



Greenhouse Gas Emissions Inventory Report

Inventory Scope: Meridian Group (all facilities)

Inventory Period: For the period 1 July 2018 to 30 June 2019

Version: Final

Audit Status: Verified

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Disclaimer

Every effort has been made to ensure that the report is accurate. Meridian Energy Limited will not be liable in contract, tort, equity or otherwise, for any reliance placed upon this report by any third party.

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The consolidation approach chosen for the greenhouse gas inventory should not be used to make decisions related to the application of employment or taxation law.

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Greenhouse Gas Emissions Inventory Summary

ISO 14064-1, 9.3.1 (j), 9.3.2 (e, f)

Table 1: Total greenhouse gas emissions for the Meridian Group by business activity and scope

Business activity	Scope	Emissions tCO ₂ e	Offsets**	Remaining tCO ₂ e
Operational				
	Scope 1	1,099.0	1,099.0	0
	Scope 2	2,317.8	2,317.8	0
	Scope 3 operational	33,565.6	33,565.6	0
	Subtotal	36,983	36,983	0
Energy purchased and on-sold*				
	New Zealand electricity	0		0
	Australia electricity and gas	611,822	611,822	0
		611,822	611,822	0
One-off construction				
	Scope 3 one-time construction	68		68
		68	0	68
Total Group value chain emissions (S1, 2 & 3)		648,873	648,805	68

*Emissions of our retailed electricity using the market-based methodology. In New Zealand we use the annual netting off methodology (see Section 11). In Australia we use the National Carbon Offset Standard administered by the Australian government

**Offsets include credits surrendered to the government for SF₆, credits cancelled by suppliers against their own emissions, 611,822 purchased to fulfil Australia's National Carbon Offset Scheme (NCOS) commitments, and Gold Standard Voluntary Emission Reductions (GS VERs) for the balance

Table 2: Greenhouse gas emissions for the Meridian Group by facility

Scope	Category	Meridian NZ	Meridian Australia	Powershop NZ	Flux NZ	2018/19 tCO ₂ e
Direct Emissions (Scope 1)	Stationary combustion	3	11	0	0	14
	Mobile combustion	907	113	1	1	1,021
	Fugitive emissions	64	0	nm	nm	64
	Subtotal	974	124	1	1	1,099
Indirect Emissions (Scope 2)	Electricity consumption (location based)	1,580	713	21	4	2,318
	<i>Electricity consumption (market based)</i>	<i>1,580</i>	<i>0</i>	<i>21</i>	<i>4</i>	<i>1,605</i>
	Subtotal (location based)	1,580	713	21	4	2,318
Indirect Emissions (Scope 3)	Purchased goods and services	10,025	2,938	451	415	13,830
	Capital goods	43	nm	nm	nm	43
	Fuel & energy related activities	230	611,857	2	1	612,090
	Upstream transportation & distribution	8,871	723	1,155	nm	10,749
	Waste generated in operations	25	31	nm	nm	56
	Business travel	1,555	291	76	296	2,218
	Employee commuting	514	58	180	41	792
	Downstream leased assets	5,678	n/a	n/a	n/a	5,678
	Subtotal	26,941	615,898	1,864	753	645,456
Total Emissions (S1, 2 & 3)		29,495	616,734	1,885	758	648,873

*Location-based emissions are calculated using the average emissions intensity of the grids on which energy consumption occurs (using grid-average emission factor data). Market-based emissions are calculated using the low carbon attributes of mechanisms such as contractual instruments or certifications bundled with the consumed electricity. For example, Meridian Australia purchase their own NCOS certified carbon neutral retail electricity product for their own use.

nm not measured

n/a not applicable

Table 3: Greenhouse gas emissions by business activity and scope

Business activity	Category	Meridian NZ	Meridian Australia	Powershop NZ	Flux NZ	2018/19 tCO ₂ e
Operational emissions						
Direct Emissions (Scope 1)	Stationary combustion	3	11	0	0	14
	Mobile combustion	907	113	1	1	1,021
	Fugitive emissions	64	0	nm	nm	64
	Subtotal	974	124	1	1	1,099
Operational emissions						
Indirect Emissions (Scope 2)	Electricity consumption (location based)	1,580	713	21	4	2,318
	Subtotal (location based)	1,580	713	21	4	2,318
Operational emissions						
Indirect Emissions (Scope 3)	Purchased goods and services	10,025	2,938	451	415	13,830
	Fuel & energy related activities	230	35	2	1	268
	Upstream transportation & distribution	8,846	723	1,155	nm	10,723
	Waste generated in operations	25	31	nm	nm	56
	Business travel	1,555	291	76	296	2,218
	Employee commuting	514	58	180	41	792
	Downstream leased assets	5,678	n/a	n/a	n/a	5,678
	Subtotal	26,873	4,076	1,864	753	33,566
Total Operational Emissions (S1, 2 & 3)		29,427	4,913	1,885	758	36,983
Energy purchased and on-sold*						
Indirect Emissions (Scope 3)	Fuel & energy related activities	0	611,822	0	n/a	611,822
	Subtotal	0	611,822	0	n/a	611,822
One-off construction						
Indirect Emissions (Scope 3)	Capital goods	43	nm	n/a	n/a	43
	Upstream transportation & distribution	26	nm	n/a	n/a	26
	Subtotal	68	0	0	0	68
Total Emissions (S1, 2 & 3)		29,495	616,734	1,885	758	648,873

*Meridian Australia purchase their own NCOS certified carbon neutral retail electricity product for their own use.

nm not measured

n/a not applicable

Table 4: Total greenhouse gas emissions by greenhouse gas

GHG Gas	Meridian NZ	Meridian Australia	Powershop NZ	Flux NZ	2018/19 tCO ₂ e
Scope 1					
CO ₂	898	122	1	1	1,022
CH ₄	0	0	0	0	0
N ₂ O	11	2	0	0	13
HFCs	-	-	-	-	-
SF ₆	64	-	-	-	64
Subtotal	974	124	1	1	1,099
Scope 2					
CO ₂	1,508	713	20	4	2,244
CH ₄	71	-	1	0	72
N ₂ O	1	-	0	0	1
Subtotal	1,580	713	21	4	2,318
Scope 3					
tCO ₂ e	26,941	615,898	1,864	753	645,456
Subtotal	26,941	615,898	1,864	753	645,456
Total	29,495	616,734	1,885	758	648,873

1 Introduction

The authenticity of the sustainability positioning of the Meridian Energy Group of companies is dependent on credible climate action, including measuring and managing our emissions and reducing the greenhouse gas emissions of our operations.

Our emission measurement and reduction guidelines support the Sustainability Policy, and our desire to take “Climate Action” in line with the 13th UN Sustainable Development Goal.

This report is the annual greenhouse gas (GHG) emissions¹ inventory report for the Meridian Group of companies. The inventory is a complete and accurate quantification of the amount of GHG emissions that can be directly attributed to the organisation’s operations within the declared boundary and scope for the specified reporting period.

Our reporting processes and emissions classifications are consistent with international protocols and standards. This report has been written in accordance with Part 9.3.1 of the requirements of *International Standards Organisation ISO 14064-1*². Where applicable discretionary information has been disclosed consistent with section 9.3.2 of the Standard. The inventory has also been prepared in accordance with the *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004)* (the GHG Protocol) and the *Greenhouse Gas Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011)* (the Scope 3 Standard).

Meridian has calculated its own “carbon footprint” since 2001. From 2006 to 2010 the organisation certified its electricity product under the carboNZero^{Cert}™ programme and in FY12 and FY13 met the requirements for CEMARS® certification. Whilst Meridian continues to manage and report on GHG in a similar manner to previous years, no external certification is sought.

For the purposes of this report “Meridian” and “Meridian Energy Ltd” refer to the organisation with no accounting or legal inference. “Meridian Group” is used to refer to the Meridian Group of companies which is broken into four facilities. For definitions of these facilities, and more information on the organisational and reporting boundaries refer to Section 6.

2 Statement of Intent

Meridian is intent on demonstrating consistency with best practice accounting for greenhouse gas emissions.

This report:

- relates specifically to the emissions of the Meridian Group;
- has been prepared following the requirements outlined in ISO 14064-1, the GHG Protocol and the Scope 3 Standard;

¹Throughout this document “emissions” means “GHG emissions”.

²International Standards Organisation *Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*, Reference number ISO 14064-1:2018(E).

-
- has been prepared as part of an ongoing commitment to measure and reduce emissions on a regular basis; and
 - excludes future targets.

3 Description of Meridian

ISO 14064-1, 9.3.1 (a) and 9.3.2 (a)

Meridian is New Zealand's largest electricity generator. The Meridian Energy Group of companies is made up of:

- Meridian Energy Limited (the “Parent”) and
- our subsidiaries (together the “Group”).

Meridian undertakes a variety of activities in the energy sector. Its primary activity is the renewable generation and retail of electricity. Other activities include:

- professional services relating to the upkeep of dams;
- development of software used by electricity retailers;
- licencing of electricity retailing software and the Powershop brand to overseas companies; and
- captive self-insurance services.

For further information about the organisation please refer to the Meridian Energy Limited Integrated Report for the year ended 30 June 2019 which is available at www.meridianenergy.co.nz. For more information about the facilities that comprise the Meridian Group see Section 6.

3.1 GHG and Sustainability Policies, Strategies and Programmes

Meridian Energy’s purpose is to provide “clean energy for a fairer and healthier world”. Our key contributions (aligned to the United Nation’s seventh and thirteenth Sustainable Development Goals) are reliable and affordable electricity, renewable energy, and a reduction in NZ’s carbon footprint.

In support of these goals, we have Greenhouse Gas Emissions Measurement and Reduction Guidelines, first approved by Meridian’s Executive Team in June 2009 and revised and approved in August 2019. These guidelines outline how Meridian will measure and reduce our greenhouse gas emissions with the objective of understanding, transparently disclosing and reducing the emission intensity of our operations.

A focus on GHG measurement and reduction, of which this GHG Inventory Report is a part, enables us to improve our workplace sustainability, and gives us case studies we can share with our customers and communities. Specifically, this advances the following objectives:

- Reducing the company’s overall environmental footprint by reducing, reusing and recycling resources;
- Encouraging our partners and suppliers to follow a sustainable development pathway and promoting leadership in this area.

4 Persons Responsible

ISO 14064-1, 9.3.1 (b)

This GHG inventory is ultimately the responsibility of the Board of Directors.

The person responsible for this GHG inventory is Mike Roan, Chief Financial Officer.

In addition, the GHG accounting and reporting team have provided background and supporting information. These team members are:

- Alison Howard, Head of Sustainability;
- Judy Ryan, Carbon Accountant;
- Rob Gillespie, Management Accountant
- Anna Mills, Commercial Support Manager
- Ewan Gestro, Commercial Insight Manager (electricity generation, purchases and power station electricity data);
- Jamie Bishop, APX Travel Management (air and rental car travel data)
- Paula Lamb, Custom Fleet (fleet vehicle travel and fuel data)
- Nick Robilliard, Procurement & Property Manager (business travel and all vehicle data inputs);
- Daniel Williamson, HR Analyst (HR data);
- Peter Harding, Commercial Manager (office electricity consumption data);
- Numerous Generation and Natural Resources staff (one-time emissions sources, SF6);
- Sandy Iti, Broadspectrum (office waste and air conditioning);
- Victoria Kladouhos (Meridian Energy Australia Pty Ltd);
- Tylee Bryne, Office Manager (Powershop Limited).
- Katrina Cooper, Office Manager (Flux Limited (NZ))
- Hannah Porter, Meter Reading & Field Services Data

5 Reporting Period Covered

ISO 14064-1, 9.3.1 (c)

This GHG inventory report covers the financial year 1 July 2018 to 30 June 2019.

6 Organisational Boundaries

ISO 14064-1, 9.3.1 (d)

The organisational boundary determines the parameters for GHG reporting in the Meridian Group GHG inventory. The boundaries were set with reference to the methodology described in the GHG Protocol and ISO14064-1 standards. The boundary encompasses the operations owned or controlled by Meridian, its subsidiaries, associate companies and joint ventures in the Meridian Group.

6.1 Consolidation approach

Meridian applies the operational control consolidation approach to the Meridian Group emissions inventory. This consolidation approach allows us to focus on those emissions sources over which we have control and can therefore implement management actions, consistent with Meridian's corporate responsibility objectives.

The table in Appendix 1 sets out how each entity in the Meridian Energy Group is treated. Appendix 2 contains a diagram of the Meridian Energy Group corporate structure as at 30 June 2019.

For further information about the organisation please refer to the Meridian Energy Limited FY19 Integrated Report which is available on [our website](#).

6.2 Defining Meridian "facilities"

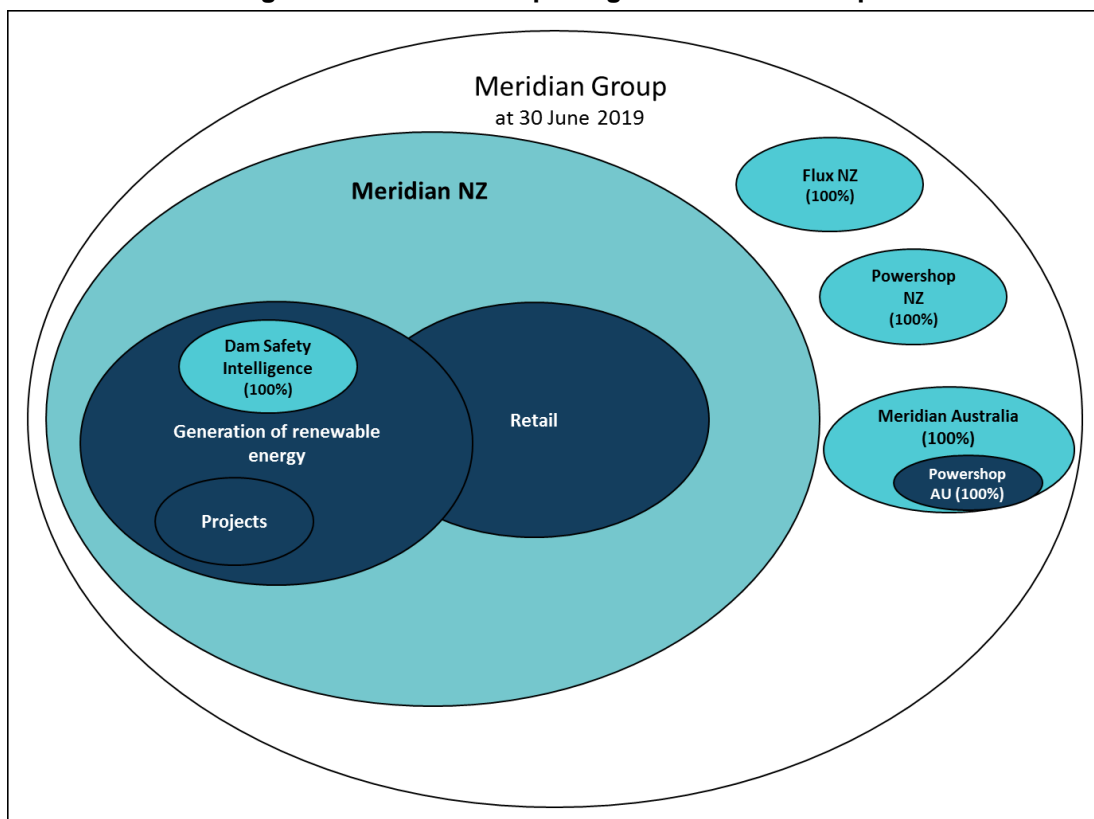
Meridian's diverse activities and resulting emissions are categorised into "facilities" in line with Annex A of ISO 14064-1 which requires that the data should be retained in its disaggregated form to aid transparency and to provide maximum flexibility in meeting a range of reporting requirements.

A facility is an operation which, by the nature of its processes or geography, can be separately accounted for. ISO 14064-1 defines a *Facility* as:

*"a single installation, set of installations or production processes (stationary or mobile), which can be defined within a single geographical boundary, organizational unit or production process"*³

For the year ended 30 June 2019 these facilities are: Meridian New Zealand, Powershop NZ, Flux NZ, and Meridian Australia as illustrated in the following diagram.

Figure 1: Facilities comprising the Meridian Group



³ ISO 14064-1:2018(E) section 3.4.1

6.3 Defining the Individual Facilities

A brief description of each of the facilities (including which legal entities are included within them) follows. See Appendix 2 for an organisational chart.

Facility	Description
Meridian NZ	<p>This includes emissions arising from Meridian’s core activities associated with the generation and retail of electricity from renewable resources. Meridian New Zealand supplied around 227,855 customer connections at 30 June 2019 and employed 698 people at 30 June 2019. It includes the following legal entities:</p> <ul style="list-style-type: none"> • Meridian Energy Limited • Dam Safety Intelligence Limited • Meridian Energy Captive Insurance Limited (non-trading) • Meridian Limited (non-trading) • Meridian Energy International Limited (non-trading) • Meridian LTI Trustee Limited (non-trading)
Powershop NZ	<p>Powershop conducts energy retailing activities within Powershop New Zealand Limited under the Powershop brand. Powershop employed 143 people and supplied around 74,422 customer connections at 30 June 2019. Further information about Powershop can be found at www.powershop.co.nz.</p>
Flux NZ	<p>Flux provides electricity retailing software to Powershop New Zealand, Powershop Australia, Meridian NZ and nPower in the U.K. It licences the Powershop brand and operating model. Flux employed 158 people at 30 June 2019. It includes the following legal entities:</p> <ul style="list-style-type: none"> • Flux Federation Ltd • Flux UK Ltd <p>Further information about Flux can be found at https://fluxfederation.com.</p>
Meridian Australia	<p>Meridian carries out generation and retailing of electricity and gas activities in Australia. Meridian Australia employed 67 people and supplied around 109,804 electricity and around 22,612 gas customer connections through the Powershop brand at 30 June 2019. It includes the following legal entities:</p> <ul style="list-style-type: none"> • Meridian Energy Australia Pty Ltd • Three River Holdings (No 1) Limited (holding company) • Three River Holdings (No 2) Limited (holding company) • Meridian Energy Markets Pty Ltd (holding company) • Meridian Finco Pty Ltd (non-trading) • GSP Energy Pty Ltd • Meridian Wind Monaro Range Holdings Pty Ltd (holding company) • Meridian Wind Monaro Range Pty Ltd (non-trading) • Mt Millar Wind Farm Pty Ltd • Meridian Australia Holdings Pty Ltd (holding company) • Meridian Wind Australia Holdings Pty Ltd (holding company) • Mt Mercer Windfarm Pty Ltd • Powershop Australia Pty Ltd <p>Further information about Meridian Australia can be found at www.meridianenergy.com.au.</p>

7 Information Management Procedures

ISO 14064-1, 9.3.2 (i)

GHG Measurement and Reduction Guidelines were developed and approved 30 June 2009 and last revised and approved in August 2019. These document measurement and reporting requirements for individual facilities and the group with the objective of understanding, transparently disclosing and reducing the emission intensity of operations.

Meridian has, for each facility, developed and maintained GHG information management processes that: ensure conformance with the principles of ISO 14064-1 and the GHG Protocol; ensure consistency with the intended use of the GHG inventory; provide routine and consistent checks to ensure completeness and accuracy; identify and address errors and omissions; and manage and store documentation in a safe and accessible manner.

The key GHG information management procedures are as follows:

- Source data is collected directly from third party suppliers or from the Meridian financial system;
- The data is stored in the SoFi software database and reviewed by the GHG accounting team;
- Emissions factors and conversion factors in SoFi are maintained by thinkstep;
- The GHG inventory is compiled using activity data and emission factors;
- The report is independently audited by Deloitte;
- The report is reviewed to identify opportunities to reduce emissions and improve the information management process; and

Senior management are informed of emissions reduction progress.

8 Operational Boundaries

ISO 14064-1, 9.3.1 (e)

GHG emissions sources from the Meridian Group value chain were identified with reference to the methodology described in the GHG Protocol, ISO 14064-1, and Scope 3 standards, and classified into categories: Under the standards, reporting of Scope 3 emissions is optional.

The following categories are used:

- Direct GHG emissions (Scope 1): GHG emissions that are operationally controlled by the company;
- Indirect GHG emissions from imported energy (Scope 2): GHG emissions from the generation of purchased electricity, heat or steam consumed by the company;
 - Reported by both location and market based emissions factors
 - Total annual emissions are reported using the location based approach
- Other Indirect GHG emissions (Scope 3): All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. These have been further categorised using the Scope 3 Standard categories:
 - Purchased goods and services (category 1);
 - Capital goods (category 2)
 - Fuel- and energy-related activities not included in Scope 1 or 2 (category 3)
 - Upstream transportation and distribution (category 4)
 - Waste generated in operations (category 5)
 - Business travel (category 6)

-
- Employee commuting (category 7)
 - Downstream leased assets (category 13)

For clarity these emissions sources are also reported in the following groups:

- Operational emissions - subject to our reduction and offsetting targets
 - Scope 1, 2, and 3 emissions relating to the day-to-day operation of our businesses
- Construction emissions – from major projects
 - Scope 3 emissions including major materials (Capital goods (category 2)), freight of major materials to site and fuel consumed by contractors (both Upstream transportation and distribution (category 4))
- Emissions from energy purchased and on-sold to customers
 - Scope 3 emissions from Fuel- and energy-related activities (category 3)

Additional Scope 3 standard categories are not reported because they are not relevant to our business, with the exception of category 11 which is captured in our reporting of energy purchased and on-sold under category 4.

9 Summary of Emission Source Inclusions

ISO 14064-1, 9.3.1 (m)

This table provides details on the emissions sources included in the GHG inventory.

Scope	Category	GHG emissions source	Facilities included	Data source	Data collection unit	Methodology, data quality, uncertainty (qualitative)
Scope 1	Stationary combustion	Fuel used for electricity generation	Meridian NZ and Meridian Australia	No fuel consumed	n/a	There were no emissions from the 13,559 GWh of electricity generated in the reporting period, as the fuel used to generate this electricity was water and wind.
		Testing of back-up generators	Meridian NZ, Meridian Australia	Estimated hourly usage multiplied by time of test.	Hydro Asset Management Team	Consumption estimated based on regular testing regime.
	Mobile combustion	Car travel (owned, leased, rented)	All facilities	GPS generated odometer readings, fuelcard (2) purchase data, rental provider activity reports, and taxi expenditure data	Vehicle operators Customfleet – fuelcards Rental suppliers Fraedom Expense Management Smartrak GPS	Actual records from GPS tracked data (owned vehicles) and start/end odometer data (rental vehicles) for distance travelled x average fuel efficiency of vehicle class (small, medium or large). Owned vehicles are calculated from litres of fuel purchased on fuelcards. Driver behaviour and individual engine performance are not taken into account for rental vehicles.
Boat travel (Tug and staff transport boat at Lake Manapōuri)		Meridian NZ	Fuel storage readings	Real Journeys	Accurate records of litres used.	

Scope	Category	GHG emissions source	Facilities included	Data source	Data collection unit	Methodology, data quality, uncertainty (qualitative)
	Fugitive emissions	Fugitive emissions from SF ₆	Meridian NZ, Meridian Australia	Maintenance records	Maintenance staff	Accurate records of storage cylinder weights. Records of 'top-ups'.
		Fugitive emissions from air-conditioning systems	All facilities	Maintenance records	Broadspectrum, maintenance contractors	Accurate record of 'top-ups' from those facilities that Broadspectrum is managing. No data from in-house maintenance.
Scope 2	Electricity	Electricity consumed in offices	Meridian Australia and Meridian NZ	Records from billing system	Meridian Australia and Meridian NZ finance teams	Accurate records from the billing system. Start and end of year are partially estimated.
			Powershop NZ and Flux NZ	Billing system & landlord invoices	Powershop finance team	Accurate records from the billing system. Start and end of year are partially estimated. Calculated from the invoices.
		Electricity consumed in facilities	Meridian NZ and Meridian Australia	The electricity market reconciled consumption files	Meridian NZ finance team and GNR	Accurate records of electricity consumed. Manapouri based on derived value – there is no meter. Australia derived from energy generated less energy exported.

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Data collection unit	Methodology, data quality, uncertainty (qualitative)
Scope 3 Operational	Purchased goods and services (category 1)	Goods and services provided not otherwise included in categories below	All facilities	Emissions information provided by suppliers where available. Where not available \$ spend used.	20% (for Meridian NZ facility) 0% for all other facilities	Meridian key purchasers and sustainability team	Suppliers contacted for information on portion of their footprint attributable to activity performed on behalf of Meridian. Generally fuel use, electricity in office and travel. Service types: IT services, professional services, maintenance services, printing services. Where no supplier information available, \$ spend by service type x emission factor sourced from Motu.
Scope 3 Operational	Fuel related emissions (not Scope 1 or 2) (category 3)	Production & distribution of fuel	All facilities	Fuel invoices	0%	Finance teams	Calculated from amount of fuel purchased (and consumed) using emissions factors derived from LCA studies
		Transmission and distribution losses from electricity consumed in offices	Meridian Australia and Meridian NZ	Records from billing system	0%	Meridian Australia and Meridian NZ finance team	Accurate records from the billing system Start and end of year are partially estimated
			Powershop NZ and Flux NZ	Billing system & landlord invoices	0%	Powershop finance team	Accurate records from the billing system Start and end of year are partially estimated Calculated from the invoices
Scope 3 Operational	Upstream transportation and distribution (category 4)	Contractor fuel (operational maintenance and construction)	All facilities with relevant activity in reporting period	Contractor records	50%	Project managers	Estimates of the amount of fuel used Some information is provided by suppliers

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Data collection unit	Methodology, data quality, uncertainty (qualitative)
		Lines company energy emissions	Meridian NZ and Powershop NZ	Emissions information provided by suppliers where available. Where not available volume used.	20%	Meridian key purchaser and sustainability team	Companies contacted for information on portion of their footprint attributable to activity performed on behalf of Meridian (scope 1, 2 but excluding T&D losses, and scope 3 field services). Where no supplier information available, volume x emission factor used as proxy.
		Contractor fuel for retail meter reading and maintenance	Meridian NZ	Supplier estimates of distances Samples of jobs Samples of vehicle types used	100%	Retail Delta Vector AMS Wells ARC Metrix	Calculated using a formula of estimated distance x estimated emissions factor. The emission factors calculated FY18 were used again in FY19. Contractors estimate distance and the average type of vehicle used. The emissions factor is a weighted average of the vehicle types, calculated from emission factors provided by Defra.
		Couriers and postage	Meridian NZ	Supplier records	100%	NZ Post	Calculated by collating quantity of each NZ Post service used by Meridian then carbon emission value assigned for that service.
Scope 3 Operational	Waste (category 5)	Waste to landfill from offices	Meridian NZ	Actual weight of waste bins	100%	Broadspectrum	Waste bins weighed on a monthly basis

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Data collection unit	Methodology, data quality, uncertainty (qualitative)
		Waste to landfill from facilities	Meridian NZ	Actual weight of waste bins	100%	Broadspectrum	Waste bins weighed on a monthly basis
Scope 3 Operational	Business Travel (category 6)	Air travel (domestic and international)	All facilities	Purchase records (supplier data, internal purchasing systems)	100%	Meridian NZ Procurement team Travel providers Finance teams	Supplier records of flights ticketed (and not cancelled but excludes 'no shows') calculated by our suppliers integrated financial data warehouse and mid-office travel management systems. Outputs are calculated using the distances travelled by sector split into domestic, shorthaul and longhaul and longhaul split by class of travel. Distances are calculated using Great Circle Mapper ⁴
		Car travel (taxi and rideshare)	All facilities	Purchase records (supplier data, internal expense management system – Fraedom)	30%	Meridian NZ Procurement team. Uber Mevo	Records of expenditure for taxis. For rideshare except Mevo this is estimated based on distance travelled x average fuel efficiency of vehicle class (assumed to be hybrid Toyota Prius). Mevo provides exact emissions for travel in their vehicles. These emissions are offset 120% by Mevo. 100% are shown as offsets in inventory.
		Car travel (private vehicles)	All facilities with relevant activity in the reporting period	Odometer readings	100%	Vehicle operators	Estimated from accurate records of distance travelled x average fuel efficiency of vehicle class (small, medium or large)

⁴ www.gcmap.com

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Data collection unit	Methodology, data quality, uncertainty (qualitative)
		Hotel accommodation	All facilities	Purchase records (supplier data, internal purchasing systems)	100%	Meridian New Zealand Procurement team Travel providers Finance teams	Hotel nights provided by travel provider, by NZ, Australia and rest of world. Accommodation booked through purchasing card is excluded as it would be difficult and time consuming to calculate. This method of purchase is actively discouraged.
Scope 3 Operational	Employee commuting (category 7)	Travel to and from work (in private vehicles and public transport)	All facilities	Employee commuter survey	100%	Sustainability team	Survey asking staff to estimate own emissions from commuting. Emissions from multiple forms of transport estimated using https://mapmyemissions.com/home
Scope 3 Operational	Downstream leased assets (category 13)	Farming activities	Meridian NZ	Leaseholder	100%	Compliance and Property Relationship Manager Land and Property Advisor	For farms: Leaseholder provided estimates of key information on stock and other activities. Farming calculator used to estimate total emissions for each farm. For salmon farms: leaseholder provided key information. Emission factor applied to live weight of salmon.
Scope 3 One off	Capital goods (category 2)	Major construction and plant upgrade materials	All facilities with relevant activity in reporting period	Project records from manufacturer or design specifications	100%	Project Managers in GNR	Records of weights or volumes of major materials used in construction projects
	Upstream transportation and distribution (category 4)	Contractor fuel used during construction and significant upgrades	All facilities with relevant activity in reporting period	Contractor records	50%	Project Managers in GNR	Estimates of the amount of fuel used Some information is provided by suppliers

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Data collection unit	Methodology, data quality, uncertainty (qualitative)
		Freight of major materials	All facilities with relevant activity in reporting period	Project records	30%	Meridian project managers	Estimates of major materials used Calculated from weight of materials x distance travelled Some information is provided by suppliers
Scope 3 energy purchased and on-sold	Fuel related emissions (not Scope 1 or 2) (category 3)	Electricity purchased and on-sold	Meridian NZ	From internal records	0%	Meridian NZ GNR and Powershop finance team	Emissions calculated using the annual netting off methodology (see Section 11)
		Electricity purchased and on-sold	Meridian Australia	From internal records	0%	Meridian Australia finance team	Emissions calculated using the National Carbon Offset Standard administered by the Australian government
		Gas purchased and on-sold	Meridian Australia	From internal records	0%	Meridian Australia finance team	Emissions calculated using the National Carbon Offset Standard administered by the Australian government

9.1 Other emissions - PFCs

No operations within the Meridian Energy Group use perfluorocarbons (PFCs) therefore no holdings of PFCs are reported and no emissions from these sources are included in this inventory

9.2 Other emissions - CO₂ Emissions from the Combustion of Biomass

ISO 14064-1, 9.3.1 (g)

There was no combustion of biomass in the operations of the Meridian Group during the reporting period.

10 GHG Emissions Source Exclusions

ISO 14064-1, 9.3.1 (i)

The emissions sources below have been identified and excluded from this GHG emissions inventory. These emissions sources are considered not material to stakeholders, not material in the context of the inventory, and/or not technically feasible nor cost effective to be quantified at the present time.

Scope	Category	GHG emissions source	Facilities	Reason for exclusion	Size of exclusion (based on FY19 data, tCO ₂ e)	% of total Scope 1 & 2 estimated inventory
Scope 1	Stationary combustion	Testing of back-up generators	Powershop NZ, Flux NZ	Emissions from the testing of back-up generators from these facilities is estimated to be <i>de minimis</i>	5	0.2%
	Stationary combustion	Back-up generators when used in emergency situations	All facilities with relevant activity in reporting period	Additional emissions from use in emergency situations is estimated to be <i>de minimis</i>	17	0.53%
	Fugitive emissions	Fugitive emissions from fridges and vehicle AC systems	All facilities	Difficult to obtain the data, estimated to be <i>de minimis</i>	17	0.53%
Total					39	1.22%

Scope 3	Category	GHG emissions source	Facilities	Reason for exclusion
Scope 3	Purchased goods and services	Contracts for Differences for electricity	Meridian New Zealand	These contracts are financial instruments for managing Meridian's financial position and are not for physical generation. Therefore no emissions are created for these contracts.
Scope 3	Upstream transportation and distribution	Freight - courier packages and minor materials	Meridian Australia, Powershop NZ and Flux NZ.	Difficult to obtain the data, estimated to be <i>de minimis</i>
		Contractor fuel for retail meter reading and maintenance	Meridian Australia and Powershop NZ	
Scope 3	Waste	Office waste to landfill	Flux NZ and Powershop NZ	Difficult to obtain the data, estimated to be <i>de minimis</i>
		All other sources of waste	Meridian Australia	Difficult to obtain the data, estimated to be <i>de minimis</i>

11 Data collection, quantification and uncertainties

ISO 14064-1, 9.3.1 (m),(n)

Section 8 provides an overview of how data was collected for each GHG emissions source, the source of the data, and any uncertainties or assumptions made. Collection of information was centralised in the finance teams of each facility, however much of the information is sourced from the procurement team, project teams, suppliers and relevant individuals throughout the business.

All data was calculated using SoFi 6.14.2. This software uses a calculation methodology for quantifying the GHG emissions inventory using emissions source activity data multiplied by GHG emissions factors.

Except as stated, emission factors used were sourced from Ministry for the Environment (MfE, New Zealand)⁵ or Department of Environment, Food and Rural Affairs (Defra, United Kingdom)⁶. All calculations in this report are expressed in total tonnes of carbon dioxide equivalent as this is how most emissions factors are presented.

- Emission factors applied to electricity consumption in New Zealand are taken from the Ministry for the Environment prior to financial year 15/16. From financial year 16/17 onwards the, equivalent electricity consumption emission factors have been calculated from Ministry of Business, Innovation and Employment (MBIE)⁷ data. The emission source was changed due to more up-to-date data published by MBIE.
- Emissions factors for electricity consumption in Australia have been sourced from NGA released by the Australian Government (Department of the Environment and Energy), July 2018⁸
- The emissions factors for purchased goods and services have been sourced from Motu⁹
- The emissions factor for International Long Haul is a weighted average of the differing classes of travel taken, calculated by Meridian from emission factors provided by MfE and include radiative forcing.
- The annual netting off methodology is applied to electricity purchased and on-sold for the Meridian NZ facility. Under this methodology the difference between electricity generated by Meridian and the electricity supplied to its retail customers is calculated on an annual basis. This calculation includes an allowance for transmission losses in the national grid and is based on the amount purchased at the entry point for local network distribution thereby taking into account losses due to distribution. If, on an annual basis, the amount purchased is more than the amount supplied, Meridian reports the net difference as a source of scope 3 emissions. The emission factor applied is calculated after removing Meridian generation from the mix.

Quantities of each greenhouse gas are converted to tonnes CO₂e using the global warming potential from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4)¹⁰. The time horizon is 100 years.

⁵ Ministry for the Environment. Measuring emissions: A guide for organisations – 2019 detailed guide: Using Data and Methods from the 2016 Calendar Year. Wellington <https://www.mfe.govt.nz/publications/climate-change/measuring-emissions-guide-organisations-2019-detailed-guide>.

⁶ Department for Business, Energy & Industrial Strategy. UK Government Greenhouse gas reporting: conversion factors 2018. London <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018>

⁷ Ministry of Business, Innovation & Employment. a) Quarterly electricity and liquid fuel emissions data. b) Emission factors electricity. Wellington.

a) https://www.mbie.govt.nz/assets/Data-Files/Energy/energy-quarterly-statistics/q1-march-2019/f21f15a7f3/Quarterly_electricity_liquid_fuel_emissions_data.xlsx

b) <https://www.mbie.govt.nz/assets/Data-Files/Energy/7042baaf2c/emission-factors-electricity.csv>

⁸ Department of the Environment and Energy, 2018: National Greenhouse Accounting Factors – July 2018. Canberra

<https://www.environment.gov.au/system/files/resources/80f603e7-175b-4f97-8a9b-2d207146594a/files/national-greenhouse-accounts-factors-july-2018.pdf>

⁹ Romanos, Carl, Suzi Kerr and Campbell Will. 2014. "Greenhouse Gas Emissions in New Zealand: A Preliminary Consumption-Based Analysis," Motu Working Paper 14-05, Motu Economic and Public Policy Research. Wellington.

<https://motu.nz/our-work/environment-and-resources/emission-mitigation/emissions-trading/greenhouse-gas-emissions-in-new-zealand-a-preliminary-consumption-based-analysis/>

¹⁰ https://www.ipcc.ch/site/assets/uploads/2018/05/ar4_wg1_full_report-1.pdf

12 Impact of Uncertainty

ISO 14064-1, 9.3.1 (p)

There is some level of uncertainty associated with preparing a GHG inventory. To minimise this uncertainty source data has been selected from a verifiable source and any further uncertainty is detailed under sections 8, 10 & 11 and above. Where uncertainty exists in the data, a conservative estimation approach has been taken leading to over, rather than understating of emissions.

13 The Base Year Selected

ISO 14064-1, 9.3.1 (k)

The base year is 1 July 2018 to 30 June 2019. This provides the most recent benchmark against which Science Based Targets can be measured.

Previously the base year was FY12. For reporting purposes this year some comparisons will be made to FY12 where they are still relevant.

14 Changes to Historic Base Year

ISO 14064-1, 9.3.1 (l)

We recalculate our base year if any of the following applied:

- if emission factors changed substantially and were relevant to prior years (for example if the science behind a factor changed);
- if we bought or sold a business; or
- if we significantly changed the scope of what we were measuring in the value chain.

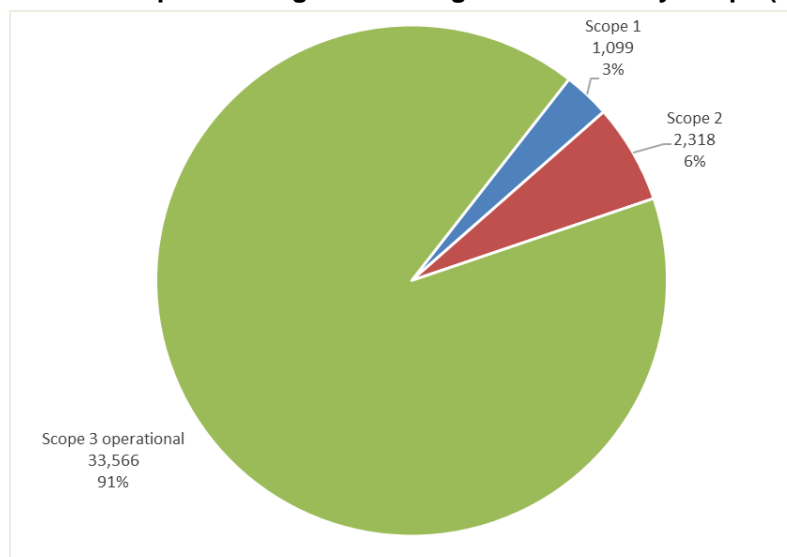
In FY19 we significantly changed the scope of what we were measuring in the value chain and committed to Science Based Targets.

15 GHG Emissions Calculations and Results

15.1 Total operational emissions by scope

Total operational GHG emissions for Meridian Group were 36,982 tCO₂e for the reporting period, shown by scope in the following graph.

Figure 2: Total operational greenhouse gas emissions by Scope (tCO₂e)



While the generation of electricity is Meridian New Zealand’s core business, there are no Scope 1 emissions from the generation of electricity as fuel sources are wind and water. Purchased goods and services make up nearly half (41%) of the Scope 3 operational emissions. The next highest category of Scope 3 operational emissions is upstream transportation and distribution (32%) followed by downstream leased assets (17%).

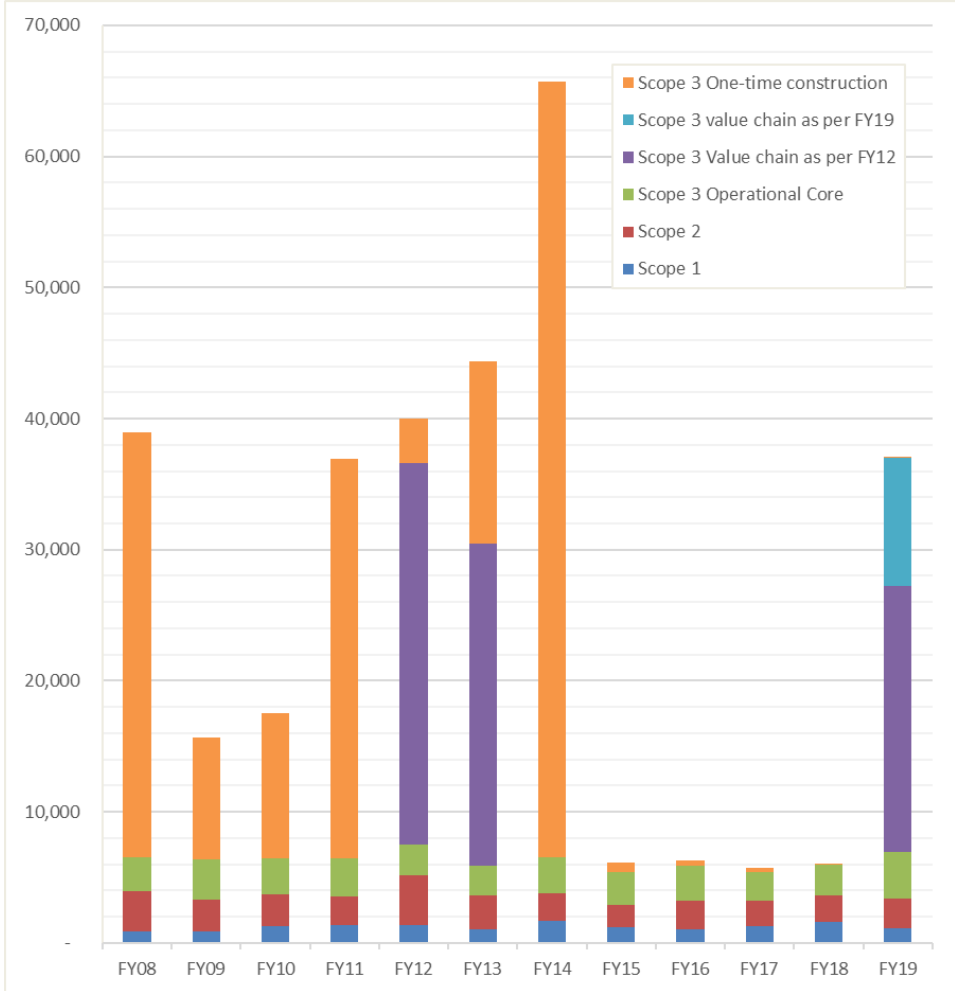
Note: operational emissions exclude one-time emissions and emissions from energy purchased and on-sold.

15.2 Total emissions by scope over time

This graph shows the total emissions by the group over time. It is broken into the following categories: Scope 1; Scope 2; Scope 3 Operational Core (as defined in FY08); Scope 3 value chain as defined in FY12; Scope 3 value chain as defined in FY19 and One-time construction. It illustrates the fluctuating nature of emissions from major construction projects. Emissions from energy purchased and on-sold (relevant to Meridian Australia) are excluded.

Overall operational core emissions (Scopes 1,2 and 3) are 6% higher in FY19 than they were in FY08, but are 6% lower than they were in FY12 when operational core emissions were at their highest.

Figure 3: Total Greenhouse Gas Emissions by Scope - Annual Comparison*



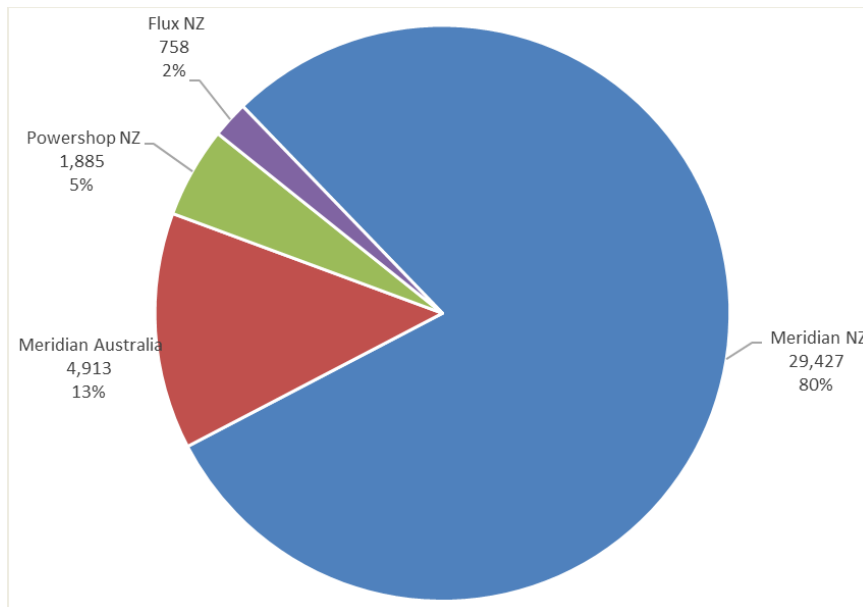
*excludes energy purchased and on-sold, due to the scale of this emissions source.

15.3 Total operational emissions by facility

The following graph show the total operational GHG emissions (tCO₂e) by facility in the reporting period.

The majority of operational emissions are from the Meridian NZ facility and are emissions from purchased goods and services. Emissions from this source are 50% of the total group operational emissions.

Figure 4 Total operational greenhouse gas emissions by facility (tCO₂e)



16 GHG Removals and Reductions

ISO 14064-1, 9.3.1 (h) and 9.3.2(j, k)

16.1 Removals

A greenhouse gas removal is defined by ISO 14064-1 as the “total mass of a greenhouse gas removed from the atmosphere over a specified period of time”. There are no removals quantified for this reporting period.

16.2 Emission Reductions / Increases

This year total Group operating emissions are 36,685 tCO₂e, a 506% increase on FY18. This year’s increase across all facilities can be attributed to increased measurement of scope 3 emissions within the group. 2018/19 has been defined as the new ‘base year’ for GHG reporting and as such no comparison to former base years has been included.

Total operational emissions by facility	2017/18 tCO ₂ e	2018/19 tCO ₂ e	tCO ₂ e change last year	% change last year
Meridian NZ	4,460	29,427	24,967	559.79%
Meridian Australia	1,327	4,913	3,585	270.17%
Powershop NZ	86	1,885	1,800	2101.64%
Flux	179	758	579	324.17%
Group	6,051	36,983	30,932	511.15%

17 GHG Offsets

ISO 14064-1, 9.3.3

There have been, or will be, a number of offsets applied to this inventory. The types of offsets applied are outlined below.

Total Offsets by Facility (tCO ₂ e)	Vendor Cancelled	Calendar Year Offsets	Gold Standard VERs	Not offset
Meridian NZ	2	64	29,361	68
Meridian Australia	0	612,659	4,076	0
Powershop NZ	0	0	1,885	0
Flux	0	0	758	0
Group	2	612,723	36,080	68

17.1 EKOS approved credits

1.974 tCO₂e was offset by Mevo on behalf of Meridian for all travel using Mevo vehicles in FY19. All Ekos carbon credits are sourced from their own indigenous forest carbon and conservation projects. These offsets are certified to international carbon standards. All credits sold by Ekos are cancelled on the New Zealand Emissions Trading Register (NZ) or Markit Environmental Registry (NY/London).

17.2 NCOS approved credits (calendar year)

Meridian Australia is certified carbon neutral against the National Carbon Offset Standard for the emissions associated with the running of its corporate business and the servicing of its windfarms and Powershop's retail electricity Australia-wide and its Victorian retail gas supply.

The CERs that are purchased are accredited under the UNFCCC Clean Development Mechanism. CERs can be from projects such as energy efficiency projects, those that involve the destruction of industrial pollutants or agricultural by-products and projects involving the destruction of landfill methane. In addition to purchasing these CERs, voluntary credits from Australian carbon offsetting projects are also purchased. No credits that are associated with palm oil production are purchased.

Reporting and surrender of credits for NCOS is by calendar year, therefore emissions reported in this inventory which occur in 2019 will be offset in the 2019 return. Those reported in this inventory which occurred in 2018 have been offset in the 2018 return. This was 620,996tCO₂e for FY19.

17.3 NZETS (calendar year)

Reporting and surrender of credits for the NZETS is by calendar year, therefore emissions reported in this inventory which occur in 2019 will be offset in the 2019 return. Those reported in this inventory which occurred in 2018 have been offset in the 2018 return. NZUs will be surrendered to the NZ Government for the 63.84tCO₂e arising from SF₆ top ups in Meridian NZ facility in FY19.

17.4 Gold Standard VERs

Meridian will surrender Gold Standard VERs for its group operational emissions for the FY19 year excluding any offsets which have been, or will be, surrendered as identified above. The 36,619 tCO₂e remaining will be offset.

18 Liabilities – GHG Stocks Held

GHG holdings	Meridian NZ	Meridian Australia	Powershop NZ	Flux NZ	2018/19 kg	2018/19 tCO ₂ e
HFC gas holdings [kg]	779	27	60	nm	866	1,707
SF6 holdings [kg]	2,157	197	n/a	n/a	2,354	53,664

The Meridian NZ facility has holdings of sulphur hexafluoride (SF₆) gas. The bulk of the gas is held in 220kV circuit breakers and current transformers with small amounts being held in 110kV, 33KV and 22kV switchgear. No SF₆ is known to be held in fire extinguishing systems. Meridian's current management practices in relation to SF₆ are well aligned with best practice as defined by the Cigré and IEC publications¹¹. SF₆ is also present in switchgear in Meridian Australia.

For the Flux facility the liability from HFCs from refrigerators has been estimated to be well below the *de minimis* threshold of 1% and the liability is not reported here.

19 Compliance with ISO 14064-1

ISO 14064-1, 9.3.1 (r)

This GHG inventory report for the year ending 30 June 2019 has been prepared in accordance with ISO 14064-1. A reporting index is provided in Appendix Three.

20 Audit of the GHG Inventory

ISO 14064-1, 9.3.1 (s)

This GHG inventory report has been audited by Deloitte, a third party independent assurance provider. A reasonable level of assurance has been given over the assertions and quantification included in this report. Deloitte is also the financial auditor of Meridian Energy Limited on behalf of the Office of the Auditor General.

21 Description of Additional Indicators

ISO 14064-1, 9.3.2 (g)

No additional indicators have been presented in this GHG inventory.

22 Assessment of Performance against Relevant Benchmarks

ISO 14064-1, 9.3.2 (h)

No assessment of performance against relevant benchmarks is presented in this GHG inventory.

¹¹ *SF6 Recycling Guide Re-Use of SF6 Gas in Electrical Power Equipment and Final Disposal* Cigré Task Force 23.10.01 G Mauthe et al, August 1997

IEC 1634 Technical Report Type 2 'High-Voltage Switchgear and Controlgear – Use and Handling of SF6 in High Voltage Switchgear and Control Gear', 1995

IEC 480 'Guide to the Checking of Sulphur Hexafluoride (SF6) Taken from Electrical Equipment', 1976

Appendix 1 – Meridian Group treatment of emissions

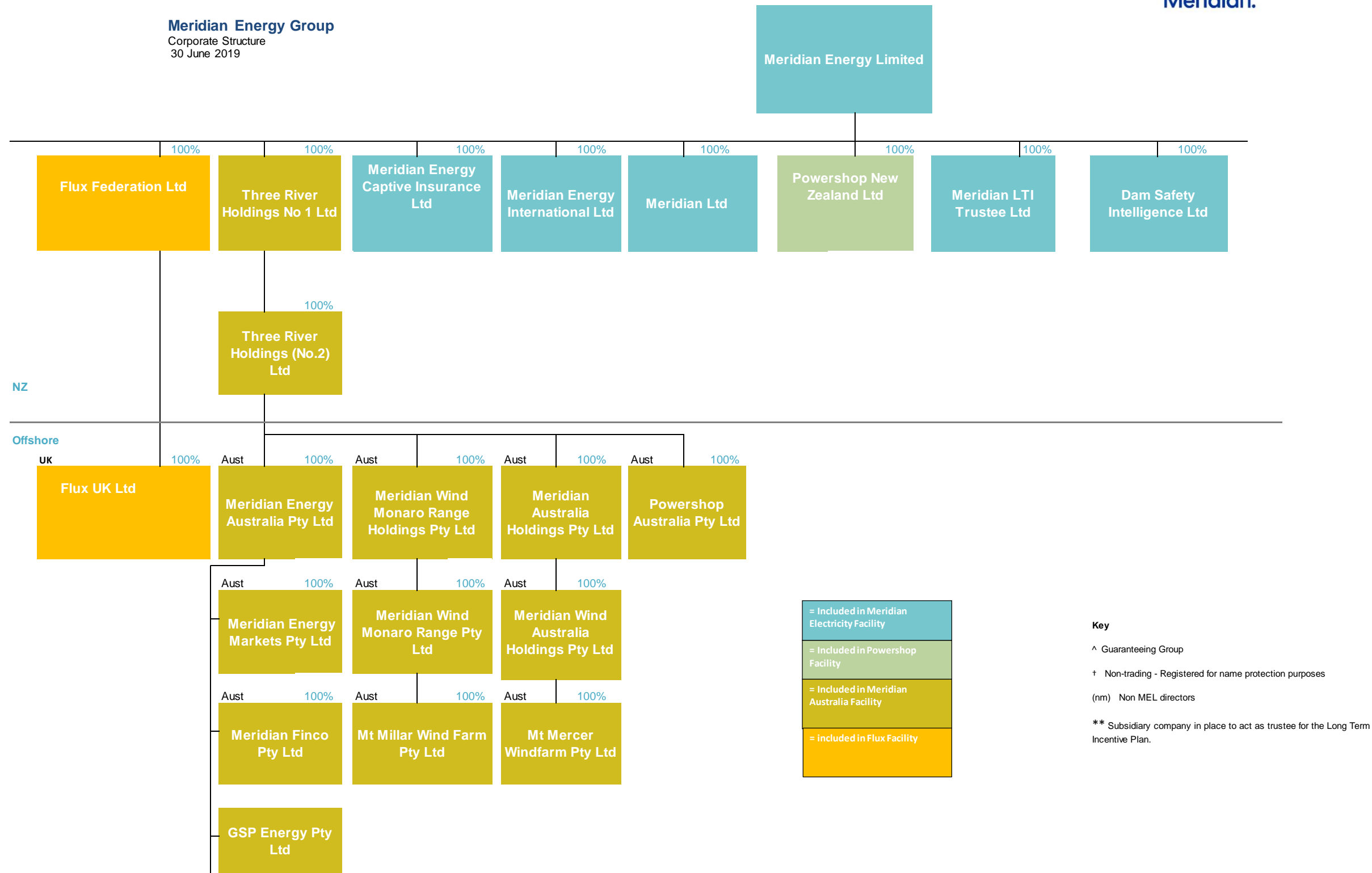
Meridian Energy treatment of emissions from subsidiaries, associates, joint ventures and investments as at 30 June 2019.

Company Name	Emissions source?	Legal structure and partners	Economic interest held by MEL	Country	Operational control	Comment	
Meridian Energy Limited (MEL)	Yes	Parent company	100%	NZ	Yes	Included in Meridian NZ facility	
Meridian Energy Captive Insurance Limited	No (non-trading entity)	Group companies / subsidiaries	100%	NZ	Yes	No activity, therefore no emissions	
Meridian LTI Trustee Limited	No (non-trading entity)	Group companies / subsidiaries	100%	NZ	Yes	No activity, therefore no emissions	
Meridian Energy International Limited	No (non-trading entity)	Group companies / subsidiaries	100%	NZ	Yes	No activity, therefore no emissions	
Meridian Limited	No (non-trading entity)	Group companies / subsidiaries	100%	NZ	No	No activity, therefore no emissions	
Dam Safety Intelligence Limited	Yes	Group companies / subsidiaries	100%	NZ	Yes	Included in Meridian NZ facility	
Three River Holdings (No 1) Limited	No (holding company)	Group companies / subsidiaries	100%	NZ	Yes	No activity, therefore no emissions	
Three River Holdings (No 2) Limited	No (holding company)	Group companies / subsidiaries	100%	via Three River Holdings (No 1) Ltd	NZ	Yes	No activity, therefore no emissions
Meridian Energy Australia Pty Ltd	Yes	Group companies / subsidiaries	100%	via Three River Holdings (No 2) Ltd	AUS	Yes	Included in Meridian Australia facility
Meridian Energy Markets Pty Ltd	No (holding company)	Group companies / subsidiaries	100%	via Meridian Energy Australia Pty Ltd	AUS	Yes	No activity, therefore no emissions (holds our trading licences)
Meridian Finco Pty Ltd	No (non-trading entity)	Group companies / subsidiaries	100%	via Meridian Energy Australia Pty Ltd	AUS	Yes	No activity, therefore no emissions
GSP Energy Pty Ltd	Yes	Group companies / subsidiaries	100%	via Meridian Energy Australia Pty Ltd	AUS	Yes	Included in Meridian Australia facility
Meridian Wind Monaro Range Holdings Pty Limited	No (holding company)	Group companies / subsidiaries	100%	via Three River Holdings (No 2) Ltd	AUS	Yes	No activity, therefore no emissions
Meridian Wind Monaro Range Pty Limited	No (non-trading entity)	Group companies / subsidiaries	100%	via Meridian Wind Monaro Range Holdings Pty Limited	AUS	Yes	No activity, therefore no emissions
Mt Millar Wind Farm Pty Ltd	Yes	Group companies / subsidiaries	100%	via Meridian Wind Monaro Range Pty Limited	AUS	Yes	Included in Meridian Australia facility
Meridian Australia Holdings Pty Limited	No (holding company)	Group companies / subsidiaries	100%	via Three River Holdings (No 2) Ltd	AUS	Yes	No activity, therefore no emissions
Meridian Wind Australia Holdings Pty Ltd	No (holding company)	Group companies / subsidiaries	100%	via Meridian Australia Holdings Pty Ltd	AUS	Yes	No activity, therefore no emissions
Mt Mercer Windfarm Pty Limited	Yes	Group companies / subsidiaries	100%	via Meridian Wind Australia Holdings Pty Ltd	AUS	Yes	Included in Meridian Australia facility (Mt Mercer wind farm)
Powershop Australia Pty Ltd	Yes	Group companies / subsidiaries	100%	via Three River Holdings (No 2) Ltd	AUS	Yes	Included in Meridian Australia facility
Powershop New Zealand Limited	Yes	Group companies / subsidiaries	100%		NZ	Yes	Included in Powershop NZ facility
Flux Federation Limited	Yes	Group companies / subsidiaries	100%		NZ	Yes	Included in Flux NZ facility
Flux UK Limited	No	Group companies / subsidiaries	100%	via Flux Federation Ltd	UK	Yes	No activity, therefore no emissions

Appendix 2 – Meridian Energy Group Structure



Meridian Energy Group
Corporate Structure
30 June 2019



Appendix 3 – ISO 14064-1 Reporting Index

ISO Reporting	Section in this report	ISO Reporting	Section in this report
9.3.1 (a)	Section 3	9.3.1 (l)	Section 14
9.3.1 (b)	Section 4	9.3.1 (m)	Section 9
9.3.1 (c)	Section 5	9.3.1 (n)	Section 11
9.3.1 (d)	Section 6	9.3.1 (o)	Section 11
9.3.1 (e)	Section 11	9.3.1 (p)	Section 12
9.3.1 (f)	Table 4	9.3.1 (q)	Section 12
9.3.1 (g)	Section 9	9.3.1 (r)	Section 19
9.3.1 (h)	Section 16	9.3.1 (s)	Section 20
9.3.1 (i)	Section 10	9.3.1 (t)	Section 11
9.3.1 (j)	Table 2		
9.3.1 (k)	Section 13		
9.3.2 (a)	Section 3	9.3.2 (g)	Section 21
9.3.2 (b)	Section 16	9.3.2 (h)	Section 22
9.3.2 (c)	Section 16	9.3.2 (i)	Section 7
9.3.2 (d)	not applicable	9.3.2 (j)	Section 16
9.3.2 (e)	Table 2	9.3.2 (k)	Section 16
9.3.2 (f)	Table 2		
9.3.3	Section 17		
