

# Greenhouse Gas Emissions Inventory Report

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INVENTORY SCOPE: MERIDIAN GROUP (ALL FACILITIES)  
INVENTORY PERIOD: FOR THE PERIOD 1 JULY 2020 TO 30 JUNE 2021  
VERSION: FINAL  
AUDIT STATUS: VERIFIED



**Meridian.**

The Power to  
Make a Difference.

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**Disclaimer**

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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, 9.3.2 (f)

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

Business activity	Scope	Emissions tCO <sub>2</sub> e	Offsets**	Remaining tCO <sub>2</sub> e
<b>Operational</b>				
	Scope 1	1,376	1,376	0
	Scope 2 (market based)	14	14	0
	Scope 3 operational	31,085	31,085	0
	<b>Subtotal</b>	<b>32,475</b>	<b>32,475</b>	<b>0</b>
<b>Energy purchased &amp; on-sold*</b>				
	New Zealand electricity	0	0	0
	Australia electricity and gas	881,461	881,461	0
		<b>881,461</b>	<b>881,461</b>	<b>0</b>
<b>One-time construction</b>				
	Scope 3 one-time construction	285	0	285
		<b>285</b>	<b>0</b>	<b>285</b>
<b>Total Group value chain emissions (S1, 2 &amp; 3)***</b>		<b>914,221</b>	<b>913,936</b>	<b>285</b>

\*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.

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

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

ISO category	Sub category	Meridian NZ	Meridian Australia	Flux NZ	2020/21 tCO <sub>2</sub> e
<b>Direct emissions</b>					
	Stationary combustion	29	49	nm	78
	Mobile combustion	703	102	1	807
	Fugitive emissions	287	205	nm	492
<b>Total direct emissions</b>		<b>1,019</b>	<b>356</b>	<b>1</b>	<b>1,376</b>
<b>Indirect emissions from imported energy</b>					
	Electricity consumption (location based)*	2,349	777	4	3,130
	Electricity consumption (market based)**	11	0	3	14
<b>Subtotal (market based)***</b>		<b>11</b>	<b>0</b>	<b>3</b>	<b>14</b>
<b>Indirect emissions from transportation</b>					
	Production and distribution of fuel	168	24	0	192
	Freight	60	0	0	60
	Business travel	642	18	62	722
	Employee commuting	444	18	32	494
<b>Subtotal</b>		<b>1,314</b>	<b>60</b>	<b>94</b>	<b>1,467</b>
<b>Indirect emissions from use of products and services purchased</b>					
	Purchased goods and services	8,994	2,188	814	11,996
	Construction services	270	0	n/a	270
	Transmission and distribution losses	16	7	0	23
	Maintenance contractors	364	57	n/a	421
	Transmission and lines services	11,166	nm	nm	11,166
	Waste	224	44	1	269
	Working from home	46	257	16	319
<b>Subtotal</b>		<b>21,080</b>	<b>2,553</b>	<b>831</b>	<b>24,464</b>
<b>Indirect emissions from use of products and services sold</b>					
	Electricity purchased and onsold	0	786,461	n/a	786,461
	Gas purchased and onsold	n/a	95,000	n/a	95,000
<b>Subtotal</b>		<b>0</b>	<b>881,461</b>	<b>0</b>	<b>881,461</b>
<b>Indirect emissions from other sources</b>					
	Downstream leased assets (farms)	5,438	n/a	n/a	5,438
<b>Subtotal</b>		<b>5,438</b>	<b>0</b>	<b>0</b>	<b>5,438</b>
<b>Total indirect emissions***</b>		<b>27,843</b>	<b>884,074</b>	<b>928</b>	<b>912,846</b>

\*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 Meridian NZ's own 100% certified renewable energy.

\*\*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	Flux NZ	2020/21 tCO <sub>2</sub> e
<b>Operational emissions direct emissions (Scope 1)</b>	Stationary combustion	29	49	nm	<b>78</b>
	Fuel used in electricity generation	0	0	n/a	<b>0</b>
	Backup generators	29	47	nm	<b>76</b>
	Gas consumption in offices	n/a	2	n/a	<b>2</b>
	Mobile combustion	703	102	1	<b>806</b>
	Boat travel	229	n/a	n/a	<b>229</b>
	Car travel	474	102	1	<b>577</b>
	Fugitive emissions	287	205	nm	<b>492</b>
	HFCs	101	0	nm	<b>101</b>
	SF6	186	205	n/a	<b>391</b>
<b>Subtotal Scope 1</b>		<b>1,019</b>	<b>356</b>	<b>1</b>	<b>1,376</b>
<b>Operational emissions indirect emissions (Scope 2)</b>	<i>Electricity consumption (location based)</i>	2,349	777	4	<b>3,130</b>
	<i>Facilities (location based)</i>	2,241	713	n/a	<b>2,954</b>
	<i>Offices (location based)</i>	107	63	4	<b>174</b>
	<i>Vehicles (location based)</i>	1	1	n/a	<b>2</b>
	<i>Electricity consumption (market based)</i>	11	0	3	<b>14</b>
	<b>Subtotal Scope 2 (market based)*</b>		<b>11</b>	<b>0</b>	<b>3</b>

Business activity	Category	Meridian NZ	Meridian Australian	Flux NZ	2020/21 tCO <sub>2</sub> e
<b>Operational indirect emissions (Scope 3)</b>	Purchased goods and services	8,994	2,188	814	<b>11,996</b>
	IT Services	751	70	128	<b>948</b>
	Maintenance Services	4,242	405	27	<b>4,674</b>
	Office Services	368	380	10	<b>757</b>
	Professional Services	3,633	1,333	649	<b>5,616</b>
	Fuel- and energy-related activities	184	31	1	<b>215</b>
	Production and distribution of fuel	168	24	0	<b>192</b>
	T&D losses from office electricity	16	7	0	<b>23</b>
	T&D losses from office gas	n/a	0	n/a	<b>0</b>
	Upstream transportation and distribution	11,575	57	0	<b>11,632</b>
	Contractor fuel (meter reading)	138	nm	n/a	<b>138</b>
	Contractor fuel (maintenance)	226	57	n/a	<b>283</b>
	Couriers and postage	45	0	0	<b>45</b>
	Lines operational	8,046	nm	n/a	<b>8,046</b>
	Transmission operational	3,120	nm	n/a	<b>3,120</b>
	Waste generated in operations	224	44	1	<b>269</b>
	Waste to landfill	220	42	1	<b>263</b>
	Waste sent to recycling	4	2	0	<b>6</b>
	Business travel	642	18	62	<b>722</b>
	Air travel	565	13	57	<b>635</b>
	Taxis and rideshare	15	3	0	<b>18</b>
	Hotel accommodation	62	2	5	<b>69</b>
	Employee commuting	490	275	48	<b>813</b>
Employee commuting	444	18	32	<b>494</b>	
Working from home	46	257	16	<b>319</b>	
Downstream leased assets (farms)	5,438	n/a	n/a	<b>5,438</b>	
<b>Subtotal Scope 3 operational</b>		<b>27,547</b>	<b>2,613</b>	<b>925</b>	<b>31,085</b>
<b>Total operational emissions (S1, 2 &amp; 3) (market based)</b>		<b>28,577</b>	<b>2,969</b>	<b>929</b>	<b>32,475</b>
<b>Energy purchased and on-sold** indirect emissions (Scope 3)</b>	Fuel- and energy-related activities	0	881,461	n/a	<b>881,461</b>
	Electricity purchased and onsold	0	786,461	n/a	<b>786,461</b>
	Gas purchased and onsold	n/a	95,000	n/a	<b>95,000</b>
<b>Subtotal Scope 3 energy on-sold</b>		<b>0</b>	<b>881,461</b>	<b>n/a</b>	<b>881,461</b>
<b>One-time construction indirect emissions (Scope 3)</b>	Capital goods	150	0	n/a	<b>150</b>
	Construction services	135	0	n/a	<b>135</b>
	Contractor fuel	118	0	n/a	<b>118</b>
	Contractor air travel	2	0	n/a	<b>2</b>
	Freight of major materials	15	0	n/a	<b>15</b>
<b>Subtotal Scope 3 one-time construction</b>		<b>285</b>	<b>0</b>	<b>n/a</b>	<b>285</b>
<b>Total emissions (S1, 2 &amp; 3) (market based)</b>		<b>28,862</b>	<b>884,430</b>	<b>929</b>	<b>914,221</b>
<i>Total emissions (S1, 2 &amp; 3) (location based)</i>		<i>31,200</i>	<i>885,207</i>	<i>930</i>	<i>917,337</i>

\*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	Flux NZ	2020/21 tCO <sub>2</sub> e
<b>Scope 1</b>				
CO <sub>2</sub>	724	149	1	<b>874</b>
CH <sub>4</sub>	0	0	0	<b>0</b>
N <sub>2</sub> O	8	2	0	<b>10</b>
HFCs	101	0	nm	<b>101</b>
SF <sub>6</sub>	186	205	n/a	<b>391</b>
<b>Subtotal</b>	<b>1,019</b>	<b>356</b>	<b>1</b>	<b>1,376</b>
<b>Scope 2 (location based)</b>				
CO <sub>2</sub>	2,254	777	4	<b>3,035</b>
CH <sub>4</sub>	92	0	0	<b>92</b>
N <sub>2</sub> O	3	0	0	<b>3</b>
<b>Subtotal</b>	<b>2,349</b>	<b>777</b>	<b>4</b>	<b>3,130</b>
<b>Scope 3</b>				
CO <sub>2</sub>	1,121	88,012	70	<b>89,203</b>
CH <sub>4</sub>	232	213	5	<b>450</b>
N <sub>2</sub> O	10	52	1	<b>63</b>
tCO <sub>2</sub> e*	26,469	795,797	849	<b>823,115</b>
<b>Subtotal</b>	<b>27,832</b>	<b>884,074</b>	<b>925</b>	<b>912,831</b>
<b>Total (location based)</b>	<b>31,200</b>	<b>885,207</b>	<b>930</b>	<b>917,337</b>

\*gas is reported as tCO<sub>2</sub>e 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) emissions<sup>1</sup> 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<sup>2</sup>. 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.

<sup>1</sup>Throughout this document “emissions” means “GHG emissions”.

<sup>2</sup>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. In Australia, we own two wind farms and three hydro power stations. The Group sells electricity to our customers through three brands – Meridian and Powershop in New Zealand, and Powershop in Australia. 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 2021 which is available at [www.meridianenergy.co.nz](http://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 climate action.

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.

In August 2019 we set an absolute target across the Group of halving our operational greenhouse gas emissions by 2030.

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:

- Tina Frew, 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 Meridian NZ);
- Jamie Bishop, APX Travel Management (air and rental car travel data Meridian NZ);
- Custom Fleet staff (fleet vehicle travel and fuel data Meridian NZ);
- Nick Robilliard, Procurement & Property Manager (business travel and all vehicle data inputs);
- Daniel Williamson, HR Analyst (HR data);
- Peter Harding, Management Accountant (office electricity consumption data Meridian NZ);
- Generation and Natural Resources staff (one-time emissions sources Meridian NZ, SF<sub>6</sub> Meridian NZ);
- 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);
- Hannah Porter, 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 2020 to 30 June 2021.

## 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 2021.

For further information about the organisation please refer to the [Meridian Energy Limited FY21 Integrated Report](#) which is available on our website.

#### 6.2 Defining Meridian "facilities"

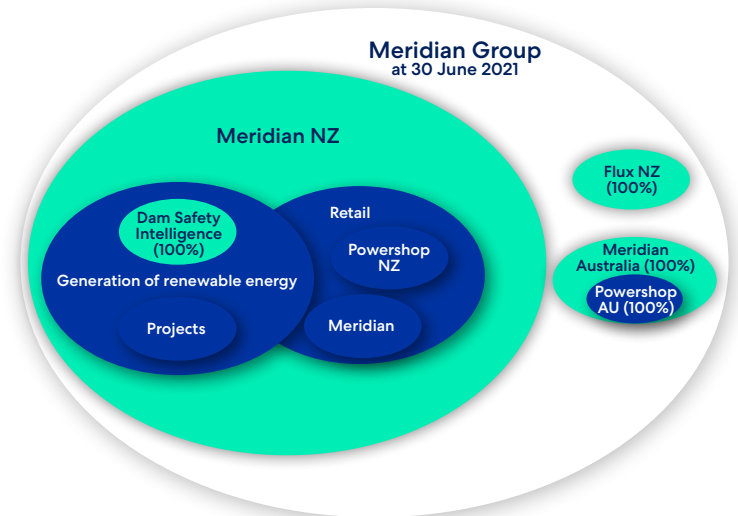
Meridian's diverse activities and resulting emissions are categorised into "facilities" in line with Annex A of ISO 14064-1 which requires that the data should be retained in its disaggregated form to aid transparency and to provide maximum flexibility in meeting a range of reporting requirements.

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"<sup>3</sup>*

For the year ended 30 June 2021 these facilities are: Meridian NZ, Flux NZ, and Meridian Australia as illustrated in the following diagram. Powershop NZ is now incorporated into Meridian NZ as its operations are combined with the parent company. There are no other changes.

Figure 1: Facilities comprising the Meridian Group



<sup>3</sup>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
<b>Meridian NZ</b>	<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 12,692 GWh of electricity, supplied around 241,026 customer connections at 30 June 2021. Powershop conducts energy retailing activities within Powershop New Zealand Limited under the Powershop brand and supplied around 105,804 customer connections at 30 June 2021. 869 people were employed by Meridian New Zealand at 30 June 2021.</p> <p>It includes the following legal entities:</p> <ul style="list-style-type: none"><li>• Meridian Energy Limited</li><li>• Dam Safety Intelligence Limited</li><li>• Meridian Energy Captive Insurance Limited (non-trading)</li><li>• Meridian Limited (non-trading)</li><li>• Meridian Energy International Limited (non-trading)</li><li>• Meridian LTI Trustee Limited (non-trading)</li><li>• Powershop New Zealand Ltd (non-trading)</li></ul> <p>Further information about Meridian can be found at <a href="http://www.meridianenergy.co.nz">www.meridianenergy.co.nz</a> and Powershop can be found at <a href="http://www.powershop.co.nz">www.powershop.co.nz</a>.</p>
<b>Meridian Australia</b>	<p>Meridian carries out generation and retailing of electricity and gas activities in Australia. 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 at 30 June 2021. It includes the following legal entities:</p> <ul style="list-style-type: none"><li>• Meridian Energy Australia Pty Ltd</li><li>• Three River Holdings (No 1) Limited (holding company)</li><li>• Three River Holdings (No 2) Limited (holding company)</li><li>• Meridian Energy Markets Pty Ltd (holding company)</li><li>• Meridian Finco Pty Ltd (non-trading)</li><li>• GSP Energy Pty Ltd</li><li>• Rangoon Energy Park Pty Ltd</li><li>• Wandsworth Wind Farm Pty Ltd</li><li>• Meridian Wind Monaro Range Holdings Pty Ltd (holding company)</li><li>• Meridian Wind Monaro Range Pty Ltd (non-trading)</li><li>• Mt Millar Wind Farm Pty Ltd</li><li>• Meridian Australia Holdings Pty Ltd (holding company)</li><li>• Meridian Wind Australia Holdings Pty Ltd (holding company)</li><li>• Mt Mercer Windfarm Pty Ltd</li><li>• Powershop Australia Pty Ltd</li></ul> <p>Further information about Meridian Australia can be found at <a href="http://www.meridianenergy.com.au">www.meridianenergy.com.au</a></p>
<b>Flux NZ</b>	<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 131 people at 30 June 2021. It includes the following legal entities:</p> <ul style="list-style-type: none"><li>• Flux Federation Ltd</li><li>• Flux UK Ltd</li></ul> <p>Further information about Flux can be found at <a href="http://www.fluxfederation.com">www.fluxfederation.com</a>.</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 BraveGen software database and reviewed by the GHG accounting team;

- Emissions factors and conversion factors in BraveGen are maintained by Meridian Energy and BraveGen;
- 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 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 4.

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	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 13,432 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.
		Gas consumption in offices	All facilities	Finance system and invoices from supplier	Meridian Australia finance team	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	Vehicle operators Customfleet – fuelcards Rental suppliers Fraedom Expense Management	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.
	Fugitive emissions	Fugitive emissions from SF6	Meridian NZ, Meridian Australia	Maintenance records	Maintenance staff	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	Niche maintenance contractors	Niche manage 65% of NZ sites and provide records of top-ups at those sites. No data from in-house maintenance in NZ and Australia.



Scope	Category	GHG emissions source	Facilities included	Data source	Data collection unit	Methodology, data quality, uncertainty (qualitative)
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.
			Flux NZ	Billing system & landlord invoices	Flux finance team	Accurate records from the billing system.
		Electricity consumed by vehicles	All facilities	GPS generated odometer readings	Smart Track GPS. Customfleet - fuelcards.	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	Meridian NZ finance team and GNR	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	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.	40%	Meridian key purchasers and sustainability team	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%	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.
			Flux NZ	Billing system & landlord invoices	0%	Flux finance team	Accurate records from the billing system. Start and end of year are partially estimated. Calculated from the invoices.

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Data collection unit	Methodology, data quality, uncertainty (qualitative)
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.
		Lines company operational emissions	Meridian NZ	Emissions information provided by suppliers where available.	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). 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%	Sustainability team	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).
		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/Intellihub	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.
		Couriers and postage	Meridian NZ	Supplier records	96%	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 and recycling from offices and facilities	All facilities	Actual weight of waste bins. Supplier records	100%	Niche and Finance teams	Waste bins weighed on a monthly basis by maintenance provider or size of bin and collections from invoices by finance teams. Estimation for Flux NZ based on Meridian NZ data.

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Data collection unit	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%	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 <sup>4</sup> .
		Car travel (taxis and rideshare)	All facilities	Purchase records (supplier data, internal expense management system – Fraedom)	50%	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.
		Hotel accommodation	All facilities	Purchase records (supplier data, internal purchasing systems)	60%	Meridian New Zealand Procurement team Travel providers Finance teams	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, due to 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%	Sustainability team	Staff were surveyed twice in FY21. They recorded typical commuting journeys with vehicle type and distance. A third party calculated the annual emissions from this activity.
		Working from home	All facilities	Employee commuter survey	100%	Sustainability team	Staff were surveyed twice in FY21. This survey noted their typical work from home routine.

<sup>4</sup> www.gcmap.com

<sup>5</sup> https://mapmyemissions.com/home

Scope	Category	GHG emissions source	Facilities included	Data source	Data from supplier engagement	Data collection unit	Methodology, data quality, uncertainty (qualitative)
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. For leased properties where no FY21 emissions data was provided, FY20 data was used.
	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.
Scope 3 one-time construction	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.
		Freight of major materials	All facilities with relevant activity in reporting period	Project records	100%	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 <a href="#">Section 11</a> ).
		Electricity purchased and on-sold	Meridian Australia	From internal records	0%	Meridian Australia finance team	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%	Meridian Australia finance team	Emissions calculated using the Climate Active Carbon Neutral Standard administered by the Australian government.

### 9.1 Other emissions - PFCs & NF<sub>3</sub>

No operations within the Meridian Group use perfluorocarbons (PFCs) or Nitrogen Trifluoride (NF<sub>3</sub>) therefore no holdings of PFCs are reported and no emissions from these sources are included in this inventory.

### 9.2 Other emissions - CO<sub>2</sub> 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 <sub>2</sub> e	% of total Scope 1 & 2 FY21 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 FY19 based on FY11 data.	5	0.36%
	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 FY21 based on FY11 data.	7	0.52%
	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.	17	1.22%
<b>Total</b>					<b>29</b>	<b>2.11%</b>

Scope	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	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.

## 11 Data collection, quantification and uncertainties

### 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 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 BraveGen. 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)<sup>6</sup> or Department of Environment, Food and Rural Affairs (Defra, United Kingdom)<sup>7</sup>. All calculations in this report are expressed in total tonnes of carbon dioxide equivalent as this is how most emissions factors are presented.

- Location based emission factors applied to electricity consumption in New Zealand have been calculated from Ministry of Business, Innovation and Employment (MBIE)<sup>8</sup> data.
- Emissions factors for electricity consumption in Australia have been sourced from NGA released by the Australian Government (Department of the Environment and Energy), October 2020<sup>9</sup>.
- The emissions factors for purchased goods and services have been sourced from Motu<sup>10</sup>, these are adjusted for inflation since publication.
- 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.

<sup>6</sup> Ministry for the Environment. Measuring Emissions: A Guide for Organisations: 2020 Detailed Guide. <https://environment.govt.nz/publications/measuring-emissions-detailed-guide-2020/>

<sup>7</sup> Department for Business, Energy & Industrial Strategy. UK Government Greenhouse gas reporting: conversion factors 2020. London <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020>

<sup>8</sup> 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](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>

- 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 System<sup>11</sup>.
- 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.

Quantities of each greenhouse gas are converted to tonnes CO<sub>2</sub>e using the global warming potential from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4)<sup>12</sup>. The time horizon is 100 years.

<sup>8</sup> Department of the Environment and Energy, 2020: National Greenhouse Accounting Factors – October 2020. Canberra <https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-2020>

<sup>10</sup> 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/>

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

<sup>12</sup> [https://www.ipcc.ch/site/assets/uploads/2018/05/ar4\\_wg1\\_full\\_report-1.pdf](https://www.ipcc.ch/site/assets/uploads/2018/05/ar4_wg1_full_report-1.pdf)

### 11.1 Changes to approaches used previously

Total emissions have been calculated using the market-based methodology for Scope 2. Prior to FY20 the location-based methodology for Scope 2 emissions was used to calculate total emissions.

The market-based methodology will be used going forward.

In alignment with the Scope 3 technical guidance in FY21 we applied inflation adjustments to our purchased goods & services emission factors. To be consistent we also applied these adjustments to FY19 and FY20 resulting in restatements. Inflation adjustments will be applied going forward.

## 12 Impact of uncertainty

### 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, 10](#) and [11](#). Where

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

## 13 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 our absolute target of halving our operational greenhouse gas emissions across the Group by 2030 can be measured.

The total Group operational emissions in the base year were 46,465 tCO<sub>2</sub>e (restated FY21).

Prior to FY19 the base year was FY12. For reporting purposes some comparisons will be made to FY12 where they are relevant.

We have restated our FY19 base year to include inflation adjustments for our purchased goods & services. This resulted in a reduction of 814 tCO<sub>2</sub>e for FY19.

## 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.

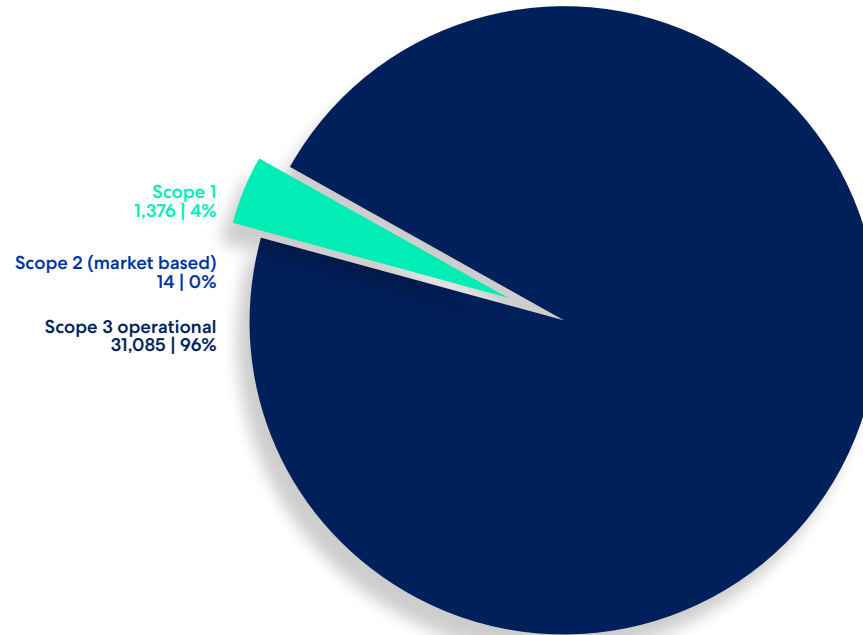
In FY19 we significantly changed the scope of what we were measuring in the value chain, committed to a significant reduction target and adopted a new base year.

## 15 GHG emissions calculations and results

### 15.1 Total operational emissions by scope

Total operational GHG emissions for Meridian Group were 32,475 tCO<sub>2</sub>e for the reporting period, shown by scope in the following graph.

Figure 2: Total operational greenhouse gas emissions by scope (tCO<sub>2</sub>e)



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 makes up 39% of the Scope 3 operational emissions. The next highest category of Scope 3 operational emissions is upstream transportation and distribution (37%) followed by downstream leased assets (17%).

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



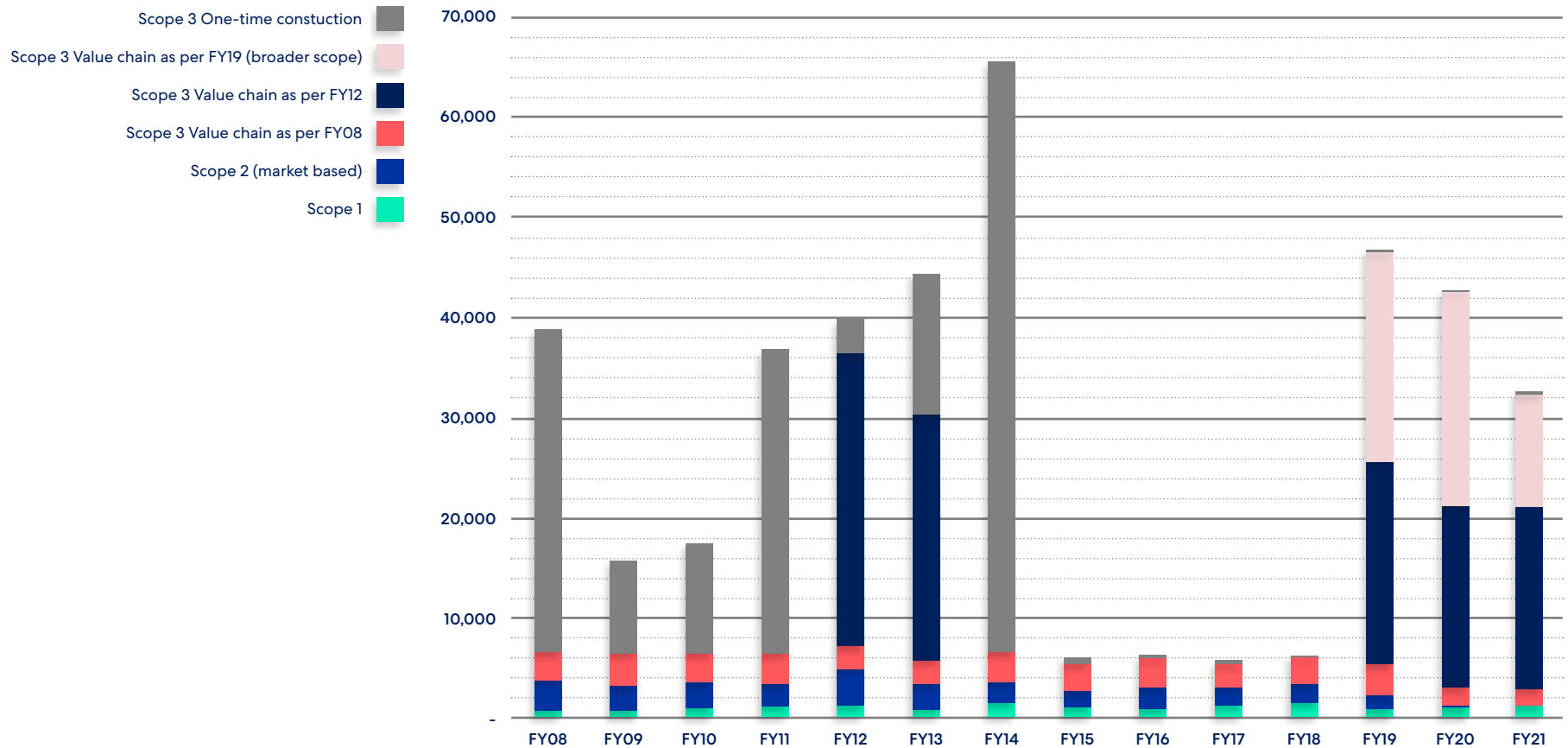
### 15.2 Total emissions by scope over time

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 Value chain as per FY08) are 55% lower in FY21 than they were in FY08, and are 61% lower than they were in FY12 when operational core emissions were at their highest.

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



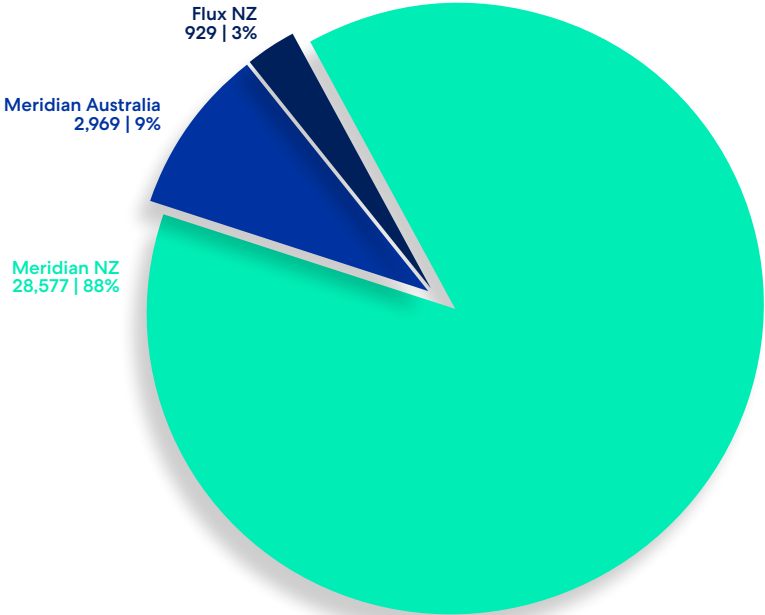
\*excludes energy purchased and on-sold, due to the scale of this emissions source.

**15.3 Total operational emissions by facility**

The following graph shows the total operational GHG emissions (tCO<sub>2</sub>e) by facility in the reporting period.

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 85% of the total group operational emissions. Emissions from purchased goods and services in the Meridian NZ facility make up 28% of the total group operational emissions while emissions from upstream transportation and distribution in the Meridian NZ facility make up 36% of the total group operational emissions.

**Figure 4: Total operational greenhouse gas emissions by facility (tCO<sub>2</sub>e)**



**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 has started a project to plant around 1.5 million trees across around 1,100 hectares of land. So far, we've planted 60,000 trees over 45 hectares, or 4% of our target.

The trees will be a mix of natives and exotics. Mixed planting is the best way to go, because the exotics are the 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. In the long term, the natives will 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**

We have an absolute target of halving our operational greenhouse gas emissions across the Group by 2030 when compared to our FY19 baseline.

Initiative	Progress
At least 50% air travel reduction	✓ We got very close to meeting this target with a 46% reduction in emissions from air travel when compared to FY20. We've achieved a 63% reduction in emissions from air travel when compared to our baseline of FY19.
Energy efficiency audits at our wind and hydro asset sites in New Zealand	✓ Energy efficiency audits at our hydro asset sites and a wind site were completed in FY21. Identified findings have been entered into the asset management plan for consideration and prioritisation.
90% battery electric passenger vehicles by the end of 2020	✓ 100% conversion of the light passenger fleet was achieved early 2021. Active investigation is underway to complete the conversion of the remaining light commercial fleet by the end of 2025.
Investigation of the electrification of Meridian's boat at Manapōuri	✓ Developing a business case.

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 emission lie. Achieving this will see us engaging and collaborating with our suppliers and a Group commitment to a roadmap that we will start to report on in the next financial year.

### 16.3 Emission reductions / increases

The total Group operational emissions in the base year were 46,465 tCO<sub>2</sub>e. This figure was restated in FY20 due to a material inclusion in Scope 3 for transmission operational emissions and restated again in FY21 to include an inflation adjustment in purchased goods and services. FY20 has also been restated to include the inflation adjustment for purchased goods and services. The FY21 adjustments have resulted in an overall reduction of 814 tCO<sub>2</sub>e in FY19 and 914 tCO<sub>2</sub>e in FY20.

This year total Group operating emissions are 32,475 tCO<sub>2</sub>e, a 25% decrease on the restated base year FY19 and a reduction of 10,969 tCO<sub>2</sub>e.

Table 5: Emission Reductions / Increases

Business activity	Category	Base Year 2018/19 tCO <sub>2</sub> e (restated FY21)	2019/20 tCO <sub>2</sub> e (restated FY21)	2020/21 tCO <sub>2</sub> e	% change from 2019/20	tCO <sub>2</sub> e change from 2019/20	% change from 2018/19 base year	tCO <sub>2</sub> e change from 2018/19 base year
<b>Operational emissions direct emissions (Scope 1)</b>	Stationary combustion	14	84	78	-6%	-5	454%	64
	Mobile combustion	1,021	873	806	-8%	-67	-21%	-214
	Fugitive emissions	64	220	492	124%	272	671%	428
	<b>Subtotal</b>	<b>1,099</b>	<b>1,177</b>	<b>1,376</b>	<b>17%</b>	<b>199</b>	<b>25%</b>	<b>277</b>
<b>Operational emissions indirect emissions (Scope 2)</b>	Electricity consumption (market based)	1,605	17	14	-14%	-2	-99%	-1,591
	<b>Subtotal (market based)</b>	<b>1,605</b>	<b>17</b>	<b>14</b>	<b>-13%</b>	<b>-2</b>	<b>-99%</b>	<b>-1,591</b>
<b>Operational emissions indirect emissions (Scope 3)</b>	Purchased goods and services	13,017	11,783	11,996	2%	213	-8%	-1,021
	Fuel & energy related activities	268	235	215	-9%	-20	-20%	-53
	Upstream transportation & distribution	21,731	22,223	11,632	-48%	-10,591	-46%	-10,099
	Waste generated in operations	56	157	269	71%	112	378%	213
	Business travel	2,218	1,286	722	-44%	-564	-67%	-1,496
	Employee commuting	792	640	813	27%	173	3%	21
	Downstream leased assets	5,678	5,926	5,438	-8%	-488	-4%	-240
	<b>Subtotal</b>	<b>43,761</b>	<b>42,250</b>	<b>31,085</b>	<b>-26%</b>	<b>-11,165</b>	<b>-29%</b>	<b>-12,676</b>
<b>Total Operational Emissions (S1, 2 &amp; 3)</b>		<b>46,465</b>	<b>43,444</b>	<b>32,475</b>	<b>-25%</b>	<b>-10,969</b>	<b>-30%</b>	<b>-13,990</b>

**17 Assessment of performance against relevant benchmarks**

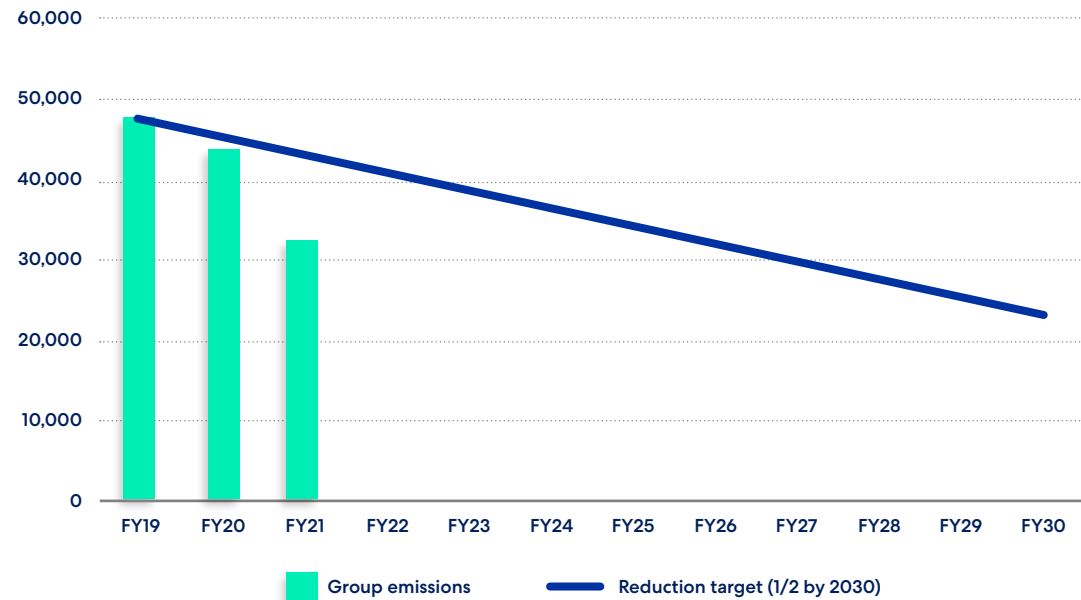
**ISO 14064-1, 9.3.2 (h)**

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). Therefore, we set ourselves some ambitious commitments from a FY19 baseline year, knowing that >95% of our operational GHG footprint is in our supply chain:

- Halving operational GHG emissions across the Meridian Group by FY30 versus a FY19 baseline
- Going net carbon neutral across our value chain from FY19 onwards

Total Group operational emissions in FY21 are 9,766 tCO<sub>2</sub>e or 23% lower than the straight-line reduction target. The reduction has been driven by lower emissions in upstream transportation and distribution.

**Figure 5: Total Group operational greenhouse gas emissions (tCO<sub>2</sub>e)**



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

## 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 <sub>2</sub> e)	Vendor cancelled	Calendar year offsets	Gold Standard VERs	Total offsets	Not offset
Meridian NZ	12	0	28,565	28,577	285
Meridian Australia	0	881,898	2,532	884,430	0
Flux	0	0	929	929	0
<b>Group</b>	<b>12</b>	<b>881,898</b>	<b>32,026</b>	<b>913,936</b>	<b>285</b>

### 18.1 Vendor cancelled

#### 18.1.1 EKOS approved credits

3 tCO<sub>2</sub>e was offset by Mevo on behalf of Meridian NZ for all travel using Mevo vehicles in FY21. 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 11 tCO<sub>2</sub>e. They have offset 9 tCO<sub>2</sub>e 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.

### 18.2 Calendar year (Climate Active approved credits)

Meridian Australia is certified carbon neutral against the Climate Active Carbon Neutral Standard for the emissions associated with the running of its corporate business, servicing of its windfarms, 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 Climate Active is by calendar year, therefore emissions reported in this inventory which occur in 2021 will be offset in the 2021 return. Those reported in this inventory which occurred in 2020 have been offset in the 2020 return. The total of these emissions as reported in this inventory is 881,898 tCO<sub>2</sub>e for FY21.

### 18.3 Gold Standard VERs

Meridian has surrendered Gold Standard VERs for its group operational emissions for the FY21 year excluding any offsets which have been, or will be, surrendered as identified above. The 32,026 tCO<sub>2</sub>e remaining have been offset. These credits are from two wind farm projects project in India.

## 18.4 NZ ETS

Meridian reports and surrenders credits for the New Zealand Emissions Trading Scheme (NZ ETS) for SF<sub>6</sub> emissions on a calendar year basis. These credits are not recorded as offsets in the calculation above as the

Government could choose to use these units to meet New Zealand's national emissions reduction target which would result in double counting.

## 19 Description of additional indicators

### ISO 14064-1, 9.3.2 (g)

There were no scope 1 emissions from the 13,432 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
Electricity generation (GWh)	13,559	14,865	13,432
Emissions from electricity generation (tCO <sub>2</sub> e)	0	0	0

## 20 Liabilities – GHG stocks held

Table 8: Greenhouse gas holdings

GHG holdings	Meridian NZ	Meridian Australia	Flux NZ	2020/21 kg	2020/21 tCO <sub>2</sub> e
HFC gas holdings [kg]	879	48	nm	926	1,795
SF <sub>6</sub> holdings [kg]	2,915	213	n/a	3,128	71,326

nm not measured  
n/a not applicable

The Meridian NZ facility has holdings of sulphur hexafluoride (SF<sub>6</sub>) 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 SF<sub>6</sub> is known to be held in fire extinguishing systems. Meridian's current management practices in relation to SF<sub>6</sub> are well aligned with best practice as defined by the Cigré

and IEC publications<sup>13</sup>. SF<sub>6</sub> 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.

13 SF<sub>6</sub> Recycling Guide Re-Use of SF<sub>6</sub> 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 (SF<sub>6</sub>) and its mixtures, August 2013

IEC 60480:2019 Specifications for the re-use of sulphur hexafluoride (SF<sub>6</sub>) and its mixtures in electrical equipment, April 2019

**21 Compliance with ISO 14064-1**

**ISO 14064-1, 9.3.1 (r)**

This GHG inventory report for the year ending 30 June 2021 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.



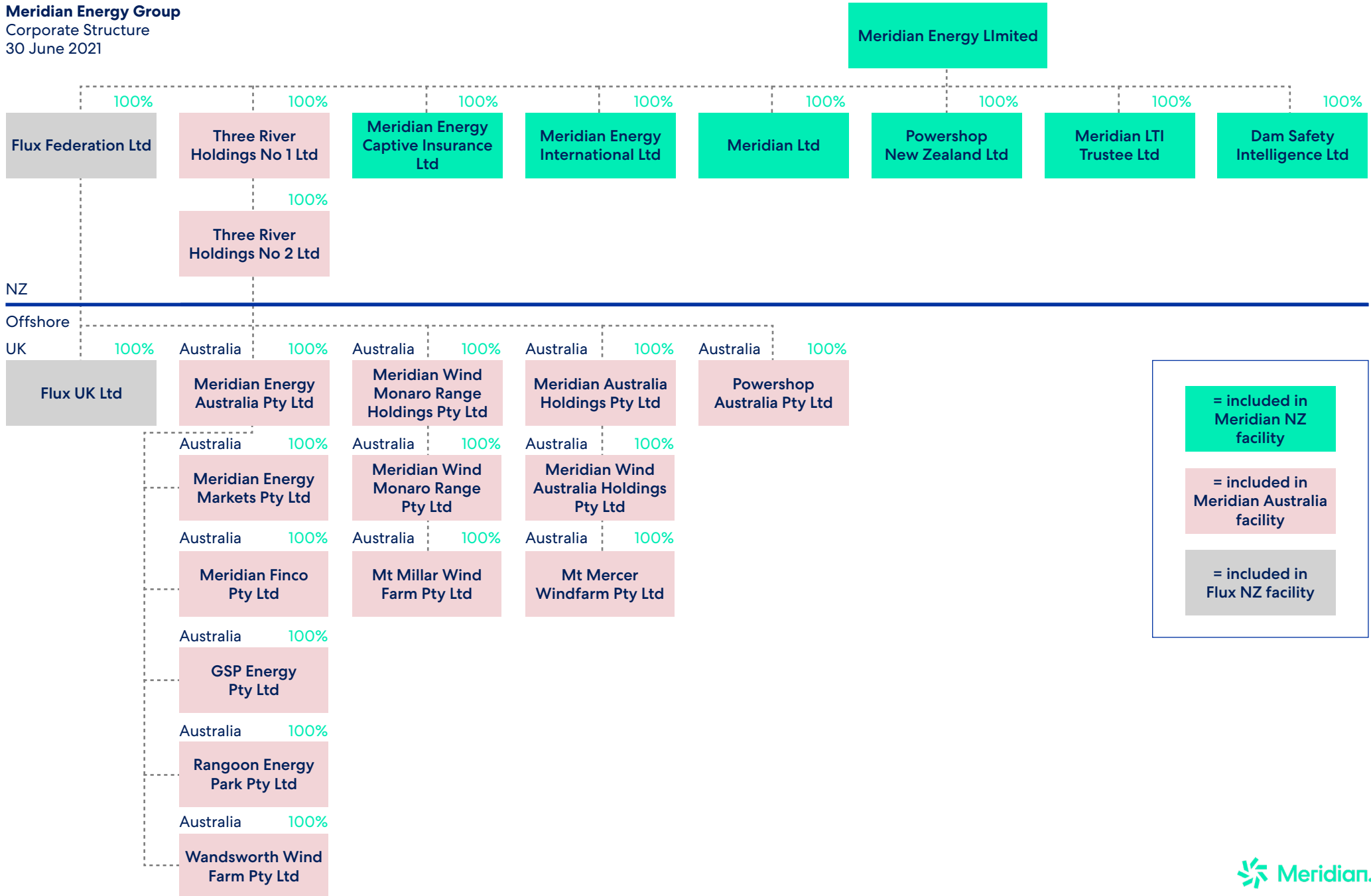
## Appendix 1 – Meridian Group treatment of emissions

Meridian Energy treatment of emissions from subsidiaries, associates, joint ventures and investments as at 30 June 2021.

Company name	Emissions source?	Legal structure & 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
Powershop New Zealand 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	Yes	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
Rangoon Energy Park Pty Ltd	Yes	Group companies / subsidiaries	100%	via Meridian Energy Australia Pty Ltd	AUS	Yes	Included in Meridian Australia facility
Wandsworth Wind Farm 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
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 2021



- = included in Meridian NZ facility
- = included in Meridian Australia facility
- = included in Flux NZ facility

## Appendix 3 ISO 14064-1 reporting index

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

## 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 2021, 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 2021 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.

We did not evaluate the security and controls over the electronic publication of the Inventory Report.

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) 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 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. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the directors of the Group for our work, for this assurance report, or for the conclusions we have reached.

## Opinion

In our opinion, the inventory report of Meridian Energy Limited for the year ended 30 June 2021 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  
24 August 2021  
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 2021 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.

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**Meridian.**

The Power to  
Make a Difference.