Dairy Australia

dmsc dairy manufacturers sustainability council

AUSTRALIAN DAIRY MANUFACTURING

ENVIRONMENTAL SUSTAINABILITY SCORECARD 2018–19

Australian dairy companies working together for a sustainable future

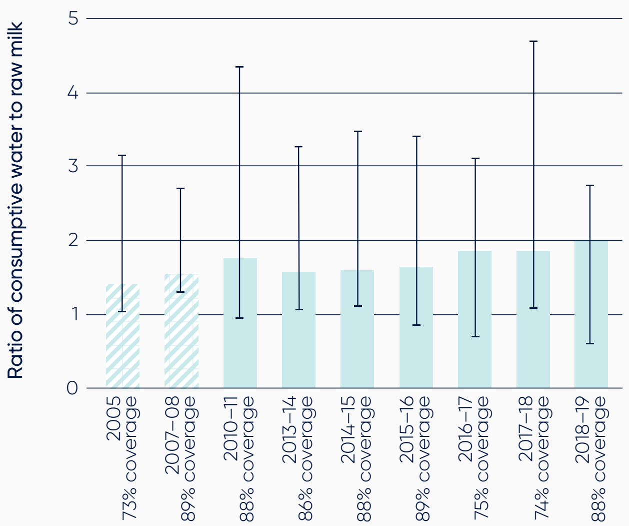
Our scorecard

Reporting by the Dairy Manufacturers Sustainability Council (DMSC) contributes to tracking industry progress against the Australian Dairy Industry Sustainability Framework under 'Reducing environmental impact' – targets 9, 10 and 11.

Target 9

30% reduction in the consumptive water intensity of dairy companies (on 2010–11 levels) by 2030

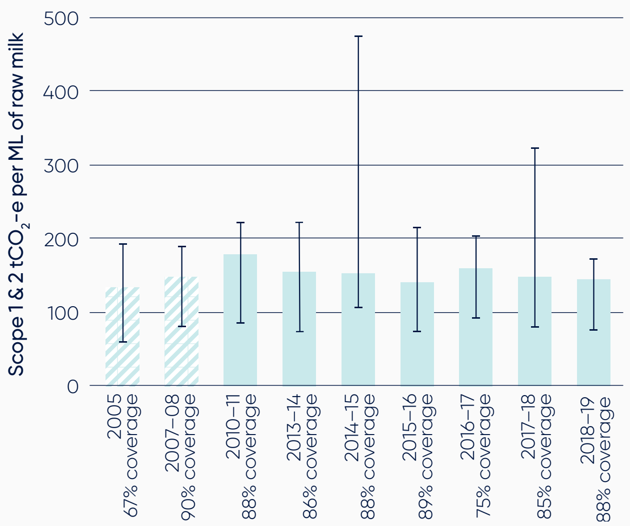
Figure 1 Change in water intensity – megalitres (ML) of water consumed per megalitre (ML) of milk processed



Target 10

30% reduction in greenhouse gas (GHG) emissions intensity across the whole industry (from a baseline of 2015) by 2030

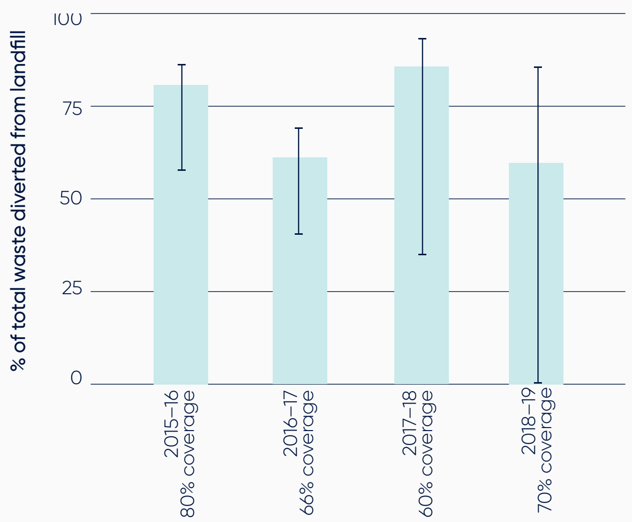
Figure 2 Change in emissions intensity – tonnes of CO_2 equivalent (tCO_2-e) per megalitre (ML) of milk processed



Target 11

100% diversion rate from landfill by 2030

Figure 3 Waste diversion rate – % of solid waste diverted from landfill



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EXECUTIVE SUMMARY

This is the ninth Australian Dairy Manufacturers Sustainability Council report on environmental sustainability performance. The scorecard covers the financial year 2018-19 and compares, where possible, the environmental performance of the industry published for 2004-05, 2007-08, 2010-11, 2013-14, 2014-15, 2015-16, 2016-17 and 2017-18. These reports are available on the **Dairy Manufacturing Resource Centre**.

The scorecard contributes data for public reporting against the Australian Dairy Industry Sustainability Framework and the environmental targets for manufacturing which are outlined in that Framework. These are also aligned to the United Nations Sustainable Development Goals. Additional data is also presented for performance tracking, capacity building and benchmarking purposes among the participating manufacturers. For more detailed information on the Framework and the latest progress report, refer to the website: **dairyaustralia.com.au/ourdairypromise**

The data presented in the scorecard is based on aggregated information provided by participating members of the Dairy Manufacturers Sustainability Council (DMSC). The collection and reporting of data serves multiple purposes. It:

- Contributes to broader progress reporting for the Australian Dairy Industry Sustainability Framework.
- Informs internal benchmarking by DMSC members, allowing members to see their specific performance in relation to anonymous peers as well as aggregated data for the industry.
- Builds the capacity of participating DMSC members in data collection and reporting and progressively improves the integrity of data.
- Provides a source of information for the dairy industry and other stakeholders interested in the performance of the sector including regulators, customers, consumers and investors.
- Helps to inform the design and delivery of DMSC projects aimed at specific areas of environmental performance which impact on the entire sector such as energy and water efficiency.

Water intensity increased slightly from 1.86 megalitres (ML) per ML of milk processed to 1.97 megalitres (ML) per ML of milk processed. This represents an increase of approximately 6% over the year.

Energy intensity decreased from 1.50 terajoules (TJ) per ML of milk processed to 1.34 TJ per ML of milk processed. This represents a decrease of approximately 11% over the year.

Greenhouse gas intensity decreased from 147 tonnes of carbon dioxide equivalent (tCO2~e) per ML of milk processed to 141.4 per tCO2~e of milk processed. This represents a decrease of approximately 4% over the year.

Wastewater intensity increased over this period from 1.66 megalitres (ML) per ML of milk processed to 1.92 ML per ML of milk processed. This represents an increase of approximately 15% over the year.

Waste intensity increased slightly from 1.66 tonnes of waste sent to landfill per ML of milk processed to 1.74 tonnes. This represents an increase of approximately 29% over the year. Over the same period, the rate of waste diverted from landfill decreased from 86% to 76%.

The data collected and presented reflects several challenges. First, resource consumption and waste and emissions generation in dairy manufacturing is influenced by the mix of dairy products produced in any given reporting cycle. Factories producing fresh milk, for example, will use resources very differently to factories which focus on the production of other dairy products such as milk powder. The scorecard data also continues to be challenged by changes to the participation rate of manufacturers, the scope of data collected and quality. Data and likely trends are influenced by the relative industry "coverage" in each data set. This is reflected as a percentage of the national volume of milk processed by those manufacturers providing data. This year, for example, the coverage of greenhouse gas intensity data represented 88% of the milk volume processed nationally, while the coverage of waste diversion data was 70%. Finally, and perhaps most importantly, the efficiency of dairy processing is significantly influenced by the total milk volumes being processed. In general, the closer a factory's milk throughput is to its maximum capacity, the more efficient the production processes are. Due to persisting drought conditions, feed shortages and elevated feed pricing, in 2018-19, national milk volumes of 8,793 million litres (ML) were significantly down (5.7%) on 2017-18 volumes of 9,325 ML. In some regions, such as the Murray and the sub-tropical dairy regions, milk production was down closer to 15% and 11% respectively. Reductions in milk volumes are therefore likely to have impacted the efficiency of some processing sites in or surrounding some regions more than others.

Reducing environmental impact	8	Improve land management	8.1	100% of stock excluded from waterways[29]
			8.2	100% of riparian zones actively managed and maintained
			8.3	100% of farmers complete and implement a soil and nutrient management plan[30]
			8.4	100% of farmers have and implement a documented biodiversity action plan[31]
			8.5	Zero net deforestation by 2020
	9	Increase water use efficiency	9.1	30% reduction in the consumptive water intensity of dairy companies (on 2010-11 levels) (ML water consumed per ML of milk processed)[32]
			9.2	Improve water use and water productivity to utilise 2.0 tonnes of dry matter per ML used
			9.3	100% of farmers recycling water from dairy sheds[33]
			9.4	100% of farmers monitoring water consumption
			9.5	100% of farmers have a water security risk management plan by 2020 and are implementing it by 2030
	10	Reduce greenhouse gas emissions intensity	10.1	30% reduction in greenhouse gas (GHG) emissions intensity across the whole industry (from a baseline of 2015)
				– Manufacturers (tonnes CO_2 ~e/ML milk processed)[34]
				– Farmers (kg CO_2 ~e/kg FPCM)
	11	Reduce waste	11.1	100% diversion rate from landfill (for dairy companies) (tonnes of waste per ML milk processed)[35]
			11.2	100% of silage wrap recycled (for farm)[36]
			11.3	All dairy companies participate in the Australian Packaging Covenant (APCO) or equivalent scheme
			11.4	100% of Australian dairy packaging to be recyclable, compostable or reusable by 2025 or earlier
			11.5	Halve food waste by 2030 (placeholder – tonnes of dairy products per ML of milk processed)

Figure 4 Relationship between the Australian Dairy Industry Sustainability framework and the DMSC Environmental Sustainability Scorecard

INTRODUCTION AND METHODOLOGY

Reporting by the Dairy Manufacturers Sustainability Council (DMSC) contributes to tracking industry progress against the Australian Dairy Industry Sustainability Framework under 'Reducing environmental impact' – targets 9, 10 and 11. These targets were updated in the Framework in 2019 to reflect an ambition to 2030. The resulting changes are reflected below:

Target	2020	2030
Target 9	Reduce the consumptive water intensity of dairy manufacturers by 20% by 2020 (based on 2010-11 levels)	30% reduction in the consumptive water intensity of dairy companies (on 2010–11 levels) by 2030
Target 10	Reduce greenhouse gas emissions intensity by 30% by 2020 (based on 2010-11 levels)	30% reduction in greenhouse gas (GHG) emissions intensity across the whole industry (from a baseline of 2015) by 2030[1]
Target 11	Reduce waste to landfill by 40% by 2020 (based on 2010-11 levels)	100% diversion rate from landfill by 2030

1 In 2015-16 Australian dairy manufacturing GHG emissions intensity was already down 21.7% compared to 2010–11 levels. The revised 2030 target of an additional 30% reduction will therefore see Australian dairy manufacturers targeting a GHG emissions intensity reduction of close to 50% based on a 2010–11 baseline.

Additional data points, such as energy intensity and wastewater, are also reported in this scorecard for performance monitoring and improvement opportunities in the dairy manufacturing sector. The information disclosed in this report was largely drawn from data gathered from dairy processors, including most members of the DMSC. An excel spreadsheet was distributed to dairy processors requesting information regarding: milk volume processed, product output, water consumption, greenhouse gas emissions, energy consumption, waste generation, waste diversion and waste water generation for the 2018-19 financial year. Nine dairy processors contributed data to this report.

The coverage of data for each parameter by volume of milk processed nationally is noted in the text. (e.g. data on water intensity reflects 88% of the volume of milk processed nationally). None of the data presented in the scorecard has been independently assured or audited although some of the raw data may have been audited by the participating companies for other purposes (e.g. compliance under the National Greenhouse & Energy Reporting Act 2007).

Members of the DMSC in 2018–19

Saputo Dairy Australia, Fonterra, Beston Global Food Company, Burra Foods Australia, Bega, Chobani, Bulla Family Dairy, Lion, UDC The Union Dairy Company

SCORECARD TARGET 9

30% REDUCTION IN THE CONSUMPTIVE WATER INTENSITY OF DAIRY COMPANIES (ON 2010–11 LEVELS) BY 2030

Most of the water used in the dairy industry is on farms. The year 2019 was Australia's driest year on record with nationally-averaged rainfall 40% below average. Much of Australia was affected by drought, which was especially severe in New South Wales and southern Queensland[2]. Drought has had a profound impact on dairy farmers and, in turn, their relationships with dairy processors – some of which have provided additional support to farmers for feed and water costs. Dairy processors also need to show leadership themselves to minimise water consumption within factories, many of which are located in regional areas directly affected by drought.

The United Nations Sustainable Goals also seek to substantially increase water-use efficiency across all sectors by 2030. Many dairy manufacturers and large, global customers have published ambitious water reduction targets and are monitoring and publicly reporting their progress. Companies are increasingly participating in initiatives such as CDP Water[3], the Alliance for Water Stewardship,[4] the CEO Water Mandate[5] and partnership projects with local water authorities.

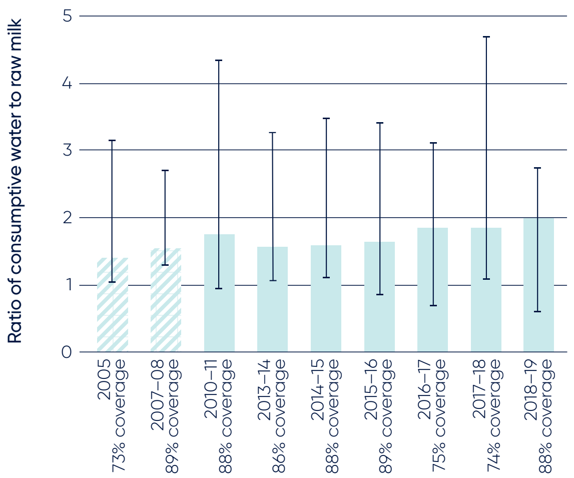
Cleaning is the single largest water-consuming process in dairy manufacturing. This is primarily driven by the need for food safety and the specific requirements of commercial customers seeking expanded ranges of dairy products for consumers. With a greater range of dairy products generated at a given site, comes an increased need for changeovers and the washing of plant and equipment to ensure product integrity and safety.

While water can be recovered and re-used in factories when producing milk powders, other products may use water when reconstituting dry ingredients for other products. The ongoing drought presents additional challenges as water quality can deteriorate as supply diminishes, requiring additional treatment or dilution, and plants also run at sub-optimal capacity due to a declining milk supply in regions impacted by drought.

Results

This year water intensity increased slightly from 1.86 megalitres (ML) per ML of milk processed to 1.97 megalitres (ML) per ML of milk processed. This represents an increase of 6.2% over the year and an increase of 12.9% on the baseline year of 2010-11. This figure represents 88% of the milk volume processed nationally. While many manufacturers reported slight or even significant reductions in water intensity, a small number of manufacturers representing greater milk volumes reported increases in water intensity.

Figure 5 Change in water intensity – megalitres (ML) of water consumed per megalitre (ML) of milk processed

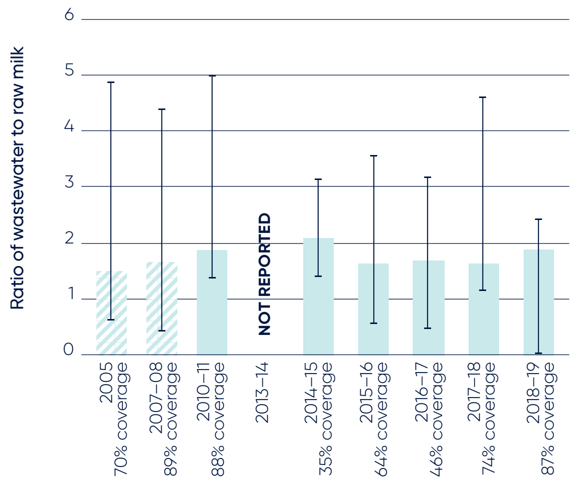


Wastewater

Dairy processing effluents include milk or milk products lost during processing, by-products of processing, wastewater from the washing of milk trucks, tanks, cans, equipment, bottles and floors, waste chemicals used in cleaning processes and starter cultures.

Dairy processing wastewater can contain high concentrations of organics, nutrients, fats, oils and grease and dissolved solids. Wastewater is also subject to significant environmental regulation by State government agencies and water authorities who determine the criteria for the end use which may be discharged to sewer, reused on or off the site, discharged to surface water or used for local irrigation.

Figure 6 Change in wastewater intensity – megalitres (ML) of wastewater generated per megalitre (ML) of milk processed



Results

Wastewater intensity increased over the reporting period from 1.66 megalitres (ML) per ML of milk processed to 1.92 megalitres (ML) per ML of milk processed. This represents an increase of 15.1% over the year. The generation of wastewater by dairy manufacturing can be influenced by many factors including:

- Changes to product mix may increase or decrease the capture of condensate
- The treatment of water due to declining quality. Manufacturers with regional plants have reported the impacts of drought on operations to include concerns regarding algal blooms and a need to treat water due to declining quality before use in factories
- More frequent changeovers due to smaller batches and a larger variety of products.

The coverage of wastewater data has increased over the past two years and represents a step forward in improving both the coverage and integrity of this data set.

The coverage of wastewater data has also increased in recent reporting cycles, from less than 50% in 2016–2017, to 87% this year. We expect that the increased coverage may also provide ongoing improvements to data integrity.

2 bom.gov.au/climate/current/annual/aus/#tabs=Rainfall
3 cdp.net/en/water
4 a4ws.org
5 ceowatermandate.org

Figure 7 Proud process owners, Danny Wilson (Manufacturing Services Manager) and David Lambert (Environment Manager) reflecting the successful project delivery of Burra Foods' sludge dewatering plant.

CASE STUDY

Bega Cheese Reducing town water consumption

A new water monitoring system was installed at the Bega Cheese Koroit site in Victoria, saving 50 megalitres (ML) of water annually and reducing the cost of town water use by $120,000 a year. As part of the site's Continuous Improvement program, environmental monitoring was conducted in 2019 to identify any excessive water usage. The environmental and maintenance departments identified that there was unusually excessive water consumption on one of the town water lines in the plant. Further investigation found that the water softener valve was not operating properly and consuming excessive volumes of town water. This was discovered through a process of deduction, as the site relied on manual meter data collection making it difficult to identify issues such as faulty valves.

To prevent this from happening in future, the team installed an improved water monitoring system. The "supervisory control and data acquisition" (SCADA) system is a computerised system that can track individual valves, vessels flows and maintenance needs. This improved technology now enables the site to quickly pinpoint any issues so they can be resolved immediately, reducing water use. Any unusual overconsumption on water lines will be more readily identified in future through more specific and computerised real-time monitoring.

CASE STUDY

Burra Foods Another look at biomass and wastewater

The Burra Foods' Continuous Improvement team has been investigating opportunities to value add to the high nutrient biomass which is generated during the treatment of wastewater at the Korumburra plant. Rather than processing it as a waste product, Burra hopes to find a feasible pathway for its Milk Supply Partners to benefit from the nutrient value in the biomass through application as an agriculture product to improve soil.

Burra Foods has already significantly reduced the water content of the biomass leaving the site for secondary re-use in commercial compost. By upgrading and increasing the capacity of the radial fan press within the wastewater treatment plant, the company has managed to increase the solids content in the dewatered biomass to close to twenty percent which is roughly six times the solids content in the "watery loads" prior to the upgrade and optimisation project.

This project has delivered major cost savings as Burra Foods has more than halved the number of truck loads required to cart organic biomass waste to the Soil and Organic Recycling Facility at Dutson Downs in East Gippsland – an expensive and lengthy round trip of 280 kilometres. The project has also resulted in reduced fuel-based emissions and increased capacity of the wastewater treatment plant by enabling a higher rate of desludging of the fermentation vessels.

SCORECARD TARGET 10

30% REDUCTION IN GREENHOUSE GAS (GHG) EMISSIONS INTENSITY ACROSS THE WHOLE INDUSTRY (FROM A BASELINE OF 2015) BY 2030

Climate change remains a key material sustainability risk for the dairy industry. Modeling suggests that climate change will increase the frequency of extreme weather events and also change climate zones across dairy regions. This will compound events seen in recent times, where limited rainfall continues to place pressure on water supplies and related temperature increases can result in additional heat stress for animals and reduced milk production.

Annual mean temperatures were above average for nearly all of Australia in 2019 which was Australia's warmest year on record. The annual national mean temperature was 1.52 °C above average, surpassing the previous record of +1.33 °C in 2013. Maximum and minimum temperatures for the year were also well above average across all of Australia[6].

In 2019, industry work focused on the 2030 target and how it might be achieved. Potential emissions reduction pathways for both farms and dairy manufacturing have been identified and are currently being assessed. A number of manufacturers and global customers have implemented initiatives to reduce their emissions and actively participate in global programs including CDP[7] and the Science-Based Targets Initiative[8].

While most carbon emissions from the dairy sector arise from farming, dairy processing contributes through energy and fuel consumption, particularly from fossil fuels. Manufacturers have increased their focus in recent years on energy efficiency projects due to steep increases in electricity and, particularly, gas costs.

Many members of the DMSC are subject to national legislation which requires public reporting of scope 1 (direct) and scope 2 (indirect) greenhouse gas emissions. While this has increased the transparency of greenhouse gas emissions by Australian businesses, it has also improved measurement, monitoring and understanding of emissions and their generation. As a result, the data sets on energy intensity and emissions intensity are likely to be the most rigorous data in this report.

Figure 8 Change in emissions intensity – tonnes of CO_2 equivalent (tCO_2-e) per megalitre (ML) of milk processed

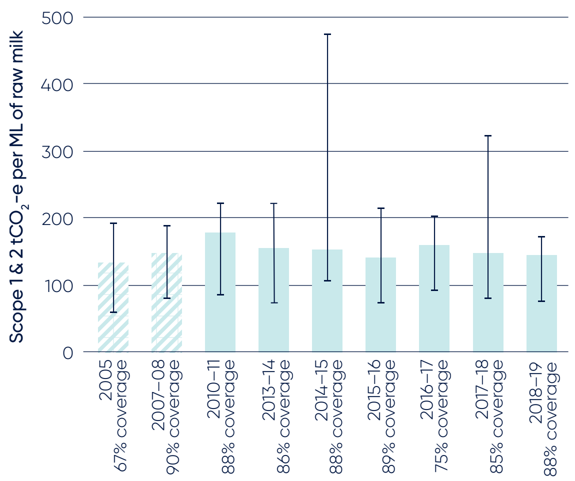
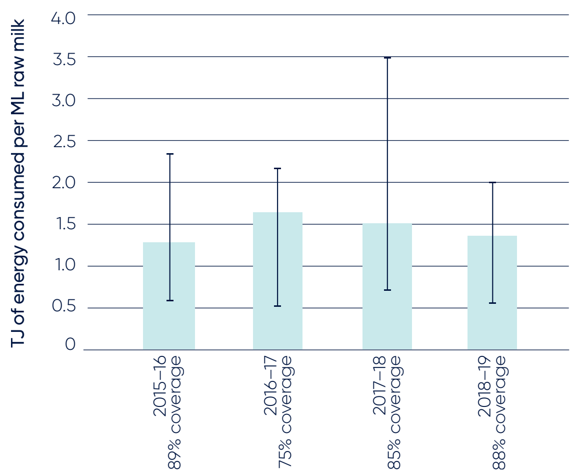


Figure 9 Change in energy intensity – terajoules (TJ) of energy consumed per megalitre (ML) of milk processed



6 bom.gov.au/climate/current/annual/aus/#tabs=Temperature
7 cdp.net/en
8 sciencebasedtargets.org

Results

Greenhouse gas emissions intensity decreased from 147 tonnes of carbon dioxide equivalent (tCO2~e) per megalitre (ML) of milk processed to 141.4 tonnes of carbon dioxide equivalent (tCO2~e) per megalitre (ML) of milk processed. This represents a decrease of 3.8% over the year and a 20% decrease since 2010–11. This represents excellent progress against our previous goal of a 30% decrease by 2020, based on 2010–11 emissions. In 2019, this target was revised to a 30% reduction by 2030 based on 2015 emissions. In 2015–16 Australian dairy manufacturing GHG emissions intensity was already down 21.7% compared to 2010–11 levels. The revised 2030 target of an additional 30% reduction will therefore see Australian dairy manufacturers targeting a more ambitious GHG emissions intensity reduction of close to 50%, based on the previous 2010–11 baseline.

This figure is representative of 88% of the milk volume processed nationally. Scope 1 and 2 emissions are included - combusted stationary fuels (Scope 1), transport fuels (Scope 1) and emissions associated with the purchase of grid electricity (Scope 2). The data for this reporting period also indicated a larger decrease in scope 1 emissions and an increase in scope 2 emissions. This may be associated with changes to product mix and a move away from gas consumption due to sharp increases in grid-supplied natural gas prices in recent years.

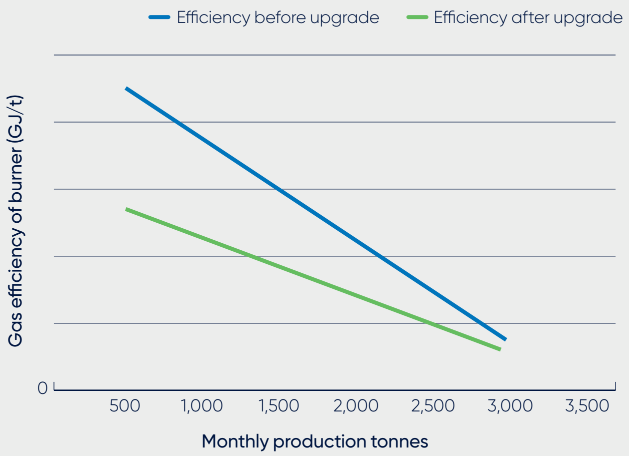
We started reporting our energy consumption intensity three years ago. In the past year, our energy intensity decreased from 1.5 terajoules (TJ) per ML of milk processed to 1.34 teraajoules (TJ) per ML of milk processed. This represents a decrease of 11.1% over the year and represents 88% of the milk volume processed nationally.

CASE STUDY

Bega Cheese
Reducing gas consumption

In 2019, the Tatura Milk site made upgrades to a dryer air heater, resulting in ongoing reductions to energy consumption. Three Tatura milk dryers were assessed to ascertan the costs and benefits of upgrading the existing air heater control systems to more modern and efficient controls. This assessment revealed that upgrading one particular dryer, the 'CD2' air heater, would provide the best return on investment. At the end of financial year, the upgrade had delivered gas savings of $42,000, which on an annualised basis equates to $51,000 saved each year.

The existing 'CD2' air heater and control system was the original equipment fitted 20 years ago. This project set about upgrading this air heater to install an improved 'fuel to air management system', resulting in more reliable and consistent temperature control in the dryer, therefore reducing the gas usage per tonne of production. In July 2018, Tatura Milk invested just under $60,000 to install the upgraded burner control systems on the CD2 air heater, with a payback of just over one year. The graph below shows the efficiency gain at the various manthly production volumes, showing the burner is more efficient especially at lower production volumes.



SCORECARD TARGET 11

100% DIVERSION RATE FROM LANDFILL BY 2030

Dairy processors typically generate a variety of waste types including: packaging waste such as cardboard, paper, cartons and plastic, organic wastes such as sludge and reject product, as well as office waste. The disposal of waste to landfill is both costly and a waste of resources, including raw materials.

The industry has embraced the 2025 National Packaging Targets[9] committing to 100% of Australian dairy packaging to be recyclable, compostable or reusable by 2025 or earlier. Some DMSC members have already published their own waste reduction targets while others can report 100% waste diversion from specific operating sites.

An industry working group has been established to drive industry-wide progress towards meeting the targets and support the development of circular economies for dairy product packaging. Working closely with the Australian Packaging Covenant Organisation (APCO) and others across the packaging and waste management chains, the working group is focusing on:

- Development of a packaging baseline for the industry
- Identifying key challenges and prioritising opportunities to improve industry performance with respect to specific packaging formats
- Mobilising R&D funding and industry projects to tackle priority packaging challenges.

Results

Waste intensity increased this year from 1.35 tonnes of waste sent to landfill per ML of milk processed to 1.74 tonnes in 2018-19. This represents an increase in solid waste to landfill of 29.1% over the year but still an overall reduction of 44% compared with the baseline in 2010–11. This figure is representative of 77% of the milk volume processed nationally. The rate of waste diverted away from landfill also decreased from 86% to 76%. This figure is representative of 70% of the milk volume processed nationally.

Data on waste to landfill and diversion rates can be difficult to collect, manage and report consistently across sites and across companies. The nature of participating companies, products represented, waste streams and relative opportunities for re-use or recycling can have a disproportionate impact on the trends in the sector. One or two major contributors or sites processing large milk volumes, but with particular waste challenges, can impact on the sector-wide data. The regional locations of many manufacturing sites also presents specific challenges when it comes to sourcing options for diversion and recycling services.

Figure 10 Change in waste intensity – solid waste to landfill (tonnes) per megalitre (ML) of milk processed

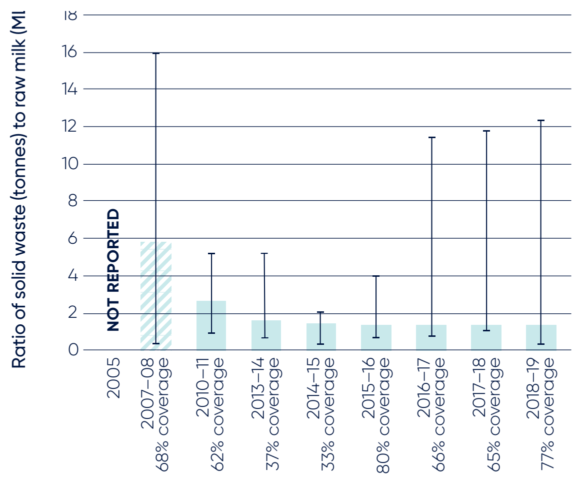
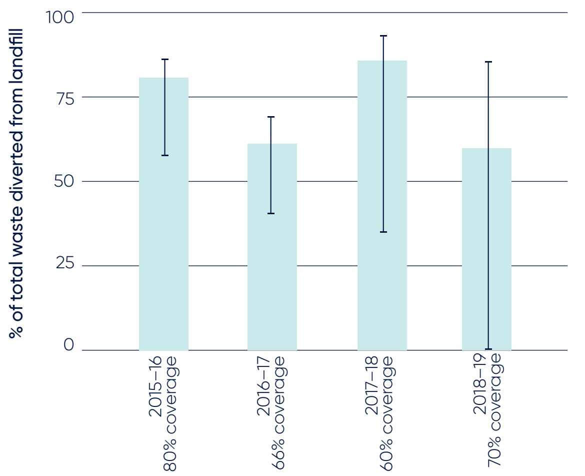


Figure 11 Waste diversion rate – % of solid waste diverted from landfill



9 packagingcovenant.org.au

CASE STUDY

Brownes better packaging

Dairy company switches to renewable cartons in a more sustainable moo-ve.

A dairy company launched Australia's first renewable cartons when it ditched the fossil-fuel derived plastic lining in its milk cartons for sugarcane during 2019.

In October Western Australia manufacturer Brownes Dairy started using waste-reducing renewable milk cartons made entirely from wood fibres and sugarcane – both renewable resources.

"There is a lot of emphasis on the importance of recycling, but less of a focus on how we can make products more sustainable from the beginning," said Brownes Dairy CEO Tony Girgis.

Whilst carton packaging already has strong environmental credentials, the Tetra Rex Bio-based board cartons used by Brownes Dairy offer a more sustainable alternative to standard milk cartons, which contain fossil-fuel derived polyethylene plastic in the lining.

Brownes Dairy switched 25 of its milk carton products – about 17.8 million milk cartons per year – to the packaging in 2019, with more products to follow in 2020. It is the first company in Australia to use the renewable cartons across its entire milk, flavoured milk and juice carton ranges.

"We wanted to improve the sustainability of our packaging across the entire lifecycle of our products," said Mr Girgis.

"We have tested the bio-based board repeatedly to ensure our product quality, product freshness and food safety are fully maintained."

"Making the switch to sugarcane is not only better for the environment, but now our consumers can trust the package is made from raw, plant-based materials."

Tetra Rex® Bio-based is the world's first beverage carton to be made entirely from renewable materials. Tetra Pak has delivered more than half a billion packs of Tetra Rex® Bio-based since the bio-based board was first introduced in dairy by Finnish brand Valio in 2015.

"Brownes is proud to be the first company in Australia to embrace this new environmentally-friendly packaging, with innovation top of mind in everything we do," Mr Girgis said.

Figure 12 Brownes Dairy switched to sugarcane-based renewable milk cartons during 2019.
Source: Brownes

CASE STUDY

REDcycle Program

The REDcycle Program is a voluntary, industry-led initiative developed by Melbourne-based organisation, RED Group. It is a product stewardship model where manufacturers, retailers and consumers are sharing the responsibility to reduce the amount of plastic packaging going to landfill. REDcycle focuses on the collection and recycling of soft plastics such as plastic bags, box liners and packages. Coles and Woolworths are key partners, providing drop off points for consumers to drop off their collected soft plastics. The plastics are then used to produce a huge range of recycled-plastic products, from fitness circuits to sturdy outdoor furniture, bollards, fencing, signage and more. Many of Australia's popular brands are supporting partners to the program including Chobani, Fonterra, Lactalis Australia and Lion. The REDcycle Program has collected over 900 million pieces of soft post-consumer packaging so far. For more information visit:**redcycle.net.au**

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