Response to Victorian Interim Targets Independent Expert Panel's *Issues Paper*

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The Australian dairy farm industry, represented by the Australian Dairy Farmers (ADF) and Dairy Australia (DA), welcomes the opportunity to make a response to the Issues Paper of the Independent Expert Panel reviewing the Victorian Government's emission reduction targets and opportunities. ADF is the industry's peak advocacy body and DA is the industry's research, development and extension (RD&E) provider. Pursing effective emissions reduction in any industry requires policy and RD&E to operate in collaboration and partnership.

INDUSTRY CONTEXT

The Victorian dairy industry is a significant contributor to the state economy. In 2016-17 Victorian dairy had a farm gate value of $2.1 billion and an export value of $2 billion. Victoria produces 64 per cent of Australia's milk and exports 76 per cent of Australia's dairy products (*Australian Dairy Industry In Focus 2017, Dairy Australia*).

According to the Australian Government's Department of Environment and Energy, agriculture accounts for approximately 13 per cent of Australia's total greenhouse gas emissions. Emissions from dairy farms represent 12.5 per cent of total agriculture emissions. This represents approximately 1.6 per cent of total national emissions. Dairy farm emissions comprise of 57 per cent from enteric methane, 20 per cent from manure and urine, 6 per cent from nitrogen fertilisers (both application and production), 9 per cent from fuel and electricity and the remaining 8 per cent from purchased feeds (Christie, K.M; Rawnsley, R.P; Phelps, C; Eckard, R.J. 2016, *Revised greenhouse-gas emissions from Australian dairy farms following application of updated methodology; Animal Production Science, CSIRO*).

INDUSTRY POLICY

ADF support an emissions intensity methodology and baseline approach. For example, tonnes of carbon (CO2e tonnes) per kilogram of milk solids. In our *Sustainability Framework* our emissions intensity target is 30 per cent reduction by 2020 based on 2011-12 levels. The proposed target is 0.80 kg/CO2e/litre of fat & protein corrected milk and 11 kg/CO2e /kg milk solids by 2030 (2009 baseline 1.1kg/CO2e/litre fat and protein corrected milk).

In terms of government action, ADF believes emission reduction targets should be based on satisfying Australia's international agreements – the Kyoto Protocol and Paris Agreement. Currently this involves reducing emissions by 5 per cent below 2000 levels by 2020 (under the Kyoto Protocol) and 26-28 per cent reduction below 2005 levels by 2030 (under the Paris Agreement). The Australian Government's climate change policy review in December 2017 found the country to be on track to meeting these targets. This is primarily due to the Australian Government's $2.55 billion Emissions Reduction Fund (ERF), which so far has secured 191.7 million tonnes of emissions reduction from the economy.

Progress against the dairy industry's emission targets are monitored through the Australian Dairy Carbon Calculator. This is aligned with the ERF and are informed by the Australian National Greenhouse Gas Inventory. The currently promoted international methodology for agriculture for monitoring carbon is ECOFYS (http://www.ecofys.com/files/files/ecofys-uni-aberdeen-pbl-2016-science-targets-agriculture-forestry.pdf). This recommends using emissions intensity pathways to set emissions reduction targets and for these to be monitored via the:

- Cool Farm Tool – this is a farm based calculator equivalent to the Australian Carbon Calculator
- European Carbon Calculator – this is similar to the Australian Carbon Calculator
- FarmGas – the Australian Carbon Calculator. This was modelled on the Australian Dairy Carbon Calculator.

ADF supports action by state governments to reduce emissions beyond Australia's international obligations on the provision that intervention does not increase energy prices, reduce energy reliability or reduce industry productivity and profitability.

INDUSTRY RESPONSE TO SELECTED QUESTIONS IN THE ISSUES PAPER

6. What are the most significant opportunities and technologies for reducing emissions in Victoria during the period 2021-2030 and to reach net zero emissions by 2050?

There are several key opportunities for reducing emissions in the dairy industry.

Increased use of renewable energy technologies

Whilst solar hot water heating is generally cost effective, the economic viability of a solar voltaic systems is highly dependent on the consumption on farm of PV-generated power and for many dairy farms, the energy demand does not match the energy generated by the solar voltaic system. Battery storage combined with solar voltaic is not yet cost effective (Smarter Energy use on Australian Dairy Farms, Dairy Australia 2015).

Installation of methane digesters on dairy farms and the use of captured biogas as a source of energy

This has the potential to reduce manure methane emissions and emissions generated through electricity generation. Currently these systems are not cost effective without subsidies, the exception being free stall dairy farms with more than 800 cows *(Is Biogas Technology Right for Australian Dairy Farms? Dairy Australia, 2016).*

Enhanced efficiency fertilisers

Extensive research has been conducted into the effectiveness of nitrification inhibitors on nitrous oxide (N2O) emissions from nitrogen applied to dairy pastures. Although nitrification inhibitors have been found to reduce N2O emissions associated with nitrogen fertiliser application there have been no measured increases in productivity in temperate dairy pastures. In the absence of an appropriate ERF method, there is no incentive for adoption of these enhanced efficiency fertiliser products.

Use of Estimated Breeding Values (EBVs) for low methane emitting animals

This research is being conducted by Agriculture Victoria, Dairy Australia and DataGene. The EBVs are expected to be released within the next 2-3 years.

Use of novel feed additives, for example 3-nitrooxypropanol inhibitor (3NOP)

Collaborative research between commercial partners, the Canadian Government, Agriculture Victoria and Dairy Australia reported feeding 3-nitrooxypropanol reduced methane emissions of feedlot cattle by 40 per cent without impacting productivity (similar reductions have been reported in dairy cattle). The results of this research will support registration of the product in Canada as a Carbon Offset Protocol, giving Canadian beef producers access to this methane mitigation technology. Additional research is required in Australia before the product can be registered for use in dairy or beef cattle.

Soil carbon levels on Australian dairy farms are already high and there is minimal potential for additional carbon sequestration *(Soil Carbon Sequestration under Pasture in Australian Dairy Regions, Dairy Australia, 2010).*

7. What are the key barriers to reducing Victoria's emissions by 2025 and 2030?

Lack of awareness among Victorian dairy farmers of emission reduction options

The Dairy Australia Profitable Dairying in a Carbon Constrained Future project reported one of the most successful activities in raising awareness of opportunities to reduce emissions was taking farmers through the industry farm business management benchmarking tool, DairyBase and Australian Dairy Carbon Calculator (the data sets from DairyBase can be imported into the carbon calculator). The emissions profiles for 60 Western Victorian dairy farms reported a 30 per cent difference in emissions intensity/litre of milk between the best and lower performers. Higher emissions intensity suggests businesses are not always implementing best practice and further interrogation of data revealed improvements could be made in the areas such as reproductive performance, pasture management and fertiliser use.

3NOP is not registered for use in Australia

3NOP has the potential to reduce enteric methane emissions by 30-40 per cent. Given enteric methane emissions represent approximately 60 per cent of dairy farm emissions, 3NOP could potentially reduce whole farm dairy emissions by 20 per cent. Multiple, long-term studies using conditions similar to those of commercial production systems are necessary for product registration and to develop associated ERF methods. Short-term studies are useful for initial screening, but long-term studies are required to determine whether the methane reduction is maintained over time.

Inadequate availability of cost/benefit analysis of mitigation strategies

Without clear profit benefits, existing and emerging strategies such as use of coated fertiliser to reduce nitrous oxide emissions, preferential selection of animals with lower methane emissions and use of feed additives are unlikely to be adopted. Subsidies to support adoption of strategies with known and reliable outcomes will assist in overcoming economic barriers.

8. What further steps can the Victorian Government take to support emissions reduction opportunities and the uptake of low carbon technologies?

Accelerate emissions reduction R&D for the dairy industry at the Primary Industries Climate Challenges Centre (PICCC)

In 2010 the PICCC was established to conduct climate change R&D for Victorian agriculture. This collaboration between the University of Melbourne and Agriculture Victoria has delivered more than 30 climate change mitigation and adaptation projects. As the lead state under the national RD&E Framework for Australia's dairy industry the PICCC has been conducting:

1. studies to quantify the impact of a range of methane-reducing dietary technologies on dairy cattle emissions and animal performance, with the aim of delivering commercially viable offset options in Canada and Australia.
2. trials that will enable producers to make more informed decisions about the cost-benefit ratio of using nitrification inhibitor-amended fertiliser to improve nitrogen use efficiency.

Increasing investment and resources in these initiatives will accelerate the pathway to commercialisation and adoption.

Expand access to service providers with the capacity to provide independent advice

Each dairy farm has a unique energy use profile depending on their milk harvesting system and the frequency and timing of milking. Feed-in tariffs, line supply (single phase vs 3 phase) and capacity to sell back into the grid are also different for each dairy farming business making it difficult for farmers to make decisions about the best option for their farm without independent advice.

Subsidise adoption of low emission technologies

Government subsidies have been important drivers for the installation of anaerobic digesters on dairy farms in the United States and Europe. Cost and lack of technical support are significant barriers to their adoption in Australia. Subsidies enable the development of the necessary service industry and over time drive installation costs down. Dairy Australia findings from projects to support on farm energy efficiency have found subsidies for renewable technologies drive faster uptake.

9. What lessons can be learned about reducing emissions in Victoria from actions taken in other states and countries to reduce emissions?

Lessons from other states and countries indicate addressing the barriers to participation as well as subsidising adoption of appropriate technologies are critical. Several examples are provided below.

USA AGSTAR program

This promotes the use of biogas recovery systems to reduce methane emissions from livestock waste. This provides funding and technical support. https://www.epa.gov/agstar

International research collaborations

For example the Technologies for Reducing Greenhouse Gas Emissions and Providing Offset Options for the Beef and Dairy Industries *(Agriculture and Agri-Food Canada, University of Melbourne, Agriculture Victoria)*

Australian Government's Carbon Farming Initiative program

Examples are the Filling the Research Gaps Methane and Nitrous Oxide research programs and the Outreach and Extension projects.

Australian Government's Department of Energy and Environment Energy Efficiency Information Grants – Smarter Energy Use on Australian Dairy Farms

20 per cent of Australian dairy farms participated and 81 per cent made changes to their practices to improve energy efficiency.

European Union supported Animal Change program (http://www.animalchange.eu/)

This investigated mitigation and adaptation options for sustainable livestock production under climate change. The project revealed that, in the short term, the European livestock sector can make a limited contribution to EU GHG emission reduction efforts, by curbing overall direct emission intensity by about 15 to 20 percent between 2005 and 2025. Production systems are already relatively efficient and marginal adjustments such as feed supplementation, biogas and energy use efficiency measures can only generate limited mitigation gains.

Co-investment in these EU-wide initiatives is one significant way to achieve economies of scale, prevent duplication of effort and address the need for critical mass in R&D in this area. Australia is the only developed country that has yet to co-invest in EU ERA-NET and FACCE-JPI initiatives.