

ChurnZero

2021 Greenhouse Gas Inventory Report

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INTRODUCTION

Thank you for partnering with GreenPlaces to assess your company's carbon footprint. Learning your emission sources is a critical step in your sustainability journey. We've prepared this document to help you understand your footprint and the methodologies we use to measure your emissions. Please feel free to reach out to our team with any questions or clarifications.

LETTER OF ENGAGEMENT

This report details the carbon assessment, results, and methodology used to determine the greenhouse gas emissions (GHG) of ChurnZero.

GreenPlaces engaged with the ChurnZero team to survey and capture data required to assess their carbon footprint.

Our analysis was prepared following the guidance of the Greenhouse Gas (GHG) Protocol, assessing each of the three scoped emissions. The GHG Protocol Corporate Accounting and Reporting Standard serves as the international benchmark for accounting and reporting greenhouse gas emissions. Our assessment includes:

Scope 1: Emissions from Direct Operations

Scope 2: Emissions from Purchased Electricity

Scope 3: Emissions from Indirect Sources

ASSESSMENT SUMMARY

Based on the information provided and the analysis conducted, subject to the attached Statement of Limiting Conditions, we have concluded that as of the assessment date, ChurnZero(also referred to as the client or reporting company) has a carbon footprint of **136.6899 mT of CO₂e**.

Scope 1: 5.1380 mT CO₂e

Scope 2: 8.6345 mT CO₂e

Scope 3: 122.9175 mT CO₂e

Company Overview

ChurnZero is a recognized leader in Customer Success and a champion of CSMs everywhere. It is through Customer Success teams that businesses thrive. The ChurnZero platform and ongoing partnerships ensure Customer Success teams can enhance onboarding, spot potential churn risks early, identify renewal and expansion opportunities, and increase adoption. Best-in-class automation and in-app communication make it easy to engage with customers and lead them to value. ChurnZero has approximately 230 employees throughout the US.

Geographic Boundary

ChurnZero is Headquartered in Washington, DC

Base Year and Reporting Period

The GHG Protocol calls for a base year to be chosen as the earliest point in time for which a company has reliable data. GreenPlaces began working with ChurnZero in 2022; as a result, 2021 will be the reporting company's base year. Through a long-term partnership, GreenPlaces will help the client implement methods that enable emissions tracking and historical data aggregation for an accurate base year calculation. GreenPlaces uses a "fixed base year" approach that allows emissions to be tracked over time on a like-with-like basis. This greenhouse gas inventory report focuses on the reporting client's emissions for the 2021 calendar year (January 1st, 2021 – December 31st, 2021).

Organizational Boundary

The organizational boundary serves as a means of identifying the reporting company's operations that are included in the emission accounting and reporting. The GHG Protocol allows for accounting and reporting to be executed through two means: an (operational or financial) control approach and an equity share approach. Under the control approach, emissions are reported for activities a company has financial or operational control over. Under an equity share approach, emissions are reported according to the percentage of equity a company has in an operation.

For the purpose of this assessment, GreenPlaces implements an operational control approach for the client's scope 1 and 2 emissions, meaning 100% of the emissions are reported for activities the client has operational control over and where data is obtainable. Scope 3 emissions, which fall under optional reporting, are examined based on the organization's goals.

Operational boundaries categorize a company's emission causing activities and serve as a method of isolating emissions that fall under mandatory reporting from those that fall under optional reporting. According to the GHG Protocol, scope 1 and 2 emissions are required to be outlined for GHG inventory reports. Scope 3 emissions are considered optional and companies are authorized to identify which operational activities are relevant to their business model.

This 2021 GHG inventory report includes scope 1, scope 2, and scope 3 emissions. Although it is assumed that ChurnZero’s 2021 occupied location was leased, indirect emissions from electricity are classified as scope 2 in this report. Should ChurnZero decide to omit leased space from operational control, indirect emissions from electricity can easily be accounted for in scope 3 category 8 (upstream leased assets).

For transparency, indirect scope 3 emissions included in this report are as follows: employee commute, business travel, fuel- and energy-related activities not included in scope 1 and 2 (transmission and distribution losses only), and purchased goods and services.

Upstream emissions from purchased electricity are not included in this assessment. Additional scope 3 emissions not examined in this report are as follows: capital goods, upstream or downstream leased assets, use of sold products, end-of-life treatment of sold products, processing of sold products, upstream and downstream transportation/distribution, franchises, or investments.

Table 1.0a Operational Scopes

Scope 1	mT CO ₂ e	Specific exclusions and reason for exclusion	Estimated Activity
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Fugitive Emissions	0	ChurnZero did not report any sources of fugitive emissions although it is unlikely that there are no sources of fugitive emissions given there are typically refrigerators in offices. The reporting company did not have control over the HVAC system.	Not applicable
Stationary Combustion	5.1380	It was assumed the leased building burns natural gas. This section only includes combustion of natural gas. No other exclusions were made.	No data was provided for this section; therefore, GreenPlaces used tables C30 and C31 from the Commercial Building Energy Consumption Survey provided by the US Energy Information Administration (EIA) to calculate the average natural gas energy intensity per square foot of the office location. The average natural gas energy intensity was calculated then multiplied by the specific square footage of the office space that is occupied by ChurnZero (1870 square feet) to get the total annual consumption of natural gas. As averages were applied to calculate these emissions and no company specific data was provided, there is a high level of uncertainty associated with these calculations.
Mobile Combustion	0	ChurnZero reported zero sources for mobile combustion.	Not applicable
Process Emissions	0	ChurnZero does not produce any process emissions to GreenPlaces knowledge.	Not applicable
Scope 2 - both market-based and location-based emissions reported here; however, location-based emissions are used in footprint total.	mT CO₂e	Specific exclusions and reason for exclusion	Estimated Activity
Purchased Electricity - Location Based	8.6345	No exclusions were made from this section of the report. Annual kWh	ChurnZero did not provide any data or bills for electricity consumption for its office space . Therefore, GreenPlaces

		was calculated only for the office space occupied by ChurnZero.	used the EIA Commercial Buildings Energy Consumption survey (CBECS) for electricity energy intensity per square foot of the building (Tables C20 and C21). GreenPlaces was then able to multiply the intensity by the total square footage of the office.
Purchased Electricity - Market Based	9.3501	No exclusions were made from this section of the report. Annual kWh was calculated only for the office space occupied by ChurnZero.	The same estimations were used from location based to calculate average kWh used per year. The only change was the use of the market based residual mix emission factor rather than the location based emission factor.
Scope 3	mT CO₂e	Specific exclusions, % this represents for relevant scope	Estimated Activity
Category 1: Purchased Goods and Services	58.8957	Items examined in this category include office supplies, electronics, meals, and data center (AWS). These were the only categories reported on, however; should ChurnZero decide to add more categories, GreenPlaces can update the footprint.	Partially estimated; exact spend for purchased goods given. Cradle-to-gate emission factors provided by the Comprehensive Environmental Data Archive (CEDA) 2022 used. Estimation of what goods purchased in each category made.
Category 2: Capital Goods	0	ChurnZero reported zero sources for Capital Goods.	Not applicable
Category 3: Fuel- and Energy-Related Activities Not Included in Scope 1 or Scope 2	0.4576	Exclusion of upstream emissions from purchased electricity due to lack of emission factors. Only transmission and distribution losses included.	Estimated annual electricity usage. Methods mentioned above. Used the US average gross grid loss factor of 5.3%. Uncertainty likely fair/poor due to the use of secondary data.
Category 4: Upstream Transportation and Distribution	0	No upstream transportation and distribution reported.	Not applicable

Category 5: Waste Generated in Operations	0	No waste generated in operations reported.	Not applicable
Category 6: Business Travel	59.1824	From GreenPlaces' understanding, all ChurnZero business travel emissions are reported.	ChurnZero provided a total annual spend for travel of \$40,000 and a spend of \$17,200 for air travel specifically. GreenPlaces then split the remaining \$22,800 with an estimated \$2,800 spent on ground transit and an estimated \$20,000 spent on accommodations. GreenPlaces chose these categories and weighed them based on data collected for similar clients. Due to the lack of specific data, GreenPlaces applied the spend-based method for calculating emissions for air travel, hotel stays, and vehicle transportation with emission factors provided by the Comprehensive Environmental Data Archive (CEDA 2022). A radiative forcing factor was multiplied by air travel CO ₂ emissions.
Category 7: Employee Commuting	4.3818	No known exclusions were made to this section of the report, however; estimations were made.	ChurnZero provided that in 2021, 468 round trip commutes were made to their office by all of their employees collectively. ChurnZero completed a typeform commute survey, however there were not enough responses to make significant assumptions. Therefore, GreenPlaces used the average US commute method breakdown (Bureau of Transportation Statistics) to calculate how many of the round trips were made via different commute options. Using this method, GreenPlaces calculated that out of 468 total round trips in 2021, about 430 were made via driving, about 23 were made via public transportation, about 2 were made via biking and about 12 were made via walking. From there the average roundtrip commute distance of 30 miles (US DOT, 2003) was multiplied by the number of round trip commute trips made by each commute method.

Category 8: Upstream Leased Assets	0	Should ChurnZero decide to claim no operational control over its leased spaces, scope 1 and 2 emissions would be recategorized here.	Not applicable
Category 9: Downstream Transportation and Distribution	0	ChurnZero did not report any sources of downstream transportation and distribution. however, it is likely that some sources of downstream transportation exist as SWAG or other goods could be shipped to employees	Not applicable
Category 10: Processing of Sold Products	0	No sold products	Not applicable
Category 11: Use of Sold Products	0	No sold products	Not applicable
Category 12: End-of-Life Treatment of Sold Products	0	No sold products	Not applicable
Category 13: Downstream Leased Assets	0	No downstream leased assets	Not applicable
Category 14: Franchises	0	No franchises	Not applicable
Category 15: Investments	Not quantified	Emissions from investments not deemed significant emission sources as this category is typically reserved for investors and companies that provide financial services.	Not applicable
Total	136.6899 mT CO₂e	–	–

Table 1.0b Intensity Ratios

Company's chosen intensity measurement scope 1, 2, and 3 emissions in tonnes CO ₂ e per employee head	0.0706 mT CO ₂ e/employee	Company's second chosen intensity measurement scope 1, 2, and 3 emissions in tonnes CO ₂ e per 1000 sq ft	73.0962 mT CO ₂ e/1000 sq ft
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It should be noted that the above is a low carbon emission to employee ratio and is likely an underestimation of ChurnZeros actual emissions. Due to data gaps and lack of client specific data, certain categories of greenhouse gas emission accounting had to be left out and assumptions had to be made for other categories. In order to get a more accurate and specific carbon footprint in the future, GreenPlaces plans on working with Churnzero and advising them on management systems they can put in place to obtain better data.

Significance Threshold and Base Year Recalculation

The reporting client's significance threshold is as follows: reporting clients will implement a base year recalculation should there be a structural change such as a merger or acquisition. In the event of a mid-year acquisition, as recommended by the GHG Protocol, GreenPlaces will implement an "all-year" option approach, applying the recalculation to the full base year and the full reporting year.

To continue, should there be a change in methodology, change in inventory boundary, or discovery of any significant errors, GreenPlaces will recalculate the base year. GreenPlaces will not recalculate the base year for any organic growth or decline, changes involving facilities that did not exist in the base year, and occurrences of outsourcing/insourcing of activities that were already reported under scope 2 or scope 3.

Targets

After the conclusion of this 2021 assessment report, GreenPlaces will strategize emissions reduction targets with ChurnZero.

Carbon Offsets

To date, GreenPlaces has not purchased any carbon offsets on behalf of ChurnZero. This is an option that can be discussed with your GreenPlaces Account Manager or Account Executive.

Greenhouse Gas Boundary

This GHG Inventory Report examines carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and hydrofluorocarbons (HCFC), Perfluorocarbons (PFC), Chlorofluorocarbons (CFC), and Sulfur Hexafluoride (SF₆) emissions.

Discussion of Methodology

1.0 Objective

GreenPlaces strives to provide clients with a comprehensive, accurate representation of their current carbon footprint, adhering to the GHG Protocol accounting and reporting principles: relevance, completeness, consistency, transparency, and accuracy.

2.0 Overview and Structure of the Calculator

GreenPlaces employs two calculators in its assessment. Scope 1 and 2 emissions are calculated using the World Resource Institute's cross-sector carbon calculation tool. Some aspects of scope 3 emissions (business travel and employee commute) are examined using this calculator as well. Additionally, GreenPlaces purchased multiple databases that helped build out emission calculations, ensuring emission factors used are up to date and accurate. When clients choose to examine additional scope 3 emission, GreenPlaces uses the Comprehensive Environmental Data Archive (CEDA). CEDA allows emissions from over 400 human activities to be calculated via a spend-based method. This GHG Protocol third party approved database is mainly used for calculating emissions from categories such as purchased goods and services, capital goods, waste generated in operations, and occasionally downstream transportation (when conducted by third party distributors). When working with clients with an international footprint, GreenPlaces uses electricity emission factors provided by the International Energy Agency (IEA). The IEA is the main trusted source for location-based international electricity emission factors. Our comprehensive methodology examines a company's scope 1, 2, and 3 emissions, ensuring both direct and indirect CO₂ emissions are reported.

What separates GreenPlaces' model is its spend-based approach which enables a detailed glimpse into companies supply chains (scope 3 emissions). According to the EPA, scope 3 emissions typically account for the majority of an organization's total GHG emissions. GreenPlaces obtains its emission factors from the latest EPA "U.S. Inventory of Greenhouse Gas Emissions and Sinks" report, guaranteeing our calculations reflect ongoing trends towards efficiency.

Scope 1 emissions are also known as direct emissions. These are the carbon emissions that are released from company-owned and controlled resources. Scope 1 emissions are divided into four categories: stationary combustion, mobile combustion, fugitive emissions, and process emissions.

Stationary combustion accounts for fuel consumption at a company-owned facility to produce electricity, steam, heat, or power. The combustion of fossil fuels via boilers, furnaces, and other fuel burning equipment all fall under stationary combustion.

Mobile combustion is classified as direct GHG emissions that are released into the atmosphere from mobile sources that are within an organization's inventory boundary (including leased mobile sources). Note: all other mobile combustion, such as employee commuting, employee travel, and upstream/downstream third-party transportation emissions are considered scope 3 indirect emissions.

Fugitive emissions are classified as direct GHG emissions that leak or escape into the atmosphere from various types of equipment and processes. Common sources of fugitive emissions are refrigeration and air conditioning systems, fire suppression systems, and the purchase and release of industrial gasses (typically seen in manufacturing and laboratory applications).

Process emissions are those that are released from industrial processes involving chemical or physical transformations other than fuel combustion.

Scope 2 emissions are also identified as owned-indirect emissions. These are the emissions that are generated through purchased energy via a utility provider.

Scope 3 emissions are inclusive of not owned-indirect emissions. According to GHG protocol, scope 3 emissions should be viewed in 15 separate categories (not every category will be relevant to all organizations). GHG Protocol Corporate Accounting and Reporting Standard states that scope 3 emissions quantification is not required for reporting purposes; however, scope 3 emissions often represent the bulk of a company's footprint, and GreenPlaces feels that an inclusive approach is the most effective way to achieve corporate sustainability. Scope 3 categories include:

1. Purchased good and services
2. Capital goods
3. Fuel and energy related activities (not included in scope 1 or 2)
4. Upstream transportation and distribution
5. Waste generated in operations
6. Business travel (in vehicles not owned or operated by reporting company)
7. Employee commuting
8. Upstream leased assets
9. Downstream transportation and distribution
10. Processing of sold products
11. Use of sold products
12. End-of-life treatment of sold products
13. Downstream leased assets
14. Franchises
15. Investments

3.0 Scope 1 Emissions

3.1 Stationary Combustion

3.1 Natural Gas

Natural gas is typically the “largest single contributor to direct emissions for U.S. buildings” (Jones & Kammen, 2014). In the event that clients are unable to provide specific annual natural gas consumption values, GreenPlaces relies on estimations that portray a company's natural gas consumption based on its sector, total square footage, and geographic location. Smart default values for energy consumption are estimated per business sector by square feet of buildings and climate zone using the Commercial Building Energy Consumption Survey (CBECS). Climatic data for each location is obtained from the National Oceanic and Atmospheric Administration (NOAA) and comprises a 30-year observance period. Using a 30-year observance period ensures climate zones are accurately represented and are not impacted by outlier weather phenomena. The climatic data is intended to reflect varying heating and cooling days. For example, when comparing an office located in Texas to one in New York, energy consumption values for both heating and cooling are drastically different.

After obtaining annual natural gas consumption (either sourced directly from clients or estimated using the method mentioned above), annual consumption is then converted directly to CO₂ emissions using a natural gas emission factor obtained from the EPA's U.S. Emission Factors for Greenhouse Gas Inventories report. The EPA assigns an emission factor of approximately 53.1145kg CO₂e/mmBtu for natural gas under scope 1 stationary combustion.

$$\text{Total Emissions from Natural Gas} = \text{activity data} \times \text{emissions factor}$$

Stationary Combustion: ChurnZero

GreenPlaces assumed that the office consumes natural gas; however, no natural gas bills or data was provided by the reporting client. As a result, GreenPlaces used tables C30 and C31 from the Commercial Building Energy Consumption Survey provided by the US Energy Information Administration (EIA) to calculate the average natural gas energy intensity per square foot of the office location. The average natural gas energy intensity was calculated then multiplied by the specific square footage of the office space that is occupied by ChurnZero (1,870 square feet) to get the total annual consumption of natural gas. Annual natural gas consumption was then multiplied by the natural gas emission factor to get the total emissions per location. As a result, scope 1 emissions from natural gas are assumed to be **5.1380 mT CO₂e**. Due to the lack of location specific data and the use of averaging, there is a high level of uncertainty associated with these calculations. Table 2.0a displays the breakdown of mmBtu and mT CO₂e for the combustion of natural gas. Table 2.0b depicts the total gas breakdown as a result of the combustion of natural gas.

Table 2.0a Scope 1 Stationary Combustion of Natural Gas: ChurnZero

Source: EPA, GHG Emission Factors Hub (<https://www.epa.gov/climateleadership/ghg-emission-factors-hub>)

Location	mmBtu Of Natural Gas Combusted Per Year	mT CO ₂ e
Washington, DC	96.7333	5.1380

Table 2.0b Scope 1 Stationary Combustion of Natural Gas; Greenhouse Gas Breakdown: ChurnZero

Source: EPA, GHG Emission Factors Hub (<https://www.epa.gov/climateleadership/ghg-emission-factors-hub>)

Location	CO ₂ Emissions (kg)	CH ₄ Emissions (kg)	N ₂ O Emissions (kg)	Total Emissions kg CO ₂ e
Washington, DC	5,132.6668	0.0967	0.0097	5137.9678

3.2 Mobile Combustion

Scope 1 mobile combustion often gets confused with scope 3 business travel and employee commuting. As discussed in section 2.0, mobile combustion applies to the calculation of greenhouse gas emissions released directly from company-owned (or company-leased) vehicles and airplanes. Mobile combustion is only considered in carbon assessments when clients provide specific information on company fleets.

GreenPlaces adheres to the GHG Protocol Corporate Standard and uses the EPA’s “Emission Factors for Greenhouse Gas Inventories” to calculate CO₂ released per gallon of fuel combusted or number of miles driven. The table below provides an example of the types of vehicles GreenPlaces examines and the emission factors associated with each mobile combustion source (GreenPlaces has the ability to examine additional vehicle types; however, only commonly used modes of transportation were selected for this demonstration to save space).

Mobile Combustion: ChurnZero

In 2021, ChurnZero did not own or lease (long term) any automobiles. As a result, emissions from mobile combustion are assumed to be **0 mT**.

3.3 Fugitive Emissions

Fugitive emissions are those that are released during the installation, operational use, and disposal of equipment that uses greenhouse gasses to produce a cooling effect. Common sources of equipment included in this category are refrigerators and freezers, HVAC systems, and fire suppression systems. In order to calculate emissions from refrigerators and freezers, GreenPlaces needs specific information on refrigerator type (make and model), refrigerant gas used, refrigerant gas charge capacity, and records of any services or repairs. GreenPlaces understands that obtaining this information is a lengthy process. Unfortunately, without refrigerator/HVAC this information, there is no way to estimate emissions from refrigerants without running the risk of being inaccurate.

Should clients provide data on fugitive emissions from refrigerants or HVAC systems, GreenPlaces will calculate fugitive emissions one of four ways: Screening Method, Method for Purchased Gasses, Material Balance Method, or Simplified Material Balance Method. The UK Department for Environment, Food, and Rural Affairs provides estimated percentages of gasses leaked during the installation, operational use, and disposal of refrigerant/HVAC systems. These estimations are used for a Screening Method. The formula commonly used for calculating emissions released from the operational use of these systems is as follows:

$$\text{Number of Units} \times \text{Equipment Charge Capacity (kg)} \times \text{Time used during reporting period (years)} \times \text{Annual Leak Rate (\%)} \times \text{Global Warming Potential of Refrigerant} = \text{Total kg CO}_2 \text{ equivalent}$$

Fugitive Emissions: ChurnZero

In 2021 ChurnZero reported no instances of purchasing, repairing, or discarding a refrigerant system, as a result, emissions from fugitive emissions are assumed to be **0 mT**. However, it is likely the office contains some refrigerators. Since these systems were only in an operational state throughout the reporting period, it is likely that emissions from this source are negligible. GreenPlaces will still work with the reporting company to implement a way to track refrigerants over the years.

4.0 Scope 2 Emissions

4.1 Purchased Electricity

Scope 2 emissions from purchased electricity include an organization's indirect emissions that are released as a result of fossil fuel combustion off-site company property. Electricity is typically purchased through a local utility company.

When possible, GreenPlaces follows GHG Protocol guidance and calculates emissions from electricity generation via two methods: location-based method and market-based method. A location-based method relies on statistical information and electricity output “aggregated and averaged for a specific geographic

boundary during a defined time period.” A market-based method quantifies GHG emissions “of a reporter based on GHG emissions emitted by the generators from which the reporter contractually purchases electricity bundled with contractual instruments or contractual instruments on their own” (WRI, 2015, p. 25).

GreenPlaces reports both location and market-based methods when calculating scope 2 emissions from purchased electricity. However, unless clients provide evidence of contractual agreements between their utility providers, only location-based emissions are considered in total emissions calculated. Both of these carbon accounting methods use “generation-only” emission factors, meaning energy losses or upstream life-cycle emissions connected to technology or fuel used in generation are not included in assessments. The GHG Protocol Corporate Standard recommends upstream emissions be quantified and reported in scope 3 emissions. Only emissions from transmission and distribution losses are reported in the scope 3 section of this report.

GreenPlaces asks that clients provide specific data around energy consumption; however, GreenPlaces understands not all companies have access to this data. The GHG Protocol recommends four methods for estimating annual purchased electricity. Method one being the most accurate and method four being the least accurate. These methods are as follows:

1. Actual Electricity Use
 - a. Involves tracking a facility’s monthly electricity bill or meter.
2. Building Specific Data Emission
 - a. Involves obtaining facilities total square footage and total electricity usage and making estimates from this information.
3. Similar Building Estimation
 - a. This method involves extrapolating data based on buildings that are similar in size, location, use, hours of operation, and energy efficiency.
4. Generic Building data
 - a. This method uses default data values such as kWh used per sq ft or sq. meter of space.

GreenPlaces uses one of the four methods above when determining estimated purchased electricity usage for a client’s GHG inventory report. When a client does not provide any data pertaining to purchased electricity consumption, smart default values for purchased electricity are estimated per business sector by square feet of buildings and climate zone using the Commercial Building Energy Consumption Survey (CBECS) or an equivalent international consumption estimation survey. This qualifies as a similar building estimation method. Climatic data for each location is obtained from NOAA and comprises a 30-year observance period. Electrical energy sources and resulting emission factors vary with geographic location. Our calculator uses the EPA’s Emissions & Generation Resource Integrated Database (eGRID) to obtain emission factors for electricity. For international clients, GreenPlaces uses international emission factors provided by the International Energy Agency (IEA). These databases are recommended by the GHG Protocol and serve as the

most in-depth source of information pertaining to the environmental characteristics of nearly all electric power generated globally. Tables 3.0 and 4.0 below provide a glimpse into emission factors per subregion.

Table 3.0 Emission Factors per eGRID subregion – Location based

Source: EPA, “Emission Factors for Greenhouse Gas Inventories,” Table 6 Electricity, March, 2022 From EPA eGRID 2020.

Grid Region - Location Based	CO ₂ e (kg/kWh)
SRVC	0.284146358

Table 4.0 Emission Factors per eGRID subregion – Residual mix

Source: 2021 Green-e Residual Mix Emission Rates (2019 Data).

Grid Region - Market Based	CO ₂ e (kg/kWh)
SRVC	0.307694133

Purchased Electricity: ChurnZero

ChurnZero did not provide any data or bills for electricity consumption for its office space . Therefore, GreenPlaces used the EIA Commercial Buildings Energy Consumption survey (CBECS) for electricity energy intensity per square foot of a building (Tables C20 and C21). GreenPlaces was then able to calculate average electricity intensity in kWh per square foot for the office and multiply the intensity by the total square footage of the office. From there, total kWh per year was multiplied by the corresponding eGRID emission factor to calculate location-based electricity emissions and by a residual mixed eGRID emission factor to calculate market-based electricity emissions. Using these calculation methods, location-based emissions for the office came to **8.6345 mT CO₂e** and market-based emissions came to **9.3501 mT CO₂e**. Since actual electricity in kWh was not provided and average electricity intensity per square foot occupied was applied, there is a fair to large amount of uncertainty associated with these calculations.

Total Emissions from Indirect Electricity Usage:

Location-based:

Total 2021 location-based emissions are approximately **8.6345 mT CO₂e** . Table 5.0a displays location, annual kWh, location-based emission factor used, and total mT CO₂e. Table 5.0b displays a gas breakdown of emissions.

Market-based:

Total market-based emissions were approximately **9.3501 mT CO₂e** . Table 5.0c displays market-based emissions per restaurant.

Table 5.0a Location-based Electricity Usage and CO₂e: ChurnZero

Source: EPA, "Emission Factors for Greenhouse Gas Inventories," Table 6 Electricity, March, 2022 From EPA eGRID 2020.

Office Location	kWH/year	Emission Factor (kgCO ₂ e/kWh)	Total Emissions mT CO ₂ e
Washington, DC	30,387.5000	0.284146358	8.6345

Table 5.0b Location-based Electricity Gas Breakdown: ChurnZero

Source: EPA, “Emission Factors for Greenhouse Gas Inventories,” Table 6 Electricity, March, 2022 From EPA eGRID 2020.

Office Location	CO ₂ Emissions (kg)	CH ₄ Emissions (kg)	N ₂ O Emissions (kg)	Total Emissions CO ₂ e (kg)
Washington, DC	85,88.5156	0.6892	0.0965	8,634.4975

Table 5.0c Market-based Electricity Emissions: ChurnZero

Source: 2021 Green-e Residual Mix Emission Rates (2019 Data).

Office Location	Total Emissions kg CO ₂ e
Washington, DC	9.3501

5.0 Scope 3 Emissions

5.1 Scope 3, Category 1: Purchased Goods and Services

Emissions from scope 3 purchased goods and services tend to represent a large fraction of a company’s total carbon footprint. The GHG Protocol Corporate Accounting and Reporting Standards understands not all companies will have the ability to assess their total scope 3 emissions as access to this specific data is limited and difficult to collect. As a result, GHG Protocol recommends “companies identify which scope 3 activities are expected to have the most significant GHG emissions, offer the most significant GHG reduction opportunities, and are most relevant to the company’s business goals” (World Resource Institute, 2018, pg 11). GreenPlaces strives to make this sustainability process easy for its clients; therefore, GreenPlaces has identified large GHG emission producing activities and includes these in its assessment. GreenPlaces’ examination of scope 3 procurement emissions includes emissions from printing services, supplies, facilities maintenance, electronics, furniture and appliances acquisition, and other goods & services (phone, internet, security, etc).

When clients report specific annual spendage, GreenPlaces uses the GHG Protocol third party approved database (Comprehensive Environmental Archive Data – CEDA 2022) as a means of calculating emissions from total spend. CEDA provides emissions factors (kg CO₂e/\$) for hundreds of human activities. Emission factors for these items are cradle to grate, meaning upstream transportation, farming, etc. are all included. These emission factors do not account for downstream transportation (shipping of the goods to the client).

Purchased Goods and Services: ChurnZero

ChurnZero provided annual spend broken up into categories essential to their business operations including office supplies, electronics, and meals. Through the use of the CEDA 2022 database, GreenPlaces calculated cradle to gate emissions from ChurnZero purchased goods. When not explicitly provided, GreenPlaces made assumptions about the physical items purchased in each category reported by the client. It should be noted that ChurnZero AWS data center emissions of 5.1 mT CO₂e were added into this category. 2021 emissions from purchased goods were approximately **58.8957 mT CO₂e**.

5.3 Scope 3, Category 3: Fuel- and Energy-Related Activities Not Included in Scope 1 or Scope 2

As discussed before, scope 2 emissions are exclusively reserved for emissions from purchased electricity. These emissions are representative of the indirect emissions released from the combustion of a fuel source burned off company property. While the scope 2 emission category may seem comprehensive, two important emission producing processes are left out from its calculation. Scope 2 emissions fail to take responsibility for the upstream emissions of purchased electricity and the emissions associated with transmission and distribution (T & D) losses along the electricity production chain.

Upstream emissions of purchased electricity are those that are produced during the extraction, production, and transportation of fuels used to generate electricity. For example, rather than only examining emissions released while burning coal, the inclusion of this category would mean emissions from mining, processing, and transportation are all included in the assessment. While electricity end-users are not directly responsible for this mining, processing, and transportation, their usage of the electricity contributes to fuel demand; therefore, a level of responsibility is attributed to end-users.

Transmission and distribution (T & D) losses are representative of emissions from electricity that are lost throughout the transference of the electricity from the power generator to the end user. Fuels for electricity are mined and sent to a power generator for processing. These power generators process the fuel and turn it into power which is then sold to utility companies. Occasionally, there is more than one utility company who handles the electricity. By the time the purchased electricity reaches the end-user, it has passed through several handlers; naturally, some electricity is lost during this process.

T & D losses can be calculated through two means: supplier-specific method and the average-data method. The supplier-specific method is where a utility-specific T & D loss rate (%) is provided by the appropriate utility company. The average-data method involves using country specific, regional, or global averaged T & D loss rates.

Transmission and Distribution Losses (T & D Losses): ChurnZero

Emissions from upstream purchased electricity are not included in this assessment; however, emissions from T&D losses are considered. Calculations for electricity usage are described in detail in section 4.1 of the report.

No supplier-specific T&D loss rates were provided. As a result, GreenPlaces used the average-data method for T&D loss calculations. T&D loss adjustment rates per country were provided by the EPA and a gross grid loss rate of 5.3% was used for all calculations. Gross grid loss rate was multiplied by the total annual kWh to determine the T&D losses per location.

Table 6.0 below displays the 2021 electricity consumption, and corresponding T&D losses in mT CO₂e. Emissions from T&D losses were approximately **0.4576 mT CO₂e**.

Table 6.0 Total Electricity Usage and T&D Losses CO₂e: ChurnZero

Source: *International Energy Agency (IEA), Emission Factors (2021)*.

Office Location	kWH/year	T&D Losses mT CO ₂ e
Washington, DC	30,387.5000	0.4576

5.4 Scope 3, Category 5: Waste Generated in Operations

Unless companies implement a rigorous waste accounting program, it is extremely difficult to keep track of total facility waste production. GreenPlaces understands the unlikelihood of monitoring all waste production processes; however, estimating annual waste production without influence from a primary data source leads to a high level of uncertainty. In order to calculate emissions from waste generated in operations, GreenPlaces needs some degree of visibility into the reporting company's waste management system or emissions can be calculated via a spend-based method.

After estimates of the company's annual waste production are established, GreenPlaces uses the GHG Protocol's average-data method for calculating emissions from waste production. The EPA assigns specific emission factors for the average-data method. As guided by the GHG Protocol, emission factors only include end-of-life processes. Table 7.0 displays emission factors used by GreenPlaces for the average-data method. Since GreenPlaces uses the average-data method, calculations are made using emission factors from mixed material types as opposed to fully separated categories. For example, rather than use the emission factor for office paper, GreenPlaces uses the emission factor for "mixed office paper." Without a waste audit, GreenPlaces cannot be certain of the types of materials being disposed of, hence GreenPlaces follows EPA

and GHG Protocol guidance, implementing the mixed emission factors. While using a mixed emissions factor yields reliable results and adheres to GHG Protocol, GreenPlaces will work with clients to strategize a way to conduct an accurate waste audit which will be used in future assessments.

GreenPlaces takes recycling emission reductions into account; however, GreenPlaces follows GHG Protocol guidance which recommends “any claims of avoided emissions associated with recycling should not be included, or deducted from scope 3 inventory, but instead may be reported separately from scope 1, scope 2, and scope 3 emissions” (WRI, 2018, p. 78).

In addition to reporting solid waste in scope 3 category 5, purchased water and wastewater is also reported here. GreenPlaces only has the ability to report on emissions from water usage and wastewater via a spend-based method. Waste management emission factors provided by the Comprehensive Environmental Data Archive (CEDA 2022) are used to calculate emissions related to water.

Table 7.0 Emission Factors Hub for Waste Generated in Operations

Source: EPA, GHG Emission Factors Hub 2022.

Material	Landfilled mT CO ₂ e/ton
Mixed Office Paper	.75
Mixed Plastics	.02
Mixed Metals	.02
Mixed Electronics	.02
Mixed Organics	.48
Glass	.02
Mixed Municipal	.52

Operational Waste: ChurnZero

In 2021, ChurnZero did not report on waste or water. As a result, emissions from waste and water are recorded at 0 mT as GreenPlaces did not feel assumptions would provide accurate estimations of carbon emission for this category. That being said, ChurnZero most likely has emissions from both waste and water and GreenPlaces would encourage implementing new ways to track this data and include it in future carbon footprint for ChurnZero.

5.5 Scope 3, Category 6: Business Travel

Although greenhouse gas calculations continue to evolve and become more accurate, significant amounts of uncertainty remain around calculating emissions from air travel. Scientific uncertainty surrounding air travel is associated with the impact of releasing greenhouse gasses at high altitudes. Variables such as cruising altitude, temperature, humidity, fuel type, and more each impact the direct emission output of an airplane. Some flights may have a “cooling effect” on the atmosphere (releasing more aerosols), while others may have 10x the expected warming impact. No two flights are alike, making it extremely difficult to estimate the warming impact of air travel. In order to account for this variability, climatologists standardized the radiative forcing index, which is the metric used to assess and compare emissions from varying airline scenarios. To account for airline variability, the IPCC recommends using a radiative forcing factor of 2.7. The formula used to calculate emissions from flights is:

$$\text{Total Emissions} = \text{Passenger miles} \times \text{emission factor} \times 2.7$$

GreenPlaces does not have a way to estimate an organization’s air travel based on their business sector. GreenPlaces asks that companies provide as much information surrounding their flight habits as possible. GreenPlaces has a method in place for calculating emissions from total mileage traveled and via spend-based methods; however the preferred method and GHG Protocol Corporate Standard Accounting method requires flight distance segments to be known. For example, reporting entities should disclose the total number of flights to travel from point A to point B as well as the passenger-miles in between each flight.

Air travel is calculated into three categories: short haul, medium haul, and long haul.

- Short haul < 300 miles
- 300 miles < Medium Haul < 2,300 miles
- Long haul > 2,300 miles

Segmentation by flight length is the preferred method of emission calculation because more emissions are released at the time of take off and landing; therefore, the emission factor for short haul flights is higher than that of long haul flights.

Table 8.0 Emission Factors for varying Flight Lengths

Source: EPA, "Emission Factors for Greenhouse Gas Inventories," Table 8 Business Travel and Employee Commuting, 2022.

Segment Type	CO ₂ Factor (kg/passenger-mile)	CH ₄ Factor (g/passenger-mile)	N ₂ O Factor (g/passenger-mile)
Short Haul	0.207	0.0064	0.0066
Medium Haul	0.129	0.0006	0.0041
Long Haul	0.163	0.0006	0.0052

Business Travel: ChurnZero

ChurnZero reported spending a total of \$40,000 on business travel in 2021 and provided that they spent \$17,200 of that total on air travel specifically. GreenPlaces then split the remaining \$22,800 of the total business travel spend: with an estimated \$2,800 spent on ground transit and an estimated \$20,000 spent on accommodations. GreenPlaces chose these categories and weighed them based on data collected for similar clients. Due to the lack of specific data, GreenPlaces applied the spend-based method for calculating emissions for air travel, hotel stays, and vehicle transportation with emission factors provided by the Comprehensive Environmental Data Archive (CEDA 2022). A radiative forcing factor was multiplied by the air travel CO₂ emissions.

Total Emissions for ChurnZero Business Travel : 59.1824 mT CO₂e

5.6 Scope 3, Category 7: Employee Commute

Employee commute is seen as part of scope 3 (indirect) emissions because the emission producing vehicles are not company-owned. GreenPlaces finds employee commuting to be a large contributor to total carbon footprints; therefore, we recommend including this section in any assessment. Given total employee commute mileage, GreenPlaces can calculate direct emissions from travel by using emission factors assigned by the EPA and UK DEFRA. Unless otherwise stated, GreenPlaces assumes employees are commuting via a passenger vehicle which exclusively uses standard gasoline for operation. GreenPlaces has the ability to calculate emissions resulting from other modes of transportation (subway, light rail, bus, boat, etc). Table 9.0 below provides an example of some of the emission factors GreenPlaces uses in its assessment of scope 3 business travel.

GreenPlaces considers the recent changes to employee commutes after COVID-19. At the time of client communications, GreenPlaces obtains as much information as possible on employee commuting habits (% of hybrid employees, % of fully remote, modes of transportation, etc). In addition to reporting emissions from employee commuting in scope 3, category 7, GHG Protocol recommends reporting emissions from home teleworking in category 7. Reporting emissions from teleworking is entirely optional; however, GreenPlaces has seen a shift in the interest towards including teleworking emissions with the transition towards remote/hybrid working during the COVID19 pandemic.

Table 9.0 Sample Employee Commuting Emission Factors (not all transportation modes included here, for space saving purposes)

Source: EPA, "Emission Factors for Greenhouse Gas Inventories," Table 8 Business Travel and Employee Commuting, March 9, 2018 & UK DEFRA, Passenger vehicles, 2019

Transportation Mode	CO ₂ Factor (kg/vehicle-mile)	CH ₄ Factor (g/vehicle-mile or passenger-mile)	N ₂ O Factor (g/vehicle-mile or passenger-mile)
Passenger Car A	0.332	0.007	0.007
Motorcycle	0.183	0.070	0.007
Transit Rail (Subway, Tram)	0.099	0.0084	0.0012
Bus	0.056	0.0210	0.0009

Employee Commute: ChurnZero

ChurnZero provided that in 2021 468 round trip commutes were made to their office by all of their employees collectively. ChurnZero completed a typeform commute survey, however there were not enough responses to make significant assumptions. Therefore, GreenPlaces used the average US commute method breakdown (Bureau of Transportation Statistics) to calculate how many of the round trips were made via different commute options. Using this method, GreenPlaces calculated that out of 468 total round trips in 2021, about 430 were made via driving, about 23 were made via public transportation, about 2 were made via biking and about 12 were made via walking. From there, the average roundtrip commute distance of 30 miles (US DOT, 2003) was multiplied by the number of round trip commutes made by each commute method. Once total mileage was calculated per commute method, the appropriate emissions factors were applied. As a result, total employee commute emissions for 2021 came to **4.3818 mT CO₂e**. As estimations were made regarding transportation methods and average commute distance, there is a fair to large amount of uncertainty associated with these calculations. Commute methods, emission factor, miles traveled per year, gas breakdown, and total mT CO₂e are displayed on table 10.0.

Table 10.0 Employee Commuting Emissions

Source: EPA, GHG Emission Factors Hub (<https://www.epa.gov/climateleadership/ghg-emission-factors-hub>)

Method of Transportation	# of Employees Commuting (rounded)	Miles Traveled per Year	Emission Factor Used (kg CO ₂ e/mile)	kg CO ₂	kg CH ₄	kg N ₂ O	mT CO ₂ e
Passenger Vehicle	430	12901.3560	0.3343	4283.2502	0.0903	0.0903	4.3124
Public Transportation (subway/rail)	23	696.3840	0.0996	68.9420	0.0058	0.0008	0.0693
Bike	2	N/A	N/A	N/A	N/A	N/A	N/A
Walk	12	N/A	N/A	N/A	N/A	N/A	N/A

Total	-	-	-	-	-	-	4.3818
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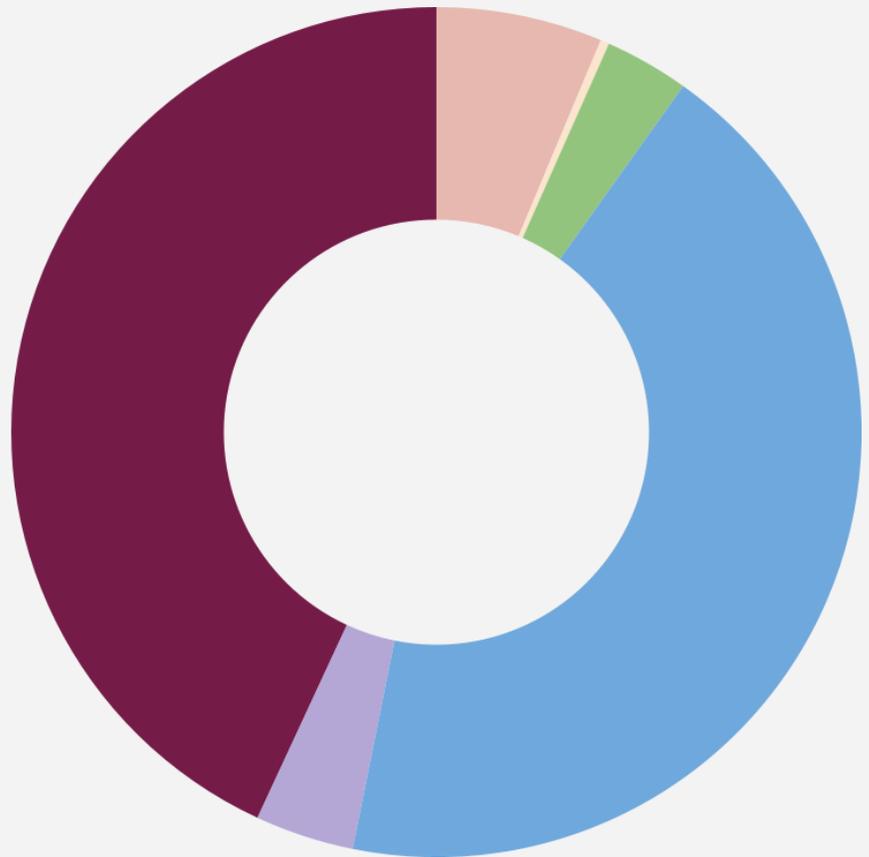
ASSESSMENT RESULTS

Based on the information provided and the analysis conducted, and subject to the attached Statement of Limiting Conditions, we have concluded that ChurnZero’s scope 1 and 2 emissions, with local-based method purchased electricity, as of the assessment date are: **13.7725 mT of CO₂e**. Scope 3 emissions as of this assessment date are approximately **122.9175 mT CO₂e**. It should be noted that this is likely a conservative number as not all emission scope were accounted for for each office.

Total emissions are:

136.6899 mT of CO₂e

- Electricity
- Transmission & Distribution Losses
- Employee Commute
- Business Travel
- Natural Gas
- Purchased Goods and Services



● **Purchased Goods & Services 43.1%**

These are the Scope 3 emissions that come from the things your business purchases to operate. Some examples include office supplies, electronics and meals. This is often one of the largest buckets as it includes most things your business needs to operate. ~ 58.8957 mT CO₂e

● **Business Travel 43.3%**

Flights, accommodations, and ground transit were all included in this calculation.~59.1824 mT CO₂e

● **Electricity 6.3%**

These are the scope 2 emissions that come from the electricity your business purchases. ~ 8.6345 mT CO₂e

● **Natural Gas 3.8%**

These are scope 1 emissions from natural gas consumption. ~5.1380 mT CO₂e

● **Employee Commute 3.2%**

We consider transportation type, commute distance, and days worked per year in this calculation.
~4.3818 mT CO₂e

● **Transmission & Distribution Losses 0.3%**

These are scope 3 emissions from electricity lost along the utility chain process. ~0.4576mT CO₂e

DOCUMENTATION

ChurnZero provided data on office location, number of employees, square footage of occupied office space, number of commute trips made per year, purchased goods and services, and AWS information.

Statement of limiting conditions

1. This Carbon Assessment is valid only for the stated purpose and as of the date of its completion.
2. Information provided by the client or its representatives has been accepted by GreenPlaces without verification and is not audited, reviewed, or otherwise validated. The carbon footprint arrived at herein is based on such information.
3. GreenPlaces has obtained certain information regarding GHG from public sources that it believes to be reliable. However, GreenPlaces makes no representation regarding the accuracy or completeness of such information and has not taken action to corroborate such information.
4. This Carbon Assessment does not constitute an environmental site assessment, and GreenPlaces takes no responsibility for identifying any actual or potential environmental liabilities or contamination on or associated with the Client's property.
5. The prior written consent of GreenPlaces is required before all or any part of the contents of this Carbon Assessment may be disseminated to the public or reproduced or distributed to any third parties. Any modification of this Carbon Assessment requires the prior written consent of GreenPlaces. This Carbon Assessment is copyright © 2022, GreenPlaces. All rights are reserved.

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