



Climate Action Plan

Net Zero by 2040

July 1, 2023

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*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.*

Executive Summary

Cincinnati Bell Inc. is a technology company that delivers integrated communications solutions over our copper and fiber optic networks, including high-speed Internet, video, voice, and data. It serves southwestern Ohio, northern Kentucky and adjacent portions of Indiana under the brand **altafiber**, and serves Hawai'i under the brand Hawaiian Telcom.

Building upon a long legacy of environmental responsibility and stewardship, altafiber made a commitment to be net-zero carbon emitters by 2040 and embarked on a path to reduce greenhouse gas (GHG) emissions. In 2022 we announced our interim goal of reducing our carbon emissions 40% from our 2021 baseline by 2030. Our targets align with those recommended by the Science Based Targets Initiative's (SBTi) guidance for [Information and Communications Technology](#) companies and contribute to the global effort to limit warming to 1.5-degrees Celsius.

This climate action plan details altafiber's actions and milestones spanning our operations in our historic network services area in greater Cincinnati, including southwest Ohio, northern Kentucky and adjacent areas of Indiana. Note, Hawaiian Telcom's unique climate action plan is available separately on their website. The purpose of this plan is to provide altafiber's roadmap to reach our net zero goals, focused on our emission reduction pathway to 2030. The key elements of the plan are as follows:




Element	Summary
 <p>Baseline emissions</p>	<ul style="list-style-type: none"> • 2021 baseline year: 38,504 mt CO₂e for altafiber • Scope 1 made up 76% of emissions for altafiber • Scope 2 emissions made up and 24% of emissions for altafiber
 <p>Reduction Targets</p>	<ul style="list-style-type: none"> • Near-term: 40% reduction in Scope 1 and 2 by 2030 • Long-term: Net Zero (90% reduction) by 2040
 <p>Abatement measures</p>	<ul style="list-style-type: none"> • Aggressively implement voice network transformation by migrating customers from copper to fiber, and shutting down energy-intensive elements of the copper network; in particular legacy voice switches and related network such as Optically Remote Modules (ORM) and Digital Loop Carrier (DLC) equipment • Increase the pace of efficiency projects in network, facilities & fleet • Consolidate & divest of network equipment, fleet, and real estate, where feasible • Integrate available electric vehicle (EV) models into our fleet as we replace vehicles at end-of-life • Add on-site solar photovoltaic systems where feasible • Procure renewable energy

Table 1: Key elements of climate action plan.

Specific carbon emission abatement measures are presented in this climate action plan including their relative cost, effort to implement, timeframe, potential carbon reduction, and current status. The abatement measures, or climate actions, for altafiber through 2030 are presented in the table below.

altafiber Carbon Abatement Measures

Project Name	Project Category	Energy Source Impact	Timing	Amount of mt CO2e Reduction by 2030
W 7th heat electrification	Electrification	Natural gas	2025	1,310
Fleet electrification	Electrification	Gasoline	2023-2030	1,680
Legacy voice, access, and other field network equipment	Operational efficiency	Purchased electricity	2023-2030	3,432
HVAC & regulated	Operational efficiency	Purchased electricity	2023-2030	1,029
On-site solar	On-site renewables	Purchased electricity	2024-2033	980
Purchased renewable electricity	Purchased RE	Purchased electricity	2027+	7,123
Total				16,272

Table 2: altafiber carbon abatement measures.

1 Climate Action Plan Introduction

altafiber is a technology company that delivers integrated communications solutions over our fiber optic network, including high-speed Internet, video, voice, and data. Our Environmental Vision is to connect people, free from waste or pollution, enhancing environmental quality and health in our communities.

altafiber is a brand belonging to Cincinnati Bell Inc, which also owns and operates Agile IWG Holdings LLC, BridgeLink Communications LLC, CBTS LLC (including OnX Enterprise Solutions, based in Canada), Cincinnati Bell Telephone Company LLC (CBT), Cincinnati Bell Wireless LLC, and Hawaiian Telcom Holdco, Inc (HT).

For this Climate Action Plan (CAP), we focus on the legacy Cincinnati Bell business, rebranded altafiber, which is an incumbent local exchange carrier (ILEC) company¹ operating legacy, copper-wire-based telephone and high-speed internet communications infrastructure. altafiber has steadily over-built its legacy ILEC territory with fiber optic broadband infrastructure, planning to offer superior fiber optic broadband in the entirety of its legacy copper-wire service area by the end of 2023. This CAP identifies carbon abatement measures specific to our ILEC company undergoing network transformation from copper- to fiber-based services, and offers a template for other ILECs undergoing similar modernization. Note, this plan only addresses climate action in altafiber's ILEC areas and does not address new growth, fiber-only areas where it is a competitive local exchange carrier (CLEC). altafiber plans to formulate a climate action plan for new growth areas in 2023.

In 2021, the company announced the completion of its take-private acquisition by Macquarie Asset Management (MAM), which accelerated the fiber build across its operating footprints in Greater Cincinnati and Hawai'i.

Macquarie has set ambitious net zero emissions targets and announced plans to operate its portfolio aligned with net zero emissions by 2040, and by the end of 2022 to have net zero business plans in place for assets where it exercises control or significant influence ([Addressing climate change and accelerating the low carbon transition | Macquarie Group](#)). MAM's managed companies must track, verify, and report greenhouse gas emissions; set science-based targets for GHG reductions; and create and implement a net zero plan. This Climate Action Plan provides altafiber's science-based targets and our net zero plan for our altafiber subsidiary. It formulates emission abatement projects, business case, project assumptions, and our net zero roadmap needed to achieve our sustainability goals. The following topics are covered:

- Section 1.1: altafiber's GHG Emissions Inventory Summary
- Section 1.2: Business-As-Usual Emissions
- Section 1.3: Emissions reduction targets aligned with Science-Based Targets initiative (SBTi)
- Section 2: Planned emissions abatement measures
- Section 3: Summary

¹ An ILEC is a local telephone company which held the regional monopoly on landline service before its service area was deregulated and opened to competitive local exchange carriers (CLEC)

1.1 GHG Emissions Inventory Summary

GHG emissions can be categorized as either Scope 1, 2, or 3, as defined by [GHG Protocol](#):

- **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.

altafiber's GHG inventory, described in this report, covers Scope 1 and 2 only. altafiber's Scope 1 and 2 were first collected in 2021 and independently verified by a third-party auditor, Cameron-Cole, LLC. Cameron-Cole provided a limited level of assurance that our 2021 GHG emissions assertions are free of material errors, omissions, or misstatements.

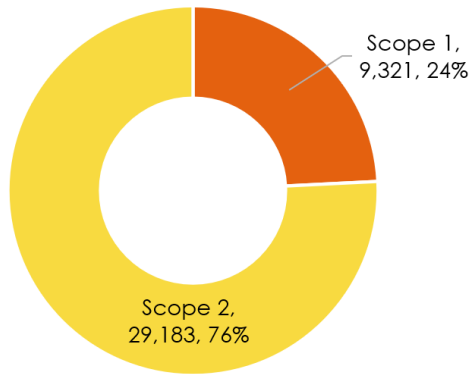
This inventory covered the period from January 1, 2021, to December 31, 2021, and used the operational control boundary approach. To access the full GHG accounting report, please view the report on our [website](#). altafiber's emissions breakdown consisted of 9,321 metric tons of CO₂ equivalent (mt CO₂e) scope 1 emissions – accounting for 24% of their total emissions, and 29,183 mt CO₂e scope 2 emissions, accounting for 76% of their total emissions.

- Scope 1 emissions sources consisted of:
 - Stationary combustion (Natural Gas) – emissions resulting from onsite combustion of natural gas in some Cincinnati-area facilities for water or area heating.
 - Stationary Combustion – Generators & Equipment (Diesel Fuel) — emissions, resulting from onsite combustion of diesel fuel to operate back-up generators during utility outages or during periodic tests and to operate any ground equipment.
 - Mobile Combustion-Fleet (Gas and Diesel) — emissions resulting from the operation of fleet vehicles.
 - Fugitive Emission (Refrigerants) — refrigerants leak from heating, ventilation, and air conditioning (HVAC) equipment in our facilities.
- Scope 2 emissions consisted of purchased electricity.

Below, is a display of our 2021 Scope 1 and 2 emissions broken down by type measured mt CO₂e:

2021 altafiber GHG Emissions

2021 Baseline Emissions, mt CO₂e



2021 Baseline Energy Use, GJ

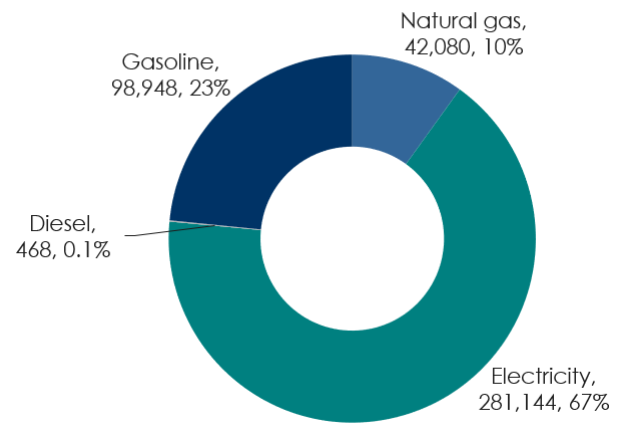


Figure 1: 2021 GHG emissions and energy use for altafiber.

Further understanding the sources within our business of our GHG emissions, and particularly our electricity use, helped us develop our climate action strategy and prioritize abatement measures. The network equipment that forms the very core of our value proposition – providing network connection in its various forms to residential, business and wholesale customers – uses electricity responsible for approximately 46% of our GHG emissions. Cooling and lighting our central offices (COs), buildings which house and protect our network equipment, is responsible for 22% of our GHGs. All our remaining “non-network” GHGs together account for 32% of our emissions. In this group are emissions from our 800+ fleet vehicles, administrative offices, retail stores, garages, refrigerant losses, and generators.

Below, is a display of our 2021 GHG emissions broken down by network equipment, cooling and lighting our central offices, and our non-network related GHG emissions measured in mt CO₂e:

2021 altafiber GHG Emissions by Source

altafiber GHG Emissions by Source (mt CO₂e)

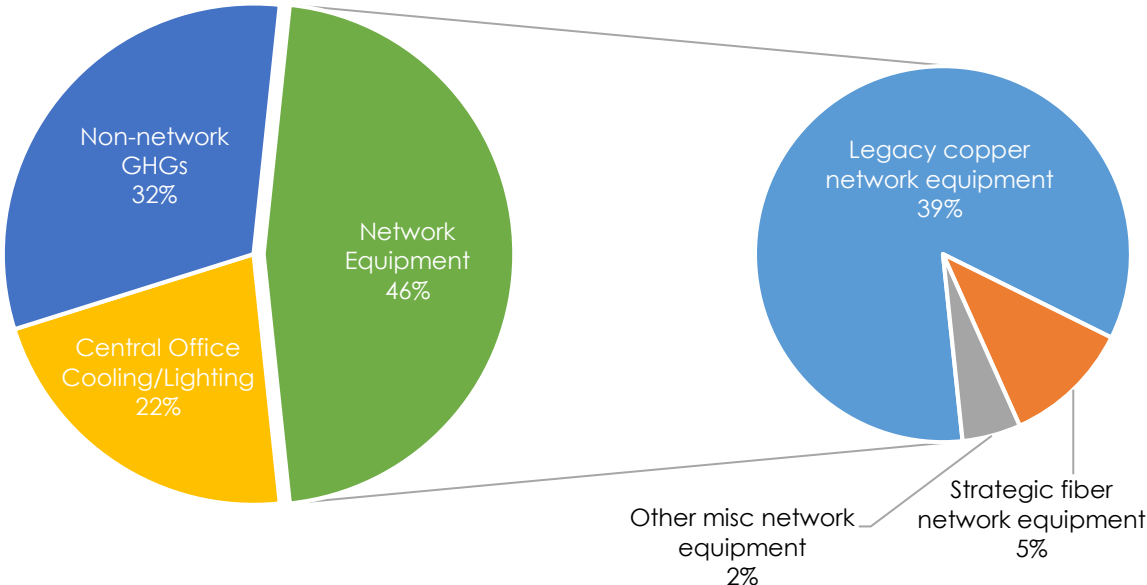


Figure 2: The 2021 GHG emissions by source for altafiber’s ILEC business.

At altafiber we use the term “legacy” in reference to our copper network, in contrast to our “strategic” fiber optic network, the network upon which we are building the future of our company. As shown in Figure 2, our network equipment is a mix of legacy copper network equipment, strategic fiber network equipment and other, miscellaneous equipment not fitting in either of those two categories. Powering the legacy network equipment itself causes 39% of our emissions, plus additional emissions from cooling it. By contrast our strategic fiber network equipment (5%) and its cooling are responsible for far less of our carbon footprint because it is so much more efficient. Our action plan includes abatement measures targeting almost every emissions category, but it prioritizes action in the parts of our business most ripe for network transformation, divestment, and efficiency gains.

To provide further context for the actions described in this plan Figure 3 shows the breakdown of our emissions attributed to various parts of our business that are addressed in the abatement measure in section 2 of this plan.

Proportion of Annual GHG Emissions by Sources in altafiber ILEC

Proportion of Annual GHG (mt CO₂e) in altafiber ILECs

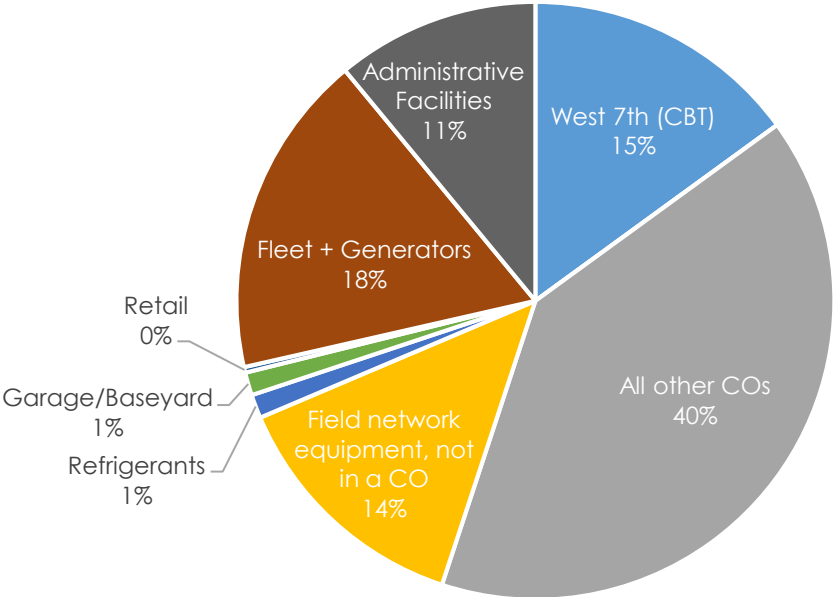


Figure 3: The 2021 GHG emissions by source for altafiber's ILEC businesses.

1.2 Business-As-Usual Emissions

As part of our climate action plan, we developed a business-as-usual (BAU) scenario to have a clear picture of our current state and to understand what future emission reductions will be necessary to meet our goals. This BAU scenario represents the emissions that would result from altafiber's operations in 2030 and 2040 if no abatement measures were implemented. The BAU considers the effects on our emissions profile of altafiber's planned growth and divestment, as well as the decarbonization of the utility grids that provide energy to our operations.

We estimated our emissions would grow by 5% over the next 9 years, based on increased energy use by newly constructed fiber networks to serve additional fiber subscribers in the ILEC territory.

Our current business plan anticipates revenue changes from customers moving from our legacy copper to the newer, faster fiber network over the next decade. However, the BAU case assumes only minimal consolidation and decommissioning of copper network equipment, commensurate with current maintenance activities, even as copper customers atrophy. The legacy copper network has a significantly higher emissions profile than the new fiber network; however, our BAU plans add the fiber networks' power requirements on top of continued operation of the legacy copper network.

1.2.1 Emission Reductions from Grid Greening

The decarbonization of the electricity grid is a core step in building a lower-carbon economy. Many states have commitments called renewable portfolio standards (RPS) which require their Public Utility Commission (PUCs) to supply renewable energy to the electricity grid. altafiber purchases electricity from these electricity grids, and as they become less carbon intensive, our emissions will reduce. In our business-as-usual scenario, we reviewed grid greening reductions from multiple sources, and then we selected a forecasted target in our Ohio operation region by 2030 and 2040:

- Ohio had approximately 4% of their grid supplied by renewable energy in 2021, which is projected to increase to 8.5% by 2030. Ohio does not have a renewable energy target for 2040.

The projected BAU emissions from 2021 to 2040 for altafiber is shown in Figure 4 below.

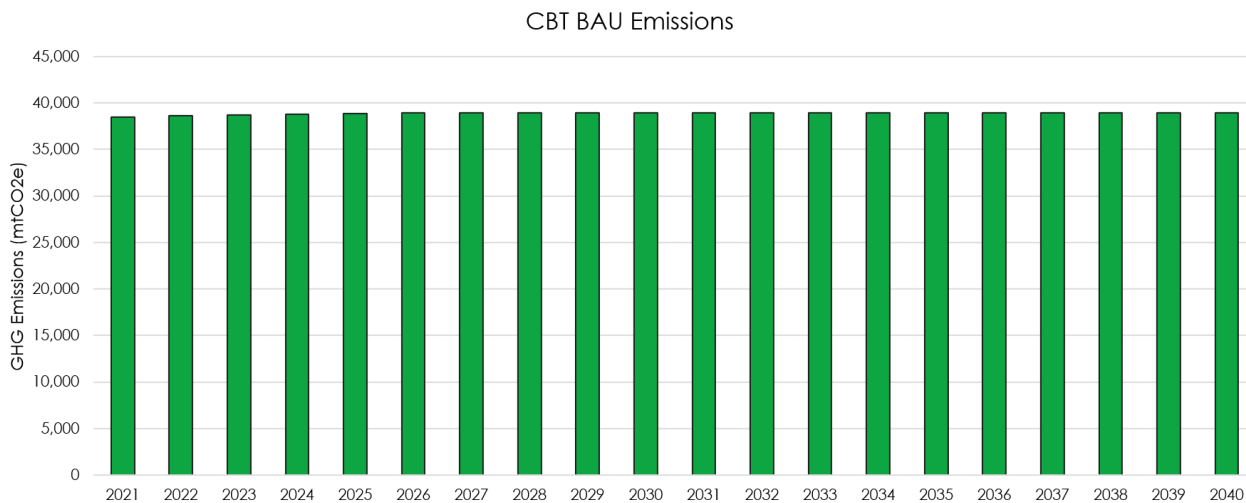


Figure 4. altafiber business-as-usual emissions projections

1.2.2 Emissions Increases from Projected Business Growth

As part of altafiber's ILEC strategic fiber network buildout, we will continue to overbuild areas currently served by legacy copper infrastructure with superior fiber optic service and products. The advantages in terms of data transmission capacity, bandwidth and speeds are significant. Fiber optic networks also provide advantages for energy and emissions savings given their enhanced transmission and power efficiencies. This business growth will result in increased emissions from new energy use by the fiber network and associated HVAC loads, albeit smaller compared to our legacy network.

In our business-as-usual scenario, we reviewed the impact of our projected strategic fiber network growth and determined a forecast for the Ohio operation region. The increase in power use by the new fiber network matches the projected growth in fiber-to-the-premise (FTTP) sellable market coverage; in other words, as the percent of FTTP sellable market covered grows, the power to the fiber network grows at the same rate, as follows:

- altafiber energy use from strategic network growth is projected to increase 34% between 2021-2026 and 1% between 2026-2030, and energy from HVAC and other regulated loads are projected to increase 8% between 2021-2026.

Note, although the BAU emissions scenario extends to 2040, our current business plan only extends to 2030. Therefore, there is no growth in business related emissions currently projected from 2030 to 2040, an assumption that will have to be revised as long-range plans develop to 2040.

1.3 Emissions Reduction Targets

One of the requirements set by MAM for altafiber is the development of a science-based net zero target. Science-based targets provide companies with information on how much and how quickly they need to reduce their emissions to prevent the worst effects of climate change.

There are several organizations that provide guidance and validation of science-based targets; one of the most prominent is the Science Based Targets initiative (SBTi). SBTi provides scenarios for emissions reductions and net-zero targets in line with climate science.

altafiber set a net zero science-based target that covers Scope 1 and 2 emissions for 2030 (near-term) and 2040 (long-term), aligned with a 1.5C warming scenario. Our targets are listed in the following table:

Base Year	Target Year	Emission Reduction Target	Annual Reduction Target
2021	2030	40% reduction in Scope 1 and 2 between 2021 - 2030	4.4%
2021	2040	90% reduction in Scope 1 and 2 between 2021 - 2040	6.0%

Table 3: Summary of interim and final net zero target.

For companies whose scope 3 emissions represent more than 40% of their combined scope 1, 2 and 3 emissions, targets must address scope 3 emissions reduction. Although altafiber does not yet have a scope 3 inventory, we expect that our scope 3 inventory will exceed that criterion. Where accounting for and reporting scope 3 emissions are relevant, we plan to calculate and track them, and recognize this is an area of improvement for our future GHG inventory.

While these targets are consistent with the SBTi requirements, they have not been submitted to the SBTi. The proposed emission target reductions are shown along with the projected BAU emissions on the graph below.

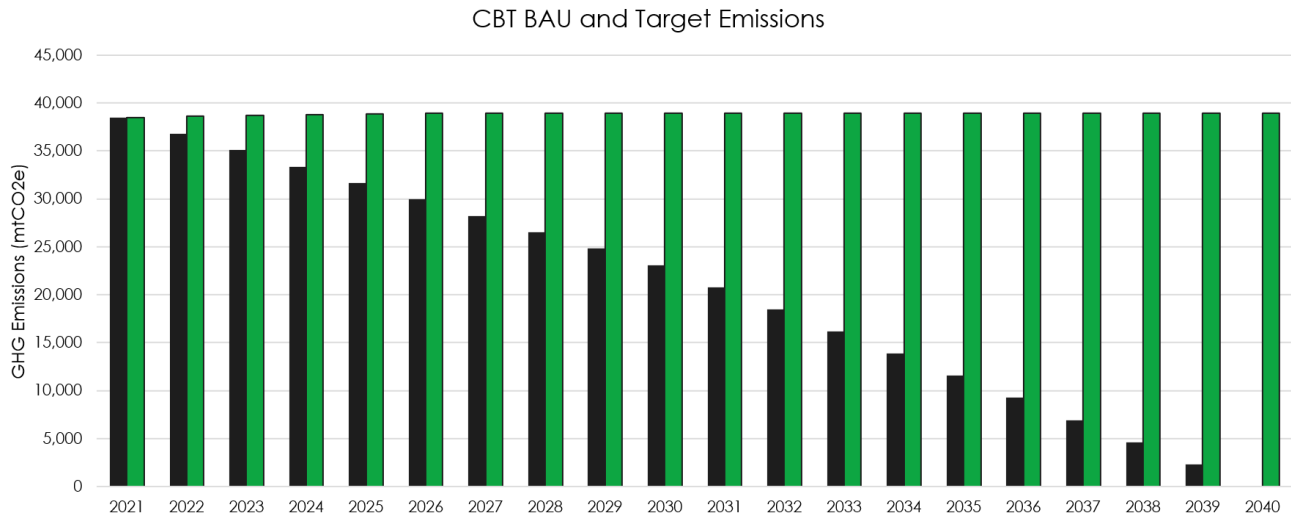


Figure 5. altafiber Business-as-usual and target emissions projections

2 Planned Abatement Measures

In 2022, altafiber convened experts throughout the organization for two multi-day workshops. We held one workshop in each of our subsidiary headquarters – one in Cincinnati, OH and another in Honolulu, HI. During these workshops, we identified a strategy to achieve our emission reduction goals. Our collective effort resulted in the following strategy:

- 1) Bring superior fiber optic service to our customers.
- 2) Aggressively implement voice network transformation by migrating customers from copper to fiber, and shutting down energy-intensive elements of the copper network; in particular:
 - a) Class 5 voice switches
 - b) Related legacy network equipment – DLC, ORM, DSLAM (defined in section 2.4)
- 3) Consolidate & divest of network equipment, fleet, and real estate, where feasible
- 4) Increase the pace of efficiency projects in network, facilities & fleet
- 5) Add available electric vehicle (EV) models into our fleet as we replace vehicles at end-of-life
- 6) Add on-site solar photovoltaic systems where feasible

Specific emissions abatement measures were developed in each of these areas, which are listed below, to help us reach our net-zero goals. altafiber will implement these measures to meet our emissions reduction targets.

Near-to-Long Term Emissions Targets

As indicated in Table 4 below and the waterfall chart which follows, altafiber will prioritize the following abatement measures in the near-term: legacy voice, access and field equipment transformation; electrifying the natural gas boilers at altafiber’s largest central office, West 7th Street; fleet electrification; adding on-site solar; and purchasing renewable electricity. Below, we have estimated the amount of mt CO₂e emissions reduction potential, timeframe for implementation, and which department is responsible for each abatement measure.







altafiber's Abatement Measures					
	Abatement Measure	Energy Source	% GHG Emission Reduction, Cumulative	Projected Start Date	Business Function
	Natural gas switch to electricity	Natural gas	3%	2028	Real estate
	Fleet electrification	Diesel, gasoline	4%	2023	Fleet
	Legacy voice, access, and associated field equipment	Electricity	9%	2023	Network
	HVAC & regulated loads	Electricity	3%	2023	All
	On-site solar	Electricity	3%	2023	Real estate
	Purchase renewable electricity	Electricity	19%	2027	Real estate

Table 4: Abatement measures 2022-2030 for altafiber.

The altafiber 2021 – 2030 waterfall figure below depicts the 2021 GHG inventory baseline emissions broken down by emission source, shown in the gray bar at the far left (labeled “2021 Baseline Year Emissions”). The chart shows expected growth in emissions associated with completing the fiber over-build of the ILEC area and the reduction achieved by grid greening which provides the BAU condition labeled on the graph. The following bars in the graph are displayed as a “waterfall” chart, with emission increases displayed in red, and decreases in emissions shown in blue. The chart details each abatement measure and its estimated emission reduction from the baseline year to 2030.

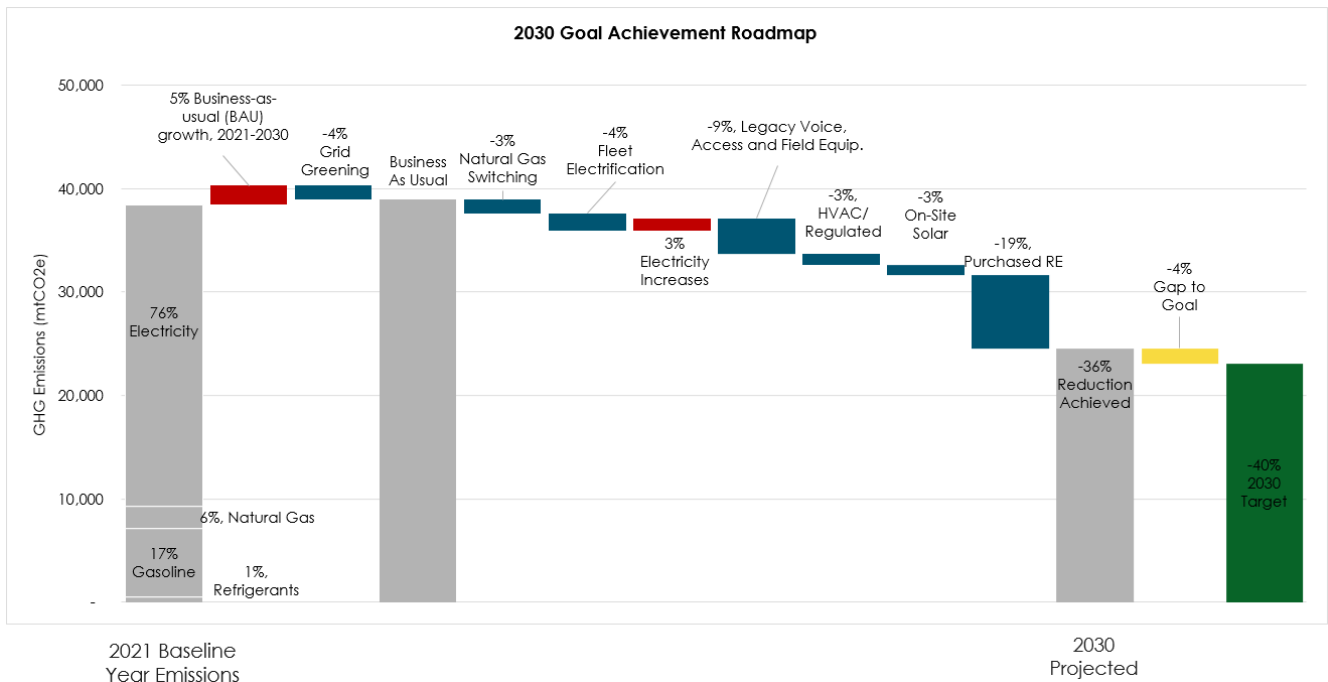


Figure 6: Waterfall chart of the altafiber 2021-2030 decarbonization strategy.

Description of Planned Abatement Measures

The following sections provide a summary of planned abatement measures, including the type of measure, what scope emissions it will reduce, and a net zero scorecard providing a summary view of the measure's cost, ease of implementation, timeframe, potential impact on achieving altafiber's targets, and the status. The qualitative scores on the net zero scorecards correspond to the following general ranges:






Metric	Low	Moderate	High
 Capital cost	\$0 - \$5M	\$5M - \$10M	\$10M+
 Net OpEx	\$0 - \$2M	\$2M - \$5M	\$5M+
 Level of effort	No to limited impact to current operations, or no to limited technical challenges with implementation	Limited to moderate impact to current operations, or limited to moderate technical challenges with implementation	Significant impact to current operations, or significant technical challenges with implementation
 Timeframe	0 - 3 years	3 - 7 years	7+ years
 Potential carbon reduction	<5% emission reduction from baseline	5 - 10% emission reduction from baseline	10+% emission reduction from baseline

Table 5: Net zero scorecard legend

2.1 Fleet Efficiency and Electrification

In Cincinnati, altafiber will have 809 vehicles serving its ILEC business by the end of 2023.

These vehicles include a range of makes, models, and years, and are all internal combustion engine (ICE) models that use gasoline or diesel for fuel. The emissions from these vehicles produce the majority of altafiber's scope 1 emissions. altafiber has plans to reduce these Scope 1 emissions via increased efficiency and fleet electrification. The fleet management team is adopting efficiency measures informed by telematics installed in 2021 which will reduce fuel use and related carbon emissions. They are also formulating a fleet modernization plan to reduce the average age of the fleet, which will increase its fuel economy. In addition to these actions, fleet

electrification is needed to move towards net-zero as EV models are available and fleet vehicles turn over. Electrifying our vehicle fleet will reduce our scope 1 emissions through 2030, but more importantly posture our company to achieve net-zero emissions by 2040, as newly purchased vehicles will last in our inventory for at least a decade. Note, it is unclear if EV models will last beyond a decade in the fleet without significant investment in battery replacement; therefore, EV models may have a shorter functional life in the fleet than the 12~15 year service life ICE vehicles currently routinely achieve.

Our fleet electrification plan starts in 2023 to allow for proper capital planning, procurement, and availability. We plan to electrify all our sedans, pickup trucks, and SUVs gradually by replacing older ICE models at the end of their functional life with EV models. This can begin immediately for sedans and in 2024 for SUVs and trucks as EVs become available and price-competitive, aided by federal incentives. In addition to sedans, pickup trucks, and SUVs, we will also purchase electric installer vans starting in 2024, assuming we can find, procure and upfit an EV van that meets our functional requirements and is reasonably price competitive. We are committed to working with original equipment manufacturers and our automotive partners to support the development of electric installer vans and steadily rejuvenate our fleet. Research for a functionally acceptable and available EV van is on-going.







Electrification of vehicles will reduce our gasoline consumption by over 180,000 gallons by 2030, and subsequently reduce our carbon emissions by 1,680 Metric tons.

The total estimated emissions reduction in 2030 for this abatement measure is 4% measured from our 2021 baseline GHG inventory.

Assumptions:

- Fleet efficiency measures (e.g., driving behavior modification; route planning; eliminating under-utilized vehicles; purchasing more efficient models) will reduce carbon emissions
- Vehicles are replaced at the end of their functional life

Fleet Electrification Scorecard

	Metric	Score
	Cost	● Moderate
	Net OpEx	● Moderate
	Effort	● High effort
	Timeframe	● Mid-Term
	Potential carbon reduction	● Low
	Status	Some projects are in progress

- Electrification can begin in 2023, supported by federal tax incentives
- EV Installer vans will not be immediately available at the levels needed, so will be gradually increased through time
- We will procure smaller vehicles first, in full, before moving to heavier class vehicles.
- Electric replacements for our heavier vehicle types are not now and will not be commercially available in the short term; therefore, any electrification of those vehicles will happen when/if such replacements enter the market and are price-competitive
- ILEC region does not increase total vehicles count
- We will develop a methodology to reimburse based on vehicle telematics
- All installer vans will charge at a garage or base yard
- 40% of the EV sedans, SUVs and pickups will home garage and charge at an employee home
- 60% of the EV sedans, SUVs and pickups charge at a garage/base yard or CO.

Additional Fleet Electrification Evaluation

altafiber will continue studying and planning for the electrification of our fleet and the supporting EV infrastructure. We will research programs available in our markets and take advantage of any grant programs.

2.2 On-site Solar PV

Solar photovoltaic (PV) systems convert sunlight into energy, which is used as electricity. There are many types of solar PV systems including rooftop, canopy, and floating. These systems are built to generate electricity and deliver benefits by reducing scope 2 emissions and stabilize and potentially reduce the cost of power.

For our climate action roadmap, we assume new solar projects would be installed over an 8-year period, starting in 2023.







The size and cost of each solar project varies based upon location, size, and installment type. A summary of the projects is broken out by subsidiary.

The plan includes four key projects for altafiber listed in the table below. In 2024, these projects are expected to generate approximately 1,230 MWh of production/year.

We plan to grow the on-site solar energy production in the rooftop arrays each year by 25% to represent 2,700 MWh of production/year in 2030.

These energy reductions are estimated to result in a cumulative GHG emissions reduction of 980 mt CO_{2e} by 2030. In several PV business cases prepared in 2022 for PV in the altafiber geography the unlevered internal rate of return (IRR) ranged 2~3% and the levered IRR from -1~-2%. The business case for PV in the Midwest is generally poor, but will improve as the cost of altafiber's electricity is expected to rise in 2024 when the current electric commodity contract in Ohio expires at the end of 2023.

On-site Solar PV Scorecard

	Metric	Score
	Cost	● High
	Net OpEx	● Moderate to high
	Effort	● Low effort
	Timeframe	● Mid-Term
	Potential carbon reduction	● Low
	Status	Not started; quotes received

altafiber on-site solar projects

Location	Size of System	Installation Year
Shotwell property roof	805 kW	2031
Shotwell canopy over reel yard	1050 kW	2025
Elm St garage	640 kW	2024
West 7th roof	238 kW	2024
Notional central office rooftop array(s)	66 kW with 1.25x additional each year	2024–2030

Table 6: Potential on-site solar projects in altafiber

Assumptions

- Installations occur in the proposed years listed in the table above.
- Systems produce according to their forecasted generation capacity.
- 0.5% system degradation per year.
- altafiber's cost of electricity will rise to approximately \$120/MWh in 2024.

2.3 Legacy Voice, Access, and Associated Equipment

altafiber's legacy networks include legacy access, legacy voice, and associated field network equipment. Our emission reduction plan is in accordance with our strategic direction to reduce altafiber's legacy footprint and move towards a fiber optic network. This undertaking will require a coordinated effort across multiple departments and will drastically reduce the emissions associated with the lower-efficiency legacy delivery network.

Network description:







The **legacy voice network** consists of all the necessary infrastructure and equipment to deliver time-division multiplexing (TDM) voice services, such as plain old telephone service (POTS) over copper lines. With the ubiquity of cell phones, subscribers to our legacy POTS product have decreased, and our business plan anticipates further decline. We expect legacy "average voice units," our POTS subscribers, to decline.

The **legacy access network** represents all the necessary infrastructure, equipment, and testing to transport internet data over last-mile copper to customers.

The **field network equipment** is housed outside of a central office in the communities we serve. Our field network equipment operates in a cabinet, a vault or possibly mounted on a pole. This category represents all the field network equipment not housed in a CO that has its own energy meter.

Fundamentally, altafiber expects operational expense savings and a payback in divesting of legacy voice switches. Challenges and benefits include:

Legacy Network Scorecard

	Metric	Score
	Cost	● High
	Net OpEx	● High
	Effort	● High
	Timeframe	○ Mid-Term
	Potential carbon reduction	● High
	Status	Planned Start in 2023

- **Institutional knowledge challenges:** The skilled technicians needed to maintain and operate legacy switches are few and at or nearing retirement; OEM support is equally limited, and parts must be salvaged.
- **Consolidation challenges:** It is difficult and costly to consolidate legacy lines to turn down portions of a switch. Experience with consolidation has shown a poor business case; therefore, although paid subscribers decrease large portions of the switch often remain in operation. In lieu of switch consolidation, our CAP focuses on achieving entire switch shutdown where possible.

In concert with the climate action plan the business is developing an updated, unique, and encompassing network transformation plan for the legacy systems in altafiber. Although network transformation from copper to fiber is on-going concurrent to our climate action planning, an aggressive abatement measure reducing energy use and emissions associated with the legacy voice network and related legacy access and field network equipment is a central part of both efforts.

altafiber's legacy voice, access and network field equipment represents a sizable portion of our emissions due to their high-power demand. Based on a 2022 study of three altafiber COs, we estimate legacy voice switches are responsible for about 41% of our CO energy usage. The associated field equipment such as ORMs, DLCs, and DSLAMs present a further opportunity for altafiber to make significant reductions. We will focus on shutting down many Class 5 and all remaining DSM10 switches, and other associated legacy technology, significantly reducing legacy operations by 2030.

Our plan targets a composite energy reduction of 9,500 MWh by 2030 in voice switches and ORMs, with additional, as yet unmeasured additional savings in their associated field equipment. The estimated energy reduction of 9,500 MWh by 2030 correlates to an annual reduction of 1,360 MWh per year from 2023 – 2030. The cumulative GHG emissions reductions is expected to be 3,432 mt CO_{2e} by 2030 representing an overall reduction of 9% towards our decarbonization goals.

In support of both efforts, we continue an ongoing project to associate every electric meter with a Common Language Location Identifier (CLLI) code such that we can associate equipment with its electric meter and further analyze field equipment energy use. This project will help, for example, identify the power used by digital subscriber line access multiplexers (DSLAM) associated with legacy switches effected by voice network transformation. This on-going work will further refine our planning assumptions and steer where and how we shut down legacy equipment to achieve our carbon reduction goals.

Assumptions

- Phase 1 (2023-2025): Decommissioning of all 14 DMS10 switches in our inventory and their related SLC, as well as the Ft. Wright ORM
- Phase 2 (2025-2027): Decommission 19 5ESS class 5 switches and 39 ORMs and their related field equipment
- Nine 5ESS switches and an ORM will remain to support customers dependent on legacy switches.

2.4 HVAC & Regulated Loads Reduction

A building's regulated loads are those governed by the energy code including heating, ventilation, and air conditioning (HVAC); lighting; losses through the building envelope; motors and hot water heating. Our regulated energy uses are the non-network systems in our central offices and are dominated by HVAC for cooling. altafiber's network teams, facilities teams, and consultants estimate CO HVAC and other regulated loads are responsible for 20% of our carbon emissions. altafiber's Real Estate office will continue, and where possible accelerate, efficiency efforts such as chiller and package-unit replacements, LED lighting projects and LEED certifying new administrative offices. In addition, as legacy network equipment shuts down under this plan, we project HVAC cooling loads will reduce at a similar pace.

We expect on-going efficiency projects to continue and, in some cases, accelerate such that the energy usage associated with HVAC will reduce by 2,856 MWh from 2023 – 2030.







The cumulative GHG emissions reduction is expected to be 1,029 mt CO₂e by 2030 representing an overall emissions reduction of 3% towards our decarbonization goals.

As our network teams decommission voice switches throughout our portfolio, we will optimize HVAC function at affected COs through recommissioning. We plan to evaluate HVAC ducting, set points, and calibrate and relocate sensors during recommissioning. In 2023 altafiber will study its largest CO, West 7th, as well as eight other large COs and begin HVAC recommissioning work.

Assumptions

- On-going energy efficiency projects continue or accelerate.
- HVAC load reduction project(s) in COs follow legacy network equipment shutdown.

HVAC & Regulated Loads Scorecard

	Metric	Score
	Cost	☐ Low to Medium
	Net OpEx	☐ Low
	Effort	☐ Low
	Timeframe	● Long-term
	Potential carbon reduction	☐ Low to Moderate
	Status	Some projects in progress

2.5 Natural Gas Switching

At our West 7th building, we currently use natural gas boilers to make steam, serving our building (209 West 7th) and its neighbor, the Cyrus One building (229 West 7th). Although well maintained, the boilers are reaching the end of their planned life. We are proactively studying replacement alternatives to the boilers, which will improve building energy efficiency, humidity control, and advance both altafiber and Cyrus One's climate action plans. These alternatives avoid the use of natural gas to reduce our carbon intensity. This project is highly complex and will involve capital investment by both altafiber and Cyrus One. A preliminary engineering study of alternatives and associated life-cycle costs will be completed in 2023, with the expectation that it will take 5-7 years to select replacement, negotiate terms with Cyrus One, budget the capital, design, and implement a project.

The estimated cumulative GHG emissions reductions are 1,310 mt CO₂e in 2030. Eliminating the use of natural gas at West 7th represents an overall 3% GHG emissions reduction by 2030 towards our decarbonization goals.

2.6 Procure Renewable Energy







Off-site renewable energy can significantly reduce an organization's Scope 2 emissions and has become a common abatement measure for reducing emissions from purchased electricity.

Renewable energy can be procured through several mechanisms such as power purchase agreements (PPAs), virtual power purchase agreements (vPPAs), green tariffs, or green pricing programs.







altafiber plans to utilize renewable energy options to close the gap on our near-term 2030 emission reduction goal.

altafiber's current contract for electricity in its largest market, Ohio, will expire at the end of 2023. Ohio is deregulated (unlike Kentucky and Indiana) so we can and will negotiate a new purchase agreement

Natural Gas Switching Scorecard

	Metric	Score
	Cost	☉ Low
	Net OpEx	☾ Moderate
	Effort	☉ Low to moderate effort
	Timeframe	☉ Near-term
	Potential carbon reduction	☉ Low
	Status	Planned for 2028

Procure Renewable Energy Scorecard

	Metric	Score
	Cost	☉ Low
	Net OpEx	☾ Low to moderate
	Effort	☉ Low to moderate effort
	Timeframe	☉ Near-term
	Potential carbon reduction	● High
	Status	Planned for 2024

for our commodity power. As we prepare to re-bid our Ohio contract, we are evaluating options and pricing for:

- Power purchase agreements (PPAs)
- Virtual Power Purchase Agreements (vPPAs)
- Utility Green Power Products: Green Tariffs and Green Pricing Programs
- Renewable Energy Credits (RECs)

Based on our planned abatement measures to 2030, there is an opportunity to use a PPA to reduce our scope 2 emissions. We plan to identify and secure one or several PPA to provide renewable energy, with plans to have our first PPA in-place and providing renewable energy in 2027.

3 Summary

The climate action plan for altafiber through 2030 is presented in the table below, which includes the following information:

- Project name
- Project category type (electrification, operational efficiency, on-site renewable energy, or renewable fuel)
- The energy source impacted by the abatement measure (natural gas, gasoline, diesel, or purchased electricity)
- The approximate timing for the implementation of the measure

Project Name	Project Category	Energy Source Impact	Timing	Cost	Net OpEx	Effort	Timeframe	Potential Carbon Reduction
W 7th heat electrification	Electrification	Natural gas	2025	Low	Moderate	Low to Moderate	Near-Term	Low
Fleet electrification	Electrification	Gasoline	2023-2030	Moderate	Moderate	High	Mid-Term	Low
Legacy voice, access, and other field network equipment	Operational efficiency	Purchased electricity	2023-2030	High	High	High	Mid-Term	High
HVAC & regulated	Operational efficiency	Purchased electricity	2023-2030	Low to Medium	Low	Low	Long-Term	Low to Moderate
On-site solar	On-site renewables	Purchased electricity	2024-2033	High	Moderate to High	Low	Mid-Term	Low
Purchased renewable electricity	Purchased RE	Purchased electricity	2027+	Low	Low to Moderate	Low to Moderate	Near-Term	High

Table 7: altafiber Abatement Measure Assessment.

4 Climate Action Plan Update and Conclusions

To ensure continued action, this plan and associated contents will require iterative updates. The CAP should be reviewed annually and updated at least every three years, or more often if warranted by changes in operations or business structure. Additionally, as abatement measures are implemented or evaluated, the plan should be updated to reflect the actual carbon impact of the measure.

Next Steps

This Climate Action Plan has detailed abatement measures for altafiber that are required to meet our emissions reduction goals. This plan signifies a critical step in the process to meet our goals, but altafiber now must implement the activities detailed in this plan.

Implementation is a large, interdepartmental effort that will require significant collaboration and addition of resources. To ensure that altafiber meets its stated goals, the Sustainability Department will develop tools such as an implementation matrix and progress tracker, goals tracker, and emissions reduction targets.

Disseminating this plan both internally and to our interested stakeholder, including the public, is an important next step. We have buy-in from corporate leadership, at the executive team (C-suite) level to implement these abatement measures. In 2023 critical next steps include:

- Disseminate the plan to responsible parties. Provide awareness-level training to all employees, and abatement-measure specific training to all involved parties
- Gather support from stakeholders to help make implementation a priority.
- Meet regularly with stakeholder group(s) to discuss the required actions associated with their departments and brainstorm ideas around any barriers that will need to be overcome in implementing the initiatives and potential partners.
- Create financial business cases for each abatement measure for which none exists today. Vet each business case against our standard financial criteria for investments to determine if, how and when each will be incorporated into our long-term financial plan and short term budgets
- Build upon our current Plan's assumptions and incorporate data from ongoing studies. As new information and details become available, it is important to refine our estimates to enhance the accuracy of our Plan.
- Track year-over-year performance against our science-based targets

We are working on a separate Climate Action Plan to develop a net-zero strategy for our expansion regions, where we are growing beyond the ILEC territory encompassed in this plan. Where we grow beyond the traditional ILEC service area, for example into Dayton, Ohio, we are a competitive local exchange carrier (CLEC) unburdened by a legacy copper infrastructure. The power used and emissions created in new-growth areas are all additive to our emissions footprint and therefore a zero-emissions growth strategy is essential so our growth does not undermine our emissions reduction goals. The new-growth (CLEC) CAP is under development in 2023.

Acronyms and Abbreviations

BAU	Business as usual
CBT	Cincinnati Bell Telephone Company LLC
CLLI	Common Language Location Identifier
CO	Central Office
DLC	Digital Loop Carrier
DSLAM	Digital subscriber line access multiplexers
ESG	Environmental, social, and governance
FTTP	Fiber-to-the-premise
GHG	Greenhouse gas
GJ	Gigajoule
kW	Kilowatt
kWh	Kilowatt hour
LED	Light-emitting diode
MBY	Moanalua Base Yard
mt CO ₂ e	Metric ton of carbon dioxide equivalent
MWh	Megawatt hour
ORM	Optically Remote Module
POTS	Plain old telephone service
PPA	Power purchase agreement
PUC	Public Utility Commission
PV	Photovoltaic
REC	Renewable energy certificate
RPS	Renewable portfolio standard
SBTi	Science Based Targets Initiative
TDM	Time-division multiplexing
vPPA	Virtual power purchase agreement

Business Case Abatement Measures Assumptions

- Discount rate was set at 8% for calculating net present costs.
- Network transformation was modeled through 2030, while solar used a lifetime of 30 years, and HVAC which used a lifetime of 25 years.
- Electricity costs for altafiber were set to increase to \$0.12/kWh in 2024, and then future increases set to the EIA average annual projected change over 5 years.
- Future natural gas cost increases are based on the EIA, Fuel Prices by Sector and Fuel - 2019-2023 Projected Average Annual % Change, with the base cost set to the commercial sector 2021 average and the high end/low end costs representing +/- 20%.
- Natural gas electrification to a heat pump is assumed to have a heat pump coefficient of performance of 3.5 (used to calculate the energy balance of switching from natural gas to an electric heat pump).
- For fleet electrification, diesel engine, EV engine, and gasoline engine efficiency was incorporated.
- A typical fleet vehicle drives 50 miles/day. 40% of cars, trucks, and SUVs will be charged at employee homes and 60% at fleet garage/baseyard. 100% of installer vans will be charged at the fleet garage/baseyard.
- For the capital cost of fleet charging infrastructure, home charging was assumed to cost \$1,500 per home; charging at a garage/baseyard was assumed to cost \$30,000 per level 2, dual port charger. Level 2 chargers are provided for 50% of EVs in fleet, assuming vehicles charge every other day. Maintenance cost of EV charging infrastructures is included.
- Solar cost range is based on solar costs ranges from \$3-5/watt for altafiber.
- Future gasoline cost increases were set to the EIA, Fuel Prices by Sector and Fuel - 2019-2023 Projected Average Annual % Change for the high-end estimate; the low-end cost increases were set to 50% of the high-end value.
- Fleet costs represent the incremental cost above purchasing an ICE model. Fleet OpEx costs include maintenance savings of EVs over ICE.
- Estimated fleet emission reductions were based on a 50-mile range and average mileage rates.
- HVAC & regulated load savings in altafiber assume a cost of \$30K to modify and recommission HVAC equipment at a CO after a legacy voice switch is decommissioned, with 10 such switches shut down per year.
- HVAC & regulated load savings in altafiber assume a cost of \$50K to modify and recommission HVAC equipment at a CO after a legacy voice switch is decommissioned.
- Purchased renewable energy was assumed to be a power purchase agreement starting in 2027 (with a 24–36-month lead time to secure a project prior to start), with a fixed PPA price representing an 8-12% premium over the projected electricity price in 2028.
- Values in table 7 are estimates based on the available data at the time of the CAP, are approximate and rounded, and are indicative costs that require verification through procurement and/or subcontractor quotations.