2020 Environmental Impact Assessment

clearwater
CREDIT UNION

clearwatercreditunion.org/environment

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Contents

Introduction

For all of us, 2020 was a year of challenges. The COVID-19 pandemic upended our operations as we worked to protect the health of our members and coworkers while continuing to provide financial products and services, including COVID relief programs. In-person services at our branches were significantly curtailed, and our coworkers that could work from home were encouraged to. Our team rose to these challenges, adapting to a shifting landscape and working hard to meet the needs of our members.
During this challenging year, Clearwater also maintained our commitment to environmental sustainability, delivering several notable successes:

- In 2020, our operations became carbon neutral, in part by using greenhouse gas offsets generated by funding increased energy efficiency in a local affordable housing development.
- We completed our first-ever assessment of the greenhouse gas impact of our balance sheet.
- We opened a new retail branch that is certified LEED Silver, designed to be net-zero energy, and features extensive use of reclaimed and locally produced materials.

2020 Environmental Impact Assessment

This report details Clearwater Credit Union's environmental impact for 2020. This includes the environmental impact of our corporate operations and, for the first time, 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 production.

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 [2]. Our balance sheet greenhouse gas assessment follows the Partnership for Carbon Accounting Financials [3]. Details of our assessment methodology and complete disclosures can be found in the technical appendix.

Greenhouse Gas Emissions

Climate change is a pressing issue for Montana and the earth as a whole. Rapid, substantial, and sustained emission reductions are needed to avoid dangerous climate change. Clearwater is committed to reducing our own greenhouse gas emissions, offsetting what we can't eliminate, and financing climate change adaptation and mitigation efforts throughout our field of membership.

Clearwater has measured our operational GHG emissions since 2017. Our operational GHG emissions are important but, as a financial institution, the impact of our operations are much smaller than the impact of our balance sheet. In 2020 we measured the GHG emissions of our balance sheet for the first time.

Operational Greenhouse Gas Emissions

Clearwater's scope 1 (direct) and scope 2 (energy indirect) GHG emissions decreased by 67.2 metric tonnes (t) of CO_2e, or 17%, from 2019 to 2020. This was driven largely by a substantial reduction in building gas use, likely as a result of a warmer winter. Purchased electricity also saw a reduction, likely as a result of decreased employee occupancy due to COVID.

Our scope 3 (other indirect; excluding balance sheet) emissions declined by 3 t. Corporate air travel and paper use saw large declines, somewhat offset by an increase in employee commuting. An increase in employee commuting during COVID may seem surprising, but this can be attributed to an increase in number of employees and a change in the assessment methodology; employee commuting emissions did show a 32% reduction between pre- and during-COVID periods in 2020.

Clearwater offset our 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.

Operational Greenhouse Gas Emissions By Scope

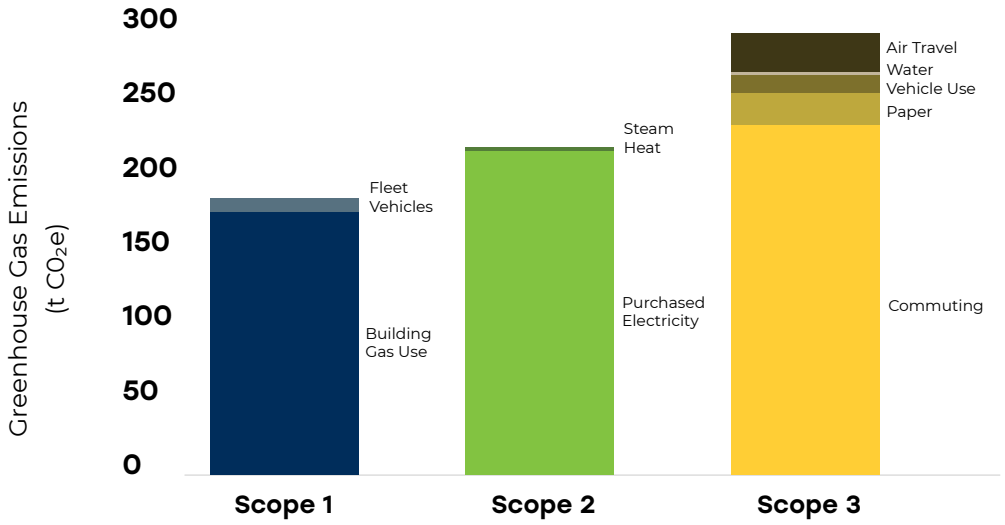

Figure 1: Emissions by Source and Scope, 2020

Year Over Year Change 2019-2020

Figure 2: Change in Emissions 2019-2020.

Summary of Emissions By Scope

		2017	2018	2019	2020	YOY Change
Scope 1	(t CO_2e)	190	202	236	177	-59
Scope 2	(t CO_2e)	238	214	220	212	-8
Scope 3	(t CO_2e)	273	306	284	280	-3
Total GHG Emissions	(t CO_2e)	701	722	740	644	-70
Emissions per Employee (FTE)	(t CO_2e)	4,900	4,608	4,767	4,051	-557
Emissions per Member	(t CO_2e)	14.29	14	15	12.29	-2

Table 1. Summary of GHG emissions by scope.

Balance Sheet Greenhouse Gas Emissions

In 2021 we assessed the greenhouse gas impact of our balance sheet for the first time, using the Partnership for Carbon Accounting Financials (PCAF) framework. PCAF is an international standard originally developed in Europe and adapted for the North American market by a working group of financial institutions including Clearwater.

Our initial assessment covered Fiscal Year 2020. At year end, our balance sheet was $753 million, of which $549 million are covered by the PCAF methodology (many types of consumer loans are currently not covered by the standard). We were able to assess $502 million, or 67% 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.

This was Clearwater's first balance sheet greenhouse gas assessment. Going forward, we will use these results and the underlying details to better understand the impact of our financed activities and how we might improve the environmental impact of our balance sheet.

Balance Sheet Greenhouse Gas Emissions

		FY 2020
Total Assets	(million $)	753
Assets Covered by PCAF	(million $)	549
Assets Assessed	(million $)	502
% of Total Assets Assessed	(%)	67%
% of Covered Assets Assessed	(%)	91%
Total GHG	(t CO_2e)	30,735
GHG Intensity	(t CO_2e/million $)	61
Weighted Average DQ Score	(1=highest; 5=lowest)	4.09

Table 2. Summary of balance sheet greehouse gas emissions, 2020.

Balance Sheet Greenhouse Gas Emissions by Asset Class

	Size	% of Class Covered	Scope 1 & Scope 2 Emissions	Scope 3 Emissions	Intensity	Data Quality
Asset Class	(million $)	(%)	(t CO_2e)	(t CO_2e)	($\frac{t\ CO_2e}{million\ \$}$)	(1=highest; 5=lowest)
Business Loans	52	39%	3,047	-	148	4.38
Commercial Real Estate	105	96%	3,246	-	32	4.66
Listed Equity & Corporate Bonds	0	100%	0	-	0	n/a
Mortgages	293	100%	2,637	-	9	4.50
Motor Vehicles	91	91%	18,700	-	211	2.02
Project Finance	8	100%	1,967	-	254	5.00

Table 3. Balance sheet greenhouse gas emissions by asset class, 2020.

Financed Avoided Emissions

	Avoided Emissions	Avoided Emissions Intensity
Asset Class	t CO_2e	t CO_2e/million $
Project Finance	-3,453	-446

Table 4. Financed avoided emissions, 2020. All of Clearwater's avoided emissions from financed solar photovoltaic projects, including in-house loans and purchased participations and investments.

Balance Sheet Greehouse Gas Emissions by Asset Class

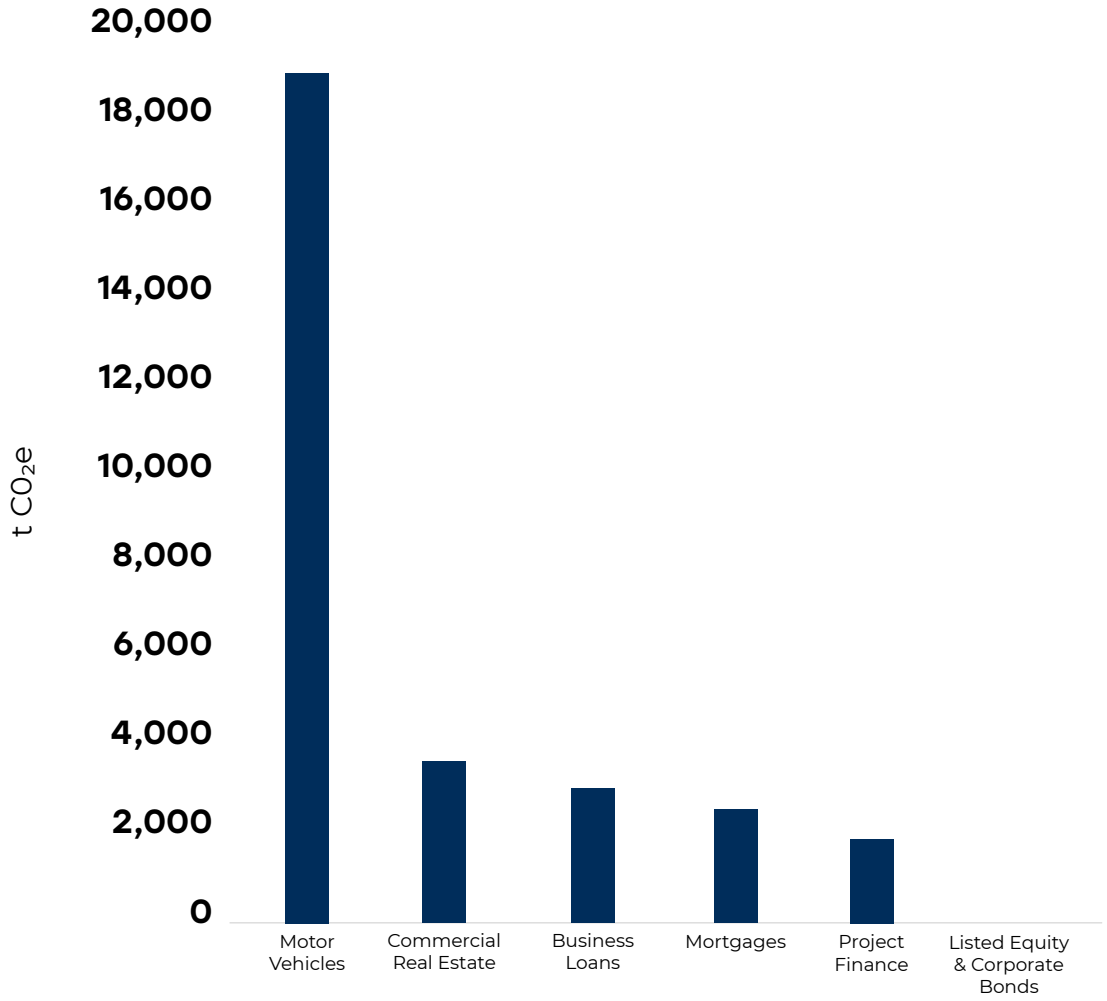

Figure 3. Balance sheet greenhouse gas emissions by asset class, 2020. Note that the Business Loans class includes only 39% of covered assets, making the total emissions for that class somewhat higher.

Balance Sheet Greenhouse Gas Emissions Intensity by Asset Class

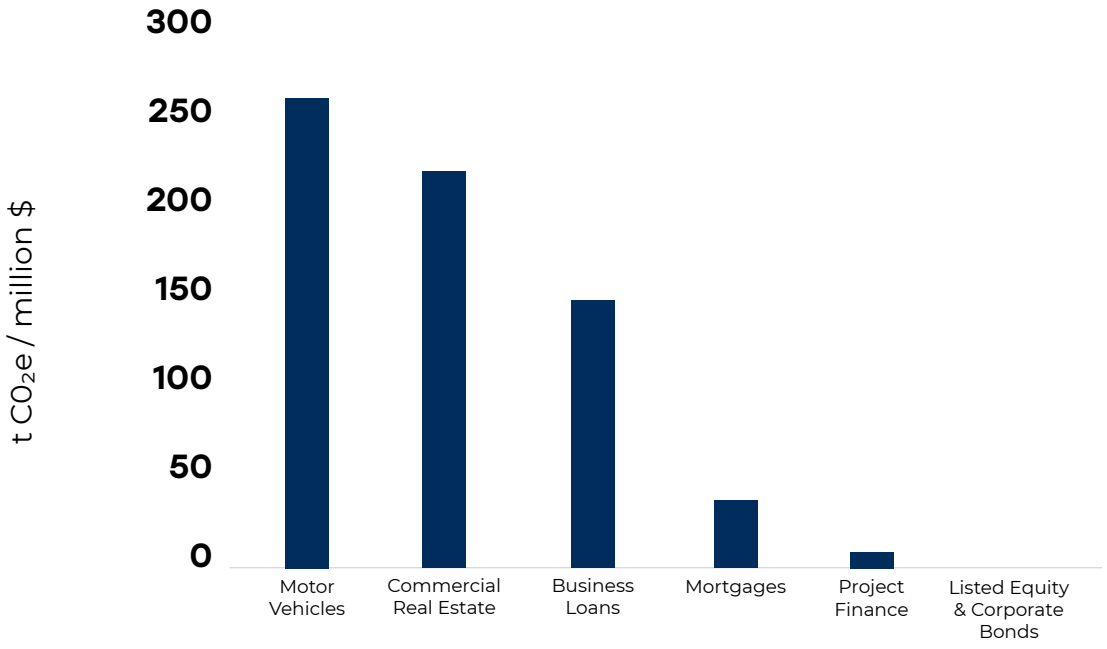

Figure 4. Balance sheet greenhouse gas emissions intensity by asset class, 2020.

Water

Water resources are a critical part of Montana's environment and economy. Healthy rivers and aquifers are the basis for our agriculture and recreation industries, and they are a key part of Montana's celebrated outdoor amenities. Clearwater is committed to monitoring our water use and using water efficiently. In 2020, we installed monitoring gauges on our previously unmonitored irrigation wells, meaning that all of our water use can now be directly measured.

Our overall water use increased significantly (86%) from 2019 to 2020. This increase was driven by a 142% increase in irrigation, which more than offset a decrease in domestic use of 41% resulting from lower occupancy due to the COVID pandemic. This increase in irrigation is attributable to several factors. Most significantly, irrigation in 2019 was much lower than normal due to construction at our headquarters campus, which is our largest user of irrigation water. Additionally, prior to 2020 we were estimating irrigation use on our largest property; a comparison or our estimated use to actual monitored use at this site in 2020 showed that the estimated use was 36% lower than actual, suggesting that our prior estimates may have been low as well. Nevertheless, our total, measured 2020 water use was in line with estimates of our 2017 and 2018 use.

		2017	2018	2019	2020	YOY Change
Domestic Use	(gal)	517,206	370,282	623,224	**370,654**	-252,570
Irrigation	(gal)	3,187,440[a]	3,510,975[a]	1,351,255[a]	**3,270,545**	1,919,290
Total Use	(gal)	3,704,647[a]	3,881,256[a]	1,954,891[a]	**3,641,199**	1,686,308
Total Use Per Employee (FTE)	(gal)	25,907	24,761	19,992	**22,901**	2,909

Table 5. Total water use., 2017-2020.
[a]Prior to 2020, a portion of our irrigation use was estimated.

Water Withdrawal by Source

Clearwater facilities have four sources of water: City of Missoula municipal supply, Town of Stevensville municipal supply, Butte-Silverbow municipal supply, and on-site wells.

Groundwater		**2020**
Municipal Supply	(gal)	1,074,904
On-Site Wells	(gal)	2,566,295
All Other Sources		
	(gal)	0

Table 6. Water withdrawal by source.

Paper

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 declined 51% from 2019 to 2020. This can be attributed to several factors. First, our paper use in 2019 was unusually high. In 2019 we changed our corporate name from Missoula Federal Credit Union to Clearwater. As such, we ordered an unusually large amount of paper with our new name. Second, due to COVID we transitioned many employees to working from home and the business community in general also became more remote and digitally focused. Finally, we continued to encourage members towards digital statements.

Total Paper Use

		2017	2018	2019	2020	YOY Change
Recycled Content	(lbs)	5,053	5,700	7,921	5,018	-2,902
Non-Recycled Content	(lbs)	22,320	17,192	25,522	11,248	-14,274
% Recycled Content	%	18%	25%	24%	31%	7%
Total Paper Use	(lbs)	27,373	22,892	33,443	16,266	-17,177
Total Paper Use Per Employee (FTE)	(lbs)	191	146	215	102	-113
Total Paper Use Per Member	(lbs)	0.558	0.457	0.657	0.310	-0.347

Table 7. Total paper use, 2020.

Solid Waste

Clearwater's solid waste production increased 9% from 2019 to 2020 and our percentage diverted from the landfill decreased by 4 percentage points. This was unexpected, as we had significantly fewer employees in the office for most of the year. Measurement of our solid waste generation continues to be difficult and the changes may, to some extent, represent variability in our measurement method.

Solid Waste Generated

		2017	2018*	2019	2020	YOY Change
Landfill Waste	(lbs)	46,265	46,265	60,190	69,637	9,447
Recycling	(lbs)	10.150	10,150	21,131	19,981	-1,150
Compost	(lbs)	5,386	5,386	11,261	11,261	0
Total Solid Waste	(lbs)	61,800	61,800	92,582	100,879	8,297
Percent Waste Diverted From Landfill	%	25.1%	25.1%	35%	31.0%	-4.0%
Total Solid Waste per Employee (FTE)	(lbs)	432	432	596	634	38
Landfill Waste per Employee (FTE)	(lbs)	324	324	388	438	50

Table 8. Solid waste generation, 2020.

**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, our first-ever balance sheet greenhouse gas assessment, and continued improvements in the sustainability of our operations. Going forward we will continue working to find cost-effective ways to reduce our environmental impact, expand our financing of sustainability projects, and improve 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 Clearwater's 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.

Clearwater's greenhouse gas assessment follows the World Resources Institute's Greenhouse Gas Protocol Corporate Accounting and Reporting Standard, Revised Edition [2]. The 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 and serving Western Montana. Founded in 1956 as a policemen's cooperative credit union, Clearwater has grown to serve over 52,000 members with a balance sheet of $753 million at year-end 2020. At year-end 2020 Clearwater had 159 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 1/1/2020 through 12/31/2020.

Organizational Boundary

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

Emissionas from leased space were accounted for following the 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)

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 resulting 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 In 2020 we conducted our first assessment of 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 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 in the following pages.

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 US EPA Emission Factors for Greenhouse Gas Inventories [4].

Fleet Vehicle Use

Activity Level

Fleet vehicle use for the reporting period was measured directly in miles. In some cases, interpolation between recorded servicing 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 US EPA Emission Factors for Greenhouse Gas Inventories [4]. Note that the US EPA class "passenger car" includes "passenger cars, minivans, SUVs, and small pickup trucks (vehicles with wheelbase less than 121 inches)." The US EPA class "light truck" includes "full-size pickup trucks, full-size vans, and extended-length SUVs (vehicles with wheelbase greater than 121 inches)."

Building Electrical Use

Activity Level

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

Emission Factors

Emissions were calculated per kWh using US EPA eGRID total production emission factors for the Northwest Power Pool (NWPP) subgrid from the US EPA Emission Factors for Greenhouse Gas Inventories [4].

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 US EPA Emission Factors for Greenhouse Gas Inventories [4].

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 US EPA emissions factor categories (<300 miles, ≥300 and <2300 miles, and ≥2300 miles, respectively).

Emission Factors

Emissions were calculated per passenger-mile for each of the three length categories (short-, medium-, and long-haul) using US EPA Emission Factors for Greenhouse Gas Inventories [4]. 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 [5,6].

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.

Emission Factors

Emissions were calculated using US EPA Emission Factors for Greenhouse Gas Inventories [4]. Note that the US EPA class "passenger car" includes "passenger cars, minivans, SUVs, and small pickup trucks (vehicles with wheelbase less than 121 inches)." The US 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 can be estimated as 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 (note that the system for describing paper weights--e.g. 20# bond, 100# cover--is non-intuitive and must be understood prior to this calculation); (3) paper products may be subsampled and directly weighed; (4) estimated using fixed conversion factors.

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 its recycled content percentage:

$$recycled\ content = total\ weight \times \%\ recycled\ content$$

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

Emission Factors

Environmental impact estimates were made using the Environmental Paper Network Paper Calculator Version 3.2.1. 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 2020, we installed meters on our 2 on-site irregation wells, meaning that all water use is now measured. 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 US 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 US EPA Emission Factors for Greenhouse Gas Inventories [4]. As elsewhere, vehicle-miles were assumed to be split 75% passenger car, 25% light truck. Hybrids and carpooling were assumed to have half 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 for 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. In the case of 2020, the pre-COVID and during-COVID values were combined into a weighted average assuming one fourth of the year was pre-COVID.

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 are not data on weight or % full of each container. To estimate annual weight, the average fullness of the containers was estimated visually over 4 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 US EPA Volume-to-Weight conversion factors [9].

Balance Sheet Greenhouse Gasses

The balance sheet greenhouse gas impact was assessed 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.

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. This appendix uses the term "accounting classification" to describe how assets are characterized on Clearwater's balance sheet and "asset classe[es]" to describe how loans are characterized for PCAF anaylsis.

This analysis exclusively used emission factors from the PCAF emission factors database. This ensures compatibility with other institutions, traceability of the factors, and avoids the need to develop factors independently.

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.

First, business loans were identified from their accounting classification. Then, loans with known business purposes that put them in another PCAF asset class (e.g. vehicle or real estate purchases) were removed. Loans were then selected 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, the information available did not include the business total value (equity + debt). In these cases, the emission factors were from the PCAF database and were NAICS-specific emissions per dollar financed. The attribution factor was simply 1. For loans the business revenue was known, 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 as business loans (accounting classification) where 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 the CRE asset class. To assess these loans, first a random sample of the securities was selected (roughly 16% of the portfolio by dollar amount) and detailed loan records for these securities were requested from the selling 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 & 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 loans, loan participations, investments, and business loans (i.e. loans that with an accounting calssification of business loans, but that are for the purchase or refinance of residential 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. Property tax IDs were matched to the Montana cadastral database to obtain the size 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 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, a portion of the securities were sampled (roughly 10% by dollar total) and were detailed loan records were requested from the selling 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.

These loans were identified using internal loan classifications. Consumer motor vehicle loans were marked by their accounting classification, and 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 (Levenshtein distance implemented 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's loans in this asset class were all for solar photovoltaic projects and were either 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 (254 t CO_2e/million $),

higher even than motor vehicles (211 t CO_2e/million $). This is surprising, given that these projects were exclusively solar PV installations.

Clearwater also estimated the avoided emissions of these projects. To do so, the outstanding amount of the loan was converted to installed capacity using a rate of $\$3/W_{dc}$ for small-scale projects ($<50kW_{dc}$) and $\$2/W_{dc}$ for larger-scale projects. The web application PVWatts (National Renewable Energy Laboratory) was used to determine a production factor (kWh/kW_{dc}-year) for the system. This was then 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 to determin the avoided emissions. The attribution factor was 1.

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 operations and 2020 as the base year for 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 [2]. 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

Emissions Factors

Activity	Gas	Units	Value	Source
Paper - 0% Recycled	Total GHG	(kg CO_2e/lbs paper)	1.271	Evironmental Paper Network
Paper - 100% Recycled	Total GHG	(kg CO_2e/lbs paper)	0.801	Evironmental Paper Network
Water Supply	Total GHG	(g CO_2e/gal)	0.675	Missoula Greenhouse Gas Emissions Inventory & Analysis, 2003-2008
Wastewater	Total GHG	(g CO_2e/gal)	1.425	Missoula Greenhouse Gas Emissions Inventory & Analysis, 2003-2008
Air Travel - Short Haul (<300 miles)	CO_2	(kg/passenger-mile)	0.225	EPA Emission Factors for Greenhouse Inventories (2018)
Air Travel - Short Haul (<300 miles)	CH_4	(g/passenger-mile)	0.0039	EPA Emission Factors for Greenhouse Inventories (2018)
Air Travel - Short Haul (<300 miles)	N_20	(g/passenger-mile)	0.0072	EPA Emission Factors for Greenhouse Inventories (2018)
Air Travel - Medium Haul (>=300 miles, <2300 miles)	CO_2	(kg/passenger-mile)	0.136	EPA Emission Factors for Greenhouse Inventories (2018)
Air Travel - Medium Haul (>=300 miles, <2300 miles)	CH_4	(g/passenger-mile)	0.0006	EPA Emission Factors for Greenhouse Inventories (2018)
Air Travel - Medium Haul (>=300 miles, <2300 miles)	N_20	(g/passenger-mile)	0.0043	EPA Emission Factors for Greenhouse Inventories (2018)
Air Travel - Long Haul (>=2300 miles)	CO_2	(kg/passenger-mile)	0.166	EPA Emission Factors for Greenhouse Inventories (2018)
Air Travel - Long Haul (>=2300 miles)	CH_4	(g/passenger-mile)	0.0006	EPA Emission Factors for Greenhouse Inventories (2018)
Air Travel - Long Haul (>=2300 miles)	N_20	(g/passenger-mile)	0.0053	EPA Emission Factors for Greenhouse Inventories (2018)
Natural Gas Fired Steam Heat	CO_2	(kg/mmBtu)	66.33	EPA Emission Factors for Greenhouse Inventories (2018)
Natural Gas Fired Steam Heat	CH_4	(kg/mmBtu)	1.25	EPA Emission Factors for Greenhouse Inventories (2018)
Natural Gas Fired Steam Heat	N_20	(kg/mmBtu)	0.125	EPA Emission Factors for Greenhouse Inventories (2018)
Building Gas Use (Natural Gas Stationary Combustion	CO_2	(kg/mmBtu)	53.06	EPA Emission Factors for Greenhouse Inventories (2018)
Building Gas Use (Natural Gas Stationary Combustion	CH_4	(g/mmBtu)	1	EPA Emission Factors for Greenhouse Inventories (2018)
Building Gas Use (Natural Gas Stationary Combustion	N_20	(g/mmBtu)	0.1	EPA Emission Factors for Greenhouse Inventories (2018)
Building Electricity Use (NWP Total Output)	CO_2	(lbs/MWh)	651.2	EPA Emission Factors for Greenhouse Inventories (2018)
Building Electricity Use (NWP Total Output)	CH_4	(lbs/MWh)	0.061	EPA Emission Factors for Greenhouse Inventories (2018)
Building Electricity Use (NWP Total Output)	N_20	(lbs/MWh)	0.009	EPA Emission Factors for Greenhouse Inventories (2018)
Passenger Car	CO_2	(kg/vehicle-mile)	0.343	EPA Emission Factors for Greenhouse Inventories (2018)
Passenger Car	CH_4	(g/vehicle-mile)	0.019	EPA Emission Factors for Greenhouse Inventories (2018)
Passenger Car	N_20	(g/vehicle-mile)	0.011	EPA Emission Factors for Greenhouse Inventories (2018)
Light-Duty Truck	CO_2	(kg/vehicle-mile)	0.472	EPA Emission Factors for Greenhouse Inventories (2018)
Light-Duty Truck	CH_4	(g/vehicle-mile)	0.019	EPA Emission Factors for Greenhouse Inventories (2018)
Light-Duty Truck	N_20	(g/vehicle-mile)	0.018	EPA Emission Factors for Greenhouse Inventories (2018)
Bus	CO_2	(kg/vehicle-mile)	0.056	EPA Emission Factors for Greenhouse Inventories (2018)
Bus	CH_4	(g/vehicle-mile)	0.0013	EPA Emission Factors for Greenhouse Inventories (2018)
Bus	N_20	(g/vehicle-mile)	0.0009	EPA Emission Factors for Greenhouse Inventories (2018)
Hybrid	CO_2	(kg/vehicle-mile)	0.1715	Custom 1/2 EPA Passenger Car Value
Hybrid	CH_4	(g/vehicle-mile)	0.0095	Custom 1/2 EPA Passenger Car Value
Hybrid	N_20	(g/vehicle-mile)	0.0055	Custom 1/2 EPA Passenger Car Value

Emission Factors & Global Warming Potentials Cont'd

Global Warming Potentials

Global Warming Potential	CO_2	Mass CO_2	1	IPCC AR5, 100-Year GWP Without Climate-Carbon Feedback [10]
Global Warming Potential	CH_4	Mass CO_2	28	IPCC AR5, 100-Year GWP Without Climate-Carbon Feedback [10]
Global Warming Potential	N_2O	Mass CO_2	265	IPCC AR5, 100-Year GWP Without Climate-Carbon Feedback [10]

Solid Waste Density Factors

Type	Density (lbs/yard^3)	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.

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

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