

Financed emissions approach and methodology.



Table of contents

Overview of our approach to estimating financed emissions	3
Vancity's financed emissions profile (estimated).....	7
Estimated emissions by asset class.....	9
Residential mortgages.....	9
Commercial real estate	14
Operational business loans	20
Motor vehicle loans	25
Project finance	28
Liquidity investments	32
Managed client investments in listed equity	36
Note on the uncertainty of our climate data.....	39
Glossary and abbreviations.....	40

Overview of our approach to estimating financed emissions

As a financial institution our most significant impacts, including climate-related impacts, are because of the loans and investments we choose to make¹. In 2019, we publicly committed to tracking and disclosing financed emissions, and in 2021 we announced our five Climate Commitments, including a commitment to make Vancity net zero across all our mortgages and loans by 2040. This means the emissions from anything we finance will be eliminated or significantly reduced, with any remaining emissions being brought to net zero by balancing any residual greenhouse gas (GHG) emissions through the removal of an equivalent amount of GHGs from the atmosphere.

Since Vancity announced its five climate commitments, including net zero by 2040, significant work has gone into delivering on these commitments. Including publicly reporting financed emissions in our annual reports using the [Partnership for Global Accounting Financials \(PCAF\) Global GHG Accounting and Reporting Standard for Financial Institutions](#) (“the PCAF Global GHG Standard”), joining the global Net Zero Banking Alliance (NZBA) in early 2021, forming a new Climate Strategy and Performance team, and retaining a consultancy to support the development of interim climate targets. We’ve been approaching the work as follows:

1. Measure and disclose financed emissions, expanding coverage and data quality over time in line with the PCAF Global GHG Standard.
2. Establish base year data and set near-term climate targets in line with the Net Zero Banking Alliance/UNEP FI’s [Guidelines for Climate Target Setting for Banks](#) (for on-balance sheet assets) and the [Net Zero Asset Managers Initiative](#) (for off-balance sheet managed client investments).
3. Develop a strategy for how we will meet our targets.
4. Track progress, monitor the science, and regularly review and adjust our strategy and targets as needed.

This technical document covers step 1. Steps 2-4 are underway, with updates being published [here](#). We have significantly increased our level of disclosures through documents such as this one, in line with PCAF recommendations, to help shape and advance harmonized and robust approaches across the financial industry.

For emissions related to our day-to-day operations, we’ve been [carbon neutral](#) since 2008. This means we measure and reduce our GHG emissions as much as possible, then offset emissions through the purchase of registered carbon offsets from emission-reducing activities that others have undertaken. Our membership of the Net Zero Banking Alliance commits us to

¹ Our financed emissions fall within scope 3 category 15, per the GHG Protocol (investments) using the financial/operational control approach. Note that scope 3 (15) for Vancity equates to scopes 1 and 2 for our members and clients—and scope 3 where required and/or data and methodologies exist.

reaching net zero emissions for both financed and operational emissions. In 2022, we will work on aligning our operational emissions with science-based targets and set interim targets, as well as determine our longer term net zero goal for operational emissions. Please refer to our [GHG Handbook and Inventory Report](#) for more information on our operational emissions.

We participate in numerous global, national, and local working groups and forums to share and encourage the implementation of best practices across the banking sector, and to contribute to the development of harmonized and ambitious sustainability framework and standards. Through these working groups we helped shape the UNEP FI's Principles for Climate Target Setting for Banks and contributed to the PCAF Global GHG Standard for measuring financed emissions.

Improving data quality

Disclosing and improving data quality over time is a core requirement of the PCAF Global GHG Standard. The PCAF data quality hierarchy ranges from 1 to 5 where a data quality score of 5 is highly estimated/uncertain and based primarily on sector or building averages, and a score of 1 signifies certainty, i.e., verified reported emissions. Because data quality will differ across asset classes, and can also vary within asset classes (e.g., by sector or building type) PCAF requires financial institutions to report the weighted data quality score by asset class. This normalizes the data quality score for each asset class based on the total outstanding loan amount. We have included the weighted data quality score along with additional explanations on data quality in the sections below, by asset class.

Guided by the PCAF standard we identified several “quick wins” to improve our data quality from previous disclosure across three asset classes in 2021: residential mortgages, commercial real estate and operational business loans. In this way, we increased our data quality score from 5 to 4.1 for residential mortgages, and from 5 to 4.6 for commercial real estate and business loans. Please refer to the relevant sections below for more details.

Due to these improvements in methodology, as well as some general improvements such as updated emission factors, we recalculated historical 2020 data to ensure it remains comparable to 2021 disclosure

As a signatory to the Principles for Responsible Banking, we're expected to obtain assurance on key climate-related disclosures as part of progress reporting. To prepare ourselves for assurance, in 2021 we hired external consultants to assess our methodology, data integrity and reporting of our financed emissions. We're also working on a climate data improvement plan which will include data clean up as well as accessing additional data, including collecting data directly from our members and clients. As part of this work, we will also clarify what triggers a recalculation of historical/base year data and/or targets, for

example significant portfolio changes or methodological developments that might compromise relevance and consistency over time.

Expanding coverage

In this document we disclose data across the following portfolios: residential mortgages to buy a home, commercial and business mortgages to acquire a property, operational business loans, motor vehicle loans, project finance (clean energy and energy-efficiency), our own liquidity investments, and a portion of off-balance sheet managed client investments. We added treasury investments and project finance in 2021. Our financed emissions coverage is approximately 82% of on-balance sheet lending per our financial statements. In addition, we cover 53% of the market value of Vancity's on-balance sheet liquidity investments, and 63% of off-balance sheet managed client investments.

PCAF disclosure requirements are extensive and include emissions broken down by scope, a weighted data quality score, the sources and dates of emission factors used, key assumptions, and transparency around what is included and not included. This is why, in addition to a high-level summary and narrative in the annual report, we created this technical document.

We do not include the following activities in our emission calculations due to data limitations and/or because there is no global methodology to quantify them yet.

- Consumer credit, including credit cards, loans and lines of credit used for general purposes (no methodology)
- Property construction and retrofit loans (no methodology)
- Business credit cards (data limitations)
- Certain types of investments where methodologies are lacking, or because we are unable to access the data we need directly or through third-party data providers. These include a "Fund of Funds", mortgage-backed securities, and off-balance sheet managed client investments in preferred shares and fixed income securities.

See notes on individual asset classes below for more details on what our calculation cover.

In addition to efforts to improve our data quality score and coverage, we continue to work on general improvements to our approach based on best practice. In 2021 this included ensuring our assumptions are robust and documented, and that we're using the most reliable emission factors—preferably the same ones that the other Canadian banks are using. A key input into our work are the PCAF working groups and their technical team. Topics discussed at the Canadian working group, comprised of Canadian financial institutions, included the challenges of accessing data for non-listed companies (i.e., small and medium sized businesses), reliable sources of up-to-date emission factors, data volatility (especially for scope 3 client emissions) and

protocols for updating/recalculating historical data. A key objective of the working group is to harmonize approaches across Canadian banking institutions, with a view to documenting key decisions and eventually integrating them into future updates of the Global GHG Standard. The group also identifies opportunities to collectively advocate for improved data.

As we continue to improve data quality and coverage within and across asset classes, we expect further changes to our methodology which may result in the recalculation of historical and base year data, and targets.

Note on emission factors

In general, we first looked to PCAF's web-based emission factor database to access emission factors. These include national and provincial emissions factors by building use and type, and for various industry sectors. In cases where we did not use the PCAF database, we indicated this along with the rationale, which is typically because we identified a more up-to-date emission factor from the same source.

Vancity's financed emissions profile (estimated)

The two tables below summarize Vancity's estimated greenhouse gas emissions by activity/asset class for 2021 and 2020.

2021 activity ¹	Outstanding loans / market value of investments	Covered ² in the calculated emissions	% value covered in the calculated emissions	Scope 1+2 absolute emissions (annual)	Change in scope 1+2 emissions since prior year	Scope 3 absolute emissions (annual)	Change in scope 3 emissions since prior year	Emissions intensity (including scope 3)	Weighted data quality score	Total emissions
Asset class	\$ million CAD	\$ million CAD	%	tCO ₂ e	%	tCO ₂ e	%	tCO ₂ e/\$M	High = 1 Low = 5	tCO ₂ e
Operational business loans	237	221	93%	7,169	-15%	22,492	-20%	134	4.6	29,661
Residential mortgages	13,288	13,064	98%	23,078	3%	not estimated	not estimated	1.8	4.1	23,078
Commercial real estate	7,008	5,360	76%	52,582	-4%	not estimated	not estimated	9.8	4.5	52,582
Motor vehicle loans	18	18	100%	3,434	-3%	not estimated	not estimated	193	5	3,434
Project finance	66	66	100%	191	0%	not estimated	not estimated	8.8 ³	5	191
Liquidity investments	3,236	1,704	53%	10,330	not estimated	not estimated	not estimated	6.1	approx. 3	10,330
Totals: on-balance sheet	23,853	20,433	86%	96,784	-3%⁴	22,492	-20%	5.8	4.1	119,276
Managed client investments: Inhance SRI mutual funds ⁵	2,119	2,056	97%	45,432	9%	not estimated	not estimated	22.1	approx. 3	45,432
Managed client investments: Discretionary ⁵	376	367	98%	12,816	5%	not estimated	not estimated	34.9	approx. 3	12,816
Total off-balance sheet listed equity	2,495	2,423	97%	58,248	8%	not estimated	not estimated	24.0	approx. 3	58,248

tCO₂e = metric tonnes of carbon dioxide equivalents.

Not estimated = reasons include it's not required by the PCAF standard, data or resource limitations, and/or the lack of standardized approach.

Please refer to the **Glossary** for definitions for these and other technical terms including absolute emissions, emissions intensity, scopes 1-3, and weighted data quality score.

1 Activities/asset classes are defined according to the PCAF GHG Standard and may not align with the terms used in our financial statements. See "Overview of approach to estimating financed emissions" for general exclusions.

2 Missing coverage is due to inadequate data for loans or investments within the asset class listed, as defined by PCAF. More details are provided in the sections below, by asset class.

3 Our clean energy projects have zero emissions associated with them; therefore, emissions intensity applies to energy efficiency projects only.

4 For comparability, the change in absolute scope 1 + 2 emissions from 2020 doesn't include treasury (liquidity) investments

5 Our third-party data provider tools do not include relevant data for fixed income securities or preferred shares; therefore, we have reported emissions attributed to listed equity only.

2020 activity ¹	Value of outstanding loans / market value of investments	Value covered ² in the calculated emissions	% value covered in the calculated emissions	Scope 1 + 2 absolute emissions (annual)	Scope 1 + 2 emissions: prior year (2019)	Change in scope 1 + 2 emissions since prior year	Scope 3 absolute emissions (annual)	Scope 3 emissions: prior year (2019)	Emissions intensity including scope 3	Weighted data quality score
Asset class ¹	\$ Million CAD	\$ Million CAD	%	tCO ₂ e	tCO ₂ e	% change	tCO ₂ e	tCO ₂ e	tCO ₂ e/\$M	1 = High 5 = Low
Operational business loans	208	204	98%	8,441	9,969	-15%	28,203	27,358	180	4.6
Residential mortgages	11,448	11,279	99%	22,391	23,720	-6%	not estimated	not estimated	2.0	4
Commercial real estate loans	6,322	4,495	71%	54,561	36,208	51%	not estimated	not estimated	12.1	4.7
Motor vehicle loans	20	20	100%	3,528	3,679	-4%	not estimated	not estimated	179	5
Project finance	21	21	100%	191	not estimated	not estimated	not estimated	not estimated	19.2 ³	5
Total on-balance sheet	18,019	16,019	89%	89,112	73,576	21%⁴	28,203	27,358	7.3	4.2
Managed client investments: Inhance SRI mutual funds ⁵	1,325	1,235	93%	41,618	not estimated	not estimated	not estimated	not estimated	33.7	approx. 3
Managed client investments: Discretionary ⁵	334	324	97%	12,262	not estimated	not estimated	not estimated	not estimated	37.9	approx. 3
Total off-balance sheet listed equity	1,659	1,559	94%	53,880	not estimated	not estimated	not estimated	not estimated	35	approx. 3

tCO₂e = metric tonnes of carbon dioxide equivalents.

Not estimated = reasons include it's not required by the PCAF standard, data or resource limitations, and/or the lack of standardized approach.

Please refer to the **Glossary** for definitions for these and other technical terms including absolute emissions, emissions intensity, scopes 1-3, and weighted data quality score.

1 Activities/asset classes are defined according to the PCAF GHG Standard and may not align with the terms used in our financial statements. See "Overview of approach to estimating financed emissions" for general exclusions.

2 Missing coverage is due to inadequate data for loans or investments within the asset class listed, as defined by PCAF. More details are provided in the sections below, by asset class.

3 Our clean energy projects have zero emissions associated with them; therefore, emissions intensity applies to energy efficiency projects only.

4 For comparability, the change in absolute scope 1 + 2 emissions from 2020 doesn't include treasury (liquidity) investments

5 Our third-party data provider tools do not include relevant data for fixed income securities or preferred shares; therefore, we have reported emissions attributed to listed equity only.

Estimated emissions by asset class

Residential mortgages

Estimated greenhouse gas emissions by property type for residential mortgages

Residential mortgages for home purchases	Loan balance covered	Scope 1 + 2 absolute emissions (annual)	Annual emissions per \$ loaned	Square meters financed ¹	Annual emissions per square meter financed	Notes and key assumptions
Property type	\$ Million CAD	tCO ₂ e	tCO ₂ e/\$ Million	Meter ²	kgCO ₂ e/Meter ²	
Single-family house detached	9,263	17,909	1.9	2,984,006	6.0	
Single-family house attached	1,835	2,991	1.6	545,943	5.5	Single attached includes semi-detached, rowhome unit, townhouse unit, duplex.
Apartments	1,966	2,178	1.1	398,331	5.5	Includes high- and low-rise apartments/condos, hotel condo units, stacked, triplex and fourplex, and modular.
Total	13,064	23,078	1.8	3,928,280	5.9	

tCO₂e = metric tonnes of carbon dioxide equivalents. Please refer to the **Glossary** for definitions for this and other technical terms including absolute emissions and scopes 1-3.

¹ Where we do not have floor area data we estimated it by deriving the square footage based on the \$ value of the property, extrapolating from loans where we know both the \$ value of property and square footage by building type.

Summary

Buildings (residential and commercial combined, excluding construction) account for around 10-12 per cent of GHG emissions in BC and Canada², mainly from the energy used to heat and cool them and provide hot water. Our residential mortgage portfolio accounts for around 19 per cent of our on-balance sheet financed emissions, all scopes. Most of our portfolio helps people buy single-family detached homes, and most emissions are attributed to the use of natural gas.

What's covered in our calculations

In line with the PCAF Global GHG Standard, we included on-balance sheet consumer loans and lines of credit used for the purchase and refinance of residential property. For now, we attribute 100 per cent of the outstanding portion of lines of credit

² https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf (see page 10) and <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2021.html#toc3> (figure ES-7: Breakdown of Canada's greenhouse gas emissions by economic sector 2019)

towards the home purchase, recognizing that over time this may not make sense. We have included residential property owned by a business under commercial real estate.

The portion of the portfolio covered in the calculated emissions for Residential Mortgages is 98 per cent. Excluded loans total \$224 million. We excluded them from the calculation because we don't have sufficient data to be able to estimate emissions, such as the type of building.

As noted in the introduction under general exclusions, we have not reported loan balances or estimated emissions for loans that are used for the construction and renovation of residential homes. These loans total \$1,198 million and are optional to include according to the PCAF Global GHG Standard. PCAF's rationale is as follows: *"Mortgages used to construct or renovate a house are not required at this point given that the homeowner does not directly account for construction emissions. As a home is often constructed or renovated by a third party (i.e., a home builder) contracted by the homeowner, the emissions of the construction would normally be accounted by the third party during the building's construction phase"*. We expect to include these loans in the future, and in the meantime, we'll continue to monitor developments. As part of our decarbonization approach we will identify opportunities to engage the construction sector, including commercial real estate and business members—i.e., construction companies, builders, tradespeople, and developers.

Financed emissions calculation

Approach

$$\textit{Financed emissions} = \sum \textit{Attribution factor} \times \textit{Emissions of the property}$$

The overall approach to calculating financed emissions in line with PCAF is to multiply an attribution factor to scope 1 and 2 emissions associated with the energy use of the property financed.

Attribution factor

$$\textit{Attribution factor} = \frac{\sum \textit{Outstanding amount}}{\textit{Property value at origination}}$$

We accounted for the portion of the annual emissions of the buildings we finance by determining the ratio between the outstanding amount (numerator) and the property value at the time of purchase (denominator). This ratio is called the attribution factor and reflects our contribution to the purchase of real estate by our members.

The **Outstanding amount** is the drawn amount of funds by the individuals we lend to at the end of the year (31 December 2021).

Property value at origination is the appraised value of the property at the time of the loan origination. If this information was not readily available in our systems, we used the most recent appraised property value, which we obtained from a third-party data provider.

Emissions of the property

$$\text{Emissions of the property} = \sum \text{Energy consumption} \times \text{Emission factor}$$

In the absence of reliable data on energy consumption, we estimate emissions using proxies based on the type, location, and size of the property in line with PCAF's data quality hierarchy (see page 87 of the PCAF GHG Standard for more details). In 2021, we focused on acquiring floor area data for the properties we finance. While we collect floor area data for most of our mortgages, this data is typically contained within a PDF and not easily accessed. After exploring options and potential data sources, we decided to purchase property attribute data for BC-based commercial and residential properties. As well as allowing us to estimate financed emissions with a greater degree of accuracy, the property attribute data also allows us to better assess physical climate-related risks associated with mortgage lending. Overall, we improved our data quality score from 5 to 4.1 for residential mortgages.

- For mortgages where we did not have floor area data, we estimated electricity-related emissions for all buildings in BC by multiplying **total electricity use by building type in BC** by the **emission factor for the BC Grid** (18.6 tCO₂e/GWh). For non-electricity-related emissions (e.g., from natural gas, oil, wood) we used **non-electricity-related GHG emissions by building type in BC**. We summed these to get total emissions for all buildings in BC. We then multiplied this total by our **share (%) of the building stock in BC** (by building type). This approach equates to a PCAF data quality of 5.

- For residential properties where we had floor area data, we first calculated total emissions for all buildings in BC by building type (as outlined in the bullet below). We divided this by **total floor space in BC** by building type to get total emissions per square meter. Then we multiplied this by **total floor area financed by Vancity** (again by building type). This approach equates to a PCAF data quality of 4.

Data quality:

The PCAF data quality score ranges from 1 to 5 where 5 is highly estimated/uncertain and based primarily on building averages, and 1 is certain (i.e., verified reported emissions). Because data quality can vary within portfolios or by building type, PCAF requires financial institutions to report the weighted data quality score by asset class. For residential mortgages, the PCAF GHG Standard includes the following data quality options to estimate financed emissions.

Data quality score 1 (highest quality/certain): Actual building emissions	Actual building emissions (e.g., data on actual building energy consumption (i.e., metered data) is available and emissions are calculated using actual building energy consumption and supplier-specific emission factors specific to the respective energy source.
Data quality score 2: Actual building emissions	Primary data on actual building energy consumption (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and average emission factors specific to the respective energy source.
Data quality score 3: Estimated building emissions based on floor area and energy labels.	Estimated building energy consumption per floor area based on official building energy labels AND the floor area are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.
Data quality score 4: Estimated building emissions based on floor area	Estimated building energy consumption per floor area based on building type and location-specific statistical data AND the floor area are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.
Data quality score 5 (lowest quality/most uncertain): Estimated building emissions based on number of buildings	Estimated building energy consumption per building based on building type and location specific statistical data AND the number of buildings are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.

The majority of our residential mortgage balance is a data quality of 4. The table below indicates that estimating emissions at the lowest data quality (5) leads to higher emissions, which we will keep in mind as we track progress.

$$\text{Weighted data quality score for residential mortgages} = \frac{(A \times 5) + (B \times 4)}{A + B} = 4.1$$

PCAF data quality score	Mortgage balance (\$ million CAD)	% loan balance	% emissions
5	683 (A)	5%	6%
4	12,381 (B)	95%	94%

Emission factors and external data used

Grid factors	British Columbia	Ontario ¹	Year	PCAF database	Source	Publication date
Generation intensity gGHG/kWh electricity generated	18.6	30	2019	Same source but more recent year ²	BC: National Inventory Report 1990-2019 Part 3 – Page 70 ³ Ontario: Page 66 of the same report	2021

¹ We applied this emission factor to commercial real estate residential homes located on Ontario (see commercial real estate section)

² PCAF uses 2018 data that references the National Inventory Report. We used 2019 data, drawing directly from the National Inventory Report 1999-2019

³ https://publications.gc.ca/collections/collection_2021/eccc/En81-4-2019-3-eng.pdf

Energy use by building type in British Columbia	Energy use/GHG emissions	Year	PCAF database	Source
Electricity use	PJ	2018	Same source but more recent year	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada Tables 32, 34 and 36 ¹ .
Detached homes	44.0			
Attached homes	8.2			
Apartments	15.4			
GHG emissions – non electricity	Mt of CO₂e			
Detached homes	2.8			
Attached homes	0.5			
Apartments	0.8			
Data quality 5: Building stock in British Columbia	# Buildings (thousands)	Year	PCAF database	Source
Detached homes	959.9	2018	Same source but more recent year	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada Table 14 ¹ .
Attached homes	250.7			
Apartments	689.9			
Data quality 4: Floor area by building type in British Columbia	Million m²	Year	PCAF database	Source
Detached homes	189.0	2018	Same source but more recent year	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada Table 18 ¹ .
Attached homes	36.6			
Apartments	69.8			

¹ https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive/trends_res_bct.cfm. At the time of writing, data for energy use by building type is now available for 2020. We understand that 2019 building stock data will be published in 2022. We will formalize our approach to applying updated emission factors in 2022.

Commercial real estate

Estimated greenhouse gas emissions by property use for commercial real estate loans and business mortgages

Commercial real estate and business mortgages for property acquisition	Loan balance	Scope 1 + 2 absolute emissions (annual)	Annual emissions per million dollars loaned	Square metres financed ¹	Annual emissions per square metre financed	Notes and key assumptions
Property use	\$ Million CAD	tCO ₂ e	tCO ₂ e/\$Million	tCO ₂ e	kgCO ₂ e/Meter ²	
Accommodation and food services	148	4,396	29.7	48,878	45.0	Includes care facilities, assisted living and childcare facilities, hotels, mobile homes and restaurants.
Educational services	39	1,730	44.0	5,908	2.4	Includes schools and religious buildings
Health care and social assistance	11	176	16.2	3,686	47.9	Includes hospitals and medical buildings.
Offices	781	9,667	12.4	200,027	19.0	Includes mixed-use buildings (retail/commercial and office/residential) in the category with the higher emission factor: retail trade and office respectively
Retail trade	1,952	31,191	16.0	368,314	14.1	
Other services	366	861	2.4	79,894	16.7	Includes buildings associated with commercial and hobby farms, golf courses, and recreational property.
Residential homes – single detached	365	391	1.1	73,868	6.6	Includes single family detached homes owned by a business.
Residential homes – single attached	64	118	1.8	12,181	5.7	Includes single family attached homes owned by a business.
Residential homes – apartments	1,633	4,053	2.5	557,784	6.5	Includes multi-unit residential apartment buildings and revenue-generating apartments.
Total	\$5,360	52,582	9.8	1,350,540	14.8	

tCO₂e = metric tonnes of carbon dioxide equivalents. Please refer to the **Glossary** for definitions for this and other technical terms including absolute emissions and scopes 1-3.

1 Includes actual floor area financed plus estimated square feet financed, which we derived from the \$ value of the property, extrapolating from mortgages where we know both the \$ value of property and square footage by building type.

2 Annual emissions per square meter financed is calculated based on data quality 4 loans only as this is most appropriate representation of this data.

Overview

Buildings (residential and commercial combined, excluding construction) account for around 10%-12% of GHG emissions in BC and Canada³, mainly from the energy used to heat and cool them and provide hot water. Our commercial mortgage portfolio and business mortgages (mortgages provided to small and medium sized enterprises) account for around 44 per cent of our on-balance sheet financed emissions, all scopes. Most of our portfolio supports buildings that are used for retail trade or housing, particularly apartments. For many years we have been proactively financing green buildings (and affordable housing), and so we expect that actual emissions will be less than estimated emissions which are based on averages by building use.

What's covered in our calculations

In line with the PCAF Global GHG Standard, we included on-balance sheet loans used for the purchase and refinance of commercial real estate (CRE), defined as property that is used for commercial purposes, such as retail, hotels, office space, or large multifamily rentals. In all cases, the building owner leases the property to tenants to conduct income-generating activities.

We cover 76 per cent of our commercial real estate portfolio, as defined by PCAF, in our financed emissions calculation. Excluded loans totalled \$1.6 billion. We excluded these loans from the calculation because we lack sufficient data to allocate a suitable emissions factor. They include:

- land-only financing (\$291 million, of which some is agricultural land).
- financing for industrial buildings (\$1,052 million).
- uncategorized (\$306 million).

We plan to obtain more details on the nature of these loans to allow us to apply the appropriate calculation to estimate emissions in the future.

In addition, and as noted in the introduction under general exclusions, we have not reported the loan balance or estimated emissions for loans used for the construction and renovation of commercial real estate. These loans total around \$277 million and are optional according to the PCAF Global GHG Standard. The rationale is as follows: *"Buildings are often constructed by a third party (i.e., a construction company) contracted by the project developer, and the emissions of the construction are normally reported under scope 3 of the project developer during the building's construction phase. As such, it can be impractical for the lender*

³ https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf (see page 10) and <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2021.html#toc3> (figure ES-7: Breakdown of Canada's greenhouse gas emissions by economic sector 2019)

to measure financed emissions of a construction or renovation loan unless the project developer reports construction emissions". We expect to include these loans in the future. In the meantime, we'll continue to monitor developments related to financed emissions measurement and identify opportunities to engage the construction sector, including clients in our business loan portfolio (see "Business loans" below) which include construction companies and builders, tradespeople, and so on.

Financed emissions calculation

Financed emissions = Attribution factor x Emissions of the property

We calculated on-balance sheet financed emissions for commercial real estate and business mortgages based on PCAF guidance, per the formula above. The overall approach to calculating financed emissions is to multiply an attribution factor to the emissions associated with the energy use of the property financed.

Attribution factor

Attribution factor = $\frac{\sum \text{Outstanding amount}}{\text{Property value at origination}}$

We accounted for a portion of the annual emissions of the organizations we finance by determining the ratio between our outstanding amount (numerator) and the property value at the time of loan origination (denominator). This ratio is called the attribution factor and reflects our contribution to the acquisition of commercial properties by our members.

The **outstanding amount** is the drawn amount of funds by the businesses we lend to at the end of the year (31 December 2021).

The **property value at origination** is the appraised value of the building at the time of loan origination. If this information was not readily available in our systems, we used the most recent appraised value which we obtained from a third-party data provider.

Emissions of the property

Emissions of the property = \sum Energy consumption x Emission factor

Actual building energy consumption is not widely available in Canada. In the absence of this, we estimated emissions based on building characteristics and publicly available data and emission factors, in line with PCAF's data quality hierarchy (see page 81 of the PCAF GHG Standard for more details). In 2021, we focused on acquiring floor area data for the properties we finance. While we collect floor area data for most of our mortgages, this data is typically contained within a PDF and not easily accessed. After exploring options and potential data sources, we decided to purchase property attribute data for BC-based commercial and residential properties. As well as allowing us to estimate financed emissions with a greater degree of accuracy, the property attribute data also allows us to better assess physical climate-related risks associated with mortgage lending. Overall, we improved our weighted data quality score from 5 to 4.5.

- For commercial buildings where we did not have floor area data, we estimated emissions by applying **emission factors** for energy use expressed in MtCO₂e, according to building use, for all of Canada. We then multiplied this by our **share of the Canadian building stock, by building use**. This approach equates to a data quality of 5.
- For commercial buildings where we had floor area data, we estimated emissions by applying **emission factors** expressed in tonnes CO₂ per square meter, scope 1 plus scope 2, according to building use and location (Province of British Columbia or Ontario). This approach equates to a data quality of 4.
- For residential properties used for income generating purposes, we applied the same calculation methodology as we used for Residential mortgages, see the residential mortgage section above (a combination of data quality 5 and 4).

Data quality

The PCAF data quality score ranges from 1 to 5 where 5 is highly estimated/uncertain and based primarily on building averages, and 1 is certain (i.e., verified reported emissions). Because data quality can vary within portfolios or by building type, PCAF requires financial institutions to report the weighted data quality score by asset class. For commercial real estate, the PCAF Global GHG Standard includes the following data quality options to estimate financed emissions.

Data quality score 1 (highest quality/certain): Actual building emissions	Primary data on actual building energy consumption (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and supplier-specific emission factors specific to the respective energy source.
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Data quality score 2: Actual building emissions	Primary data on actual building energy consumption (i.e., metered data) is available. Emissions are calculated using actual building energy consumption and average emission factors specific to the respective energy source.
Data quality score 3: Estimated building emissions based on floor area and energy labels.	Estimated building energy consumption per floor area based on official building energy labels AND the floor area are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.
Data quality score 4: Estimated building emissions based on floor area	Estimated building energy consumption per floor area based on building type and location-specific statistical data AND the floor area are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.
Data quality score 5 (lowest quality/most uncertain): Estimated building emissions based on number of buildings	Estimated building energy consumption per building based on building type and location specific statistical data AND the number of buildings are available. Emissions are calculated using estimated building energy consumption and average emission factors specific to the respective energy source.

Weighted data quality score for commercial real estate: $\frac{((A \times 5) + (B \times 4))}{A+B} = 4.5$

PCAF data quality score	Mortgage balance (\$ million CAD)	% of loan balance	% of emissions
5	2,913 (A)	54%	83%
4	2,446 (B)	46%	17%

Loans with the lowest data quality score of 5, while just over half of the balance, contribute the most emissions. We therefore expect emissions to decrease as we make improvements to our data quality, in addition to the effort we and others make to reduce building-related emissions.

Emission factors and other external data sources

Building use (data quality 5)	Emission factor MtCO ₂ e	Year	PCAF database (Y/N)	Source
Educational services	5.8	2017	Per building methodology not available in PCAF database for Canada	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada ¹
Health care and social assistance	6.1			
Other services	0.7			
Offices	15.5			
Retail trade	7.1			
Accommodation and food services	3.5			
Building stock (data quality 5)	# buildings in Canada	Year	PCAF database (Y/N)	Source

Educational services (best match: Elementary and/or secondary schools)	17,501	2014 ²	Per building methodology not available in PCAF database for Canada	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada ²
Health care and social assistance (best match: Hospitals)	798			
Other services ((best match: office buildings, non-medical)	183,880			
Offices (best match: office buildings, non-medical)	15,982			
Retail trade (best match: non-food retail store)	61,672			
Accommodation and food services (best match: Hotels, motels or lodges)	12,714			

¹https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/query_system/querysystem.cfm

² <https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/scieu/2014/tables.cfm>. We understand that 2019 building stock data will be published in 2022.

Building use (date quality 4)	Emission factor tCO ₂ e/m ² British Columbia	Emission factor tCO ₂ e/m ² Ontario	Year	PCAF database (Y/N)	Source
Educational services	Scope 1 = 0.0237412 Scope 2 = 0.0175149	Scope 1 = 0.048762 Scope 2 = 0.006214	2017	Yes	Natural Resources Canada (NRCAN)
Health care and social assistance	Scope 1 = 0.064336 Scope 2 = 0.10473	Scope 1 = 0.0874187 Scope 2 = 0.00954681			
Other services	Scope 1 = 0.0248983 Scope 2 = 0.0187	Scope 1 = 0.04614 Scope 2 = 0.0052779			
Offices	Scope 1 = 0.0209507 Scope 2 = 0.0199158	Scope 1 = 0.0395145 Scope 2 = 0.00699344			
Retail trade	Scope 1 = 0.0242209 Scope 2 = 0.0195233	Scope 1 = 0.0484401 Scope 2 = 0.00606153			
Accommodation and food services	Scope 1 = 0.043456 Scope 2 = 0.0277231	Scope 1 = 0.0719245 Scope 2 = 0.00850746			

Operational business loans

Estimated greenhouse gas emissions by sector for business loans

Business loans for operational purposes (excludes mortgages)		Loan balance	Scope 1 + 2 absolute emissions (annual)	Scope 3 absolute emissions (annual)	Total emissions (annual)	Annual emissions per million dollars loaned
NAICS ¹	Description of NAICS	\$ CAD	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e/\$ Million
11	Agriculture, forestry, fishing and hunting	871,749	317	181	498	571
212-213	Mining and quarrying & support activities for mining	116,515	124	17	141	1,210
211-213	Oil and gas extraction & support activities for oil and gas extraction	0	0	0	0	0
22	Utilities	204,560	186	18	204	997
23	Construction	23,253,826	837	6,218	7,055	303
31-33	Manufacturing	13,878,114	1,387	3,935	5,322	383
42	Wholesale trade	10,029,106	688	1,683	2,372	237
44-45	Retail trade	9,761,476	527	862	1,388	142
48-49	Transportation and warehousing	3,269,084	158	317	475	145
51	Information	7,324,945	92	431	522	71
52	Finance and insurance	2,378,446	12	20	32	13
53	Real estate rental and leasing	19,676,227	400	412	812	41
54	Professional, scientific, and technical services	15,618,999	256	711	967	62
55	Management of companies and enterprises	12,550,807	38	117	155	12
56	Administrative and support and waste management and remediation services	24,021,399	414	909	1,324	55
61	Educational services	1,491,771	11	34	45	30
62	Health care and social assistance	32,893,388	677	2,509	3,186	97
71	Arts, entertainment, and recreation	7,806,113	159	1,002	1,161	149
72	Accommodation and food services	13,211,128	579	2,477	3,056	231
81	Other services (except public administration)	22,395,349	306	634	940	42
90-99	Public administration	31,726	1	3	5	158
Total	All sectors	220,784,727 (\$221 Million)	7,169	22,492	29,661	134

tCO₂e = metric tonnes of carbon dioxide equivalents. Please refer to the **Glossary** for definitions for this and other technical terms including absolute emissions and scopes 1-3.

¹North American Industry Classification Codes

Overview

In line with PCAF, we included all on-balance sheet loans and lines of credit for general business purposes (i.e., with unknown use of proceeds) to non-listed/private businesses and nonprofits. We also included revolving credit facilities, overdraft facilities, and general-purpose real estate secured loans/line of credits.

According to Statistics Canada⁴, small businesses with 1-99 employees made up 98 per cent of all businesses as of December 2019 and provided almost 70 per cent of private-sector jobs. They also contribute significantly to Canada's GHG inventory: in a 2018 report⁵, ClimateSmart estimated "*total emissions from Canadian SMEs to be more than 200 million tonnes of carbon dioxide equivalent (CO₂e), nearly 30% of the national total.*" There is growing awareness and expectation of climate action from customers, suppliers and regulators, but small business can lack the knowledge and resources to reduce emissions from their own operations and value chain, and/or to build the business case for doing so. Moreover, they are often overlooked when it comes to net zero pathways and goals. We see supporting SMEs to contribute to a low-carbon, resilient and fair economy as a significant opportunity.

Business loans represent around one per cent of total lending dollars outstanding. However, they contribute 25 per cent of emissions, if we factor in scope 3 member emissions. This excludes business mortgages, which we have included in commercial real estate for the purposes of financed emissions accounting in line with the PCAF Global GHG Standard.

While many financial institutions must contend with emissions attributed to fossil fuel investments, we don't lend to or directly invest in that sector. Our business loans support small and medium sized enterprises and not-for profit organizations. In 2021, the top emitters by total emissions in our portfolio were associated with manufacturing, construction (in particular, emissions related to the construction and renovation of buildings), and health care and social assistance. Many of the organizations we support are community-oriented and values-based, and so we expect that actual emissions will be less than estimated emissions which are based on averages by sector. The most carbon intensive sectors we lend to, in terms of emissions per dollar invested, are mining and quarrying, utilities, manufacturing, and construction. However, our exposure to the first two sectors is limited.

⁴ [Key Small Business Statistics — 2020 - SME research and statistics](#)

⁵ [2018-02-Climate-Smart-SME-200M-Tonnes.pdf \(businessinsurrey.com\)](#)

What's covered in the calculation

In 2021 we were able to calculate emissions for 93 per cent of the portfolio balance. The remaining six per cent were primarily uncategorized loans where we did not have sufficient data to be able to calculate emissions. We will explore these loans and see if we can fill in the data gaps in the future.

Financed emissions calculation

Our approach to calculating financed emissions in line with PCAF is to multiply an attribution factor by the emissions of the borrower. While PCAF does not require it, we have opted to report scope 3 client emissions, as well as scope 1 and 2 client emissions.

In 2021, we focused on accessing financial data for the organizations we finance, specifically annual revenue, total debt and total equity. We were able to extract this data manually from our credit risk rating model, which we apply to larger business loans. The financial data may not be up to date; however, PCAF recognizes there is often a time-lag between the year of reporting and required emissions or business-related data. We use the most recent data that is available, per PCAF's guidance. Overall, we improved our weighted data quality score from 5 to 4.6 for 2021.

Attribution factor

$$\textit{Attribution factor} = \frac{\sum \textit{Outstanding amount}}{\textit{Company value}}$$

We accounted for a portion of the annual emissions of the organizations we finance by determining the ratio between our outstanding amount (numerator) and the economic value of the organization (denominator). This ratio is called the attribution factor and reflects that our financing funds general operating activities undertaken by organizations in our communities.

The **outstanding amount** is the drawn amount of funds by the organizations we lend to at the end of the year (31 December 2021).

We calculated **company value** in two ways:

- Where available from our internal records, we used total liabilities and equity to calculate enterprise value based on year-end reported financials.
- In cases where information on debt and equity was not readily available, we defaulted to using total balance sheet value (total assets) as a proxy for organizational value.

Financed emissions

Financed emissions = Attribution factor x Emissions of the borrower

Few of the small and medium sized enterprises we lend to track or currently report emissions. In the absence of reliable member and client data on their emissions, we estimated emissions using economic activity-based emissions by sector in line with PCAF's data quality hierarchy (see page 65 of the PCAF GHG Standard for more details). We calculated Emissions of the borrower in one of two ways, and we used the same approach for Scope 1, 2 and 3 emissions:

- For companies where we knew the company's revenue, we applied the appropriate **emission factor for the sector (based on NAICS) per unit of revenue**, e.g., tCO₂e per dollar revenue earned in a sector. This approach equates to a data quality of 4.
- Where we knew the outstanding amount in the company, but did not have financial data, we applied the appropriate **emission factor for the sector (based on NAICS) per unit of asset**, e.g., tCO₂e per dollar of asset in a sector). This approach equates to a data quality of 5.

Data quality

The PCAF data quality score ranges from 1 to 5 where 5 is highly estimated/uncertain and based primarily building averages, and 1 is certain (i.e., verified reported emissions). Because data quality can vary across and portfolios, PCAF requires financial institutions to report the weighted data quality score by asset class. For business loans and unlisted equity, the PCAF Global GHG Standard includes the following data quality options to estimate financed emissions.

Data quality score 1 (highest quality/certain): Verified emissions	Outstanding amount in the company and total company equity plus debt are known. Verified emissions of the company are available.
Data quality score 2: Physical activity-based emissions	Outstanding amount in the company and total company equity plus debt are known. Unverified emissions calculated by the company are available OR emissions are calculated using primary physical activity data for the company's energy consumption and emission factors specific to that primary data. Relevant process emissions are added.
Data quality score 3: Physical activity-based emissions	Outstanding amount in the company and total company equity plus debt are known. Emissions are calculated using primary physical activity data for the company's production and emission factors specific to that primary data.
Data quality score 4: Economic activity-based emissions	Outstanding amount in the company, total company equity plus debt, and the company's revenue are known. Emission factors for the sector per unit of revenue are known (e.g., tCO ₂ e per dollar of revenue earned in a sector)

Data quality score 5 (lowest quality/most uncertain): Economic activity-based emissions	Outstanding amount in the company is known. Emission factors for the sector per unit of asset (e.g., tCO ₂ e per dollar of asset in a sector) OR emission factors for the sector per unit of revenue (e.g., tCO ₂ e per dollar revenue earned in a sector) and asset turnover ratios for the sector are known.
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Weighted data score for business loans (all emission scopes):
$$\frac{((A \times 5) + (B \times 4))}{A+B} = 4.6$$

PCAF data quality score	Loan balance (\$ million CAD)	% of loan balance	% of emissions
5	127.26 (A)	58%	43%
4	93.52 (B)	42%	57%

Emission factors

	Value	Year	PCAF database	Source
Emission intensity per million € of revenue	Various, by sector based on NAICS code	2019	Yes	PCAF Economic Activity-based Emission Factors for Canada derived from EXIOBASE ¹
Emission intensity per million € of assets	Various, by sector based on NAICS code	2019	Yes	PCAF Economic Activity-based Emission Factors for Canada derived from EXIOBASE ¹

¹ The EXIOBASE database is a global, detailed multi-regional table that estimates emissions by industry. The database has high sectoral coverage and a large set of environmental information (e.g., types of emissions, materials/resources). Note that we convert € to \$ CAD when performing emissions analysis.

Motor vehicle loans

Estimated greenhouse gas emissions for motor vehicle loans

	Loan balance	Scope 1 + 2 absolute emissions (annual)	Annual emissions per \$ loaned	Notes and key assumptions
	\$ Million CAD	tCO ₂ e	tCO ₂ e/\$ Million	
Motor vehicle loans	18	3,434	193	Includes all on-balance sheet consumer loans and lines of credit for the specific, known purpose of financing motor vehicles.
Total	18	3,434	193	

tCO₂e = metric tonnes of carbon dioxide equivalents. Please refer to the Glossary for definitions for this and other technical terms including absolute emissions and scopes 1-3.

Overview

In 2019, transportation represented the largest source of emissions in British Columbia (BC)—approximately 39 per cent of BC’s gross emissions—with passenger vehicles contributing approximately 14 per cent of the province’s emissions⁶. While vehicle emissions do not represent a significant portion of Vancity’s on-balance sheet financed emissions (3.5 per cent), the emissions intensity of vehicle loans (193 tonnes CO₂e/\$ million) is substantial in comparison to that of other sectors represented in our portfolio. Supporting members in transitioning to electric vehicles and other low carbon forms of transportation, for example through [Vancity’s Planet-Wise Transportation Loans](#), will be important to meeting our net zero by 2040 goal.

What’s covered in our calculations

The percentage of the portfolio covered in the calculated emissions for Motor Vehicles is 100. In line with the PCAF GHG Standard, we have included all on-balance sheet consumer loans and lines of credit for the specific purpose of financing motor vehicles. However, more members purchase vehicle using loans and lines of credit than we can identify, including business members, and we don’t know the value or number of these loans. As such we are unable to track business loans used by businesses to finance motor vehicles, and we have included these under Business Loans for now. Because the portfolio is likely relatively small and our systems and processes would require a major overhaul to begin tracking, we are currently focusing data quality improvements on residential mortgages, commercial real estate and business loans.

⁶ https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/2021_climate_change_accountability_report.pdf (page 8).

Financed emissions calculation

$$\text{Financed emissions} = \sum \text{Attribution factor} \times \text{Vehicle emissions}$$

The overall approach to calculating financed emissions in line with PCAF is to multiply an attribution factor to scope 1 and 2 emissions associated with the energy use of the motor vehicle, scope 1 being direct emissions from fuel combustion in vehicles and scope 2 being indirect emissions from electricity generation consumed in hybrids or fully electric vehicles.

Attribution factor

$$\text{Attribution factor} = \frac{\sum \text{Outstanding amount}}{\text{Value of motor vehicle at origination}}$$

We account for the portion of the annual emissions of motor vehicles we finance by determining the ratio between our outstanding amount (numerator) and the total value of the motor vehicle at the time of the transaction (denominator). This ratio is called the attribution factor and reflects our contribution to the purchase of vehicles by our members.

The **outstanding amount** is the drawn amount of funds by the individuals we lend to at the end of the year (31 December 2021).

The **value of the motor vehicle at origination** is the assessed value of the motor vehicle at the time of loan origination. If this information is not readily available in our systems, we take a conservative approach and assume 100 per cent attribution of the vehicle's emission as per PCAF's recommendations.

Emissions of the motor vehicle

$$\text{Emissions of the motor vehicle} = \sum \text{Distance travelled} \times \text{Efficiency} \times \text{Emission factor}$$

In the absence of reliable data on any of the above (we do not track the model or make or year of the motor vehicle we are financing), we estimated emissions by multiplying the number of motor vehicles financed (using number of loans as a proxy) by **emissions per average vehicle year in BC**, which we sourced from the PCAF database.

PCAF prescribes that emissions per vehicle-year are calculated by multiplying the distance travelled (km) in a year by the vehicle's fuel efficiency (litres of gasoline/km) and the vehicle's fuel type-specific emissions factor (kg CO₂e/litre of gasoline).

Data quality

In the absence of vehicle-specific emissions data, we applied a highly estimated approach to calculating emissions in line with a PCAF data quality score of 5. (See page 94 of the PCAF GHG Standard for more details).

Emission factors and external data used

	Value	Year	PCAF database	Source
Emissions per average vehicle-year in BC	2.66429 tCO ₂ e	2020	Yes	Office of Energy Efficiency, Natural Resources Canada and Statistics Canada ¹

Project finance

Estimated greenhouse gas emissions for project finance, by type

Activity	Loan balance	Scope 1 + 2 absolute emissions (annual)	Absolute avoided emissions (annual)	Emissions intensity	Notes and assumptions
Project finance, by type	\$ Million CAD	tCO ₂ e	tCO ₂ e	tCO ₂ e/\$ Million	
Clean energy (solar and wind)	42.0	0	775	0	Assumes emissions produced of 0 for wind and solar projects.
Energy efficiency (various)	21.7	191	3,542	8.8	
Energy storage	2.4	0	0	0	Due to lack of relevant data for “behind the meter” battery energy storage projects, assumes operational emissions of 0.
Total	66.1	191	4,317	8.8	

tCO₂e = metric tonnes of carbon dioxide equivalents. Please refer to the **Glossary** for definitions for this and other technical terms including absolute emissions, emissions intensity, scopes 1-3, and weighted data quality score.

Summary

In line with the PCAF GHG Standard, we have included loans for specific projects/purposes that are on our balance sheet, specifically financing for power generation (clean energy projects) as well as energy efficiency and energy storage projects. In 2021, project finance contributed just 0.2% to estimated on-balance sheet financed emissions, due in part to their nature (operational clean energy projects have assumed zero emissions produced associated with them).

Financed emissions calculation

Approach

$$\text{Financed emissions} = \sum \text{Attribution factor} \times \text{Project emissions}$$

The overall approach to calculating financed emissions in line with the PCAF Global GHG Standard is to multiply an attribution factor to scope 1 and 2 absolute emissions associated with the project. Due to a lack of reliable data, we have not estimated

scope 3 emissions at this time. In addition to measuring financed emissions, we also track and separately report avoided emissions.

Attribution factor

$$\text{Attribution factor} = \frac{\sum \text{Outstanding amount}}{\text{Project value}}$$

We account for a portion of the annual emissions of the financed project by determining the ratio between the outstanding amount (numerator) and the total project value (denominator). For **project value**, we have used total project value (cost). This is in place of total project equity and debt, or total balance sheet value, per the PCAF Global GHG Standard. We plan to use balance sheet value in the future. The **outstanding amount** is the balance sheet value of the debt the borrower owes to Vancity as at the end of the financial year (31 December 2021).

Project Emissions

Our approach to calculating emissions generated varies by project. In many cases, we obtain projected energy consumption and/or emission generated and avoided by the project directly from the project developer, which the developer calculates based on certain assumptions, which we record. In cases where the developer provides energy use data (vs. emissions data), we apply the appropriate emission factors to calculate emissions generated or avoided. In some cases, energy use/emissions projections are verified by an independent engineering report. For one project, we did not have complete energy data and we used estimated annual project revenue combined with an economic activity-based emissions factor from the PCAF database. We will adjust our approach to better align with the PCAF Global GHG Standard and explore options for obtaining primary rather than estimated data.

Data quality:

The PCAF data quality score ranges from 1 to 5 where 5 is highly estimated/uncertain and based on economic activity data (e.g., revenue) and average emission factors per economic activity (e.g., tCO₂e/\$ revenue), and 1 is certain (i.e., verified emissions collected from the project or through independent third parties). Our emissions data is mostly based on projections provided by the developer/third party at the time of the loan origination. PCAF's data quality hierarchy (see page 73 of the

PCAF Global GHG Standard) does not consider third-party projections of emissions. Because of this, and due to the variation in approach by project, we have reported that project finance emissions data is the highest degree of uncertainty.

Emission factors and external data sources

Project type	Emission factor description	Emission factors (value)	Year	PCAF database (Y/N)	Source	Publication date
Energy generation projects (solar and wind)	Assume no produced emissions from renewable energy generation	Assumed emissions = 0	Not applicable	Not applicable	Not applicable	Not applicable
Energy efficiency projects (various, including LED building retrofit projects and geo-exchange)	Provincial grid emissions	BC Grid Intensity = 0.0000117 t/kWh AB Grid intensity = 0.00062 t/kWh ON Grid Intensity = 0.00003 t/kWh QC Grid Intensity = 0.0000012 t/kWh	2019	Same source but more recent year ¹	National Inventory Report 1999-2019 - Part 3 ²	2021
Energy efficiency projects (deep building retrofit – one project)	Canadian emissions intensity per \$M in revenue: electricity, gas, steam and air conditioning	Scope 1: 2,139.41 Scope 2: 43.627 Scope 3: 178.667	2015	Yes	PCAF database	-
Energy storage (one project)	Provincial grid emissions	ON Grid Intensity = 0.00003 t/kWh	2019	Same source but more recent year ¹	National Inventory Report 1999-2019 - Part 3 ³	2021

¹We use the same source per the PCAF database, but a more recent version. The PCAF database uses 2018 data listed in a 2021 Energy Star report that references the National Inventory Report. We used 2019 data, drawing directly from the National Inventory Report 1999-2019 which was published in 2021.

² https://publications.gc.ca/collections/collection_2021/eccc/En81-4-2019-3-eng.pdf

Avoided emissions calculation

Avoided emissions related to renewable power projects are the reduction in emissions of the financed project compared to what would have been emitted in the absence of the project (the baseline emissions). To calculate emissions avoided as a result of the project, we used annual kWh avoided estimates provided directly by the project developer compared to what would have been emitted in the absence of the project (the baseline emissions).

Accounting for lifetime emissions as an initial lender

One challenge when accounting for emissions related to project finance is when financing the construction of a project, if the loan is repaid shortly after operation starts the portfolio emissions for that investment would only reflect a small portion of the total emissions impact during the project's lifetime (which may or may not be significant depending on the type of project). To address this, PCAF's Global GHG Standard asks that a financial institution, if they are an initial sponsor or lender, assess the total projected lifetime scope 1 and 2 emissions for projects that were financed during the reporting year and to report those emissions separately in the year of contracting.

In 2021 Vancity Investment Bank financed the construction and operation of an eight-megawatt combined heat and power (CHP) installation. The system uses natural gas to generate electricity, and as a by-product, thermal energy (heat). Both are then used onsite by the manufacturing facility, enabling the manufacturer to disconnect from the electricity grid. **The projected lifetime scope 1 greenhouse gas emissions for generated by the project are 427,556 tonnes over 20 years.** There are no Scope 2 emissions as the project the CHP installation does not draw electricity from the grid. As a result of the CHP installation, when compared to baseline emissions, **an estimated 6,645 tonnes of greenhouse gas emissions will be avoided** over 20 years—emissions that would otherwise be emitted into the atmosphere.

As the sole lender with the remaining project costs funded by the borrower, 76% of estimated annual emissions would typically be attributed to Vancity for each year that we serviced the loan, around 16,247 tonnes a year.

Given our Climate Commitments and recent efforts to measure and track financed emissions and understand climate-related risks, this project came to our attention given its relatively high annual emissions profile—over 20,000 tonnes annually. We made a subsequent decision to sell the loan, which we did prior to the end of 2021. We further decided to craft a policy to guide lending to projects that involve energy production and to clarify Vancity's role in the energy transition (see page 18 of our Annual Report).

Liquidity investments

Estimated greenhouse gas emissions for liquidity investments, by type of investment

Activity	\$ invested (market value)	Investments covered (in the calculated emissions)	Scope 1 + 2 absolute emissions (annual)	Emissions intensity	Notes and assumptions
Investment type	\$ Million (CAD)	\$ Million (CAD)	tCO ₂ e	tCO ₂ e/\$M	
Term deposits – Canadian and US	171	Not estimated	Not estimated	Not estimated	Unable to estimate emissions due to lack of data
Federal and provincial regular and green government bonds and T-bills	2,769	1,428	10,215	7.2	We used the PCAF (2021). PCAF's draft new methods for public consultation, which includes methodology under development for Sovereign bonds (at country and provincial level, as needed)
Corporate bonds (including bank bonds and impact bonds) and bankers acceptances	296	276	114	0.4	We used the PCAF methodology for Listed equity and corporate bonds
Total	3,236	1,704	10,330	6.1	

tCO₂e = metric tonnes of carbon dioxide equivalents. Please refer to the Glossary for definitions for this and other technical terms including absolute emissions, emissions intensity and scopes 1-3.

Summary

Liquidity investments make up a sizable portion of Vancity's on-balance sheet investments. These are liquid investments can be quickly and economically converted to cash, as needed.

What's covered in the calculations

Liquidity investments include term deposits, government and corporate bonds. We estimated emissions for around 53% of liquidity investments. We did not estimate emissions for term deposits, mortgage-backed securities and some government and corporate bonds due to the absence of available emissions data. We will continue to source data, improve our data quality and increase coverage.

We accounted for a portion of the annual emissions associated with the investments by determining the ratio between the outstanding amount of our investments (numerator) and financial investments classified and designated as fair value through other comprehensive income (FVOCI) (denominator). The denominator excluded financial investments measure at fair value through profit or loss (FVTPL), which primarily consist of impact investment funds.

Financed emissions calculations

Approach

The overall approach to calculating financed emissions in line with the PCAF Global GHG Standard is to multiply an attribution factor to scope 1 and 2 absolute emissions associated with the investments. We did not include scope 3 emissions due to challenges accessing reliable scope 3 data.

$$*Financed emissions = Attribution factor \times Emissions*$$

We reviewed available PCAF methodologies to determine which ones were best suited to calculate the attribution factor for the different investment types. We obtained actual emissions data from annual or sustainability reports. We used the most recent available financial and emissions data even though this may have resulted in a discrepancy between the date of the transaction and company data.

Attribution factors for listed equity and bonds to private companies

$$*Listed equity attribution factor = \frac{\sum Outstanding amount}{Enterprise Value Including Cash}*$$

$$*Bonds to private companies attribution factor = \frac{\sum Outstanding amount}{Total equity + debt}*$$

The **outstanding amount** is the on-balance sheet market value of the investment as at the end of the financial year (31 December, 2021).

Financial data for **enterprise value including cash** (EVIC) or **total equity and debt** (the denominator(s)) was based on the most recent available company data. We obtained financial data from a variety of sources, including directly from annual reports or (for banks) directly from the [Office of the Superintendent of Financial Institutions \(OSFI\)](#). The majority of financial data was based on the value at December 31, 2021, which aligns with our financial year end. However, some company financial data was based on 2020 data due to lags in financial reporting.

Company emissions

$$\text{Financed emissions} = \text{Attribution factor} \times \text{Company Emissions}$$

Due to an inherent lag in public greenhouse gas emissions accounting and reporting by companies, investee emissions were based on 2021 reports where available, and 2020 reports if not. This is a known issue for this type of calculation and reporting, with PCAF recognizing that *“there is often a lag between financial reporting and required data, such as emissions data for the borrower or investee becoming available. In these instances, financial institutions should use the most recent data available even if it is representative of different years, with the intention of aligning as much as possible.”*

Attribution factor for Sovereign (Government) bonds

$$\text{Attribution factor} = \frac{\sum \text{Outstanding amount}}{\text{Total debt of country}}$$

As of the date of writing, [PCAF's draft new methods for public consultation](#) included sovereign (government) bonds, green bonds and loans and investments in emissions removals. The approach for government and green bonds is not part of the PCAF Global GHG Standard, therefore we opted to apply the draft methods for public consultation to calculate emissions for government (country and provincial) and green bonds using the debt attribution method. According to PCAF, using *“debt for attribution of sovereign emissions has its limitations”*. We sourced **total debt of country** for Canada from the [Government of Canada](#), and provincial debt from respective provincial websites. We will update our sources and calculations as new methods are finalized.

The **outstanding amount** is the on-balance sheet market value of the investment as at the end of the financial year (31 December, 2021).

Sovereign (Government) emissions

$$\text{Financed emissions} = \text{Attribution factor} \times \text{Government Emissions (country or provincial)}$$

We obtained **government emissions** from the most recent country or provincial reports where available. For Canada's emissions we utilized data from the [Government of Canada](#).

Data quality

For corporate bonds, the data quality score is 3 according to PCAF's data quality hierarchy. [PCAF's draft new methods for public consultation](#) for sovereign (government) bonds do not include a data quality hierarchy, and so we did not assign a score for these.

Managed client investments in listed equity

Estimated greenhouse gas emissions for managed client investments

GICS ¹	Sector	\$ invested (market value)	Scope 1 + 2 absolute emissions (annual)
#	Description	\$ Million CAD	tCO ₂ e
10	Energy	11	not estimated
15	Materials	142	not estimated
20	Industrials	249	not estimated
25	Consumer discretionary	333	not estimated
30	Consumer staples	79	not estimated
35	Health care	154	not estimated
40	Financials	548	not estimated
45	Information technology	453	not estimated
50	Communication services	193	not estimated
55	Utilities	77	not estimated
60	Real Estate	188	not estimated
Total		\$2,426	58,248

tCO₂e = metric tonnes of carbon dioxide equivalents. Please refer to the Glossary for definitions for this and other technical terms including absolute emissions and scopes 1-3.

¹Global Industry Classification Standard

Summary

Managed client investments, which are off-balance sheet, fall under the [Net Zero Asset Managers Initiative](#), which [Vancity Investment Management](#) (VCIM) signed in 2021. Guided by this initiative, VCIM will establish near-term climate targets in 2022. How we and others manage assets is key to achieving the global goal of net zero emissions by 2050 or sooner.

As detailed below, we obtain emissions data for investee companies from a third-party data provider, MSCI ESG Research. The data we obtained from MSCI for 2021 did not allow us to breakdown emissions by industry (GICs). We plan to request and disclose this breakdown for 2022 data. However, a preliminary analysis showed us that scope 1 and 2 investee emissions were primarily due to investments in the Materials (specifically chemicals), Consumer discretionary (specifically Internet & Direct Retail Marketing) and the Information Technology (software) sectors.

What's covered in the calculation

We estimated total emissions for around 63 per cent of managed client investments, which are discretionary member and client investments, such as mutual funds, stocks, bonds, or cash and cash equivalents, which VCIM manages on their behalf. Our emissions calculation includes investments in listed equity including mutual funds—specifically corporate common stock that is traded on a market. We have not estimated emissions for other types of client investments such as corporate bonds or preferred stock at this time due to challenges accessing the required data.

Financed emissions calculation

Approach

Financed emissions = attribution factor × company emissions

The PCAF Global GHG Standard does not have an approach for off-balance sheet investments, and so we applied the PCAF methodology for listed equity which is defined as 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.

The overall approach to calculating financed emissions for listed equity is to multiply an attribution factor to emissions associated with covered investee companies. PCAF requires financial institutions to report investees' absolute scope 1 and scope 2 emissions across all sectors. For scope 3 emissions, PCAF recommends a phased approach, which requires scope 3 reporting depending on the sector in which the companies are active. For sectors where scope 3 emissions reporting is required (oil and gas, and mining in 2021), PCAF asks that the financial institution separately discloses absolute scope 3 emissions, including the specific sectors covered to allow for full transparency.

Vancity Investment Management does not directly invest in oil and gas; they do invest in mining (Materials). We will explore disclosing scope 3 emissions for specific sectors in the future, in line with best practice and as data and methodologies allow.

Attribution factor

Attribution factor = $\frac{\sum \text{outstanding amount}}{\text{Value of investee company}}$

MSCI account for a portion of the annual emissions associated with our investments by determining the ratio between the outstanding amount of our investment (numerator) and the value of the investee company. MSCI uses market capitalization to calculate the **value of the investee company** (market value of a company's outstanding shares). While PCAF allows for this approach, the Standard states a preference for using EVIC (enterprise value including cash) and has indicated it will require all financial institutions to use EVIC in 2024 and beyond.

The **outstanding amount** is the market value of the investment as at the end of the financial year (31 December 2021).

Financed emissions

Financed emissions data for investee companies was provided by MSCI ESG Research. MSCI ESG Research collects data once per year from most recent corporate sources, including annual reports, corporate social responsibility/sustainability reports and websites. When reported company data is unavailable, MSCI look at emissions data reported through the CDP (formerly the Carbon Disclosure Project) or government databases. In cases where companies have not disclosed any relevant data, MSCI ESG Research uses a proprietary methodology to estimate scope 1, scope 2, and scope 3 downstream and upstream emissions. We did not report scope 3 emissions due to concerns with the reliability of scope 3 data and potential double (or triple) counting.

Due to an inherent lag in public greenhouse gas emissions accounting and reporting by investees, the majority of reported 2021 actuals and estimates are likely based on 2020 company financial and emissions information. This is a known issue for this type of calculation and reporting, with PCAF recognizing that *“there is often a lag between financial reporting and required data, such as emissions data for the borrower or investee becoming available. In these instances, financial institutions should use the most recent data available even if it is representative of different years, with the intention of aligning as much as possible.”*

Data quality

Because the emissions data for 2021 was provided by MSCI ESG Research, a third party using a proprietary methodology, we are unsure of the weighted data quality score. However, the data quality likely ranges between 1 (verified company-reported emissions) and 3 (emission estimated based on physical activity) assuming the methodology used is in line with the GHG Protocol.

Note on the uncertainty of our climate data

The voluntary climate-related data we have chosen to disclose throughout this report, and related conclusions and statements, are necessarily based on many assumptions and estimates. Measurement errors, inaccurate approximations and choice of methodology can all lead to higher levels of uncertainty in the data we have reported. We applied the PCAF Global GHG Standard to the extent possible, which reduces uncertainty by constraining the choices we may make in our methodology, but we still needed to make certain methodological choices and assumptions. We have documented these in this document for full transparency, and to allow others to understand what we did, and to either use the same approach or (hopefully) build on and improve it.

The assumptions, estimates and underlying data contained in this report are subject to change, just as our climate-related capabilities and net zero by 2040 transition plan will continue to evolve. We expect that certain disclosures made in this report will be amended, updated, recalculated and restated in the future.

We will consider conducting a sensitivity analysis to reveal differences in our emissions inventory results due to methodological choices, especially as we report progress year over year while continuing to improve our data quality score and coverage.

Glossary and abbreviations

Absolute emissions: The emissions attributed to a financial institution's lending and investing activity. Expressed in tonnes CO₂e.

Assurance: The provision of an independent, objective examination and assessment of certain subject matter or performance information to give confidence or credibility.

Assurance provider (independent/external): A practitioner who provides assurance. Types of assurance providers vary from professional audit and quality assurance firms, sustainability assurance consultancies, civil society assurers and opinion/non-governmental organization leaders or advisory panels.

Attribution factor: The share of total greenhouse gas (GHG) emissions of the borrower or investee that are allocated to the loans or investments made.

Base year: A historical year against which a company's emissions are tracked over time.

Business loans: On-balance sheet loans and lines of credit for general business purposes (i.e., with unknown use of proceeds) to non-listed/private businesses and nonprofits. This includes revolving credit facilities, overdraft facilities, and real estate secured general purpose loans/line of credits. Note that we included business mortgages under Commercial real estate in line with the PCAF Global GHG Standard.

Carbon offsets: A reduction in greenhouse gas emissions created by one party that can be purchased and used to compensate for (offset) the greenhouse gas emissions of another party.

CO₂ equivalent (CO₂e): The universal unit of measurement to indicate the global warming potential (GWP) of each greenhouse gas, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis.

Commercial real estate (CRE) loans: On-balance sheet loans used for the purchase or re-finance of properties used for commercial purposes, such as office, retail, hotels, and large multifamily rentals. In all cases, the building owner leases the

property to tenants to conduct income-generating activities. (Note that while commercial real estate lending also includes loan to industrial properties, land loans, and construction or renovation loans, these are not currently included in Vancity's reported emissions due to lack of a suitable methodology or appropriate data.)

Direct emissions: Emissions from sources that are owned or controlled by the reporting entity or the borrower or investee.

Emissions: This is a short-form way of referring to greenhouse gas emissions (GHGs) and refers to the release of greenhouse gases into the atmosphere.

Emission factor: A factor that converts activity data into GHG emissions data (e.g., kg CO₂e emitted per liter of fuel consumed, kg CO₂e emitted per kilometer traveled, etc.).

Emissions intensity (economic): Absolute emissions divided by the loan and investment volume, expressed as tCO₂e/\$M invested.

Emissions intensity (physical): Absolute emissions divided by an output value, expressed as tCO₂e/MWh, tCO₂e/tonne product produced.

Financed emissions: Absolute emissions that banks and investors finance through their loans and investments.

Global Industry Classification Standard (GICS): A method for assigning companies to a specific economic sector and industry group that best defines its business operations. It is used widely by investment market participants as an industry analytical framework for investment research and portfolio management.

Greenhouse gases (GHGs): Six gases covered by the United Nations Framework Convention on Climate Change (UNFCCC): carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF₆).

GHG Protocol: A comprehensive global standardized framework to measure and manage GHG emissions from private and public sector operations, value chains, and mitigation actions. The GHG Protocol supplies the world's most widely used GHG accounting standards.

Indirect emissions: Emissions that are a consequence of the activities of the reporting entity but occur at sources owned or controlled by another entity. Scope 2 and 3 emissions cover indirect emissions.

Listed equity: Shares, units or other financial products listed and traded on an exchange.

Loan origination: The process by which a borrower applies for a new loan, and a lender processes that application.

Motor vehicle loans: On balance sheet consumer loans and lines of credit for specific for the specific purpose of financing motor vehicles. (Note that business loans and lines of credit may also be used to finance motor vehicles; however, because Vancity is currently unable to track this, these loans have been included under business loans for now.)

North American Industry Classification System (NAICS): A business classification system that facilitates the comparison of statistics of business activities across North America. Companies are classified and separated into industries that are defined by the same or similar production processes. (For business loans in Vancity's portfolio where we know company revenue, we apply the appropriate emission factor for the sector based on NAICS per unit of revenue, e.g., tCO₂e per dollar revenue earned in a sector.)

Net zero: Reducing GHG emissions and investing in solutions that bring the balance of your emissions to net zero. Once reductions have come as close to zero as possible, remaining solutions may include carbon sequestration through forests or other nature-based solutions, and/or technologies that sequester (or trap) GHG emissions. Many businesses (and governments) are setting time-bound targets for net zero. E.g., Vancity is committed to [Net Zero by 2040](#).

Off-balance sheet managed client investments: Discretionary and non-discretionary member and client investments, such as mutual funds, stocks, bonds, or cash and cash equivalents, which we manage on their behalf.

On-balance sheet assets: Everything a company owns that is determined to have a future economic benefit, and that is reported on the balance sheet.

Operational emissions: The emissions generated by a company's operations, expressed in tonnes of carbon-dioxide equivalent (tCO₂e). At Vancity, operational greenhouse gas emissions include those from premises energy use, paper use, our vehicle fleet, employee business travel by vehicle or air, and employee commuting to and from work in a single-occupancy vehicle.

Partnership for Carbon Accounting Financials (PCAF): Open-source methodologies that enable financial institutions to measure the greenhouse gas emissions associated with their loans and investments.

Project finance: This asset class includes all loans or equities to projects for specific purposes (i.e., with known use of proceeds as defined by the GHG Protocol) that are on the balance sheet of the financial institution. The financing is designated for a defined activity or set of activities, such as the construction and operation of a wind or solar project, or energy efficiency projects. (Note that construction and installation emissions are current excluded from Vancity's emissions reporting.)

Residential mortgages: On-balance sheet consumer loans and lines of credit used for the purchase and refinance of residential property. (Note that residential property used to conduct income-generating activities is included under commercial real estate. We have also not reported loan balances or estimated emissions for loans that are used for the construction and renovation of residential homes.)

Scope 1 emissions: Direct GHG emissions that occur from sources owned or controlled by the reporting company—i.e., emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.

Scope 2 emissions: Emissions from the generation of purchased or acquired electricity, steam, heating or cooling consumed by the reporting company.

Scope 3 emissions: All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. Upstream emissions Indirect GHG emissions from purchased or acquired goods and services. Downstream emissions Indirect GHG emissions from sold goods and services.

Scope 3 category 15 (investments) emissions: This category includes scope 3 emissions associated with the reporting company's loans and investments in the reporting year, not already included in scope 1 or scope 2. Note that scope 3 (15) for

Vancity equates to scopes 1 and 2 for our members and clients—and scope 3 where required and/or data and methodologies exist.

Small and medium-sized businesses/enterprises (SMEs): According to Industry Canada, small businesses are businesses with 1 to 99 employees; Medium-sized businesses are businesses with 100 to 499 employees.