



ELECTRICITY AND GAS
DISTRIBUTION SERVICES

Greenhouse Gas Emissions Inventory Report

01 April 2020 – 31 March 2021

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Executive Summary

Powerco's vision is to be a reliable partner in delivering New Zealand's energy future. We see our action on climate change and greenhouse gas (GHG) emissions as being a key contribution to this. As part of Powerco's Climate Change Policy, we commit to offsetting any remaining emissions at 2030 from our scope 1 and 2 emissions, excluding those associated with electricity and gas line losses. The focus of our mahi (work) extends to collaborating with industry to reduce where practicable our largest scope 3 emissions"

This GHG inventory report covers the financial year ending 31 March 2021 (FY21).

Our total reported emissions for FY21 decreased by 1.87% compared with the FY19 base year, whilst our scope 1 and scope 3 emissions increased. The main drivers for these increases are as follows:

- Improved reporting and data availability for scope 1 emissions sources meant that emissions from Stationary Combustion – Generators¹ were included for the first time in FY21.
- Scope 3 emissions increased due to an expanded electricity network works programme. Under our Customised Price Path, our contractors have driven more kilometres on our behalf in FY21 as part of an increase in maintenance and construction work. In addition, better reporting and data availability has meant the inclusion of leased downstream assets and additional purchased goods and services for the first time in FY21.

Further detail on the emission sources that make up each scope category, is provided in section 4 of this report.

Table 1: GHG emissions (tCO₂e) by scope

Scope	FY21	Base year FY19	Variance	
	tCO ₂ e	tCO ₂ e	tCO ₂ e	%
1	7,927.87	7,744.08	+183.79	+2.37
2	28,185.58	30,898.12	-2,712.54	- 8.78
3	5,428.6	3,693.02	+1,735.58	+46.99
Total	41,542.05	42,335.22	-793.17	-1.87

Powerco's emissions reduction target is to first focus on reducing emissions, and then offsetting any remaining scope 1 and 2 emissions, excluding those associated with distribution line losses by 2030. Powerco has chosen to exclude line losses from its offsetting targets for the following reasons:

- As New Zealand moves towards its goal of 100% renewable electricity generation, the emissions associated with electricity line losses will reduce similarly. This will occur irrespective of any influence from Powerco.
- Emissions associated with the line losses are already accounted for at the point of obligation through New Zealand's Emissions Trading Scheme
- Line losses are largely uncontrollable by distribution companies, other than through options that would result in a materially large cost to consumers.

During FY21, we have developed an emissions reduction roadmap to Powerco's emissions reduction plans.

¹ Generators include both those owned and operated by Powerco and temporary/portable generators. We have spent time since FY19 gathering the data sources together.

Introduction

Our vision

Our vision is to be a reliable partner in delivering New Zealand's energy future. To do this, we apply a sustainability mindset to our investment decisions and operational practices to minimise their impacts on the climate. Reporting of greenhouse gas (GHG) emissions supports our sustainability commitments and our desire to align Powerco with the United Nation's Sustainable Development Goal 13 "Climate Action". The decarbonisation of New Zealand's economy and our own carbon emissions have been identified by our stakeholders as a material sustainability issue.

This Inventory Report is a complete and accurate account of the GHG emissions that result from Powerco's operations within the declared boundary and scope for the reporting period.

Powerco's reporting processes and emissions categorisation is consistent with international protocols and standards and has been prepared in accordance with:

- *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004)*
- *Greenhouse Gas Protocol: Corporate Value chain (Scope 3) Accounting and Reporting Standard (2011)*
- *Global Reporting Index (GRI) standards, specifically GRI 305: Emissions (2016)*²
- *ISO14064-1:2018*

This is our second public GHG emissions disclosure and relates to the year ended 31 March 2021.

Powerco's sustainability strategy

Powerco is one of New Zealand's largest electricity and gas distributors. We strive to deliver reliable energy to our customers by keeping the lights on and gas flowing to around 1.1m customers (across 452,000 homes, businesses, and organisations) across many North Island regions. These consumers are served through Powerco assets including approximately 30,000 kilometres of electricity lines and 6,000 kilometres of gas pipelines³.

Our Corporate Sustainability strategy covers the triple bottom line of people, planet and profits and sets out Powerco's sustainability vision, and a framework to ensure authentic balance across environmental, social, and financial outcomes.

Our emissions reduction and offsetting target was approved by Powerco's Board of Directors in June 2020, and in addition to this target, we will also be working to collaborate with industry to reduce where practicable, our largest scope 3 emissions. These include business travel and purchased goods and services.

During FY21, we articulated our approach to climate change through the development of our Climate Change Policy. One of Powerco's commitments in this policy is our emissions reduction and offsetting target and this GHG Inventory Report is our public accountability of progress towards this goal.

Intended uses and users of the report

This report is intended to advise the stakeholders of Powerco Limited, on its GHG inventory for the reporting period, along with the steps and measures taken by Powerco to reduce the greenhouse gas emissions associated with its activities.

Stakeholders include shareholders, investors, regulators, communities to who we supply energy, employees, contractors, and members of the public with an interest in the report contents.

² Contact person for GHG is the Corporate Sustainability Manager email: Corporate.sustainability@powerco.co.nz

³ For further information about the organisation refer to powerco.co.nz

Scope and boundaries

Organisational boundary

The organisational boundary determines the parameters for GHG reporting and ensures a consistent approach is applied when assessing which factors to include. Powerco applies the operational control consolidation approach. This means we aggregate the emissions from Powerco Limited and its subsidiary companies to a single Powerco value.

Powerco's operations are conducted out of seven locations throughout New Plymouth, Whanganui, Palmerston North, Wellington, and Tauranga. The Liardet Street premises in New Plymouth is our registered office.

Powerco's operational control starts at the grid exit point and the gas gate station, where energy is transferred to our networks from Transpower and First Gas and finishes at the point where the energy reaches our customers⁴.

Our operational control includes additional off-site locations and all operational activities undertaken by Powerco. These activities include:

- Powerco owned transmission, sub-transmission, distribution and service cables and lines, zone substations, distribution transformers and associated network equipment.
- Powerco owned gas pipes, valves, district regulator stations and associated network equipment.
- Administrative activities within the areas occupied by Powerco at each office location.
- The operations of subsidiary companies Base Power, Powerco Transmission Services, and The Gas Hub.

Operational boundary

The GHG emission sources from the Powerco value chain were identified with reference to the methodology described in the GHG protocol and the GRI 305 Standards. These have been classified as follows.

- **Scope 1** - Direct GHG emissions that are operationally controlled by Powerco including:
 - Mobile consumption emissions relating to non-biogenic fuels.
 - Fugitive emissions including sulphur hexafluoride (SF₆) in relation to our electricity network, and carbon dioxide (CO₂) and methane (CH₄) in relation to our gas network.
 - Stationary combustion emissions relating to direct consumption of natural gas and non-biogenic fuels in generators.
- **Scope 2** - Indirect GHG emissions from imported energy.
 - This includes the GHG emissions from distribution network line losses and purchased electricity consumed by Powerco.
- **Scope 3** - Other indirect GHG emissions not included in Scope 1 or 2 that occur in Powerco's value chain. These have been further categorised as:
 - Purchased Goods and services
 - Business travel.
 - Waste.
 - Employee commuting.
 - Downstream leased assets

Due to the unavailability of data, emissions associated with waste from the disposal of network equipment and waste from our Masterton, Whanganui and Te Aroha locations are excluded. A full list of exclusions and reasoning is included in table 7.

⁴ For the electricity network this is the pillar box or fuse before the service cable or line that enters the property boundary. For the gas network this includes the service pipe and may or may not include the gas meter.

GHG emissions across scopes 1, 2, and 3 are calculated using a bottom-up approach where outputs from our activities are converted to a CO₂e value using an appropriate emission factor.

Scope 1 and scope 3 GHG emissions are calculated using direct measurement of energy sources consumed and conversion to GHG (a CO₂ equivalent value). For gas network pipeline losses, our methodology is based on Australia's National Greenhouse and Energy Reporting (NGER) Scheme Method 1, with modifications for a New Zealand setting. The equations used for this calculation are detailed in Appendix A.

Scope 2 emissions are calculated using location-based emission factors which reflect the average GHG emissions intensity of New Zealand's electricity grid supply.

Emission factors

Table 2: Emission factors applied to our emission sources

Scope	Category	Emission source	Emission factor	Reference	
1	Mobile combustion	Petrol	2.45 kgCO ₂ e /L	NZ Ministry for the Environment 2020	
		Diesel	2.69 kgCO ₂ e /L		
	Fugitive emissions	SF ₆	GWP = 22,800	EPA – Emissions Trading Scheme	
		Gas network pipeline losses	GWP CH ₄ = 28 GWP CO ₂ = 1	Modified NGER Scheme Method 1 – see Appendix A	
2	Stationary combustion	Purchased gas	0.195 kgCO ₂ e / kWh	NZ Ministry for the Environment 2020	
		Generators - diesel	2.66 kgCO ₂ e /L		
	Electricity	Electricity network line losses	0.101 kgCO ₂ e / kWh		
Purchased electricity		0.101 kgCO ₂ e / kWh			
3	Purchased goods and services	Diesel	2.66 kgCO ₂ e /L	UK Department for Business, Energy & Industry Strategy 2021	
		Petrol	2.33 kgCO ₂ e /L		
		LPG	3.03 kg/CO ₂ e/kg		
	Business travel	Contractor fuel (operational maintenance and construction, petrol, and diesel)	Petrol	2.45 kgCO ₂ e /L	NZ Ministry for the Environment 2020
			Diesel	2.69 kgCO ₂ e /L	
			Rental cars large diesel	0.235 kgCO ₂ e /L	
			large petrol	0.220 kgCO ₂ e/L	
		medium petrol	0.198 kgCO ₂ e/L		
		Petrol hybrid - medium	0.149 kgCO ₂ e/L		
		Taxis	0.0702 kgCO ₂ e /\$		
Employee commuting	Travel to and from work in private vehicles (medium petrol car) and public transport (Taxi travel kms)	0.198 kgCO ₂ / Km			
		0.225 kgCO ₂ / Km			
Waste	Composting	1.72 kgCO ₂ e /kg			
		Waste to landfill (general)	1.17 kgCO ₂ e /kg		
Downstream leased assets	BasePower units (stationary combustion of diesel)	2.66 kgCO ₂ e /L			

Reporting period and base year

The current reporting period is the financial year ended 31 March 2021 (FY21). The base year is the year ended 31 March 2019 (FY19).

FY19 was selected as the base year due to the availability of data and similarity of scope with FY21. This definition will be reassessed if:

- We significantly change the scope of what we are measuring within our value chain.
- We buy or sell a company.
- Emission factors change significantly and affect previous years, e.g., if the science behind the emissions factor is revised.
- On discovery of an error or cumulative errors that could be collectively significant.

This year we are able to report on SF₆ data for the financial year period. Previous reports have included this data as calendar year due to limitations in reporting tools.

Data collection and review process

Data is collected by the Sustainability Analyst and uploaded into BraveGen⁵. The calculations and methodologies are reviewed by the Environment and Sustainability Manager and this report is approved for publication by the General Manager, Customer Group.

The data collection and review process are outlined in Table 3.

For scope 1 and 2 emissions 97% are from internal sources and 3% are calculated using data obtained from suppliers or other value chain partners.

For scope 3 emissions, 94.5% of emissions are calculated using data obtained from suppliers or other value chain partners.

Data quality of reported emissions

Based on the qualitative method for data quality assessment from B.P Wiedema and M.S. Wesnaes⁶, less than 1% of our emissions (from waste and worker commute) is deemed to be “fair” quality. The remainder is deemed to be of ‘very good’ quality.

There are some limitations to some data sources. Specifically:

- Electricity T&D losses for energy delivered to ICPs – Streetlights are estimated as these are not metered.
- There are uncertainties and estimations used to calculate employee commuting.
- There is a 10% factor used to calculate waste emissions at a shared location where waste is not collected separately.
- Only tier 1 contractors’ fuel are accounted for in purchased goods and services.
- LPG quantities have been estimated based on a monetary spend figure.

In FY21 the categories for scope 3 emissions were reviewed and contractor fuel usage was reclassified as Purchased goods and services. This was previously incorrectly reported as downstream transportation and distribution.

⁵ BraveGen is a New Zealand owned and operated, carbon accounting Software as a Service system.

⁶ B.P Weidema and M.S. Wesnaes, “Data quality management for life cycle inventories – an example of using data quality indicators” Journal of Cleaner Production 4 no. 3-4 (1996): 167-174

Table 3: Data relating to our emission sources

Scope	Category	Emission source	Data	Data source
1	Mobile combustion	Petrol, diesel	Fuel usage (litres)	Automated report from external fuel supplier
		SF ₆	Identified equipment and quantity ⁷	Internal report based on external equipment maintenance service provider
	Fugitive emissions	Gas network pipeline losses	Refer appendix A	Powerco's audited information disclosure for gas distribution ⁸
		Refrigerants	Leakage quantities	Annual report from external service provider
	Stationary combustion	Purchased gas	Gas usage (kWh)	Retailer invoices
		Diesel	Fuel usage (litres)	External generator hire and servicing contractors
2	Electricity	Electricity network lines losses	Electricity losses (GWh)	Powerco's audited information disclosure for electricity distribution ⁹
		Purchased electricity	Electricity usage (kWh)	Building owner invoices and automated reports from electricity retailer
3	Purchased goods and services	Petrol, Diesel	Fuel usage (litres)	External report from tier one contractors
		LPG	Cost in \$NZD	External report from tier one contractors
		Contractor fuel (operational maintenance and construction, petrol, and diesel)	Distance travelled (kms) and/or fuel (litres)	External report from tier one contractors
	Business travel	Rental cars (petrol, diesel)	Distance travelled (kms)	External report from rental agency
		Taxis	Financial cost	Internal report from staff coding
		Flights (domestic, international short haul and long haul)	Distance between departure and arrival airports (kms)	Automated report from external travel provider
	Employee commuting	Travel to and from work (in private vehicles and public transport)	Distance to work per employee is pro-rated across Powerco's total FTE's (kms)	Voluntary bi-annual employee commute survey
	Waste	Waste to landfill from offices	Waste to landfill and recyclables (tonnes)	External report from waste management company
	Downstream leased assets	Customer use of diesel in BasePower units	Fuel usage (litres)	Internal report from maintenance contractors

⁷ Calculated consistent with those specified by the Environmental Protection Authority (EPA) in the Climate Change Response Act Regulations accounting for losses of SF₆ gas to atmosphere and the corresponding tCO_{2e}.

⁸ See schedule 8(i) in the disclosures here <https://www.powerco.co.nz/who-we-are/pricing-and-disclosures/gas-disclosures>

⁹ See schedule 9e(ii) in the disclosures here <https://www.powerco.co.nz/who-we-are/pricing-and-disclosures/electricity-disclosures>

Emissions by scope

Powerco's GHG emissions for the year ended March 2021 are 41,542tCO₂e, representing a 1.87% reduction compared to the FY19 base year.

Table 4: GHG emissions (tCO₂e) by scope

Scope	FY21	Base year FY19	Variance	
	tCO ₂ e	tCO ₂ e	tCO ₂ e	%
1	7,927.87	7,744.08	+183.79	+2.37
2	28,185.58	30,898.12	-2,712.54	- 8.78
3	5,428.6	3,693.02	+1,735.58	+46.99
Total	41,542.05	42,335.22	-793.17	-1.87

The largest decrease in our emissions came from a reduction in Scope 2 emissions. This is a result of our electricity line losses being less than the base year. Slightly more electricity was distributed through Powerco's distribution network in FY21 compared to FY19. However, the emissions factor for FY21 is less than that for FY19.

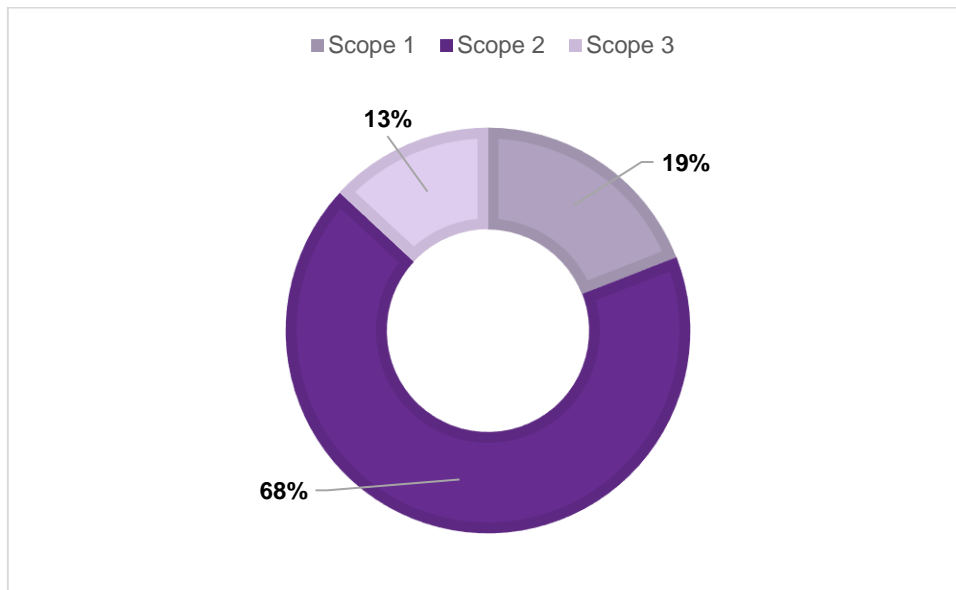


Figure 1: Total FY21 GHG emissions by scope

Emissions by activity

Figure 2 shows our emissions by activity as a percentage of total emissions for FY21. Network losses account for 84% of total emissions (67% electricity line losses plus 17% gas network losses) across scopes 1 and 2. The next largest single source of emissions is in scope 3 – Purchased goods and services at 12% of total emissions. Other scope 1 emissions make up approximately 2% and consist of emissions from mobile combustion and fugitive emissions. Other scope 3 emissions account for 1% of total emissions and are made up of business travel, worker commute and emissions from waste.

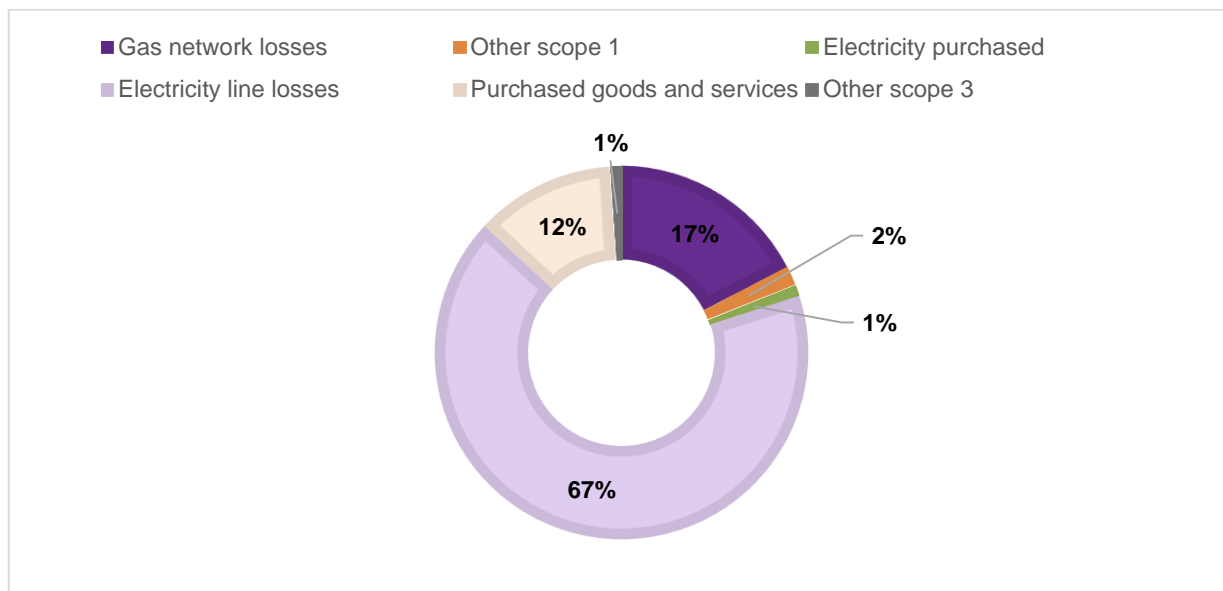


Figure 2: Total FY21 GHG emissions by activity

Table 5: FY21 GHG emissions (tCO₂e) by activity

Category	FY21 tCO ₂ e	FY19 tCO ₂ e
Mobile combustion	375.02	402.43
Fugitive emissions - SF ₆	57.23	50.16
Fugitive emissions - Gas network pipeline losses	7,246.65	7,291.37
Fugitive emissions – Refrigerants	0	-
Stationary combustion - Diesel	248.85	-
Stationary combustion – Natural Gas	0.12	0.12
Total Scope 1	7,927.87	7,744.08
Electricity network line losses	27,785.02	30,464.0
Purchased electricity	400.56	434.12
Total Scope 2	28,185.58	30,898.12
Purchased goods and services	5,009.66 ¹⁰	2925.69
Business travel	90.64	487.25
Employee commuting	298.22	246.15
Waste	15.52	33.93
Downstream leased assets – BasePower units	14.56	-
Total Scope 3	5,428.60	3,693.02
Total Scope 1, 2, and 3	41,542.05	42,335.22

¹⁰ FY21 Figure includes additional data not reported on in FY19

Table 6: FY21 total greenhouse gas emissions by greenhouse gas

Scope	tCO ₂	tCH ₄	tN ₂ O	tSF ₆	Other tCO _{2e} ¹¹	Total
1	658.41	7,204.87	7.37	57.23	0	7,927.87
2	27,069.42	1,077.49	38.68	0	0	28,185.58
3	5,040.30	26.27	63.81	0	298.22	5,428.60
Total	32,768.13	8,308.62	109.85	57.23	298.22	41,542.05

Emissions over time

Figure 3 shows Powerco’s total emissions and the breakdown by scope, for FY19, FY20 and FY21. While total emissions in FY21 are lower than FY19, between FY20 and FY21 total reported emissions in all scopes increased.

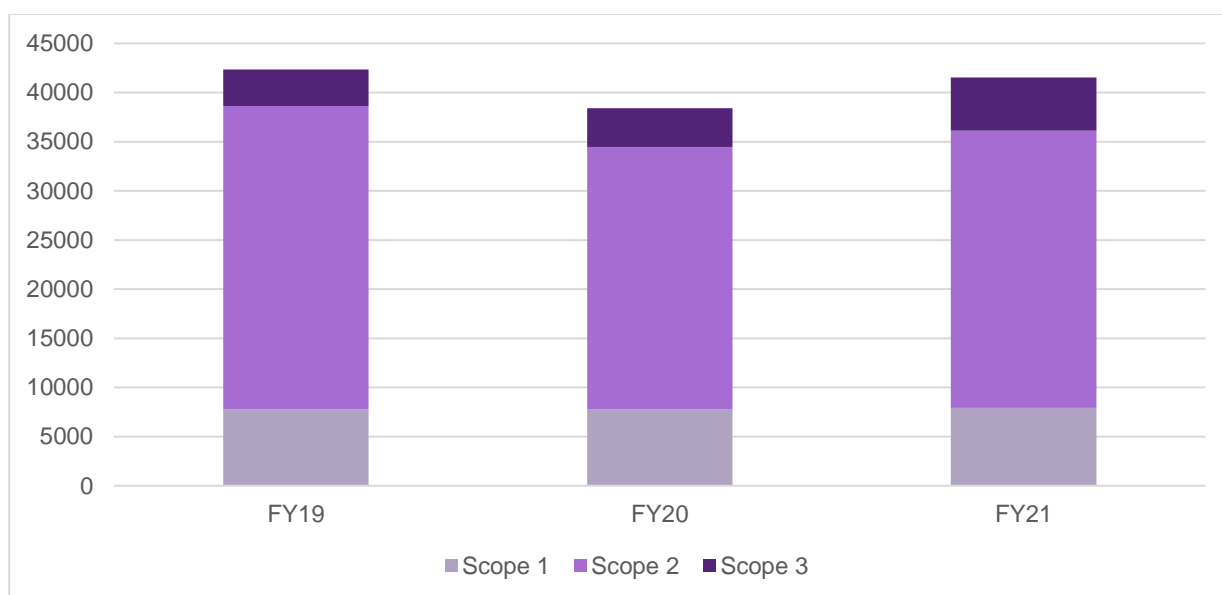


Figure 3: Comparison of total GHG emissions over time

The increase in scope 1 emissions between FY20 and FY21 is due to improved reporting of stationary combustion emissions (from diesel generators). If the impact of this additional reporting was discounted, scope 1 emissions would have decreased by 72tCO_{2e}.

Scope 2 emissions increased between FY20 and FY21. Electricity network lines losses increased even though there was a very small decrease in the total electricity distributed by our network in FY21. Powerco’s purchased electricity for the FY21 period also decreased by 2,245.5kWh, but emissions for the period increased by 3.8%. Both of these increases were due to the purchased electricity emissions factor increasing.

Overall scope 3 emissions increased between FY20 and FY21. Due to the impacts of COVID19 and restricted business travel, emissions from this source decreased by 361tCO_{2e} (80%). This was offset by an increase of 420tCO_{2e} from purchased goods and services due to an increased electricity network works programme. We were also able to include two additional sources of emissions in FY21. Stationary combustion from BasePower units and Energy and fuel emissions from the use of diesel, petrol and LPG by contractors in their equipment.

¹¹ Powerco has no emissions from HFCs PFCs or NF3.

Emissions avoided

Powerco has a small photovoltaic solar array connected to the Network Operations Centre building in New Plymouth. All the renewable electricity generated by the array is consumed by the building. In FY21, 9.5MWh of electricity was generated. This equates to 0.96tCO_{2e} avoided from our scope 2 emissions.

During FY21, Powerco commissioned a Mobile Substation that will replace the use of portable generators from FY22. It is anticipated that our FY22 report will include emissions avoided from this initiative.

We have also assisted remote rural customers to install stand-alone power supplies (BasePower units) and as a result have then decommissioned the electricity lines supplying those customers. We hope in future to be able to calculate the network lines loss emissions avoided.

GHG emissions intensity

Emissions intensity is a measure of carbon emissions in relation to a suitable business metric. We have chosen total energy transported through our networks in GWh as the metric. Our FY21 GHG emissions intensity for scope 1 and 2 emissions is 4.73tCO_{2e} per GWh of transported energy. This is a decrease from 5.11 tCO_{2e} in our base year of FY19. The decrease in emissions intensity is due to an overall decrease in emissions and a slight increase in energy transported through the networks, as shown in table 5. The emissions intensity calculation includes scope 1 and 2; with a separate intensity calculation for scope 3. CO₂, SF₆, N₂O and CH₄ are included in our calculations.

Table 7: GHG intensity

	FY21	Base year FY19	Variance	
	tCO _{2e}	tCO _{2e}	tCO _{2e}	%
Total GWh of energy transported through networks	7,639.84	7,565.20	+74.64	+0.99
Scope 1 & 2 emissions tCO _{2e}	36,113.45	38,642.20	-2,528.819	-6.54
Emissions intensity tCO_{2e}/GWh Scope 1 & 2	4.73	5.11	-0.38	-7.44
Scope 3 emissions	5,428.6	3,693.02	+1,735.71	+47.0
Emissions intensity tCO_{2e}/GWh Scope 3	0.71	0.49	+0.22	+30.96

Exclusions

Table 8: GHG emissions excluded from the FY21 GHG Inventory

The following data is currently excluded from the FY21 GHG Inventory Report:

Scope	Category	Subcategory	Reason for exclusion
Scope 1	Stationary Combustion	LPG for on-site BBQs	Considered immaterial
		Diesel generator to set up Mobile Substation	Data not available in FY21
	Fugitive Emissions	Refrigerants	Data for Palmerston North office not available.
Scope 3	Waste	Construction and waste related to construction	Data not available. Impact on emissions unknown.
		Waste associated with the disposal of network equipment	Data not available. Impact on emissions unknown.
		Office waste from Whanganui, Masterton and Te Aroha locations	Data not available, small offices >10 people
		Office waste from Wellington, Liardet Street and Tauranga locations	Due to shared office buildings, data not currently available, except for recycling from Wellington office.
		Office waste from Top Town location	Waste to landfill and composting not available for this location. Recycling is recorded
	Working from home		Data on hours worked not available
	Transmission and distribution losses		Powerco has not reported T&D losses for gas and electricity consumed separately, as the full distribution losses for the entire network are reported in scope 1 and scope 2.
	Water and wastewater		Considered immaterial
	Business travel	Accommodation	Data not available
		Public transport	Data not available
Purchased Goods and Services		Not all data currently available. Some work has begun in industry to calculate embodied emissions of key asset types. We have included milage by Tier 1 Electricity and Gas Contractors for construction and maintenance work. Tier 2 contractors have not been included to date. Fuel usage for stationary plant construction and maintenance is included for one of our five tier one contractors.	
Capital goods		Data not currently available. Some work has begun in industry to calculate embodied emissions of key asset types.	
Fuel and energy related activities (not included in scope 1 or scope 2)		Data not available	
Upstream leased assets		Powerco does not have any upstream leased assets.	

Upstream transportation and distribution	Data not available. Some work has begun in industry to calculate embodied emissions of key asset types
Downstream leased assets	Data not currently available in FY21 for all the BasePower units on Powerco's footprint. The data set reported on in FY21 is two thirds complete. Data collection from these sites is now included as an annual maintenance task and the data set should be complete in FY22.
Downstream Transportation and Distribution	Powerco does not have any products to transport.
Investments	Powerco does not have any investments to report on.
Franchises	Powerco is not a franchised business.
End of life treatment of sold products	The product of electricity and gas energy is not owned by Powerco. Powerco transports the product via the two energy networks to end consumers for its owner.
Processing of sold products	
Use of sold products	

Work is underway in FY22 to enable the inclusion of all emissions associated with downstream leased assets, working from home, more office waste data, and accommodation.

GHG offsets

New Zealand Emissions Trading Scheme (NZETS)

Powerco is required to participate in the NZETS due to our total SF₆ holdings being over 1000kg. Reporting and surrendering of credits for the NZETS is undertaken using calendar year. During FY21, NZ Units were surrendered to the New Zealand Government for 57.23tCO₂e arising from 2.51kg of SF₆ loss from end-of-life equipment during the 2020 calendar year.

Emissions reduction and offsetting target

Powerco is aiming to reduce emissions and offset any remaining scope 1 and 2 emissions excluding network line losses by 2030.

FY21 saw total emissions included in our emissions reduction and offsetting target increase 21.98% compared to the FY19 base year (Table 9). This is largely due to the increased reporting of emissions sources. Emissions from generators used on the electricity network have been reported on for the first time in FY21. The impacts of restricted travel due to COVID-19 alert levels can be seen in a 6.81% reduction in emissions from mobile combustion (our vehicle fleet). A number of building energy efficiency improvements made in the later part of FY21, coupled with the majority of staff working from home for long periods saw a decrease in purchased electricity emissions. The increase in SF₆ emissions was a result of an increase in third party damage to our SF₆ equipment.

Table 9: Emissions (tCO_{2e}) relating to our emissions reduction and offsetting target

Emission source	FY21	Base year FY19	Variance	
	tCO _{2e}	tCO _{2e}	tCO _{2e}	%
Mobile combustion	375.02	402.43	-27.41	-6.81
SF ₆	57.23	50.16	+7.07	+14.09
Purchased gas	0.12	0.12	0	0
Diesel generators	248.85	New in FY21	NA	NA
HVAC system losses	0	New in FY21	NA	NA
Purchased electricity	400.56	434.12	-33.58	-7.73
Total	1081.78	886.83	+194.95	+21.98

Although Scope 3 emissions are not included in our emissions reduction and offsetting target, we monitor these across three focus areas. Powerco's business travel in FY21 was significantly reduced due to the impacts of COVID-19, with boarder closures meaning that there were no international flights, along with travel restrictions within New Zealand at various times reducing the number of domestic flights. Purchased goods and services increased as a result of an increased electricity network works programme under our Customised Price Path. Our contractors have driven more kilometres on our behalf in FY21 as part of maintenance and construction work.

Table 10: Emissions from Scope 3 focus areas (tCO_{2e})

Emission source	FY21	Base year FY19	Variance	
	tCO _{2e}	tCO _{2e}	tCO _{2e}	%
Business travel	90.64	487.25	-396.61	-81.4
Purchased goods and services	5,009.66	2,925.69	+2,083.97	+71.2
Employee Commute	298.22	246.00	+52.22	+21.2
Total	5,398.52	3,659.09	+1,739.43	+47.5

Appendix A – modified NGER Scheme Method 1

Powerco's natural gas pipeline loss calculation is based on the Australian NGER (National Greenhouse and Energy Reporting) Scheme Method 1, modified for New Zealand. This formula estimates fugitive emissions based on the total emissions measured in tCO₂e that pass through the network equipment and a region-specific emissions factor. A detailed explanation of this formula can be found on page 147 of the NGER Determination (2008)¹².

In the absence of a reliable emissions factor for the New Zealand context, the formula was modified to reflect the Maunsell report's (2007) recommended average gas line loss of 0.2%. The modified formula calculates the amount of unburnt carbon dioxide (CO₂) and methane (CH₄) lost from the gas pipelines as a result of distribution, in tonnes, multiplied by the Global Warming Potential of each gas and expressed as tCO₂e.

$$E = (TP * 26.137) * 0.2\% * F * D * GWP / 1000$$

E	Emissions
TP	throughput (GJ)
26.137	converts GJ to m ³
0.2%	estimated gas line losses (from Maunsell's 2007 report)
F	average fraction of gas in mix (methane or carbon dioxide) expressed as a percentage
D	density of gas in kg/m ³ (methane = 0.678, carbon dioxide = 1.98) ¹³
GWP	global warming potential of gas (tCO ₂ e/tonne)
1000	converts to tonnes

The calculation is completed twice with different values of F: once for the methane component of the gas (81%) and once for the carbon dioxide component (5.745%). The resulting emissions are summed to give the total amount of emissions from natural gas pipeline losses.

¹² [National Greenhouse and Energy Reporting \(Measurement\) Determination 2008](#) – see page 147, section 3.81 for Method 1

¹³ From: Schäfer, Michael; Richter, Markus; Span, Roland (2015). "Measurements of the viscosity of carbon dioxide at temperatures from (253.15 to 473.15)K with pressures up to 1.2MPa". The Journal of Chemical Thermodynamics. 89: 7–15. doi:10.1016/j.jct.2015.04.015. ISSN 0021-9614

Appendix B – GRI standards content index

This report contains standard disclosures from the GRI Sustainability Reporting Guidelines. The table below maps the content of this document to the GRI disclosure requirements.

GRI standard	Disclosure	Reference or response	Page
103 Management approach	103-1 Explanation of the material topic and its boundaries	Introduction section of report Operational Boundary section	4 5
	103-2 The management approach and its components	Powerco, GHG and Sustainability section Emissions reduction and offsetting target progress	4 15
	103-3 Evaluation of the management approach	Emissions reduction and offsetting target progress Offsets – NZETS	15 14
305 Emissions	305-1 Direct (Scope 1) GHG emissions	Table 4 – GHG emissions by scope	9
		Table 5 – FY21 GHG emissions by activity	10
		Base year selected	7
		Table 2 – Emission factors	6
		Organisational boundary section	5
		Data collection process section	8
		Methodology section and appendix A – Modified NGRS method 1	6 and 16
	Table 8 – Exclusions	13	
	305-2 Energy Indirect (Scope 2) GHG emissions	Table 4 – GHG emissions by scope	9
		Table 5 – FY21 GHG emissions by activity	10
		Base year selected	7
		Table 2 – Emission factors	6
		Organisational boundary section	5
Data collection process section		7	
305-3 Other indirect (Scope 3) GHG emissions	Table 4 – GHG emissions by scope	9	
	Table 5 – FY21 GHG emissions by activity	10	
	Base year selected	7	
	Table 2 – Emission factors	6	
	Organisational boundary section	5	
	Data collection process section	7	
	Methodology section	6	
Table 8 - Exclusions	13		
305-4 GHG emissions intensity	Table 7 – GHG intensity	12	

GHG assurance report is on the following page(s).



**INDEPENDENT ASSURANCE REPORT ON POWERCO LIMITED'S
GREENHOUSE GAS EMISSIONS INVENTORY REPORT
TO THE BOARD OF DIRECTORS OF POWERCO LIMITED**

Report on Greenhouse Gas Emissions Inventory Report

We have undertaken a limited assurance engagement relating to the Greenhouse Gas Emissions Inventory Report (the 'inventory report') of Powerco Limited (the 'Company') for the year ended 31 March 2021, comprising the Emissions Inventory and the explanatory notes set out on pages 3 to 15.

The inventory report provides information about the greenhouse gas emissions of the Company for the year ended 31 March 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 with 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.

Auditors' Responsibility

Our responsibility is to express a limited assurance conclusion on the inventory report based on the procedures we have performed and the evidence we have obtained. We conducted our limited 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 limited assurance about whether the inventory report is free from material misstatement.

A limited assurance engagement undertaken in accordance with ISAE (NZ) 3410 involves assessing the suitability in the circumstances of the Company's use of ISO 14064-1:2018, the GHG Protocol, and the Corporate Value Chain Standard as the basis for the preparation of the inventory report, assessing the risks of material misstatement of the inventory report whether due to fraud or error, responding to the assessed risks as necessary in the circumstances, and evaluating the overall presentation of the inventory report. A limited assurance engagement is substantially less in scope than a reasonable assurance engagement in relation to both the risk assessment procedures, including an understanding of internal control, and the procedures performed in response to the assessed risks.

The procedures we performed were based on our professional judgement and included enquiries, observations of processes performed, inspection of documents, analytical procedures, evaluating the appropriateness of quantification methods and reporting policies, and agreeing or reconciling with underlying records.

Given the circumstances of the engagement, in performing the procedures listed above we:

- Through enquiries, obtained an understanding of the Company's control environment and information systems relevant to emissions quantification and reporting, but did not evaluate the design of particular control activities, obtain evidence about their implementation or test their operating effectiveness.
- Evaluated whether the Company's methods for developing estimates are appropriate and had been consistently applied. However, our procedures did not include testing the data on which the estimates are based or separately developing our own estimates against which to evaluate the Company's estimates.

- Reviewed adherence to the principles and requirements outlined in ISO 14064-1:2018, GHG Protocol, and the Corporate Value Chain Standard, which included a consideration of completeness;

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had we performed a reasonable assurance engagement. Accordingly, we do not express a reasonable assurance opinion about whether Powerco Limited's inventory report has been prepared, in all material respects, in accordance with the ISO 14064-1:2018, GHG Protocol, and the Corporate Value Chain Standard.

Inherent Limitations

GHG quantification is subject to inherent uncertainty because of incomplete scientific knowledge used to determine emissions factors and the values needed to combine emissions of different gases.

Our Independence and Quality Control

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

Other than this engagement and our role as auditor of the financial statements, our firm carries out other assurance services including the audit of regulatory disclosure statements and project quality assurance, we have no relationship with or interests in the Company or any of its subsidiaries.

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

This report is provided solely for your exclusive use in accordance with the terms of our engagement. Our report is not to be used for any other purpose, recited or referred to in any document, copied or made available (in whole or in part) to any other person without our prior written express consent. We accept or assume no duty, responsibility or liability to any other party in connection with the report or this engagement, including without limitation, liability for negligence in relation to the opinion expressed in this report.

Limited Assurance Conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that Powerco Limited's inventory report for the year ended 31 March 2021 is not prepared, in all material respects, in accordance with the requirements of ISO 14064-1:2018, the GHG Protocol, the Corporate Value Chain Standard.



Chartered Accountants

Auckland, New Zealand

11 November 2021

This limited assurance report relates to the GREENHOUSE GAS EMISSIONS INVENTORY REPORT of Powerco Limited for the year ended 31 March 2021 included on Powerco Limited's website. Powerco Limited is responsible for the maintenance and integrity of Powerco Limited's website. We have not been engaged to report on the integrity of Powerco 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 limited 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 these 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 limited assurance report dated 11 November 2021 to confirm the information included in the GREENHOUSE GAS EMISSIONS INVENTORY REPORT presented on this website.