

St Kilda Methane Facility Open Day

Morning, Wednesday 12 February 2025

St Kilda open day schedule

09:30 am	Guest arrival, biosecurity, sign in	
09:45 am	H&S, plan for day Introduction to the facility	Robyn Hirst
Strategy segment 9:55am – 10:10am		
9:55 am	Strategy and benefit to NZ Ag	Mark Leslie
	ASB sustainability partnership	Aidan Gent
Science segment 10:10am – 11:00am		
10:15 am	Introduction	Paul McGill
	Mitigations technology	Kelly Forster
	Dairy Beef breeding	Dr Natalie Pickering
	Technologies - genetics as mitigation	Dr Suzanne Rowe
Operations segment 11:05am – 11:20am		
11:05 am	The Operation walkaround	Kat Broomfield Robyn Hirst
Benefits segment 11:20am – 12:10pm		
11:20 am	Sustainability/methane commitments	Sam Bridgman
	Fonterra	Kane Harton
	LIC	Paul Charteris
	Kowbucha	Ben Reeves
	Ruminant Biotech	George Russell
Wrap up and lunch 12:10pm – 12:55pm		
12:10 pm	Lunch and wrap up	With thanks to ASB
12:55 pm	Ends	



Your health and safety is important.

Please note the following hazards:

- **Electric fences**
- **Stock (unpredictable)**
- **Trip hazards**
- **Zoonotic diseases (wash hands)**
- **Vehicles and driving – dust on roadway obscuring vision**

Please help us keep farms free of pests, weeds, and disease with clean footwear.

With thanks to



C-lock plant

Equipment for cattle feeding, water, and measurement



SmartFeed

SmartFeed is a portable, self-contained, easy to use system that measures individual total daily feed intake.

Used for measuring individual feed intake/efficiency, the SmartFeed units are easy to install with virtually no changes required in pen infrastructure and no additional investments required for on farm IT/computer/software.



SmartScale

SmartScale is a wireless scale system that captures animal weight, performance, and behaviour each time it drinks water.



GreenFeed - Large Animal

GreenFeed is a turn-key system designed to measure gas fluxes of Methane (CH₄), Carbon Dioxide (CO₂), and optionally, Oxygen (O₂), and Hydrogen (H₂) from individual animals. It is possible to aggregate emissions data from individual animals and determine herd averages. The system is typically configured to entice the animals to visit multiple times per day. The gas emissions data is logged then processed allowing users to easily access a summarized report of calculated fluxes.

St Kilda facility set up

1. Getting it built, September 2024

- C-Lock units installed – construction and consent took @two months
- Base dug out to 750mm
- Barn designed to composting barn guidelines
- Full effluent capture: 2mm poly lining, drainage metal and 600mm woodchip
- Design and construction of feeder yards to weighing platform
- Two pens capable of housing up to 40 cattle each
- Source appropriate feed for the facility – short chop lucerne baleage

2. Meeting Animal Ethics requirements (AEC)

- AEC application to external Animal Ethics Committee
- Facility visited and approved by AEC committee for first cohort
- Three weeks transition on feed

Once in the facility:

- Ensure animals can feed and drink water, and settle into their environment.
Live web interface to monitor EID information on water and feed
- Report submitted to AEC for approval of next step.

With a career that spans across scientific research, product development, and quality management, and a Master's Degree in Animal Nutrition,



Facility Manager Robyn Hirst brings a wealth of experience. She has expertise in animal nutrition, parasitology, and veterinary pharmaceuticals, and oversaw the design and implementation of the composting barn, high standards of animal welfare, feeding protocols, and measuring methane and CO2 emissions.



SUCCESS! (via lots of learning)

Ready for our first group of study animals January 2025

3. Meeting AEC requirements and validity of data capture

Two pens of 40 replacement heifers (autumn born)

- Mock study
- One week of adaptation to eating and drinking, and training in the Greenfeed (methane measurement)
- Data capture over five weeks
- Ensure animals are gaining weight (very good, average well over 1kg/day)
- Submit report to AEC



4. Kowbucha (Fonterra Study) current cohort

- Kowbucha calves – Feed intake study
- Early learnings – feed intake variable between animals (up to 4-5 kg per day)
- Growing well
- Seven weeks of study (first week adaptation)
- Currently in fifth week in the barn.



Pāmu overview

112

Total number of farms managed by Pāmu

356,048*

Hectares

1,255,619

Stock units

630

Employees



As at 30 June 2024

*Excluding Molesworth Station, (180,787ha leased from DOC), Pāmu manages 175,261ha



The fundamental opportunity for Pāmu is to execute farming excellence at scale.

Our goal is to increase Pāmu Farm of New Zealand’s total shareholder return and play our part in lifting the overall performance of New Zealand agribusiness as a significant contributor to the national economy.

In November 2024 Pāmu advised an uplift in our forecast net operating profit for the financial year ending 30 June 2025 to be between \$25 million and \$40 million. Our current view is that we will be at the upper end of this range. The change to forecast net operating profit reflects increased revenue due to positive production trends, and higher milk and red meat prices.

Our most recent integrated report is available at:

www.pamunewzealand.com/financials

Pāmu creating value for NZ Inc.

Collaboration and partnerships

Climate mitigation and adaption – St Kilda facility for measurement data for feed efficiency and methane selection.

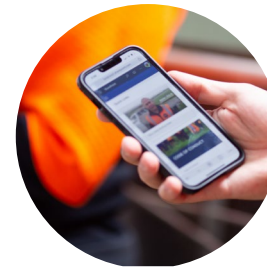
Genetics – Focus Genetics is developing low methane beef and sheep. The Sheep of the Future research programme is developing an "easy care" sheep with greater tolerance to hot weather aligned to climate scenarios, lower emissions and worm resistance, while maintaining meat quality traits.

Dairy Beef and Silver Stabilisers – Significant progress in the large-scale use of dairy beef. In FY25 Pāmu reared 63% of all of its dairy calves. Our Silver Stabilisers breed meets the needs of dairy farmers, calf rearers, beef finishers and processors. Pāmu has partnered with LIC to commercialise these genetics.

Health and Safety – Pāmu is committed to its leadership position in H&S and actively shares these learnings.

Pathways to Farm Ownership – Providing a range of pathways to develop talent for the benefit of New Zealand. Investing in leadership and on-farm training has been underway at Pāmu for some years. We've launched the Pāmu Apprenticeship Scheme to encourage more young people into the industry and our new contracting option for dairy teams is a great opportunity for those with ambition to build equity towards farm ownership.

Pamu FarmIQ and FARMAX Software – Comprehensive farm management and scenario modelling tools are also utilised by 4,800 farmers to support decision-making and meet compliance requirements; e.g., Farm Environment Plans, processor audit requirements.



Mark Leslie, Chief Executive Officer, Pāmu.



Mark has 30 years of experience in the agricultural industry at both leadership and governance levels.

He is passionate about the role Pāmu can play as an innovative and sustainable agriculture business that can support the broader sector.

He holds a Bachelor of Agricultural Science (Hons) and a Masters of Business Administration (with Distinction), both from Massey University.

Spring Sheep – A scaled sheep milking industry provides a significant opportunity to support the doubling of export earnings while reducing environmental footprint. As a 50% JV partner we have developed a thriving business including a fit for purpose processing site (Melody Dairies joint venture).

ASB sustainability partnership

Aidan Gent, ASB

We are passionate about the future of New Zealand’s food and fibre sector and are committed to supporting its transition to a low emissions, climate-resilient economy.

We want to be part of the solution that addresses farmers’ needs for accessible and effective tools that will help them future-proof their businesses, by improving environmental and social outcomes while maintaining productivity and profitability.

As part of the Sustainable Progress Initiative programme, ASB is providing Pāmu with \$1 million over three years. This will support a new apprenticeship scheme, a methane reduction through genetics programme, as well as agri-data tools for better decision-making via FarmIQ and FARMAX.

By supporting these initiatives, we believe we can help enhance sustainable outcomes with farmers and growers across New Zealand by sharing lessons learned to enable more enduring farm businesses.

Aidan Gent is General Manager, Rural Banking, ASB Bank. From Ruawai, Northland, Aidan maintains an active involvement in his Ruawai farming business.



Starting his banking career as a Rural Graduate in Christchurch, Aidan has had roles in Rural and Institutional Banking, Corporate Advisory, Strategy, Product and Transformation across NZ and Australia.

Aidan is deeply passionate about the opportunities within the food and fibre sector and helping customers achieve their goals.

The strands that weave our purpose together

Financial PROGRESS

Good for you, your whānau, or your business.



Social PROGRESS

Good for our communities.



Environmental PROGRESS

Good for the planet.



Implementing a technology-led approach to reduce emissions

Kelly Forster, Ministry for Primary Industries

Kelly Forster, Head of Accelerating New Mitigation Technologies at MPI, was previously Programme Director for He Waka Eke Noa, and a senior policy analyst for the Ministry for the Environment.



Drivers for Action

NZ Govt target / Domestic requirements:

- 10 per cent reduction below 2017 biogenic methane emissions by 2030, and 24-47 per cent by 2050* (*2050 under review)

Key Trading Partner requirements:

- Free trade agreements with enforceable sustainability and climate requirements (EU-NZ FTA; CPTPP; UK-NZ FTA)
- Carbon border tax adjustments (EU, Taiwan)
- Deforestation Regulation (EU, UK)

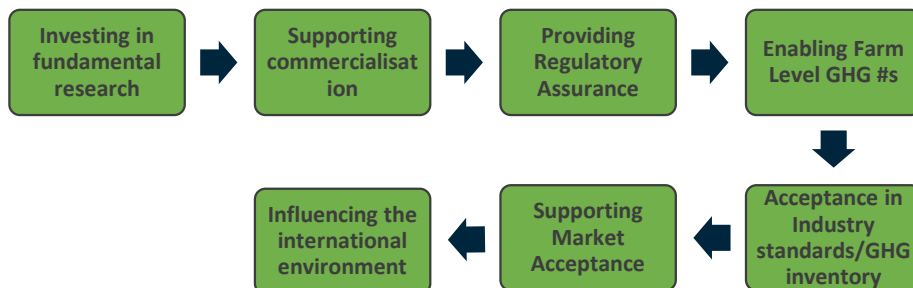
Customer requirements:

- Scope 3 Targets (e.g. supermarket supply chain including on farm emissions).

Successes

- ✓ Partnered with AgriZero^{NZ} and NZAGRC to invest
- ✓ Streamlined regulatory approval processes
- ✓ Promoted prioritisation of inhibitors in Codex
- ✓ Worked with sector to develop and implement a standardised farm level emissions calculation methodology.

Technology-led approach



New mitigation technologies closer to market

Technology	Estimated/targeted reduction	Estimated/targeted date available
EcoPond – treatment for anaerobic lagoons	92% effluent pond methane	2025
Low methane breeding	1% enteric methane per annum	Sheep: 2024; Dairy: 2029; Beef: 2035
Ruminant BioTech – methane inhibiting bromoform bolus	Up to 70% enteric methane	2025
Biolumic - high lipid pasture	Up to 15% enteric methane	2026/27
Lucidome Bio/Arkeabio Vaccines	Up to 30% enteric methane	TBC

Genomic tools and low methane breeding

Drs Suzanne Rowe and Natalie Pickering

AgResearch and Focus Genetics

Dr Suzanne

Rowe, Senior Scientist at AgResearch, is a quantitative geneticist working on the application of genomic



tools for sustainable livestock breeding. She is leading a programme of work using genomic information to breed livestock that naturally produce less methane. She works on the understanding of the variation in gut microbiomes and the ability of our grazing livestock to digest feed more effectively.

Currently her main focus is the commercialisation of a decade of research with the implementation of genomic prediction for lowered methane emissions within the New Zealand national livestock industry, and what it means for meeting New Zealand's environmental targets.

Dr Natalie Pickering (PhD, BAppSc (Hons1), Animal Breeding Scientist at Focus Genetics, leads and collaborates with our research community and



commercial farmers; implementing research into our sheep and deer breeding programmes, directing genetic plans, and focusing on continual improvements for the sector.

Her background in farming provided a foundation for her studies across genetics and genomics, and helped shape her 'get on and do it' attitude.

Natalie has worked on numerous traits including – meat eating quality, climate adaptation traits, low-methane sheep, flystrike and dags, and host resistance to internal parasites.

Dairy beef

Paul McGill – Pāmu

Pāmu is aiming to rear all calves born on its dairy farms by 2030.

Dairy beef combines dairy and beef farming approaches whilst leveraging our scale, farming, and genetics knowledge to produce and rear calves from dairy farms as meat animals.

Dairy beef as a concept is not new, and in Aotearoa New Zealand about 70% of total beef is estimated to originate from dairy – a mix of bobby calves, surplus heifers, bulls, and cull cows. The difference is that we are developing a new stock class, putting systems into place to make this change at a large scale across Aotearoa New Zealand, and sharing our learnings with farmers across the country.

Genetics and systems expertise combined

Dairy cows and beef or dairy sires are selected for genetic traits including robust growth, feed efficiency, and meat quality, coupled with short gestation and easy birthing.

Where are we now?

Pāmu is currently raising 63% of the calves produced by our dairy herds. The next milestone is 75% raised by the end of FY26. We acknowledge that the final 20% will be the most challenging.

Aotearoa New Zealand dairy products are valued as most of our cows live outside and graze on grass, rather than indoors as in many other countries. One of the challenges of our more natural farming system is most calves are born in spring, and this means a lot of calves will need to be reared at the same time which means big changes to farm systems, and new skills to be developed, from calf rearing, to forage and finishing, to processing.



Paul McGill, Head of Innovation and Extension, has been with Pāmu for over a decade and in this new role for the past year.



Twenty years of agricultural involvement has seen several highlights including Young Farmer of the Year grand Finalist, 2006 Kellogg Rural Leadership Programme, 2008 Wairarapa Farm Business of the Year, and a 2010 New Zealand Nuffield Scholarship. He is passionate about keeping up with the latest innovations in food production systems particularly related to pastoral farming.

Why move to dairy beef?

As well as consumer demand, dairy beef has other advantages to both industries:

- A stock class with the best attributes of different breeds, apt for prime cuts and a lean manufacturing beef
- Reduction in livestock farms' GHG emissions intensity / kg LWT
- Once bred-heifers that bring lighter animals onto hill country
- Reduces system duplication
- Transparent, traceable grass-fed beef
- Improved animal welfare outcomes as we select for robust and easy to calve animals
- Jobs in the regions, calf rearing industry, new sharemilkers.

Sustainability at Pāmu

Our climate change response is an important part of the Pāmu sustainability plan (see below). Pāmu is committed to reducing our climate impact by decreasing our greenhouse gas (GHG) emissions and strengthening climate resilience through adaptation. Our practices are evolving and include a continuing focus on:

- adapting land use for the changing climate
- achieving a science-based reduction target
- ensuring climate risk mitigation is embedded in the organisation
- responding to market, financial and consumer requirements.

Pāmu has set a target to reduce net GHG Emissions by at least 30.3% by financial year 2031 from a financial year 2021 baseline. The target has been reinforced through our Sustainability Linked Loan.

Our emissions reduction plan has a strong focus on collaborating with others to identify and accelerate new technologies and practices. Low methane genetics is an important, and available, tool to help reduce emissions – one that benefits that whole sector. Linking feed efficiency and low methane livestock can result in sustainability, productivity and market goals all being achieved.

By accelerating efforts to reduce gross emissions, decrease emissions intensity per product, and accelerate reduction initiatives, we are confident we can achieve our net reduction target and deliver sustainable agricultural solutions.

Our sustainability action plan (right) aligns our key sustainability goals with the projects we have underway, developed in consultation with our farm teams, to shift the dial in our performance. These actions are designed to cover our identified material issues.

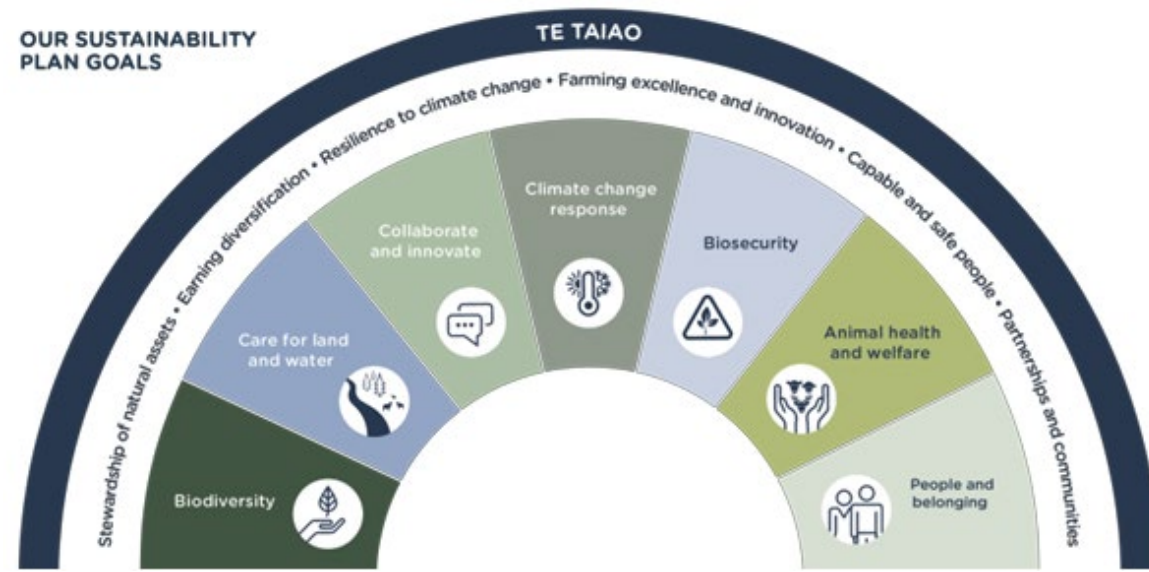
Sam Bridgman leads the Pāmu Sustainability team which drives the Sustainability Plan, as well as provides technical leadership in emissions reduction, climate adaptation, freshwater and biodiversity.



They are heavily involved in strategic direction, stakeholder engagement, and on-farm advisory.

Sam is specifically leading the sustainable finance and climate action workstreams. He has over twenty years' experience in sustainability in roles ranging from central government, consulting and business.

OUR SUSTAINABILITY PLAN GOALS



Investment in St Kilda sets up NZ inc to grow the dairy-beef advantage

Growing the dairy-beef GHG advantage

āta mātai, mātai whetū

-20%
vs beef

UNLOCKS GENETIC GAIN ON EMISSIONS TRAITS

- Intense selection in dairy dams for GHG performance
- The best, most efficient, beef sire in the straw

Opportunity to tap into “green” shoots

Customers with aggressive targets	Low carbon business models
<p style="text-align: center;">Scope 3 targets</p> <div style="display: flex; flex-direction: column; align-items: center; gap: 20px;"> <div style="display: flex; align-items: center; gap: 10px;"> <p>↓16% by '30</p> </div> <div style="display: flex; align-items: center; gap: 10px;"> <p>↓39% by '33</p> </div> <div style="display: flex; align-items: center; gap: 10px;"> <p>↓46% by '30</p> </div> <div style="display: flex; align-items: center; gap: 10px;"> <p>↓55% by '32</p> </div> </div>	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 45%;"> <p>Swedish beef with 80% lower footprint</p> </div> <div style="width: 45%;"> <p>Australian beef carbon neutral by 2025</p> </div> </div> <div style="display: flex; justify-content: space-between; align-items: flex-start; margin-top: 20px;"> <div style="width: 45%;"> <p>Sainsbury – premium dairy-beef with 25% lower footprint</p> </div> <div style="width: 45%;"> <p>NET CARBON ZERO BY NATURE™</p> <p>Silver Fern Farms – emissions insetting</p> </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>Low-carbon, yearling NZ dairy-beef</p> </div>

Kane Harton is Commercial Development Manager for Fonterra

LIC and Dairy-Beef ... next 10 years

Technologies converge...

Sexed semen, wearables, short gestation length semen and specialist genetics for dairy-beef.

Drivers cannot be ignored...

LIC (& international) straw trends, dairy-beef carbon efficiency, branded products, potential bobby calf shift.

Already evolving mating plans...

Beef from day 1 of mating, sexed semen, short gestation length, extended AB.

LIC investment...

Genetics for the entire dairy-beef value chain, data systems, breed development, partnering for verified lower carbon beef.



Paul Charteris, Beef Genetics Product Lead, LIC, began his career in beef cattle genetics in the mid 90's – working at Massey University, Colorado State University and for a biotech company in California.



Following a 180-degree career shift for where he founded some of New Zealand's best know-known ultra-distance running events, he's back on track and looking to create new dairy-beef genetic opportunities for New Zealand farmers.

Benefits

Ruminant Biotech - George Reeves

Ruminant Biotech (RBT) is a New Zealand based company founded in 2021. We are on a mission to develop the worlds best methane mitigation technology for pastoral grazed ruminants.

Our technology solution is a patent protected bolus which delivers the following **Key Benefits**:

1. **Precision Dosing**: delivers a consistent, reliable dose for optimal methane reduction.
2. **Sustained performance**: from one application : works for over 100 days.
3. **World Leading Efficacy** in Pastoral Grazing: one dose delivers +70% methane reduction for over 100 days.
4. **Broad applicability**: can be deployed in all pastoral production systems and in intensive farm systems.
5. **Purity & Safety**: consistent, high-purity product, free from contaminants - ensuring a safe and effective solution.
6. **Convenience**: one single application that fits into farm animal management practices.
7. **Verifiable**: contains a RFID which enables detection and monitoring of animals under inhibition.



George Reeves is the Head of Intellectual Assets and Strategic Partnerships at Ruminant BioTech.



George leads Ruminant BioTech's efforts in market access, stakeholder engagement, regulatory approvals, marketing and bolus commercialisation.

He has 30 years experience in Agriculture, Animal and Human Health Care, and FMCG. Prior to joining Ruminant BioTech in 2021 he led the Farm Animal Business Units at Elanco & Bayer Animal Health.

Contact: george.reeves@ruminantbiotech.com

The bolus impact on GHG emissions is significant. One application to an R2 animal delivers the equivalent of 630kgs of CO₂-equivalent reductions. This is >25% of annualized emissions from the R2 animal.

Our first commercial product will target R2 beef animals.

RBT are working on an accelerated launch in New Zealand and aim to have the bolus solution on the market in Q4 2025.

Benefits - Kowbucha

- Discovered from Fonterra’s large bacterial culture collection, our scientists noticed lower methane emissions from pigs in human clinical trials
- Kowbucha is dosed to calves from birth until weaning, fed with colostrum, cow milk or calf milk replacer (CMR).
- In multiple clinical trials Kowbucha™ has reduced feed intake but improved feed conversion efficiency, leading to similar weight gain for less feed input
- Lower feed intake leads to lower methane emissions but the same weight gain in calves, lowering methane intensity
- Up to ~20% lower feed intake, ~20% lower methane emissions but equal or better calf growth rate
- The effect has been observed up to 12 months of age, and extending the benefit to adult cattle is a major focus of our research
- Kowbucha is a novel technology to support higher production efficiency and lower methane (emissions and intensity) in dairy
- Research is ongoing into the biological and genetic mechanism of action and extension of the effects into lactating cattle
- Kowbucha’s research team is comprised of Jennifer Burke, Emma Bermingham and Hamish Doohan. EpiVets are our clinical and statistical partners. AgResearch are long term collaborators on the Kowbucha programme.



Epivets team dosing Pāmu calves, Kowbucha Spring 2024 trials



Ben Russell is CEO of Kowbucha Ltd, a subsidiary of Fonterra Co-operative Group.



Pāmu – Kowbucha collaboration

- Pāmu has been valued collaborators in Kowbucha on-farm research since 2022
- In 2024, Kowbucha commenced a large animal trial working with the Pāmu teams at Pinta, Exeter and St Kilda to dose, rear and measure the effects of different Kowbucha formulations on dairy replacement heifers
- The St Kilda facility is critical to enable accurate, automated and timely collection of individual feed intake, liveweight and methane emissions.
- Feed conversion efficiency is a largely untapped lever in New Zealand dairy compared to more intensive northern hemisphere systems.
- Significant genetic and phenotypic variation exists in feed conversion efficiency in cattle, which in turn can support lower methane emissions, producing a “win-win” for farmers and the environment.
- Kowbucha worked closely with the Pāmu team, lead by Paul McGill, to plan the practical implementation of the trials.
- Kowbucha is pleased to be one of the first external clients of the St Kilda facility and looks forward to working with Pāmu on future trials.

