

# Environmental Data Reporting Notes – Sustainability Report 2020

## Introduction

This document is a supplement to our Sustainability Report 2020 published to provide additional supporting information on our reported environmental performance.

## Assurance

Independent assurance of our Sustainability Report including this appendix has been completed by Bureau Veritas. Please refer to the assurance statement in the main report.

## Organisational Boundary

The report covers the global activities of Fonterra Co-operative Group Limited and joint ventures under Fonterra's management control. On a raw milk collected and processed basis, New Zealand and Australia represent more than 95% of the farming and manufacturing activities reported.

For our greenhouse gas emissions (GHG) reporting Fonterra has chosen to report on Scope 1, 2 where we have operational control and also our main Scope 3 emissions. Farms supplying milk to us account for the largest portion of our emissions and fall within our sphere of influence so we believe it is important to report these under Scope 3 emissions.

Fonterra directly operates a small number of farms in New Zealand and China. For these farms we have adopted the same approach as for other farms but allocated the emissions to Scope 1 and 2 where required.

## Reporting Period

The primary reporting period is for the Financial Year 2020 (FY20), 1 August 2019 – 31 July 2020.

To align with Australian regulatory reporting (NGERS), Australian energy and emissions data is 1 July 2019 – 30 June 2020.

## Key Energy and Emissions Data

### Total energy used by manufacturing

	FY18		FY19		FY20	
	Energy (PJ)	% renewable	Energy (PJ)	% renewable	Energy (PJ)	% renewable
Fuel consumption	20.0	0	19.8	0	19.5	0
Steam consumption	4.2	4	4.1	6	4.0	6
Electricity consumption	5.2	53	5.1	55	5.0	55
Energy used	29.5	10	29.0	11	28.5	11
Non-renewable sources	90		89		89	
Energy intensity per tonne of finished goods	7.31	GJ/tonne	7.29	GJ/tonne	7.23	GJ/tonne

These figures include energy used by our manufacturing sites, main research centre, large corporate sites and our own milk collection transport fleet in New Zealand and Australia. It includes energy used and finished goods for businesses which were divested of during FY19. It excludes energy used by some smaller offices and support facilities which are considered immaterial. It also excludes energy used on the farms we own and operate because this is included in the lifecycle analysis for on-farm emissions. It is immaterial to our overall energy usage and the associated emissions are already captured in our on-farm reporting.

Energy used is sourced from electricity, purchased steam and purchased fuels. Fuels used include coal, natural gas, diesel, liquid petroleum gas (LPG), furnace oil, petrol and biofuels. Coal and natural gas are primarily used for process heating while liquid fossil fuels are primarily used for vehicles.

Based on the proportion of renewables used to generate the electricity and steam we purchase, and including the biofuels we directly use, we estimate that 11% of our total energy comes from renewable sources.

Our co-generation facilities in New Zealand generated excess electricity which was sold. The total sold during FY20 was 821 GJ.

We are unable to report energy used for heating separate to that used for cooling but heating dominates our energy use.

Global consolidated emissions<sup>1</sup>

	FY18	FY19	FY20	Units
Scope 1	1,716	1690	1,696	000 tCO <sub>2</sub> -e
On-farm	221	210	227	000 tCO <sub>2</sub> -e
Manufacturing	1,495	1,480	1,469	000 tCO <sub>2</sub> -e
Distribution and other	0	0	0	000 tCO <sub>2</sub> -e
Scope 2	692	659	628	000 tCO <sub>2</sub> -e
On-farm	64	51	52	000 tCO <sub>2</sub> -e
Manufacturing	628	608	576	000 tCO <sub>2</sub> -e
Distribution and other	0	0	0	000 tCO <sub>2</sub> -e
Scope 1 and 2 sub-total	2,408	2,349	2,323	000 tCO <sub>2</sub> -e
On-farm	284	261	279	000 tCO <sub>2</sub> -e
Manufacturing	2,124	2,088	2,045	000 tCO <sub>2</sub> -e
Distribution and other	0	0	0	000 tCO <sub>2</sub> -e
Scope 3	22,398	21,459	21,240	000 tCO <sub>2</sub> -e
On-farm	22,138	21,204	21,001	000 tCO <sub>2</sub> -e
Manufacturing	63	61	58	000 tCO <sub>2</sub> -e
Distribution and other	197	193	181	000 tCO <sub>2</sub> -e
Total Scope 1,2 & 3	24,806	23,808	23,564	000 tCO <sub>2</sub> -e
On-farm	22,422	21,465	21,280	000 tCO <sub>2</sub> -e
Manufacturing	2,187	2,149	2,103	000 tCO <sub>2</sub> -e
Distribution and other	197	193	181	000 tCO <sub>2</sub> -e
Scope 1 & 2				
Emissions intensity by finished goods	0.60	0.59	0.59	tCO <sub>2</sub> -e/t
Emissions intensity by revenue	118	118	111	tCO <sub>2</sub> /million NZ\$
Scope 1,2 & 3				
Emissions intensity by finished goods	6.1	6.0	6.0	tCO <sub>2</sub> -e/t
Emissions intensity by revenue	1,214	1,195	1,123	tCO <sub>2</sub> -e/million NZ\$

Our GHG emissions reporting applies the principles of the Greenhouse Gas (GHG) Protocol. We also report our GHG emissions via the Carbon Disclosure Project (CDP), with our first submission completed in 2015.

<sup>1</sup> Due to rounding in this summary table, some rows may not add exactly to the overall total.

## Common principles

### Baseline years

For our long-term energy efficiency programme in New Zealand manufacturing sites, FY03 (1 August 2002 to 31 July 2003) is our baseline year. This was the first full financial year after the formation of Fonterra and the start of the energy efficiency programme in New Zealand manufacturing sites.

For our global manufacturing emissions reduction target of 30% by 2030, our baseline year is FY15 (1 August 2014 – 31 July 2015), the first year where we have reasonably complete data for our global manufacturing emissions.

For our science-based global scope 1 and scope 2 emissions reduction target of 30% by 2030, our baseline year is FY18 (1 August 2017 – 31 July 2018). When submitting a target for approval by the Science Based Target's initiative we were required to provide a more recent baseline than FY15.

For our water reduction target at sites in water-constrained regions of 30% by 2030, our baseline year is FY18 (1 August 2017 – 31 July 2018) to align with our science-based emissions reduction target.

### Data collection and aggregation

Wherever possible, data is sourced from a verifiable source. For energy this is usually records from supplier invoicing. For water this is from supplier invoicing where relevant or from metering used to satisfy environmental resource permits. Data is aggregated and analysed via Excel.

### Missing or delayed data

Where measured data is normally available for a given item in a given region but it is not available for a given time period (e.g. one particular month), it is estimated based on the specific circumstances.

Where there is uncertainty about fuel sources and emissions factors, a conservative approach has been taken. For example, where a site purchases steam from a third party, generated using biomass but with LPG used as the back-up energy source, we have assumed that 20% of the input energy comes from the LPG.

If the data subsequently becomes available, the estimated value will be replaced with the actual and totals recalculated. If this difference is significant, prior year data will be restated in the next public reporting period.

### Other

Where an output from any factory is then subject to secondary processing we only count the finished goods once for intensity purposes.

The New Zealand specific manufacturing reporting on energy intensity excludes our fast-moving consumer manufacturing sites for historic reasons. These sites account for less than 2% of our total energy use in New Zealand and are included in all other reporting.

## Methodologies

### On farm

For on-farm information, the estimated emissions are reported using a lifecycle analysis (LCA) methodology which considers the full on-farm carbon lifecycle, from 'cradle-to-farm gate' and provides an estimated kgCO<sub>2</sub>-e/kg FPCM<sup>2</sup> factor for the given country. For each country where we collect milk, the total quantity of milk collected during the financial year is multiplied by the most recently available factor.

The extent of analysis required to complete an LCA means these cannot be completed for the current season within the reporting timetable. We complete an analysis for New Zealand milk each year because it dominates our on-farm emissions. For other countries we do this less frequently.

For this report, the most recently available LCA results are as follows: 2018/19 season for New Zealand; 2017/18 for Australia and Chile; and 2016/17 for our China farms.

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<sup>2</sup> Fat- and protein-corrected milk.

For New Zealand LCA, we commissioned AgResearch to complete this analysis based on regional data from DairyNZ/LIC statistics, a DairyNZ DairyBase survey of 388 farms and Fonterra milk production data. This year, the approach has been updated to align with recent changes to the NZ Inventory methods and include latest information and thinking such as: split of nitrogen between urine and dung; split of livestock manure across manure management systems; inclusion of on-farm peatland; usage of urea with urease inhibitor; updated electricity grid emission factors and PKE emission factor (including peatland emissions). All changes have been applied retrospectively to allow the underlying trend to be compared.

For Australia LCA, this has been calculated based on data drawn from the 17/18 Dairy Farm Monitor Project Annual reports for Tasmania and Victoria. The data are reported for Tasmania and for all three Victorian dairy regions (Northern Victoria, South West Victoria and Gippsland) which covers Fonterra's Australian milk pool.

For our China farms, we commissioned AgResearch to complete this analysis based on detailed data for all 7 farms from our farm management systems.

For Chile LCA, we commissioned AgResearch to complete this analysis based on data from a sample of farms from the northern region supplying Soprole and the southern region supplying Prolesur.

For the smaller milk volumes purchased in Brazil and Venezuela we have used the average of the two lifecycle factors determined for Chile.

For the very small volumes sourced in Sri Lanka, the emission factor has been taken as the average for South Asia in 2015 from the UN FAO/GDP GHG emissions fact sheet.

The main methodology used is common across all LCA and conforms to IDF (2015) and LEAP (2015) guidelines. It considers Methane (CH<sub>4</sub>), Nitrous oxide (N<sub>2</sub>O) and Carbon dioxide (CO<sub>2</sub>) arising from feed sources, animals, fertilisers, energy and land use change. For supplying farms emissions are split between the milk and meat co-products, with only the milk component being counted here. For the few farms that we manage, full emissions are allocated here. The LCA methodology includes emissions related to all on-farm activities, including emissions related to fuel use and electricity consumption, and emissions related to supplementary feed, including emissions related to overseas production for PKE.

We have adopted IPCC AR5, with GWP factors of CO<sub>2</sub> = 1; N<sub>2</sub>O = 265 and CH<sub>4</sub> = 28. This means that our reported figures for New Zealand may be higher than figures reported in other publications that consider a New Zealand inventory only which still uses IPCC AR4.

## Manufacturing

For countries where energy contents and emission factors are well understood and supported by local regulations and/or reporting guidelines, the local factors have been applied. In other countries, if officially sanctioned factors are available, we have used them, otherwise internationally accepted default factors have been applied.

For thermal energy the convention in New Zealand and Australia is to report energy totals in gross terms (higher heating value). Therefore, this approach has been adopted for reporting across all countries.

The sources of the default factors were:

- Energy contents: International Energy Agency (IEA) "Energy Statistics Manual"  
Electricity use has been converted to energy terms at 0.0036 GJ per kWh while fuel use has been converted on a gross calorific, or higher heating value, basis<sup>3</sup>.
- Electricity emission factors: IEA "Emission Factors (2019 edition)"  
The factors used for FY20 were as tabulated by country for the 2017 calendar year as this was the most recent complete set available.
- Fuels emission factors: Greenhouse Gas (GHG) tools library and specifically the spreadsheet "Emission\_Factors\_from\_Cross\_Sector\_Tools\_March\_2017.xlsx"

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<sup>3</sup> Many countries report energy use in net calorific value (lower heating value) terms where the latent heat available in the water formed during combustion is excluded from the available energy. Typically, the gross values are about 5% higher than net values for solid and liquid fuels and up to 10% higher for gaseous fuels.

% Renewable in electricity generation:

- New Zealand: Ministry of Business, Innovation & Employment, Quarterly electricity generation and consumption.
- Australia: Australian Energy Statistics 2019, Table O: Australian electricity generation, by fuel type, 2017-18 and 2018.
- Other: World Bank Data: Renewable electricity output (% of total electricity output).

Carbon dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous oxide (N<sub>2</sub>O), and hydrofluorocarbons (HFCs) have been considered with IPCC Assessment Report 5 global warming potential factors (GWPs) while perfluorinated compounds (PFCs) and sulphur hexafluoride are not applicable.

### Scope 3

#### Distribution

Data has been collected and reported for movement within New Zealand, including coastal shipping around New Zealand. We have also reported all international ocean freight under the control of our shipping partner Kotahi. This includes exports from New Zealand, Australia, Europe and North America to the final destination port. We make minimum use of air freight but data has been collected and reported for air freight from New Zealand since FY18.

This is estimated to account for more than 85 per cent of our GHG emissions from the distribution of finished goods.

#### Travel

Data has been collected and reported for all business air travel, most rental car, and most hotel accommodation. This emission data has been provided by our nominated travel agents.

#### Other

Energy transmission and distribution losses have been included for gas and electricity purchases in New Zealand and Australia.

Our Scope 3 emissions reporting aims to account for all main items. Contributions not reported include items such as use of taxis, personal travel to and from work, some finished product transportation and milk collection outside of New Zealand and Australia, emissions associated with packaging, chemicals, and non-dairy ingredients, and capital spend.

In line with the GHG reporting protocol, we also do not report the GHG emissions arising from the end use of our products due to the diverse range of customers and potential applications.

A screening exercise completed when submitting our emissions reduction target to the Science-Based Target initiative estimated that the excluded items account for less than 10% of Scope 3 emissions.

## Water use and discharge

### Scope

Water use and waste water discharge is reported for our manufacturing sites only.

### Quality data

Chemical oxygen demand (COD) is the most common water quality measure used by our manufacturing sites but some sites use biological oxygen demand (BOD). We have therefore chosen to report on discharge water quality using COD.

Where only BOD results are available for a given wastewater destination, we have converted the BOD results to COD using a conversion factor derived from research into typical compositions for wastewater from dairy manufacturing sites (COD = BOD/0.6).

Water quality sampling frequency varies between sites and destination of waste water but is in line with the requirements of relevant regulations or permits. At some sites it is tested internally to a procedure approved by the relevant authority while at other sites it is analysed by external laboratories.

## Aggregation of global quality data

For each site outlet, the overall COD result for the reporting period is calculated as an average from the individual test results for that outlet. The average is generally calculated as a median but in some cases a mean is used.

To aggregate these into global results per discharge destination, a weighted average is calculated based on the volume discharged for each overall COD result.

If a facility provides a volume but is unable to provide the matching COD, or BOD, that volume has been excluded from the globally aggregation calculation.

## Data changes

### Acquisitions and Divestments

During FY19 we divested of several business which have been within the scope of our environmental reporting. The environmental data from these businesses remains included in our reporting for FY19 for the time that these businesses were under our operational control (see table below). For reporting progress against targets, we have adopted the approach recommended by the GHG Protocol. This means that, where the target depends on a baseline value in a given financial year, we have adjusted the baseline value to reflect divestment of the businesses and reported progress on a like-for-like basis (i.e. as if we had never owned that business).

Business	Data included until
Inlaca, Venezuela	28/02/2019
Tip top, New Zealand	31/05/2019

There were no acquisitions which impacted our environmental reporting.

### Restatements of prior year results

In previous years we reported on-farm emissions one year in arrears to allow time for the lifecycle analysis (LCA) to be completed. This year we have aligned estimated on-farm emissions with the financial year in which they occurred. This means that for FY20, the on-farm emissions are all based on quantities of milk collected in FY20 multiplied by the most recently available LCA for the respective country.

For FY19 we have made minor updates for manufacturing data to reflect finalisation of FY19 data and some small corrections.

FY19 solid waste to landfill has been restated to include missing data, remove incorrectly classified recycling and re-estimation of some items based on FY20 process improvements.

For intensity by revenue, we have restated results to reflect the updated revenue figures from the Annual Report 2020. Please see Note 28 in the Financial Statements for further explanation.

