Fonterra
Dairy for life

What this emissions reduction approach means for us

When it comes to reducing on-farm emissions, we're building on a strong position. We can be proud of the generations of ingenuity, innovation, and effort that you've put in to being as efficient as possible. This has put the Co-op at an advantage.

But we need to protect and build on this advantage to stay competitive. That's why we've set a target of a 30% reduction in on-farm emissions intensity by 2030, against a FY18 baseline. This target is across all milk supplied to the Co-op, not per farm.

Having a target is important to our Co-op's future.

The biggest food companies in the world have set emissions targets. And this number of companies is only multiplying. We're predicting that around 30% of the Co-op's 2030 gross margin will come from sustainability-focused customers. To create long-term resilience in the Co-op, it's important that we build on the leadership position we have and move with the market.

The top 3 largest food companies in the world all have set emissions reduction targets:

Nestlé
$us 337.66 b
market value
50% absolute reduction across all scopes by 2030 from a 2018 baseline

PepsiCo
$us 267.64 b
market value
40% absolute reduction in scope 3 by 2030 from a 2015 baseline

AB InBev
$us 128.21 b
market value
25% intensity reduction across all scopes by 2025 from a 2017 baseline

And they're not alone, here are some of our major customers who have joined them:

Nestlé	Mars	Starbucks	Unilever	Yum!
50% absolute reduction by 2030, and Net Zero by 2050.	50% absolute reduction by 2030, and Net Zero by 2050.	50% absolute reduction by 2030.	Net Zero by 2039.	46% intensity reduction by 2030 for scope 3, and Net Zero by 2050.

Sources: Forbes, The Global 2000, 2023; Companies taking action - Science Based Targets: sciencebasedtargets.org/companies-taking-action#dashboard

Customers are moving quickly. 20% of our customers (supporting $4 billion worth of revenue) now have an emissions target. This was 11% a year ago.

Our sustainability-focused customers are those who typically pay Fonterra a premium for our sustainability credentials and value-added products. If we do not sell to them, that volume of milk would be diverted into our commodity products, which attract less of a price premium.

For these reasons, we think choosing to only sell product to customers who do not have emission reduction requirements would not result in good outcomes for us. Even if we did, emissions reductions would still be required to ensure continued access to funding and capital, for both the Co-op and farms, and to meet increased legal and reporting obligations.

> *"The opportunities for Mars and Fonterra to work together on sustainability going forwards... is to absolutely position sustainability not as a peripheral agenda item, but at the heart of what we do.... There will be a lot less suppliers in the future of Mars's business, and it's the sustainable ones that will win in the long run."*
>
> **Alistair Child,**
> *Chief Sustainability Officer, Mars Wrigley*

Small efficiency gains are good for emissions and your bottom-line.

We know that even small efficiency gains on farm can benefit your bottom-line.

For example, utilising your fertiliser, feed and cows in the best way possible and focusing on maintaining farm milk supply while reducing inputs can mean more kgMS per cow. Improving efficiency lifts the profitability of your milk.

Through Farm Source we have a team of specialists, armed with innovative tools, expertise, and products to help you with identifying opportunities to save or optimise – we're here to help you every step of the way.

Small steps towards success.

Every small step you take is multiplied by the power of all the farmers in our Co-operative.

We appreciate every farm is at a different point in the journey, and the opportunities and challenges you face may be very different to those of your neighbour over the fence. No matter where you're at, small on-farm efficiency gains can have a big impact. All reductions – big or small – across different farming operations will help us meet this collective target.

> *"Probably the big issue here is that it's expected that sustainability-focused customers will just continue to grow so our pool of customers that don't have emission reduction requirements or ambition in this space is going to become really small... Restricting ourselves to sales outside of sustainability focused customers will likely impact our ability to obtain the highest value for our farmers milk."*
>
> **Charlotte Rutherford,** *Director of Sustainability, Fonterra*

We are targeting a:

30% reduction in on-farm emissions intensity by 2030, against a FY18 baseline

Absolute versus intensity

Emissions are predominantly reported in two ways: absolute emissions or emissions intensity.

Absolute emissions refer to the total amount of GHGs being emitted. Emissions intensity is the amount of emissions produced per unit of product. By improving how efficiently a farm can produce a similar amount of milk season to season, farmers are able to maintain productivity while reducing emissions on both an absolute and intensity basis. You can read more on this, and absolute emissions, in the FAQ below.

How does this target break down?

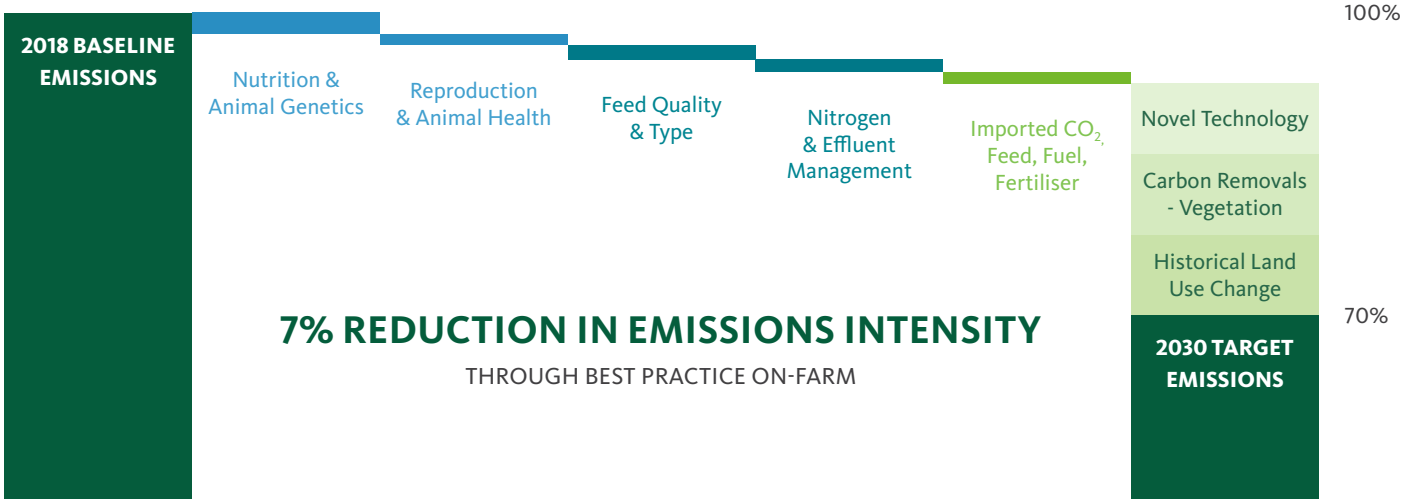
On-farm actions	Novel technology	Carbon removals	Historical land use change
7%	**7%**	**8%**	**8%**
Supporting farmers to continue to adopt best practice farming	Scaled up and commercially viable novel technologies	Carbon removals from existing and new vegetation	Historical land-use change of land to dairy farming

To achieve a collective result, we need individual action

The pathway to deliver to our 2030 on-farm emissions target has four key contribution categories (as seen above).

The chart below shows the five main focus areas on-farm that may contribute an emissions intensity reduction towards the 2030 target*. The reduction we're looking to achieve through efficiency gains on-farm is collective across all milk supplied to the Co-op.

The quick reference guide on the next page offers key actions in these main focus areas, the effect on emissions, benefits for the farm, and guidance to relevant information in the booklet 'What this emissions approach means for us'.



We have committed to set near-term company-wide science-based emission targets with SBTi. We are currently in the process of submitting our Scope 1 and 2, and Scope 1 and 3 FLAG emissions reductions targets to SBTi for approval.

Our targeted emissions reductions to 2030 have been forecast to be achievable based on what we currently know and expect to become possible with the right technological developments, government policy support and on-farm practices. For a fuller description of the key assumptions and uncertainties please refer to the Appendix.

* The depiction of potential emissions reductions from specific activities in this chart is for illustrative purposes and is approximate only. In particular, we acknowledge that the reductions that will be able to be achieved as a result of adoption of best farming practices will be different for every farm.

Reduction category	Lever	CH_4	N_2O	CO_2	Practice change on-farm	How does it affect emissions?	Benefits to farm system	Risks to farm system	Further info in booklet
Nutrition and Animal Genetics	Production efficiency	✓	✓	✓	Using the same volume of fertiliser and feed inputs for increased farm production - more kgMS per cow.	GHG efficiency - more kgMS produced relative to emissions.	Improved animal efficiency, lifts profitability of milk produced .	Requires strong detail focus around feeding.	Page 22-28
	Animal genetics	✓	✓	✓	Improved genetic merit of cows increases MS per cow.	GHG efficiency - more kgMS produced relative to emissions.	Improved profitability of milk produced.	Requires ability to cull poorest performers and strong detail around feeding.	Page 28
	Comparative stocking rate	✓	✓	✓	Increasing feed availability per cow leading to increased MS per cow.	GHG efficiency - more kgMS produced relative to emissions.	More feed per animal increases efficiency, increases milk production and likely other performance benefits.	May require different farm feed inputs or small reductions in stock numbers.	Page 22-28
Reproduction and Animal Health	Improved reproductive results	✓	✓	✓	Better in-calf rate can result in fewer replacements, and tighter calving spread for more days in milk will increase MS per cow.	Reduces all gases from young stock % more kgMS produced relative to emissions.	Cost reductions from rearing fewer replacements. Improved profitability of milk produced.	More days in milk for same cows, may increase farm feed requirements.	Page 23
	Improved animal health	✓	✓	✓	More milk captured from fewer sick cows will increase MS per cow.	GHG efficiency - more kgMS produced relative to emissions.	Improved profitability of milk produced	Some improvements may affect animal health spend (preventatives vs treatment).	Page 24, 25, 27
Feed Quality and Type	Different feeds used	✓	✓	✓	Higher ME feeds create more milk per kgDM therefore increases MS per cow.	GHG efficiency - more kgMS produced relative to emissions.	Less feed needed to generate target milk or more milk from current feed. Improved profitability of milk produced.	May affect protein percentage and feed price.	Page 26
	Plantain		✓		Plantain incorporation in diet reduces urinary N losses.	Reduces N_2O losses from urine patches.	Can free up energy for cow, no longer processing surplus protein. Co-benefit with reduced N leaching.	Lower N feeds may not fit system, plantain/maize/fodder beet.	Page 32
Nitrogen and Effluent Management	Nitrogen impact on pasture protein		✓		Reducing urinary N by careful N fertiliser use, can manage crude protein levels in grass.	Reduces N_2O losses from urine patches.	Can free up energy for cow, no longer processing surplus protein. Co-benefit with reduced N leaching.	Reduced N rates in late spring may slightly reduce peak growth affecting total farm pasture surplus (not enough to create spring deficit).	Page 33, 35
	Timing of nitrogen		✓	✓	Not using N fertiliser in low growth periods where plant uptake is poor (very cold or dry).	Increased N uptake by plants reduces N_2O.	Strategic application may reduce total N volume used, saving money. Co-benefit with reduced N leaching.	Having less N-boosted growth may affect feed budget in these months.	Page 22, 24
	Partner nutrients		✓	✓	Ensuring no other soil nutrient is limiting, will get best growth response to N, supporting reduced application rate.	Increased N uptake by plants reduces N_2O.	When soils are cold and wet, adding sulphate may get a much better pasture growth response than N alone. Reduces farm spend. Co-benefit with reduced N leaching.	Need to consider application of other nutrients which may affect fertiliser spend.	Page 33
	Application rate of nitrogen		✓	✓	Reducing individual application rates of N.	Increased N uptake by plants reduces N_2O.	Adjusting application rates may reduce total N volume used and farm spend.		Page 33, 35
	Coated urea		✓	✓	Using coated urea products.	Protects N from volatilising and turning into N_2O before plant uptake occurs.	Less N needed to achieve same growth, reduce total N volume used and farm spend.	Product more expensive.	Page 34
	Effluent pond volume	✓			Less effluent stored (keep pond level low in warmer months).	Reduces CH_4 generation by bacteria.		Spreading at lower value times for nutrient use.	Page 36, 38, 40
	Solids separation	✓			Less solids go into storage.	Reduces CH_4 generation by bacteria.		More infrastructure to manage.	Page 36, 38, 40
Imported CO_2: Feed, Fuel, Electricity	Imported feed type			✓	Changing the type of imported feed.	Embedded CO_2 volumes vary with different feeds. Changed feed types can inc/dec CO_2 emissions imported.	Different feed type of same volume will reduce CO_2 imported. May have other nutritional benefits.	Price difference may occur on feed, may have nutritional compromises.	Page 39
	Imported feed volume			✓	Changing amount of imported feed.	Embedded CO_2 based on volume of imported feed can inc/dec CO_2 emissions imported.	Reduced volume of imported feed amounts, will reduce cash feed expenses (inc will inc expense).	Inc/dec of feed volumes will affect farm feed budget.	Page 39
	Electricity and fuel use			✓	Change in amount of non-renewable electricity or fuel used on-farm.	Embedded CO_2 based on fuel and electricity use can inc/dec CO_2 emissions imported.	Less product used, reduces farm spend.		Page 41

GHG accounting methods back-calculate the energy requirements (ME) from the amount of milk produced, then using a standardised figure for MJME/kgDM calculate methane emissions. This means, any increase in milk (by using the same volume of farm inputs in a different way) may lead to an increase in total methane emissions.

Frequently Asked Questions

Q. What's the difference between absolute emissions and emissions intensity?

- **Absolute emissions:** the total amount of GHG being emitted by an enterprise. On-farm this is reported as $kgCO_2e$/ha – multiply this by the total size of the farm to calculate the total absolute emissions for a farm.
- **Emissions intensity:** the amount of emissions produced per unit of product. On dairy farms this is often reported as emissions produced per kilogram of milk solids ($kgCO_2e$/kgMS). The Co-op's target is on a per tonne of fat and protein corrected milk basis. This is an intensity metric that is recommended by SBTi.
- By improving how efficiently a farm can produce a similar amount of milk season to season, farmers are able to maintain productivity while reducing emissions on both an absolute and intensity basis.
- The Co-op's target is on a per tonne of fat and protein corrected milk basis. This is an intensity metric that is recommended by SBTi.

Q. What is fat and protein corrected milk (FPCM)?

- Fat-and-protein-corrected milk (FPCM) standardises milk to 4.0% fat and 3.3% protein as required by the International Dairy Federation. This internationally recognised method enables milk produced by different countries to be compared on a common energy and protein basis. For Fonterra's New Zealand farms one kgMS is roughly equivalent to 13kg FPCM.

Q. Why do you use intensity for one target and absolute for the other?

- We follow SBTi guidance and their target setting tools to develop our emissions reduction targets in line with the objective of limiting global warming to 1.5°C. Our approach allows Fonterra to deliver emissions reduction in line with the objective of limiting warming to 1.5°C while driving efficiency and productivity with our farmers.
- Scope 1 & 2 emissions are within our control and can be reduced on an absolute basis.
- Scope 1 & 3 FLAG emissions target reflects emissions performance and efficiency improvements. It drives efficiency in our supply and increases comparability of emissions performance amongst peers.

Q. How are you engaging with your farmers to get them on board with this change?

- An important part of the plan is the setting of an on-farm emissions reduction target. We have taken the past year to work with our farmer owners to help them understand what this means for them and how the Co-op can support them.
- We have a dedicated field team that have been supporting these one-on-one conversations with farmers, as well as regular regional catch ups to keep our farmers up to date with the bigger picture.
- We appreciate every farm is at a different point in the journey, and the opportunities and challenges each farmer faces will vary.
- The emissions reduction target will be Co-op wide. It will take a collective effort to deliver it, so we'll be working closely with farmers to get to where we need to be. To help farmers track progress, we provide data at an individual farm level through Farm Insights Reports.

Q. Shouldn't you be setting an absolute target?

- Whilst we are setting an intensity target, we will continue to report annually on our reduction in absolute emissions, which have reduced by 1.85 million tonnes of CO2e (-6.9%) since 2018.
- We are in the process of submitting our targets for validation with the Science Based Target initiative - a globally recognised organisation that defines and promotes best practice in science-based target setting.
- Our approach is aligned to the objective of keeping warming below 1.5°C and aims to drive efficiency and productivity with our farmers.
- The intensity-based approach is not novel or new, with other comparative international companies such as Cargill, Glanbia, Kerry and Tyson Foods having intensity-based approaches. Closer to home it is also used by Synlait and Olam.
- In developing a suitable target, Fonterra has been discussing this topic with our key strategic customers, banks and markets.
- Our customers have been very supportive. As they purchase dairy ingredients from Fonterra, they know that any reduction in emissions intensity means they get a reduced emissions footprint for every product that they purchase from Fonterra.

Q. Can you provide more detail on what you mean by land use change?

- Approximately 8% of emissions intensity reduction is expected to come from lower rates of conversion of forestry to dairy land from 2010. Much of the historical deforestation accounted for in our footprint is expected to reach the end of the 20-year responsibility window by our 2030 target year.
- A responsibility window marks the period of time where the responsibility for losses of carbon that have happened in the past due to conversion of land are accounted through the supply chain. At the expiry of a responsibility window, the carbon losses from land conversion are considered fully accounted for.
- This accounting approach is in line with the GHG Protocol Land Sector and Removals Guidance, and Fonterra uses GIS data from the LUCAS NZ Land Use Map 2016 (v011) to model these emission reductions. We will continue to update this modelling as and when more recent GIS data is available.

Q. Aren't you taking a short cut by counting land use change from 20 years ago?

- We are required to account for and report emissions from land use change as part of our GHG footprint.
- The GHG Protocol Land Sector and Removals Guidance requires an assessment period of at least 20 years.
- As conversions to dairy and resulting deforestation has slowed down, the emissions related to LUC has also decreased. These emissions will continue to decrease as conversions to grassland are fully accounted for.
- These reductions will be accounted for in line with the draft GHG Protocol Land Sector and Removals Guidance and follow the SBTi FLAG.

Q. You can't dictate farmer behaviour so how are you going to ensure they do their bit?

- The best options to reduce and mitigate on-farm emissions for each farm will vary depending on factors such as the farm system and location.
- We also appreciate every farm is at a different point in the journey, and the opportunities and challenges each farmer faces will vary.
- The emissions reduction target is Co-op wide. It will take a collective effort to deliver it, so we'll be working closely with farmers to get to where we need to be.
- To help farmers track progress and improve their efficiency, we provide data at an individual farm level through Farm Insights Reports.

Q. What's the cost to farmers?

- By focusing on on-farm efficiency improvements, we expect the cost of change will balance out with the savings accrued from such improvements. Opportunities for savings are explained in the booklet as well as in Farm Insights Reports – for example, money is saved if fertiliser application is optimised or if somatic cell count is reduced.
- A cost saving opportunity may also come from the potential government emissions pricing whereby reducing emissions intensity may have a complementary effect on reducing absolute emissions and therefore reducing the cost incurred through potential emissions pricing in future.
- On-farm changes that work best for some farms may require capital investment. This is dependent on each individual farm and will have different costs to change and value opportunities.

Q. How is the short-lived nature of methane gas considered compared to other greenhouse gases?

- More than half of our on-farm footprint is due to biogenic methane, a 'short-lived' greenhouse gas.
- Despite being short-lived, methane has a much stronger warming effect per unit of mass than carbon dioxide.
- The short-lived nature of methane is recognised in New Zealand's split-gas approach to agricultural emissions but because this effect is so potent and the impact of change in production of methane has a quicker impact than the long-lived gases, it is important to be reducing methane as well as getting the long-lived gases to net zero to have a chance at limiting warming and climate impacts.

Q. What is a Science-Based Target?

- The Science-Based Targets initiative (SBTi) is a global body that promotes best practice in science-based target setting and independently assesses companies' targets. Targets are considered 'science-based' if they are aligned to meet the goals of the Paris Agreement – limiting global warming to 1.5°C above pre-industrial levels. The Paris Agreement was adopted by countries under the United Nations Framework Convention on Climate Change on 12 December 2015.
- For more information visit: sciencebasedtargets.org

Q. What is SBTi FLAG?

- SBTi Forest Land and Agriculture (FLAG) is a suite of tools and guidance for companies in the Forestry, Land and Agricultural sector to assist setting science-based targets that can include land-based emissions and removals.
- This guidance differs from the standard SBTi guidance as it accommodates the characteristics of the sector in the target setting criteria (such as commodity pathways, use of carbon removals etc)
- As SBTi progresses their sector guidance we expect targets will become increasingly nuanced and bespoke depending on the sector guidance applied to their organisations (e.g., FLAG, transport, power etc)

Q. What innovative and new technologies do you think will help us achieve this target?

- We are open to all solutions, so long as they don't compromise the health of the cow or the safety or quality of our milk. They must also be practical and affordable for farmers to adopt while delivering emission reductions.

  We're investing in our own research and development as well as partnering with others to try and find breakthroughs that will further support farmers. Some innovations include:

  - **Vaccines** – Supporting scientific research to develop a vaccine that reduces methane emitted by cows and other ruminants.
  - **Kowbucha™** - Developing and deploying the methane reduction potential of organisms in Fonterra's dairy and probiotic culture collection as early life or daily dose treatments for cows.
  - **Non-biological technologies** – Supporting the development and validation of technologies that collect methane after it's been emitted.
  - **Working partnerships** – The Centre for Climate Action on Agriculture Emissions Joint Venture was established in 2022 to accelerate development and delivery of reduction solutions in New Zealand. The joint venture, AgriZeroNZ, has seven founding industry and Government shareholders, committing at least $170m in capital over four years to accelerate the development and commercialisation of solutions to get them in the hands of farmers faster. Through the partnership, Fonterra will invest up to $50m over four years.

    We're also partnering with Nestlé to develop a commercially viable net zero carbon emissions dairy farm in Taranaki, as well as implementing a GHG farmer support pilot programme.

Q. To what extent are innovations and technologies in the future likely to help the Co-op and its farmers address the emission reductions required to meet targets?

- We're investing in our own research and development as well as partnering with others to try and find breakthroughs that will further support farmers. However, it is widely accepted that it is unlikely for there to be one 'silver bullet' solution for all farmers.
- Although we are investing heavily into research and development, we must address emission reduction in every area we can to have the best chance at reducing our impact and achieving targets. This requires every area of our Co-op to do their part, from on-farm, to manufacturing, to R&D of GHG mitigation technologies.
- There are still significant opportunities to reduce emissions through the continued adoption of good farming practices on-farm. There are tools, services and knowledge available today to help you increase your farm's efficiency. Use your farms bespoke Farm Insights Report to see what opportunities you might have on-farm.