried woodchip product we need to fully understand supply chain risks and backup supply solutions

We need more of the pellet and dried woodchip solutions as this will allow conversion of existing coal boilers

The biomass supply chain needs to embrace FSC or equivalent sustainability certification with full traceability as our customers are requesting that we report the sustainability of our biomass to ensure deforestation is not occurring, as well as negative social and environmental aspects are not occurring from the biomass supply


Ngā mihi
Thank you
Fonterra
Dairy for life

Recent published research in the Journal of Dairy Science shows our New Zealand on-farm carbon footprint is approximately 1/3rd the global average as reported by the FAO

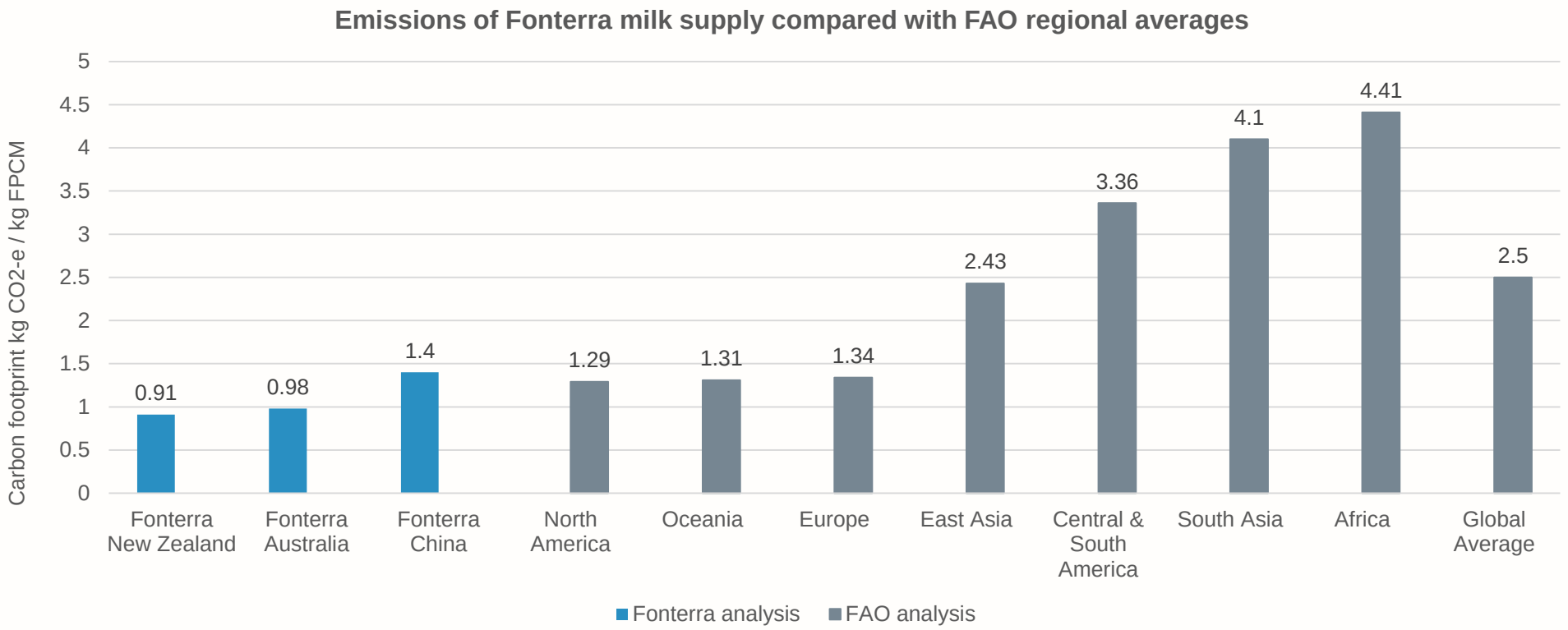


Figure 1: Emissions of Fonterra milk supply (Fonterra commissioned analysis prepared using IDF Carbon Footprint methodology 2016) compared with FAO regional averages (FAO 2018 report), including land-use change.

SOURCE:
Fonterra New Zealand Figures from Ledgard, S.F. et al. 2020. Temporal, spatial, and management variability in the carbon footprint of New Zealand milk. Journal of Dairy Science Vol 3 Issue 1: 1031-1046.
Regional Footprint Information provided on a regional basis using FAO 2018. FAO and GDP. 2018. Climate change and the global dairy cattle sector – The role of the dairy sector in a low-carbon future. http://www.fao.org/3/CA2929EN/ca2929en.pdf .

New Zealand has a low footprint due to efficient pasture-based farming systems & good management practices

Confidential to Fonterra Co-operative Group

Healthy Environment

We are working together to achieve a healthy environment for farming and society.

Tiakina te whenua i tēnei rā, hei oranga tangata mō ngā rā e heke mai nei.

Caring for the land today, so that the land cares for us tomorrow.

To do this we are:

- **Improving the health and biodiversity of** our land and water by having a regenerative mindset, reducing the impacts of farming and manufacturing, and working in partnership with others.
- **Leading the transition to a low-carbon future** by investing in innovation and infrastructure to remove greenhouse gas (GHG) emissions from our supply chain.
- **Helping meet the growing nutritional demand** through improvements in productivity and minimising waste from farm to consumer.

By looking after land, water and animals, and using resources wisely, we are finding a path to regenerate the environment. It's all part of our transition to a more sustainable way of dairying.

Stephanie & Keeley, Auckland

Heavy & Medium Vehicle Fleets

Light Vehicle Fleet

Other vehicles – Farm & Forklifts

Tanker Fleet: Milk-E

OVERVIEW

- Milk-E has a range of ~140km on a full charge and this will be tested
- Battery swap system & should take ~3 hours to charge
- 46 tonne GVM
- Will carry ~2,300 litres less milk (normally ~28,000 L)
- Based at our Waitoa site
- Co-funding received from EECA's Low Emission Transport Fund

Fonterra's fleet decarbonisation

- EVs
- Vehicle chargers installed
- Electric forklifts
- Pilot E-tanker

96 Electric Vehicles
82 EV Car Chargers installed
464 Electric Forklifts
1 Battery Electric Truck