Conserving Carolina Greenhouse Gas Inventory and Management Plan 2019-2020

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CONSERVING CAROLINA

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Introduction:

This report aims to establish a general inventory of Conserving Carolina's operational greenhouse gas (GHG) emissions for the years 2019 and 2020 and establish science-based targets and strategies to decrease company emissions in the future. Emissions for 2019 and 2020 were calculated to develop an understanding of how the COVID-19 pandemic impacted annual GHG emissions.

Using methods outlined in the Environmental Protection Agency's Guide to Greenhouse Gas Management for Small Businesses and Low Emitters, which uses the World Resources Institute/World Business Council for Sustainable Development GHG Protocol Corporate Accounting Reporting Standard, the worldwide standard for calculating corporate greenhouse gas emissions, emissions data was compiled into two EPA-developed Simplified GHG Emissions Calculator spreadsheets for 2019 and 2020. These spreadsheets calculated the amount of carbon dioxide (CO2) equivalent in metric tons that Conserving Carolina released in both 2019 and 2020 using U.S.-specific cross-sector emission factors from the Emissions Factors Hub. CO2 equivalent (CO2e) is the standard unit for comparing the degree of potential climate impact caused by emissions of different GHGs, including carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. Emission factors are representative values that attempt to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

After the GHG inventory was completed, a Science-Based Target Setting Tool developed by the Science-Based Targets Initiative (SBTi) was used to set GHG reduction targets. These reduction targets are consistent with the global goal to limit warming to 1.5 degrees Celsius. From there, five major strategies for meeting reduction targets were identified.

While not summarized in this report, a GHG Inventory Management Plan (IMP) was developed that accurately documented the processes used to collect the GHG inventory data, so that a high-quality and consistent inventory can be used to measure progress in the future.

Section 1 – Preparing the Inventory

A. Identifying Emission Sources (Operational Boundaries)

Conserving Carolina's GHG emission calculations are based upon five primary emission sources, or operational boundaries as they are defined by the EPA Guide to GHG Management for Small Business and Low Emitters, that contribute to company GHG emissions:

- **Stationary Combustion**
- **Purchased Electricity**
- **Mobile Sources**
- **Business Travel**
- **Employee Commuting**

Stationary Combustion: Stationary Combustion encompasses stationary sources that combust fuel. Conserving Carolina's stationary combustion emissions result from the on-site combustion of natural gas for office heating.
Purchased Electricity: Electricity purchased from utilities, in this case Duke Energy, for all facilities.
Mobile Sources: Mobile sources are vehicles owned and operated by the company or organization. For Conserving Carolina, this includes our three company vehicles.
Business Travel: Emissions from employee travel involving vehicles that are not owned or leased by Conserving Carolina. For instance, travelling to a work site using a personal vehicle.
Employee Commuting: Employee commuting data includes employee travel to and from work in personal vehicles.

B. Base Year

The base year serves as the comparison point for emissions reduction targets. This inventory calculated GHG emissions for 2019 and 2020. Due to the COVID-19 pandemic, operational GHG emissions were significantly lower in 2020 compared to 2019. However, these emissions are likely to increase as Conserving Carolina resumes normal operations. 2019 was selected as a base year because it is a more accurate representation of Conserving Carolina's annual emissions than 2020, therefore being a more accurate baseline for measuring GHG reductions.

C. Organizational Boundaries

An organizational boundary determines the facilities and operations that are included in our GHG emissions data collection and inventory. The operational control approach was used for this inventory, meaning operations that the organization has full authority to implement operating policies on were included. This includes the three offices, including the main office, the Felburn building, and the Lynn Rd. satellite office.

Section 2 - Calculating Greenhouse Gas Emissions

A. Tool: Simplified GHG Emissions Calculator

The EPA Guide to GHG Management contains the EPA Simplified GHG Emissions Calculator, a Microsoft Excel workbook that automatically calculates GHG emissions when provided with data for each emission source. The data collected throughout the accounting process was entered into the separate sections of the calculator, each of which is formatted to calculate GHG emissions for each source. For our accounting process, we separated yearly data into a 2019 and a 2020 Simplified GHG Emissions Calculator.

B. Scope 1, 2, and 3 Emissions

The EPA Guide to Greenhouse Gas Management for Small Businesses and Low Emitters outlines three categories, or "scopes", into which each emission source is categorized. Scopes 1, 2, and 3 delineate not only the type of emission source but also the origin of the emissions as it relates to the company (whether fuels were combusted on-site, etc.):

A. **Scope 1 –** Scope 1 emissions are *direct* emissions that originate from sources owned, operated, or controlled by our company. For this report, our scope 1 emissions category will include our **Mobile Sources** and **Stationary Combustion** sources.
B. **Scope 2 –** Scope 2 emissions are *indirect* emissions that are a consequence of the operations of the organization but occur at sources owned or controlled by another organization. For this report, our scope 2 emissions category will include **Purchased Electricity**.
C. **Scope 3 –** Scope 3 emissions are *indirect* emissions not included under scope 1 and 2. They result from activities that do not involve company-owned or operated equipment, vehicles, etc. Our scope 3 emission sources are **Employee Commuting** and **Business Travel.**

C. Data Collection

The data collection process for each source was specific to the type of data required. The collection processes were as follows:

A. **Stationary Combustion -** Monthly natural gas consumption data was collected and recorded from past utility bills for the Hendersonville office.
B. **Purchased Electricity** – Monthly electricity usage was collected from past utility bills from December 2018 to January 2021 for all three offices.
C. **Mobile Sources** – Average gas mileage and fuel usage were calculated for 2019 and 2020 using annual company mileage logs for each of the three company vehicles: Rav4, Frontier, and Pilot.
D. **Business Travel** – Mileage reimbursement data was collected from QuickBooks reports for company-related travel.
E. **Employee Commuting** – Employee commuting data was collected using a Microsoft Forms survey that asked for the type of vehicle, average miles driven, and average number of days the employee drove to the office for 2019 and 2020. These values were then entered into an Excel spreadsheet in which annual miles for each employee for 2019 and 2020 were calculated. Those annual miles, as well as the type of vehicle for each employee, were entered into the 2019 and 2020 EPA Simplified GHG Emissions Calculators.

Section 3 – Results

A. 2019 Annual Emissions

Conserving Carolina emitted 104.5 metric tons of CO2e in 2019 (Figure 5).

For 2019, our largest emission source was **Employee Commuting**, emitting **63.8** metric tons of CO2e or **61%** of annual emissions (Figure 1).

Our second largest emission source was **Purchased Electricity,** emitting **15.6** metric tons of CO2e or **15%** of annual emissions (Figure 1).

The third largest emission source was **Mobile Sources**, emitting **12.8** metric tons of CO2e or **12%** of annual emissions (Figure 1).

The fourth largest emission source was **Business Travel,** emitting **10.4** metric tons of CO2e or **10%** of annual emissions (Figure 1).

The smallest emission source was **Stationary Combustion**, emitting **1.9** metric tons of CO2e or **2%** of annual emissions (Figure 1).

B. 2020 Annual Emissions

Conserving Carolina emitted 64.5 metric tons of CO2e in 2020 (Figure 5).

For 2020, our largest emission source was **Employee Commuting**, emitting **41.7** metric tons of CO2e or **65%** of annual emissions (Figure 3).

The second largest emission source was **Purchased Electricity**, emitting **8.6** metric tons of CO2e or **13%** of annual emissions (Figure 3).

The third largest emission source was **Mobile Sources**, emitting **7.9** metric tons of CO2e or **12%** of annual emissions (Figure 3).

The fourth largest emission source was **Business Travel,** emitting **4.5** metric tons of CO2e or **7%** of annual emissions (Figure 3).

The smallest emission source was **Stationary Combustion**, emitting **1.9** metric tons of CO2e or **3%** of annual emissions (Figure 3).

C. Building Energy Use vs. Transportation

Emission sources were divided into two combined categories for additional assessment: **Building Energy Use** and **Transportation**. **Transportation** includes **Employee Commuting**, **Mobile Sources**, and **Business Travel** while **Building Energy Use** encompasses the **Purchased Electricity** and **Stationary Combustion** categories.

Transportation made up the vast majority of GHG emissions for both 2019 and 2020 while **Building Energy Use** made up a much smaller percentage (Figure 2, Figure 4).

In 2019, **Transportation** emitted **87** metric tons of CO2e or **83%** of annual emissions. **Building Energy Use** emitted **17.5** metric tons of CO2e or **17%** of annual emissions (Figure 2).

In 2020, **Transportation** emitted **54** metric tons of CO2e or **84%** of annual emissions. **Building Energy Use** emitted **10.5** metric tons of CO2e or **16%** of annual emissions (Figure 4).

D. Comparing 2019 and 2020 Annual Emissions

There was a **38%** decrease in total GHG emissions from 2019 to 2020 (Figure 5). Due to the COVID-19 pandemic, all sources except **Stationary Combustion** had significant emission reductions from 2019 to 2020 (Figure 6, Figure 7). For instance, CO2e emissions from **Employee Commuting** fell from **63.8** metric tons to **41.7** metric tons, a **35%** decrease (Figure 6).

From 2019 to 2020, there was a respective **45%, 38%,** and **57%** decrease in CO2e emitted from **Purchased Electricity**, **Mobile Sources**, and **Business Travel** (Figure 7).

Figure 1.

2019 ANNUAL GHG EMISSIONS BY SOURCE

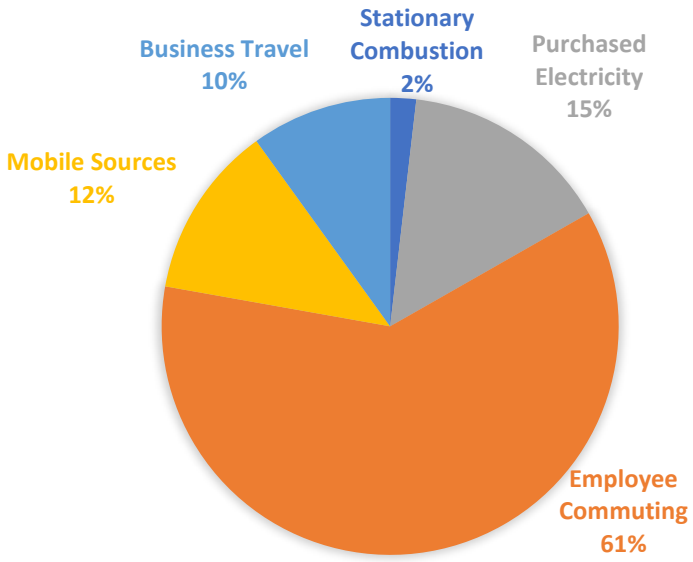


Figure 2.
2019 ANNUAL GHG EMISSIONS
BUILDING ENERGY USE VS. TRANSPORTATION

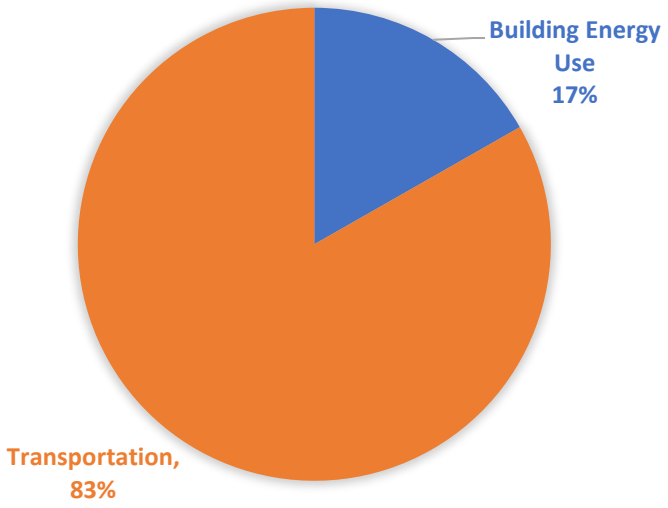


Figure 3.
2020 ANNUAL GHG EMISSIONS BY SOURCE

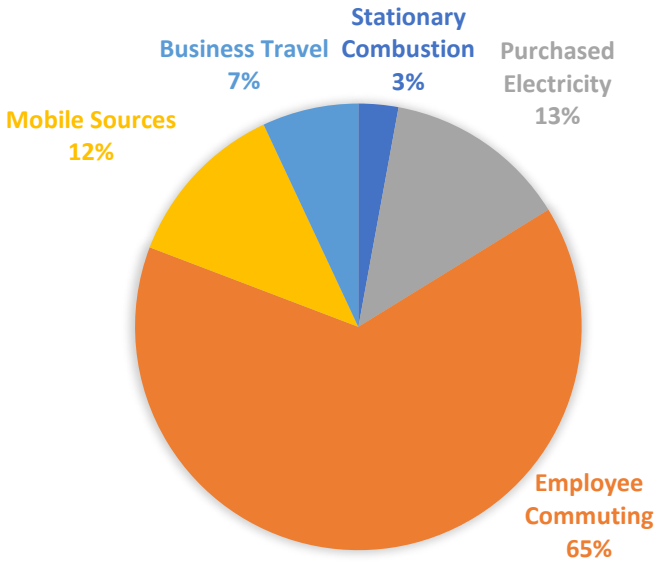


Figure 4.

2020 ANNUAL GHG EMISSIONS
BUILDING ENERGY USE VS. TRANSPORTATION

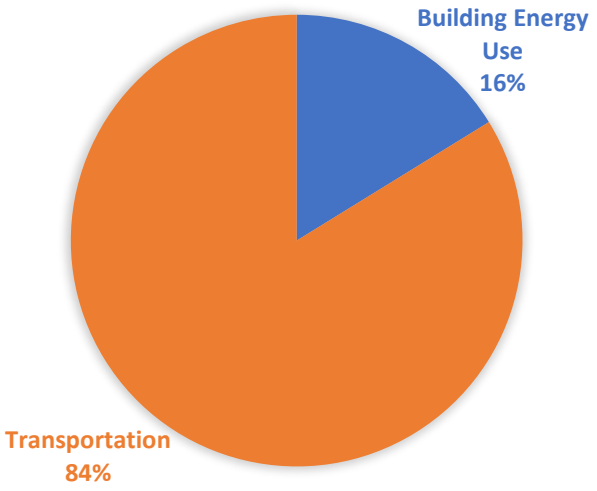


Figure 5.

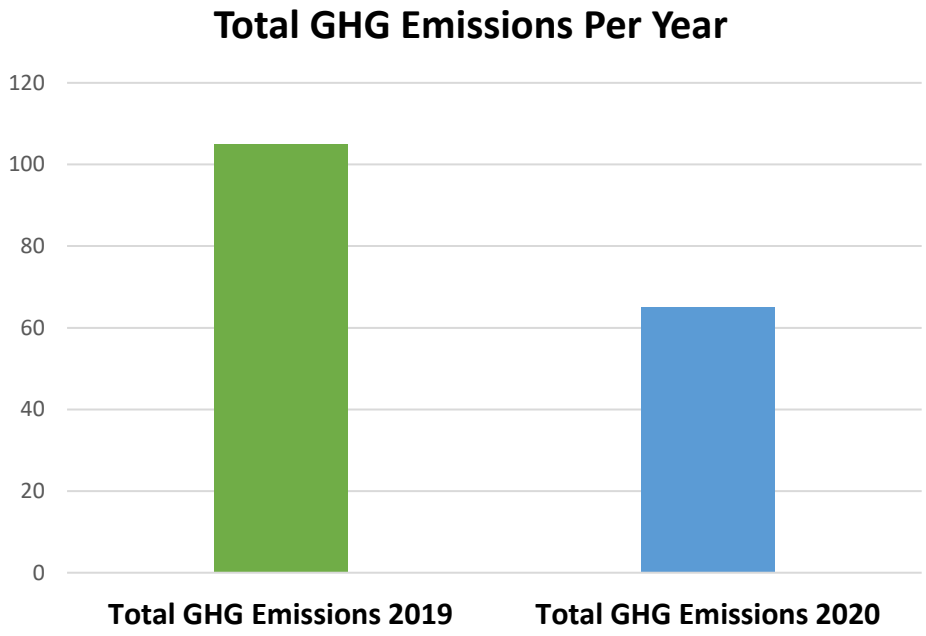


Figure 6.

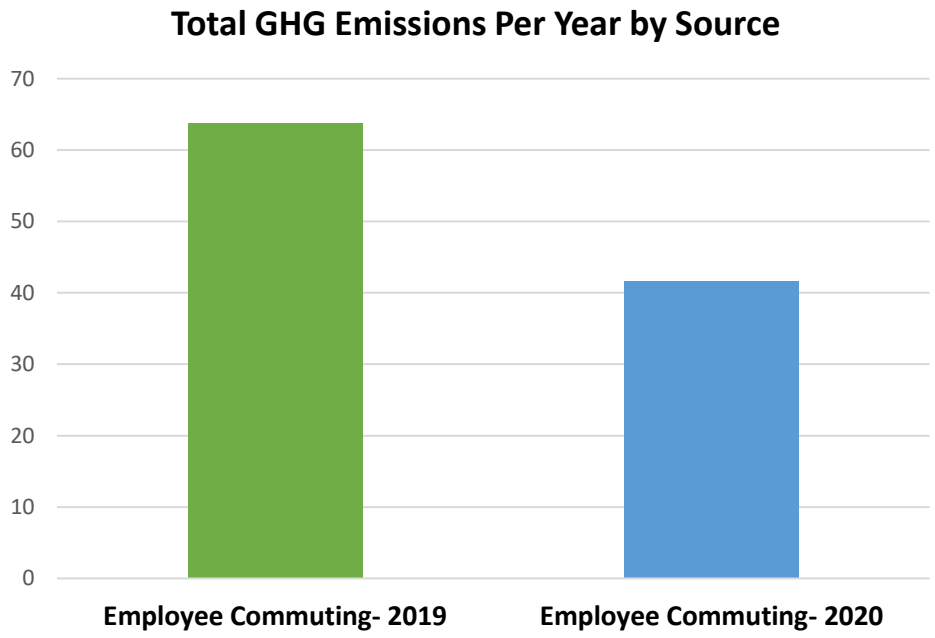
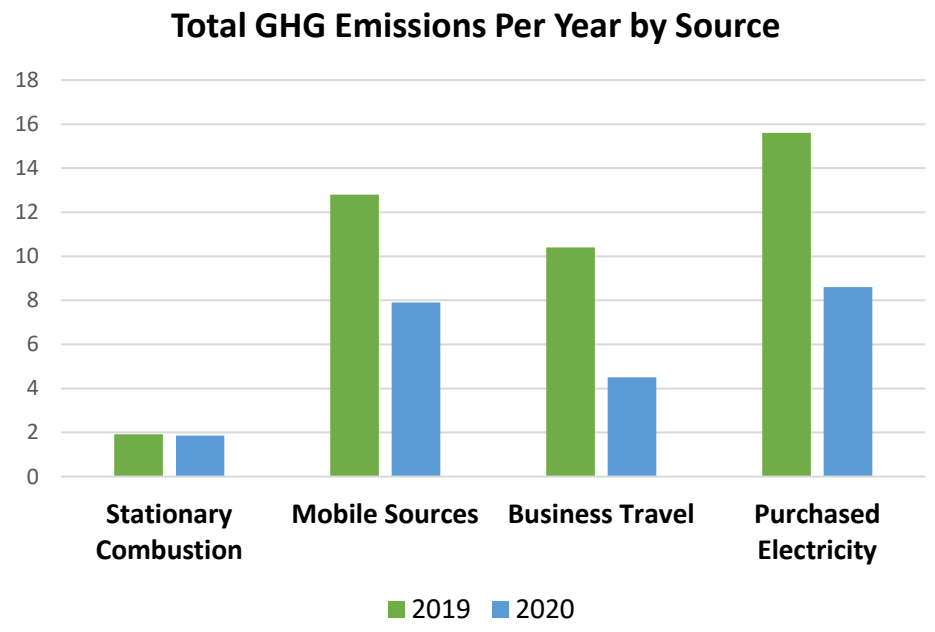


Figure 7.



Section 4 – Reduction Targets and Strategies

A. Science-based Reduction Targets

The reduction targets developed for Conserving Carolina's GHG emissions are science-based targets that aim to limit warming to 1.5 degrees Celsius. Our science-based targets are consistent with the trajectories outlined in the Paris Agreement, which states that to avoid catastrophic climate change impacts we must limit warming to 1.5 degrees Celsius.

Using a Science-Based Target Setting Tool developed by the Science-Based Targets Initiative, or SBTi, we have established several science-based targets to decrease operational GHG emissions. Our SBTi targets are based upon a 15-year timeframe with 2034 as the main target year. By 2034, Conserving Carolina will reduce operational GHG emissions by **63%**, emitting no more than **38.9** metric tons of CO2e annually.

Five-year incremental targets that ensure progress toward the **63%** reduction target by 2034 have also been identified. Conserving Carolina will reduce operational GHG emissions by **21%** by 2024 (absolute target of **83** metric tons CO2e annually) and **42%** by 2029 (absolute target of **61** metric tons CO2e annually).

Further reductions will be necessary after 2034 with the goal of reducing operational GHG emissions to as close to zero as possible by 2050. However, future reduction targets and strategies after 2034 will be developed when the current reduction target is met.

B. Reduction Strategies

Conserving Carolina's emission targets will be achieved through a combination of our own initiative and changes to governmental policy and societal infrastructure. Nonetheless, to reach a **63%** reduction of GHG emissions by 2034 numerous reduction strategies must be implemented by Conserving Carolina. Overall, these strategies seek to reduce vehicle travel for commuting and business, electrify existing emission sources, and deploy renewable energy infrastructure to offset additional electricity use. Primary strategies for decreasing operational GHG emissions are as follows:

1. **Reducing Employee Commuting** – Employee Commuting was the largest contributor to Conserving Carolina's total GHG emissions in both 2019 and 2020. However, emissions from employee commuting were significantly lower in 2020 due to decreased commuting. This shift to working remotely should be sustained indefinitely to maintain GHG emission reductions from employee commuting.
2. **Carpooling** – Carpooling is an effective way to decrease transportation-related GHG emissions. Conserving Carolina should develop incentives for carpooling and cultivate a company culture that encourages carpooling.
3. **Transitioning to an Electric Vehicle Fleet** – As of now, all three company vehicles run on standard gasoline. Conserving Carolina's vehicle fleet must transition from internal combustion vehicles powered by gasoline to electric vehicles. This strategy will require the installation of electric vehicle charging stations in office parking lots.
4. **Natural Gas Heating Replacement** – Office heating is currently fueled by natural gas. Replacing this natural gas heating with a heat pump will electrify the heating at our offices, therefore eliminating the need to combust fuel on-site.

5. **Solar Panels** – Transitioning to an electric vehicle fleet and heat pump will significantly increase our electricity consumption. Conserving Carolina should install sufficient solar panel capacity at our offices to offset all electricity consumption. This will significantly decrease our need for purchased electricity from Duke Energy and contribute to a renewable energy grid.