Enable – Fibre Broadband

Green House Gas Inventory Report

COVERING THE FINANCIAL YEAR 1 JULY 2021 TO 30 JUNE 2022.

Contents

Chapter One: Organisation goals and inventory objectives

1.1 About Enable

Enable is the fibre broadband network provider for greater Christchurch and has worked hard to bring ultra-fast fibre broadband to over 200,000 homes, businesses and schools in Christchurch and towns in the Waimakariri and Selwyn districts – as part of the national ultra-fast broadband initiative.

Enable is 100 percent owned by the people of Christchurch, through its parent company Christchurch City Holdings Limited (CCHL). With the UFB network primarily completed, part of Enable's focus is to ensure its connected customers constantly enjoy world-class fibre connectivity. Work is focused on network extensions (for example greenfields and subdivisions), connecting customers to the network, and operating and maintaining the network.

Enable's Vision is: "Our fibre network is the essential enabler of an economically and socially vibrant, connected, innovative and globally competitive greater Christchurch".

1.2 Persons responsible for the greenhouse gas emissions (GHG) inventory

The greenhouse gas (GHG) emissions inventory is ultimately the responsibility of Enable's Senior Leadership Team. The person responsible for developing this GHG emissions inventory is Melissa Keys, Sustainability Lead.

1.3 Reporting period and frequency of reporting

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

1.4 Uses and users of this report

The intended uses of this report are to provide a verified inventory against which to:

- Reduce GHG emissions and measure progress towards targets
- Inform operational decisions, including opportunities to improve energy efficiency
- Contractor engagement, to bring GHG emissions from core business activities Enable outsources into the inventory
- Inform annual reporting.

The intended users of this report are:

- *The Board of Directors and the Senior Leadership Team:* To update on increases or decreases in GHG emissions and seek approval for initiative investment to meet targets and reduce overall emissions.
- *Enable staff:* To inform and educate staff of Enable's GHG emissions footprint and actions they can take to help reduce their emissions.
- *Christchurch City Council and Christchurch City Holdings Limited:* To update on GHG emissions footprint and progress towards meeting targets.

Chapter Two: Organisational and reporting boundaries

1.7 Organisational and reporting boundaries

The organisational boundaries were set with reference to the methodology described in the GHG Protocol Corporate Reporting and ISO14064-1-2018 Standards. The operational control approach was adopted to determine the boundaries for Enable's carbon footprint. Under the operational control approach an organisation must account for all GHG emissions and/or removals from facilities over which is has operational control. *Appendix One* provides a detailed list of the assets owned and controlled by Enable and the related GHG emission categories used in reporting. *Figure One* on page 5 illustrates the relationships between Enable's organizational and reporting boundaries.

1.8 Criteria used to evaluate the significance of indirect emissions:

The following criteria were used to evaluate the significance of indirect emissions, in context of the intended uses of this inventory detailed in section 1.4.

1. **Magnitude**: The indirect emissions that are assumed to be quantitatively substantial.
2. **Level of influence:** The extent to which Enable can monitor and reduce emissions.
3. **Access to data:** The ability for Enable to access data in a cost effective, efficient, timely way to accurately measure the indirect emissions source
4. **Outsourcing:** The indirect emissions resulting from outsourced activities that are typically core business activities
5. **Staff engagement:** The indirect emissions that could motivate Enable people to change their behaviors and reduce energy use.
6. **Shareholder interest:** The indirect emissions that Enable's shareholders (ie CCHL and CCC) would expect it to monitor and report on.

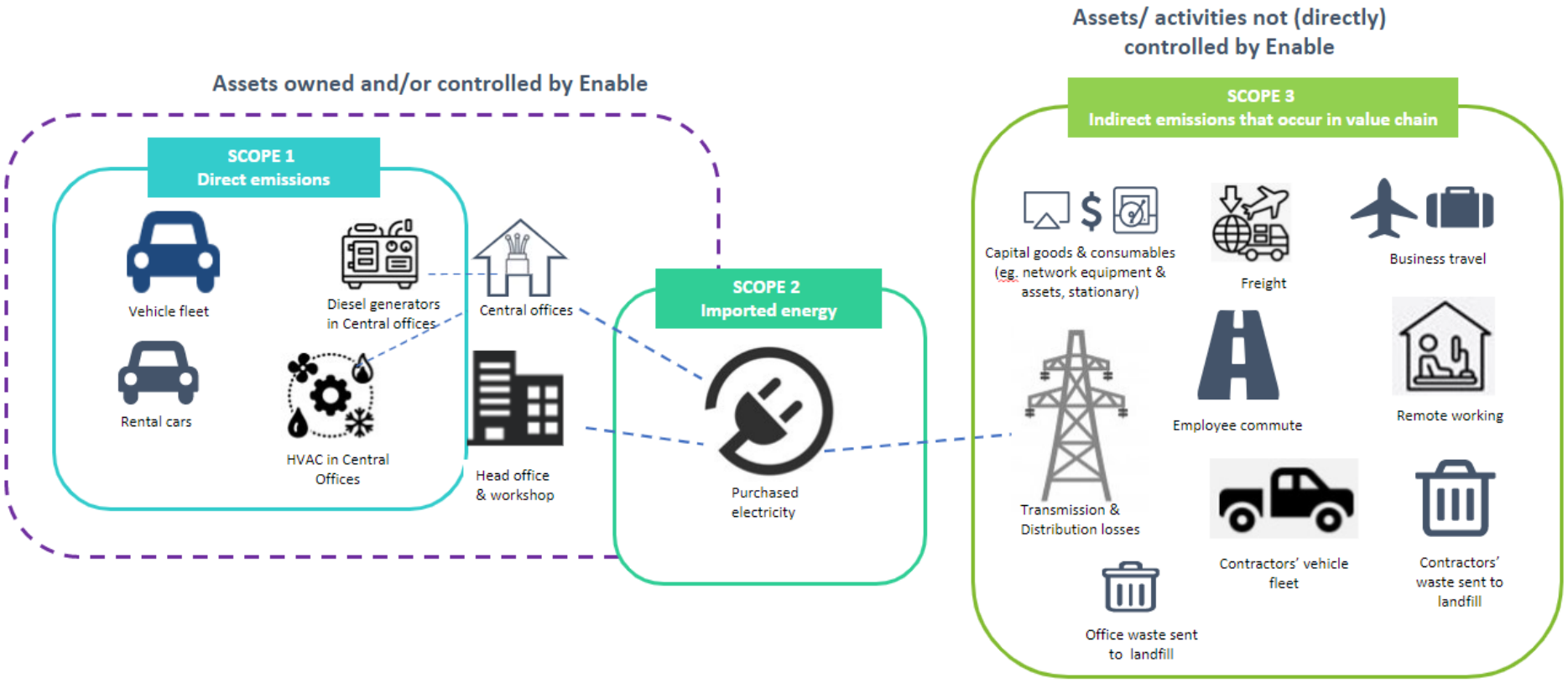
1.9 Inclusion and exclusion of indirect GHG emission sources

Indirect emissions were evaluated for inclusion and exclusion by applying the criteria detailed above. *Appendix Two* details the emissions sources identified for inclusion and exclusion in this inventory, the data collection methodology used and data quality, and the reasons for any exclusions.

1.10 Data collection and quantification

Appendix Three details data collection and quantification methodology and uncertainties. In summary, wherever possible Enable used measured data for emission source quantities. The information was sourced directly from the Enable's suppliers, contractors, and key staff. Enable uses BraveGen's carbon emissions management software to manage and report GHG emissions

Figure One: Relationship between Enable's organisational and reporting boundaries



Chapter Two: GHG Inventory of emissions

2.1 Base year

The FY20 GHG inventory is Enable's base year. This inventory provides the benchmark against which Statement of Intent targets, science-based targets and the target to achieve net zero emissions by 2030 will be measured.

Enable's total reinstated[1] emissions in the FY20 base year were 667 tonnes of carbon dioxide equivalent (tCO_2e), and scope 1 and 2 emissions were 227 tCO2e. This figure is being reinstated in FY22 to include total estimated contractor fuel emissions from new connections (installations) and inactive reconnected installations. Contractor fuel emissions were partially included in FY20 (39%) and FY21 (67.5%)[2], the reason for estimating total contractor emissions and restating the base year is because contractor emissions will be included in Enable's scope 3 science-based reduction target for which FY20 will be the base year.

The reinstated total measured Enable emissions in the base year were 1,197 tCO2e. The reported and reinstated baselines are documented in Chapter Three. Refer to *Appendix Four* for details of the methodology used to estimate total contractor emissions to reinstate FY20 base year and FY21 emissions.

2.2 Base-year recalculation procedure

Enable's base-year recalculation procedure is as follows:

We will 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 a business and/or significantly diversified our revenue stream
- If we significantly changed the scope of what we were measuring in the value chain.

New scope 3 emission sources are being measured and reported for the first time in the FY22 inventory. FY22 will become the base year for these new emission sources – freight, staff commute & remote working emissions - against which to measure future emissions changes.

2.3 FY22 reported emissions

The total reported GHG emissions for Enable for the period 1 July 2020 to 30 June 2021 were 976 tCO_2e. The following emission sources were measured for the first time in the FY22 inventory:

- International and domestic freight

[1] This figure was reinstated in FY21 from the original verified 696 tCO2e to include updated refrigerant emissions from HVACs and updated contractor's waste emissions - due to actual data being obtained rather than relying on estimates.

[2] Fuel from Civtec, one of Enable's 3 contractors was included in FY20 (and FY21. Fuel from Downer and MMC was not included due to difficulties obtaining data. In FY22 Civtec was appointed as Enable's primary contractor.

- Staff commuting to work
- Staff remote working.

FY22 will become the base year for the new emission sources against which future increases and decreases will be measured.

Scope 1 and 2 emissions for FY22 were 209 tCO_2e (21% of total reported emissions).

Scope 3 emissions (excluding new emission sources added in FY22) were 864 tCO_2e.

Enable's GHG emissions footprint is dominated by scope 3 emissions, which make up 79% of total emissions.

- Fuel used in contractor's (Civtec's) vehicle fleet was the highest source of emissions 601.5 tCO_2e making up 62% of total emissions.
- The second highest source of emissions was purchased energy used in the Central offices 161 tCO_2e (17% of total emissions and 85% of scope 1 and 2 emissions).

Note: The latest Ministry for the Environment guidance has rental cars use assigned as scope 3/category 3 rather than scope 1. Rental car emissions have therefore been categorised and reported as scope 3 instead of scope 1 (as per FY20 and FY21). Given rental car emissions are de minimis at 0.08tCO2e, there is no material impact on reported scope 1 emissions.

2.4 Biogenic emissions

Biogenic sources of carbon typically arise from the burning of biomass and biofuel, operating wastewater treatment plants and composting biomass. None of these activities is undertaken by Enable. The Ministry for the Environment emission factors have been used and they exclude biogenic carbon dioxide emissions.

Figure Two: Enable's FY22 GHG emissions by scope and source (%)

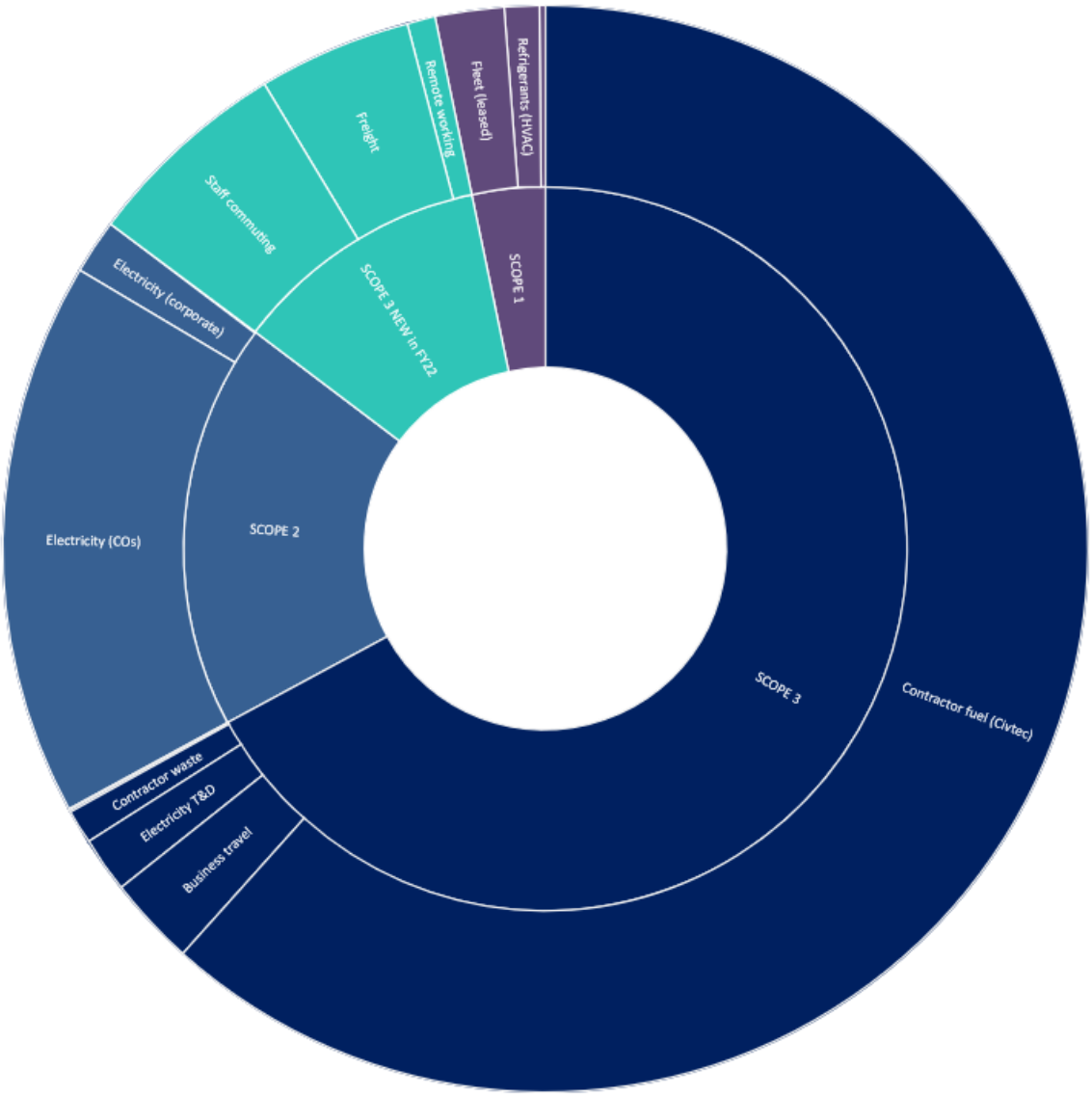


Table One: Total FY22 GHG emissions by category, scope and source (tCO2e)

ISO Sub-category	Source	tCO2e	% of Total	% Scope 1 & 2	tCO2	tCH4	tN20	HFCs	Other
Scope 1 - Direct emissions and removals									
1 Fugitive emissions	Refrigerants (HVAC)	10.1	1.0	5				10.11	
1 Mobile combustion	Fleet (leased)	20.1	2	10	19.46	0.12	0.48		
1 Stationary combustion	Diesel generators	1.6	0.2	1	1.63	0.01	0.00		
Scope 2 - indirect emissions from imported energy									
2 Purchased energy (location-based method)	Electricity (corporate)	15.7	2	7	15.26	0.41	0.03		
	Electricity (COs)	161.9	17	77	157.37	4.2	0.3		
	Electricity (vehicles)	0.2	0.0	0.11	0.22	0.01	0.00		
Scope 3 - indirect emissions from purchased goods and services									
3 Transportation	Accommodation	0.4	0.0						0.36
	Air travel	25.4	3		25.04	0.06	0.28		
	Rental cars	0.08	0.0	0.04	0.08	0.00	0.00		
	Contractor's fuel (Civtec)	601.5	62		585.95	2.79	12.81		
	Freight (domestic)	5.1	0.5		5.02	0.02	0.07		
	Freight (international)	39.2	4.0		38.98	0.00	0.21		
	Staff commuting	60.1	6		58.16	0.44	1.54		
	Taxi	0.2	0.0		0.19	0.00	0.00		
	Remote working	8.3	0.8		7.97	0.32	0.01		
4 T&D losses	Electricity T&D	16.1	2		15.65	0.42	0.03		
4 Waste	Contractor's waste to landf	10.1	1.0			10.09			
	Office waste to landfill	0.3	0.0			0.35			
Total		**976**			**930**	**19**	**16**	**10**	**0**
Scope 1 & 2		**210**	21		**194**	**5**	**1**	**10**	**0**
Scope 1, 2, & 3 excluding new emission sources added in FY22		**864**	88		**821**	**18**	**14**	**10**	**0**

Chapter Three: GHG emission removals and reductions

3.1 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.

3.2 Emission reduction initiatives

The following emissions reductions initiatives were implemented in FY2022 year:

- **Electric and hybrid vehicles** – two additional electric and six hybrid vehicles joined the fleet in FY22. 70% of the fleet is now electric or hybrid.
- **Solar panels** - Solar panels were installed on three Central Offices – Mt Pleasant, Burwood and Rolleston. Approval has been given to install solar on the remaining COs in FY23 and 24. The panels will generate up to 20% of the COs energy requirements.
- **Science-based targets** – Scope 1 and 2 Science-based targets were adopted, alongside an emissions reduction plan and associated investment. Scope 3 targets and reduction plan were drafted.
- **Contractor Sustainability KPIs** – To support our primary contractor – Civtec – to reduce their emissions we have established KPIS with (cash) incentives linked directly to fuel and waste reduction targets.

3.3 Emission increases and reductions

A target was set within Enable's Statement of Intent to reduce scope 1, 2 and scope 3 (excluding staff commute) emissions by 17% (against verified FY2020 base year) to 581 tCO2e.

Total reported emissions

Enable's total reported emissions in FY22 are 976 tCO2e. As noted in section 2.1, FY20 base year emissions are being reinstated to 1,197 tCO2e to include total estimated contractor fuel. Given new emission sources have been added in FY22, increases and decreases in total reported emissions in FY20 and FY22 are not directly comparable.

It is anticipated that Enable's total reported emissions will continue to increase as its GHG emissions measurement and management continues to mature and additional emission sources are identified.

Decrease in Scope 1, 2, and 3 emissions excluding new emission sources added in FY22.

For the emission sources that are directly comparable to the restated 2020 base year – ie scope 1 and 2, scope 3 (excluding staff commute, remote working and freight) emissions decreased by 28% (333.4 tCO2e) from the restated FY20 base year (refer to *Figure Three* and *Table Two*). Reductions were seen in 12 of the 14 directly comparable emissions categories.

The reasons for these decreases can be directly attributed to:

- Decrease in new contractor gross installations and inactive reconnected installations from 21,666 in FY20 to ~12508 in FY22, which decreased contractor fuel emissions by 28%. While overall contractor emissions have decreased, emissions per new gross connections have increased by ~11%.

- 70% of the fleet being converted to electric or hybrid vehicles and the overall reduction in fleet size, resulting in a 60% reduction in fleet emissions.
- Moving Enable's head office to a Greenstar 4 building in FY2021, resulting in a 30% reduction in head office emissions from FY2020.
- The impact covid 19 has had on our business travel. which is responsible for the reductions in air travel domestic (60%) and international (75%), taxi (69%) and accommodation (60%) emissions.

Scope 1 and 2 emissions

- Scope 1 and 2 emissions decreased by 18 tCO2e (8%), primarily due to the fleet reductions noted above.
- The increase in purchased electricity emissions in the Central Offices by 22tCO2e (16%) from FY20 base year can be attributed to a 21% increase in active connections across the Central offices. While overall CO purchased energy emissions have increased, emissions per active connection have reduced by 5% to 1.12 kgCO2e.

Figure Three: Total GHG emissions by scope over time (tCO2e)

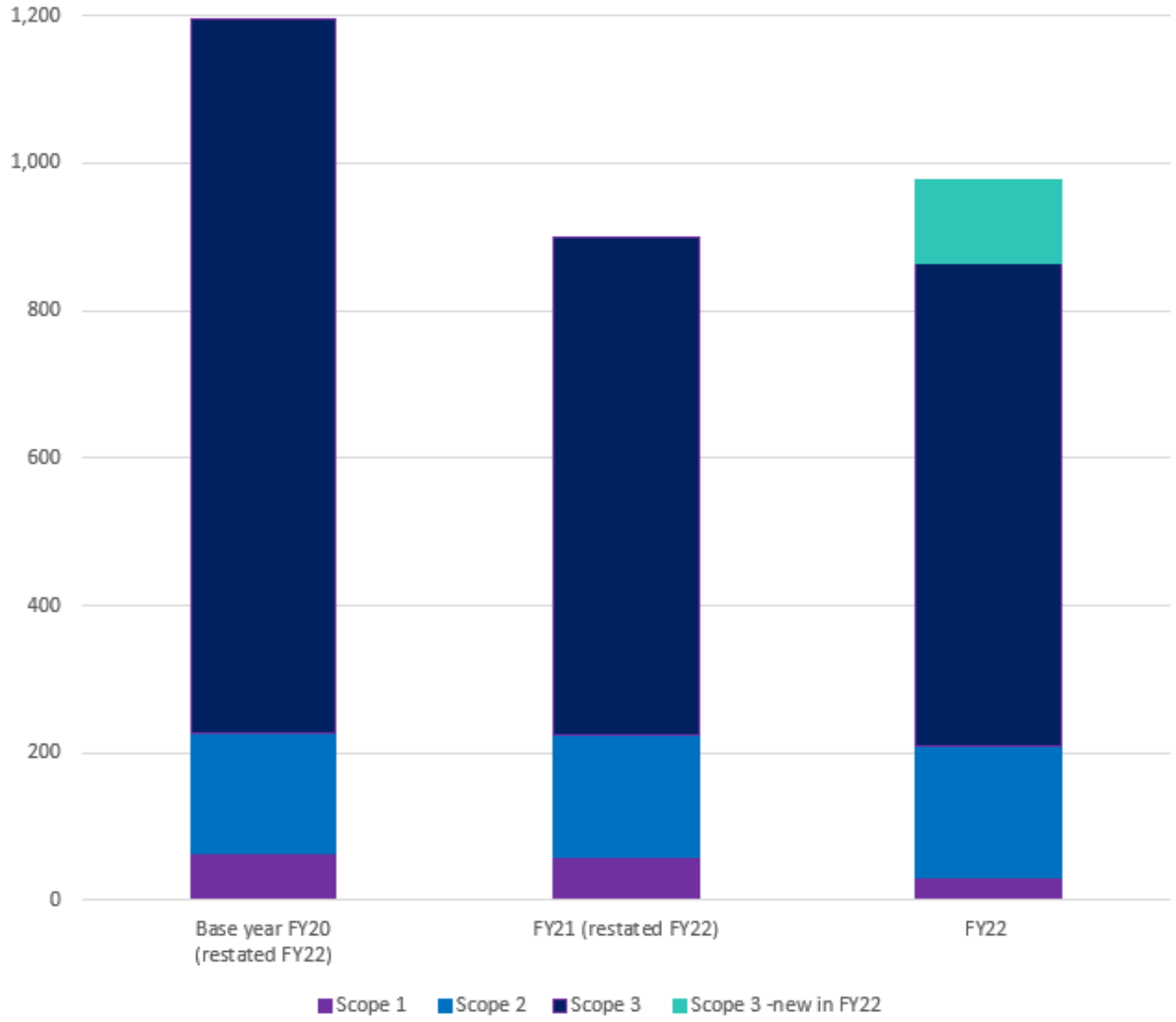


Table two: Enable's GHG emissions reductions/increases overtime (tCO2e)

KEY	Restated	Decrease	Increase	Not comparable

ISO Sub-category	Source	Base year FY20 (restated FY21) tCO2e	Base year FY20 (restated FY22) tCO2e	FY21 tCO2e	FY21 (restated FY22) tCO2e	FY22 tCO2e	% change from restated FY21	tCO2e change from restated FY21	% change from restated FY20 base year	tCO2e change from restated FY20 base year
Scope 1 - Direct emissions and removals										
1 Fugitive emissions	Refrigerants (HVAC)	12.9	12.9	12.9	12.9	10	-22	-3	-22	-3
1 Mobile combustion	Fleet (leased)	51	50.6	43	42.9	20	-53	-23	-60	-31
1 Stationary combustion	Diesel generators	1.3	1.3	3	3.0	2	-45	-1	28	0
Scope 2 - indirect emissions from imported energy										
2 Purchased energy (location based-method)	Electricity (corporate)	22	22.4	19	18.8	16	-16	-3	-30	-7
	Electricity (COs)	140	139.6	146	146.3	161.9	11	16	16	22
	Electricity (vehicles)	0.00	0.0	0.00	0.0	0.2		0.2		0.2
Scope 3 - indirect emissions from purchased goods and services										
3 Transportation	Accommodation	0.9	0.9	0.5	0.5	0.4	-27	-0.1	-60	-0.5
	Air travel (domestic)	39	38.6	20	19.6	16	-16	-3.2	-58	-22.3
	Air travel (international)	37	36.7	0.00	0.0	9	100	9	-75	-27.7
	Rental cars	0.3	0.3	0.1	0.1	0.1	-43	-0.1	-74	-0.2
	Contractor's fuel (Civtec)	338	867	424	627.8	601.5	-4	-26.2	-31	-265.4
	Freight (domestic)	0.00	0.0	0.00	0.0	5		5		5
	Freight (international)	0.00	0.0	0.00	0.0	39		39		39
	Staff commuting	0.00	0.0	0.00	0.0	60		60		60
	Taxi	0.6	0.6	0.3	0.3	0.2	-43	-0.1	-69	-0.4
	Remote working	0.00	0.0	0.00	0.0	8		8		8
4 T&D losses	Electricity T&D	14	14.0	14	14.1	16	14	2	15	2
4 Waste	Contractor's waste to landfill	10	10.4	11	11.2	10	-10	-1.1	-3	-0.4
	Office waste to landfill	1.2	1.2	1	1.0	0.3	-66	-0.7	-71	-0.9
Total		667	1,197	694.93	898	976	9	281	-18	-221
Scope 1 & 2		227	227	224	224	210	-6	-14.3	-8	-17.2
Scope 1, 2, & scope 3 excluding new in FY22		667	1,197	684	898	864	-4	-34.7	-28	-332.8

Chapter Four: Compliance and Verification

4.1 Compliance

This GHG inventory report has been prepared in accordance with the GHG Protocol Corporate Reporting and ISO14064-1-2018 standards.

4.2 Verification of this GHG emissions inventory

This GHG inventory report was verified by McHugh and Shaw, a third-party independent assurance provider. A reasonable level of assurance has been given for Scope 1 and 2 (ISO category 1 and 2) emissions and limited assurance for Scope 3 (ISO Cat 3-6) emissions.

Appendix One: Organisational boundary assets & reporting boundary category

Asset	Description	Owned or controlled?	Reporting boundary
UFB network layer 1 assets	Provision of unlit optical fibre	Both	None associated emissions – so no assigned emissions category
UFB network layer 2 assets	12 Central Offices (COs) buildings which contain layer 2 assets	Both	Indirect emissions from purchased electricity (scope 2)
	Fire suppressants and HVAC	Both	Direct emissions (scope 1) fugitive emissions
	Back-up generators (diesel)	Both	Stationary combustion, Direct emissions (scope 1)
	Network equipment	Both	Indirect emissions from capital goods & consumables (scope 3)
Rangiora workshop	Small workshop space	Both	Indirect emissions from purchased electricity (scope 2)
Leased Head office	Level 3/93 Cambridge Terrace, Christchurch Central City	Controlled	Indirect emissions from purchased electricity (scope 2) Indirect emissions from waste (scope 3) Indirect emissions from capital goods & consumables (scope 3)
Leased vehicle fleet	Vehicles leased via fleet partners	Controlled	Mobile combustion, Direct emissions (scope 1)
Contractors' vehicle fleet & waste	Vehicles used and waste produced from network extensions, network operation & maintenance, CO facilities management.	Neither	Indirect emissions from transportation & waste (scope 3)

Appendix Two: Emission sources identified for inclusion and exclusion

Table A: Emissions sources included in the GHG inventory

This table details the emissions sources identified for inclusion and includes information on data sources, methodology and data quality.

GHG Protocol & ISO 14064-1-2018 reporting category	Activity/ Emission source	Data Source	Methodology, data quality, uncertainty
Scope 1 – Category 1 Direct GHG emissions and removals			
Stationary combustion	Diesel used to run back-up generators in Central Offices	Total Power Solutions	M1: Accurate records of litres used. Note diesel consumed is primarily for generator testing.
Mobile combustion	Fuel used in leased vehicle fleet	Fleet Partners	M1: Accurate records of litres used supplied by fleet partners
Fugitive emissions	HVAC – refrigerants – 407C	Hartnell Coolheat Ltd	M1: Accurate records of R407C refrigerant top-ups (kgs) provided
Scope 2 -Category 2 indirect emissions from imported energy			
Purchased energy	Leased Head Office (Cambridge Tce)	Meridian electricity bills	M1: Accurate records from billing system. Electricity emissions have been calculated using the location-based method.
	Rangiora workshop		
	Central Offices (COs)		
	Electric vehicles	ChargeNet invoices	M1: Accurate records from billing system. Note data for two of three vehicles only. Electricity emissions have been calculated using the location-based method.

Scope 3 – Category 3 indirect emissions from transportation			
Indirect emissions from transportation	Taxi travel	P card or expense claims from Enable staff	M2: Records of expenditure for taxis.
	Hotel stays (Accommodation)	Orbit World Travel, monthly environmental impact reports	M1: Hotel nights by city/country provided
	Air travel	Orbit World Travel, monthly environmental impact reports	M1: Details of booking class, domestic, trans-Tasman or international, kms travelled, and number of travellers provided.
	Rental cars	Orbit World Travel, monthly environmental impact reports	E2: Number of rental car days provided. Assumed 50km travelled per day and rental vehicles are petrol, which is likely higher than actual VKT.
	Freight - international	Tax Invoices from DHL, FedEx Express, Channel	M1: Details of transport method, location of origin, weight (kgs), volume. Distance travelled estimated based on location of origin and tonne.km calculated based on estimated distance travelled and weight.
	Freight - domestic	Mainfreight Ltd, Enable emissions dashboard	M1: Personalised emissions dashboard provided by Mainfreight containing transport mode, tonne.km, origin, destination, weight, volume and Mainfreight specific emissions factors and MfE default emissions.
	Staff commute	Staff survey	E2: Staff survey April 2022. Over 73% of staff responded. Results extrapolated to represent 100% of staff and full year.
	fuel used in Contractor's (Civtec) vehicle fleet for new connections (installations)	Civtec	M1: Fuel data provided by Civtec which is obtained from McFall fuel (accurate records of litres of fuel via McFall invoices have been made available).

Scope 3 – Category 4			
Transmission and Distribution losses	T & D losses for electricity consumed in offices	Meridian electricity bills	M1: Accurate records from billing system.
Products used by an organisation	Energy consumed from staff remote working	Staff survey	E3: Staff survey April 2022. Over 73% of staff responded. Results extrapolated to represent 100% of staff and full year.
Waste	Office waste sent to landfill	Deemac Services, cleaning contractor.	M2: Landfill and recycling bags are weighed daily (kgs) by Deemac and data provided to Enable monthly.
	Contractor's (Civtec) waste sent to landfill	Waste Management Sustainability Reports, via Civtec	M2: Civtec has had accurate weight measurements since December 2021, provided in Waste Management's sustainability reports. Prior to this, the Ministry for the Environment's estimates of Waste emissions based on a volume/weight ratio were used. However, in December 2021 it was found that this estimate was ~5x the actual waste emissions. Therefore, Civtec used the actual waste weight/volume ratio from operations in December 2021 to prorate emissions for July 2021-November 2021. Waste quantities and content had not changed materially in that time.

Table B: Emissions sources excluded from the GHG inventory

GHG Protocol & ISO 14064-1 reporting category	Activity/ Emission source	Reason for exclusion & methodology used to estimate	Estimated size of exclusion tCO_2e	% Of total Scope 1 & 2
Scope 1 – Category 1 Direct GHG emissions and removals				
Fugitive emissions	Refrigerants (HFC) Vehicles	Access to data, magnitude of emissions low, level of influence low, staff engagement and stakeholder interest low. Based on 0.0009kgCO_2e from HVAC per kgCO_2e from combustion of fuel	.046	0.022%

	Refrigerants (HFC) Fridges	Difficult to obtain data. Not considered significant source of emissions (there are two fridges in the corporate offices). Based on average of 0.5kgCO_2e per FTE. FTE of approximately 132 for FY22.	.066	0.03%
Scope 2 – Category 2 Indirect emissions from imported energy				
Purchased energy	Electric vehicles	One of three EVs Magnitude/volume of emissions is low. Access to data is difficult as vehicle currently charged at employee's home. Estimated based on estimated KMs from fleet partners compliance report using MfE's emission factors.	0.15	0.07%
Scope 3 – Category 4 indirect emissions from products an organisation uses				
Capital goods and consumables	Capital goods	Difficult to capture meaningfully. But will explore for inclusion in future inventories.	Unknown	N/A
	Purchased goods and services	Difficult to capture meaningfully. But will explore for inclusion in future inventories.	Unknown	N/A
Scope 3 – Category 5 indirect emissions associated with the use of products from the organisation				
Emissions associated with the use of products from the organisation	Energy consumed by customer premise equipment (ONU + router)	Sapere research highlights customer equipment is a major source of power use ~88-98% of total energy consumption in the access network. kgCO2e per user pa is 15. Access to data is poor, unsure how many users we currently have/have data on active connections only. At this stage stakeholder expectation to include these emission sources in our inventory is low but will increase as we integrate sustainability into our brand value.	~1770	N/A
	Customer premise equipment end of life disposal	Sapere research emissions from open loop recycling of ONU + router = 15.4gCO2e. Access to data is poor - unknown what quantities of CPE are disposed of each	Unknown	N/A

		year. At this stage stakeholder expectation to include these emission sources in our inventory is low.		
	Energy consumed by city wifi	City wifi was launched on 27 June 2022. Magnitude of emissions not yet unknown - energy consumed is purchased by CCC. Next step is to work with CCC to obtain energy data so we can include in our FY23 inventory.	Unknown	N/A

Appendix Three: Data collection, quantification and uncertainties

Data collection and quantification

Wherever possible, Enable used measured data for emission source quantities and the measure that relates as close as possible to the point of combustion or emission (e.g. litres of fuel, rather than kilometres travelled). The information was sourced directly from the following Enable people, suppliers and contractors:

- Petru Hoju, Enable's Facilities Manager (diesel generator data via Total Power Solutions and HVAC data via Hartnell Coolheat Ltd)
- Megan Wilkes, Enable's Assistant Accountant (Taxi data via Pcards and expense claims)
- Orbit World Travel (air travel, rental car and accommodation data)
- Meridian Energy (electricity consumption data for corporate offices and central offices)
- Fleet Partners (leased fleet vehicle travel and fuel data).
- Deemac Services (head office waste data)
- Honour Bowler, CIVTEC (contractor fuel and waste data).

Collection of the information was centralised in a designated folder in Onedrive and subsequently uploaded to BraveGen.

In FY2022 Enable commissioned BraveGen's carbon emissions management software to manage and report GHG emissions. Emissions source activity data was multiplied by GHG emissions factors – uploaded into BraveGen. Emissions factors were sourced from the Ministry for the Environment[3]. All calculations in this report are expressed in total tonnes of carbon dioxide equivalent (tCO_2e).

Impact of uncertainty

There is some level of uncertainty associated with preparing a GHG emissions inventory. To minimise this uncertainty source data has been selected from a verifiable source and any further uncertainty is detailed in the tables in Appendix One and description of planned actions for reducing uncertainty for future inventory.

Data management	Data collection		
	Measured	Derived	Estimated
Robust	M1	D1	E1
Satisfactory	M2	D2	E2
Questionable	M3	D3	E3

Measured = Data directly provided by a service provider, contractor or directly obtained from a monitoring device. For example electricity invoices, contractor receipts, emissions monitoring equipment, incident reports, consultant reports etc.

[3] https://environment.govt.nz/guides/measuring-reporting-and-offsetting-greenhouse-gas-emissions/

Derived = Data obtained from calculations, mass balances, use of physical/chemical properties, use of coefficients and emission factors etc., for example converting cubic meters of waste into tonnes.

Estimated = Usually, where there is no other available method for obtaining the data. Such data could be prorated on previous results, use of precedents or historical data, or even a calculated guess.

Robust = Evidence of sound, mature and correct reporting system, where room for error is negligible. Examples would include use of spreadsheets, databases and on-line reporting.

Satisfactory = Examples would include manual, but structured keeping of records, files and results. Some potential for error or loss of data.

Questionable = No logical or structured approach to data or record keeping. High potential for error &/or loss of data. Data may appear to differ from those initially reported.

Appendix Four: Methodology used to estimate total contractor emissions to reinstate FY20 base year and FY21 emissions.

Total new gross connections (installations) and inactive reconnected installations (new installations) in FY20 and FY21 were used to estimate the total contractor emissions. The total new gross connections Civtec installed in each financial was divided by Civtec's total fuel emissions in the given year – this provided an estimated tCO2e per connection. The estimated tCO2e per connection was multiplied by the total new installations in each financial year to give an estimated total tCO2e. A limitation with this method is that it looks at new connections (installations) and reconnected inactive connections only. It does not estimate contractor fuel used for network extensions or operation and maintenance work due to the challenges with estimating/quantifying. Based on this contractor emissions in FY21 and FY20 would have been higher. The data quality has been assessed by Enable as E2.