2021 Environmental Impact Assessment

clearwater
CREDIT UNION

clearwatercreditunion.org/environment

Contents

Introduction

This report details Clearwater Credit Union's environmental impact for 2021. This includes the environmental impact of our corporate operations, as well as the greenhouse gas impact of our balance sheet. To assess our environmental impact, we focus on issues that are important to local and global sustainability, that we have a significant impact on, and that cover the majority of our impact. For us, these issues are greenhouse gas emissions, water use, paper use, and solid waste generation. Our impact in each of these areas is described below.

Our environmental impact reporting follows standard disclosures from the Global Reporting Initiative's Sustainability Reporting Guidelines [1]. Our greenhouse gas assessment follows the World Resources Institute's Greenhouse Gas Protocol Corporate Accounting and Reporting Standard, Revised Edition [2]. Our balance sheet greenhouse gas assessment follows the PCAF Global GHG Accounting and Reporting Standard for the Financial Industry [3]. Details of our assessment methodology and complete disclosures can be found in the technical appendix.

Greenhouse Gas Emissions (GRI 103)

Clearwater is responsible for our Scope 1 (direct) and Scope 2 (energy Indirect) emissions. We also chose to measure some Scope 3 emissions that we believe can be influenced by management decisions. Notably, this includes the GHG impact of our balance sheet (Scope 3, Chapter 15). Because the greenhouse gas impact of our balance sheet is much larger than our operational impact, it is described separately.

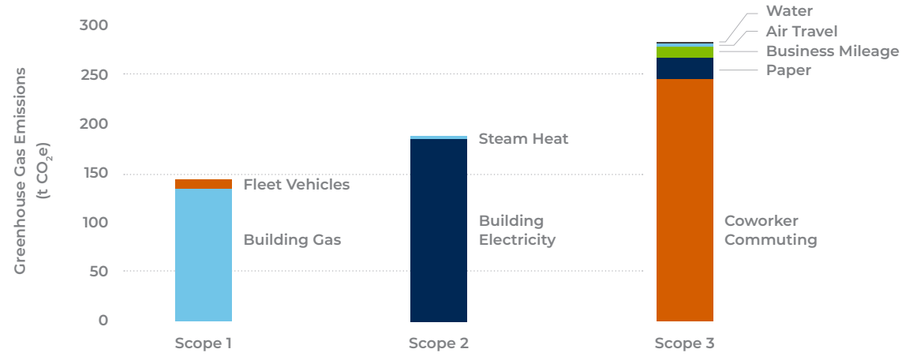
Operational Greenhouse Gas Emissions

Overall, our Scope 1 and 2 GHG emissions decreased by 55.6 metric tons (t) of CO_2e, or 17%, from 2020 to 2021. This was driven mainly by reductions in building electricity use (42% of reduction) and building natural gas use (55% of reduction). In 2021 we installed 90 kW of additional solar photovoltaic capacity, bringing our total to 150.5 kW. The reduction in purchased electricity matches the expected production from the increased solar capacity. The reduction in building gas use appears to be the result of milder temperatures during the heating seasons in calendar year 2021.

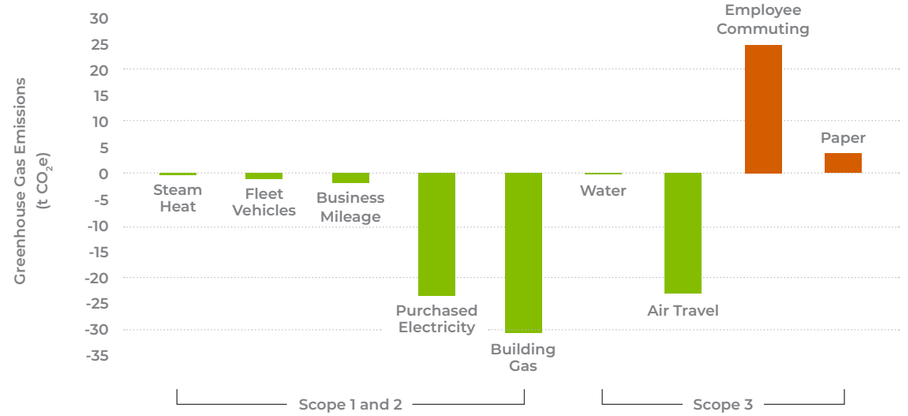
Operational Scope 3 emissions increased by 3.0 t CO_2e, or 1%, from 2020 to 2021. A substantial reduction in emissions from corporate air travel was offset by a roughly equivalent increase by coworker commuting. Other operational Scope 3 emissions were essentially unchanged.

Clearwater offset our 2021 Scope 1 and 2 emissions using purchased credits generated by a partnership with the Missoula Housing Authority and Climate Smart Missoula. Clearwater funded energy efficiency improvements in an affordable housing development owned and operated by the Missoula Housing Authority in exchange for the rights to the reduced greenhouse gas emissions from the more efficient building systems [4].

OPERATIONAL GREENHOUSE GAS EMISSIONS, 2021



CHANGE IN OPERATIONAL SCOPE EMISSIONS, 2020 TO 2021



OPERATIONAL GREENHOUSE GAS EMISSIONS

		2017	2018	2019	2020	2021	YOY Change
Scope 1	(t CO_2e)	190	202	236	177	145	-91
Scope 2	(t CO_2e)	238	214	220	212	188	-32
Scope 3 - Operational	(t CO_2e)	273	306	284	280	283	0
Scope 3 - Balance Sheet	-	-	-	-	-	-	-
Total GHG emissions	**(t CO_2e)**	**701**	**722**	**740**	**669**	**617**	**-123**
Emissions per employee (FTE)	(kg CO_2e)	4,900	4,608	4,767	4,210	3,634	-1,133
Emissions per member	(kg CO_2e)	14.3	14.4	14.5	12.8	11.3	-3.3

Balance Sheet Greenhouse Gas Emissions

We assessed the greenhouse impact of our balance sheet using the Partnership for Carbon Accounting Financials (PCAF) framework [3]. At year-end 2021, our balance sheet was $874 million, of which $591 million were covered by the PCAF methodology (many types of consumer loans are currently not covered by the standard). We were able to assess $539 million, or 62% of our total balance sheet and 91% of assets covered by the standard. The details of the asset class definitions and calculation methods are given in the technical appendix.

Our balance sheet greenhouse gas intensity declined by 7.8 t CO_2e per million dollars, or 12.7%, from 2020 to 2021. Between 2021 we added a substantial amount of residential mortgage assets to the balance sheet. This asset class has the lowest emissions intensity (t CO_2e / $ million), which drove down our balance sheet emissions intensity.

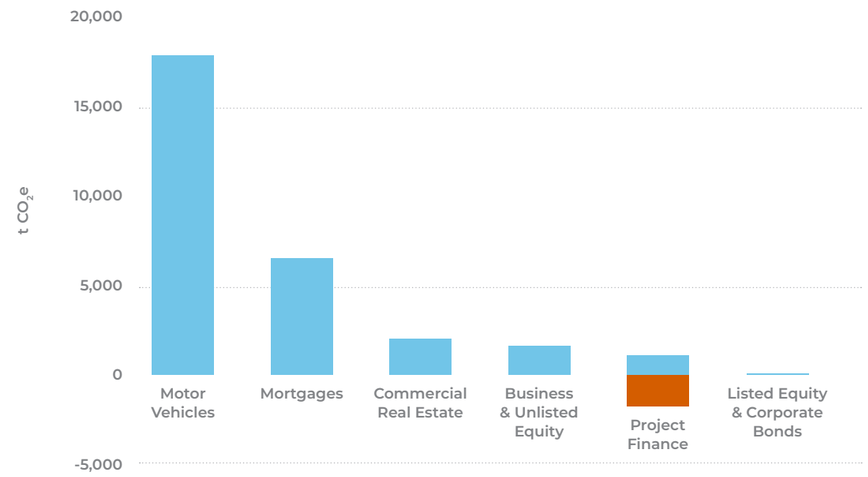
BALANCE SHEET GREENHOUSE GAS EMISSIONS

		2020	2021	YOY Change
Total balance sheet assets	(million $)	753	874	122
Assets covered by PCAF	(million $)	549	591	42
Assets assessed	(million $)	502	539	37
Total GHG	(t CO_2e)	30,735	28,880	-1,855
% of total assets assessed	(%)	67%	62%	-5%
% of covered assets assessed	(%)	91%	91%	0%
GHG intensity	(t CO_2e /million $)	61.2	53.6	-7.7
Weighted average DQ score	(1=highest; 5=lowest)	4.09	4.02	-0.07

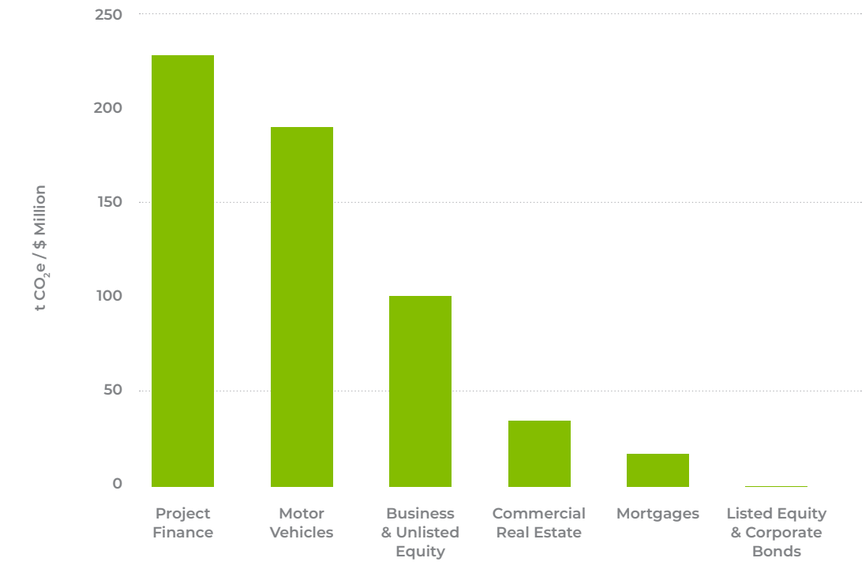
BALANCE SHEET GREENHOUSE GAS EMISSIONS BY ASSET CLASS, 2021

Asset Class	Assets In Class ($ million)	% of Assets in Class Assessed (%)	Total Scope 1 & 2 Emissions (t CO_2e)	Total Scope 3 Emissions (t CO_2e)	Emissions Intensity (t CO_2e / $ million)	Weighted Data Quality (1=best; 5=worst)	Avoided Emissions (t CO_2e)
Motor Vehicles	95	99%	17,774	-	189	2.1	0
Mortgages	371	100%	6,468	-	17	4.4	0
Commercial Real Estate	105	53%	1,980	-	36	4.4	0
Business & Unlisted Equity	45	35%	1,569	-	100	4.0	0
Project Finance	5	100%	1,027	-	226	5.0	-1,789
Listed Equity and Corporate Bonds	0	100%	0	-	0	0.0	0

BALANCE SHEET GREENHOUSE GAS EMISSIONS BY ASSET CLASS



BALANCE SHEET GREENHOUSE GAS EMISSIONS INTENSITY BY ASSET CLASS



Water (GRI 303)

Our overall water use increased 6.0% from 2020 to 2021. A substantial decrease in domestic water use was offset by a larger increase in irrigation use. We have only been metering our largest water (irrigation at our headquarters campus) since 2020, so multi-year comparisons are difficult, but overall water use appears to be generally stable over time.

TOTAL WATER USE

		2017	2018	2019	2020	2021	YOY Change
Domestic use	(gal)	517,206	370,282	623,224	370,654	301,182	-69,472
Irrigation	(gal)	3,187,440[a]	3,510,975[a]	1,351,255[a]	3,270,545	3,571,486	300,941
Total use	**(gal)**	**3,704,647[a]**	**3,881,256[a]**	**1,954,891[a]**	**3,641,199**	**3,872,668**	**231,469**
Total use per employee (FTE)	**(gal)**	**25,907**	**24,761**	**19,992**	**22,901**	**22,821**	**-80**

[a] Prior to 2020, a portion of our irrigation use was estimated.

WATER WITHDRAWAL BY SOURCE

Most Clearwater facilities are served by municipal supply. The exception is irrigation at our headquarters, which is drawn from on-site wells.

Domestic use		**2021**
Municipal supply	(gal)	1,060,747
On-site well	(gal)	2,811,921
All other sources		
	(gal)	0

Paper (GRI 301)

Paper Use

Paper use is reported here as total recycled and non-recycled content. Recycled content includes both pre- and post-consumer material.

Paper use increased 17% from 2020 to 2021. Total paper use continues to be challenging to measure precisely, so some of this increase may be the result of measurement error. In addition, 2021 saw some coworkers returning to the office as the COVID-19 pandemic eased.

TOTAL PAPER USE

		2017	2018	2019	2020	2021	YOY Change
Recycled content	(lbs)	5,053	5,700	7,921	5,018	6,244	1,226
non-recycled content	(lbs)	22,320	17,192	25,522	11,248	13,445	2,197
% content recycled	%	18%	25%	24%	31%	32%	1%
Total paper use	**(lbs)**	**27,373**	**22,892**	**33,443**	**16,266**	**19,689**	**3,423**
Total paper use per employee (FTE)	**(lbs)**	**191**	**146**	**215**	**102**	**116**	**20**
Total paper use per member	**(lbs)**	**0.558**	**0.457**	**0.657**	**0.310**	**0.360**	**0.063**

Solid Waste (GRI 306)

Clearwater's solid waste production increased 3.1% and our percentage diverted from the landfill decreased by 0.3% from 2020 to 2021. Measurement of waste generation continues to be challenging, and this change is within the error inherent in the measurement technique.

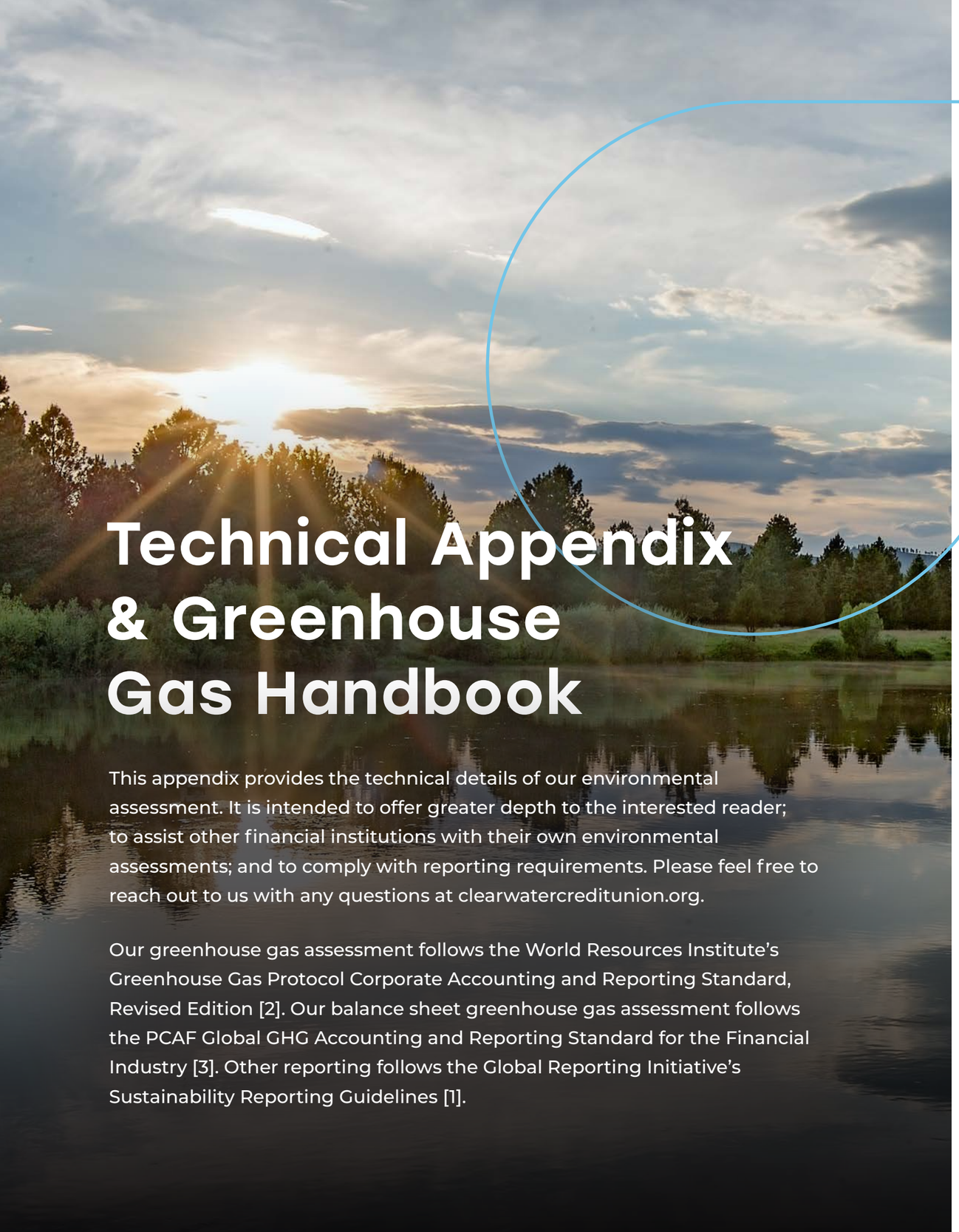
SOLID WASTE GENERATED

		2017	2018	2019	2020	2021	YOY Change
Landfill waste	(lbs)	69,637	69,637	60,190	69,637	71,444	1,807
Recycling	(lbs)	19,981	19,981	21,131	19,981	21,275	1,294
Compost	(lbs)	11,261	11,261	11,261	11,261	11,261	0
Total solid waste	(lbs)	100,879	100,879	92,582	100,879	103,980	3,101
Percent waste diverted from landfill	**%**	**31.0%**	**0**	**35.0%**	**31.0%**	**31.3%**	**0.3%**
Total solid waste per employee (FTE)	**(lbs)**	**634**	**634**	**596**	**634**	**613**	**-22**
Landfill waste per employee (FTE)	**(lbs)**	**438**	**438**	**388**	**438**	**421**	**-17**

**The 2017 waste audit was actually conducted in early 2018 and those results were used for both 2017 and 2018.*

Conclusion

Environmental sustainability is an expression of Clearwater's core values – cooperative ownership, inclusion, empowerment, and impact. We are pleased to report largely positive trends in our environmental performance, including a measurable reduction in our operational greenhouse gas emissions as the result of an investment in solar power generation. Going forward we will continue working to find cost-effective ways to reduce our environmental impact, expanding our financing of sustainability projects, and improving our assessment methodology. We hope to inspire other financial institutions to do the same.



Technical Appendix & Greenhouse Gas Handbook

This appendix provides the technical details of our environmental assessment. It is intended to offer greater depth to the interested reader; to assist other financial institutions with their own environmental assessments; and to comply with reporting requirements. Please feel free to reach out to us with any questions at clearwatercreditunion.org.

Our greenhouse gas assessment follows the World Resources Institute's Greenhouse Gas Protocol Corporate Accounting and Reporting Standard, Revised Edition [2]. Our balance sheet greenhouse gas assessment follows the PCAF Global GHG Accounting and Reporting Standard for the Financial Industry [3]. Other reporting follows the Global Reporting Initiative's Sustainability Reporting Guidelines [1].

Description of the Company

Clearwater Credit Union is a member-owned, not-for-profit financial cooperative headquartered in Missoula, Montana. Founded in 1956 as a policemen's cooperative credit union, Clearwater has grown to serve 54,633 members with a balance sheet of $874,473,613 at year-end 2021. We serve anyone who lives, works, worships, studies, or participates in an association headquartered in the 20 westernmost counties of western Montana. At year-end 2021 Clearwater had 169.7 full-time equivalent positions, operated 7 retail branches, and occupied 6 owned buildings and two leased locations.

Reporting Period

The period covered by this report is 1/1/2021 through 12/31/2021.

Organizational boundary

Clearwater owns and fully occupies all of our facilities with the exception of two leased branches and has no subsidiaries or equity shares in other organizations. Therefore, we selected the operational control approach to set organizational and operational boundaries for this assessment. Under this approach we will report all greenhouse gas emissions for organizations and operations that we have direct operational control over.

To account for emissions from leased space we followed GHG Protocol Appendix F and included emissions from on-site natural gas combustion in scope 1 emissions and purchased electricity in Scope 2 emissions. *No sources, facilities, or operations were excluded.*

Scope 1 *(Direct Emissions)*

As a financial institution, Clearwater has few sources of direct emissions. These sources are: (1) on-site combustion of natural gas for space and water heating; (2) operation of a small vehicle fleet.

Scope 2 *(Energy Indirect)*

Energy indirect emissions result from the production of electricity purchased by Clearwater and steam heat used at Clearwater's University Center branch.

Scope 3 *(Other Indirect)*

Scope 3 emissions are those that result from business operations but are not covered under Scopes 1 & 2. Clearwater is reporting scope 3 emissions from activities that have a significant impact on total GHG emissions and are potentially responsive to management activities. We assessed the greenhouse gas impact of our balance sheet (Scope 3, chapter 15) using the Platform for Carbon Accounting Financials (PCAF) methodology. The Scope 3 emissions sources reported here are: corporate air travel, business travel in non-fleet vehicles, water use, paper use, employee commuting, and balance sheet assets.

Methodology

Due to the nature of Clearwater's operations, most emissions cannot be measured directly. Instead, emissions were estimated for each source using the following model:

EMISSIONS = ACTIVITY LEVEL x EMISSIONS FACTOR

The units and sources of the activity levels and emission factors are described below.

Natural Gas Combustion

Activity level

Natural gas use is metered at all Clearwater facilities. In the case of the two leased spaces, Clearwater's share of the total building consumption was calculated on the basis of proportional floor space.

Emission factors

Emission factors used were from the U.S. EPA Emission Factors for Greenhouse Gas Inventories [5].

Fleet Vehicle Use

Activity Level

Fleet vehicle use for the reporting period was measured directly in miles. In some cases, interpolation between recorded services was required to match vehicle mileage to the reporting period.

Emission factors

Emissions were calculated for vehicle-miles for each class of vehicle (light truck and passenger car). Emission factors used were from the U.S. EPA Emission Factors for Greenhouse Gas Inventories [5]. Note that the U.S. EPA class "passenger car" includes "passenger cars, minivans, SUVs, and small pickup trucks (vehicles with wheelbase less than 121 inches)." The U.S. EPA class "light truck" includes "full-size pickup trucks, full-size vans, and extended-length SUVs (vehicles with wheelbase greater than 121 inches)."

Building Electricity Use

Activity Level

Electricity use is metered at all Clearwater facilities, including leased space.

Emission factors

Emissions were calculated per kWh using U.S. EPA eGRID total production emission factors for the Northwest Power Pool (NWPP) subgrid from the U.S. EPA Emission Factors for Greenhouse Gas Inventories [5].

Steam Heat

Activity level

Steam heat is used only at Clearwater's leased University branch. In this case, Clearwater's share of the total building consumption was calculated on the basis of proportional floor space.

Emission factors

Emission factors used were from U.S. EPA Emission Factors for Greenhouse Gas Inventories [5].

Corporate Air Travel

Activity Level

Origins, intermediate stops, and destinations for all corporate air travel were collected. Distances between airports were calculated along great circle routes and an additional 9% was added to account for route deviations and airport traffic control patterns. Flight segments were then classified as short-, medium-, and long-haul following U.S. EPA emissions factor categories (<300 miles, ≥300 and <2,300 miles, and ≥2,300 miles, respectively).

Emission factors

Emissions were calculated per passenger-mile for each of the three length categories (short-, medium-, and long-haul) using U.S. EPA Emission Factors for Greenhouse Gas Inventories [5]. Recognizing that emissions from aviation have an enhanced radiative forcing effect on the atmosphere, emissions from aviation were multiplied by a radiative forcing coefficient of 2 [6].

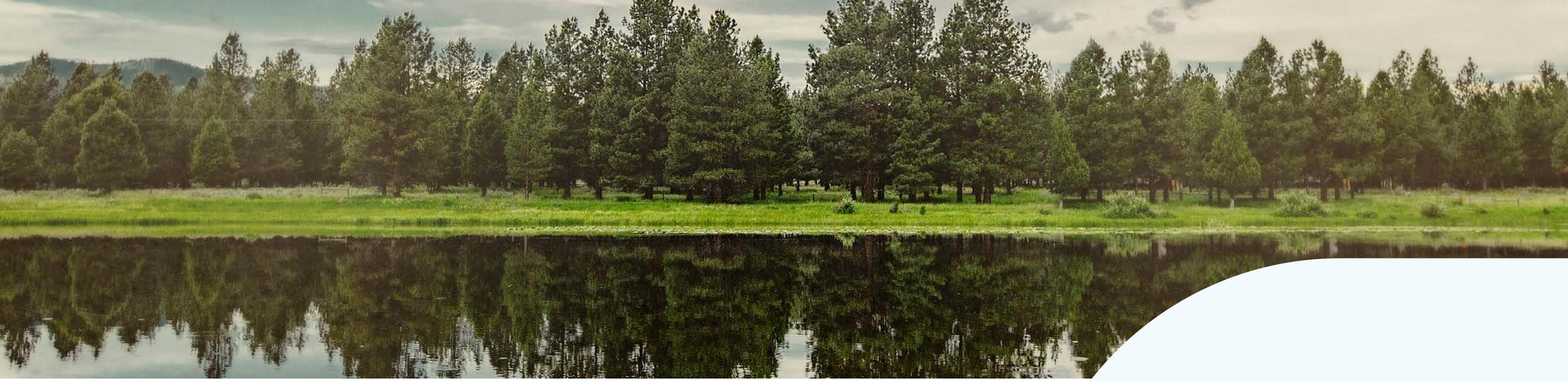
Business Travel in Non-owned Vehicles

Activity Level

Business travel in non-owned vehicles took place almost entirely in employees' personal vehicles. Total miles traveled were collected from accounting entries. Vehicle class is not recorded, so vehicle-miles are assumed to be 75% in passenger cars and 25% in light trucks (see note in emission factors about vehicle classes).

Emission factors

Emissions were calculated using U.S. EPA Emission Factors for Greenhouse Gas Inventories [5]. Note that the U.S. EPA class "passenger car" includes "passenger cars, minivans, SUVs, and small pickup trucks (vehicles with wheelbase less than 121 inches)." The U.S. EPA class "light truck" includes "full-size pickup trucks, full-size vans, and extended-length SUVs (vehicles with wheelbase greater than 121 inches)."



Paper Use

Activity Level

Clearwater uses a wide variety of paper from several sources and total paper use is necessarily an estimate with significant uncertainty. Efforts to quantify paper use focused on the major categories of use and most common products. It is recognized that, given the quantity and variety of paper products used, not all paper use will be captured. A simplifying assumption used here is that paper used during the reporting period is equivalent to paper ordered during the reporting period.

Generally speaking, paper use is recorded as quantity of products, which must then be converted to weight. This can be accomplished in four ways, listed here in decreasing order of preference: (1) Shipping weights determined from product specifications; (2) unit weights determined from product dimensions and paper specification weights[1]; (3) paper products may be subsampled and directly weighed; (4) estimated using fixed conversion factors.

As described in emission factors (below), paper is separated into total weight of recycled (pre- and post-consumer content) and non-recycled content by multiplying the total weight of each particular paper product by it recycled content percentage:

RECYCLED CONTENT = TOTAL WEIGHT x % RECYCLED CONTENT

Where the recycled percentage is not known, it was assumed to be zero.

[1] *See, for example, https://www.neenahpaper.com/resources/aboutpaper/basisweights*

Emission factors

Environmental impact estimates were made using the Environmental Paper Network Paper Calculator Version 3.2.1. For more information visit www.papercalculator.org. It was determined that GHG emissions were a perfect linear function of recycled percentage. As a result, paper can be aggregated into total recycled content (100% recycled) and total non-recycled content (0% recycled) using the formula in activity level, above. The emission factors used were for uncoated groundwood for uncoated freesheet. Note that the emission factors provided by the Environmental Paper Network are lifecycle emissions, that is, they include emissions from disposal.

Water Use

Activity level

Water use at Clearwater falls into two categories: domestic (i.e. facilities use) and irrigation. Water use can also be separated by source: municipal water supplies or groundwater wells.

Most Clearwater facilities use metered municipal water supplies. In the case of our leased locations, Clearwater's water use was calculated from the building total on the basis of proportional floor area. Most facilities also had separate meters for irrigation supply. In the case that a building had a single meter for domestic and irrigation use, the domestic use was estimated by averaging the use over the winter months when no irrigation was taking place, then subtracting this value from the summer months to calculate irrigation use.

Emission factors

For this assessment, emission factors for municipal supply and wastewater treatment were taken from the City of Missoula's GHG inventory [7]. Those values, in turn, were the result of detailed calculations following ICLEI U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions [8].

Employee Commuting

Activity Level

Employee commuting emissions were calculated using a survey of annual commuting behavior. The survey asks:

- How many days per week do you work?
- How far do live from your office?
- Is your primary vehicle:
  - Gas/diesel?
  - Hybrid?
  - Full electric?
- In an average week, how many days do you travel to work by:
  - Driving alone?
  - Carpooling?
  - Taking the bus?
  - Riding a bike/walking?
  - Working from home?
  - Any other notes?

From these responses, the total miles to work can be calculated. Emission factors used were from the U.S. EPA Emission Factors for Greenhouse Gas Inventories [5]. As elsewhere, vehicle-miles were assumed to be split 75% passenger car, 25% light truck. Hybrids and carpooling were assumed to have ½ the emissions of passenger cars per occupant-mile. Electric vehicle miles were converted to kWh at a rate of 0.346 kWh/vehicle-mile, then kWh converted to emissions using the same emissions factors as building electricity use. Total weekly commuting emissions as surveyed were converted to per-FTE emissions, then multiplied by total FTE and 50 weeks to calculate total annual commuting emissions.

Solid Waste

Solid waste is not included in our greenhouse gas inventory, but the activity level estimation method is presented here for reference.

Activity Level

Very little data is available for solid waste generation. Each facility is contracted for regular pickup of a fixed size container, but there is no data on weight or % full of each container. To estimate annual weight, the average fullness of the containers was estimated visually over several weeks, and a density coefficient applied to convert volume to weight. There is considerable uncertainty in this method and in the resulting estimates of total weight of solid waste.

All conversion factors are from U.S. EPA Volume-to-Weight conversion factors [9].

Balance Sheet Greenhouse Gasses

We assessed the greenhouse gas impact of our balance sheet assets using the Platform for Carbon Accounting Financials methodology (PCAF). This is a methodology specifically developed for financial institutions to perform these calculations. The standard is designed to fit into the World Resources Institute's GHG Protocol Corporate Accounting and Reporting Standard, Revised Edition as Scope 3, Chapter 15 emissions and shares a number of features, but it is essentially its own method. As such, we describe our approach here.

The PCAF standard currently covers six asset classes: Business Loans and Unlisted Equity, Commercial Real Estate, Listed Equity and Corporate Bonds, Mortgages, Motor Vehicles, and Project Finance. These categories as defined in the standard likely do not align perfectly with the categorization used by the institution. For example, PCAF would categorize a loan to a business for a truck as a motor vehicle loan. Throughout this appendix we will refer to "accounting classifications" to describe how we organize our balance sheet and "asset class[es]" to describe how loans are organized for PCAF analysis.

Throughout our analysis we used emission factors from the PCAF emission factors database. This ensures compatibility with other institutions, traceability of the factors, and relieves us of the burden of developing the factors on our own.

Business and Unlisted Equity

This asset class covers "all loans and lines of credit for general corporate purposes (i.e. with unknown use of proceeds as defined by the GHG Protocol) to businesses, nonprofits, and any

other structure or organization that are not traded on the market and are on the balance sheet of the financial institution." All of Clearwater's loans in this asset class were in-house.

We first identified business loans using our accounting classification, then removed loans with known business purposes that would put them in another PCAF asset class (e.g. vehicle or real estate purchases). We then selected those loans for which the business North American Industry Classification System (NAICS) code was available (roughly 40% of total portfolio balance). For the majority of our loans, we did not have the business total value (equity + debt). In these cases, the emission factor was from the PCAF database and NAICS-specific emissions per dollar financed and the attribution factor was simply 1. For loans where we did know the business revenue, the emission factor used was NAICS-specific per $ revenue and the attribution factor was the loan balance outstanding divided by the business revenue.

Commercial Real Estate

This asset class covers on-balance sheet loans for the purchase and refinance of commercial real estate, including multi-family housing (> 4 units) and on-balance sheet investments. Clearwater's Commercial Real Estate (CRE) assets were of three types: in-house loans, loan participations, and investments.

The in-house loans were identified in our business portfolio by the NAICS industry classification as "Real Estate, Rental, and Leasing." Details on the building type (to match PCAF database categories), size (where available), and value at origination were obtained by manually reading appraisal documents for the loans. The emission factors used were from the PCAF database and were state and building type specific. Per-area emission factors were used where the building size was available, per-unit emission factors where it was not. The attribution factor was calculated as the outstanding loan balance divided by the total value at origination.

Clearwater had a single CRE loan participation. Calculation of the emissions were similar to those for the in-house loans.

Clearwater's CRE investments were in the form of commercial loan backed securities and made up a significant portion (~67%) of our CRE asset class. To assess these loans, we first selected a random sample of the securities (roughly 16% of the portfolio by dollar amount) and requested detailed loan records from our broker. These records provided the state the building was located in, the building type, the number of units, the appraised value at origination, the balance outstanding, and the portion of the loan owned by Clearwater. These were used to calculate the financed emissions as for in-house CRE loans, with the additional step of including the proportion of the outstanding balance owned by Clearwater in the attribution factor. The calculated emissions intensity (t CO_2e/million $) was then applied to the remaining investment portfolio to calculate total financed emissions.

Listed Equity and Corporate Bonds

This asset class covers "all listed corporate bonds and all listed equity for general corporate purposes (i.e. unknown use of proceeds as defined by the GHG Protocol) that are traded on a market and are on the balance sheet of the financial institution." Clearwater did not have any assets that fit this definition.

Mortgages

This asset class covers on-balance sheet loans for the purchase and refinance of residential real estate, including multifamily housing with ≤4 units. The class does not include home equity loans or lines of credit. Clearwater's Mortgage asset class includes four components: in-house, participations, investments, and business loans (i.e. loans that we classify internally as business loans, but that are for the purchase or refinance of rental properties with ≤4 units).

In-house loans were identified as mortgages by Clearwater's existing accounting classification. The loan details gave the balance outstanding and the value at origination. A Python script matched the property tax IDs to the Montana cadastral database to obtain the size (square footage) of the buildings and the property class (e.g. single family home, condominium, etc...). Emission factors were from the PCAF database and were state and property class specific by area where available, and by unit if not. The attribution factor was the balance outstanding divided by the balance at origination.

Clearwater's participations were in the form of Hybrid ARMs. The loan data gave the value outstanding and value at origination. Loan data also give the state and property class, but not the building size. The emission factors were from the PCAF database and were state and property class specific per unit. The attribution factor was calculated as the outstanding loan balance divided by the total value at origination.

The business loans (loans for residential properties with ≤4 units) were identified during our assessment of the Commercial Real Estate asset class. Appraisals were reviewed by hand to determine property type and size, if available. Property tax IDs were then mapped to the Montana Cadastral database to determine building size if it was not available from the appraisal reports. The emission factors were from the PCAF database and were state and building type specific per area if available, per unit if not. The attribution factor was the value outstanding divided by the value at origination.

Clearwater's investments are in the form of purchased mortgage-backed securities and make up a significant portion of the Mortgages asset class (36%). To calculate these emissions, we sampled a portion of the securities (roughly 10% by dollar total) and requested detailed loan records from our broker. These records gave the value outstanding, the value at origination, the portion owned by Clearwater of the overall tranche, the property type, and the state. The emission factor was from the PCAF database and was state and property type specific per unit. The attribution factor was the amount outstanding times the percentage of the tranche owned by Clearwater, divided by the value at origination.

Motor Vehicles

This asset class covers on-balance sheet loans to individuals for the purchase of motor vehicles. Clearwater's loans of these type were entirely in-house and originated in both our consumer and business banking portfolios.

We identified these loans using internal loan classifications. Consumer loans were already listed in our system as motor vehicle, and our loans to businesses for motor vehicles were identified by collateral type. Internal loan data include vehicle make, model, and VIN. These VINs were matched to a National Highway Traffic Safety Administration website to procure a second set of vehicle make and model descriptions. These were then both matched to the PCAF database using a fuzzy match package in Python, and the best match was used to select the emission factor from the PCAF database. These emission factors were vehicle-specific per-year numbers. A small number of loans failed to match based on vehicle make and model, these were assigned an emission factor based on vehicle type. The attribution factor was the loan amount outstanding divided by the value at origination.

Project Finance

This asset class covers loans or equities to projects for specific purposes. Clearwater Project Finance loans were all for solar photovoltaic projects. This includes in-house loans and purchased participations.

The emission factors used were from the PCAF database and were per-dollar emissions for the NAICS code 221114. Because a per-dollar invest EF was used, the attribution factor was 1. It is worth noting that this asset class had the highest emissions intensity of all classes. This is surprising, given that these projects were exclusively solar PV installations. We are currently investigating the methodology and emission factors used to determine the cause of this result.

Clearwater also estimated the avoided emissions of these projects. To do so, we started with the outstanding amount of the loan, converted that to installed capacity using a rate of $3/Wdc for small-scale projects (<50kWdc) and $2/W for larger-scale projects. We then used the web application PVWatts (National Renewable Energy Laboratory) to determine a production factor (kWh/kWdc-year) for the system. This was used to calculate the total annual production of the system. The total annual production was then multiplied by the marginal emission factor for the eGRID subgrid where the project was located.

Base Year

The GHG Protocol requires an organization to define a base year as a point of comparison for reporting reductions, progress towards targets, and compliance with applicable reporting requirements. Clearwater has defined calendar year 2017 as its base year for our operations, and 2020 as the base year for our balance sheet emissions. 2017 was the first year an operational greenhouse gas inventory was completed. 2020 was the first year a balance sheet assessment was completed. Recalculation of base year emissions shall follow the guidance and procedures in the GHG Protocol [3]. Per GHG Protocol, base year emissions shall be recalculated in the case of:

- Acquisitions or divestments.
- Outsourcing or insourcing of emitting activities.
- Changes in calculation methodology that result in a significant impact on the base year emissions data.
- Discovery of significant errors, or a number of cumulative errors that are collectively significant.

What constitutes a significant impact on base year emissions data is left to the organization; Clearwater has set this threshold at 10% of total GHG emissions in CO_2e.

Base year recalculation is not required for:

- Organic growth or decline.
- Acquisition or insourcing of facilities that did not exist in the base year.
- Outsourcing or insourcing of scope 2 and scope 3 emissions.

Emission factors & Global Warming Potentials

EMISSION FACTORS	Activity	Gas	Units	Value	Source
	Paper - 0% recycled	Total GHG	(kg CO_2e/lbs paper)	1.271	1
	Paper - 100% recycled	Total GHG	(kg CO_2e/lbs paper)	0.801	1
	Water Supply	Total GHG	(g CO_2e/gal)	0.675	2
	Wastewater	Total GHG	(g CO_2e/gal)	1.425	2
	Air Travel - Short Haul (< 300 miles)	CO_2	(kg/passenger-mile)	0.225	3
	Air Travel - Short Haul (< 300 miles)	CH_4	(g/passenger-mile)	0.0039	3
	Air Travel - Short Haul (< 300 miles)	N_2O	(g/passenger-mile)	0.0072	3
	Air Travel - Medium Haul (>= 300 miles, < 2,300 miles)	CO_2	(kg/passenger-mile)	0.136	3
	Air Travel - Medium Haul (>= 300 miles, < 2,300 miles)	CH_4	(g/passenger-mile)	0.0006	3
	Air Travel - Medium Haul (>= 300 miles, < 2,300 miles)	N_2O	(g/passenger-mile)	0.0043	3
	Air Travel - Long Haul (>= 2,300 miles)	CO_2	(kg/passenger-mile)	0.166	3
	Air Travel - Long Haul (>= 2,300 miles)	CH_4	(g/passenger-mile)	0.0006	3
	Air Travel - Long Haul (>= 2,300 miles)	N_2O	(g/passenger-mile)	0.0053	3
	Natural Gas Fired Steam Heat	CO_2	(kg/mmBtu)	66.33	3
	Natural Gas Fired Steam Heat	CH_4	(kg/mmBtu)	1.25	3
	Natural Gas Fired Steam Heat	N_2O	(kg/mmBtu)	0.125	3
	Building gas use (Natural Gas Stationary Combustion)	CO_2	(kg/mmBtu)	53.06	3
	Building gas use (Natural Gas Stationary Combustion)	CH_4	(g/mmBtu)	1	3
	Building gas use (Natural Gas Stationary Combustion)	N_2O	(g/mmBtu)	0.1	3
	Building electricity use (NWPP Total Output)	CO_2	(lbs/MWh)	651.2	3
	Building electricity use (NWPP Total Output)	CH_4	(lbs/MWh)	0.061	3
	Building electricity use (NWPP Total Output)	N_2O	(lbs/MWh)	0.009	3
	Passenger car	CO_2	(kg/vehicle-mile)	0.343	3
	Passenger car	CH_4	(g/vehicle-mile)	0.019	3
	Passenger car	N_2O	(g/vehicle-mile)	0.011	3
	Light-duty truck	CO_2	(kg/vehicle-mile)	0.472	3
	Light-duty truck	CH_4	(g/vehicle-mile)	0.019	3
	Light-duty truck	N_2O	(g/vehicle-mile)	0.018	3
	Bus	CO_2	(kg/passenger-mile)	0.056	3
	Bus	CH_4	(g/passenger-mile)	0.0013	3
	Bus	N_2O	(g/passenger-mile)	0.0009	3
	Hybrid	CO_2	(kg/vehicle-mile)	0.1715	4
	Hybrid	CH_4	(g/vehicle-mile)	0.0095	4
	Hybrid	N_2O	(g/vehicle-mile)	0.0055	4

SOURCES *1 - Environmental Paper Network* *2 - Missoula Greenhouse Gas Emissions Inventory and Analysis, 2003-2008*
3 - EPA Emission factors for Greenhouse Inventories (2018) *4 - Custom. 1/2 EPA passenger car value.*

GLOBAL WARMING POTENTIALS

Global Warming Potential	CO_2	Mass CO_2	1	IPCC AR5, 100-year GWP without climate-carbon feedback
Global Warming Potential	CH_4	Mass CO_2	28	IPCC AR5, 100-year GWP without climate-carbon feedback
Global Warming Potential	N_2O	Mass CO_2	265	IPCC AR5, 100-year GWP without climate-carbon feedback

SOLID WASTE DENSITY FACTORS

Type	Density (lbs/yard3)	Source
Trash	138	Commercial, all waste, uncompacted.
Recycling	101.5	Containers (plastic bottles, aluminum cans, steel cans, glass bottles), corrugated containers, and paper.
Compost	396	Food waste – restaurants.

References

[1] GRI, *Consolidated Set of GRI Sustainability Reporting Standards: 2016*. 2016, The Global Reporting Initiative.

[2] WRI/WBCSD, *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)*. 2004, World Resources Institute and World Business Council for Sustainable Development.

[3] PCAF, The Global GHG Accounting and Reporting Standard for the Financial Industry, First edition. 2020.

[4] For more information, see https://www.missoulafootprintfund.org/cornerstone.html

[5] U.S. EPA, *Emission factors for Greenhouse Gas Inventories*. March 9 2018. United States Environmental Protection Agency.

[6] ESU, *Aviation and Climate Change: Best practice for calculation of the global warming potential*. 2013, ESU-services Ltd.

[7] City of Missoula, *Missoula Greenhouse Gas Emissions Inventory and Analysis, 2003-2008: Toward a Blueprint for Municipal Sustainability.* 2010, City of Missoula and University of Montana.

[8] ICLEI, *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Appendix F*. 2013, ICLEI – Local Governments for Sustainability USA.

[9] U.S. EPA, *Volume-to-Weight Conversion Factors*. 2016, United States Environmental Protection Agency Office of Resource Conservation and Recovery. Updated appendix to U.S. EPA, *Measuring Recycling: A Guide for State and Local Governments*. 2007.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