

Greenhouse Gas Emissions Inventory Report

INVENTORY SCOPE: MERIDIAN GROUP (ALL FACILITIES)
INVENTORY PERIOD: FOR THE PERIOD 1 JULY 2021 TO 30 JUNE 2022
VERSION: FINAL
AUDIT STATUS: ASSURED



Meridian.

The Power to
Make a Difference.

Prepared by: Rob Gillespie, Commercial Carbon Accountant
Judy Ryan, Carbon Accountant

Reviewed by: Tina Frew, Head of Sustainability
Claire Shaw, GM Corporate Affairs and Sustainability

Final review by:



Phillip Green
Commercial Support Manager

Approved by:



Mike Roan
Chief Financial Officer

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.

No part of this work covered by copyright may be reproduced or copied in any form or by any means (graphic, electronic or mechanical, including photocopying, recording, taping, information retrieval systems, or otherwise) without the written permission of the copyright holder.

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.

Contents

Greenhouse gas emissions inventory summary	4
1 Introduction.....	9
2 Statement of intent	9
3 Description of Meridian.....	10
4 Persons responsible.....	11
5 Reporting period covered.....	11
6 Organisational boundaries	12
7 Information management procedures.....	14
8 Operational boundaries	15
9 Summary of emission source inclusions	16
10 GHG emissions source exclusions.....	21
11 Data collection and quantification	22
12 Impact of uncertainty.....	23
13 Base year selected.....	23
14 Changes to historic base year.....	23
15 GHG emissions calculations and results	24
16 GHG removals and reductions.....	27
17 Assessment of performance against relevant benchmarks.....	30
18 GHG offsets.....	31
19 Description of additional indicators	32
20 Liabilities – GHG stocks held	32
21 Compliance with ISO 14064-1.....	33
22 Audit of the GHG inventory.....	33
Appendix 1 – Meridian Group treatment of emissions.....	34
Appendix 2 – Meridian Energy Group structure	34
Appendix 3 – ISO 14064-1 reporting index	35
Independent reasonable assurance report to the board of directors of Meridian Energy Limited	36

Greenhouse gas emissions inventory summary

ISO 14064-1, 9.3.2 (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	792	792	0
	Scope 2 (market based)	35	35	0
	Scope 3 operational	31,881	31,881	0
	Subtotal	32,708	32,708	0
Energy purchased & on-sold*				
	New Zealand electricity	0	0	0
	Australia electricity and gas	521,642	521,642	0
		521,642	521,642	0
One-time construction				
	Scope 3 one-time construction	8,243	0	8,243
		8,243	0	8,243
Total Group value chain emissions (S1, 2 & 3)***		562,593	554,350	8,243

[^]Group includes Meridian Australia to 31 Jan 2022 only.

*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 Climate Active Carbon Neutral Standard (Climate Active) administered by the Australian government.

**Offsets include credits cancelled by suppliers against their own emissions, credits purchased to fulfil Australia's Climate Active commitments, and Gold Standard Voluntary Emission Reductions (GS VERs) for the balance. For details on offsets see [Section 18](#).

***Total emissions are calculated using the market-based methodology for Scope 2 emissions. [Section 11.1](#) explains this.

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

ISO category	Sub category	Meridian NZ	Meridian Australia^ (to 31-Jan-22)	Flux NZ	2021/22 tCO ₂ e
Direct emissions					
	Stationary combustion	28	33	nm	60
	Mobile combustion	612	60	1	673
	Fugitive emissions	2	56	nm	58
Total direct emissions		642	149	1	792
Indirect emissions from imported energy					
	Electricity consumption (location based)*	1,758	336	3	2,097
	Electricity consumption (market based)**	1	33	1	35
Subtotal (market based)***		1	33	1	35
Indirect emissions from transportation					
	Production and distribution of fuel	145	14	0	159
	Contractor fuel	5,499	32	n/a	5,531
	Freight	526	2	0	528
	Business travel inc contractors	442	2	127	571
	Employee commuting	152	11	3	166
Subtotal		6,764	61	130	6,955
Indirect emissions from use of products and services purchased					
	Purchased goods and services	9,937	1,411	776	12,124
	Capital goods	2,670	0	n/a	2,670
	Transmission and distribution losses	16	5	0	21
	Transmission and lines services	13,190	nm	nm	13,190
	Waste	238	41	1	280
	Working from home	69	64	11	144
Subtotal		26,120	1,521	788	28,429
Indirect emissions from use of products and services sold					
	Electricity purchased and onsold	0	460,761	n/a	460,761
	Gas purchased and onsold	n/a	60,881	n/a	60,881
Subtotal		0	521,642	0	521,642
Indirect emissions from other sources					
	Downstream leased assets (farms)	4,740	n/a	n/a	4,740
Subtotal		4,740	0	0	4,740
Total indirect emissions***		37,625	523,256	919	561,801

^Meridian Australia was sold effective 31-Jan-22. Emissions are included for the 7 months to 31-Jan-22.

*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 Climate Active certified carbon neutral retail electricity product for their own use, and Meridian NZ uses their own 100% certified renewable energy.

***Total indirect emissions are calculated using the market-based methodology for Scope 2 emissions. [Section 11.1](#) explains this.

nm : not measured

n/a : not applicable

Table 3: Greenhouse gas emissions by business activity and scope

Business activity	Category	Meridian NZ	Meridian Australian [^] (to 31-Jan-22)	Flux NZ	2021/22 tCO ₂ e
Operational emissions direct emissions (Scope 1)	Stationary combustion	28	33	nm	61
	Fuel used in electricity generation	0	0	n/a	0
	Backup generators	28	31	nm	59
	Gas consumption in offices	n/a	2	n/a	2
	Mobile combustion	612	60	1	673
	Boat travel	213	n/a	n/a	213
	Car travel	399	60	1	460
	Fugitive emissions	2	56	nm	58
	HFCs	2	0	nm	2
	SF6	0	56	n/a	56
	Subtotal Scope 1	642	149	1	792
Operational emissions indirect emissions (Scope 2)	<i>Electricity consumption (location based)</i>	1,758	336	3	2,097
	<i>Facilities (location based)</i>	1,676	294	n/a	1,970
	<i>Offices (location based)</i>	81	42	3	126
	<i>Vehicles (location based)</i>	1	0	0	1
	<i>Electricity consumption (market based)</i>	1	33	1	35
		Subtotal Scope 2 (market based)*	1	33	1

[^]Meridian Australia was sold effective 31-Jan-22. Emissions are included for the 7 months to 31-Jan-22.

Business activity	Category	Meridian NZ	Meridian Australian^ (to 31-Jan-22)	Flux NZ	2021/22 tCO ₂ e
Operational indirect emissions (Scope 3)	Purchased goods and services	9,937	1,411	776	12,124
	IT Services	851	38	222	1,111
	Maintenance Services	4,207	386	5	4,598
	Office Services	540	332	5	877
	Professional Services	4,339	655	544	5,538
	Fuel- and energy-related activities	717	52	0	769
	Production and distribution of fuel	145	14	0	159
	T&D losses from office electricity	16	5	0	21
	T&D losses from office gas	n/a	0	n/a	0
	Contractor fuel (meter reading)	171	nm	n/a	171
	Contractor fuel (maintenance)	385	33	n/a	418
	Upstream transportation and distribution	13,226	2	0	13,228
	Couriers and postage	36	2	0	38
	Lines operational	10,000	nm	n/a	10,000
	Transmission operational	3,190	nm	n/a	3,190
	Waste generated in operations	102	41	1	143
	Waste to landfill	99	40	1	140
	Waste sent to recycling	3	0	0	3
	Business travel	438	2	127	567
	Air travel	394	2	124	520
	Taxis and rideshare	8	0	0	8
	Hotel accommodation	36	0	3	39
	Employee commuting	221	75	14	310
	Employee commuting	152	11	3	166
	Working from home	69	64	11	144
	Downstream leased assets (farms)	4,740	n/a	n/a	4,740
Subtotal Scope 3 operational		29,381	1,582	918	31,881
Total operational emissions (S1, 2 & 3) (market based)		30,024	1,764	920	32,708
Energy purchased and on-sold** indirect emissions (Scope 3)	Fuel- and energy-related activities	0	521,642	n/a	521,642
	Electricity purchased and onsold	0	460,761	n/a	460,761
	Gas purchased and onsold	n/a	60,881	n/a	60,881
Subtotal Scope 3 energy on-sold		0	521,642	n/a	521,642
One-time construction indirect emissions (Scope 3)	Capital goods	2,670	0	n/a	2,670
	Construction services	5,573	0	n/a	5,573
	Contractor fuel	4,942	0	n/a	4,942
	Contractor air travel	4	0	n/a	4
	Freight of major materials	490	0	n/a	490
	Waste to landfill	136	0	n/a	136
Waste sent to recycling	1	0	n/a	1	
Subtotal Scope 3 one-time construction		8,243	0	n/a	8,243
Total emissions (S1, 2 & 3) (market based)		38,267	523,406	920	562,593
<i>Total emissions (S1, 2 & 3) (location based)</i>		<i>40,024</i>	<i>523,709</i>	<i>922</i>	<i>564,655</i>

^Meridian Australia was sold effective 31-Jan-22. Emissions are included for the 7 months to 31-Jan-22.

*Total emissions are calculated using the market-based methodology for Scope 2 emissions. [Section 11.1](#) explains this.

**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 Climate Active Carbon Neutral Standard (Climate Active) administered by the Australian government.

nm : not measured
n/a : not applicable

ISO 14064-1, 9.3.1 (f)

Table 4: Total greenhouse gas emissions by greenhouse gas

Greenhouse gas	Meridian NZ	Meridian Australia^ (to 31-Jan-22)	Flux NZ	2021/22 tCO ₂ e
Scope 1				
CO ₂	629	92	1	722
CH ₄	1	0	0	1
N ₂ O	10	1	0	11
HFCs	2	0	nm	2
SF ₆	0	56	n/a	56
Subtotal	642	149	1	792
Scope 2 (location based)				
CO ₂	1,708	336	3	2,047
CH ₄	46	0	0	46
N ₂ O	4	0	0	4
Subtotal	1,758	336	3	2,097
Scope 3				
CO ₂	6,482	56,392	134	63,008
CH ₄	18	110	1	129
N ₂ O	98	33	1	132
tCO ₂ e*	31,026	466,689	782	498,497
Subtotal	37,624	523,224	918	561,766
Total (location based)	40,024	523,709	922	564,655

^Meridian Australia was sold effective 31-Jan-22. Emissions are included for the 7 months to 31-Jan-22.

*gas is reported as tCO₂e where no breakdown of the emission factor by gas is available

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 14064-1². 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.

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

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

² International 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).

3 Description of Meridian

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

Meridian is New Zealand's largest electricity generator through our five wind farms, seven hydro power stations, and commercial solar arrays. Meridian sells electricity to our customers through two brands in New Zealand - Meridian and Powershop. Meridian sold its Australian subsidiary - Meridian Energy Australia - during the year. The Australian operations consisted of two wind farms and three hydro power stations. Energy was sold to customers through the Powershop brand in Australia.

The Meridian Energy Group of companies is made up of:

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

The Meridian Group 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 2022 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 purpose is **Clean energy for a fairer and healthier world**. Four years ago, we identified two United Nations Sustainable Development Goals (SDGs) as being most relevant to our business and in 2021 expanded our focus on recognition of our wider impacts and evolved business context – you can learn more about this in our [Sustainability Policy](#). We apply the objectives of these Goals and align our efforts to the underlying targets where we believe we can make the biggest difference.

In support of these goals, we have Greenhouse Gas Emissions Measurement and Reduction Guidelines, first approved by Meridian's Executive Team in June 2009 – last revised and approved in June 2022. 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.

"Half by 30" is a target within our business to reduce gross operational emissions by half by FY30 from a FY21 baseline excluding one-off emissions from the major maintenance and construction of renewable energy generation assets. This year we restated our baseline to FY21 (Meridian Australia emissions excluded), from FY19, to ensure the most recent GHG inventory was used in support of seeking verification that our target is science-aligned, as preferred by Science Based Target initiative (SBTi). The baseline year restatement has not decreased the emissions abatement effort required.

We seek to minimise one-off construction emissions associated with renewable energy generation assets by project specific KPIs, including for suppliers. For example, the Harapaki wind farm currently under construction includes a range of KPIs address emissions reporting, emission reduction initiatives, the adoption of continuous improvement initiatives etc.

This year, we developed a Group Half by 30 roadmap that is now embedded in our [Climate Action Plan](#). The roadmap includes six areas of focus, all three scopes of activity and three horizons with targets that together form our plan to deliver on our Half by 30 commitment.

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:

- Tina Frew, Head of Sustainability;
- Judy Ryan, Carbon Accountant;
- Rob Gillespie, Commercial Carbon Accountant;
- Phillip Green, Commercial Support Manager;
- Criggy Haas, Sustainability Lead
- Claire Keeling, Sustainability Lead
- Ewan Gestro, Commercial Insight Manager (electricity generation, purchases and power station electricity data Meridian NZ);
- Julie Carcaterra Barnes and Jamie Bishop, APX Travel Management (air and rental car travel data Meridian NZ);
- Andrea Savage, Custom Fleet (fleet vehicle travel and fuel data Meridian NZ);
- Kevin Klein, Market Ops and Transformation Lead (office electricity consumption data Meridian NZ and Powershop);
- Sarah Grimes, Finance Analyst - Hydro (one-time emissions sources Meridian NZ)
- Phil Edmonds, Electrical Engineer (Meridian NZ SF₆);
- Rebekah Peni, Niche FM (office waste and air conditioning Meridian NZ);
- Victoria Kladouhos (All Meridian Australia emissions);
- Rachel Lagan, Office Manager (Powershop);
- Office Manager (Flux);
- Ryan Black, Reconciliations and Settlement Manager (Brooklyn wind turbine generation and consumption, lines company load)
- Paul Lloyd, Hydro Maintenance Manager (boat fuel consumption)
- Lloyd Clark, Environment and Sustainability Manager (Harapaki construction emissions)
- Damien Rillstone, Team Manager - Tech Support, Meter Reading & Field Services Data Meridian NZ.

5 Reporting period covered

ISO 14064-1, 9.3.1 (c)

This GHG inventory report covers the financial year 1 July 2021 to 30 June 2022.

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 2022.

For further information about the organisation please refer to the [Meridian Energy Limited FY22 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:

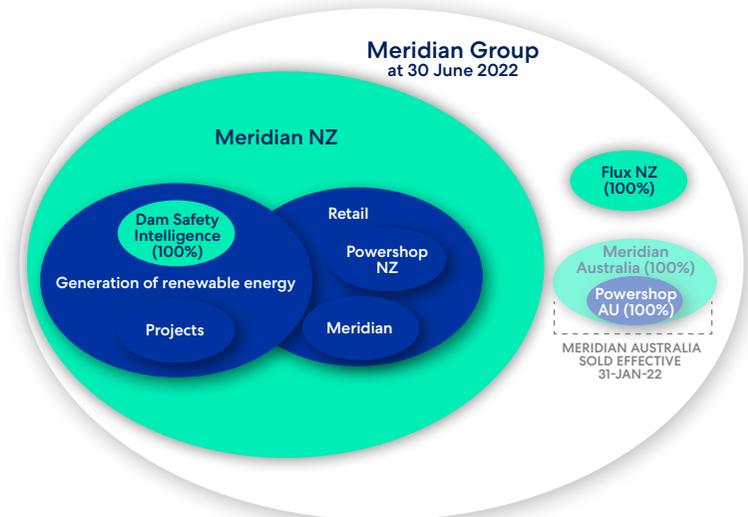
“a single installation, set of installations or production processes (stationary or mobile), which can be defined within a single geographical boundary, organizational unit or production process”³

³ ISO 14064-1:2018(E) section 3.4.1

For the year ended 30 June 2022 these facilities are: Meridian NZ, Flux NZ, and Meridian Australia as illustrated in the following diagram. Meridian Australia was sold effective 31 January 2022.

The sale means seven months of emissions have been included for this year and it will be removed from the inventory from FY23 onwards. Emissions from Meridian Australia have not been included in section 15 (GHG emissions calculations and results), section 16 (GHG removals and reductions) and section 17 (assessment of performance against relevant benchmarks).

Figure 1: Facilities comprising the Meridian Group



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 generated 13,557 GWh of electricity, supplied around 248,376 customer connections at 30 June 2022. Powershop conducts energy retailing activities within Powershop New Zealand Limited under the Powershop brand and supplied around 116,970 customer connections at 30 June 2022. 882 people were employed by Meridian New Zealand at 30 June 2022.</p> <p>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 New Zealand Ltd (non-trading) <p>Further information about Meridian can be found at www.meridianenergy.co.nz and Powershop can be found at www.powershop.co.nz.</p>
Meridian Australia	<p>Meridian Australia was sold during the year. The sale was effective from 31-Jan-22. Seven months of emissions are included in this inventory report. Meridian carried out generation and retailing of electricity and gas activities in Australia. In the FY21 year Meridian Australia generated 740 GWh of electricity, employed 88 people and supplied around 142,029 electricity and around 43,905 gas customer connections through the Powershop brand.</p>
Flux NZ	<p>Flux provides electricity retailing software to Powershop New Zealand, Powershop Australia and Meridian NZ. It licences the Powershop brand and operating model. Flux employed 125 people at 30 June 2022. 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 www.fluxfederation.com.</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 June 2022. 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 ESP CSR software database and reviewed by the GHG accounting team;

- Emissions factors and conversion factors in ESP CSR are maintained by Meridian Energy and ESP CSR;
- 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.

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.

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 market 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 3.

9 Summary of emission source inclusions

ISO 14064-1, 9.3.1 (g, m)

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

Scope	Category	GHG emissions source	Facilities included	Data source	Methodology, data quality, uncertainty (qualitative)	
Scope 1	Stationary combustion	Fuel used for electricity generation	Meridian NZ and Meridian Australia	No fuel consumed	There were no emissions from the 13,557 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.	Consumption estimated by asset management team based on regular testing regime.	
		Gas consumption in offices	All facilities	Finance system and invoices from supplier	Accurate records from the billing system. Start and end of year are partially estimated.	
	Mobile combustion	Car travel (owned, leased, rented)		All facilities	GPS generated odometer readings, fuelcard purchase data, rental provider activity reports, and taxi expenditure data	Start/end odometer data (rental vehicles) for distance travelled x average fuel efficiency of vehicle (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.
		Fugitive emissions	Fugitive emissions from SF ₆	Meridian NZ, Meridian Australia	Maintenance records	Records of storage cylinder weights and top-ups in NZ. Estimated storage cylinder weights and top-ups in Australia.
	Fugitive emissions from air-conditioning systems		All facilities	Maintenance records	Records from service providers who maintain and top up units.	

Scope	Category	GHG emissions source	Facilities included	Data source	Methodology, data quality, uncertainty (qualitative)
Scope 2	Electricity	Electricity consumed in offices	Meridian Australia and Meridian NZ	Records from billing system	Accurate records from the billing system.
			Flux NZ	Billing system & landlord invoices	Accurate records from the billing system.
		Electricity consumed by vehicles	All facilities	GPS generated odometer readings	NZ vehicles are calculated from kWh of electricity purchased on fuelcards. Australia kilometres travelled from fleet management system.
		Electricity consumed in facilities	Meridian NZ and Meridian Australia	The electricity market reconciled consumption files	Accurate records of electricity consumed by Meridian NZ facilities. Meridian Australia facilities derived from energy generated less energy exported.

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	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.	23%	All major suppliers (spend >\$250k in year) 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, office services. Where no supplier information available, \$ spend by service type x emission factor sourced from Motu (inflation adjusted).
Scope 3 operational	Fuel related emissions (not Scope 1 or 2) (category 3)	Production & distribution of fuel	All facilities	Fuel invoices	100%	Calculated from amount of fuel purchased (and consumed) using emission factors sourced from DBEIS.
			Meridian Australia and Meridian NZ	Records from billing system	0%	Accurate records from the billing system. Start and end of year are partially estimated.
		Flux NZ		Billing system & landlord invoices	0%	Accurate records from the billing system. Start and end of year are partially estimated. Calculated from the invoices.
		Contractor fuel (operational maintenance and construction)	All facilities with relevant activity in reporting period	Contractor records	90%	Estimates of the amount of fuel used. Some information is provided by suppliers.
Contractor fuel for retail meter reading and maintenance	Meridian NZ	Supplier estimates of distances Samples of jobs Samples of vehicle types used	85%	Calculated using a formula of estimated distance x estimated emissions factor. 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. One contractor provides fuel used information.		

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Methodology, data quality, uncertainty (qualitative)
Scope 3 operational	Upstream transportation and distribution (category 4)	Lines company operational emissions	Meridian NZ	Emissions information provided by suppliers where available.	61%	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). Company reporting periods may not match Meridian's reporting period, no adjustments are made to account for this. Where no supplier information available, volume x emission factor used as proxy.
		Transmission company operational emissions	Meridian NZ	Emissions information provided by supplier	100%	Company contacted for information on portion of their footprint attributable to activity performed on behalf of Meridian (scope 1, 2 excluding T&D losses, and scope 3 maintenance).
		Couriers and postage	All facilities	Emissions information provided by suppliers where available. Where not available \$ spend used.	94%	Calculated by collating quantity of each service used then carbon emission value assigned for that service. Where no supplier information available, \$ spend x emission factor sourced from Motu (inflation adjusted).
Scope 3 operational	Waste (category 5)	Waste to landfill and recycling from offices and facilities	All facilities	Actual weight of waste bins. Supplier records	100%	Waste bins weighed on a monthly basis from some site suppliers. If weight unavailable, full bins are assumed each time they are emptied. Estimation for Flux NZ based on Meridian NZ data.

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Methodology, data quality, uncertainty (qualitative)
Scope 3 operational	Business travel (category 6)	Air travel (domestic and international)	All facilities	Purchase records (supplier data, internal purchasing systems)	100%	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.
		Car travel (taxi and rideshare)	All facilities	Purchase records (supplier data, internal expense management system – Fraedom)	50%	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 this inventory.
		Hotel accommodation	All facilities	Purchase records (supplier data, internal purchasing systems)	60%	Hotel nights provided by travel provider, by NZ, Australia and rest of world. NZ data is extrapolated to find an average room night cost, and then multiplied against total hotel spend from PCard system to determine total room nights, for bookings made outside of travel provider.
Scope 3 operational	Employee commuting (category 7)	Travel to and from work (in private vehicles and public transport)	All facilities	Employee commuter survey	100%	Staff for surveyed in Q4 of FY22. They recorded typical commuting journeys with vehicle type and distance. A third party calculated the annual emissions from this activity. Adjustments were made for lockdown periods during the year. Meridian Australia was estimated based on FY21 data.
		Working from home	All facilities	Employee commuter survey	100%	Staff were surveyed in Q4 of FY22. This survey noted their typical work from home routine. Adjustments were made for lockdown periods during the year. Meridian Australia was estimated based on FY21 data.

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Methodology, data quality, uncertainty (qualitative)
Scope 3 operational	Downstream leased assets (category 13)	Farming activities	Meridian NZ	Leaseholder	100%	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 on energy use on site. For one farm, half year data factored up for full year use.
Scope 3 one-time construction	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%	Records of weights or volumes of major materials used in construction projects provided by project managers.
	Upstream transportation and distribution (category 4)	Contractor fuel used during construction and significant upgrades	All facilities with relevant activity in reporting period	Contractor records	100%	Estimates of the amount of fuel used provided by project managers. Some information is provided by suppliers.
		Freight of major materials	All facilities with relevant activity in reporting period	Project records	100%	Estimates of major materials used calculated from weight of materials x distance travelled provided by project managers. 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%	Emissions calculated using the annual netting off methodology (see Section 11).
		Electricity purchased and on-sold	Meridian Australia	From internal records	0%	Emissions calculated using the Climate Active Carbon Neutral Standard administered by the Australian government.
		Gas purchased and on-sold	Meridian Australia	From internal records	0%	Emissions calculated using the Climate Active Carbon Neutral Standard administered by the Australian government.

9.1 Other emissions - PFCs & NF₃

No operations within the Meridian Group use perfluorocarbons (PFCs) or Nitrogen Trifluoride (NF₃) 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

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	Estimated size of exclusion tCO ₂ e	% of total Scope 1 & 2 FY22 inventory
Scope 1	Stationary combustion	Testing of back-up generators	Flux NZ	Emissions from the testing of back-up generators from these facilities is estimated to be de minimis. Recalculated in FY22 based on FY11 data.	5	0.60%
	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 de minimis. Recalculated in FY22 based on FY11 data.	5	0.56%
	Fugitive emissions	Fugitive emissions from fridges and vehicle AC systems	All facilities	Difficult to obtain the data, estimated to be de minimis. Based on FY11 data.	14	1.71%
Total					24	2.87%

Scope	Category	GHG emissions source	Facilities	Reason for exclusion
Scope 3	Purchased goods and services	Contracts for Differences for electricity	Meridian New Zealand	Meridian enters into a large number of financial derivative products annually, primarily for the purposes of mitigating exposure to electricity spot pricing. These do not require the physical supply of energy and therefore have no associated emissions.
Scope 3	Upstream transportation and distribution	Lines company and gas transmission company operational emissions	Meridian Australia	Difficult to obtain the data.
		Freight - courier packages and minor materials	Meridian Australia and Flux NZ.	Difficult to obtain the data, estimated to be de minimis.
		Contractor fuel for retail meter reading and maintenance	Meridian Australia	Difficult to obtain the data, estimated to be de minimis.

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

Section 9 provides an overview of how data was collected for each GHG emissions source, the source of the data, and methodologies used. Collection of information was centralised in the finance teams of each facility, however much of the information is sourced from the finance team, project teams, suppliers and relevant individuals throughout the business.

All data was calculated using ESP CSR. 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)⁴ or Department for Business, Energy & Industrial Strategy (DBEIS, United Kingdom)⁵. All calculations in this report are expressed in total tonnes of carbon dioxide equivalent.

- Location based emission factors applied to electricity consumption in New Zealand have been calculated from Ministry of Business, Innovation and Employment (MBIE)⁶ data.
- Emissions factors for electricity consumption in Australia have been sourced from NGA released by the Australian Government (Department of the Environment and Energy)⁷.
- The emissions factors for purchased goods and services have been sourced from Motu⁸, these are adjusted for inflation since publication.
- Air travel emission factors include radiative forcing⁹. International long haul travel is assumed to be business class.
- Where possible, construction emission factors are sourced from BRANZ CO₂NSTRCT¹⁰.

4 Ministry for the Environment. 2022. Measuring emissions: A guide for organisations: 2022 detailed guide. Wellington: Ministry for the Environment. <https://environment.govt.nz/publications/measuring-emissions-a-guide-for-organisations-2022-detailed-guide>

5 Department for Business, Energy & Industrial Strategy, UK Government, Greenhouse gas reporting: conversion factors 2021 v2 <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021>

6 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/nz-energy-quarterly-and-energy-in-nz/electricity.xlsx> b) <https://www.mbie.govt.nz/assets/Data-Files/Energy/nz-energy-quarterly-and-energy-in-nz/quarterly-electricity-liquid-fuel-emissions-data.xlsx>

- 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.
- The market based emission factor for electricity consumption in the Meridian NZ offices and facilities is based on the purchase of Meridian NZ's certified renewable energy product for their own use. Any electricity use which was not covered by this product has been disclosed at a residual factor provided by New Zealand Energy Certificate System¹¹.
- The market based emission factor for Meridian Australia is based on the purchase of Powershop Australia's Climate Active certified carbon neutral retail electricity product for their own use. Any electricity use which was not covered by these purchases has been disclosed at a residual factor calculated according to the Climate Active programme.

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) except for refrigerant gases which use the Fifth Assessment Report (AR5). The time horizon is 100 years.

7 Department of the Environment and Energy, 2021: National Greenhouse Accounting Factors – August 2021. Canberra <https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-2021>

8 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/>

9 Radiative forcing is associated with emissions at higher altitudes and results in a higher global warming potential. MfE apply a multiplier of 1.9%.

10 <https://www.branz.co.nz/environment-zero-carbon-research/framework/branz-co2nstruct/>

11 <https://www.certifiedenergy.co.nz/residual-supply>

11.1 Changes to approaches used previously

There have been no changes to the approaches used in FY21.

ISO 14064-1, 9.3.1 (p, q)

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 9 and 11. Where uncertainty exists in the data, a conservative estimation approach has been taken leading to over, rather than understating of emissions.

A quantitative analysis for the top 20 sources of GHG emissions using the GHG protocol tool indicates that the aggregated uncertainty ranking is high and the cumulated uncertainty is +/- 5%. The top 20 sources account for over 99% of Meridian's emissions.

12 Impact of uncertainty

ISO 14064-1, 9.3.1 (k)

The base year is 1 July 2020 to 30 June 2021. This provides the most recent benchmark against which our absolute target of halving our operational greenhouse gas emissions across the Group by 2030 can be measured.

The total Group (excluding Meridian Australia) operational emissions in the base year were 29,507 tCO₂e.

The base year has been updated from FY19 to FY21 to account for the sale of the Australian business in 2022 and to ensure that our most recent GHG inventory was used in our commitment to set near and long-term company-wide emission reductions in line with science-based net-zero with the Science Based Target initiative (SBTi).

Removing emissions from Meridian Australia for the base year has resulted in revised Group operational emissions which are 2,969 tCO₂e lower than the emissions reported in FY21.

13 Base year selected

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.

Meridian Australia was sold during the FY22 year. Its emissions have been removed from the base year calculation.

14 Changes to historic base year

15 GHG emissions calculations and results

15.1 Total operational emissions by scope

Total operational GHG emissions for Meridian Group in FY22 were 32,708 tCO₂e shown by scope in the following graph. This includes seven months of data for Meridian Australia. Excluding Meridian Australia the total operational emissions were 30,944 tCO₂e.

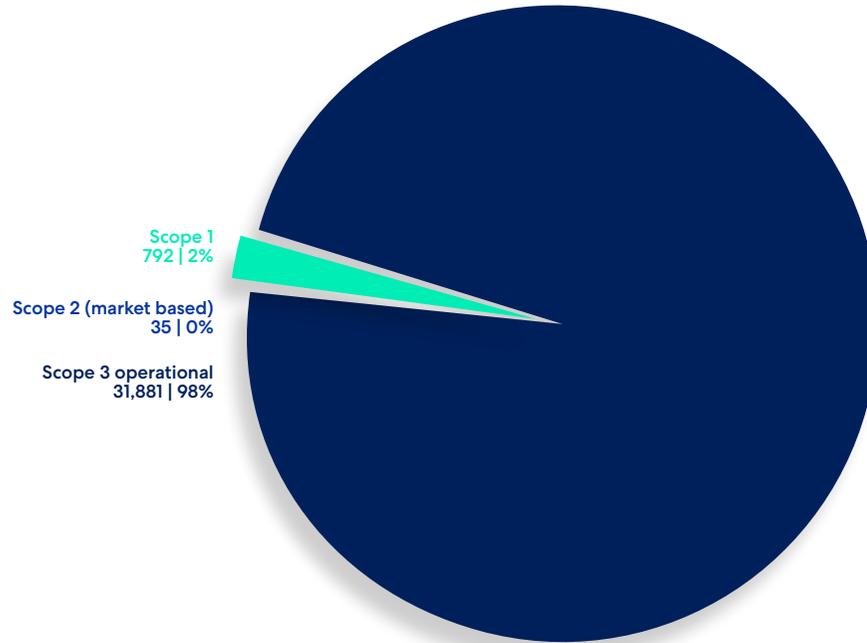


Figure 2: Total operational greenhouse gas emissions by scope (tCO₂e)

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. Upstream transportation makes up 41% of Scope 3 operational emissions. The next highest category is purchased goods and services (38%) followed by downstream leased assets (15%).

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

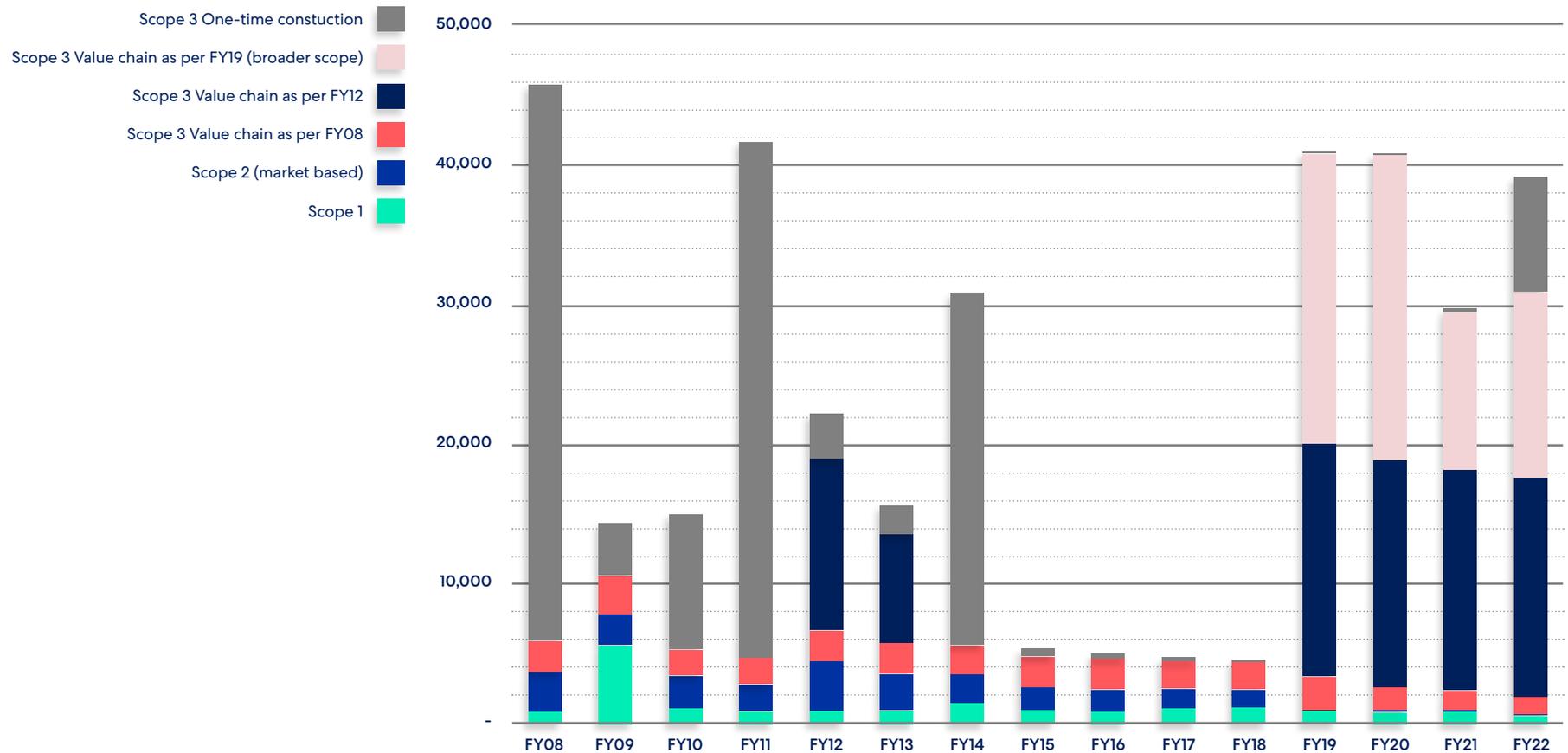
15.2 Total emissions by scope over time Meridian NZ and Flux

This graph shows the total emissions for Meridian NZ and Flux 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.

Overall operational core emissions (Scopes 1, 2 and 3 Value chain as per FY08) are 67% lower in FY22 than they were in FY08, and are 70% lower than they were in FY12 when operational core emissions were at their highest.

One-time construction emissions in FY22 relate primarily to the construction of the Harapaki wind farm.

Figure 3: Total greenhouse gas emissions by scope - annual comparison

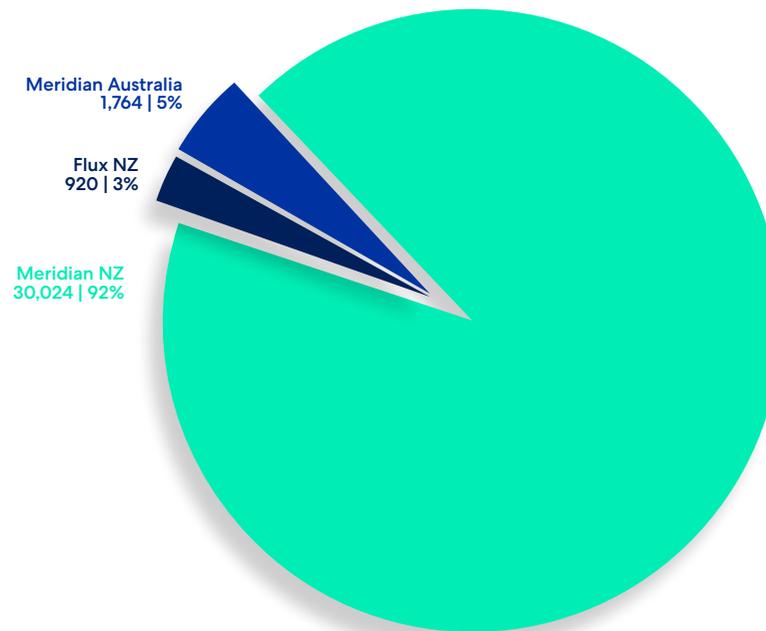


15.3 Total operational emissions by facility

The following graph shows the total operational GHG emissions (tCO₂e) by facility in the reporting period for the Meridian Group. This includes seven months of data for the Meridian Australia facility.

The majority of operational emissions are from the Meridian NZ facility and are emissions from upstream transportation and distribution and purchased goods and services. Scope 3 operational emissions from Meridian NZ are 92% of the total group operational emissions. Emissions from purchased goods and services in the Meridian NZ facility make up 30% of the total group operational emissions while emissions from upstream transportation and distribution in the Meridian NZ facility make up 40% of the total group operational emissions.

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



16.1 Removals

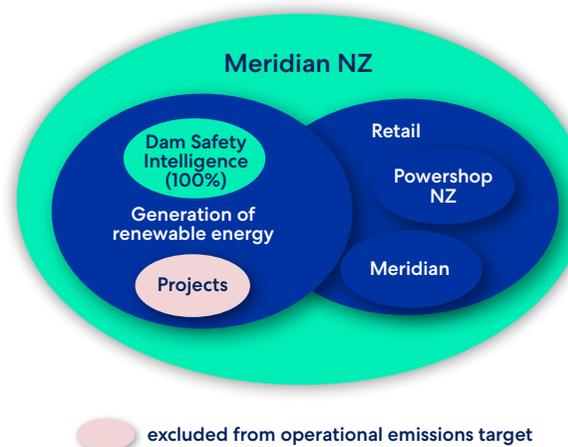
A greenhouse gas removal is defined by ISO 14064-1 as the “total mass of a greenhouse gas removed from the atmosphere over a specified period of time”. There are no removals quantified for this reporting period.

Meridian is progressing with its project to plant around 1,100 hectares of land in forest. So far in FY22 we’ve secured over 55% of the land required and planted and or registered around 130 hectares with the Ministry for Primary Industries (around 130,000 stems), or 12% of our target.

Trees will be a mix of natives and exotics. In a climate crisis, mixed planting is our chosen pathway because the exotics are a carbon 'engine' - pulling carbon down from the atmosphere in a hurry. They then create a canopy to protect the natives in their early days so they can flourish later in life. The long-term forest-management plans ensure that the natives take over, leaving a lasting legacy for future generations. In a few years, we expect that they’ll remove the same amount of carbon as the Meridian Group emits.

16.2 Emission reduction initiatives

Figure 5: Meridian's boundary for half by 30 target



Half by 30 is Meridian's ambitious commitment to half our FY21 baseline emissions by FY30. Our operational emissions boundary (our Half by 30 boundary) excludes Meridian Australia (sold in January 2022) and all one-time construction emissions from major projects, including activities that are capitalised as part of renewable energy projects.

In FY22 Meridian Group reset its baseline to FY21 to account for the sale of the Australian business and to ensure that our most recent GHG inventory was used in our commitment to set near and long-term company-wide emission reductions in line with science-based net-zero with the Science Based Target initiative (SBTi). The reset of the baseline has not decreased the abatement effort required of Meridian.

During FY22 we have concentrated our energies on developing a refreshed [Climate Action Plan \(CAP\)](#), setting out a roadmap for how we will deliver Half by 30. This CAP is designed to be a living document that will be updated each year – communicating new initiatives and milestones. The roadmap is comprised of six focus areas over three time horizons. The focus areas include Land Transport, Farms, Fugitive Emissions, Air Travel, Ferry & Barge and Waste.

Outside of our operational boundary we are still committed to minimising our construction and development emissions. At Harapaki, our most recent construction project, we have set the following sustainability KPIs and meet quarterly to ensure continuous improvement:

- Monthly and annual carbon impact reports;
- Waste diversion target of >75% on site;
- Carbon emissions target of <25kgCO₂/100km travelled on site.

Initiative	Progress FY22
<p>Continue to reduce air travel emissions in FY22.</p> <p>Develop a plan for halving air travel emissions by 2030 (see Climate Action Plan).</p>	<ul style="list-style-type: none"> ✓ In FY22 we achieved our goal of reducing air travel by 16% compared to FY21 (excluding MEA from FY21). ✓ We began the design work for introducing an air travel carbon budget in FY23.
<p>Progress energy efficiency audits at our wind and hydro asset sites in New Zealand.</p> <p>Develop the architecture for an internal decarbonisation fund – able to progress 'additional' interventions.</p>	<ul style="list-style-type: none"> ✓ To date, of the 42 recommended actions, 9 have been discounted, 21 are under consideration, 2 are planned (scheduled), 9 are in progress and 1 has been completed (abating 1.4tCO₂e). ✓ The design work of the internal decarbonisation fund is underway. Some recommended actions from the energy audit will be eligible for this fund.
<p>100% electrification of light passenger and commercial fleet.</p>	<ul style="list-style-type: none"> ✓ 33% conversion of light commercial fleet complete (100% conversion of light passenger complete)
<p>Investigation of the electrification of Meridian's boat at Manapōuri.</p>	<ul style="list-style-type: none"> ✓ Concept designs for an E-Boat and the supporting shoreside infrastructure has progressed and is nearing completion.

Tackling the challenge of half by 2030 will require deliberate effort across the Group and in particular includes a sharp focus on our supply chain, which is where over 95% of our operational emissions lie. Achieving this will see us engaging and collaborating with our suppliers and a Group commitment to the Half by 30 Climate Action Plan.

16.3 Emission reductions / increases for Meridian NZ and Flux

The operational emissions in the base year for Meridian NZ and Flux were 29,507 tCO₂e.

This year operational emissions for Meridian NZ and Flux are 30,944 tCO₂e, a 5% increase on the base year FY21 and an increase of 1,437 tCO₂e.

Table 5: Emission Reductions / Increases

Business activity	Category	Base Year 2020/21 tCO ₂ e (excludes Meridian Australia)	2021/22 tCO ₂ e (excludes Meridian Australia)	% change from 2020/21 base year	tCO ₂ e change from 2020/21 base year
Operational emissions direct emissions (Scope 1)	Stationary combustion	29	28	-3%	-1
	Mobile combustion	704	613	-13%	-91
	Fugitive emissions	287	2	-99%	-285
	Subtotal	1,020	643	-37%	-377
Operational emissions indirect emissions (Scope 2)	Electricity consumption (market based)	14	2	-86%	-12
	Subtotal (market based)	14	2	-86%	-12
Operational emissions indirect emissions (Scope 3)	Purchased goods and services	9,808	10,712	9%	904
	Fuel & energy related activities	549	718	31%	169
	Upstream transportation & distribution	11,211	13,226	18%	2,015
	Waste generated in operations	225	103	-54%	-122
	Business travel	704	565	-20%	-139
	Employee commuting	538	235	-56%	-303
	Downstream leased assets	5,438	4,740	-13%	-698
	Subtotal	28,473	30,299	6%	1,826
Total Operational Emissions (S1, 2 & 3)		29,507	30,944	5%	1,437

17 Assessment of performance against relevant benchmarks

ISO 14064-1, 9.3.2 (h)

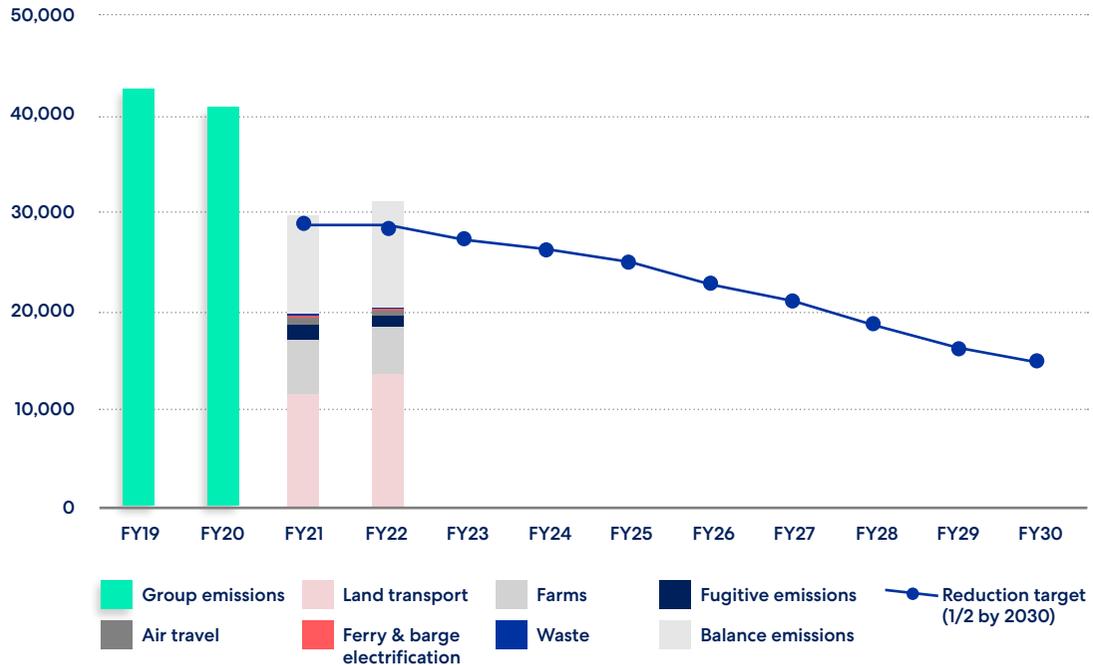
Half by 30 is Meridian's ambitious commitment to half our FY21 baseline emissions by FY30*. In line with this commitment, the Science-Based Targets initiative (SBTi) has approved Meridian Energy's near-term science-based emissions reduction target to reduce absolute scope 1 and 2 GHG emissions 50% by FY30 from a FY21 base year and to reduce absolute scope 3 GHG emissions 50% within the same time frame (excluding all one-time construction emissions from major projects and all activities that are capitalised as part of renewable energy projects).

Our scope 1 and 2 target has been classified as 1.5 aligned by the SBTi** and we have committed to set long-term emissions reduction targets with the SBTi in line with reaching net-zero by 2050.

As a 100% renewable energy generator with no fossil fuel combustion for electricity generation, we recognise that our biggest impact will come from the continued investment in further renewable energy generation to enable further decarbonisation, and having an operational GHG target that is focused on our supply chain (scope 3).

Total Group (excluding Meridian Australia) operational emissions in FY22 are 2,306 or 8% higher than the target for FY22. The greatest increase was in upstream transportation and distribution which increased by 2,015 tCO₂e or 18%. These emissions are recorded in land transport in the graph below.

Figure 5: Total Group (excluding Meridian Australia) operational greenhouse gas emissions (tCO₂e)



Note: This graph reflects the restated FY19, FY20 and FY21 emissions.

* Excluding Meridian Australia (MEA) FY21 emissions from the baseline after the MEA sale in January 2022.

**A methodology to classify scope 3 targets is under development by the SBTi.

ISO 14064-1, 9.3.3

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

The Meridian Group has a policy to offset Group operational emissions. These include all Scope 1, Scope 2 (market based) and Scope 3 operational emissions where they are not offset by vendors or as part of another programme. The Meridian Group does not offset emissions from one-time construction activities.

Table 6: Offsets applied to this inventory

Total offsets by facility (tCO ₂ e)	Vendor cancelled	Calendar year offsets	Gold Standard VERs	Total offsets	Not offset
Meridian NZ	152	0	29,872	30,024	8,243
Meridian Australia	23	521,805	1,578	523,406	0
Flux	0	0	920	920	0
Group	175	521,805	32,370	554,350	8,243

18.1 Vendor cancelled

18.1.1 EKOS approved credits

2 tCO₂e was offset by Mevo on behalf of Meridian NZ for all travel using Mevo vehicles in FY22. Mevo sources its offsets through Ekos. 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).

18.1.2 VERs

Services provided by Fujitsu are recorded in our inventory at 14 tCO₂e. They have offset 10 tCO₂e of these through purchase of a mix of VCS and Gold Standard VERs which have been cancelled as appropriate. They have also purchased NZECS certified renewable energy for their NZ premises.

PWC Australia has Climate Active Carbon Neutral certification. They have provided services to both Meridian NZ and Meridian Australia during the year. These were recorded in the inventory as 164 tCO₂e. PWC offsets met the Climate Active Carbon Neutral programme rules and were a mix of VCU on the Verra Registry and ACCUs and CERS held on the ANREU registry.

Anderson Lloyd are carbonZero certified. They provided less than 1 tCO₂e of services in FY22. Anderson Lloyd offsets meet the requirements of the carbonZero programme and were cancelled on the appropriate registries.

18.2 Calendar year (Climate Active approved credits)

Meridian Australia was certified carbon neutral against the Climate Active Carbon Neutral Standard for the emissions associated with the running of its corporate business and servicing of its windfarms from 1 July 2021 to 31 December 2021. Powershop's retail electricity Australia-wide and its Victorian retail gas supply were certified carbon neutral against the Climate Active Carbon Neutral Standard from 1 July 2021 until 30 January 2022.

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 Climate Active is by calendar year, therefore emissions reported in this inventory which occur in 2022 will be offset in the 2022 return. Those reported in this inventory which occurred in 2021 have been offset in the 2021 return. The total of these emissions as reported in this inventory is 521,805 tCO₂e for FY22.

18.3 Gold Standard VERs

Meridian has retired Gold Standard VERs for its group operational emissions for the FY22 year excluding any offsets which have been, or will be, surrendered as identified above. The 32,370 tCO₂e remaining have been offset. These credits are from a wind farm project in India. Details on the [Gold Standard Registry](#).

18.4 NZ ETS

Meridian reports and surrenders credits for the New Zealand Emissions Trading Scheme (NZ ETS) for SF₆ emissions on a calendar year basis. Surrendering units as part of a legal requirement under the NZ ETS is not voluntary climate change mitigation.

19 Description of additional indicators

ISO 14064-1, 9.3.2 (g)

There were no scope 1 emissions from the 13,557 GWh of electricity generated in the reporting period, as the fuel used to generate this electricity was water and wind.

Table 7: Emissions from electricity generation

Additional indicators	FY19	FY20	FY21	FY22
Electricity generation (GWh) Meridian NZ only	13,570	14,224	12,692	13,557
Emissions from electricity generation (tCO ₂ e)	0	0	0	0

20 Liabilities – GHG stocks held

Table 8: Greenhouse gas holdings at 30 June 2022

GHG holdings	Meridian NZ	Meridian Australia	Flux NZ	2021/22 kg	2021/22 tCO ₂ e
HFC gas holdings [kg]	775	n/a	nm	775	1,534
SF ₆ holdings [kg]	2,992	n/a	n/a	2,922	70,312

nm not measured
n/a not applicable

The Meridian NZ facility has holdings of sulphur hexafluoride (SF₆) gas. The bulk of the gas is held in 220kV circuit breakers and 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 publications¹².

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.

¹² 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 622271-4:2013 High-voltage switchgear and controlgear - Part 4: Handling procedures for sulphur hexafluoride (SF₆) and its mixtures, August 2013

IEC 60480:2019 Specifications for the re-use of sulphur hexafluoride (SF₆) and its mixtures in electrical equipment, April 2019

nm : not measured
n/a : not applicable

21 Compliance with ISO 14064-1

ISO 14064-1, 9.3.1 (r)

This GHG inventory report for the year ending 30 June 2022 has been prepared in accordance with ISO 14064-1. A reporting index is provided in Appendix Three.

22 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 also provides assurance of the Meridian Group Integrated Report against the GRI Standards, and is the financial auditor of Meridian Energy Limited on behalf of the Office of the Auditor General.

Appendix 3 ISO 14064-1 reporting index

ISO Reporting	Section in this report
9.3.1 (a)	Section 3
9.3.1 (b)	Section 4
9.3.1 (c)	Section 5
9.3.1 (d)	Section 6
9.3.1 (e)	Section 8
9.3.1 (f)	Table 4
9.3.1 (g)	Section 9
9.3.1 (h)	Section 16
9.3.1 (i)	Section 10
9.3.1 (j)	Table 2
9.3.1 (k)	Section 13
9.3.1 (l)	Section 14
9.3.1 (m)	Section 9 Section 11
9.3.1 (n)	Section 11
9.3.1 (o)	Section 11
9.3.1 (p)	Section 12
9.3.1 (q)	Section 12
9.3.1 (r)	Section 21
9.3.1 (s)	Section 22
9.3.1 (t)	Section 11
9.3.2 (a)	Section 3
9.3.2 (b)	Section 16
9.3.2 (c)	Section 16
9.3.2 (d)	not applicable
9.3.2 (e)	Table 2
9.3.2 (f)	Table 1 Table 2
9.3.2 (g)	Section 19
9.3.2 (h)	Section 17
9.3.2 (i)	Section 7
9.3.2 (j)	Section 16
9.3.2 (k)	Section 16
9.3.3	Section 18

INDEPENDENT ASSURANCE REPORT ON MERIDIAN ENERGY LIMITED'S GREENHOUSE GAS EMISSIONS INVENTORY REPORT

TO THE BOARD OF DIRECTORS OF MERIDIAN ENERGY LIMITED

Report on Greenhouse Gas Emissions Inventory Report

We have undertaken a reasonable assurance engagement relating to the Greenhouse Gas Emissions Inventory Report (the 'inventory report') of Meridian Energy Limited and its subsidiaries ('the Group') for the year ended 30 June 2022, comprising the Emissions Inventory and the explanatory notes set out on pages 1 to 35.

The inventory report provides information about the greenhouse gas emissions of the Group for the year ended 30 June 2022 and is based on historical information. This information is stated in accordance with the requirements of International Standard ISO 14064-1 Greenhouse gases – Part 1: *Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals* ('ISO 14064-1:2018'), the Greenhouse Gas Protocol: *A Corporate Accounting and Reporting Standard (2004)* ('the GHG Protocol') and the Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011) ('the Corporate Value Chain Standard').

Board of Directors' Responsibility

The Board of Directors are responsible for the preparation of the inventory report, in accordance ISO 14064-1:2018, the GHG Protocol, and the Corporate Value Chain Standard. This responsibility includes the design, implementation, and maintenance of internal control relevant to the preparation of an inventory report that is free from material misstatement, whether due to fraud or error.

Our Responsibility

Our responsibility is to express an opinion on the inventory report based on the evidence we have obtained. We conducted our reasonable assurance engagement in accordance with International Standard on Assurance Engagements (New Zealand) 3410: *Assurance Engagements on Greenhouse Gas Statements* ('ISAE (NZ) 3410'), issued by the New Zealand Auditing and Assurance Standards Board. That standard requires that we plan and perform this engagement to obtain reasonable assurance about whether the inventory report is free from material misstatement.

A reasonable assurance engagement undertaken in accordance with ISAE (NZ) 3410 involves performing procedures to obtain evidence about the quantification of emissions and related information in the inventory report. The nature, timing and extent of procedures selected depend on the assurance practitioner's judgement, including the assessment of the risks of material misstatement, whether due to fraud or error, in the inventory report. In making those risk assessments, we considered internal control relevant to the Group's preparation of the inventory report. A reasonable assurance engagement also includes:

- Assessing the suitability in the circumstances of the Group's use of ISO 14064-1:2018, GHG Protocol, and the Corporate Value Chain Standard, as the basis for preparing the inventory report;
- Evaluating the appropriateness of quantification methods and reporting policies used, and the reasonableness of estimates made by the Group; and
- Evaluating the overall presentation of the inventory report.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Inherent Limitations

Non-financial information, such as that included in the Group's Inventory Report, is subject to more inherent limitations than financial information, given both its nature and the methods used and assumptions applied in determining, calculating, and sampling or estimating such information. Specifically, GHG quantification is subject to inherent uncertainty because of incomplete scientific knowledge used to determine emissions factors and the values needed to combine emissions of different gases.

Our Independence and Quality Control

We have complied with the independence and other ethical requirements of Professional and Ethical Standard 1 International Code of Ethics for Assurance Practitioners (including International Independence Standards) (New Zealand) ('PES 1') issued by the New Zealand Auditing and Assurance Standards Board, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

Other than this engagement and our role as auditor of the statutory financial statements on behalf of the Auditor-General, our firm carries out other assignments for the Group in the areas of limited assurance of the sustainability content in the integrated report, review of the interim financial statements, audit of the securities registers, vesting of the executive long-term incentive plan, the solvency return of Meridian Captive Insurance Limited, assurance of lockbox workings for the Meridian Energy Australia Group of subsidiaries and supervisor reporting. We also carried out non-assurance assignments for the Group relating to the Corporate Taxpayers Group and the CFO Vantage Programme, which are compatible with those independence requirements.

In addition, principals, and employees of our firm deal with the Group on arm's length terms within the ordinary course of trading activities of the Group. These services have not impaired our independence for the purposes of this engagement. Other than these engagements and arm's length transactions, we have no relationship with, or interests in, the Group.

The firm applies Professional and Ethical Standard 3 (Amended): *Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance Engagements* issued by the New Zealand Auditing and

Assurance Standards Board, and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Use of Report

Our assurance report is made solely to the directors of the Group in accordance with the terms of our engagement. Our work has been undertaken so that we might state to the directors those matters we have been engaged to state in this assurance report and for no other purpose. We accept or assume no duty, responsibility or liability to any other party in connection with the report or this engagement, including without limitation, liability for negligence in relation to the opinion expressed in this report.

Opinion

In our opinion, the inventory report of Meridian Energy Limited for the year ended 30 June 2022 has been prepared, in all material respects, in accordance with the requirements of ISO 14064-1:2018, the GHG Protocol, the Corporate Value Chain Standard.

Deloitte Limited

**Chartered Accountants
23 August 2022
Auckland, New Zealand**

This reasonable assurance report relates to the GREENHOUSE GAS EMISSIONS INVENTORY REPORT of Meridian Energy Limited for the year ended 30 June 2022 included on Meridian Energy Limited's website. Meridian Energy Limited is responsible for the maintenance and integrity of the Meridian Energy Limited's website. We have not been engaged to report on the integrity of the Meridian Energy Limited's website. We accept no responsibility for any changes that may have occurred to the GREENHOUSE GAS EMISSIONS INVENTORY REPORT since they were initially presented on the website. The reasonable assurance report refers only to the GREENHOUSE GAS EMISSIONS INVENTORY REPORT named above. It does not provide an opinion on any other information which may have been hyperlinked to/from the GREENHOUSE GAS EMISSIONS INVENTORY REPORT. If readers of this report are concerned with the inherent risks arising from electronic data communication they should refer to the published hard copy of the GREENHOUSE GAS EMISSIONS INVENTORY REPORT and related reasonable assurance report to confirm the information included in the GREENHOUSE GAS EMISSIONS INVENTORY REPORT presented on this website.

287/293 Durham Street North,
Christchurch Central,
Christchurch 8013

Meridian Energy Limited
0800 496 777
meridian.co.nz



Meridian.

The Power to
Make a Difference.