



GREENHOUSE GAS EMISSIONS INVENTORY REPORT 2024



Introduction

This report is for the Vector Limited Group (Vector or the group). The group comprises Vector Limited and its subsidiaries. Vector Limited is NZX listed and 75.1% owned by Entrust, a private community trust. A list of all subsidiaries can be found in [appendix 1](#).

The purpose of this report is to transparently disclose Vector's greenhouse gas ("GHG") emissions: how they are quantified, how Vector is tracking towards its reduction target and steps planned to further reduce GHG emissions.

The inventory covered in this report is a complete and accurate quantification of the amount of GHG emissions that can be attributed to Vector's operations within the declared boundary and scope for the specified reporting period. Any exclusions from reporting are disclosed and justified.

This report has been prepared in accordance with the Greenhouse Gas Protocol: *A Corporate Accounting and Reporting Standard* [1] ("GHG Protocol Standard"), the Greenhouse Gas Protocol: *Corporate Value Chain (Scope 3) Accounting and Reporting Standard* [2] ("GHG Protocol Value Chain Standard"), and other related technical guidance issued under the GHG Protocol Standards.

Statement of intent

Vector reports on its GHG emissions on an annual basis and has been calculating its carbon footprint since 2017. The intended users of this report are all interested stakeholders, including shareholders, investors, regulators, communities, employees, customers and contractors. The GHG inventory has been reasonably assured by KPMG; see [appendix 3](#).

Reporting period covered

This GHG inventory report covers Vector's financial year 1 July 2023 to 30 June 2024 ("FY2024"). A summary of emissions can be found in both Vector's annual report 2024 and climate-related disclosures 2024.

Disclaimer

This report is not earnings guidance or financial advice for investors. Rather, this report provides a summary of Vector's greenhouse gas emissions inventory. The report reflects Vector's current understanding as at 26 August 2024, in respect of the 12 months ended 30 June 2024.

Greenhouse gas emissions calculations use data and methodologies that are developing. Vector acknowledges that the understanding of climate change, and the inputs to assist with this understanding are constantly evolving.

This report contains forward looking statements (including targets and assumptions) that may not evolve as predicted.

Vector (including its directors, officers and employees) do not:

- represent that the statements, intentions and/or opinions contained in this report will not change, or will remain correct after publishing this report, or
- promise to revise or update those statements and opinions if events or circumstances change or unanticipated events happen after publishing this report.

The greenhouse gas emissions data described in this report, and Vector's strategies to achieve our greenhouse gas emissions target, may not eventuate or may be more or less significant than anticipated. There are many factors that could cause Vector's actual results, performance or achievement of climate-related targets to differ materially from that described, including economic and technological viability, climatic, government, consumer, and market factors outside of Vector's control. Vector gives no representation, warranty or assurance that actual outcomes or performance will not materially differ from the forward-looking statements.

To the maximum extent possible under New Zealand law, Vector (including its directors, officers and employees) does not accept and expressly disclaims any liability whatsoever for any direct, indirect or consequential loss or damage occasioned from any use or inability to use the information contained in this report, whether directly or indirectly resulting from inaccuracies, defects, errors, omissions, out of date information or otherwise.

We recommend you seek independent advice before acting or relying on any information in this report. Vector reserves the right to revise statements made in, or its strategy or business activities described in, this report, without notice.

This disclaimer should be read along with other methodologies, assumptions and uncertainties and limitations contained in this report, as well as in Vector's climate-related disclosures for FY2024. All amounts disclosed in this report are estimates and are in NZD unless context otherwise requires.

This report is not an offer document and does not constitute an offer or invitation or investment recommendation to distribute or purchase securities, shares, or other interests. Nothing in this report should be interpreted as capital growth, earnings or any other legal, financial tax or other advice or guidance. For detailed information on our financial performance, please refer to our [annual report](#), available on vector.co.nz/investors/reports.

Summary of emissions

In FY2024, Vector's greenhouse gas emissions across scopes 1, 2 and 3 amount to 1,530,722 tCO₂e. This is a 19% reduction from FY2020, Vector's base year.

Table 1: GHG inventory by scope and category in tCO₂e. FY2024 emissions highlighted in green indicate a reduction since the base year or the year in which emissions were first reported, whereas emissions in red show increases.

| EMISSIONS CATEGORY | FY2020 | FY2021 | FY2022 | FY2023 | FY2024 |
|---|------------------|------------------|------------------|------------------|------------------|
| Total scopes 1, 2 and 3 | 1,900,841 | 1,682,645 | 1,602,955 | 1,620,856 | 1,530,722 |
| Scope 1 | 24,431 | 19,991 | 23,763 | 20,019 | 15,545 |
| Natural gas distribution fugitive emissions † | 18,313 | 13,507 | 16,218 | 13,323 | 9,379 |
| SF ₆ leakage † | 524 | 1,263 | 2,081 | 1,299 | 924 |
| Other fugitive emissions | 141 | 142 | 134 | 141 | 65 |
| Stationary combustion | 3,558 | 2,971 | 3,348 | 3,183 | 3,102 |
| Vehicle fleet | 1,895 | 2,108 | 1,982 | 2,073 | 2,075 |
| Scope 2 | 33,148 | 34,448 | 39,486 | 42,810 | 26,900 |
| Electricity consumption* (market-based) | 643 | 826 | 408 | 220 | 8 |
| Electricity consumption (location-based) | 815 | 801 | 891 | 1,210 | 682 |
| Electricity distribution losses | 32,505 | 33,622 | 39,078 | 42,590 | 26,892 |
| Scope 3 | 1,843,262 | 1,628,206 | 1,539,706 | 1,558,027 | 1,488,277 |
| Purchased goods and services | | | | | |
| Upstream-purchased natural gas | 227,569 | 170,442 | 136,821 | 152,290 | 148,230 |
| Upstream-purchased LPG | 46,555 | 47,609 | 52,806 | 58,140 | 62,529 |
| Fuel used by field service providers | 6,475 | 6,822 | 6,456 | 7,235 | 7,127 |
| Upstream-purchased materials and products | 15,266 | 11,733 | 13,874 | 11,783 | 16,089 |
| Upstream-purchased other goods and services | 75,939 | 71,465 | 75,080 | 79,559 | 78,783 |
| Fuel and energy-related activities | 1,405 | 1,312 | 1,450 | 1,456 | 1,406 |
| Upstream transportation | 2,717 | 2,557 | 3,225 | 2,891 | 3,085 |
| Waste generated in operations | | | | 92 | 174 |
| Business travel | 332 | 103 | 95 | 271 | 187 |
| Employee commuting and working from home | | | | 933 | 821 |
| Use of sold products | | | | | |
| <i>Distributed natural gas AKL - Total</i> | <i>772,265</i> | <i>760,185</i> | <i>711,337</i> | <i>735,048</i> | <i>706,356</i> |
| Sold natural gas - AKL | 151,603 | 115,578 | 57,149 | 66,376 | 42,475 |
| Shipped natural gas - AKL | | | 55,245 | 66,265 | 64,985 |
| Other distributed natural gas - AKL | 620,662 | 644,607 | 598,943 | 602,407 | 598,896 |
| Sold natural gas - non-AKL | 562,567 | 381,871 | 231,127 | 223,568 | 184,162 |
| Shipped natural gas - non-AKL | | 47,002 | 183,614 | 160,293 | 154,973 |
| Sold LPG | 131,385 | 126,245 | 122,904 | 123,542 | 123,565 |
| Investments | | | | | |
| Liquigas | 87 | 89 | 108 | 105 | 86 |
| Bluecurrent | 700 | 771 | 809 | 821 | 703 |
| Biogenic carbon | 162 | 134 | 150 | 138 | 131 |

† Updated emission factor for methane to GWP of 28, and SF₆ to GWP of 23,500 in FY2024

* Market-based method for electricity consumption. While location-based electricity emissions are also included in our inventory, the amounts in table 1 include only market-based emissions, as these form part of our emissions reduction target.

Glossary of terms

Table 2: Definition and glossary of terms

| TERM | DESCRIPTION |
|-------------------------|--|
| AKL | Auckland |
| Carbon footprint | Vector's greenhouse gas emissions covered by the Kyoto Protocol, calculated in tonnes of carbon dioxide equivalent (tCO ₂ e) |
| CO₂ | Carbon dioxide |
| CRD | Climate-related disclosures - that comply with Aotearoa New Zealand Climate Standards |
| DEFRA | Department of Environment, Food and Rural Affairs (UK) |
| EGF | Vector's electricity distribution, gas distribution and fibre business |
| Emissions | Greenhouse gas emissions |
| EPD | Environmental product declaration |
| EV | Electric vehicle |
| FSP | Field service provider |
| FY | Financial year |
| GHG | Greenhouse gas For the purposes of this report, GHGs are the seven gases listed in the Kyoto Protocol. These are currently: carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF ₆), and nitrogen trifluoride (NF ₃) |
| GHG Protocol | The Greenhouse Gas Protocol, a partnership between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). The GHG Protocol develops standards and guidance, such as the Corporate Standard and the Corporate Value Chain (scope 3) Standard, both used as guidance for this report |
| GWP | Global warming potential, a measure of how much energy the emissions of 1 tonne of a greenhouse gas will absorb over a given period, relative to the emissions of 1 tonne of carbon dioxide (CO ₂) |
| GXP | Grid exit point |
| HVAC | Heating, ventilation, and air conditioning |
| ICP | Installation control point |
| IPCC (AR5) | Intergovernmental Panel on Climate Change (Fifth Assessment Report) |
| LPG | Liquefied petroleum gas - a mixture of hydrocarbons, consisting primarily of propane and butane. The higher density - in contrast to natural gas - allows it to be easily compressed to liquid, and is therefore largely distributed in bottles |
| MfE | Ministry for the Environment (New Zealand) |
| NZ | New Zealand |
| NZU | New Zealand units |
| NZECS | New Zealand energy certificate scheme |
| NZ ETS | New Zealand emissions trading scheme |
| OGMP | Oil and Gas Methane Partnership |
| SBTi | Science Based Targets initiative |
| SELMA | Street evaluation laser methane assessment |
| SF₆ | Sulphur hexafluoride - a gas used to electrically insulate electrical assets. SF ₆ has a global warming potential of 23,500 times that of CO ₂ |
| T&D | Transmission and distribution |
| tCO₂e | Tonnes of carbon dioxide equivalent |
| TPD | Third-party damages |
| Vector | Vector Limited Group |
| WTT | Well-to-tank |

1. Organisational boundaries

Description of Vector

Vector is a New Zealand energy company which runs a portfolio of businesses delivering energy and communication services to more than 624,000 residential and commercial customers across New Zealand.

The operations of the group are electricity and gas distribution, natural gas and LPG sales, telecommunications and new energy solutions. For further information, visit vector.co.nz.

Organisational boundaries

Vector uses the operational control approach, as defined by the GHG Protocol Standard. This approach was chosen as it allows a focus on emissions over which the group has greatest control, and thereby can influence most with emissions reduction measures.

For carbon accounting purposes, emissions are categorised into the business areas as outlined in figure 1. A detailed list of all subsidiaries and shareholdings under Vector and their relevance for carbon accounting can be found in [appendix 1](#).

Treatment of investments

In addition to these business areas, Vector has investments in a number of businesses that complement our network businesses and strengthen our capabilities in the energy services field. This subsection discusses the treatment of emissions generated by those businesses.

For carbon accounting purposes, Vector has set a threshold for equity investments of 20%, unless significant influence can be evidenced.

Liquigas Limited (60.25%)

Liquigas provides tolling, storage and distribution of bulk LPG in New Zealand. It is not considered to be under Vector's operational control, because Vector does not have "full authority to introduce and implement its operating policies at the operation" (definition of operational control according to the GHG Protocol Standard). As a result, Liquigas' scope 1 and 2 emissions are included under Vector's scope 3 – category 15 (investments), with a 60.25% equity share. On 26 July 2024 (after the balance date of this disclosure) Vector entered a conditional agreement to sell the 60.25% shareholding of the Liquigas business. Any future sale of Liquigas will be reflected in future reports as required/appropriate.

Bluecurrent (50%)

Previously fully owned by Vector as Vector Metering, Bluecurrent manages around 2.5 million advanced electricity and gas meters across New Zealand and Australia. Bluecurrent provides high-resolution energy data services to enable new and innovative energy products that give customers large and small the ability to make smarter energy choices. Vector has ceased operational control of Bluecurrent and, via the same method as Liquigas, accounts for a proportional share of Bluecurrent's scope 1 and 2 emissions under scope 3 - category 15. Bluecurrent is jointly owned by QIC and Vector.

mPrest Systems Limited (8.1%)

At the balance date of this disclosure, Vector held an 8.1% shareholding in mPrest Systems (2003) Limited. The mPrest technology allows companies to better monitor, analyse, and control energy networks and connect traditional infrastructure like electricity lines and substations with new technology like solar and battery energy solutions.

On the 22 August 2024 (after the balance date of this disclosure) Vector sold its shares in mPrest.

Vector's shareholding in mPrest is excluded from our analysis.

Treatment of business closures

Vector Powersmart

Vector Powersmart discontinued operations as of 31 December 2023. Because this was an organic business shutdown, as opposed to a sale, the FY2020 base year does not need to be rebased. Further to this, Vector Powersmart's emissions are well below Vector's materiality threshold for re-calculation.

The data captured during the period October 2023 to December 2023 may not be complete due to the business not being operational in January 2024 to conduct adequate quality control. We expect any excluded data to be immaterial and therefore have not conducted quality control of this data from the group level.

Natural Gas Trading

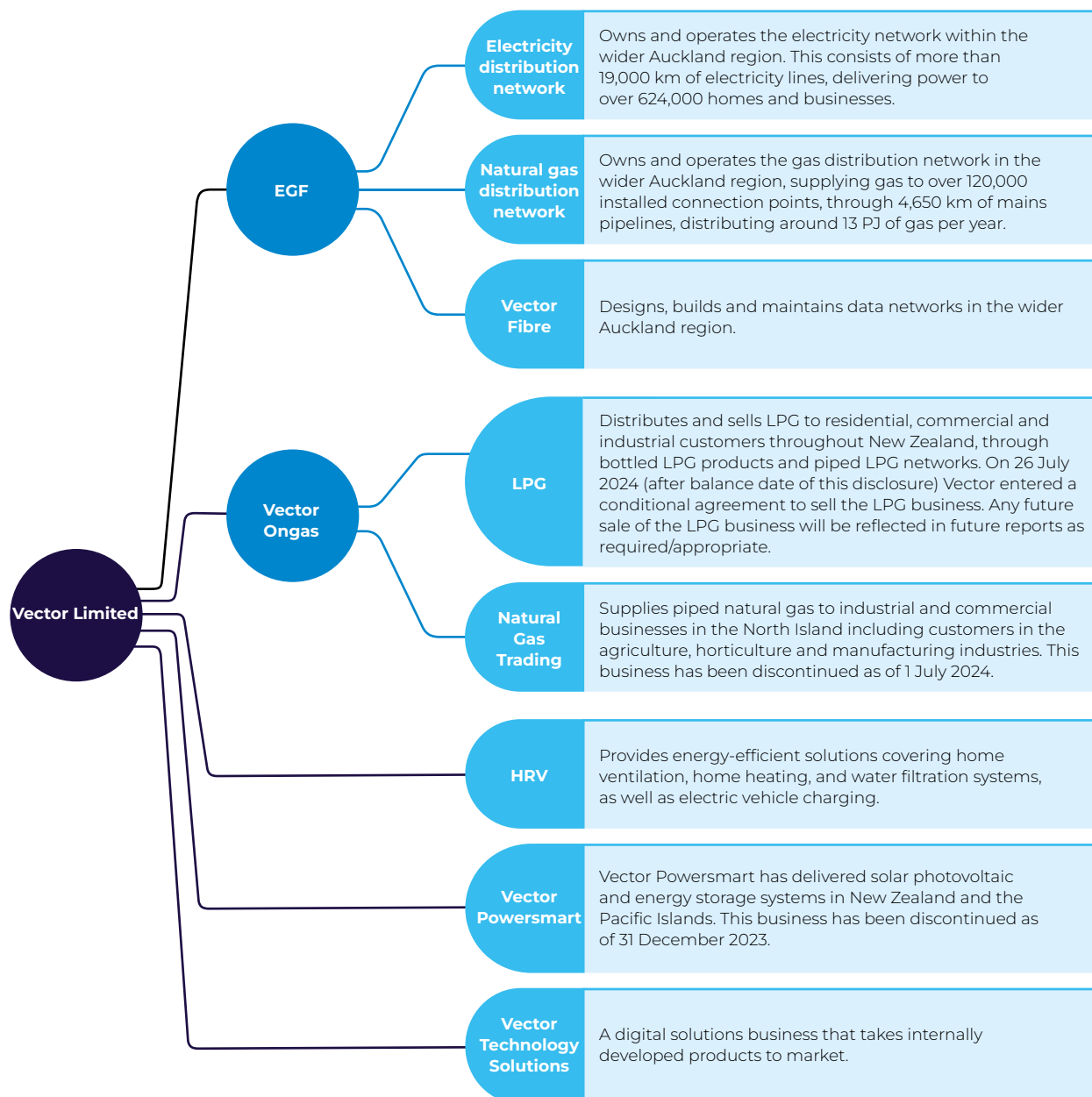
Vector's Natural Gas Trading business has been on a wind-down since FY2020, whereby contracts for natural gas sales were not renewed. This has led to a year-on-year reduction in gas sales-related scope 3 emissions, under category 11 (use of sold products) and category 1 (purchased natural gas). In FY2024, Vector entered into a conditional agreement to sell the remaining contracts of the Natural Gas Trading business as of 1 July 2024, and shut down the business from then on. Because the remaining contracts are to be sold to a third party, for FY2025 reporting Vector will rebase the emissions associated with these sold contracts.

Free public electric vehicle chargers

Since 2016, Vector has provided free public electric vehicle ("EV") charging stations across Auckland to support the uptake of EVs. The electricity costs associated with charging these vehicles are paid for by Vector, and therefore have been included in our scope 2 emissions. In FY2024, Vector sold/de-energised our charging stations. The emissions associated with the electric chargers do not meet Vector's materiality threshold for rebasing the FY2020 base year.

1. Organisational boundaries (continued)

Figure 1: Vector Limited's businesses per organisational boundaries. Vector's Natural Gas Trading business and Vector Powersmart have been discontinued as of 1 July 2024 and 31 December 2023, respectively.



2. Operational boundaries

Operational boundaries

The GHG Protocol Standard splits emissions into three categories:

Scope 1 – Emissions Vector directly controls, such as vehicle fleet fuel combustion, diesel backup generators, natural gas fugitive emissions, and SF₆ leaks.

Scope 2 – Vector's consumption of purchased electricity, and electricity distribution losses along the network.

Scope 3 – All other indirect value chain emissions, such as customer energy consumption and supply chain emissions.

The GHG Protocol Value Chain Standard splits scope 3 emissions into 15 categories. To gain a more comprehensive understanding of our emissions, in FY2020 Vector commissioned an external review of our carbon accounting methodology. This included a scope 3 screening exercise to identify applicable and material categories and activities across Vector's supply chain. A total of 14 categories were determined as being applicable to Vector (all but category 10 – processing of sold products), of which two were defined as material. The threshold at which a scope 3 category is considered as material is set to 1% of total scope 3 emissions.

During the screening process, emissions were calculated for 11 scope 3 categories, with emissions from the remaining three categories considered to be included in other categories of the inventory (categories 2 and 8) or to be zero (category 12). Prior to FY2023, we chose to externally report only on emissions categories that were material (categories 1 and 11) or where data was deemed robust (categories 3, 4, 6 and 15). With additional work undertaken to more accurately determine emissions from other sources, from FY2023 we also reported on emissions under categories 5 and 7 as well as emissions from all purchased products and services under category 1.

Included in other categories

Category 2 – capital goods: Included in category 1 as it was not possible to separate new infrastructure construction and other assets from maintenance of existing infrastructure.

Category 8 – upstream leased assets: Included in scope 1 and 2, as leased assets are expected to be under Vector's operational control.

Excluded scope 3 categories

Category 9 – downstream transportation and distribution: immaterial.

Category 12 – end-of-life treatment of sold products: expected to be zero.

Category 13 – downstream leased assets: immaterial.

Category 14 – franchises: immaterial.

GHG emissions source inclusions

Table 4 provides an overview of all emissions sources highlighted in Vector's GHG inventory, including their data sources, calculation methods and an assessment of data quality and uncertainty.

For completeness, Vector is reporting on well-to-tank ("WTT") emissions for fuel used by field service providers ("FSPs") under categories 1 and 4 as well as on emissions from gas distributed via Vector's gas network under category 11 (other distributed natural gas).

As some gas sold or shipped by Natural Gas Trading is transported via Vector's gas distribution network, these volumes are subtracted from the overall 'other distributed natural gas' amount to avoid double counting.

Exclusions from GHG inventory

Table 3 shows scope 3 emissions sources that were excluded from reporting (in addition to the excluded categories listed previously) and the reasoning behind this.

Other emissions – biogenic CO₂

Vector uses a 5% biodiesel blend in generators used by Vector Fibre and the electricity distribution network. In FY2024, Vector's combustion of biodiesel blend created 131 tonnes of biogenic emissions. This is a reduction of 19% from FY2020.

Table 3: Excluded emissions sources from reporting

| EXCLUDED EMISSIONS ACTIVITY | REASONS FOR EXCLUSION |
|---|--|
| Emissions from FSP fuel use where fuel amount is <1% of overall FSP fuel use (part of category 1 - fuel used by FSPs) | Emissions immaterial; data difficult to obtain |
| Third-party transportation for upstream-purchased materials and products covered under category 1, and distribution services paid by Vector, other than where data on fuel use was available (part of category 4 - upstream transportation) | Emissions immaterial; low data quality using spend- and distance-based methods |
| Use of sold HVAC units (part of category 11 - use of sold products) | Likely immaterial; limited data availability |
| WTT emissions from natural gas used at the Ogas BottleSwap depot (part of category 3 - fuel- and energy-related activities) | Emissions immaterial |
| Emissions from cash expense claims for air travel, hotels, employee travel in public transport and rental cars (part of category 6 - business travel) | Emissions immaterial; data difficult to obtain |

2. Operational boundaries (continued)

Figure 2: Examples of emissions sources across Vector's value chain

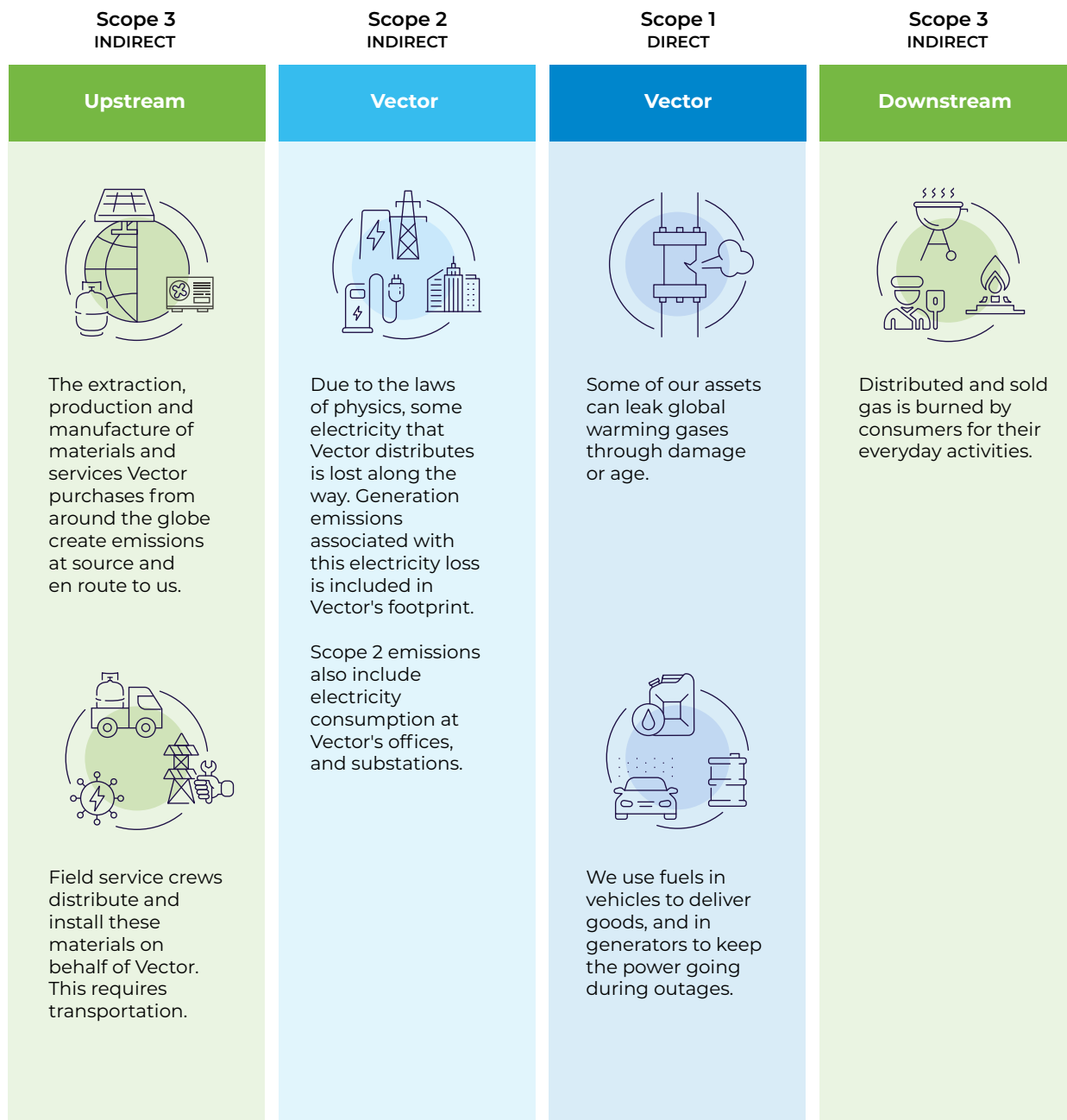


Table 4: Emissions calculation methods, data quality and sources

| REPORTING CATEGORY | EMISSIONS ACTIVITY | CALCULATION METHOD | DATA SOURCE | GWP SOURCE | DATA QUALITY AND UNCERTAINTY |
|--|--|---|--|---|--|
| SCOPE 1 | | | | | |
| Natural gas distribution fugitive emissions | Fugitive natural gas across Vector's distribution network | See section 3 | FSP records; company records on asset database | MfE (2024) – IPCC AR5 | Quality-assured data on all leaks by asset and emissions category provided by FSPs. Multiple estimates and assumptions made, as laid out in section 3, lead to medium uncertainty that Vector is continuing to improve. Vector's methodology has been reviewed by GNS Science, and assessed as OGMP 2.0 Level 3 or slightly above. |
| SF₆ fugitive emissions | SF ₆ leaks in switchgear | Top-up method | Gas recovery records; FSP SF ₆ cylinder records' log sheets; nameplate capacity amounts | | Records on gas top-ups and recoveries provided by FSPs. Multiple estimations, adjusted over time as data becomes available. Medium level of uncertainty that Vector is working on improving where possible. |
| Other fugitive emissions | LPG losses from venting, HVAC leaks (offices, substations, vehicle fleet), and CO ₂ | Top-up method for LPG, CO ₂ and HVAC; screening method for HVAC; estimates for LPG and CO ₂ | Service records; invoices; inventory lists | | Most data on HVAC top-ups available, and when not available annual averages for each inventory item used as specified by MfE. LPG and CO ₂ use estimated – de minimis. High uncertainty, but emissions <1% of scope 1 and are considered adequate. |
| Biodiesel stationary combustion | Biodiesel used in generators | Fuel-based method | Provider records | | Records on litres of diesel used in generators supplied by lease provider monthly. Low uncertainty. |
| Diesel stationary combustion | Diesel used in forklifts and generators | Fuel-based method | Invoices | | Records on diesel used in forklifts provided by supplier. Remaining diesel use estimated – de minimis. Overall low uncertainty. |
| LPG stationary combustion | LPG used in forklifts, flaring and vaporisers | Fuel-based method | Invoices | | Invoices for forklift LPG use. LPG amounts in vaporisers are estimates based on annual actual consumption, while re-valve flaring amounts are estimates based on standard capacity of the sites. Medium uncertainty that is considered adequate as <1% of scope 1. |
| Natural gas stationary combustion | Water and space heating | Fuel-based method | Invoices | | Usage data sourced from invoices. Low uncertainty. |
| Vehicle fleet | Fuel used in vehicle fleet | Fuel-based method | Fuel records by lease providers | | Records on diesel and petrol use sourced from fuel card data. Low uncertainty. |
| SCOPE 2 | | | | | |
| Electricity consumption from grid (market and location based) | Electricity use at offices, substations, and public EV chargers | Location-based method and market-based method, respectively | Invoices by retailers; NZECS website (market-based approach) | MfE (2024) – IPCC AR5 (location-based) NZECS – IPCC AR5 (market-based) | Consumption data in kWh provided by retailers. Records on NZECS to calculate market-based approach provided on NZECS website. Moderate uncertainty from emission factors. |
| Electricity distribution losses | Electricity losses along the network | Location-based method | Transpower and distributed generators (ingoing); retailers (outgoing) | MfE (2024) – IPCC AR5 | Metered data at grid exit point ("GXP") provided by Transpower and distributed generators. Data at installation control points ("ICP") level provided by retailers. Some estimations at year-end. Low uncertainty. |

2. Operational boundaries (continued)

Table 4 (continued): Emissions calculation methods, data quality and sources

| REPORTING CATEGORY | EMISSIONS ACTIVITY | CALCULATION METHOD | DATA SOURCE | GWP SOURCE | DATA QUALITY AND UNCERTAINTY | EMISSIONS CALCULATED USING DATA PROVIDED BY VALUE CHAIN PARTNERS ¹ |
|---|--|---|---|---|--|---|
| SCOPE 3 | | | | | | |
| C1 - upstream-purchased natural gas | Natural gas purchased | Hybrid method and average-data method | Invoices | DEFRA (2023) – IPCC AR5 NZG 2019 – IPCC AR5 (Kapuni specific) | Records of gas purchases sourced from supplier invoices. Moderate uncertainty on emission factor for overall purchases as it uses national average rather than site-specific data. | 76% |
| C1 - upstream-purchased LPG | LPG purchased | Hybrid method and average-data method | Cost of sales report | | Records of LPG purchases based on supplier invoices. Moderate uncertainty on emission factor for overall purchases as it uses national average rather than site-specific data. | 77% |
| C1 - fuel used by FSPs | Fuel used by FSPs on behalf of Vector, incl. WTT | Hybrid method | Fuel data provided by FSPs | MfE (2024) – IPCC AR5 DEFRA (2023) – IPCC AR5 | Petrol and diesel use on behalf of Vector shared by each FSP for relevant business areas, in litres. Some data on regular and premium petrol combined. Low uncertainty. | 100% |
| C1 - upstream-purchased materials and products | Key products purchased across Vector business areas | Supplier-specific and average-data method | Procurement or FSP data on quantities (by weight or length) of products purchased | EPDs – IPCC AR5 | Records on quantities sourced from internal systems. Where supplier-specific data was used, uncertainty is lowest. For average-data method, some estimations were made and secondary data is used; therefore, uncertainty is relatively high. More details in section 3. | 6% |
| C1 - upstream-purchased other goods and services | All remaining products and services purchased | Spend-based method | Procurement spend data | Eora MRIO 2017 | Spend by supplier sourced from internal procurement system, emission factor was assigned based on supplier's main business activity. High uncertainty. More details in section 3. | 0% |
| C3 - fuel- and energy-related activities | T&D, upstream, and WTT emissions from the group's electricity and fuel use | Average-data method | Same invoice data as fuel and electricity use in scope 1 and 2 | MfE (2024) – IPCC AR5 (T&D losses) DEFRA (2023) – IPCC AR5 (WTT fuels and electricity) | All data based on fuel data or location-based electricity consumption data provided for scope 1 and 2. T&D emissions not calculated for electricity consumption in Auckland, as this is covered under scope 2 losses. Moderate uncertainty from emission factors. | 0% |

¹ Proportion of emissions calculated using calculation methods based on data obtained from suppliers or other value chain partners. Remaining emissions are calculated using internal or average data.

Table 4 (continued): Emissions calculation methods, data quality and sources

| REPORTING CATEGORY | EMISSIONS ACTIVITY | CALCULATION METHOD | DATA SOURCE | GWP SOURCE | DATA QUALITY AND UNCERTAINTY | EMISSIONS CALCULATED USING DATA PROVIDED BY VALUE CHAIN PARTNERS ¹ |
|---|---|--------------------------------|---|---|---|---|
| SCOPE 3 | | | | | | |
| C4 - upstream transportation | Fuel used by LPG transport providers | Fuel-based method | Fuel data provided by transport providers | MfE (2024) – IPCC AR5 DEFRA (2023) – IPCC AR5 | Records of petrol and diesel litres used per month by FSPs. Low uncertainty. | 100% |
| C5 – waste generated in operations | Waste sent to landfill from Vector's offices and workshops/ depots | Waste-type specific method | Waste contractor records | MfE (2024) – IPCC AR5 | Weight per waste category by location provided by waste contractors. Some measurements use averages. Based on information provided by Vector's waste contractors, it is assumed that all waste goes to landfills with gas recovery. Medium uncertainty that is considered adequate as <1% of scope 3. | 0% |
| C6 - business travel | Air travel, hotels, rental cars, mileage claims, and taxis | Distance-based method | Records provided by booking agents or internal expense management platform | MfE (2024) – IPCC AR5 (flights excl. radiative forcing) | Monthly travel details provided by booking agents on km flown by class of travel, hotel nights by country, km travelled by size of rental car, km travelled by taxi. Employee mileage emissions based on km, average petrol vehicle, and some spend base for taxis. Medium uncertainty that is considered adequate as <1% of scope 3. | 0% |
| C7 – employee commuting and WFH | Emissions from staff commutes to work and work-from-home | Distance-based method | Results from staff survey on commuting habits | MfE (2024) – IPCC AR5 | Data gathered on travel modes, distance to work, and days in office via staff survey. Extrapolated for the full year assuming that travel habits are stable across the year. Some estimations and assumptions that lead to high uncertainty. Considered adequate as <1% of scope 3. | 0% |
| CT1 - sold natural gas – Auckland | Natural gas sold via the Vector network, directly by Natural Gas Trading or via retailers | Direct use-phase method – fuel | Invoices to Auckland customers and retailers; downstream allocation reports | MfE (2024) – IPCC AR5 | Quantities of gas sold directly to customers or retailers on the Auckland network. Retailer quantities derived from downstream allocation report. Calculation assumes all gas sold is converted to CO ₂ via either combustion or chemical process by consumers. Low uncertainty. | 100% |

¹ Proportion of emissions calculated using calculation methods based on data obtained from suppliers or other value chain partners. Remaining emissions are calculated using internal or average data.

2. Operational boundaries (continued)

Table 4 (continued): Emissions calculation methods, data quality and sources

| REPORTING CATEGORY | EMISSIONS ACTIVITY | CALCULATION METHOD | DATA SOURCE | GWP SOURCE | DATA QUALITY AND UNCERTAINTY | EMISSIONS CALCULATED USING DATA PROVIDED BY VALUE CHAIN PARTNERS ¹ |
|---|---|--------------------------------|--|-----------------------|---|---|
| SCOPE 3 | | | | | | |
| C11 - shipped natural gas - Auckland | Natural gas transported via the Auckland network | Direct use-phase method – fuel | Invoices to Auckland customers | MfE (2024) – IPCC AR5 | Quantities of gas transported to customers on the Auckland network. Calculation assumes all gas is converted to CO ₂ via either combustion or chemical process by consumers. Low uncertainty. | 100% |
| C11 - other distributed natural gas | Gas distributed via Auckland network, excl. Natural Gas Trading amounts | Direct use-phase method – fuel | Firstgas OATIS system | | Quantities of gas distributed via Auckland network, excluding quantities of gas shipped and sold on Auckland network via Natural Gas Trading. Calculation assumes all gas is converted to CO ₂ via either combustion or chemical process by consumers. Low uncertainty. | 100% |
| C11 - sold natural gas – non-Auckland | Natural gas sold outside of Auckland network | Direct use-phase method – fuel | Invoices to customers, retailers and wholesale buyers outside of Auckland; downstream allocation reports | | Quantities of gas sold directly to customers not on the Auckland network. On wholesale buyers, an assumption is made that any gas sold is sold outside of Auckland network. Calculation assumes all gas sold is converted to CO ₂ via either combustion or chemical process by consumers. Low uncertainty. | 100% |
| C11 - shipped natural gas – non-Auckland | Gas transported outside of Auckland network | Direct use-phase method – fuel | Invoices to customers outside of Auckland | | Quantities of gas transported to customers not on the Auckland network. Calculation assumes all gas is converted to CO ₂ via either combustion or chemical process by consumers. Low uncertainty. | 100% |
| C11 - sold LPG | LPG sold | Direct use-phase method – fuel | Sales report | | Quantities of LPG sold. An assumption is made that customers burn the full amount of LPG sold per bottle. Low uncertainty. | 100% |
| C15 - Liquigas | 60.25% of scope 1 and 2 emissions from Liquigas | Investment-specific method | Invoice-based records provided by Liquigas | MfE (2024) – IPCC AR5 | Actual energy consumption provided by Liquigas. Low uncertainty. | 100% |
| C15 – Bluecurrent | 50% of scope 1 and 2 emissions from Bluecurrent | Investment-specific method | Invoice-and-FSP-based records provided by Bluecurrent | MfE (2024) – IPCC AR5 | Actual energy consumption provided by Bluecurrent. Gas metering fugitive emissions based on multiple assumptions and estimates, which leads to medium uncertainty. Considered adequate. | 100% |

¹ Proportion of emissions calculated using calculation methods based on data obtained from suppliers or other value chain partners. Remaining emissions are calculated using internal or average data.

3. Data collection and quantification

Information management procedures

Vector uses an internal process guideline for GHG emissions accounting to ensure consistency in the preparation of our GHG inventory. This was developed following a screening of Vector's full value chain emissions, and setting the base year to FY2020. The document outlines responsibilities, and defines thresholds, calculation methods and recalculation policy, among other details that ensure conformance with the GHG Protocol Standards over time.

Vector uses the software solution BraveGen to collect data and calculate our carbon footprint. Activity data is gathered and uploaded either by Vector's staff across all business areas, or directly by suppliers. All data is reviewed by the GHG accounting team before final upload onto the system. Emissions are calculated automatically within BraveGen by multiplying the provided activity data with each applicable emission factor. These factors are updated every year as required by our GHG accounting team.

Some material changes, such as the change in the GWP of methane from 25 to 28, are overseen by Vector's board audit committee as a key judgment.

Prior to KPMG's assurance of the GHG inventory, the inventory is analysed by our GHG accounting team for trends and missing data. Upon completed assurance, Vector's executive team and board are informed of changes in emissions over time. Both the internal GHG emissions accounting guide as well as our emissions reduction strategy are reviewed and updated frequently.

Methodologies

Most of Vector's GHG emissions are calculated by multiplying activity data with appropriate emission factors. Examples of activity data include kilowatt-hour (kWh) of electricity used, volume of fuel used, or giga-joules (GJ) of gas sold. Most activity data is based on consumption data sourced from invoices provided by suppliers, or internal sales and purchase reports. An overview of sources used per category is included in table 4.

Most emission factors used are sourced from the latest publications (at financial year end) by New Zealand's Ministry for the Environment ("MfE") [3] and the UK's Department of Environment, Food and Rural Affairs ("DEFRA") [4]. Exceptions are outlined below:

- The emission factor for additional processing at Kapuni for both Ogas LPG and Natural Gas Trading has been sourced from table 10 of the latest version of the Climate Change (Stationary Energy and Industrial Processes) Amendment Regulations 2009 [5]. These additional emissions are to account for removal of extra CO₂ present at this gas field to meet the nationally required standard for natural gas. They are calculated by comparing the 'Kapuni' emission factor to the 'Kapuni LTS' one, and multiplying the difference by the GJ of natural gas purchased from the Kapuni gas field. For LPG purchases, the factor is first converted to kg of LPG.
- Until March 2023, market-based emissions from electricity consumption exclude kWh covered by renewable energy certificates.
- From March 2023, the majority of Vector group's consumed electricity is purchased from Ecotricity, a Toitū climate-positive certified electricity retailer. Electricity consumed via installation control points ("ICPs") included on the Ecotricity contract can be calculated as zero under market-based reporting.
- Emissions from FY2024 electricity use not purchased from Ecotricity are calculated using the Residual Supply Mix emission factor as disclosed by the New Zealand Energy Certificate System [6]. The residual factor is based on the production year period April to March.
- The emission factor applied for LPG fugitive emissions has been sourced from the IPCC [8] AR5, aligned with MfE factors, for a 50:50 mix of butane and propane. Including these emissions is voluntary and counted as carbon dioxide (CO₂) in table 1 above.

Emission factor sources and the underlying assessment report for each scope and category are listed in table 4 above.

All calculations in this report are expressed in tCO₂e. The GWP time horizon in all cases is 100 years.

Fugitive emissions from gas distribution (scope 1) as well as emissions from 'upstream-purchased materials and products' and 'upstream-purchased other goods and services' (scope 3 – category 1) are subject to more complex calculations that are described in the following two subsections.

3. Data collection and quantification (continued)

Gas distribution fugitive emissions

Methods for calculating gas distribution fugitive emissions (methane leaks) are unique to gas distribution pipeline companies and will be briefly described here for completeness.

In FY2021, Vector undertook a comprehensive study to model methane leaks on our gas network. The model created a fluid-dynamics based, quasi-digital twin of the network, which enabled us to identify and quantify methane leaks.

Vector is aligned to the guidelines of the Technical Association of the European Gas Industry (Marcogaz [9]), and the Oil and Gas Methane Partnership methodology (OGMP 2.0 [10]), which are found to be the most comprehensive and applicable to Vector's gas network. Marcogaz is currently in the process of integrating these guidelines into the CEN/ TC 234 European Technical Standard for Gas Infrastructure.

This quantification method requires Vector to split the gas network into groups of assets and corresponding categories of emissions that can be expected from these groups. The emission categories can be defined as:

Pipe permeation: Permeation of gas through the membrane material of the polyethylene pipes.

Leaks detected by systematic surveys: Found using street evaluation laser methane assessment ("SELMA"), which are conducted on a six-monthly basis.

District regulator stations: Operational emissions approximated using the American Petroleum Institute Compendium of Greenhouse Gas Emissions [1].

Third-party damages ("TPD"): Leaks when gas pipelines are damaged by third parties.

Operational/maintenance emissions: Vented natural gas during commissioning, decommissioning, and asset maintenance.

Public-reported escapes: Leaks detected by members of the public.

Valves and fittings: Additional leaks from seal failures of valves and fittings.

As it is not feasible to measure every variable, key assumptions are made. The following assumptions have a material impact on the overall data:

- Duration of leak detected during systematic surveys: When a leak is found on a routine survey, there is no knowledge of when the leak started. However, we do know when the pipe was last surveyed, and, assuming a normal distribution, can assume that on average the duration of a leak is half the time since the last survey. For example, Vector runs routine surveys every six months. We can therefore approximate that the average leak duration is three months. This is in alignment with Marcogaz guidelines.
- Average size of leak found on systematic surveys: Most of the historical records of the detected leaks have been due to loose fittings. Vector has conducted several review sessions internally and across the industry and found that the most applicable assumption is in the RR630-HSE, UK standard. Within that, we take a conservative estimate of a hole size of 2 mm².
- Average size of leaks found from third-party damages: Normalised across all third-party damages to 30 mm, based on measured samples.
- Permeability of the ground: 7,000 km of pipes run through various ground and geological formations. An estimation of soil permeability is made according to ISBN 0-486- 65675-6, and based on the New Zealand soil map. We have recently conducted actual field measurements to verify these assumptions. This testing further improves our current reporting level relative to the Marcogaz criteria and the OGMP 2.0 guidelines.

In FY2023, GNS Science conducted an independent review of this methodology. This included a review of the Marcogaz methodology that Vector is following in assessing emissions; a review of Vector's implementation of this methodology; an assessment of Vector's current level of reporting relative to the Marcogaz criteria and the underlying standards; as well as recommendations for future work that would improve Vector's emissions reporting and move Vector to a higher reporting level.

The key improvement opportunity identified is to obtain more specific, local emission factors, with GNS Science's overall finding that Vector is currently operating at OGMP 2.0 Level 3 or slightly above. Level 5 is the highest possible level that also requires the use of site-level measurement to reconcile source and site-level emission estimates.

Table 5: Breakdown of gas distribution fugitive emissions by category in tCO₂e

| EMISSIONS SOURCE | FY2020 | FY2021 | FY2022 | FY2023 | FY2024 |
|---|---------------|---------------|---------------|---------------|--------------|
| Total | 18,313 | 13,507 | 16,218 | 13,323 | 9,379 |
| Pipe permeation | 54 | 54 | 55 | 55 | 38 |
| Leaks detected in systematic surveys | 11,981 | 6,739 | 8,446 | 7,491 | 3,931 |
| Operational/maintenance emissions | 12 | 15 | 10 | 5 | 5 |
| Third-party damages | 4,698 | 5,242 | 6,245 | 4,353 | 3,958 |
| Public reported escapes | 23 | 17 | 21 | 21 | 19 |
| District regulator stations ("DRS") (maintenance and operation) | 847 | 742 | 737 | 688 | 708 |
| Valves and fittings | 698 | 698 | 704 | 710 | 720 |

Upstream-purchased materials and products

Methodologies to quantify emissions from purchased goods and services vary depending on what data is available from suppliers. Those identified as key suppliers for a specific business unit, either based on spend or the type and quantities of products purchased, were contacted to request supplier-specific emissions data.

Preference was given to data published in environmental product declarations ("EPDs"), from which we extracted the GWP for the manufacturing/production phase (A1 – A3; total GWP where a breakdown was provided). Where supplier-specific EPDs were not available, secondary emission factors from EPDs for comparable products or underlying raw materials have been used as proxy data.

Upstream-purchased other goods and services

Emissions from all remaining purchases were quantified using the spend-based method. For FY2024, this calculation covers around 28% of Vector's annual spend and more than 1,000 suppliers. It uses environmentally-extended input output (EEIO) emission factors, which estimate GHG emissions resulting from the production and upstream supply chain activities of different products in an economy. We used Eora MRIO 2017 scope 3 multipliers for New Zealand [12, 13] and adjusted them for inflation to the most recent quarter before the start of each financial year. Emission factors were assigned based on a supplier's main business activity.

As more specific data becomes available, such as through supplier release of EPDs, the emissions data for upstream-purchased materials and products can be refined, therefore reducing the percentage of emissions calculated using the spend-based approach.

The approach we used for both sub-categories built on previous work completed in FY2023 with the support of thinkstep-anz, a trans-Tasman firm offering strategic advice on sustainability.

Note that emissions from gas purchases as well as fuel used by FSPs have been calculated using supplier-specific data since FY2020 and have been reported under scope 3 – category 1 in Vector's GHG emissions inventory since then.

4. GHG emissions calculation and results

Base year

Vector's base year for emissions reporting is FY2020, 1 July 2019 to 30 June 2020. This was the first year that the GHG inventory included most material scope 3 emissions and forms the base year for Vector's emissions reduction target.

Changes to historic base year

Vector recalculates its historic base year emissions if the inventory is affected by changes that in aggregate total 5% of our carbon footprint. These changes can be structural (e.g. acquisitions or divestments), changes in the way the inventory is calculated, or discovery of omissions or errors. Vector might decide to update the base year for changes below the threshold for other reasons, such as consistency or clarity.

Recalculations were required this year as follows:

- an update to the GWP of methane (CH_4) from 25 to 28 in alignment with IPCC AR5
- an update to the GWP of SF_6 from 22,800 to 23,500 in alignment with IPCC AR5
- SF_6 was previously calculated by calendar year. This has now been updated to financial year.

Note that the rebasing of the sold Natural Gas Trading contracts will appear in our FY2025 disclosure. Rebasing of the Ogas LPG business and Liquigas shareholding will also appear in the FY2025 disclosure pending sale.

For an overview of all recalculations, including those from previous years, see [appendix 2](#). All emissions have been rebased from FY2020.

FY2024 results

In FY2024, total GHG emissions for Vector came to 1,530,722 tCO₂e. This is a reduction of 19% from our base year in FY2020.

Scope 1

Vector's direct emissions in FY2024 amount to 15,545 tCO₂e, a reduction from our base year by 36%. Explanations on the most notable changes in emissions across scope 1 are outlined below.

Natural gas distribution fugitive emissions

Natural gas fugitive emissions have decreased by 49% between FY2020 and FY2024 due to proactive pipeline surveying and other operational initiatives, e.g. reducing response time and flaring instead of venting. In FY2023, we re-initiated a proactive communications strategy in collaboration with other underground networks to reduce third-party damages.

Diesel use in generators

With the switch from diesel generators to mobile transformers on planned asset replacements, this year we can see a 2.5% drop in emissions from fuel used in generators, both compared to last year and 13% from Vector's FY2020 base year. This is despite other factors driving up the need for generation overall, e.g. increased capital works.

SF₆ emissions

SF₆ emissions have been high over the past three years due to multiple leaks in two large sub-transmission switchboards. These leaks have now been repaired resulting in a 29% reduction in SF₆ emissions from FY2023. SF₆ emissions are, however, still 76% higher than the FY2020 baseline.

Figure 3: Vector's GHG emissions inventory FY2024, scope 1 and 2 only

SCOPE 1



SCOPE 2



Scope 2

Scope 2 emissions are split into emissions from Vector's own consumption of electricity from the grid, and emissions from distribution losses across Vector's network.

Vector's 17% decrease in electricity distribution losses in FY2024 is due to a reduction in the electricity emissions factor associated with all electricity generation that is injected into the national grid.

Market-based emissions from the group's own consumption of electricity dropped this year, as Vector now purchases the majority of electricity through Ecotricity, a Toitū climate positive certified retailer. This allows us to calculate close to zero emissions under market-based reporting from March, for all applicable ICPs.

Scope 3

Value chain emissions have decreased 19% relative to the FY2020 base year. The material category is the use of sold products, whereby there is a 8.5% decrease in emissions within Vector's gas distribution network, and a 40% reduction in sold/shipped natural gas outside of the Auckland region.

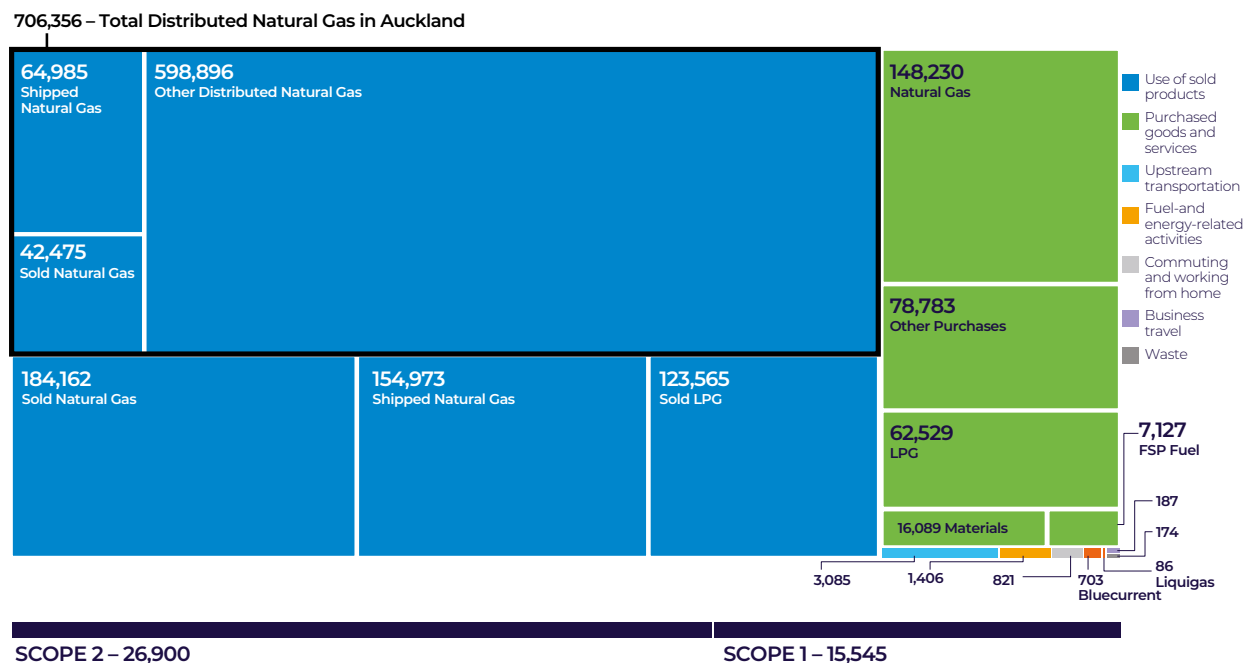
The most noticeable contributor to an increase in emissions across scope 3 is the LPG purchases from Kapuni, which have increased steadily over the year. As we are accounting for additional emissions for purchases from Kapuni due to the high levels of CO₂ in gas extracted from this field, this consequently has led to an increase in emissions. The two categories 'upstream-purchased materials and products' and 'upstream-purchased other goods and services' have risen over the years also, which can be attributed to an increase in maintenance and capital works on Vector's electricity distribution network.

Table 6: Scope 1 and scope 2 FY2024 GHG emissions in tCO₂e. PFCs and NF₃ are not listed here as they are not relevant to Vector's activities.

| SCOPE | CO ₂ | CH ₄ | N ₂ O | HFCS | SF ₆ | TOTAL tCO ₂ e |
|---------------------|-----------------|-----------------|------------------|-----------|-----------------|--------------------------|
| Total FY2024 | 31,084 | 10,270 | 104 | 63 | 924 | 42,445 |
| Scope 1 | 5,171 | 9,311 | 76 | 63 | 924 | 15,545 |
| Scope 2* | 25,913 | 959 | 28 | 0 | 0 | 26,900 |

* Market-based method for electricity consumption. While location-based electricity emissions are also included in our inventory, the amounts in table 6 include only market-based emissions, as these form part of our emissions reduction target.

Figure 4: Vector's GHG emissions inventory FY2024



5. GHG emissions reductions

Emissions reduction target

In FY2021, Vector set an absolute emissions reduction target. That target is for Vector to reduce its scope 1 and 2 emissions (excluding electricity distribution losses) by 53.5% by FY2030 from a FY2020 baseline. The target was developed by thinkstep-anz in 2021, based on a methodology published by the Science Based Target Initiative (SBTi) and the SBTi's then applicable guidance on reductions required to be consistent with keeping global warming to 1.5°C.

Our target has not been validated by SBTi because SBTi's methodology provided for the inclusion of emissions related to electricity distribution losses, which we have excluded. Further detail regarding this exclusion is set out below.

The emissions reduction target does not rely on any offsets. Vector does not have any interim targets.

We achieved a GHG emissions reduction of 38% in FY2024 against the FY2020 baseline. This is largely due to a reduction in natural gas fugitive emissions.

Exclusion of electricity distribution losses from our target

Electricity distribution losses are not like a water or gas leak; they are an inherent characteristic of electricity distribution networks. Although we can measure these losses, and report their associated emissions based on New Zealand's published electricity generation emissions factor, we can never fully remove them. As distribution losses are largely an inevitable by-product

of electrical conduction, Vector has elected to exclude emissions associated with such losses from our emissions reduction target. This allows our target to focus on emissions that we can more readily manage.

By way of example, in FY2024 Vector's emissions related to electricity distribution losses decreased by 17% against a FY2020 baseline. This was due to a decrease in the emission intensity of electricity generation injected into the national grid, rather than any action taken by Vector.

As Vector does not generate electricity, the main reason for this reduction in emissions was outside of our operational control. Excluding emissions related to distribution line losses from Vector's target better enables us to monitor and measure the impact of those management actions that are within Vector's operational control.

Additional information

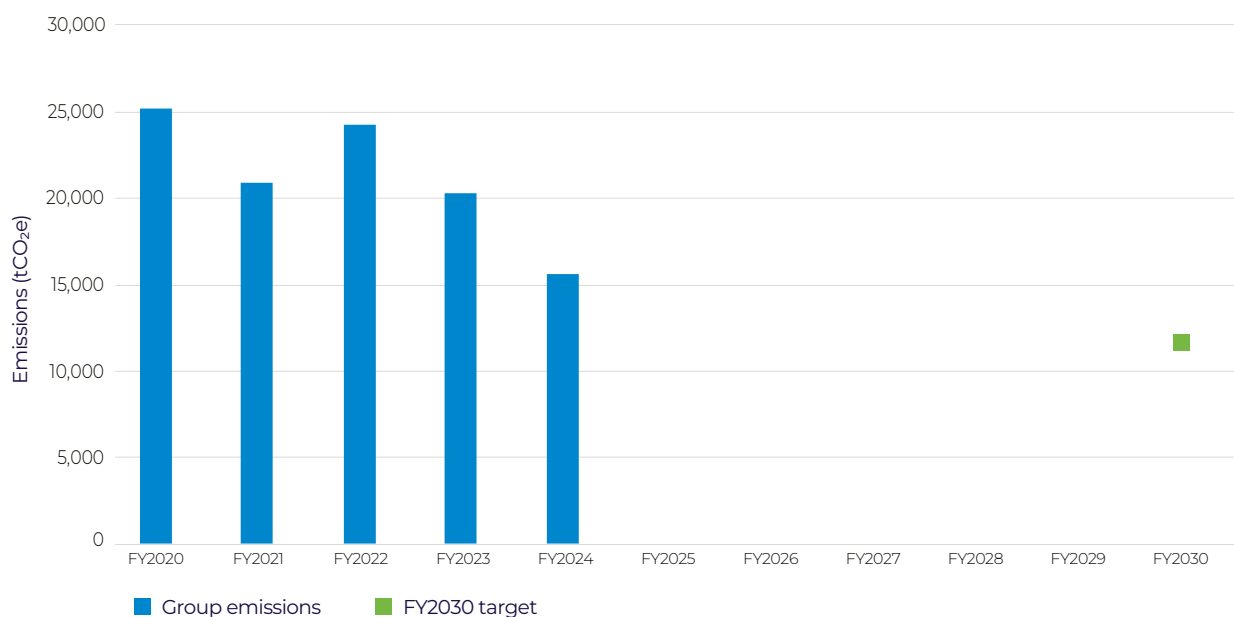
Under the New Zealand Emissions Trading Scheme ("NZ ETS"), Vector is obligated to surrender New Zealand Units ("NZUs") for emissions related to fugitive SF₆.

NZ ETS reporting is by calendar year, while Vector's GHG emissions reporting is by financial year (1 July - 30 June). For the 2023 calendar year, Vector surrendered NZUs to the value of 969 tCO₂e related to fugitive SF₆ gases.

Assurance

KPMG does not provide assurance of this section of the GHG report.

Figure 5: Vector's yearly emissions since FY2020



Emissions reduction initiatives

In FY2022, Vector developed a carbon abatement cost curve to help measure and understand our reduction target (scope 1 and 2 excluding electricity distribution losses) and actions available to Vector to contribute to reaching that target.

This work identifies the financial impact of potential carbon reduction activity across scope 1 and 2 emissions, using an internal carbon cost of \$140 per tCO₂e. This amount was chosen as it aligns with the Climate Change Commission's 2021 recommendations to government to meet 2050 targets [14].

Through this work, we identified emissions that could be reduced while achieving cost savings for the group (those with negative abatement cost), and others that were close to cost neutral (those with bars close to \$0/tCO₂e/year), with the balance assessed as being more complex to abate given the availability of current alternatives.

The cost curve was updated in FY2024 to include a newly identified initiative, reflect project cost changes, and highlight completed projects. We have extended the horizontal axis as well, to highlight additional diesel generation emissions that did not occur in FY2020. We have calculated that this increase is predominantly due to increased planned works in the electricity distribution business.

The cost curve also highlights some key challenges that Vector faces in meeting its emissions reduction target. Abatement initiatives which are not planned or have issues are represented by a red dot in the abatement curve graphic (figure 6).

The most noticeable changes from last year's abatement curve and status updates on key initiatives are as follows:

- **Cost estimate of electric trucks:** Vector has received cost estimates of larger six-cab trucks prior to market release. These costs are still very high and we expect the market price of these trucks to reduce with time. Currently, due to the very high abatement costs, Vector has decided to not proceed with purchasing these electric trucks.
- **Initiation of six-monthly gas pipeline surveying:** Six-monthly gas pipeline surveying has been initiated.
- **Extension of the horizontal axis to incorporate additional diesel generation:** Increased capital works since FY2020 has caused the amount of diesel generation to rise. While this does not impact the base year's calculation, it is important to consider this additional generation in a marginal cost abatement curve to ensure emission reductions also cover these extra emissions.
- **Hybrid generator:** Combining a generator with a battery pack to create a hybrid generator is theorised to reduce emissions. A physical trial is still pending to verify this.

We expect this curve to continue to change annually as new technologies reach the market, new business innovations are trialled, and the costs of the abatement strategies change.

5. GHG emissions reductions (continued)

Figure 6: Vector's marginal carbon cost abatement curve. The horizontal axis corresponds to Vector's total FY2020 scope 1 and 2 emissions excluding electricity distribution losses. Each bar relates to a potential emissions reduction initiative where the thickness of the bar details the amount of emissions reductions estimated to be possible as a result of the initiatives. The vertical axis represents the estimated cost, with negative values indicating estimated cost savings. Initiatives are ordered left to right, from the most cost-saving to the most expensive.

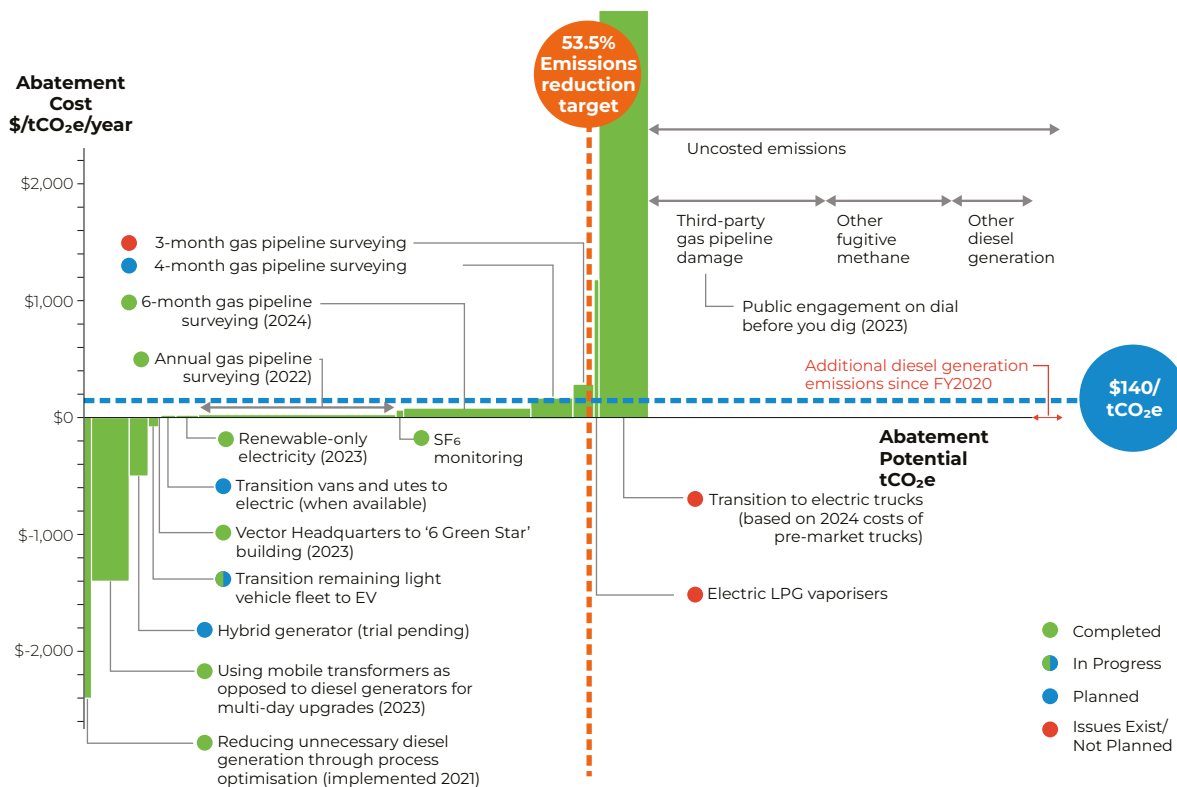


Table 8: Key risks that may form a barrier to Vector achieving its emissions reduction target

| CARBON ABATEMENT RISK | DESCRIPTION |
|---|--|
| Dependency on electric truck manufacturers for heavy vehicle fleet decarbonisation | Vector Ongas has a fleet of 95 trucks. Currently there are limited suitable electric heavy vehicles available to complete this transition. Some pre-production electric trucks are available to transition a small portion of this fleet; however, this comes at a significant marginal abatement cost. |
| Damage to high-pressure pipelines | Damage to Vector's high-pressure gas pipelines can release significant quantities of CO ₂ e. For example, two leaks detected in FY2022 were responsible for the release of over 3,000 tCO ₂ e. While Vector can reduce emissions over time on average, these high-volatility events can cause a sudden spike in emissions for that reporting year. In addition, there is a risk that emissions from third-party damages (such as a contractor digging into the pipe) remain high or increase, with limited influence from Vector's side. |
| Long-term SF₆ assets on Vector's network | Many of Vector's SF ₆ assets have a lifetime beyond 2030. It is challenging to replace all these assets before FY2030, and leaks are largely unpredictable. Although we have installed some monitoring devices that alert us of leaks quickly, there is still a risk that leaks could increase and keep occurring. SF ₆ has an emission factor 23,500 times that of CO ₂ ; therefore, even small leaks of SF ₆ can have material impacts on our emissions inventory. |

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Appendix

Appendix 1: Vector's subsidiaries as at 30 June 2024

| WHOLLY OWNED AND JOINT OPERATIONS | CF RELEVANT | FURTHER INFO ON CARBON FOOTPRINT RELEVANCE | ECONOMIC INTEREST HELD | PRINCIPAL ACTIVITY | VECTOR ORG STRUCTURE NAME | HOLDING COMPANY NAME |
|---|-------------|--|------------------------|---|----------------------------|------------------------------------|
| Vector Limited | yes | Operational control approach (100% for Vector's scopes 1,2,3) | 100% | Parent company | Vector Limited | N/A |
| Vector Investment Holdings Limited | no | No emissions from operations | 100% | Holding company | N/A - Holding company | Vector Limited |
| Vector Gas Trading Limited | yes | Operational control approach (100% for Vector's scopes 1,2,3) | 100% | Natural gas trading and processing | Vector Natural Gas Trading | Vector Investment Holdings Limited |
| Liquigas Limited | yes | No operational control. Proportional (60.25%) scope 1 and 2 emissions accounted for under scope 3, category 15 | 60.25% | Bulk LPG storage, distribution and management | N/A | Vector Investment Holdings Limited |
| On Gas Limited | yes | Operational control approach (100% for Vector's scopes 1,2,3) | 100% | LPG sales and distribution | Vector Ongas | Vector Investment Holdings Limited |
| Vector Advanced Metering Assets (Australia) Limited | no | No emissions from operations | 100% | Metering services | N/A | Vector Investment Holdings Limited |
| Vector MeterCo Limited | no | No emissions from operations | 100% | Holding company | N/A - Holding company | Vector Investment Holdings Limited |
| Bluecurrent Holdings NZ Limited and its subsidiaries | yes | No operational control. Proportional (50%) scope 1 and 2 emissions accounted for under scope 3, category 15 | 50% | Metering services | N/A | Vector MeterCo Limited |
| Bluecurrent Holdings (Australia) Pty Limited and its subsidiaries | yes | No operational control. Proportional (50%) scope 1 and 2 emissions accounted for under scope 3, category 15 | 50% | Metering services | N/A | Vector MeterCo Limited |
| Vector Communications Limited | yes | Operational control approach (100% for Vector's scopes 1,2,3) | 100% | Tele-communications | Vector Fibre | Vector Limited |
| Vector Energy Solutions Limited | no | No emissions from operations | 100% | Holding company | N/A - Holding company | Vector Limited |
| Powersmart NZ Limited | yes | Operational control approach (100% for Vector's scopes 1,2,3) | 100% | Energy solutions services | Vector Powersmart | Vector Energy Solutions Limited |
| E-Co Products Group Limited | no | No emissions from operations | 100% | Holding company | N/A - Holding company | Vector Energy Solutions Limited |
| Cristal Air International Limited (HRV) | yes | Operational control approach (100% for Vector's scopes 1,2,3) | 100% | Ventilation, heating and water systems sales and assembly | HRV | E-Co Products Group Limited |
| mPrest | yes | Below equity investment threshold. Emissions not accounted for as no influence | 8% | | N/A | Vector Limited |

Appendix 1 (continued): Vector's subsidiaries as at 30 June 2024

| WHOLLY OWNED AND JOINT OPERATIONS | CF RELEVANT | FURTHER INFO ON CARBON FOOTPRINT RELEVANCE | ECONOMIC INTEREST HELD | PRINCIPAL ACTIVITY | VECTOR ORG STRUCTURE NAME | HOLDING COMPANY NAME |
|-------------------------------------|-------------|---|------------------------|---------------------------|-----------------------------|-----------------------|
| Vector Technology Solutions Limited | yes | Operational control approach (100% for Vector's scopes 1,2,3) | 100% | Technology services | Vector Technology Solutions | Vector Limited |
| VPS Pacific Limited | no | No emissions from operations | 100% | Energy solutions services | N/A | Powersmart NZ Limited |
| Vector ESPS Trustee Limited | no | No emissions from operations | 100% | Trustee company | N/A - Trustee company | Vector Limited |
| Vector Auckland Property Limited | no | No emissions from operations | 100% | Assets holding company | N/A - Holding company | Vector Limited |
| Vector Northern Property Limited | no | No emissions from operations | 100% | Assets holding company | N/A - Holding company | Vector Limited |

Appendix 2: Summary of GHG emissions inventory recalculations across years

| RECALCULATION DESCRIPTION | RESULTING CHANGE IN INVENTORY | YEAR OF REPORTED CHANGE | SCOPE(S) AND YEAR(S) AFFECTED |
|---|--|-------------------------|--|
| Structural change: Divestment of Treescape shares | Recalculation of scope 3 – category 15. Voluntary recalculation for clarity | FY2022 | Scope 3 – category 15 FY2020: -3,069 tCO ₂ e FY2021: -2,956 tCO ₂ e |
| Structural change: Sale of a 50% interest in Bluecurrent, with loss of operational control | Removing Bluecurrent emissions from scope 1, 2 and 3, and adding proportional scope 1 and 2 emissions in relation to the joint venture to scope 3 – category 15 | FY2023 | Removal of Bluecurrent emissions across scopes 1, 2 and 3 FY2020: -5,017 tCO ₂ e FY2021: -5,099 tCO ₂ e FY2022: -4,824 tCO ₂ e 50% of Bluecurrent's scope 1 and 2 moved to scope 3 – category 15 FY2020: +700 tCO ₂ e FY2021: +771 tCO ₂ e FY2022: +809 tCO ₂ e |
| Improvement of data quality and data availability for material emissions source | Inclusion of additional purchased goods and services emissions to scope 3 – category 1 | FY2023 | Scope 3 – category 1 FY2020: +91,205 tCO ₂ e FY2021: +83,199 tCO ₂ e FY2022: +88,953 tCO ₂ e |
| Quantification of leaks identified subsequent to year-end | Update to gas fugitive emissions to include data quantified after financial year-end FY2022 | FY2023 | Scope 1 FY2022: +3,040 tCO ₂ e |
| Improvement in the accuracy of emission factors | Increase in scope 1 emissions due to the change in GWP for CH ₄ between AR4 and AR5 | FY2024 | Scope 1 FY2020: +1,945 tCO ₂ e FY2021: +1,433 tCO ₂ e FY2022: +1,724 tCO ₂ e FY2023: +1,415 tCO ₂ e |
| Improvement in the accuracy of emission factors and changes to calculation methodology | Increase in scope 1 emissions due to change in GWP for SF ₆ between AR4 and AR5 as well as update to SF ₆ emissions to change from calendar year data to financial year data | FY2024 | Scope 1 FY2020: +99 tCO ₂ e FY2021: +671 tCO ₂ e FY2022: +223 tCO ₂ e FY2023: -880 tCO ₂ e |

Appendix 3: KPMG's Assurance Report



Independent Reasonable Assurance Report to Vector Limited

Opinion

Our reasonable assurance opinion has been formed on the basis of the matters outlined in this report.

In our opinion, in all material respects, the Greenhouse Gas Emissions Inventory Report on pages 3 to 17 has been prepared in accordance with Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, and Greenhouse Gas Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard and other related technical guidance issued under the GHG Protocol standards (the **Criteria**) for the period 1 July 2023 to 30 June 2024.

Information subject to assurance

We have performed an engagement to provide reasonable assurance on the Greenhouse Gas Emissions Inventory Report for the period 1 July 2023 to 30 June 2024, on pages 3 to 17, which includes the following sections:

- Summary of Emissions;
- Organisational boundaries;
- Operational boundaries;
- Data collection and quantification
- GHG emission calculation and results.

Our engagement to provide reasonable assurance does not cover the information in section 5. GHG emissions reductions, and we express no opinion on the information included in this section.

Criteria

The Criteria used as the basis of reporting are the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (GHG Protocol Standard), Greenhouse Gas Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard (GHG Protocol Value Chain Standard) and other related technical guidance issued under the GHG Protocol standards published by the World Resources Institute and World Business Council for Sustainable Development. As a result, this report may not be suitable for another purpose.

Standards we followed

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 (**Standard**). We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion. In accordance with those standards we have:

- assessed the suitability of the circumstances of Vector Limited's use of the criteria as the basis for preparation of the Greenhouse Gas Emissions Inventory Report;
- used our professional judgement to assess the risks of material misstatement and plan and perform the engagement to obtain reasonable assurance that the Greenhouse Gas Emissions Inventory Report is free from material misstatement, whether due to fraud or error;



- considered relevant internal controls when designing our assurance procedures, however we do not express an opinion on the effectiveness of these controls;
- evaluated the appropriateness of reporting policies, quantification methods and models used in the preparation of the Greenhouse Gas Emissions Inventory Report, and the reasonableness of estimates made by the Group;
- evaluated the overall presentation of the Greenhouse Gas Emissions Inventory Report; and
- ensured that the engagement team possesses the appropriate knowledge, skills and professional competencies.

How to interpret reasonable assurance and material misstatement

Reasonable assurance is a high level of assurance, but is not a guarantee that it will always detect a material misstatement when it exists.

Misstatements, including omissions, within the Greenhouse Gas Emissions Inventory Report are considered material if, individually or in the aggregate, they could reasonably be expected to influence the relevant decisions of the intended users taken on the basis of the Greenhouse Gas Emissions Inventory Report.

Inherent limitations

As noted in the Table 4 of page 9 within the Greenhouse Gas Emissions Inventory Report, GHG quantification is subject to inherent uncertainty because of incomplete scientific knowledge used to determine emission factors and the values needed to combine emissions of different gases.

Use of this assurance Report

Our report is made solely for Vector Limited. Our assurance work has been undertaken so that we might state to Vector Limited those matters we are required to state to them in the assurance report and for no other purpose.

Our report is released to Vector Limited on the basis that it shall not be copied, referred to or disclosed, in whole or in part, without our prior written consent. No other third party is intended to receive our report.

Our report should not be regarded as suitable to be used or relied on by anyone other than Vector Limited for any purpose or in any context. Any other person who obtains access to our report or a copy thereof and chooses to rely on our report (or any part thereof) will do so at its own risk.

To the fullest extent permitted by law, none of KPMG, any entities directly or indirectly controlled by KPMG, or any of their respective members or employees accept or assume any responsibility and deny all liability to anyone other than Vector Limited for our work, for this independent reasonable assurance report, and/or for the opinions we have reached.

Our opinion is not modified in respect of this matter.

Vector Limited's responsibility for the Greenhouse Gas Emissions Inventory Report

The Management of Vector Limited are responsible for the preparation of the Greenhouse Gas Emissions Inventory Report in accordance with the criteria. This responsibility includes such internal control as the Management determine is necessary to enable the preparation of the Greenhouse Gas Emissions Inventory Report that is free from material misstatement whether due to fraud or error.



Our responsibility

Our responsibility is to express an opinion to Vector Limited on whether the Greenhouse Gas Emissions Inventory Report is, in all material respects, prepared in accordance with the criteria for the period 1 July 2023 to 30 June 2024

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.

The firm applies Professional and Ethical Standard 3 *Quality Management for Firms that Perform Audits or Reviews of Financial Statements, or Other Assurance or Related Services Engagements* (**PES 3**), which requires the firm to design, implement and operate a system of quality control including policies or procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Our firm has also provided financial audit, regulatory assurance, other assurance and compliance services in relation to R&D tax credits to Vector Limited. Subject to certain restrictions, partners and employees of our firm may also deal with Vector Limited on normal terms within the ordinary course of trading activities of the business of Vector Limited. These matters have not impaired our independence as assurance providers of Vector Limited for this engagement. The firm has no other relationship with, or interest in, Vector Limited.

A handwritten signature of the KPMG firm, written in blue ink, appearing as 'KPMG'.

KPMG
Wellington
26 August 2024

