



**2023**  
**GREENHOUSE GAS REPORT**

Updated June 2024

**altafiber**  
elevating connection

# Introduction

Cincinnati Bell Inc., a telecommunications and global IT services company, began doing business as **altafiber** in March of 2022. Building upon a long legacy of environmental responsibility and stewardship, we have embarked on a path to net-zero greenhouse gas (GHG) emissions by 2040. That journey starts with tracking emissions with enough accuracy and detail to manage them effectively and find reductions. In 2021 an internal cross-functional GHG inventory team was formed to accomplish this goal. **altafiber** is publishing its greenhouse gas emissions report for 2023, which provides an accounting of the company's GHG emissions, as compared to our baseline year of 2021. This GHG inventory has been independently verified by a third-party auditor, Cameron-Cole, LLC. Cameron-Cole provided a limited level<sup>1</sup> of assurance that our GHG emissions assertions submitted to are free of material errors, omissions, or misstatements (Appendix II).

## Who we are:

Cincinnati Bell Inc. and its consolidated subsidiaries provide integrated communications and IT solutions that keep consumer and business customers connected with each other and with the world. Our Company operates its businesses through its Network and IT Services and Hardware segments. The Network segment serves customers in the Greater Cincinnati region through our **altafiber** brand and services customers in Hawaii through our Hawaiian Telcom brand. The IT Services and Hardware segment services customers in the U.S. and Europe through our CBTS brand and in Canada through our OnX brand. Additional subsidiaries Agile IWG Holdings, LLC, and BridgeLink Communications LLC complete our family of companies.

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<sup>1</sup> A "limited level" means that the auditor checked for any errors, omissions, or misstatements in exceedance of the allowable 10% materiality range

**Let's get started.**

# Emissions Inventory Boundaries

**altafiber** follows The GHG Protocol, A Corporate Accounting and Reporting Standard from the World Resources Institute (WRI) to calculate and report our GHG emissions.

The protocol provides standards and guidance for the following:

- GHG Accounting and Reporting Principles
- Setting Organizational Boundaries
- Setting Operational Boundaries
- Tracking Emissions over Time
- Reporting GHG Emissions

The GHGs reported under this protocol are:

- Carbon Dioxide (CO<sub>2</sub>)
- Sulfur Hexafluoride (SF<sub>6</sub>)
- Methane Gas (CH<sub>4</sub>)
- Nitrous Oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFC)
- Perfluorochemicals (PFC)
- Nitrogen Trifluoride (NF<sub>3</sub>)

Note there are other GHGs that occur in **altafiber's** operations and for which it is also responsible, such as chlorofluorocarbons (CFCs) and halons. These are governed under the Montreal Protocol and consequently are not reported under greenhouse gas inventories. Other GHGs emitted by our operations such as ozone or VOCs are short-lived in the atmosphere when considered over a decadal timeframe and by convention are not managed and reported in GHG inventories.

GHG Accounting and Reporting Principles: **altafiber's** GHG accounting and reporting is based on the principles defined by the GHG protocol that include relevance,

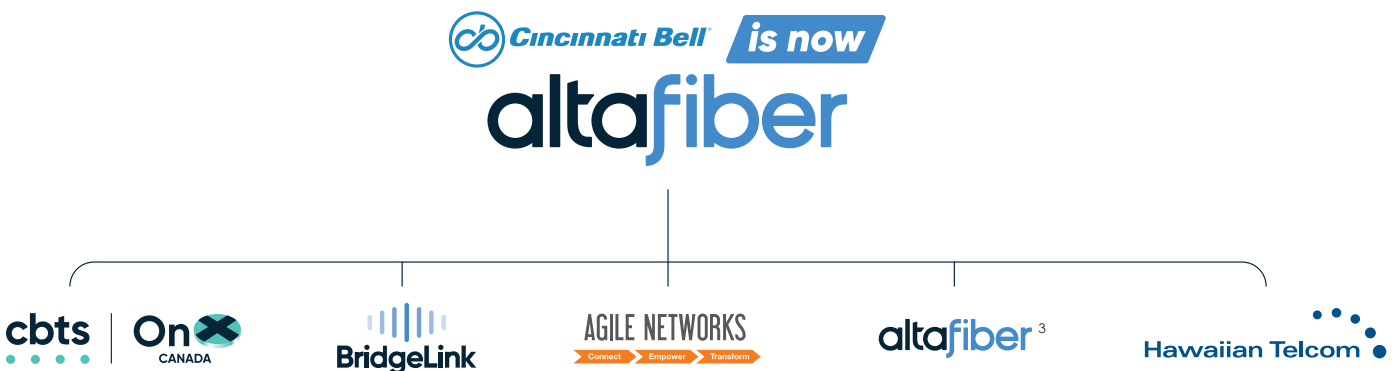
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<sup>2</sup> Found at <http://www.ghgprotocol.org/>

completeness, consistency, transparency and accuracy. Our reporting uses emissions factors and Global Warming Potential (GWP) values of reputable sources including the US Environmental Protection Agency (EPA), the Climate Registry, the Intergovernmental Panel on Climate Change and others to arrive at the metric of carbon dioxide equivalents (CO<sub>2</sub>-e) across our GHG emissions. All emissions factors and assumptions are provided in Appendix III, Methodology.

**Setting Organizational Boundaries:** An organizational boundary defines the entities and facilities that will be included in this GHG inventory. **altafiber's** GHG inventory follows the operational control approach, whereby a company accounts for 100% of the GHG emissions from operations over which it or one of its subsidiaries has control (financial or operational), and does not account for GHG emissions from operations in which it owns an interest but has no control. Having operational control means **altafiber** has full authority to introduce and implement its operating policies at the operation. Having selected the operational control approach, it shall be applied at all levels of the organization.

Our organizational boundary includes **altafiber** (legally, Cincinnati Bell Inc., doing business as **altafiber**) and its subsidiaries CBTS LLC, Cincinnati Bell Telephone Company LLC (CBT), BridgeLink Communications LLC, Agile IWG Holdings, LLC., and Hawaiian Telcom Holding Inc (HT).



<sup>3</sup> Formerly Cincinnati Bell Telephone (CBT) in prior year reporting.

Setting Operational Boundaries: To help delineate direct and indirect emission sources and improve transparency, consistency and accuracy, three different scopes are defined for GHG accounting and reporting purposes:

- **Scope 1:** Direct GHG Emissions—emissions that occur from sources owned and controlled by the company; for example **altafiber's** owned or controlled vehicles, boilers, furnaces, generators, and any refrigerant releases.
- **Scope 2:** Electricity Indirect GHG Emissions—GHG emissions from the generation of purchased electricity brought into the organizational boundary of the company and consumed. It is based on site electricity use, and does not include transmission and distribution losses.
- **Scope 3:** Other Indirect Emissions—an optional reporting category that allows for the treatment of all other indirect emissions. scope 3 emissions are a consequence of the activities of the company but occur from sources not owned or controlled by the company, such as emissions from the commuting of our employees to work and home; business-related travel whether by vehicle or commercial air; emissions related to the materials (copper and fiber lines, customer premise equipment, paper, ink, etc.) consumed by **altafiber**; emissions related to our material reuse and recycling, waste disposal and transport; emissions from our extensive supply chain of subcontractors including construction contractors; and emissions from the use of our products and services.

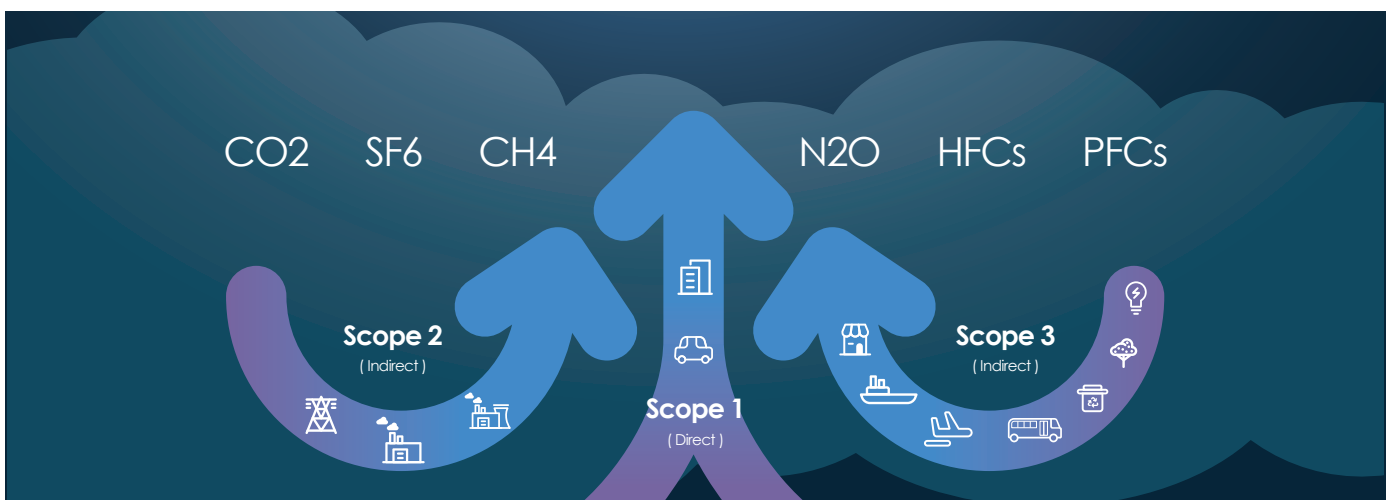


Figure 1: Overview of scopes and emission across a value chain (from GHG protocol)

<sup>4</sup> GHG emissions not covered by the Kyoto Protocol because they are governed by other treaties (e.g., Montreal Protocol) such as certain refrigerants shall not be included in scope 1, but may be reported separately.

Scopes 1 and 2 are carefully defined in the GHG protocol to prevent double counting of emissions by **altafiber** and other reporting companies; therefore, these emissions must be separately accounted for and reported. The protocol does not require reporting of scope 3 emissions. For our baseline year in 2021 we have accounted for our scope 1 and 2 emissions as required. No scope 3 emissions are tracked yet; however, we acknowledge their importance and commit to tracking them in the future.

Operational control is clear for assets that we own, such as our owned facilities, equipment, and fleet vehicles. We also have operational control over facilities that we lease, and have worked to capture emissions associated with their operation. Almost all our leases are financial control leases, where we have limited control of a small space in comparison to the building footprint. From an accounting perspective leased and right-of-use (ROU) spaces are “financer operated” and are brought onto our balance sheet when leased for over a year. Viewed through the lens of the GHG Protocol, we have operational control over the energy consuming equipment and lighting in our leased office spaces and have estimated the purchased electricity associated with them in our scope 2 inventory. Subsidiary OnX has operational control of two data centers included in our scope 2 inventory. We do not have operational control of other data center leasing activity within both CBTS and Hawaiian Telcom negotiated on behalf of our customers but under their control. Therefore all such data center leases entered into on behalf of our customers and not operated by us fall under our scope 3 emissions.

The emissions associated with third party contractors, such as the construction contractors building our fiber network, are part of our scope 3 emissions and not yet tracked in this inventory. Where accounting for and reporting scope 3 emissions are feasible and also relevant to inform management action, we will track them in the future. This is an area for improvement of our inventory in the future.

**Tracking Emissions over Time:** The GHG protocol requires us to identify a base year for which verifiable emissions data are available and specify our reasons for choosing that year. We established our base year as 2021, our first year of GHG reporting.

For posterity and context note that in 2021 the company, our customers, and society at large was experiencing the global Covid-19 pandemic. It's difficult to predict how **altafiber's** emissions will respond in the post-Covid-19-pandemic world, against the 2021 baseline year. If subsequent baseline recalculation helps us to meaningfully track and act on our emissions, we will document such future actions.

**altafiber's** policy for recalculating base-year emissions follows the GHG protocol's requirements. The following would trigger a recalculation of base-year emissions:

- Structural changes in the reporting organization that have a significant impact on the company's base-year emission (mergers, acquisitions, outsourcing/insourcing of activities).
- Changes in the calculation methodology or improvements in the accuracy of data.
- Discovery of significant, single or cumulative errors.

Our significance threshold for deciding to recalculate our base year and historic emissions is a 5% or greater change (increase or decrease) in the base year inventory resulting from the change. Base year emissions and any historic data are not recalculated for organic growth or decline.

**Baseline Year Corrections:** In 2023 we revisited, corrected and recalculated our baseline year (2021) and 2022 emissions inventories for subsidiaries CBTS and HT, affecting our overall inventory. In brief:

- Several leased data center facilities previously classified as scope 2 belong in scope 3. CBTS and HT lack operational control over these leased facilities, and they are now excluded from the corrected inventory, but will be captured in future scope 3 accounting.
- Certain properties were erroneously included in the inventory that had actually been vacated.



- We now use actual electricity use data from utility bills at two CBTS properties that were previously estimated.
- Several leased properties have corrected/updated square footage. As the square footage was used to estimate energy use, the corrections changed their estimated emissions.
- Certain leased properties located in Hawaii were originally included in CBTS's inventory, but are now correctly attributed to HT.

According to altafiber's policy for recalculating base-year emissions, these changes do not exceed our significance threshold (5%), nor the materiality threshold (10%) of our third-party verification. Yet we chose to recalculate the 2021 and 2022 emissions inventories for CBTS and HT to make year-over-year reporting as accurate and comparable as possible, and because the changes do make a significant change to CBTS's inventory when viewed on its own. While on the whole altafiber's emissions changed only approximately 3% in 2021 and 2022, CBTS's recalculations resulted in an emissions decrease of 57% in 2021 and 40% in 2022 for that business unit. All figures for 2021 and 2022 in this report are the corrected figures.

**Reporting GHG Emissions:** altafiber has identified the following GHG emissions within its operational and organizational boundaries:

### Scope 1 Emissions

- Stationary Combustion (Natural Gas)—emissions resulting in onsite combustion of natural gas in some Cincinnati-area facilities for water or area heating.
- Stationary Combustion-Generators & Equipment (Diesel Fuel)—emissions, resulting in onsite combustion of diesel fuel to operate back-up generators during utility outages or during periodic tests and also to operate any ground equipment.
- Fugitive Emission (Refrigerants)—refrigerants leak from heating, ventilation and air conditioning (HVAC) equipment in our facilities.
- Mobile Combustion-Fleet (Gas and Diesel)—emissions resulting from the operation of fleet vehicles in both the Hawaii and Midwest geographies.

### Scope 2 Emissions

- Purchased Electricity (kWh)
  - o In buildings we own and some leased facilities we receive the utility bills directly and therefore track actual electrical consumption.
  - o Many of our facilities are leased spaces in commercial buildings and we do not receive utility statements or bills. For such facilities we estimate our electricity consumption based on our leased square footage and an estimate of energy use intensity (EUI) in energy use per square foot (kWh/sf) for the type of facility. EUIs are derived from the Energy's Commercial Buildings Energy Consumption Survey (CBECS) data or by benchmarking similar facilities in our own inventory for facility types not in CBECS.

### Scope 3 Emissions (optional)

Not inventoried at this time.

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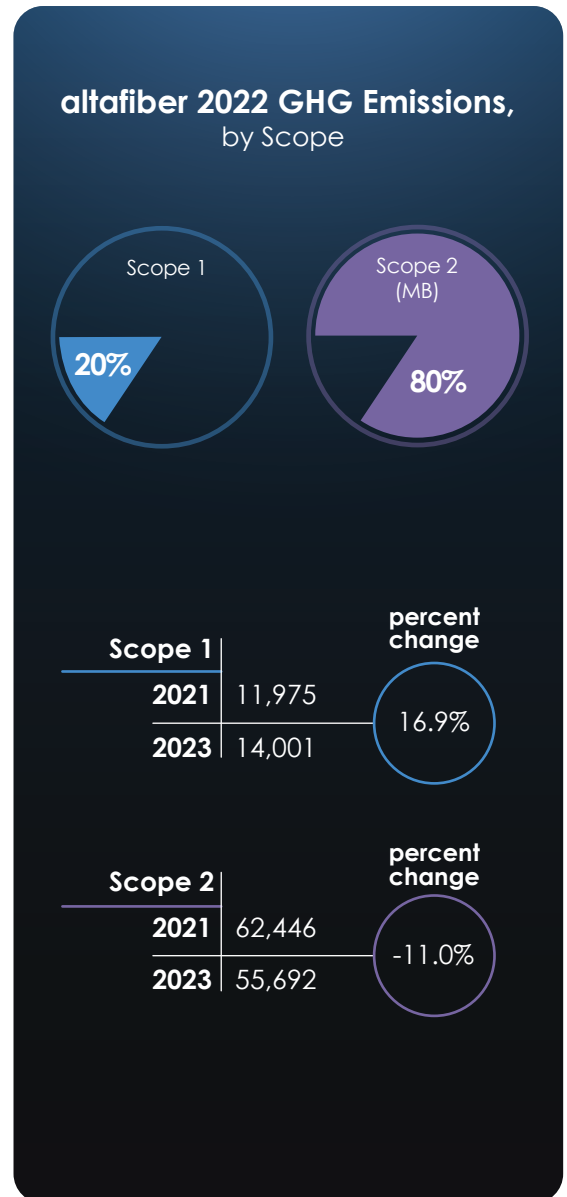
<sup>5</sup> Specifically, the Department of Energy's Commercial Buildings Energy Consumption Survey (CBECS) was used to estimate the energy intensity of leased office space for which we don't receive actual energy data. CBECS latest data is from 2018, prior to the Covid19 pandemic.

# Methodology

Appendix III shows the sources of our emissions data along with assumptions or limitations.

## GHG Emissions

Table 1 shows **altafiber's** emissions by scope in the units of carbon dioxide equivalents (CO<sub>2</sub>e), a standard unit for measuring carbon footprints. The term expresses the impact of each different greenhouse gas in the amount of CO<sub>2</sub> that would create the same amount of warming. That way, a carbon footprint consisting of many different greenhouse gases can be expressed as a single number. Standard ratios are used to convert the various gases into equivalent amounts of CO<sub>2</sub>. These ratios are based on the global warming potential (GWP) of each gas, which describes its total warming impact relative to CO<sub>2</sub> over a set period. The CO<sub>2</sub>e is expressed in the unit of metric tons of emissions and was calculated by using the GHG Protocol's methodology for each scope.

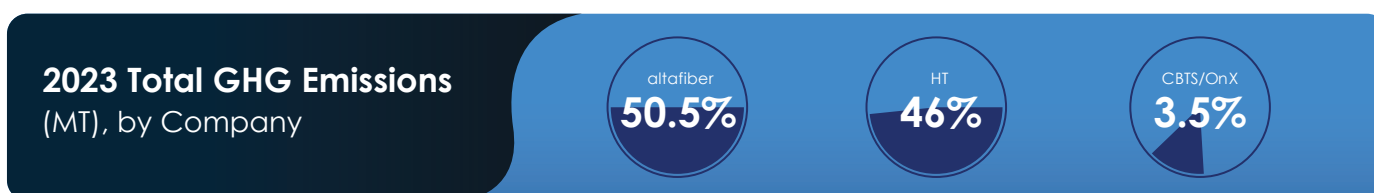


**Table 1: Emissions Inventory – Current Year Compared to Baseline (2021)**

altafiber GHG Emissions Summary				
Scope	Activity Type	2021 Metric Tons of CO2e	2022 Metric Tons of CO2e	2023 Metric Tons of CO2e
<b>Scope 1</b>	Stationary combustion	2,151	2,672	2,340
	Mobile combustion	9,248	10,490	10,836
	Fugitive emissions from refrigerants	576	868	826
	<b>Scope 1 - Total</b>	<b>11,975</b>	<b>14,030</b>	<b>14,001</b>
<b>Scope 2</b>	Purchased electricity - location based	64,459	64,086	62,563
	Purchased electricity - market based*	53,412	50,641	48,546
	Purchased Electricity Leased Facilities	9,034	8,792	7,146
	<b>Scope 2 - Total (location based)</b>	<b>73,494</b>	<b>72,878</b>	<b>69,710</b>
	<b>Scope 2 - Total (market based)*</b>	<b>62,446*</b>	<b>59,433*</b>	<b>55,692*</b>
<b>Total GHG Emissions (Market Based)</b>		<b>74,420</b>	<b>73,463</b>	<b>69,693</b>
<b>Total GHG Emissions (Location Based)</b>		<b>85,468</b>	<b>86,908</b>	<b>83,711</b>

\* Market based emissions figures for Hawaiian Telcom (HT) were not available at the time of our 3<sup>rd</sup>-party audit; therefore, these totals were not validated. All location based figures and the market based figure for CBT have been 3<sup>rd</sup> party verified. See Appendix III

Table 2 shows each of **altafiber’s** subsidiary companies GHG emissions by scope for 2021. With this baseline, we will be able to track and reduce emissions in each unique business over time.



**Table 2: Emissions by Subsidiary**

Company	Scope	Activity Type	Metric Tons of CO <sub>2</sub> e		
			2021	2022	2023
altafiber	Scope 1	Stationary Combustion	2,151	2,647	2,327
		Mobile Combustion	6,673	7,577	8,046
		Fugitive Emissions	497	713	795
	Scope 2	Purchased Electricity - Market Based	24,927	23,392	20,766
		Purchased Electricity - Location Based (LB)	30,802	32,210	29,953
		Purchased Electricity - Leased Facilities (LB)	4,256	4,234	3,159
<b>Total altafiber** Emissions:</b>			<b>38,504</b>	<b>38,562</b>	<b>35,093</b>
Hawaiian Telcom	Scope 1	Mobile Combustion + Stationary Combustion	2,425	2,761	2,670
		Fugitive Emissions	79	155	30
	Scope 2	Purchased Electricity - Location Based	33,657	31,876	32,610
		Purchased Electricity - Market Based*	28,484*	27,249	27,780
		Purchased Electricity - Leased Facilities (LB)	1,836	1,821	1,698
<b>Total HT Emissions:</b>			<b>32,824*</b>	<b>31,986</b>	<b>32,180</b>
CBTS & OnX	Scope 1	Stationary Combustion	N/A	N/A	N/A
		Mobile Combustion	150	178	131
		Fugitive Emissions	N/A	N/A	N/A
	Scope 2	Purchased Electricity - Location Based	N/A	N/A	N/A
		Purchased Electricity - Leased Facilities (LB)	2,942	2,737	2,289
<b>Total CBTS &amp; OnX Emissions:</b>			<b>3,092</b>	<b>2,915</b>	<b>2,420</b>
<p>* In 2021 Market based emissions figures for Hawaiian Telcom (HT) were not available at the time of our third-party audit; therefore, these totals were not validated. All location based figures and the market based figure for <b>altafiber</b> have been third-party verified. See Appendix III.</p> <p>** <b>altafiber</b> was reported as Cincinnati Bell Telephone (CBT) in the baseline year (2021) report</p>					

Lastly, Table 3 provides some emission intensity metrics we can use to track progress over time as the business grows and changes. Our stakeholders and customers can also see these metrics alongside those reported by our businesses peers. The carbon emissions per

full-time equivalent (FTE) employee and the emissions per \$1M in revenue (referred to as carbon efficiency) are two common intensity metrics in our industry.

**Table 3: 2021 Emissions Intensities, using Market Based Emissions**

altafiber	2021 baseline	2022 baseline	2023 baseline
Carbon Emissions per FTE (Metric Tons CO <sub>2</sub> e per employee)	15.8	14.7	14.1
Carbon Efficiency (Metric Tons CO <sub>2</sub> e per \$1M Net Revenue)	33	32	29
Subsidiaries' Carbon Efficiency (Metric Tons CO <sub>2</sub> e per \$1M Net Revenue)			
Hawaiian Telcom	95	93	85
<b>altafiber*</b>	57	56	51
CBTS & OnX	3	2	2
* <b>altafiber</b> was reported as Cincinnati Bell Telephone (CBT) in the baseline year (2021) report			

## Future Inventory Practices

In future years we will grow and adapt our tracking methodology for ease and accuracy. We will focus our efforts on our major GHG emission sources, as identified in our baseline year, and find an appropriate level of tracking for small, de minimis sources of GHGs such as our generator usage and refrigerant losses. We will be challenged to integrate new businesses acquired and likewise, adjust when any sales or divestments occur.

To improve our reporting, **altafiber** will assess scope 3 emissions in 2024. **altafiber** is estimating its emissions in the 15 scope 3 categories defined in the GHG Protocol, with the goal of understanding which categories are most impactful to our business. The GHG Protocol suggests reporting scope 3 emissions that are relevant, in that they:

- Are large (or believed to be large) relative to our scope 1 and 2 emissions
- Contribute to our GHG risk exposure
- Are deemed critical by our stakeholders
- Pose potential emissions reductions that could benefit our company, our stakeholders or our clients

## Appendices

## Appendix I: References and Tools

The following guidance documents were used to prepare this report:

- World Resources Institute (March 2004). The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, Revised Edition.
  - o With February 2013 Amendment, "Required gases and GWP values."
- World Resource Institute (December 2002). Working 9 to 5 on Climate Change: An Office Guide.
- World Resource Institute (May 2006). Hot Climate, Cool Commerce: A Service Sector Guide to Greenhouse Gas Management.

The following tools were used to calculate our GHG emissions:

- Intergovernmental Panel on Climate Change, Fifth Assessment Report (2014)
- Intergovernmental Panel on Climate Change, Fourth Assessment Report (AR4) (2007), section 2.10.2 Direct Global Warming Potentials and Chapter 2: Changes in Atmospheric Constituents and in Radiative Forcing
- Department for Environmental, Food & Rural Affairs (DEFRA), 2021 Guidelines to DEFRA/DECC's Greenhouse gas reporting Conversion Factors 2021 for Company Reporting. From the Department for Business, Energy & Industrial Strategy. Published June 2nd 2021. Last updated January 24th, 2022.
- EPA, "Emission Factors for Greenhouse Gas Inventories," Table 1 Stationary Combustion Emission Factors, April 2021  
([https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors\\_apr2021.pdf](https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf)).
- EPA eGRID2020, January 2022, <https://www.epa.gov/egrid/summary-data>
- The Climate Registry, Default Emission Factors, May 2021  
(<https://www.theclimateregistry.org/wp-content/uploads/2021/05/2021-Default-Emission-Factor-Document.pdf>)
- United Nations Framework Convention on Climate Change (UNFCCC) <https://unfccc.int/ghg-inventories-annex-i-parties/2021> Canada – download 'NIR' (national inventory report) (Published: 15 Apr 2021).
- India Climate Transparency Report (2021)  
<https://www.climate-transparency.org/wp-content/uploads/2021/10/CT2021India.pdf>



## Appendix II: CY2023 GHG Inventory Verification Statement

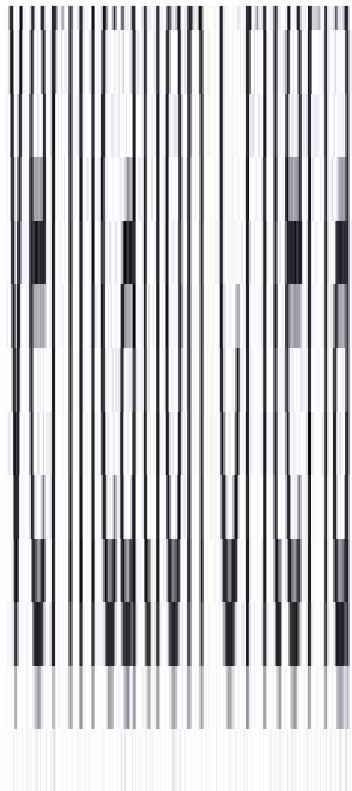
INSTITUTE (WWW) WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT (WBCSD) GREENHOUSE GAS PROTOCOL: A Corporate Accounting and Reporting Standard (2004 revised edition) along with its associated amendments. Our opinion on the results of the inventory, with respect to the verification objectives and criteria, is provided in this statement.

### Responsibility of AltaFiber & Independence of Verification Provider

AltaFiber has sole responsibility for the content of its GHG Statement. Cameron-Cole accepts no responsibility

## Appendix II: CY2023 GHG Inventory Verification Statement (continued)

### Responsibility of AltaFiber & Independence of Verification



## Appendix II: CY2023 GHG Inventory Verification Statement (continued)

## Appendix III: Methodology

While the overall methodology and emission sources remained consistent between our 2021-2023 inventories, minor updates were made to emission factors and/or activity data collection methods in order to reflect the improved data accuracy and collection methods in 2022. The following methodology section describes the improved process used in 2022 and 2023.

GHG calculations follow the formula below unless otherwise indicated:

Activity data x emission factor x global warming potential (GWP) = CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions

- Where:
  - Activity data is a quantitative measure of a level of activity (e.g. liters of fuel consumed, kilometers traveled, etc.) that results in GHG emissions
  - Emission factor is a factor that converts activity data into GHG emissions data (e.g. kg CO<sub>2</sub> emitted per liter of fuel consumed, kg CH<sub>4</sub> emitted per kilometer traveled, etc.)
  - Global warming potential (GWP) is a factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG, relative to one unit of CO<sub>2</sub> over a 100-year time horizon. Multiplying emissions of a given GHG by its GWP gives us the CO<sub>2</sub> equivalent emissions.

The global warming potential factors, detailed methodology, and emission factors used for each emission source are listed in this document.

### Global Warming Potentials used in this inventory:

Greenhouse Gas	GWP (100-year)	Source
CO <sub>2</sub>	1	Intergovernmental Panel on Climate Change, Fifth Assessment Report (2014)
CH <sub>4</sub>	28	Intergovernmental Panel on Climate Change, Fifth Assessment Report (2014)
N <sub>2</sub> O	265	Intergovernmental Panel on Climate Change, Fifth Assessment Report (2014)
HFC-134a	1300	Intergovernmental Panel on Climate Change, Fifth Assessment Report (2014)
R-410 A	2088	Intergovernmental Panel on Climate Change, Fifth Assessment Report (2014)
R-v438 A	2265	2.10.2 Direct Global Warming Potentials - AR4 WGI Chapter 2: Changes in Atmospheric Constituents and in Radiative Forcing
R-458A	1564.4	High-GWP Refrigerants   California Air Resources Board- AR5
R404A	3942.8	High-GWP Refrigerants   California Air Resources Board- AR5

## Scope 1 Methodology

Scope 1 includes direct GHG emissions from sources that are owned or controlled by the company. For example, emissions from combustion in owned or controlled boilers, furnaces, or vehicles.

### Approach for Natural Gas

Methodology	Description
<b>Activity Data</b>	<b>altafiber</b> uses natural gas in 34 sites serviced by Duke Energy and two sites serviced by the City of Hamilton Utility. Activity data is collected & processed by nZero, <b>altafiber's</b> carbon management software. The utility bills are collected from online portals. The activity data provided by the bills were converted from CCF to Therms
<b>Method</b>	Calculation follows the general formula.
<b>Limitations</b>	Only fuel consumption is known in mass/volume units, and no information is available about the fuel heat content or carbon content. This method has the most uncertainty because the emission factor is based on default fuel heat content, rather than actual heat content
<b>Emission Factor for Natural Gas</b>	53.1145 kg CO <sub>2</sub> e/mmBtu
<b>Emission Factor Source</b>	<b>Source:</b> EPA, "Emission Factors for Greenhouse Gas Inventories," Table 1 Stationary Combustion Emission Factors, March 2023 <a href="https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf">https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf</a>

## Approach for Stationary Combustion-Generators & Equipment

Methodology	Description
<p><b>Activity Data</b></p>	<p><b>altafiber:</b> altafiber's Senior Manager for Network Real Estate Management, Construction and Engineering, Mr. Randy Wooten, orders the diesel fuel to fill all generators in the Midwest, except for the generators at the West 7th building in downtown Cincinnati. Mr. Wooten provided the invoices for fuel purchased to fill the generator tanks in 2021. This figure is taken as a surrogate for fuel the generators use in a year, as actual fuel use is not measured and tracked.</p> <p>Operations Manager Kevin W Daniel provided the diesel fuel usage for generators for 209 W7th St building.</p> <p><b>HT:</b> Hawaiian Telcom's generators' tanks are refilled either by purchasing fuel using a fuel card (the "WEX" card) or by using fuel from the bulk storage tanks operated by HT at three self-fueling sites at Moanalua in greater Honolulu (MBY), Oahu; Lihue, Kauai; and Hilo, Hawaii. The total fuel purchased for HT in 2022 from all these sources – the fuel card and the three in-house tanks – was tallied for the inventory. This year, we were able to separate the fuel used for generators, field equipment and fleet vehicles.</p>
<p><b>Method</b></p>	<p>Calculation follows the general formula.</p>
<p><b>Limitations</b></p>	
<p><b>Emission Factor for Generator</b></p>	<p>Distillate Fuel Oil #2: 10.243 kg CO<sub>2</sub>e/gal            Motor Gasoline Stationary Equipment:            8.812kg CO<sub>2</sub>e/gal</p>
<p><b>Emission Factor Source</b></p>	<p><b>Source:</b> EPA, "Emission Factors for Greenhouse Gas Inventories," Table 1 Stationary Combustion Emission Factors, March 2023 <a href="https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf">https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf</a></p>

## Approach to Fugitive Emissions- Refrigerants

Methodology	Description
<p><b>Activity Data</b></p>	<p><b>altafiber:</b> altafiber's Senior Manager for Network Real Estate Management, Construction and Engineering, Mr. Randy Wooten, oversees altafiber's HVAC contractor Titan Mechanical. Mr. Wooten purchases and stores 30-pound canisters of R-410 and R-134a for use by Titan as needed for altafiber facilities. Mr. Wooten and Titan maintain a tracking log for the canisters, recording each time a Titan technician picks up a new refrigerant canister. That technician will use the canister until depletion and then retrieve a new one. The canister log used to estimate the amount of refrigerant used in altafiber facilities. The log is used as a surrogate for each refrigerant used in a year, acknowledging there is remaining product in canisters in Titan's possession from year to year. This methodology can be used consistently year-over-year. Mr. Wooten also tracks retirement and reclamation of refrigerant for HVAC replacements.</p> <p>The West 7th Street building does not have any HVAC equipment in it that uses refrigerants. The chilled water plant is in the neighboring CyrusOne building and altafiber only pays for the chilled water delivered to the building.</p> <p>West 7th has HFC fire suppression agents, specifically FM-200 and FE-25. The systems have no leakage rate and sit in standby until they are discharged. We have not had any discharge in the 209 W7th St building, so no emissions are included for West 7th. Note, there are also halon fire extinguishers throughout the building, which is not a substance inventoried under the GHG Protocol.</p> <p><b>HT:</b> Technicians and contractors in HT submit an "accidental or unintentional release report" every time equipment is recharged with refrigerant after losses occur. Each report records the amount of refrigerant charged into equipment when its charge is found too low. The amount of the recharge is assumed to be the amount lost to the atmosphere for this inventory. The same forms are also used to track refrigerant addition or reclamation. The release reports are the source of refrigerant data for this inventory.</p>



## Approach to Fugitive Emissions- Refrigerants (continued)

Methodology	Description
<b>Method</b>	<p>Simplified Material Balance Method - <a href="https://www.epa.gov/sites/default/files/2020-12/documents/fugitiveemissions.pdf">https://www.epa.gov/sites/default/files/2020-12/documents/fugitiveemissions.pdf</a> Equation 6: Calculating Refrigerant Emissions with the Simplified Material Balance Method</p> <p>Emissions = (PN- CN) + PS + (CD- RD) where:</p> <p>PN = purchases of refrigerant used to charge new equipment (omitted if the equipment has been pre-charged by the manufacturer)</p> <p>CN = total refrigerant capacity of the new equipment (omitted if the equipment has been pre-charged by the manufacturer)</p> <p>PS = purchases of refrigerant used to service equipment</p> <p>CD = total refrigerant capacity of retiring equipment</p> <p>RD = refrigerant recovered from retiring equipment</p>
<b>Limitations</b>	
<b>GWP Factor for vRefrigerants</b>	<p>HFC-134a-1300  R-410A-1923.5  R-438A- 2058.76  R-458A-1564.4  R404A-3942.8</p>
<b>Emission Factor Source</b>	<p>PCC AR5- High-GWP Refrigerants   California Air Resources Board - AR5</p>

## Approach for Mobile Combustion-Fleet

Methodology	Description
<b>Activity Data</b>	Activity data collected from purchase reports.
<b>Method</b>	<p><b>altafiber and CBTS:</b> Fuel for the <b>altafiber</b> and CBTS fleets is purchased on fuel credit cards issued by a single vendor, Superfleet. Purchases are tracked to four accounts:</p> <ul style="list-style-type: none"> <li>• EI522 – for a small number of Cincinnati Bell corporate (CBI) vehicles. This account is included with <b>altafiber's</b> vehicle fleet fuel use</li> <li>• EI525 - CBTS</li> <li>• EI527 – CBT, included in <b>altafiber's</b> use</li> <li>• EI533 - Supply chain vehicles, which are also included with <b>altafiber's</b> fuel use</li> </ul> <p>Fuel purchases are invoiced by Superfleet monthly. Accounting provided the monthly reports, which were tallied to capture the fuel use by <b>altafiber</b> and CBTS's fleet.</p> <p><b>HT:</b> All fuel is purchased either with a gas card (WEX) or purchased in bulk fuel tanks and dispenses at one of three self-owned fueling stations.</p> <p>Calculation follows the general formula. When calculating CO<sub>2</sub> emissions, the activity data gathered is the quantity of fuel combusted for each fuel type. Since vehicle models from the fleet inventory could not be paired with purchase reports, &amp; distance was not captured. CH<sub>4</sub> &amp; N<sub>2</sub>O was calculated using estimates from The Climate Registry.</p> <p><b>CO<sub>2</sub>:</b> Emissions = Fuel x EF</p> <p><b>Where:</b>            Emissions= Mass of CO<sub>2</sub> emitted            Fuel= Mass or volume of fuel combusted            EF = CO<sub>2</sub> emission factor per mass or volume unit            CH<sub>4</sub> and N<sub>2</sub>O: Emissions=MT CO<sub>2</sub> x EF</p>

## Approach for Mobile Combustion-Fleet (continued)

Methodology	Description
<b>Method</b>	<b>Where:</b> Emissions = Mass of CH <sub>4</sub> or N <sub>2</sub> O emitted MT CO <sub>2</sub> = calculated from fuel consumption data & formula above EF = MT GHG (CH <sub>4</sub> /N <sub>2</sub> O) per MT of CO <sub>2</sub>
<b>Limitations</b>	CO <sub>2</sub> : Fuel consumption is known only in mass or volume units, and no information is available about the fuel heat content or carbon content.  CH <sub>4</sub> & N <sub>2</sub> O: Utilized factors for estimating CH <sub>4</sub> and N <sub>2</sub> O emissions from gasoline and diesel vehicles (SEM) from The Climate Registry. Distance data paired with vehicle classification would provide a more accurate account.
<b>Emission Factor CO<sub>2</sub></b> (Diesel & Motor Gasoline)	Diesel Fuel CO <sub>2</sub> : 10.21 kg CO <sub>2</sub> /gal  Motor Gasoline CO <sub>2</sub> : 8.78 kg CO <sub>2</sub> e/gal
<b>Emission Factor for Estimating CH<sub>4</sub> and N<sub>2</sub>O</b>	MT GHG per MT of CO <sub>2</sub> CH <sub>4</sub> :2.04E-05 N <sub>2</sub> O:2.19E-05
<b>Source CO<sub>2</sub></b>	Source: EPA, "Emission Factors for Greenhouse Gas Inventories," Table 2 Mobile Combustion Emission Factors, March 2023 <a href="https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf">https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf</a>
<b>Source CH<sub>4</sub> N<sub>2</sub>O</b>	Table 2.9 The Climate Registry, Default Emission Factors, May 2022 <a href="https://theclimateregistry.org/wp-content/uploads/2022/11/2022-Default-Emission-Factors-Final.pdf">https://theclimateregistry.org/wp-content/uploads/2022/11/2022-Default-Emission-Factors-Final.pdf</a>

# Scope 2 Methodology

Scope 2 includes GHG emissions from the generation of purchased electricity consumed by the company. Purchased electricity is electricity to be consumed that is purchased or otherwise brought into the organizational boundary of the company. These disclosures are consistent with the reporting requirements of the [scope 2 Guidance | Greenhouse Gas Protocol](#)

## Location-based Method

The location-based method calculates emissions based on electricity consumption at the location where the energy is used, considering the fuel mix used to generate electricity within the locations and time periods in which **altafiber** operates. **altafiber** uses EPA eGRID average emission factors to report location-based emissions for all offices included in the inventory scope.

For the international leased assets in CBTS (United Kingdom, South India and Canada - Alberta, British Columbia, Newfoundland, Labdrado, Nova Scotia, Ontario), the following static international emission factors are used: DEFRA for the UK, Province level Canadian Greenhouse Gas Offset Credit System Regulations and the UN CTR for India.

Methodology	Description
<b>Activity Data</b>	<p><b>altafiber:</b> altafiber has 1556 sites using purchased electricity. Twelve of the utilities provide usage through monthly bills that are synthesized and collected by nZero. Two of the utilities have 15-minute data that nZero pulls into the nZero platform daily.</p> <p><b>HT:</b> Hawaiian Telcom uses purchased electricity at 361 sites. The Senior Manager for Real Estate Operations for HT provides nZero monthly totals of electricity consumption compiled from bills sent from the utility provider. Hawaiian Telcom also sources electricity from TWSG, an on-site PV solar renewable energy source, via a power purchase agreement (PPA). HT can claim this energy usage as carbon-free, with data regarding usage collected through the same process as HT's other utilities.</p>

## Location-based Method (continued)

Methodology	
<p><b>Activity Data</b> continued</p>	<p>Leased facilities: <b>altafiber</b>, HT and CBTS all have leased facilities within their operations.</p> <ul style="list-style-type: none"> <li>• The corporate real estate manager for <b>altafiber</b> manages the leases for <b>altafiber</b>.</li> <li>• CBTS contracted Colliers to manage its facilities starting in 2022, all of which are leased.</li> <li>• The real estate operations (REO) manager for HT manages leases for HT.</li> </ul> <p>Where any entity receives an actual utility bill, or is passed along actual utility usage data on landlord invoices or end-of-year common area maintenance (CAM) charge reconciliations, actual usage data was used in the inventory. However, for most leased facilities we do not receive a utility bill or statement. In those instances the square footage for the leased facility is used, in combination with an average energy use intensity (EUI) for each facility type.</p>
<p><b>Method</b></p>	<p>Calculation follows the general formula. Activity data for each <b>altafiber</b>, CBTS and HT location (MWh) are multiplied by grid average emission factors and GWP factors to convert electricity consumption into CO<sub>2</sub>e emissions.</p> <p>For leased facilities where our space is not metered or sub-metered separately and for which we receive no utility bill, the following methods were used to estimate usage (kWh) and resulting emissions:</p> <p>The EPA's "U.S. Energy Use Intensity by Property Type" document (April 2021) provides national median source EUI's for different facility types using data gathered by the DOE's Commercial Building Energy Consumption Survey (CBECS). CBECS EUI were used for the following facility types: garages, office, retail, and warehouse.</p>

## Location-based Method (continued)

Methodology	Description
<p><b>Method</b> continued</p>	<p>Our inventory includes small data centers, antennae, interconnections, and equipment rooms which typically house IT equipment rack(s). CBECS does not provide an EUI for such facilities. Energy Star suggests an estimate of 2000 kBtu/sf of source energy for data centers. To convert this estimate to site energy, we chose to use the same ratio as "other" tech/science facilities in CBECS where site energy is 45% of source energy. Therefore, we consistently use an EUI of 900 kBtu/sf (45% of 2000) in our inventory for our leased facilities in the categories above.</p> <p>For two facility types unique to our inventory, the central office (CO) and the optically remote module (ORM), we estimated an EUI based on our own facilities' metered data. We took the average EUI for all ORMs and all COs for which we had utility data. The EUIs derived were used to estimate the energy use of COs and ORMs in our leased inventory for which we receive no utility bill.</p> <p>Scope 3 leased spaces: Typically, lessee emissions are classified as scope 1 or 2. However, if the lessee lacks operational control over the leased space, these emissions can be allocated as scope 3 emissions according to Greenhouse Gas Protocol (GHGP) standards. Operational control, as defined by GHGP, involves a company's authority to establish and enforce operating policies at a specific operation. We assessed our ability to implement such policies, and if we had none or highly limited ability, emissions are deemed scope 3 to avoid double counting of emissions from leased assets. Following the GHGP's leased emission allocation guidance (Appendix F to the GHG Protocol Corporate Accounting and Reporting Standard), we categorize emissions as scope 2 (Leased Spaces) and scope 3 (Upstream Leased Assets) based on operational control considerations:</p>

## Location-based Method (continued)

Methodology	Description
<p><b>Method</b> continued</p>	<ul style="list-style-type: none"> <li>• <b>Scope 2, Leased Assets:</b> Includes emissions in leased spaces where operational control can be demonstrated. Our assessment covers multiple aspects including the ability to implement operating policies such as customizing power use (e.g. decision-making regarding power supply, HVAC and/or lighting); our control over equipment selection; and, our control of management decisions that affect equipment power consumption behavior of the equipment. For example, if the equipment in the leased space is network equipment of our choosing supporting data access or transport for our Network segment customers, we have operational control and the leased space is included in our scope 2 emissions.</li> <li>• <b>Scope 3, Upstream Leased Assets:</b> Includes emissions from leased facilities (data center, equipment room or rack space), housing our client's equipment or data on their behalf. In such cases we are a service provider, lacking operational control over both the leased facilities operating practices, and the equipment and data storage and transport activity determined by the client. Typically we are acting as a business or IT consultant arranging such leases on behalf of a client. This includes our services where we lease designated areas within third-party data center facilities for a client, securely housing our clients' equipment or data in cages, while the building operations &amp; equipment/data are controlled by different entities.</li> </ul>
<p><b>Limitations</b></p>	<p>Most leased facilities in our inventory are not sub-metered or metered; therefore, we have to estimate to account for the fuel/energy use in those facilities using the assumptions and methods above.</p>

## Location-based Method (continued)

Methodology	Description
<b>Emission Factor for Location based</b>	<p>EPA eGRID2021, January 2023, <a href="https://www.epa.gov/egrid/summary-data">https://www.epa.gov/egrid/summary-data</a></p> <p>DEFRA: 2022 Guidelines to Defra/ DECC's Greenhouse gas reporting Conversion Factors 2022 for Company Reporting. From the Department for Business, Energy &amp; Industrial Strategy. <a href="https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022">https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022</a></p> <p>Canadian Greenhouse Gas Offset Credit System Regulations. June 8th, 2022. Table 6- Electricity consumption intensity values  <a href="https://www.canada.ca/en/environment-climate-change/services/-climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-greenhouse-gas-offset-system/emission-factors-reference-values.html">https://www.canada.ca/en/environment-climate-change/services/-climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-greenhouse-gas-offset-system/emission-factors-reference-values.html</a></p> <p>UN Climate Transparency Report (2022)- <a href="https://www.climate-transparency.org/wp-content/uploads/2022/10/CT2022-India-Web.pdf">https://www.climate-transparency.org/wp-content/uploads/2022/10/CT2022-India-Web.pdf</a></p>



## Market-based Method

The market-based method shows emissions for which **altafiber** is responsible through its purchasing decisions based on contractual emissions.

### Market-based, altafiber

Methodology	Description
<b>Activity Data</b>	Total electricity consumed (MWh) (see "location-based activity data," above)
<b>Method</b>	nZero employs an advanced grid study which takes into account the seasonal, daily, and hourly variation in location-based emissions factors to provide a more accurate and detailed measurement of the organization's scope 2 GHG emissions. The grid study uses facility-specific and resource-specific data that is matched to actual generation dispatch and linked to the time of consumption, which results in a more comprehensive and precise measurement than using an annual grid average emission factor (EPA eGRID dataset). The methodology is proprietary to nZero, was provided and reviewed by our third-party verifier, Cameron Cole, and available upon request/agreement of nZero.
<b>Limitations</b>	Due to lack of information, market-based reporting was not conducted on leased facilities.
<b>Emission Factor for Market Based</b>	<p>nZero calculated <b>altafiber's</b> grid balancing authority, PJM's, hourly carbon intensity over the 2022 period, along with an annual summary and hourly break down of PJM's generation mix and interchange.</p> <p>Therefore the emissions factor was calculated hourly, and paired to the corresponding hourly usage in <b>altafiber's</b> inventory to calculate resulting emissions. The 2022 annual average emissions factor using this methodology was 764.35 lbs CO<sub>2</sub>e/MWh.</p>

**Market-based, HT (continued)**

Methodology	Description
<b>Activity Data</b>	Total electricity consumed (MWh) (see "location-based activity data," above)
<b>Method</b>	<p>The Greenhouse Gas Protocol's scope 2 Guidance establishes a market-based hierarchy. Under HT's contracts, TWSG generates on-site renewable energy, which is claimed as carbon-free, with an emission factor of 0. HT's small number of utilities and the geographic organization of its grid allowed for the use of supplier-specific emission factors. Supplier-specific EFs for Hawaii, Oahu, and Maui County were sourced from HEI's 2022 ESG Report, which was verified by a HEI contact and publicly reported at <a href="https://s2.q4cdn.com/268623243/files/doc_downloads/2022/04/HEI_ESG_2022_R10.pdf">https://s2.q4cdn.com/268623243/files/doc_downloads/2022/04/HEI_ESG_2022_R10.pdf</a>.</p> <p>In the case of Kauai, COO Brad W. Rockwell provided the emission factor, which was publicly disclosed in the EPA FLight program at <a href="https://ghgdata.epa.gov/ghgp/-main.do">https://ghgdata.epa.gov/ghgp/-main.do</a> and in KIUC's Annual Reports at <a href="https://www.kiuc.coop/annual-reports">https://www.kiuc.coop/annual-reports</a>.</p>
<b>Limitations</b>	
<b>Emission Factor for Market Based</b>	MT CO <sub>2</sub> e/ MWh Hawaii Island-0.423 Oahu-0.651 Maui County-0.474 KIUC-0.2889



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