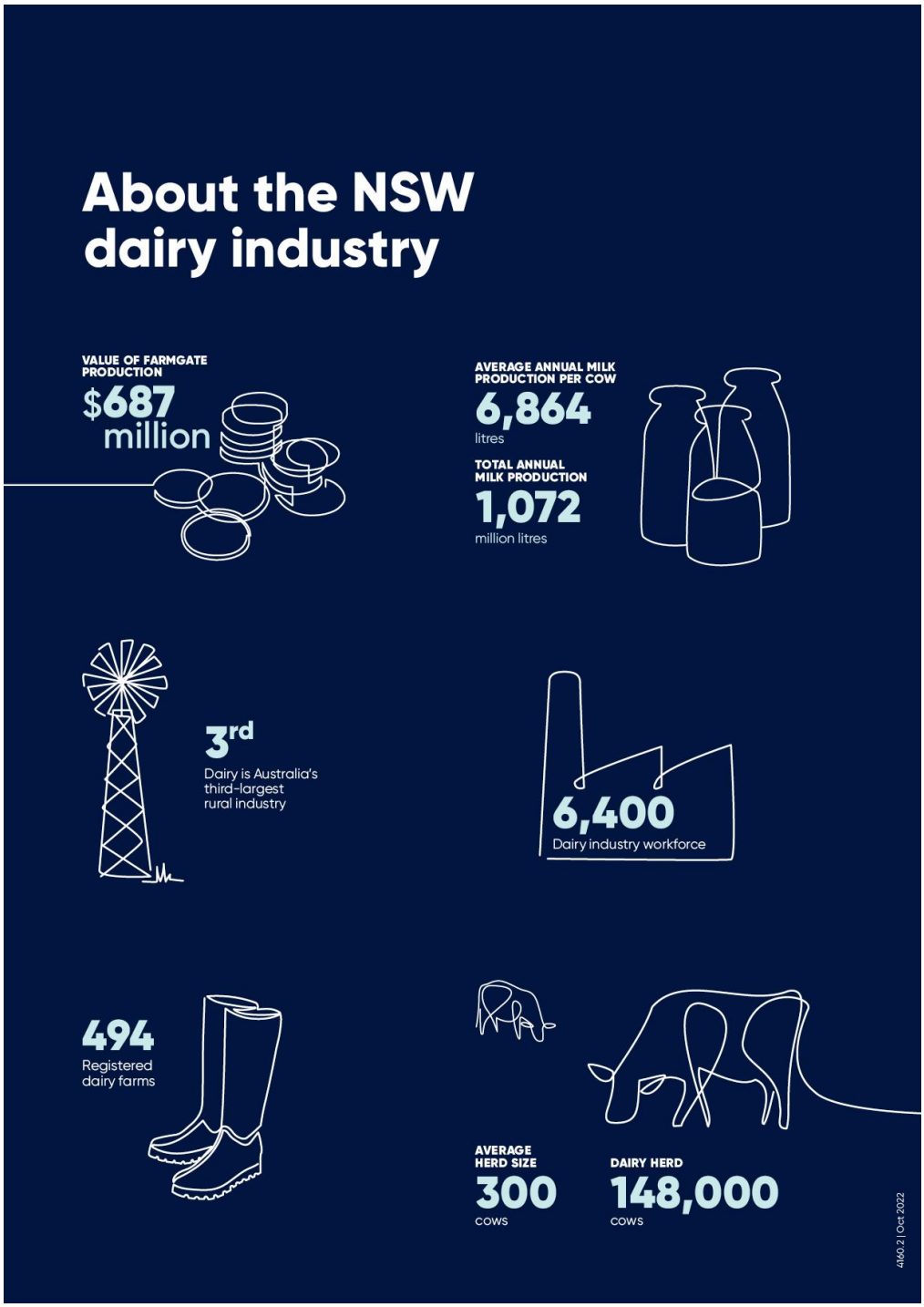
Dairy Australia Limited ABN 60 105 227 987
Level 3, HWT Tower
40 City Road, Southbank Vic 3006 Australia
T +61 3 9694 3777 F +61 3 9694 3701
E enquiries@dairyaustralia.com.au
dairyaustralia.com.au

November 2022

Dairy Australia submission:
NSW EPA draft Climate Change Policy and Action Plan 2022–25



Key points

Contacts:
Megan Hill, Policy Lead Natural Resource Management, Dairy Australia

- This submission responds to NSW EPA's consultation on a proposed Climate Change Policy and Action Plan.

- The submission's primary intent is to inform the EPA NSW about the distinct 'state of knowledge' in Australian dairy sector, and the extensive range of industry and sector-led mechanisms and research for assessment of emissions and their management, including achieving reductions.

- Agriculture represents around 12% of NSW emissions, however, EPA NSW only regulates a small proportion of the sector through licenses under Schedule 1 of the Protection of the Environment Operations Act 1997.

- GHG emissions assessment and management is a key focus not only of the Australian dairy industry but the global dairy sector. The sector has set goals and targets for reducing emissions, described in this submission and is investing in pathways to achieve these, including the Australian Dairy Carbon Calculator, animal genetics and animal treatments that result in lower emissions.

- However, there are limits on achievable enteric methane reductions pending scientific and technical research and economic feasibility outcomes for feed supplements or other treatments. There is also ongoing scholarly effort both here in Australia and globally on developing robust measurement frameworks for dairy carbon footprinting and this is work in progress.

- In addition, while GHG measurement at the dairy farm-level (carbon footprinting) is low at the current time (~11%), there are emissions intensity reductions happening in common and widely applied farm practice (on 94% of Australian dairy farms).

- Any proposed additional measures from EPA NSW for managing GHG emissions must not undermine federal mechanisms (or other state mechanisms) to achieve reductions or farmer participation in carbon markets. We see a significant risk of misalignment of policy levers across jurisdictions that will cause confusion for farmers about what they do—and how they participate in mitigation income opportunities. **See section 5.**

- To this end, Dairy Australia seeks to be involved in further consultation to better understand the extent, application and intent of any new guidelines or regulations on the dairy industry.

- Notwithstanding the above, any guidelines for managing GHG emissions should point to and account for existing industry effort and action, recognise the global research state of play for enteric methane reduction solutions and align with whole-of-government policy objectives for food and fibre production, community nutrition, economic development and trade.

- Dairy Australia, as an RDC committed to supporting farmers manage the impacts of climate, would welcome the opportunity to work with the EPA, DPA, other RDCs and livestock industries on optimal government interventions addressing technical and market failures in farm GHG emissions reduction.

1 Introduction

Dairy Australia is the national dairy industry-owned service company, limited by guarantee and known as a Research and Development Corporation. It is mainly funded by the Dairy Services Levy, a tax paid by all dairy farmers based on milk production. It also acts as a funding body through which the Australian Government provides funding for rural research and development in Australia. As well, Dairy Australia attracts funding at project level from state governments, universities, research organisations and other dairy support organisations.

In this way, we play a critical role in shaping a profitable and sustainable dairy industry.

Dairy Australia operates nationally across eight dairy regions (see **Figure 1: Dairying regions**), where the knowledge, innovation and insights generated by farmer levy investment are delivered back to the farmer. Dairy Australia's *Strategic Plan (2020-2025)* describes the seven priorities and outcomes that will contribute to delivering improved profitability and a more sustainable dairy industry nationally, and in NSW. These priorities and outcomes are provided as an infographic in **Appendix 1** (note 4c with regard to emissions reduction).

Dairy NSW (mid-south NSW), Murray Dairy (southern NSW) and Subtropical Dairy (north-coast NSW) are the Regional Development Programs operating in the state of New South Wales. Each with their own board, they carefully identify and develop priorities for ongoing research, development, education and extension relevant in their region. In doing so, they work hard to ensure regional, state and national policies are linked and fully integrated so that research and extension work is prioritised for regional benefit.

Our submission to the *NSW EPA draft Climate Change Policy and Action Plan 2022–25* complements that made by industry representative body, the NSW Farmers. In recognition of our distinct role in **dairy R, D&E**, our submission seeks to summarise notable emissions reduction commitments and investment in the Australian (including NSW) dairy primary production and processing sector. It aims therefore to **build the factual 'state of knowledge**' around GHG emissions assessment and management—a key focus not only of the Australian dairy industry but the global dairy sector.

2 NSW dairy industry

Dairy is the fourth largest Australian rural industry and a key sector of the agricultural economy.

Dairy farms operating in NSW made up 12.1% of national milk production in 2020/21.[1] Approximately 1.75 billion litres of milk produced from 143,000 cows on 523 farms generated farmgate production valued at $670 million in 2020/21. The direct and flow-on economic contribution of the NSW dairy sector (both farming and processing) to gross regional product in the NSW dairy regions was estimated at approximately $3.2 billion in 2019/20.[2]

As **Figure 1** shows, the dairy industry in NSW operates across a diverse landscape: spread along the subtropical north coastal right along the coast to the south and in irrigated inland river valleys in the south of the state, notably inside the Murray Darling Basin.

The dairy industry acts as a major source of employment across these three key regional areas. It is estimated that approximately 5,600 people were directly employed on dairy farms and by

[1] Dairy Australia 2021. *Australian Dairy Industry In Focus 2021*, 52pp. See Appendix 2 p. 34.
[2] BDO EconSearch 2021. *Economic contribution of the dairy industry in Australia – a report for Dairy Australia*. December, Adelaide, 124pp.

dairy companies in 2020/21[3], with 26 milk processing factories positioned in regional communities across the state (**Figure 2**).

NSW dairy farmers also contribute significant community benefits that are more difficult to quantify, such as undertaking weed and vermin control, managing water courses and catchments, protecting biodiversity and endangered species and in this way making a contribution to public environmental objectives and to tourism in regional and coastal areas.

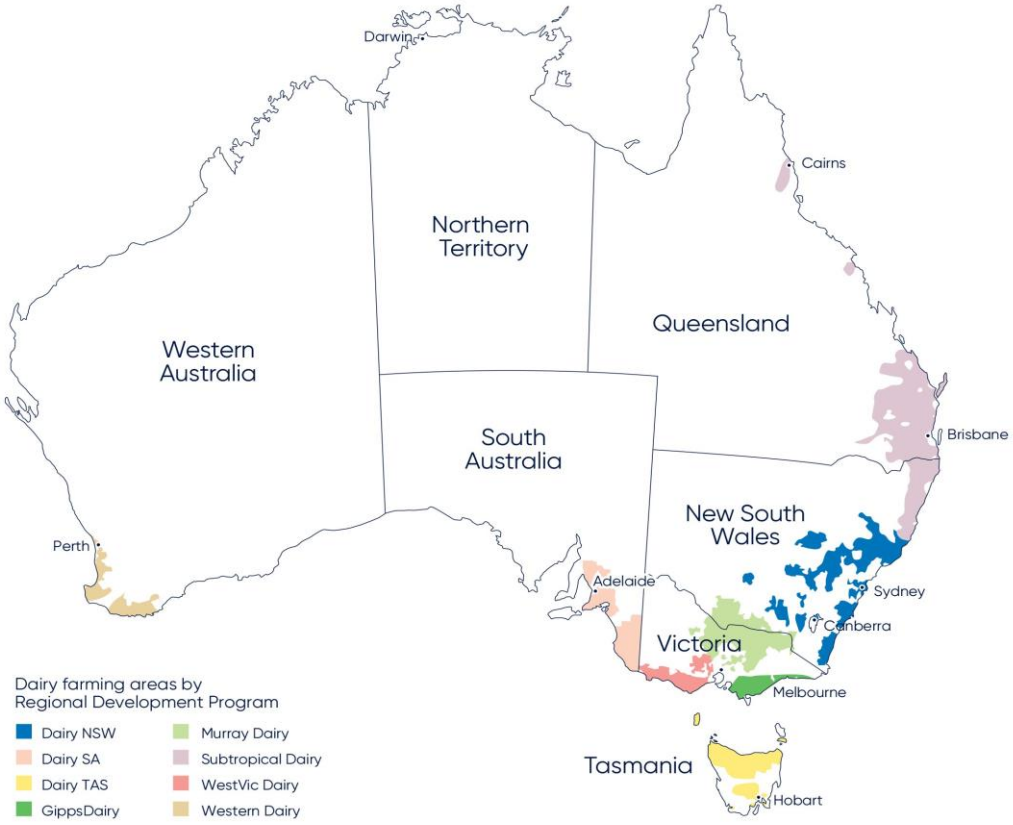


Figure 1: Dairying regions.[4]

[3] Dairy Australia 2021. *Australian Dairy Industry In Focus 2021*, 52pp. See Appendix 2 p. 34.
[4] Ibid.

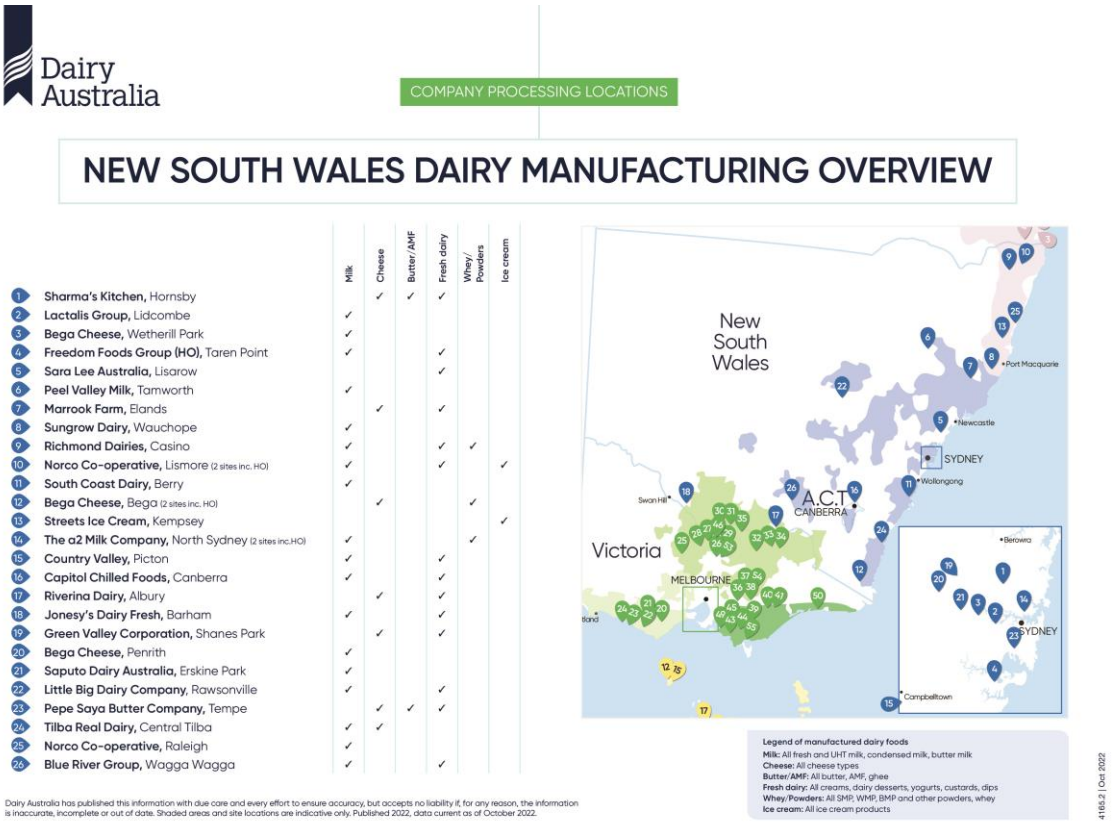


Figure 2: Locations of dairy manufacturing sites in NSW in 2022

3 Dairy is investing to reduce greenhouse gas (GHG) emissions

GHG emissions assessment and management is a key focus not only of the Australian dairy industry but the global dairy sector.

The Australian dairy industry contributes ~2 per cent to the nation's GHG emissions and ~12.5 per cent of agricultural GHG emissions.

Dairy Australia is committed to supporting primary producers and milk processors meet their climate obligations into the future. Our current R&D investments are laid out in the Dairy Australia *Climate Change RD&E Strategy 2020-25*.

As this strategy describes, on farm is the predominant source of emissions across the dairy supply chain, with the largest source of emissions coming from methane from livestock enteric (rumen) fermentation (58% of on-farm emissions and also known as biogenic methane), followed by methane and nitrous oxide from urine and dung (18%). Nitrogen fertilisers cause emissions, via nitrous oxide, (6%) through both their production and application in dairy farm systems (**Figure 3**).

Farms also emit significant amounts of carbon dioxide through the on-farm use of fossil fuels and electricity (8% combined), purchased feeds and concentrates (8%) and purchased fertilisers (3%). There is a range of pre and post-farm gate activities that generate their own greenhouse gas emissions, which contribute to the dairy industry's total carbon footprint.

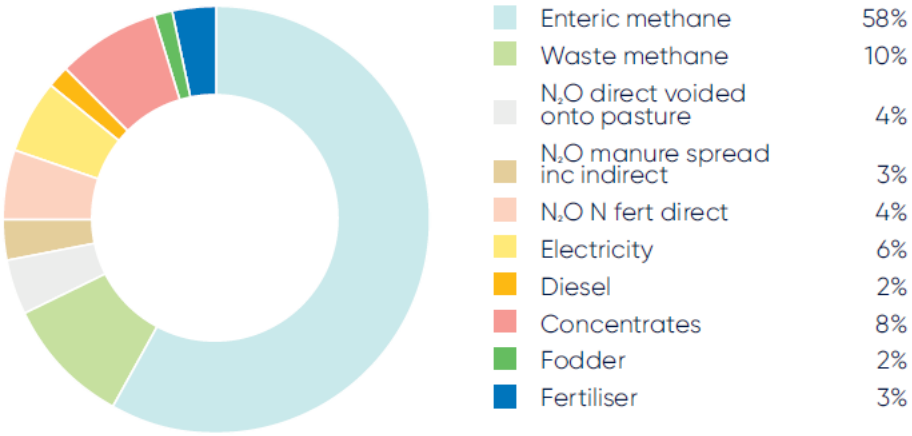


Figure 3: Analysis of dairy farm greenhouse gas emissions data from DairyBase (Christie 2020).

The broader agriculture sector, including dairy, faces the dual challenge of increasing food production to meet the nutrition requirements of a growing population while reducing emissions.

Australian dairy farmers' and milk processors' strong public commitment to climate action is described in the Australian Dairy Sustainability Framework.

- Target 10: **Reduce greenhouse gas emissions intensity by 30% across whole industry on 2015 levels**.

Commercial pressures to reduce emissions are significant (and) and empty promises to do so are increasingly subject to material consequences. This is a key driver for action. There are inherent and significant complexities involved in achieving GHG emissions reductions in agriculture, particularly for enteric methane (see **Box 1**), as well as in accurately monitoring, verifying and

reporting these emissions in our sector. Scientists are continuing to explore and analyse life-cycle emissions metrics—this is a live scholarly exercise at the global level (see further in this submission).

At the farm level, the loss of GHG emissions represent an inefficiency in dairy systems; this is another key driver for action. The loss of methane and nitrous oxide gases into the atmosphere means that energy and nitrogen that could be directed towards production are being lost. Some level of emissions is expected, but there are many opportunities within a typical dairy system to reduce greenhouse gases and achieve efficiency and profitability gains.

Although the carbon footprint of Australian dairy farming is one of the lowest internationally (1.03 CO2-e/kg Fat & Protein Corrected Milk)[5], the first step towards reducing emissions further is understanding the source of emissions on-farm and then highlighting the most effective options for reducing them.

Box 1: Facts on methane in livestock production

- Methane is a product of rumen (stomach) fermentation in cattle and is a result of a physiological process which cannot be negated entirely if the rumen is to function normally providing energy for metabolism from feedstuffs
- Methane from livestock production is often referred to a "biogenic" methane
- While the global warming potential of methane is approximately 28 times that of CO2 (hence 1kg Methane = 28 kgs CO2e in simple GHG calculations) the gas has a far smaller half life of approximately 9-10 years in the atmosphere compared to CO2 which is greater than 100 years
- International consensus on how biogenic methane should be calculated to derive a global warming estimate remains an active debate
- A typical lactating dairy cow, consuming 20 kg of feed dry matter per day and producing approximately 28 litres (kg) of milk will also produce around 400 g of methane per day

Table 1 (on page 9) summarises **key research investments**[6] that support NSW dairy farmers to assess/calculate and manage GHG emissions by:

- understanding their **emissions baseline/sources and profile/footprint** (Australian Dairy Carbon Calculator) and
- implementing **economically feasible reduction measures** (such as advances in animal genetics/breeding that reduce the intensity of emissions and using the insights from our Marginal Abatement Cost Curve modelling[7] to inform selection of other options to reduce emissions and improve energy efficiency).

Numerous interventions can and do reduce the GHG emissions and intensity of dairy cattle. Many of the efficiency improvements farmers make in their farming systems have modest but cumulative potential to reduce GHG emissions intensity, including for methane.[8] Oftentimes, because these efficiency and productivity improvements are normal business practice and improve profitability, farmers may not be aware of their favourable contribution to emissions reduction—and reductions may not be 'counted' in any GHG accounting framework, though the mitigating impact on global warming is there. The incentive for the practice change is

[5] For dairy farms, emissions intensity is measure as CO2-e/kg FPCM (fat and protein corrected milk). FPCM is milk corrected for its fat and protein content to a standard of 4.0 per cent fat and 3.3 per cent protein. This is a standard used for comparing milk with different fat and protein contents. It is a means of evaluating milk production of different dairy animals and breeds on a common basis.
[6] These are farmer-funded investments, from the compulsory levy they pay for RD&E, administered by Dairy Australia.
[7] Point Advisory 2019. *Emissions reduction roadmap for the Australian Dairy Industry - Final Report*. Report prepared for Dairy Australia, 26 July 2019, 53pp.
[8] Lean, I. and Moate, P. 2021. Cattle, climate and complexity: food security, quality and sustainability of the Australian cattle industries. *Australian Veterinary Journal*, 99(7):293-308. doi: 10.1111/avj.13072.

improvement to farm business profitability—in simple terms, for example, the more efficient an animal is at making milk (expressed as kgs milk solids/kgs liveweight per lactation), the lower her emissions intensity footprint. A Dairy Australia farmer survey has highlighted that almost all dairy farms (94%) are undertaking activities and farm practices that reduce GHG emissions intensity, while only ~11% currently know their emissions or carbon footprint.[9] These representative farms are not specifically chasing emissions reductions, but they *are* chasing efficiency and productivity gains in the face of clear challenges to terms of trade and climate volatility.

Notwithstanding the explanation above, to reduce the **enteric (biogenic) methane emissions** of their animals to achieve voluntary emissions reduction targets, it is recognised globally that livestock producers need new and economically viable technologies targeting this problem.

Technical and scientific research programs on feed supplements to reduce enteric methane emissions are in progress, here in Australia and globally.[10] While this research effort is expected to result in commercially available solutions, all require further research and development and are some way off. The current Australian Government research grant program (*Methane Emission Reduction in Livestock* (MERiL) serves to acknowledge this by seeking to fund key research and knowledge gaps, which include the technical feasibility of the feed supplement technologies themselves, emissions factors, and feasibility of administration use in real farming systems.

For dairy companies, GHG emissions intensity is measured by tonnes of carbon dioxide equivalent (tCO2~e) per ML of milk processed. Dairy processing contributes to scope 1 (direct) and scope 2 (indirect) GHG emissions through energy and fuel consumption, particularly from fossil fuels. In 2019/20 dairy processing companies consumed on average, an estimated 1.24 terajoules of energy per ML of raw milk processed. In 2019/20, Australian dairy manufacturers recorded a decrease of 3.3% in GHG emissions intensity over the year, representing a 23.5% decrease since 2010/11 and a 10% decrease since 2015. This now represents a 27% reduction in absolute GHG emissions since 2010/11. A number of manufacturers and global customers have committed to reduce their emissions and actively participate in global programs such as the Science-Based Targets Initiative. Many dairy processing companies operating in Australia are also subject to Australia's national legislation that requires public reporting of scope 1 and scope 2 emissions which form the basis of performance reporting for the sector's target.[11]

The Australian dairy industry publishes scorecards[12] each year articulating progress towards targets (including Target 10) in the Sustainability Framework. In this way, dairy is accountable for our actions. This assures markets of our progress as an industry but has the dual benefit also of encouraging further practice change among sector participants.

[9] Dairy Australia 2020. *Land, Water and Climate Survey Report*. Prepared by Down to Earth Research, May 2020, 77pp.
[10] Feed supplements such as 3-NOP and *Asparagopsis* sp. are the ongoing subject of research trials relevant to dairy.
[11] Dairy Manufacturers Sustainability Council 2020. *Dairy Manufacturers Sustainability Council Environmental Scorecard 2019-20*, published by Dairy Australia, 8pp.
[12] Ibid. Also: https://www.dairy.com.au/sustainability/sustainability-framework-reports-and-scorecards

Table 1: Key research strategies and investments that support NSW dairy farmers to assess and manage GHG emissions.[13]

Initiative or resource	Brief description	Timeline and Link
Dairy Australia Climate Change RD&E Strategy 2020-25	This strategy is the inaugural organisation-wide strategy for climate change. It includes long term planning for both adaptation and GHG mitigation. The strategy links to both the DA Strategic Plan and Dairy Sustainability Framework. The strategy guides DA investment in RD&E to address the challenges of climate change in the dairy industry. Internal Climate Change Advisory Group (ICCAG) responsible for its delivery.	www.dairyaustralia.com.au/climate
Australian Dairy Sustainability Framework (DSF) Environmental targets	The DSF is the Australian dairy sector roadmap for a sustainable industry. It is an active and evolving plan, guided by a steering committee with full industry ownership. The DSF has a single climate-related measure of success: 30% emissions intensity reduction by 2030. The data collected by the DairyBase Carbon Calculator and the Dairy Australia Land Water Carbon survey (*see below) are used to track progress against this target at the farm level. The Dairy Sustainability Manufacturing Council tracks progress at the milk processing level.	Scorecards here: https://www.dairy.com.au/sustainability/australian-dairy-sustainability-framework https://www.dairyaustralia.com.au/manufacturing-resources-and-support/manufacturing-sustainability#.YgBR8epBw2w Consumer facing info on emissions here: https://www.dairy.com.au/sustainability/reducing-environmental-impact/reducing-emissions
30 Ways Australian dairy is tackling climate change	Although the carbon footprint of Australian dairying is one of the lowest internationally, there is still scope to improve efficiency. Significant progress is being made across dairy farms in Australia, as outlined in this report.	Source here: 30 Ways Australian dairy is tackling climate change | Dairy Australia - Dairy Australia
Marginal abatement cost curve (MACC) assessment of existing and new emission reduction technology	The marginal abatement cost curve assessment is a process which has been previously used by Dairy Aust (2019) to assess the emissions reduction potential and cost of established and emerging technologies in this area. Given new technology and treatments are presented for review with reasonable frequency in this domain, the MACC is now being updated to make it easier for new technologies to be incorporated for assessment of applicability, efficacy and cost.	The updated MACC shall be available in late 2022.
Australian Dairy Carbon Calculator (ADCC)	The Aust. Dairying industry has had a carbon calculator (to estimate the carbon footprint on an individual farm) for multiple years. The version in use currently is v6. which has	https://www.dairyingfortomorrow.com.au/tools-and-

[13] Indicative not exhaustive; further detail can be provided on request

	been released for use as a stand-alone tool, or combined with the Dairy Base farm performance resource. Dairy Base is the industry standard platform for calculating and benchmarking farm annual physical and financial performance. The ADCC has allowed the Aust. dairy industry to estimate is carbon footprint relative to other dairying countries. The current estimate is 1.03 kg CO2 eq per kg FPC milk. Approximately 7% of dairy farms currently calculate their GHG footprint using this the ADCC.	guidelines/dairy-greenhouse-gas-abatement-calculator/
Feed saved Australian Breeding Value (ABV)	Australian dairy uses a genetic evaluation system of breeding values (called Australian Breeding Values (ABVs)) which enable farmers to choose artificial breeding bulls based on over 40 measured traits. This mirrors genetic evaluation systems in other part of the world. The Australian system is overseen by DataGene which is an industry owned organisation. A new Feed Saved breeding value has been recently developed by the joint venture partners in DairyBio (Agriculture Victoria, Dairy Australia and the Gardiner Foundation) and released by DataGene for use by Australian farmers. This breeding value allows farmers to select bulls whose progeny produce the same milk but consume less feed. Because of this, these animals have a lower GHG emissions footprint per unit of milk produced compared to progeny from bulls with a lower Feed Saved ABV.	The ABV became available in Nov 2020 and is updated three times a year with each new ABV release. https://datagene.com.au/feed-saved https://dairybio.com.au/
The Environmental Performance Index	Breeding indexes are a way of combining multiple Australian Breeding Values based on their economic importance to produce a ranking for farmers to select bulls to sire their next generation of cows. Based on research undertaken by the joint venture partners in DairyBio, the Environmental Performance Index (working title) is a proposed breeding index focused on reducing greenhouse gas emissions. It will be released by DataGene as a companion resource alongside the existing Balanced Performance and Health Weighted Indexes. The intention of this new index is to allow farmers to select bulls which produce daughters with increased survivability in the herd, increased feed efficiency and decreased GHG footprint overall. It allows a farmer to select bulls which, over time, reduce the GHG footprint of a herd through genetic selection. This improvement is compounding and permanent.	The initial breeding index has been published by Datagene. *Further detail available on request*
Land Water and Climate farmer (LWC) survey	Dairy Australia commissions a survey of dairy farmers, every 3 years dedicated to topics concerning land, water and carbon (LWC). Due to the survey design, DA are able to longitudinally track practice change. The survey is robust given the sample size of approximately 500 farmers (approximately 10% of the national dairy farmer population). The survey allows DA to assess topics such as applied technology to reduce energy use on farm and the percentage of farms who have assessed their carbon footprint.	2020 Survey results here: DA-LWC-2020-Report-FINAL-external-version.pdf (dairyingfortomorrow.com.au)

	Prior surveys were conducted in 2006, 2012, 2015 and 2020. Next survey in field 2023.	
Saving energy on dairy farms booklet	Published by Dairy Aust in 2018, and available to all dairy farmers at no cost, this resource describes option available to dairy farm businesses to reduce their energy use and hence their carbon footprint. This publication is due to have a second edition published in 2022.	2018 Edition available now. https://www.dairyaustralia.com.au/resource-repository/2020/07/08/saving-energy-on-dairy-farms-booklet#.Yf73ad9ByUk
RD&E projects to enhance cow production efficiency	Dairy Aust have created and run numerous projects and programs since 2003 with an aim to enhance individual cow longevity within a herd in addition to optimising milk production relative to liveweight. Examples of such programs and projects are InCalf (optimising cow reproductive performance, 2006-2019) and Adapting Farm Systems (2019-present). Adoption of resources from these programs on farm ultimately lead to cows that are more productive, within a lactation and have more lactations in their lifetime. Both outcomes reduce the carbon footprint of an individual dairy cow and the herd.	Example sources here: Plant Research | Improving Pasture Quality | Dairy Australia Animal Research & Technologies | Dairy Australia Adapting Dairy Farm Systems | Dairy Australia C4Milk Project | Dairy Australia
More Profit from Nitrogen project	Nitrogen containing fertilisers (eg Urea and DAP) are commonly used in the dairy industry to grow more kgs of pasture dry matter per year. However, their application can also result in the release of nitrous oxide, through volatilisation of the fertiliser. Nitrous oxide is a GHG with global warming potential that is significantly higher compared to methane. The More Profit from Nitrogen development and extension project provides farmers with resources required to maximise the efficiency of nitrogenous fertiliser outputs while reducing the risk of inadvertent release of nitrous oxide through suboptimal fertiliser application technique.	The More Profit from Nitrogen project was in development between 2016 to 2019 and was a Cwlth funded initiative. Resources from the project are free and available for use. http://www.dairyingfortomorrow.com.au/tackling-specific-issues/soils/more-profit-from-nitrogen-dairy/
Envirotracker	"Envirotracker" is an on-line tool and resource to enable a dairy farm to assess their natural capital status (soil, water, biodiversity, energy and GHG) in addition to planning for sustainable and optimal practice management. A simple example from this tool is its use to plan tree use for shade (thereby enhancing cow production efficiency in hot weather) and how tree planting can alter the carbon footprint of a farm. This is a Cwlth funded project through the National Landcare Program: Smart Farms.	Envirotracker is published on the DA website and freely available for use.
Climate and Environment Online learning modules for farmers	Dairy Australia is currently developing 6 online learning modules on the following topics: Climate Risks for Dairy, Adapting to climate change, Dairy Greenhouse Gas Emissions, Dairy and the environment, managing water on your farm, and biodiversity. These self-paced modules take users through activities, videos, information, and resources in order to improve a farmer's overall knowledge of the environment and climate.	Launch and pilot late 2022.

	The modules will be adapted into face-to-face extension packages delivered by regional extension officers.	
Lean and Moate review for the Australian Veterinary Journal	This invited scientific review aimed to assess options available to livestock producers to reduce GHG emissions in herds with an emphasis on enteric (biogenic) methane. From the paper abstract: Interventions to reduce GHG production: Reductions in land clearing and burning of grasslands and increased carbon sequestration in soils and trees have potential to substantially reduce GHG emissions. Increased efficiencies of production through intensified feeding and enteric modification have markedly reduced intensity of GHG emissions for cattle in Australia. Genetic selection for lower emissions has modest, but cumulative potential to reduce GHG (mostly CH4) emissions and intensity. Improved reproductive performance can reduce intensity of GHG emissions, especially in beef production. Feeds and technologies that reduce GHG production and intensity include improved 20 pastures, grain feeding, dietary lipids, nitrates, ionophores, seaweed, 3-NOP, hormonal growth promotants in beef, and improved diets for peri-parturient dairy cattle. There is considerable potential to further reduce emissions from cattle using the technologies reviewed.	Published May, 2021, in the Aust. Vet J. https://www.semanticscholar.org/paper/Cattle%2C-climate-and-complexity%3A-food-security%2C-and-Lean-Moate/c5cf6479c9bba0c1f2abc191baf1df8cd28ad44b
Soil carbon report Australia dairy: 2018 update	Current scholarly state of knowledge on the potential for carbon sequestration in dairy pasture soils. The report also discusses the risks and possible opportunities for farmers considering engaging in carbon markets to obtain income from soil carbon credits. From the report: Well-managed dairy pastures often have relatively high soil carbon levels. If the soil is close to the steady-state carbon content possible for the soil type and climate, the capacity to store more carbon will be small and the potential for the dairy farmer to gain carbon credits is limited.	https://www.dairyaustralia.com.au/resource-repository/2020/07/09/soil-carbon-sequestration-under-pasture--2018#.YgGvW7pBw2w
Technical research to reduce emissions underway in the milk processing sector	Collaborative research to improve the environmental performance of dairy manufacturing, e.g. energy efficiency and productivity.	Technical research studies in dairy manufacturing | Dairy Australia

4 The global dairy industry is committed to working towards net zero

Along with its own national sectoral target described above, the Australian dairy industry has also signed onto the Global Dairy Platform Pathways to Dairy Net Zero pledge. Along with Dairy

Australia, Australian dairy milk processing industry peak representative body, the Australian Dairy Products Federation, has signed the Declaration to take direct action on GHG mitigation.

Moreover, Dairy Australia is investing farmer levies in life cycle analysis (LCA) research being undertaken by the International Dairy Federation. This work is intended to arrive at a global dairy scientific consensus for calculating the carbon footprint of dairy food, at the farm and processing level, for corporate or product reporting. Key challenging issues to resolve through the research program include: methodology (attributional vs consequential LCA), functional unit (which product), scope of value chain, quality of data, and emissions factors. This global work is currently in progress but will be relevant to the Australian dairy sector when finalised.

The 'state of knowledge' at the sector level about reducing GHG emissions on Australian dairy farms and in the milk processing sector is high.

However, there are limits on achievable enteric methane reductions pending scientific and technical research and economic feasibility outcomes for feed supplements or other treatments. There is also ongoing scholarly effort both here in Australia and globally on developing robust measurement frameworks for dairy carbon footprinting and this is work in progress.

In addition, while GHG measurement at the dairy farm-level (carbon footprinting) is low at the current time (~11%), there are emissions intensity reductions happening in common and widely applied farm practice (on 94% of Australian dairy farms).

Any EPA guidelines for managing GHG emissions should recognise the distinct 'state of knowledge' in livestock agriculture, and the extensive range of industry and sector-led mechanisms and research for assessment of emissions and their management, including achieving reductions.

5 There is potential policy misalignment with the national emissions reduction framework and any proposed EPA NSW regulations for managing GHG emissions

The Australian Government, through the Department of Industry, Science, Energy & Resources (DISER) is developing a livestock emissions framework to support accounting that aligns with the National Greenhouse Gas Inventory (NGGI) and allows for application within the Emissions Reduction Fund (ERF). The framework will provide a clear and scientifically validated pathway for livestock industries to implement and record emissions reductions. Leading methane experts make up the working group. The framework and models are aimed to apply at a farm to national scale, but full implementation is expected to take some time.

Through the ERF, participants (e.g. dairy farmers) can earn carbon credit units for emissions reductions. These can be sold to generate income. The policy principle is to incentivise emissions reduction activities. A state regulation, or guideline that is seen to be alike to a regulatory requirement, disqualifies participation in the ERF.[14]

In this way, any additional measures imposed by EPA could lead to a misalignment of policy approaches. It is not clear how the federal Clean Energy Regulator, for example, would view requirements from a State regulator or how it might affect participation in carbon markets. Such misalignment of policy levers across jurisdictions will cause confusion for farmers about what they do—and how they participate in mitigation income opportunities. As such, the intent of the proposed guidelines and the way they would be applied needs careful consideration.

[14] "An ERF project must not…be required to be carried out under a State law". Source accessed 3 Feb 2022 from http://www.cleanenergyregulator.gov.au/ERF/About-the-Emissions-Reduction-Fund/eligibility-to-participate-in-the-emissions-reduction-fund

Any additional measures imposed by EPA NSW for managing GHG emissions must not undermine federal mechanisms (or other State policy objectives) to achieve reductions or farmer participation in carbon markets. We see a significant risk of misalignment of policy levers across jurisdictions that will cause confusion for farmers about what they do—and how they participate in mitigation income opportunities.

To this end, Dairy Australia seeks engagement throughout the development of proposed EPA measures to ensure they will be sensible and can be practically applied.

Proposed EPA measures for managing GHG emissions should point to and account for existing industry effort and action, recognise the global research state of play for enteric methane reduction solutions and align with whole-of-government policy objectives for food and fibre production, community nutrition, economic development and trade.

6 Conclusion

Dairy Australia encourages the NSW EPA to work with industry and the scientific community on regulatory approaches to GHG emissions in agriculture.

At the outset, we encourage the EPA to understand current industry investments and approaches to GHG emissions assessment/calculation (e.g. the Australian Dairy Carbon Calculator) and management (the Dairy Australia *Climate Change RD&E Strategy 2020-25* outlines priority investments but this submission also notes the global dairy R&D state of play), including current limitations (e.g. unresolved scientific endeavour).

The Australian dairy industry has set voluntary targets for emissions reduction and put action plans in place to make progress—at the farm level and at the processing level. The industry also wants to participate in carbon market opportunities as they materialise.

In light of all the complexities laid out in this submission, we question whether EPA regulation is the most suitable way to achieve emissions reductions on farm or in milk processing.

Dairy Australia, as an RDC committed to supporting farmers manage the impacts of climate, would welcome the opportunity to work with the EPA, DPI other RDCs and livestock industries on optimal government interventions addressing technical and market failures in farm GHG emissions reduction.

Appendix 1

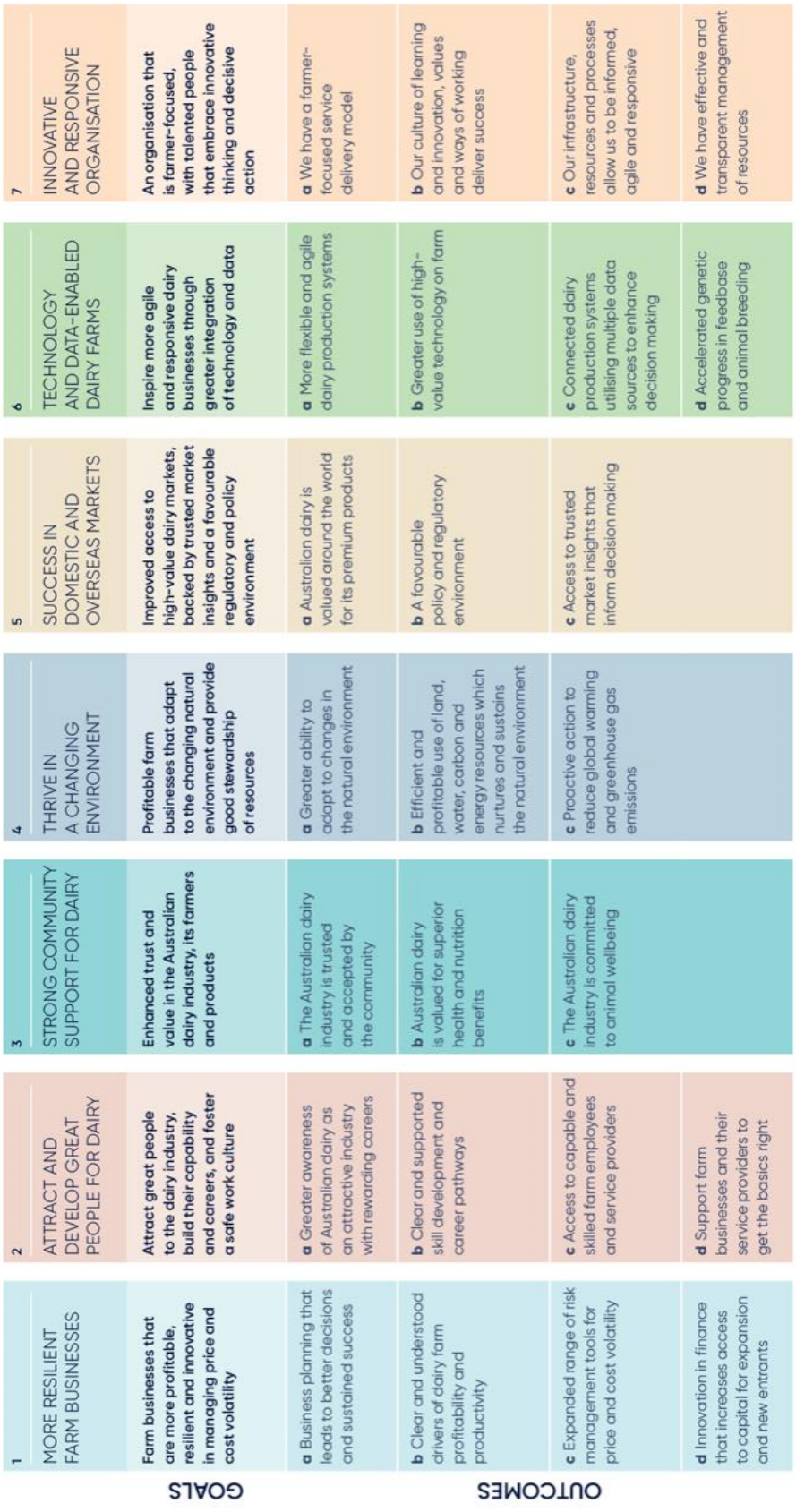


Figure A1. Dairy Australia's agenda for contributing to a profitable and sustainable national dairy industry, as outlined in the organisational Strategic Plan 2020-25.