

The background of the cover is a blue-tinted photograph of a large-scale solar panel installation on a flat roof. The solar panels are arranged in a grid pattern and reflect the sky. In the distance, a cityscape with various buildings and utility poles is visible under a cloudy sky. The overall aesthetic is clean and modern, emphasizing sustainable technology.

**2021**

**GREENHOUSE GAS REPORT**

**altafiber**  
elevating connection

# Introduction

Building upon a long legacy of environmental responsibility and stewardship, altafiber (which operated as Cincinnati Bell until March 2022) a telecommunications and global IT services company, is embarking 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 first greenhouse gas emissions report which provides an accounting of the company's GHG emissions, establishing 2021 as our base year. This GHG inventory has been independently verified by a third-party auditor, Cameron-Cole, LLC. Cameron-Cole provided a limited level of assurance that our GHG emissions assertions submitted to are free of material errors, omissions, or misstatements (Appendix II).

---

<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,

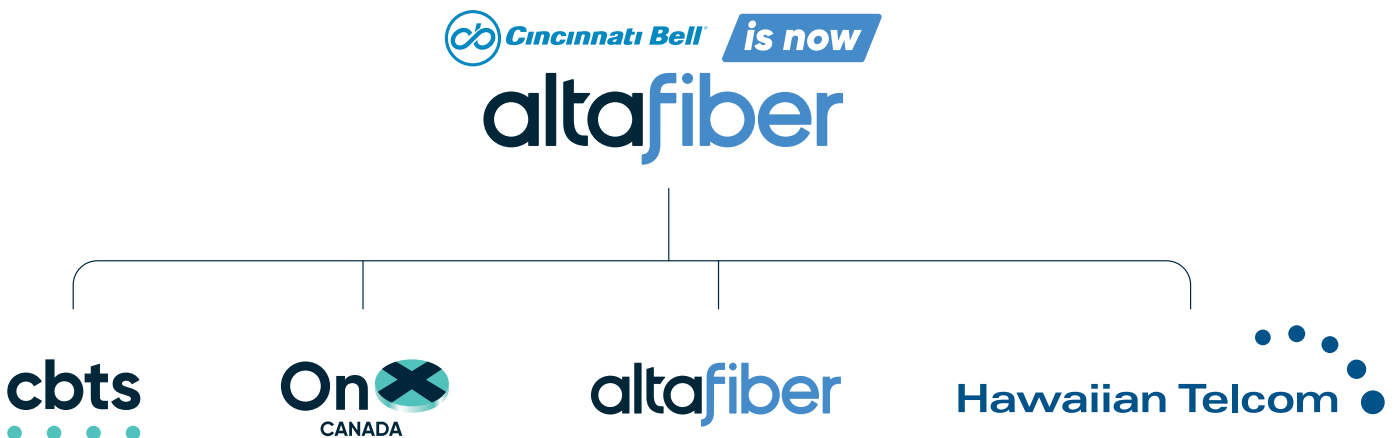
---

<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.

**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** Inc. (Cincinnati Bell Inc [CBI] until March 2022) and its subsidiaries CBTS LLC (including OnX Enterprise Solutions, based in Canada), Cincinnati Bell Telephone Company LLC (CBT), and Hawaiian Telcom Holding Inc (HT).



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.

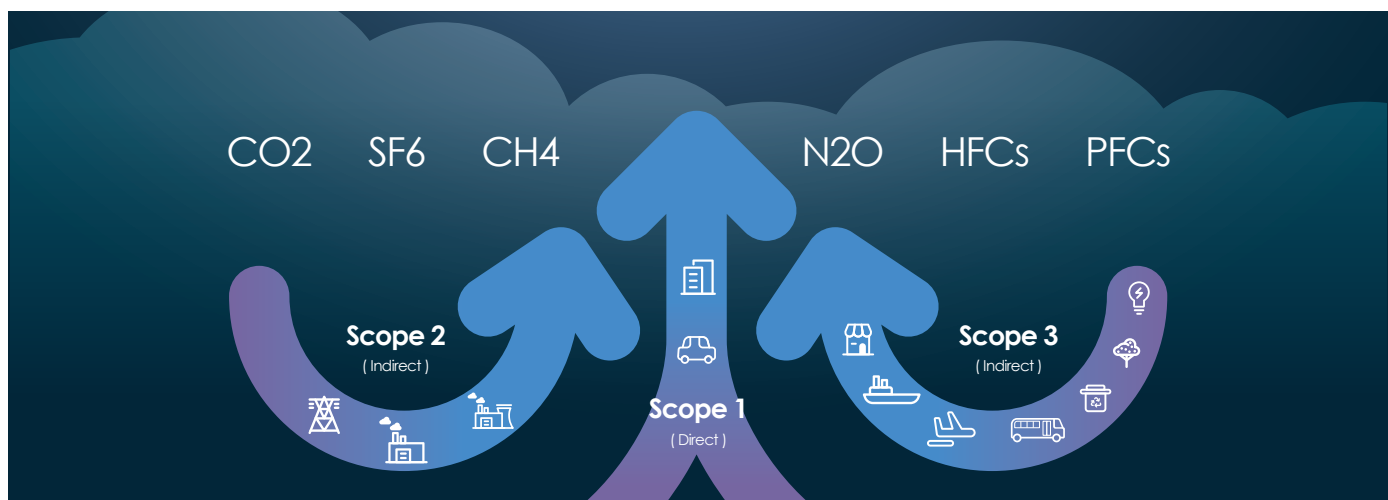


Figure 1: Overview of scopes and emission across a value chain (from GHG protocol)

<sup>3</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 spaces and have estimated the purchased electricity associated with them in our Scope 2 inventory.

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 writ large was experiencing the global Covid-19 pandemic. Therefore in our baseline year the occupancy and related energy use of our offices was historically low, most employees were working from home or in a hybrid arrangement, and business travel was highly curtailed. This mainly affected our leased office spaces, which mostly lack a utility meter or sub-meter and for which we primarily estimated energy use using pre-pandemic industry averages from the Department of Energy. That means that our inventory for our leased spaces does not accurately reflect the reduced energy use likely caused by the lack of occupancy. Rather, our inventory likely overestimates the energy use of our leased office spaces during the pandemic, which is a conservative approach. Many facets of our business were dramatically changed by the pandemic in 2020-2021 and a “new normal” had not yet manifested itself. 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.



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 (EIU) in energy use per square foot (kWh/sf) for the type of facility. EIUs 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.

---

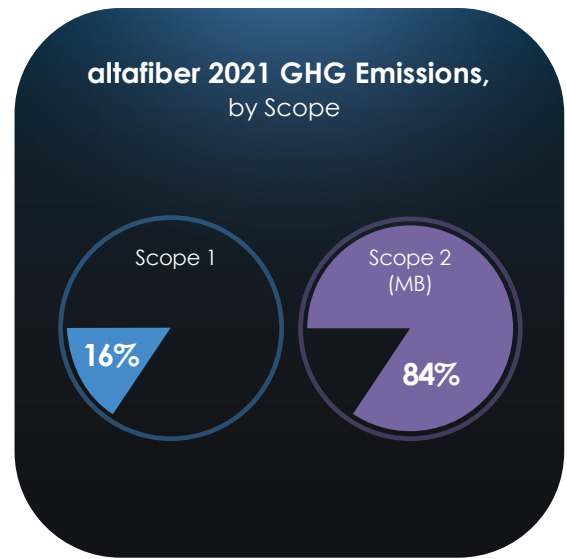
<sup>4</sup> Specifically, the Department of Energy's Commercial Buildings Energy Consumption Survey (CBECS) was used to estimate the energy intensity of leased office space for which we don't receive actual energy data. CBECS latest data is from 2018, prior to the Covid19 pandemic.

## Methodology

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

## GHG Emissions

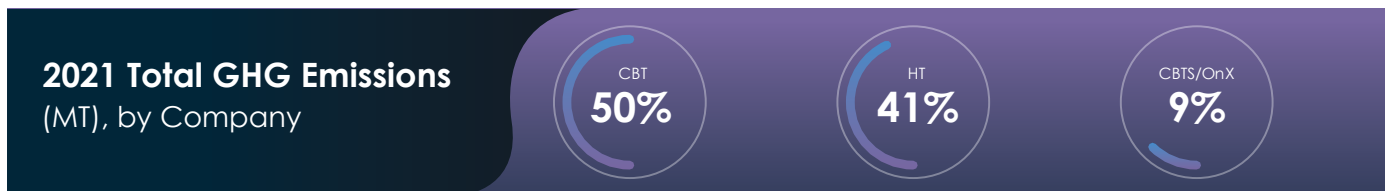
Table 1 shows **altafiber's** emissions by scope in the units of carbon dioxide equivalents (CO<sub>2</sub>e), a standard unit for measuring carbon footprints. The term expresses the impact of each different greenhouse gas in the amount of CO<sub>2</sub> that would create the same amount of warming. 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 – 2021** (Baseline Year)

2021 altafiber GHG Emissions Summary		
Scope	Activity Type	Metric Tons of CO <sub>2</sub> e
<b>Scope 1</b>	Stationary combustion	2,151.05
	Mobile combustion	9,247.87
	Fugitive emissions from refrigerants	575.58
	Scope 1 - Total	11,974.50
<b>Scope 2</b>	Purchased electricity - location based	64,459.38
	Purchased electricity - market based*	53,411.58
	Purchased Electricity Leased Facilities	11,597.29
	Scope 2-Total (location based)	76,056.66
	Scope 2 - Total (market based)*	65,008.87*
<b>Total GHG Emissions (Market Based)</b>		<b>76,983.36</b>
Total GHG Emissions (Location Based)		88,031.16
* 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
Cincinnati Bell Telephone	Scope 1	Stationary Combustion	2,151.05
		Mobile Combustion	6,672.90
		Fugitive Emissions	496.96
	Scope 2	Purchased Electricity - Market Based	24,927.17
		Purchased Electricity - Location Based (LB)	30,801.98
		Purchased Electricity - Leased Facilities (LB)	4,256.26
<b>Total CBT Emissions:</b>			<b>44,379.15</b>
Hawaiian Telcom	Scope 1	Mobile Combustion + Stationary Combustion	2,424.88
		Fugitive Emissions	78.62
	Scope 2	Purchased Electricity - Location Based	33,657.39
		Purchased Electricity - Market Based*	28,484.41*
		Purchased Electricity - Leased Facilities (LB)	211.46
<b>Total HT Emissions:</b>			<b>36,372.36*</b>
CBTS & OnX	Scope 1	Stationary Combustion	N/A
		Mobile Combustion	150.09
		Fugitive Emissions	N/A
	Scope 2	Purchased Electricity - Location Based	N/A
		Purchased Electricity - Leased Facilities (LB)	7,129.57
<b>Total CBTS &amp; OnX Emissions:</b>			<b>7,279.66</b>
* 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 CBT have been third-party verified. See Appendix III.			

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
Carbon Emissions per FTE (Metric Tons CO <sub>2</sub> e per employee)	15.4
Carbon Efficiency (Metric Tons CO <sub>2</sub> e per \$1M Net Revenue)	35
<b>Subsidiaries' Carbon Efficiency</b> (Metric Tons CO <sub>2</sub> e per \$1M Net Revenue)	
Hawaiian Telcom	90
Cincinnati Telephone Company	57
CBTS & OnX	6

## 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** can investigate and account for Scope 3 emissions. 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.
  - 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: CY2021 GHG Inventory Verification Statement



## Verification Statement Cincinnati Bell- CY2021 GHG Inventory

### Background

---

Cameron-Cole, LLC (Cameron-Cole) was retained by Cincinnati Bell to perform an independent verification of its global Greenhouse Gas (GHG) Emissions Inventory for Calendar Year 2021 (CY2021). The Scope 1 and 2 GHG Inventory was developed according to the World Resources Institute (WRI)/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 Cincinnati Bell & Independence of Verification Provider

---

Cincinnati Bell has sole responsibility for the content of its GHG Inventory. Cameron-Cole accepts no responsibility for any changes that may have occurred to the GHG emissions results since they were submitted to us for review. Based on internationally accepted norms for impartiality, we believe our review represents an independent assessment of Cincinnati Bell's CY2021 GHG Emissions Inventory. Finally, the opinion expressed in this verification statement should not be relied upon as the basis for any financial or investment decisions.

### Level of Assurance

---

The level of assurance is used to determine the depth of detail that a Verification Body designs into the Verification Plan to determine if there are material errors, omissions or misstatements in a company's GHG assertions. Although Absolute Assurance may provide the highest level of confidence that an emissions assertion is materially correct, it is often not practical for complex verification assignments. The two remaining levels of assurance that are generally recognized – reasonable and limited – are routinely provided by Verification Bodies. Reasonable Assurance generates the highest level of confidence that an emissions report is materially correct, while Limited Assurance provides less confidence, and involves less detailed examination of GHG data and supporting documentation. Limited Assurance statements assert that there is no evidence that an emissions report is not materially correct. Cameron-Cole's verification of Cincinnati Bell's GHG Emissions Inventory for CY2021 was constructed to provide a Limited Level of Assurance for Scopes 1 & 2.

### Objectives

---

The primary objectives of this verification assignment were as follows:

- Determine whether the GHG emissions assertions meets/exceeds the agreed upon 90% threshold for accuracy for Scopes 1 & 2 emissions, assessed individually; and,
- Evaluate the conformance of Cincinnati Bell's accounting and calculation methodologies, processes and systems to The GHG Protocol.

## Appendix II: CY2021 GHG Inventory Verification Statement (continued)



### Verification Statement Cincinnati Bell- CY2021 GHG Inventory

#### Verification Criteria

---

Cameron-Cole conducted verification activities in alignment with the principles of ISO-14064-3:2019(E) Specifications with Guidance for the Validation and Verification of Greenhouse Gas Assertions. The Cincinnati Bell GHG Inventory was prepared using, and verified against, The GHG Protocol.

#### Verification Scope & Assertions

---

The scope of the verification covers Cincinnati Bell's CY2021 GHG Emissions Inventory with the following boundaries:

- **Geographical:** Worldwide
- **Chemical:** carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), hydrofluorocarbons (HFCs)
- **Organizational Boundary:** approximately 1,800 locations under the operational control boundary
- **Operational Boundary:** The following sources/emissions were identified in Cincinnati Bell's organizational boundary: includes Cincinnati Bell Telephone; CBTS; Cincinnati Bell Any Distance; OnX Canada; Hawaiian Telcom

##### Scope 1

- Direct Emissions from Stationary Combustion Sources: natural gas and diesel generators
- Direct Emissions from Mobile Combustion Sources: approximately fleet vehicles
- Direct Emissions from Fugitive Sources: refrigerants

##### Scope 2

- Indirect Emissions from Purchased Electricity
- Indirect Emissions from Purchased Heating

Cincinnati Bell's CY2021 GHG assertions are as follows:

- Scope 1 emissions totaled 11,974.50 MT CO<sub>2</sub>e
- Location-Based Scope 2 emissions totaled 76,056.66 MT CO<sub>2</sub>e
- Market-Based Scope 2 emissions totaled 70,181.79 MT CO<sub>2</sub>e

# Appendix II: CY2021 GHG Inventory Verification Statement (continued)





## Verification Statement Cincinnati Bell- CY2021 GHG Inventory

### Verification Opinion

---

Based on the method employed and the results of our verification activities, **Cameron-Cole has found no evidence of material errors, omissions or misstatements in Cincinnati Bell's CY2021 GHG Inventory within the boundaries described above.** Cameron-Cole also found that Cincinnati Bell's GHG accounting and calculation methodologies, processes and systems for this inventory conform to guidance from The GHG Protocol. Cameron-Cole's verification of Cincinnati Bell's CY2021 GHG Emissions Inventory was constructed to provide a Limited Level of Assurance for Scopes 1 & 2.

 <b>Mallory Andrews, Lead Verifier</b> <i>Senior Strategist, Sustainability Services</i> June 30, 2022	 <b>Chris Lawless, Independent Reviewer</b> <i>Director, GHG Management Services</i> June 30, 2022
--	--

## Appendix III: Methodology

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.

Global Warming Potentials used in this inventory:

Greenhouse Gas	GWP (100-year)	Source
CO2	1	Intergovernmental Panel on Climate Change, Fifth Assessment Report (2014)
CH4	28	Intergovernmental Panel on Climate Change, Fifth Assessment Report (2014)
N2O	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-438 A	2265	2.10.2 Direct Global Warming Potentials - AR4 WGI Chapter 2: Changes in Atmospheric Constituents and in Radiative Forcing

# 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> utilizes 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, CBT's sustainability software contractor. The utility bills are collected from online portals. In a couple instances, nZero had to call the utility to email the bills that were not available on the online portal. 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  Source: EPA, "Emission Factors for Greenhouse Gas Inventories," Table 1 Stationary Combustion Emission Factors, April 2021 ( <a href="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</a> ).

## Approach for Stationary Combustion-Generators & Equipment

Methodology	Description
<p><b>Activity Data</b></p>	<p><b>CBT: altafiber's</b> 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 the amount of fuel the generators use in a year, as actual fuel use is not measured and tracked.</p> <p>The West 7th facility's four generators are tracked in Cummins Engine Control Modules (ECMs). The generator's fuel use is being tracked by what percent full the tank is, which is a metric well suited to alarm when the tank needs to be refilled, but not suitable to calculate fuel usage. Although percent full data is available from the data historian there are data gaps. We are making monitoring changes to accurately capture the fuel used in the West 7th generators, but the use is not captured or estimated in the 2021 inventory.</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 2021 from all of these sources – the fuel card and the three in-house tanks – was tallied for the inventory. We are unable to separate the fuel used for generators, field equipment and fleet vehicles. The total fuel used is included in the inventory as "mobile and stationary" emissions.</p>
<p><b>Method</b></p>	<p>Calculation follows the general formula.</p>
<p><b>Limitations</b></p>	<p><b>altafiber:</b> The fuel used in the West 7th generators is not captured or estimated in the 2021 inventory. We are making monitoring changes to accurately capture this fuel use in the future. Relative to the size of the inventory this data gap is de minimis.</p> <p><b>HT:</b> The fuel used for the generators cannot be separated from all other fuel uses in HT.</p>

## Approach for Stationary Combustion-Generators & Equipment (continued)

Methodology	Description
<b>Emission Factor for Generator</b>	<p>Diesel Generator: 10.2105 kg CO<sub>2</sub>e/gal</p> <p>Motor Gasoline Stationary Equipment: 8.7805kg CO<sub>2</sub>e/gal</p> <p>Source: EPA, "Emission Factors for Greenhouse Gas Inventories," Table 1 Stationary Combustion Emission Factors, April 2021 (<a href="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</a>).</p>



## Approach to Fugitive Emissions- Refrigerants

Methodology	Description
<p><b>Activity Data</b></p>	<p><b>CBT:</b> <b>altafiber's</b> Senior Manager for Network Real Estate Management, Construction and Engineering, Mr. Randy Wooten, oversees CBT'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 <b>altafiber</b> 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 for 2021 was provided and used to estimate the amount of refrigerant used in <b>altafiber</b> facilities. The log is used as a surrogate for the amount of 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 <b>altafiber</b> 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. HT had just over 40 such reports in 2021. 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>	Utilized the Greenhouse Gas Protocol (GHGP) cross-sector tool, "Refrigeration and Air-Conditioning Equipment" ( <a href="https://ghgprotocol.org/calculation-tools">https://ghgprotocol.org/calculation-tools</a> ) The RAC tool calculates the HFC and PFC emissions from the manufacture, servicing, and/or disposal of RAC equipment. The life cycle stage approach method was utilized given the activity data collected.
<b>Method</b>	Utilized the Greenhouse Gas Protocol (GHGP) cross-sector tool, "Refrigeration and Air-Conditioning Equipment" ( <a href="https://ghgprotocol.org/calculation-tools">https://ghgprotocol.org/calculation-tools</a> ) The RAC tool calculates the HFC and PFC emissions from the manufacture, servicing, and/or disposal of RAC equipment. The life cycle stage approach method was utilized given the activity data collected.
<b>Limitations</b>	Refrigerant tracking practices in <b>altafiber</b> estimate the amount of product used each year, rather than tracking each equipment service amount. Note, refrigerants constitute a small, de minimis portion of CBT's emissions inventory.
<b>Emission Factor for Generator</b>	See Attached RAC Tool on refrigerant calculations

## 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. Purchased are tracked to four accounts:</p> <ul style="list-style-type: none"> <li>• EI522 – for a small number of <b>altafiber</b> corporate vehicles. This account is included with CBT’s vehicle fleet fuel use</li> <li>• EI525 - CBTS</li> <li>• EI527 - <b>altafiber</b></li> <li>• EI533 - Supply chain vehicles, which are also included with CBT’s 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 the <b>altafiber</b> and CBTS fleet in 2021.</p> <p><b>HT:</b> As described for the “Approach for Stationary Combustion-Generators &amp; Equipment,” in HT 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. The total fuel use from these sources is tallied. Due to lack of granularity in the reports, we are unable to distinguish fuel used in fleet vehicles from other uses such as generators and field equipment. Therefore we are reporting total emissions for mobile and stationary sources combined.</p> <p>Calculation follows the general formula. When calculating CO2 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. CH4 &amp; N2O was calculated using estimates from The Climate Registry.</p>

## Approach for Mobile Combustion-Fleet (continued)

Methodology	Description
<b>Method</b>	<p>CO<sub>2</sub>: Emissions = Fuel x EF</p> <p>Where:  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</p> <p>CH<sub>4</sub> and N<sub>2</sub>O: Emissions=MT CO<sub>2</sub> x EF</p> <p>Where:  Emissions = Mass of CH<sub>4</sub> or N<sub>2</sub>O emitted  MT CO<sub>2</sub> = calculated from fuel consumption data &amp; formula above  EF = MT GHG (CH<sub>4</sub>/N<sub>2</sub>O) per MT of CO<sub>2</sub></p>
<b>Limitations</b>	<p>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.</p> <p>CH<sub>4</sub> &amp; 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.</p> <p>HT's fleet vehicle fuel use cannot be isolated from its mobile fuel use so they are reported in aggregate.</p>
<b>Emission Factors for Mobile Combustion</b>	<p>Diesel Fuel CO<sub>2</sub>:  10.21 kg CO<sub>2</sub>/gal</p> <p>Motor Gasoline CO<sub>2</sub>:  8.78 kg CO<sub>2</sub>e/gal</p> <p>Source:  EPA, "Emission Factors for Greenhouse Gas Inventories," Table 1 Stationary Combustion Emission Factors, April 2021 (<a href="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</a>).</p>

## Approach for Mobile Combustion-Fleet (continued)

Methodology	Description						
<b>Emission Factors for Mobile Combustion</b>	<p>CO<sub>2</sub>: Emissions = Fuel x EF</p> <p>Where:            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</p> <p>CH<sub>4</sub> and N<sub>2</sub>O: Emissions=MT CO<sub>2</sub> x EF</p> <p>Where:            Emissions = Mass of CH<sub>4</sub> or N<sub>2</sub>O emitted            MT CO<sub>2</sub> = calculated from fuel consumption data &amp; formula above            EF = MT GHG (CH<sub>4</sub>/N<sub>2</sub>O) per MT of CO<sub>2</sub></p> <p>CH<sub>4</sub>, N<sub>2</sub>O</p> <table border="1" data-bbox="396 961 992 1171"> <thead> <tr> <th>GHG</th> <th>MT GHG per MT of CO<sub>2</sub></th> </tr> </thead> <tbody> <tr> <td>CH<sub>4</sub></td> <td>2.37E-05</td> </tr> <tr> <td>N<sub>2</sub>O</td> <td>4.29E-05</td> </tr> </tbody> </table> <p>The Climate Registry, Default Emission Factors, May 2021            (<a href="https://www.theclimateregistry.org/wp-content/uploads/2021/05/2021-Default-Emission-Factor-Document.pdf">https://www.theclimateregistry.org/wp-content/uploads/2021/05/2021-Default-Emission-Factor-Document.pdf</a>)</p>	GHG	MT GHG per MT of CO <sub>2</sub>	CH <sub>4</sub>	2.37E-05	N <sub>2</sub> O	4.29E-05
GHG	MT GHG per MT of CO <sub>2</sub>						
CH <sub>4</sub>	2.37E-05						
N <sub>2</sub> O	4.29E-05						

## 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. Scope 2 guidance requires dual reporting, following emission factor hierarchies from the Greenhouse Gas Protocol.

### Location-based Method

Methodology	Description
<p><b>Activity Data</b></p>	<p><b>CB: altafiber</b> has 1,552 sites using purchased electricity. Eighteen of the utilities provide usage through monthly bills that are synthesized and collected by nZero. Four of the utilities send bills either by mail or e-mail to <b>altafiber</b>, which then shares the usage with nZero.</p> <p><b>HT:</b> Hawaiian Telcom (HT) 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 is able to claim this energy usage as carbon-free, with data regarding usage is collected through the same process as HT's other utilities.</p> <p>CB leases facilities around the world to support CBT, HT and CBTS's operations. The Real Estate manager for <b>altafiber</b> manages the leases for both <b>altafiber</b> and CBTS anywhere in the world other than Hawaii, while the Real Estate manager for HT manages leases for HT and CBTS's operation in Hawaii. Where <b>altafiber</b> or HT receives an actual utility bill, or is passed along utility usage on landlord invoices, actual usage data was used in the inventory. However, for the majority of leased facilities we do not receive a utility bill or statement. In those instance the square footage for the leased facility is used, in combination with an average energy use intensity (EUI) for each facility type.</p>

**Location-based Method** (continued)

Methodology	Description
<p><b>Method</b></p>	<p>Calculation follows the general formula. Activity data for each <b>altafiber</b> and HT location (MWh) are multiplied by grid average emission factors and GWP factors to convert electricity consumption into CO2e 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:            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> <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><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. Note that in our inventory purchased energy from the leased facilities is de minimis.</p>

## Location-based Method (continued)

Methodology	Description
<b>Emission Factor for Location based</b>	<p><b>EPA eGRID2020, January 2022,</b>  <a href="https://www.epa.gov/egrid/summary-data">https://www.epa.gov/egrid/summary-data</a>:            relevant eGrid values (lbs. CO<sub>2</sub>e/MWh)</p> <ul style="list-style-type: none"> <li>• HIMS: 1151.124</li> <li>• HIOA: 1665.5</li> <li>• CAMX: 514.5</li> <li>• RFCW: 990.818</li> <li>• SRTV: 839.2</li> <li>• RFCE:655.4</li> <li>• AZNM:850.2</li> <li>• ERCT:822.0</li> <li>• FRCC:838.2</li> <li>• NEWE: 532.957</li> <li>• NYCW:635.957</li> <li>• SRVC: 626.3</li> </ul> <p><b>DEFRA:</b> 2021 Guidelines to Defra/ DECC's Greenhouse gas reporting Conversion Factors 2021 for Company Reporting. From the Department for Business, Energy &amp; Industrial Strategy. Published June 2nd 2021. Last updated January 24th, 2022.</p> <ul style="list-style-type: none"> <li>• United Kingdom: .211 kgCO<sub>2</sub>e/kWh</li> </ul> <p><b>Aggregated Source:</b>  <a href="https://www.carbonfootprint.com/docs/2022_03_emissions_factors_sources_for_2021_electricity_v11.pdf">https://www.carbonfootprint.com/docs/2022_03_emissions_factors_sources_for_2021_electricity_v11.pdf</a>            Specific Source: United Nations Framework Convention on Climate Change (UNFCCC) <a href="https://unfccc.int/ghg-inventories-annex-i-parties/2021%20Canada%20-%20download%20%27NIR%27%20(national%20inventory%20report)%20(Published%3A%2015%20Apr%202021).%20Page%2060%20onwards%20on%20%27Part%203%27%20document.">https://unfccc.int/ghg-inventories-annex-i-parties/2021 Canada – download 'NIR' (national inventory report) (Published: 15 Apr 2021). Page 60 onwards on 'Part 3' document.</a></p> <ul style="list-style-type: none"> <li>• Alberta: .62 kgCO<sub>2</sub>e/kWh</li> <li>• British Columbia: .0186 kgCO<sub>2</sub>e/kWh</li> <li>• Newfoundland &amp; Labrador: .028kgCO<sub>2</sub>e/kWh</li> <li>• Nova Scotia: .76 kgCO<sub>2</sub>e/kWh</li> <li>• Ontario: .028 kgCO<sub>2</sub>e/kWh</li> </ul> <p><b>India-Southern Grid:</b> India Climate Transparency Report (2021)  <a href="https://www.climate-transparency.org/wp-content/uploads/2021/10/CT2021India.pdf">https://www.climate-transparency.org/wp-content/uploads/2021/10/CT2021India.pdf</a></p> <ul style="list-style-type: none"> <li>• India-.708 kgCO<sub>2</sub>e/kW</li> </ul>



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

### Market-based Method

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

Methodology	Description
<b>Activity Data</b>	Total electricity consumed (MWh) (see "location-based activity data," above)
<b>Method</b>	<p>nZero's default reporting method is designed to offer the highest precision based upon data available, and within the framework outlined by the Greenhouse Gas Protocol for market based reporting. nZero analyzes a client's energy attribute certificates, contracts, supplier/utility specific emission factors and residual mix emission factors. If an nZero customer reaches "location based" within the market based hierarchy, nZero uses 24x7 hourly grid intensity at a given location. nZero provides proprietary emission modeling which harmonizes multi-granularity inputs and outputs, but provides 24/7 Balancing Area hourly grid intensity as a backstop. Where necessary due to customer or utility data constraints nZero resorts to monthly Balancing Authority-level grid intensity or annual reported averages.</p> <p>Hawaiian Telcom has a contract with TWSG for on-site solar generation which can be claimed as carbon free energy generation and reflected in market based reporting.</p> <p><b>altafiber</b> market-based approach differs from location-based through nZero's 24x7 hourly grid intensity modeling. It is the localized grid mixes, accompanied with BA-level grid intensity, reflected in the market based approach (values below), that show a higher granularity &amp; more accuracy than 2020 eGrid values often used for location based reporting.</p>

## Location-based Method (continued)

Methodology	Description																																								
<b>Limitations</b>	Due to lack of location-specific information, market-based reporting was not conducted on leased facilities.																																								
<b>Emission Factor for Market Based</b>	<p>Units are kWh for usage, lbs. CO<sub>2</sub>e for emissions and lbs-CO<sub>2</sub>e/MWh for carbon intensity. All of the CB values are hourly through nZero's emission modeling system, matched to hourly values when possible, which is why there is minor variation in the different providers even though they're pulling from the same parent Balancing Authority (PJM) in most cases.</p> <table border="1" data-bbox="391 808 966 1071"> <thead> <tr> <th>name</th> <th>metered_kwh</th> <th>co2e_lbs</th> <th>carbon_intensity</th> </tr> </thead> <tbody> <tr> <td>Duke Energy OH &amp; KY</td> <td>63286286.13</td> <td>50032882.81</td> <td>790.58</td> </tr> <tr> <td>Butler Rural Electric Co-op</td> <td>87529.25</td> <td>69525.59</td> <td>794.31</td> </tr> <tr> <td>City of Falmouth</td> <td>99311.53</td> <td>78786.35</td> <td>793.33</td> </tr> <tr> <td>South Central Power</td> <td>2575.75</td> <td>2050.49</td> <td>796.07</td> </tr> <tr> <td>White Water Valley REMC</td> <td>24610.25</td> <td>19551.02</td> <td>794.43</td> </tr> <tr> <td>City of Hamilton</td> <td>1986509.10</td> <td>1585933.27</td> <td>798.35</td> </tr> <tr> <td>City of Williamstown</td> <td>264065.12</td> <td>209831.39</td> <td>794.62</td> </tr> <tr> <td>Blue Grass Energy</td> <td>24499.33</td> <td>19446.31</td> <td>793.75</td> </tr> <tr> <td>LG&amp;E</td> <td>338282.00</td> <td>273548.19</td> <td>808.64</td> </tr> </tbody> </table> <p>The only relevant market based factor for HT was renewable energy from TWSG which is claimed as carbon free, with an emission factor of zero.</p>	name	metered_kwh	co2e_lbs	carbon_intensity	Duke Energy OH & KY	63286286.13	50032882.81	790.58	Butler Rural Electric Co-op	87529.25	69525.59	794.31	City of Falmouth	99311.53	78786.35	793.33	South Central Power	2575.75	2050.49	796.07	White Water Valley REMC	24610.25	19551.02	794.43	City of Hamilton	1986509.10	1585933.27	798.35	City of Williamstown	264065.12	209831.39	794.62	Blue Grass Energy	24499.33	19446.31	793.75	LG&E	338282.00	273548.19	808.64
name	metered_kwh	co2e_lbs	carbon_intensity																																						
Duke Energy OH & KY	63286286.13	50032882.81	790.58																																						
Butler Rural Electric Co-op	87529.25	69525.59	794.31																																						
City of Falmouth	99311.53	78786.35	793.33																																						
South Central Power	2575.75	2050.49	796.07																																						
White Water Valley REMC	24610.25	19551.02	794.43																																						
City of Hamilton	1986509.10	1585933.27	798.35																																						
City of Williamstown	264065.12	209831.39	794.62																																						
Blue Grass Energy	24499.33	19446.31	793.75																																						
LG&E	338282.00	273548.19	808.64																																						





altafiber  
elevating connection

**2021 GREENHOUSE GAS  
ACCOUNTING AND REPORTING**  
altafiber, INC