



# Environmental Data Reporting Notes- Sustainability Report 2018

## Introduction

This document is a supplement to our Sustainability Report 2018 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 per cent 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 2018 (FY18), 1 August 2017 – 31 July 2018.

To align with Australian regulatory reporting (NGERS), Australian energy and emissions data is 1 July 2017 – 30 June 2018.

Due to the elapsed time required to complete a lifecycle analysis, the reporting period for our on-farm GHG emissions is the 2016-17 milking season, 1 June 2016 – 31 May 2017.

## Key Energy and Emissions Data

### Total energy used by manufacturing

		Units
<b>Energy used</b>	29.4	PJ (10 <sup>6</sup> Gigajoules, GJ)
<b>Renewable sources</b>	13	%
<b>Non-renewable sources</b>	87	%
<b>Energy intensity per tonne of finished goods</b>	7.41	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 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 13% 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 FY18 was 657 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

	On farm	Manufacturing and distribution	Other	Overall <sup>1</sup>	Units
<b>Scope 1</b>	224	1470	0	1,693	000 tCO <sub>2</sub> -e
<b>Scope 2</b>	70	647	0	717	000 tCO <sub>2</sub> -e
<b>Scope 1 and 2 sub-total</b>	293	2,117	-	2,411	000 tCO <sub>2</sub> -e
<b>Scope 1 &amp; 2 Emissions intensity</b>					
<b>by finished goods</b>	0.07	0.53		0.61	tCO <sub>2</sub> -e/t
<b>by revenue</b>	14	104	-	118	tCO <sub>2</sub> /million NZ\$
<b>Scope 3<sup>2</sup></b>	19,538	189	66	19,793	000 tCO <sub>2</sub> -e
<b>Scope 1,2,3 Total</b>	19,831	2,307	66	22,204	000 tCO <sub>2</sub> -e
<b>Scope 1,2 &amp; 3 Emissions intensity</b>					
<b>by revenue</b>	970	113	3	1,086	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.

<sup>2</sup> Scope 3 on-farm figure corrected in this table in this version of this appendix. Earlier version overstated scope 3 due to double counting on-farm emissions from owned farms.

## 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 more recently set targets, our baseline year is FY15 (1 August 2014 – 31 July 2015), the first year where we have reasonably complete data for our operations globally.

### 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 worst-case approach has been taken. For example, where a site purchases steam from a third party, generated from a mix of furnace oil, gas and biomass but the proportions of these fuels is unknown. In this report it is assumed to be generated entirely from furnace oil as this gives the highest emissions.

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 and water intensity excludes our fast-moving consumer manufacturing sites for historic reasons. These sites account for less than 5% of our total energy and water use in New Zealand and are included in all other reporting.

## Methodologies

### On-farm

For on-farm, the estimated emissions are reported using a lifecycle analysis (LCA) methodology which considers the full on-farm carbon lifecycle, from 'cradle-to-farm gate'. Fonterra commissions AgResearch to complete this analysis based on a sample of farms from each region of interest. The analysis for the most recent report, for the 2016-17 season, was completed for New Zealand (459 farms) and China (all 7 farms). Australia was last completed for 2015-2016 season. The main methodology used is common across all and conforms to IDF (2015) and LEAP (2015) guidelines.

It considers Methane (CH<sub>4</sub>), Nitrous oxide (NO<sub>2</sub>) 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. These inclusions mean that our reported figures may be higher than figures reported in other publications that consider a New Zealand inventory only.

### Manufacturing

For New Zealand and Australia, 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 we have used officially sanctioned factors if they are available 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 fuels use is converted on a gross calorific, or higher heating value, basis<sup>3</sup>.

Electricity emission factors: IEA "CO<sub>2</sub> Emissions from Fuel Combustion (2017 edition)"

The factors used were as tabulated by country for the 2015 calendar year as this was the most recent complete set available. These have been applied for FY16, FY17 and FY18. Venezuela is not listed so the Non-OECD American factor has been used.

Fuels emission factors: Greenhouse Gas (GHG) tools library and specifically the spreadsheet "Emission\_Factors\_from\_Cross\_Sector\_Tools\_March\_2017.xlsx"

% Renewable in electricity generation:

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

Carbon dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>) and Nitrous oxide (NO<sub>2</sub>) have been considered with SAR5 GWPs.

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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.

## Scope 3

### Distribution

Data has been collected and reported for movement within New Zealand and ocean freight from New Zealand to final destination port for export products. For FY18 we have also reported emissions from coastal shipping around New Zealand and the export of products from other countries. This is estimated to account for more than 85 per cent of our emissions from distribution of finished goods.

### Air travel

Data has been collected and reported for all business air travel organised through 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 included are small and include items such as use of hire cars and taxis, personal travel to and from work, some finished product transport and milk collection outside of New Zealand and Australia, and emissions associated with packaging, chemicals, and non-dairy ingredients.

A definitive gap analysis has not been completed but it is estimated that the excluded items account for less than 5 per cent of Scope 3 emissions.

## Water use and discharge

### Scope

Water use and waste water discharge is reported for global 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. 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

For FY18 we have been able to include extra data within our calculations. For distribution, we have included emissions data for New Zealand coastal shipping, air freight from New Zealand and ocean freight from Australia, United States and Europe. For manufacturing wastewater, we now have COD for wastewater discharge in Chile.

#### Restatements of prior year results

For the estimated GHG emissions arising from land use change in New Zealand, a recent change in methodology by the New Zealand Ministry of Primary Industries equates to an increase of approximately 17% in the LUC component compared to that used previously. Given its significance, we have used this to recalculate and restate prior years so the underlying trend can be viewed (see page 61 of the main report).

For New Zealand manufacturing, previously reporting energy and emissions for FY17 included some estimated values for July 2017 and used the estimated grid emissions factor that was available at the time. This year we have restated those based on subsequently received actual values.

For manufacturing energy and emissions in Brazil, we have restated FY16 and FY17 to correct two misunderstandings. For Garanhuns, we had counted energy and emissions for both steam and the fuel oil used to generate that steam. For Los Lagos, we had counted the emissions arising from biofuels used to generate steam consumed but these biofuels were actually purchased by a third party.

For FY18 we have reported emissions from coastal shipping around New Zealand and the export of products from countries other than New Zealand. Corresponding data for prior reporting years is not available so we have used the FY18 estimated emissions for FY16 and FY17.

For New Zealand manufacturing water efficiency, we identified this year that water consumed by our Kapuni site was missing from our F15 baseline. This has now been included and progress from the baseline restated for FY17.

For New Zealand, 700 tonnes of solid waste to landfill was previously overlooked in FY17 when a change to the main service provider led to a gap in the reporting coverage. This has been included in the restated quantity for FY17.