dairy manufacturers sustainability council

Environmental Sustainability Scorecard 2016–17

A Dairy Australia report on behalf of the Dairy Manufacturers Sustainability Council

Australian dairy companies working together for a sustainable future

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Our scorecard

Minimising our environmental footprint

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

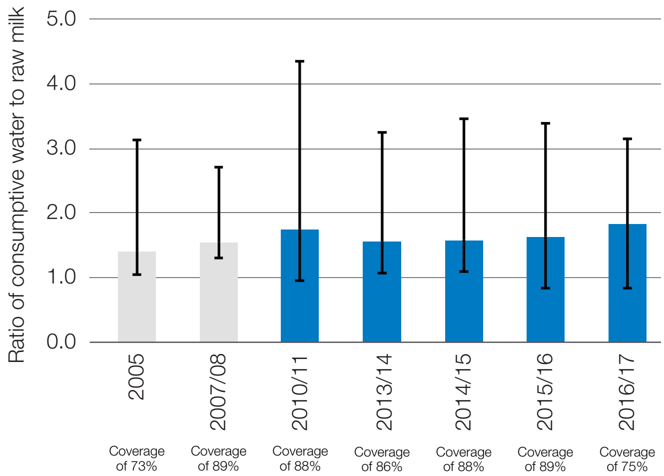
Target 9

Reduce the consumptive water intensity of dairy manufacturers by 20% by 2020

Performance indicator

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

Baseline (2010/11)	2017 (result)	2017 (% change from previous year)	Progress (since 2010/11)
1.75	1.85	13.6% increase ▲	5.7% increase ▲



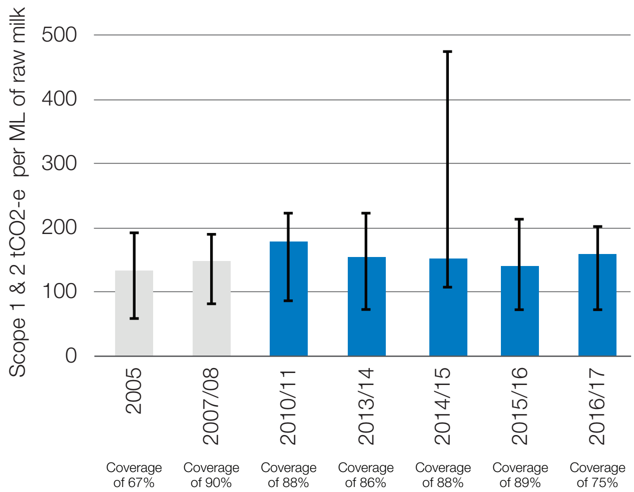
Target 10

Reduce greenhouse gas emissions intensity by 30%

Performance indicator

10.1 Emissions from dairy manufacturers (tonnes of CO_2 equivalent per ML milk processed)

Baseline (2010/11)	2017 (result)	2017 (% change from previous year)	Progress (since 2010/11)
178.7	159.6	14% increase ▲	10.7% decrease ▼



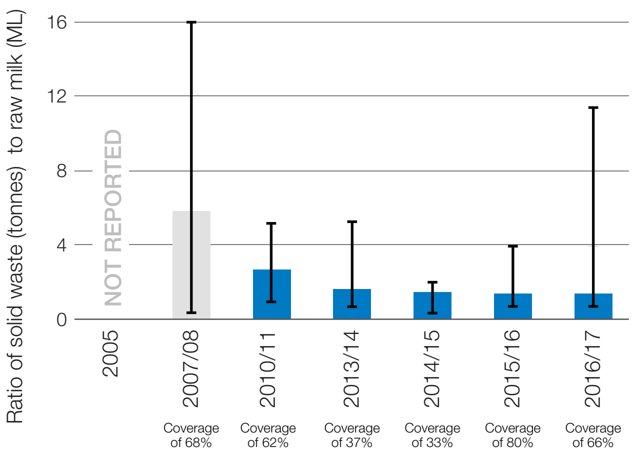
Target 11

Reduce waste to landfill by 40%

Performance indicator

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

Baseline (2010/11)	2017 (result)	2017 (% change from previous year)	Progress (since 2010/11)
2.69	1.32	4.6% decrease ▼	50.8% decrease ▼



Executive summary

This is the sixth Australian Dairy Manufacturers Sustainability Council report on environmental sustainability performance. The scorecard covers the financial year 2016–17 and compares, where possible, the environmental performance of the industry published for 2004–2005, 2007–08, 2010–11, 2013–2014, 2014–2015 and 2015–2016.

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 that Framework. For more detailed information on the Framework, refer to sustainabledairyoz.com.au.

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 reporting for the Australian Dairy Industry Sustainability Framework.
- It informs internal benchmarking by DMSC members, allowing members to see their performance in relation to anonymous peers as well as aggregated data.
- It builds the capacity of participating DMSC members in data collection and reporting and progressively improves the integrity of data.
- It provides a source of information for dairy industry and other stakeholders interested in the performance of the sector including customers, consumers, regulators and investors.
- It 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.

Scorecard focus: Dairy manufacturers' contribution to reducing environmental impact

Enhancing livelihoods

Improving wellbeing

Reducing environmental impact

dairy manufacturers sustainability council

The DMSC aims to reduce:

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

The data presented in the scorecard is influenced by several factors.

First, the consumption of natural resources, such as energy and water, in dairy manufacturing is influenced by the mix of dairy products produced. Factories producing fresh milk will use resources and generate waste very differently to factories which focus on the production of cheese, yoghurt or milk powder. As a result, changes to the national product mix during the reporting period will have an impact on the performance trends presented in the scorecard.

Second, this year has been a particularly volatile year for the industry with more than 10% of farmers changing the processor they supply milk to and 2016–17 milk production dropping to 9.015ML – a decrease of 5.5% across the year nationally, with some regions such as northern Victoria more heavily impacted than others marking the lowest production in 21 years.[1] As a consequence of the reduced milk supply, a number of factories would have been operating significantly below capacity and, in doing so, using resources far less efficiently.

Third, participation rates by Australian dairy manufacturers in both the DMSC and the environmental data collection for this report vary year on year, as does the extent of data each company provides. As a result, the environmental trends can be somewhat impacted by both the relative industry 'coverage' in each data set –reflected as a percentage of the national volume of milk processed by participants providing data – as well as which companies are participating. This year, for example, the coverage of water intensity data represented 75% of the milk volume processed nationally, while in 2015–2016 the data represented 89% of national milk volume processed.

- Water intensity increased from 1.62 megalitres (ML) per ML of milk processed to 1.85 megalitres (ML) per ML of milk processed. This represents an increase of 13.6% over the year.
- Wastewater intensity also increased over this period from 1.65 megalitres (ML) per ML of milk processed to 1.7ML per ML of milk processed. This represents an increase of 2.7% over the year.
- Energy intensity also increased from 1.29 terajoules (TJ) per ML of milk processed to 1.6 TJ per ML of milk processed. This represents an increase of 23.7% over the year.
- Greenhouse gas intensity increased from 1.40 tonnes of carbon dioxide equivalent (tCO2~e) per ML of milk processed to 159.6 per tCO2~e of milk processed. This represents an increase of 14% over the year.
- Waste intensity decreased from 1.39 tonnes of waste sent to landfill per ML of milk processed to 1.32 tonnes. This represents a decrease of 4.6% over the year. However, over the same period, the rate of waste diverted from landfill also decreased from 72% to 66%.

[1] https://www.dairyaustralia.com.au/industry/dairy-situation-and-outlook/situation-and-outlook-archive/situation-and-outlook-june-2017

Units of energy intensity corrected from petajoules (PJ) per ML to terajoules (TJ) per ML in November 2019

Introduction and methodology

The information disclosed in this report was largely 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 2016–2017 financial year. Seven of the eight 2016–2017 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 (eg. data on water intensity reflects 75% 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*).

Dairy Manufacturers Sustainability Council members participating in the 2016–17 report

Scorecard targets

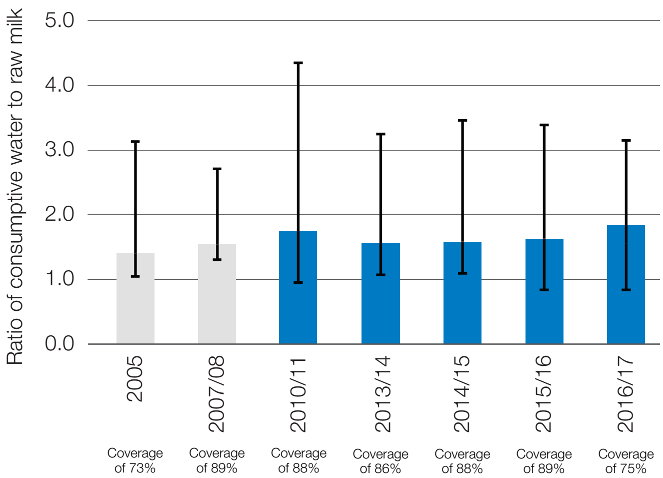
Target 9

Reduce the consumptive water intensity of dairy manufacturers by 20% by 2020

Many dairy manufacturers and large customers have published water reduction targets and the UN Sustainable Goals seek to substantially increase water-use efficiency across all sectors by 2030.

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. Producing a larger range of products and in smaller batches results in increased water consumption due to the additional cleaning required during product changeovers. Water consumption can also increase with the commissioning of new plants and when existing plants run at sub-optimal capacity, which has been one impact of the volatility in milk supply over the past year. Changes to the mix of products also impacts on the generation and availability of recovered and recycled water in factories in the form of condensates.

Figure 1 Change in water intensity



Results

This year, water intensity increased from 1.62 megalitres (ML) per ML of milk processed to 1.85 megalitres (ML) per ML of milk processed. This represents an increase of 13.6% over the year and an increase of 5.7% on the baseline year of 2010–2011. This figure represents 75% of the milk volume processed nationally, which is less coverage than previous years. 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. In 2016, for example, the scope of consumptive water was adjusted to exclude re-used and recycled water and water used for other purposes such as dilution for waste water treatment purposes with a view to capturing this data separately and reporting on it in future reporting cycles. Some manufacturers are making gains in mapping water use and in moving toward a mass balance approach.

CASE STUDY

Bega Cheese: Saving energy and waste water at Lagoon Street

At Bega Cheese's Lagoon Street site in North Bega, New South Wales. significant modifications were made during the past year to improve the efficiency of the evaporation process. These modifications included:

- Introduction of a drying step, using less energy in evaporation
- Improvements to process control parameters and the return of usable hot water to the boiler
- Recovery and processing of buttermilk
- Use of reverse osmosis in water utilisation.

As a result of these improvements, energy intensity (GJ/tonne) was reduced by 11%, while solids concentration increased from 54% to 60%. The site has also decreased the generation of wastewater by 10% and chemical oxygen demand (COD) of the wastewater was reduced by 46.7%.

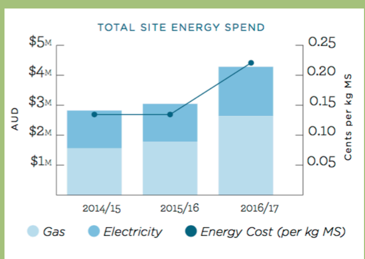
Wastewater

The generation, management and discharge of wastewater is an ongoing challenge for dairy manufacturers. 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. Wastewater is also subject to significant environmental regulation by State government agencies and water authorities. Wastewater treatment is generally designed to reduce organic loads and minimise environmental impacts associated with the resulting effluent.

CASE STUDY

Burra Foods Energy Management

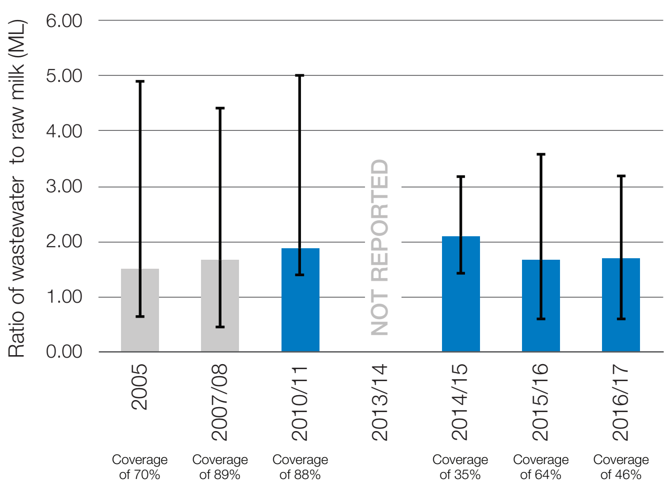
As with the residents and farmers of Gippsland, Burra Foods is facing increasing utility costs. This is made more pronounced with growing the company's production capacity. From 2016 to 2018 Burra Food's combined electricity and gas bill will have increased by almost $4 million per annum. With the support of Sustainability Victoria, Burra Foods commenced a detailed study of site energy usage.



An early initiative included the design and installation of an energy management system to control peak load demand and collect minute-by-minute data by department. This will enable the tracking of energy demand measured against product output in specific detail so Burra Foods can consider how to better manage supply. One easy decision was to install solar panels on available roof space. With the help of LaTrobe Valley based Energis Pty Ltd, Burra Foods installed 600 square metres of solar panels which was completed in September 2017. This is expected to deliver 2.4% of Burra Foods electricity needs with a five-year payback period. More solar, wind turbine, gas tri-generation turbines, renewable energy fed boilers and other options are all being evaluated for an investment decision during 2018.

Image source by Burra Foods

Figure 2 Change in wastewater intensity



Result

Wastewater intensity increased over this period from 1.65 megalitres (ML) per ML of milk processed to 1.7ML per ML of milk processed. This represents an increase of 2.7% over the year. The volume of wastewater produced by dairy manufacturing often mimics water consumption, which increased more significantly than wastewater generation did over the same period. This may be due to changes in the product mix and some large capacity sites producing less milk powder. Milk powder production generally makes water available which can be recovered and re-used within the site, thereby decreasing the need for freshwater consumption. During 2016–2017 the production of less milk powder may have resulted in an increase in freshwater consumption while not resulting in a commensurate impact on waste water generation.

It is disappointing that the coverage of this data set has decreased to below 50% of the overall national milk processed by volume and that is likely to influence year on year comparability.

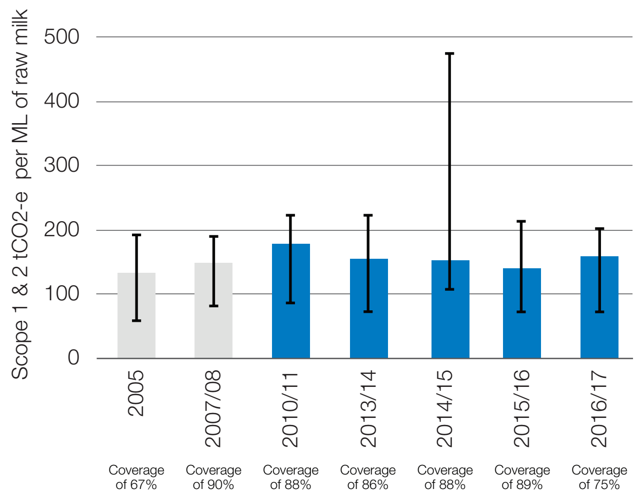
We hope to increase the coverage to include a greater share of the milk volume processed and improve data integrity in coming reporting cycles.

Target 10 Reduce greenhouse gas emissions intensity by 30% by 2020 (based on 2010–2011 levels)

Dairy manufacturing in Australia is responsible for around 5% of the emissions from the dairy sector overall.[2] The greatest impact on greenhouse gas emissions from the dairy sector is from farms and, specifically our animals. However, manufacturers are committed to reducing energy consumption and greenhouse gas emissions associated with their operations and many are subject to national legislation which requires public reporting of scope 1 and scope 2 greenhouse gas emissions.

The UN Sustainable Development Goals seek to double the rate of improvement in energy efficiency by 2030. Domestically, the rising cost of energy over the past year has resulted in an increased focus on energy efficiency and the results are likely to be felt in coming years as companies invest in plant and infrastructure and management programs and start to realise savings.

Figure 3 Change in emissions intensity



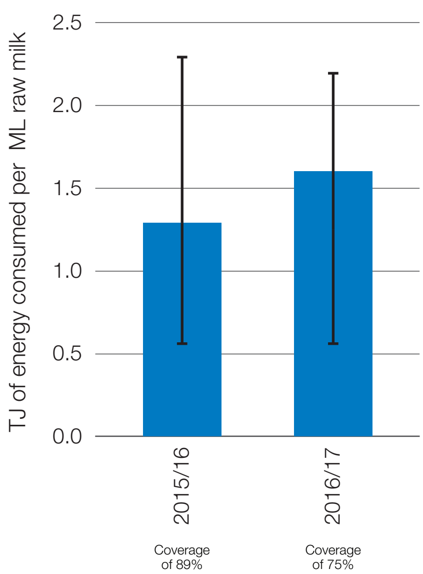
Result

Greenhouse gas intensity increased from 140 tonnes of carbon dioxide equivalent (tCO2~e) per ML of milk processed to 159.6 per tCO2~e of milk processed. This represents an increase of 14% over the year but a decrease of 10.7% compared to the baseline of 2010–2011. Our current aim is to reduce greenhouse gas emissions intensity from dairy manufacturing by 30% by 2020 compared to 2010–2011 levels. This figure is representative of 75% 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 grid electricity (scope 2).

This is the second year in which we are also reporting on our energy intensity which was 1.60 TJ (terajoules) per ML of milk processed in 2016–2017 and an increase of 23.7% on the previous year. This represents 75% of the milk volume processed nationally.

The increase in energy intensity and resulting greenhouse gas emissions is almost certainly linked to milk supply volatility and volume step-down during 2016–2017, which lead to many plants in affected regions running at sub-optimal capacity. There is also a strong relationship between increased water intensity associated with cleaning and the energy required to heat water required for cleaning.

Figure 4 Energy intensity



[1] https://www.environment.gov.au/system/files/resources/48f221e4-6613-4eb2-b279-18ad7061484a/files/economic-sector-2013.pdf.

Target 11

Reduce waste to landfill by 40% (based on 2010–2011 levels)

The UN Sustainable Development Goals seek to substantially reduce waste generation through prevention, reduction, recycling and reuse by 2030. Large customers have adopted ambitious waste reduction targets and are embracing the circular economy agenda to maximise resource efficiency. Dairy manufacturers generate a variety of waste streams, ranging from cardboard and plastic packaging to wooden pallets and wastewater treatment sludges. Some DMSC members have published waste reduction targets while others report 100% waste diversion from specific operating sites. Waste to landfill also represents a cost as most Australian states use levies to finance voluntary waste reduction efforts.

Results

Waste intensity decreased from 1.39 tonnes of waste sent to landfill per ML of milk processed to 1.32 tonnes in 2016–2017. This represents a decrease of 4.6% over the year and an overall 50.8% reduction compared with the baseline in 2010–2011, exceeding the 40% target. Over the same period, the rate of waste diverted from landfill decreased from 72% to 66%.

While some of this reduction is due to increased efforts to reduce waste, some improvement is also likely to be due to changes in how waste is measured. More companies are requiring contractors to weigh waste more accurately to improve waste accounting and reduce costs. However, some companies still estimate waste at some sites or for specific waste streams by volume and then convert this to weight. This impacts on data accuracy and comparability in any given year but this is likely to improve in coming cycles as contracts with waste companies are negotiated.

Behaviour change programs have also had an impact within companies and particularly at site level where waste is arguably more visible than energy and water consumption. The success of domestic waste reduction and recycling initiatives also play a role in translating culture change in the workplace.

The decrease in the rate of waste diverted from landfill may be due to changes in the type of companies contributing data this year. Waste data represents only 66% of national milk processed by volume and this is only the second year of collecting data on the rate of diversion. The change in participating companies also influences the types of products represented, associated waste streams and relative opportunities for re-use or recycling.

Figure 5 Change in waste intensity

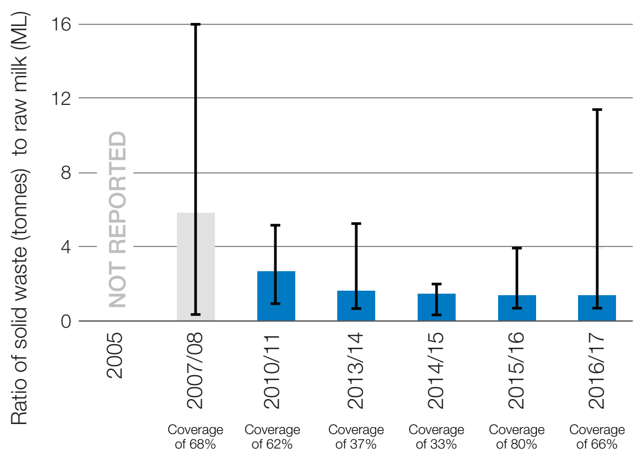
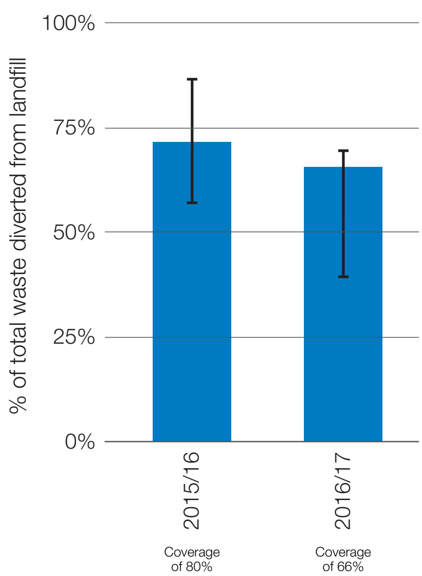


Figure 6 Waste diversion rate



CASE STUDY

Fonterra - Wooden crates recycled for Stanhope Men's Shed

Fonterra's new cheese plant at Stanhope in Victoria opened in August 2017 after a $140 million upgrade. The upgrade followed a fire which destroyed the primary cheese plant in 2014. The cheese site produces mozzarella, cheddar, parmesan, pecorino, romano, ricotta and gouda, as well as ingredient cheddar for domestic and export markets. Fonterra Australia Regional Operations Manager Jason Wright said the site was a hive of activity with all the building, equipment arriving and the beginning of the assembly process. With so much equipment, came the potential for a lot of waste material as the equipment is transported in large wooden crates inside shipping containers to keep it safe and stable. Discussions with the Stanhope and District Men's Shed resulted in the large wooden crates being recycled to build toys and Christmas decorations for local children which were given away as Christmas presents. Des Crittin from Stanhope and District Men's Shed said that getting so much recyclable material meant that the Men's Shed could make wonderful wooden toys, like cars, trains and dolls.

Image source from the Men's Shed and Fonterra

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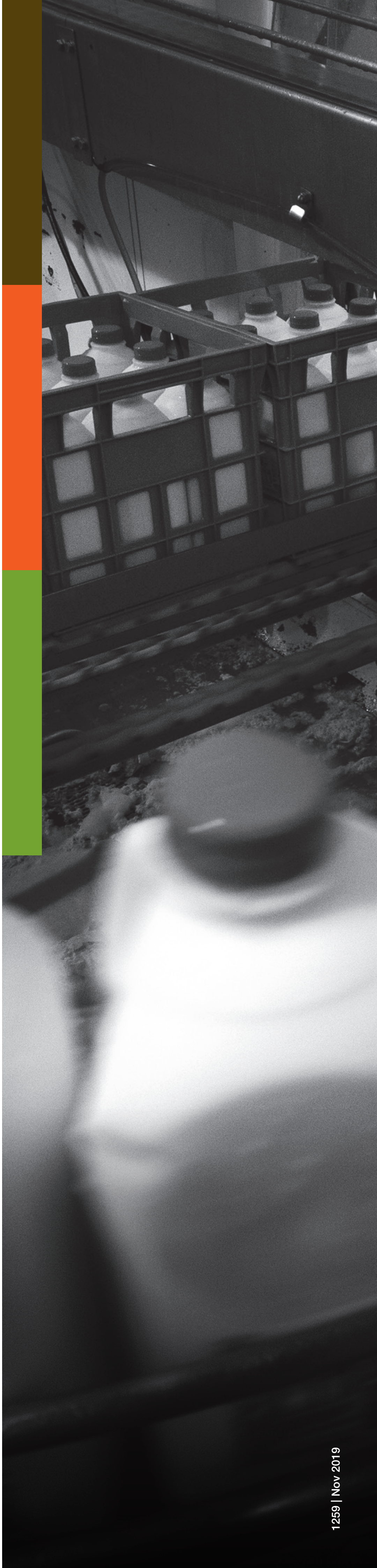

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