AUSTRALIAN DAIRY MANUFACTURING

ENVIRONMENTAL SUSTAINABILITY SCORECARD 2017–18

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 targets 9, 10 and 11 – 'Reducing environmental impact'

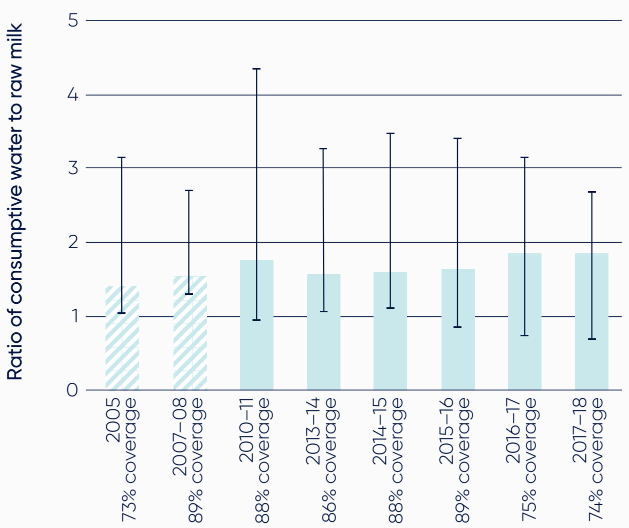
Target 9

Reduce the consumptive water intensity of dairy manufacturers by 20 per cent by 2020

Performance indicator

9.1 Consumptive water intensity of dairy manufacturers (litres of water used per litre of milk processed)

Baseline 2010–11	**2017–18** result	**2017–18** % change from previous year	**Progress** since 2010–11
1.75	1.86	↑ **0.6** increase	↑ **6.3** increase



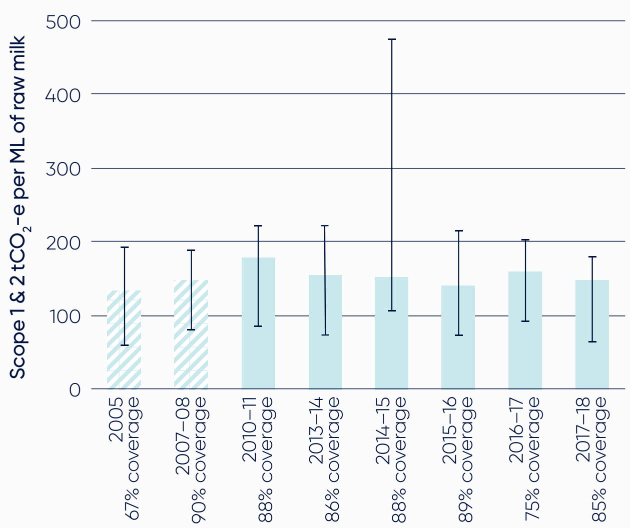
Target 10

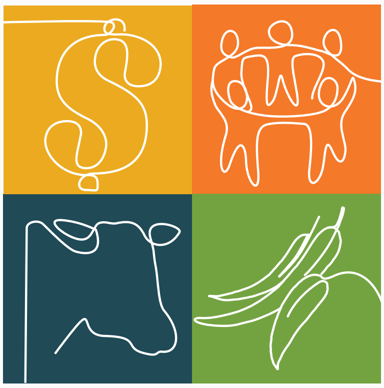
Reduce greenhouse gas emissions intensity by 30 per cent by 2020

Performance indicator

10.1 Emissions intensity of dairy manufacturers (tonnes of CO_2 equivalent per megalitre [ML] of milk processed)

Baseline 2010–11	**2017–18** result	**2017–18** % change from previous year	**Progress** since 2010–11
178.7	147.0	↓ **7.9** decrease	↓ **17.7** decrease



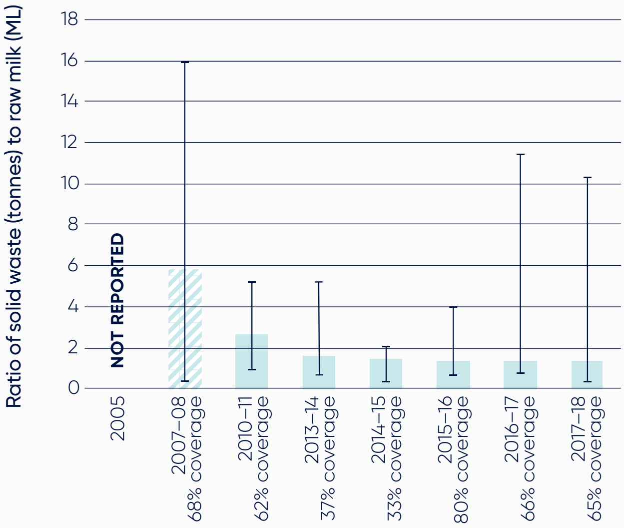


Target 11
Reduce waste to landfill intensity by 40 per cent by 2020

Performance indicator

11.1 Waste to landfill intensity of dairy manufacturers (tonnes of waste per ML milk processed)

Baseline 2010–11	**2017–18** result	**2017–18** % change from previous year	**Progress** since 2010–11
2.69	**1.35**	↑ **2.1** increase	↓ **49.7** decrease



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EXECUTIVE SUMMARY

This is the seventh Australian Dairy Manufacturers Sustainability Council report on environmental sustainability performance. The scorecard covers the financial year 2017–18 and compares, where possible, the environmental performance of the industry published for 2004–05, 2007–08, 2010–11, 2013–14, 2014–15, 2015–16 and 2016–17. These reports are available at **manufacturing.dairyaustralia.com.au/ manufacturingsustainabilityreports**.

The scorecard draws on information gathered for reporting against the Australian Dairy Industry Sustainability Framework and the environmental targets for manufacturing which are outlined in the Framework. More detailed information on the framework and the latest progress report can be found at **sustainabledairyoz.com.au**

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

- Contributes to broader progress reporting for the Australian Dairy Industry Sustainability Framework
- Informs internal benchmarking by DMSC members, allowing them to see their specific performance in relation to anonymous peers as well as data for the industry as a whole
- 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 consumption.

Water intensity increased from 1.85 to 1.86ML per ML of milk processed – an increase of 0.6 per cent over the year

Wastewater intensity decreased from 1.7 to 1.66ML per ML of milk processed – a decrease of 2 per cent over the year

Energy intensity decreased from 1.6 to 1.5 terajoules (TJ) per ML of milk processed – a decrease of 6 per cent over the year

Greenhouse gas intensity decreased from 159.6 to 147 tonnes of carbon dioxide equivalent (tCO_2~e) per ML of milk processed – a decrease of 7.9 per cent over the year

Waste intensity increased slightly from 1.32 to 1.35 tonnes of waste sent to landfill per ML of milk processed – an increase of 2.1 per cent over the year. However, over the same period, the rate of waste diverted from landfill increased from 61 per cent to 86 per cent

The data collected and presented reflects several challenges. First, resource consumption, waste production and emissions generation in dairy manufacturing is influenced by the mix of dairy products produced. This varies in any given year. 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 continues to be challenged by changes to the participation rate and scope of data collected. Data and likely trends are impacted by the relative industry 'coverage' in each data set. This is reflected as a percentage of the national volume of milk processed by participants providing data. This year, for example, the coverage of greenhouse gas intensity data represented 85 per cent of the milk volume processed nationally, while the coverage of waste diversion data was only 60 per cent. Coverage also varies between reporting cycles, with coverage for emissions intensity peaking at 89 per cent of the milk volume processed in 2015–16.

AUSTRALIAN DAIRY INDUSTRY SUSTAINABILITY FRAMEWORK

Figure 1 Relationship between the Australian Dairy Industry Sustainability framework and the DMSC Environmental Sustainability Scorecard

Our Dairy Promise

To provide nutritious food for a healthier world

Underpinned by our commitments

Enhancing economic viability and livelihoods

Creating a vibrant industry that rewards dairy workers and families, their related communities, business and investors

2 Zero Hunger · 3 Good Health and Well-Being · 8 Decent Work and Economic Growth

Improving wellbeing of people

Providing nutritious, safe, quality dairy food

2 Zero Hunger · 3 Good Health and Well-Being

Providing best care for all our animals

Striving for health, welfare and best care for all our animals throughout their lives

2 Zero Hunger · 3 Good Health and Well-Being

Reducing environmental impact

Meeting the challenge of climate change and providing good stewardship of our natural resources

2 Zero Hunger · 6 Clean Water and Sanitation · 7 Affordable and Clean Energy · 8 Decent Work and Economic Growth · 9 Industry, Innovation and Infrastructure · 12 Responsible Consumption and Production · 13 Climate Action · 15 Life on Land

dmsc dairy manufacturers sustainability council

The DMSC aims to reduce:

- consumptive water intensity
- greenhouse gas emissions intensity
- waste to landfill

We publicly report our progress and support the UN Sustainable Development Goals (SDGs)

INTRODUCTION

The information in this report was drawn from data gathered from members of the DMSC. An Excel spreadsheet was distributed to DMSC members 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 2017–18 financial year.

Seven members of the DMSC 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 74 per cent 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 and Energy Reporting Act 2007*).

DMSC members 2017–2018

Saputo Dairy Australia

Fonterra

LION

Burra Foods Australia

Bega

CHOBANI

Bulla Family Dairy

UDC The Union Dairy Company

SCORECARD TARGET 9

REDUCE THE CONSUMPTIVE WATER INTENSITY OF DAIRY MANUFACTURERS BY 20 PER CENT BY 2020 (BASED ON 2010–11 LEVELS)

The vast majority of water used in the dairy industry is attributed to on-farm use. However, it is still important that dairy processors minimise water consumption within factories. Prolonged drought and water shortages in regional and urban areas are leading processors to review their onsite water use, sometimes in response to local water authorities, but also to demonstrate responsible resource management in regional communities.

The United Nations Sustainable Development Goals seek to substantially increase water-use efficiency across all sectors by 2030. Many dairy manufacturers and large customers have published ambitious water reduction targets and companies are increasingly participating in initiatives such as CDP Water and the Alliance for Water Stewardship.

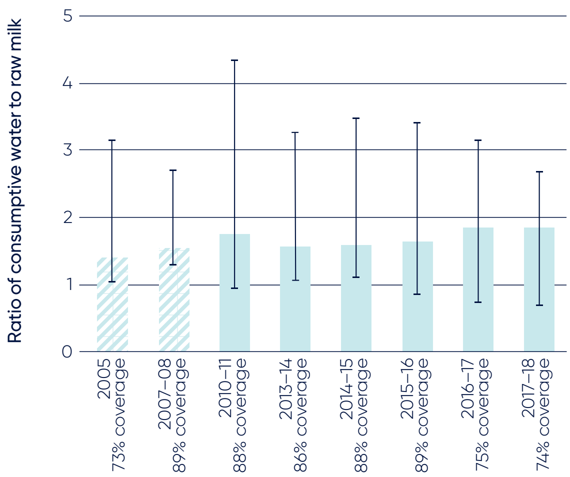
Cleaning is the single largest water-consuming process in dairy manufacturing. This is primarily driven by food safety and the specific requirements of a range of large commercial customers. Water is also used for the operation of utilities such as cooling water and steam production, and for on-site amenities and gardens.

Improving water efficiency is an ongoing challenge. Producing an increasingly larger range of products, often in smaller batches, results in increased water consumption due to the additional cleaning required during product changeovers. Water intensity also increases when plants run at sub-optimal capacity, which was the case in 2016–17 when milk supply decreased. Although national milk production did rebound by approximately three per cent to 9.289 billion litres in 2017–18, this is still substantially down from previous peaks, meaning plants are likely to be using water less efficiently than if they were operating closer to full capacity.

Results

This year, water intensity was relatively flat compared to 2016–17, increasing from 1.85 to 1.86ML per ML of milk processed. This represents an increase of 0.6 per cent over the year and an increase of 6.3 per cent on the baseline year of 2010–11. This figure represents 74 per cent of the milk volume processed nationally. Data integrity remains a challenge and at least some of the range of results in reported consumption is a function of shifting data management, on-ground monitoring, completeness of water mapping and assumptions made in data collection and management.

Figure 2 Change in water intensity – ML of water consumed per ML of milk processed

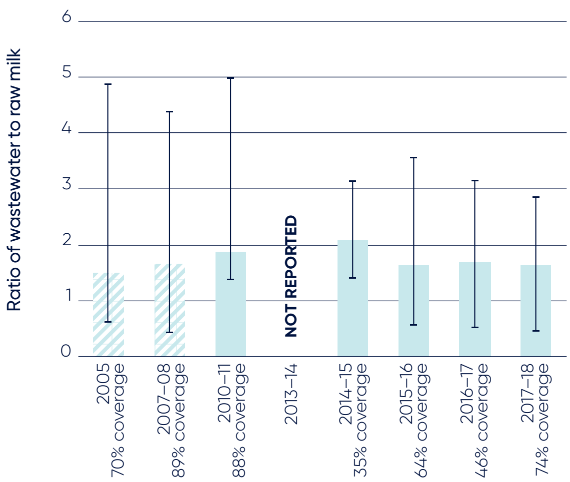


Wastewater

Milk includes fat, protein, lactose, lactic acid and trace elements such as sodium, potassium, calcium and chloride which require treatment prior to discharge to the environment. 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 CIP processes and starter cultures used in the manufacture of cheese and yoghurt.

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 discharge to sewer, reused on or off the site, discharged to surface water or used for irrigation.

Figure 3 Change in wastewater intensity – ML of wastewater generated per ML of milk processed



Results

Wastewater intensity decreased over the reporting period from 1.7 to 1.66 ML per ML of milk processed. This represents a decrease of two per cent over the year. The volume of wastewater produced by dairy manufacturing often mimics water consumption, which increased, but only slightly over the same period. While it is encouraging to see a reduction in wastewater despite relatively steady water consumption, it is important to note that the coverage of wastewater data itself is increasing. The coverage of wastewater data this year has increased to 74 per cent of the national milk processed by volume. DMSC members are committed to continuously improving both the coverage and integrity of data and look forward to confirming improvements to this data set next year.

CASE STUDY

Bega Cheese Multiple savings through condensate recovery

Bega Cheese installed a steam condensate return system at its Tatura site in 2018. The system was designed in-house by one of the company's own engineers. The project was initiated to return the water arising from steam used in the Clean in Place Plant and other activities in the cheese plant, such as cream cheese pasteurisation, cream cheese separation, preheating and high fat pasteurisation. The project results in multiple environmental and cost benefits including:

- Decreased steam usage of 405,244 kilograms per annum
- Decreased gas consumption by an average of 7,720 gigajoules per annum
- Decreased trade waste discharge of an average of 18.7 megalitres per annum
- Decreased water consumption of 26.7 megalitres per annum
- Decreased chemical use and cleaner feed water resulting in less scale and improved boiler efficiency.

CASE STUDY

Fonterra Waterwerx STREAMWISE Project

In 2017 Fonterra's Spreyton factory conducted a trial of Waterwerx's STREAMWISE technology.

Waterwerx is a specialist in water and wastewater treatment and the STREAMWISE technology is an automated system for optimising the chemistry of industrial wastewater solid-liquid separators, such as dissolved air flotation (DAF) units, induced air flotation units and clarifiers.

As part of the trial, Waterwerx installed the STREAMWISE system at the Spreyton site and then monitored the performance of the site's DAF unit against a typical baseline. The trial established that the STREAMWISE system could save Fonterra approximately 30 per cent of its wastewater treatment and disposal costs through a combination of chemical, energy, labour and trade waste savings. This translated to a cost reduction of approximately $260,000 per annum.

Waterwerx leases the STREAMWISE equipment to a site and then takes a portion of the savings to help pay off the asset. In 2018, Fonterra entered into a leasing agreement with Waterwerx to supply the STREAMWISE system at their Spreyton site for the management of the waste water treatment plant.

SCORECARD TARGET 10

REDUCE GREENHOUSE GAS EMISSIONS INTENSITY BY 30 PER CENT BY 2020 (BASED ON 2010–11 LEVELS)

Most carbon emissions from the dairy sector arise from farming. Across the whole life cycle, from farm to home refrigeration, dairy processing represents around 15 per cent of total carbon emissions.[1] These emissions relate to energy consumption, particularly from fossil fuels.

Manufacturers are subject to multiple drivers to reduce energy consumption and resulting greenhouse gas emissions. Steep increases in both electricity and gas costs have occurred for Australian manufacturers in recent years and, in some facilities, energy is second only to labour in operating costs. This has led to an increasing emphasis on energy efficiency projects, an exploration of options in renewable energy generation and more holistic approaches to energy management.

Many members of the DMSC are subject to national legislation which requires public reporting of scope one (direct) and scope two (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.

Results

Greenhouse gas emissions intensity decreased from 159.6 to 147 tonnes of carbon dioxide equivalent (tCO_2~e) per ML of milk processed. This represents a decrease of 7.9 per cent over the year and a decrease of 17.7 per cent compared to the baseline of 2010–11. This figure is representative of 85 per cent of the milk volume processed nationally. Scope one and two emissions are included — combusted stationary fuels (Scope one), transport fuels (Scope one) and emissions associated with the purchase of grid electricity (Scope two).

The DMSC started reporting energy consumption intensity three years ago. In the past year, energy intensity decreased from 1.6 to 1.5 per ML of milk processed. This represents a decrease of 6 per cent over the year and represents 85 per cent of the milk volume processed nationally.

Figure 4 Change in emissions intensity – tonnes of CO_2 equivalent (tCO_2-e) per ML of milk processed

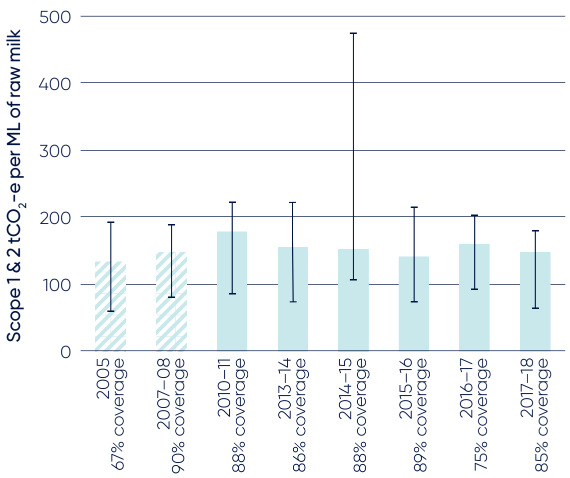
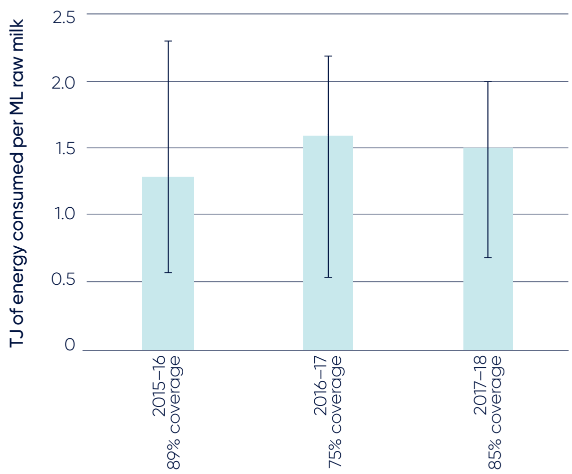


Figure 5 Change in energy intensity – TJ of energy consumed per ML of milk processed



1 Lunde, S. *et al.*, 2003. Evaluation of the environmental performance of the Australian dairy processing industry using life cycle assessment, s.l.: Dairy Research Development Corporation.

Units of energy use corrected from petajoules (PJ) to terajoules (TJ) in November 2019.

CASE STUDY

Burra Foods
Adding renewables to efficiency efforts

The escalating cost of energy led Burra Foods to commence a detailed study of energy use. Between 2016 and 2018, Burra Foods' combined electricity and gas bill increased by almost $4 million per annum. This represents a significant production cost, second only to labour, and fluctuations make it difficult to plan production costs.

With the assistance of Sustainability Victoria, Burra Foods was able to track energy demand against product output in specific detail. The company can now manage its peak energy demand by comparing the site's electricity usage with the grid price giving 'live visibility' to managers. Over the same period Burra Foods installed 600 square metres of solar panels and, through 2018, evaluated more solar, wind turbine, gas tri-generation turbines, renewable energy fed boilers and other options for investment.

This led to a ten-year corporate power purchase agreement with a Melbourne-based energy retailer, which includes access to wind power from the Ararat Wind Farm. Burra Foods now has the capacity to track energy pricing and sources, change production plans based on prices and peak energy demand and be a net exporter of renewable power.

CASE STUDY

Bega Cheese and Parmalat
Lighting upgrades

Lights at Parmalat's Lidcombe site in New South Wales used 1624 MWh/yr, representing 9.5 per cent of the total annual bill and costing $230,000 per year. Following a site energy audit, a lighting upgrade was undertaken.

The project reduced overall energy use by 660 MWh, saving $105,000 per annum in energy costs with a capital cost of $268,000. At Bega Cheese's Derrimut warehouse facility in Victoria, another lighting upgrade realised significant energy and financial savings.

The warehouse operated around the clock with 130 inefficient metal halide lights which were replaced with more efficient high bay LED lights. Along with a reduction in energy use, there were added benefits in less heat generation, less maintenance and higher lux levels throughout the facility (meeting AS/NZS1,680 lighting standards).

Savings of $40,000 per year in operating costs were made ($60,337 operating and $4,534 maintenance pre-upgrade, and $18,984 per year operating cost post-upgrade).

SCORECARD TARGET 11

REDUCE WASTE TO LANDFILL BY 40 PER CENT BY 2020 (BASED ON 2010–11 LEVELS)

The UN Sustainable Development Goals seek to substantially reduce waste generation through prevention, reduction, recycling and reuse by 2030. Dairy processors typically produce 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.

Some DMSC members have already published their own waste reduction targets while others can report 100 per cent waste diversion from specific operating sites. National diversion and recycling efforts were disrupted during this period when China stopped accepting 24 categories of solid waste from Australia.

Results

Waste intensity increased slightly this year from 1.32 tonnes of waste sent to landfill per ML of milk processed to 1.35 tonnes in 2017–18. This represents an increase in solid waste to landfill of 2.1 per cent over the year and an overall reduction of 49.7 per cent compared with the baseline in 2010–11. This figure is representative of 64 per cent of the milk volume processed nationally. While waste intensity slightly increased, the rate of waste diverted away from landfill increased from 61 per cent to 86 per cent. This figure is representative of 60 per cent of the milk volume processed nationally.

Data collection and management remains a challenge for DMSC members. Data on waste to landfill and diversion rates is difficult to collect, manage and report consistently across sites and across companies. Changes in participating companies also influences the types of products represented, associated waste streams and relative opportunities for re-use or recycling. The current data set for waste reflects less than 65 per cent of the milk volume processed nationally and may, therefore, not be fully representative of the waste management practices and performance of DMSC members. The DMSC hopes to improve both the accuracy and scope of waste data across the dairy processing industry in future reports.

Figure 6 Change in waste intensity – solid waste to landfill per ML of milk processed

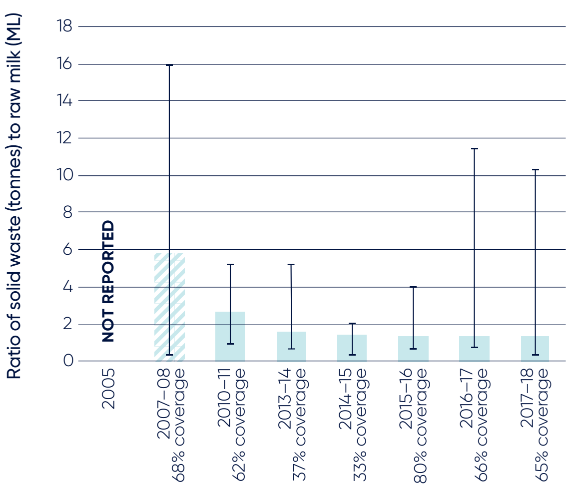
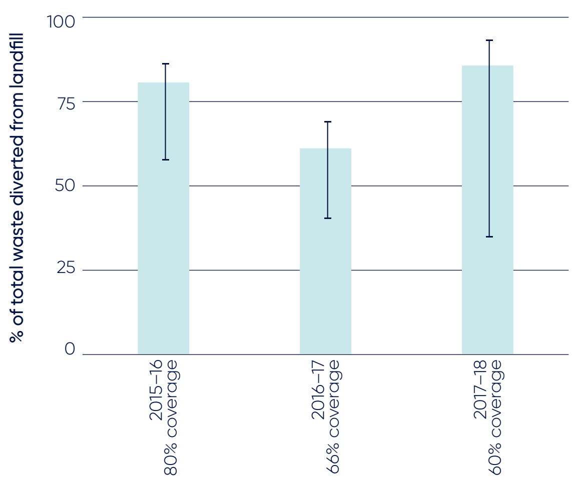


Figure 7 Waste diversion rate – per cent of solid waste diverted from landfill



CASE STUDY

Lion Dairy Pride by-products Reducing waste to landfill and closing the loop

Lion's business includes processing products other than dairy, such as fruit juices and brewing beer. This results in the generation of a diverse and challenging range of waste streams. In 2017, Lion was able to divert 97 per cent of its manufacturing by-products to reuse or recycling.

As part of this effort, Lion offers its dairy farmers access to buy spent grain from the brewing process at discounted rates. The spent grain is sourced from local Lion breweries and is a nutrient dense stockfeed which, as part of the balanced diet, can help to increase milk output, enhance fat and protein composition and improve productivity.

Lion's dairy farmers in New South Wales also have access to citrus pulp from Lion's Leeton juice processing site. Lion is currently looking to add other nutritious by-products from manufacturing sites to this program.

CASE STUDY

Industry working group on sustainable packaging

Australian dairy manufacturers are taking the lead in minimising the amount of dairy product packaging that ends up in landfill after national packaging targets were set in late 2018.

The DMSC convened an Industry Working Group on Sustainable Packaging to drive its consideration of sustainable options. Led by Dairy Australia, the working group is supported by strong participation from Lion Dairy and Drinks, Bega, Bulla, Saputo, Fonterra, Chobani and Parmalat, as well as the Australian Dairy Products Federation.

The group aims to ensure that the sector provides leadership on packaging and continues to provide consumers with 'permission to buy' dairy products. The initiative will enable the dairy industry to respond to changing consumer expectations, set the agenda, and move quickly on funding and government support.

In addition to developing industry-wide packaging targets and an annual reporting structure, the working group is exploring the development of dairy-specific 'sustainable packaging guidelines'. The guidelines will provide insight into how packaging can be better designed to ensure it is correctly sorted at Australia's waste management facilities. The working group is also investigating harmonised labelling to better communicate how consumers sort their packaging waste, such as the Australasian Packaging Recycling Label system.

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