

**BGO**

# **Annex 1: 2022 GHG Reporting Methodology**

**June 2023**

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# 1. Background

BGO reports its emissions annually as a way to identify and manage its climate-related risks and opportunities. It supports BGO's ability to drive building performance, reduce energy usage, and progress towards net zero targets.

Brightly Software (Brightly), in concert with BGO, prepares an energy, water, and emissions report each year, summarizing progress made in reducing energy, water, and emissions across select funds in the Investment Management portfolio, i.e. select BGO funds where BGO is the asset manager, including office, retail, medical, residential and industrial assets. Emissions are calculated for each real estate asset following the guidance of the GHG Protocol<sup>i</sup>, the industry standard for corporate disclosure purposes.

Using the Scope 1, 2, and 3 emissions inventory of the properties owned by the investment funds, Brightly calculates the Scope 3, Category 15 emissions that BGO is responsible for reporting for its assets under management (AUM) following the guidance Partnership for Carbon Accounting Financials (PCAF)<sup>ii</sup> for reporting of financed emissions.

This document details the methodology used to derive the greenhouse gas (GHG) emissions reported for the 2022 reporting year (January 1<sup>st</sup>, 2022 to December 31<sup>st</sup>, 2022).

## 2. Operational Boundaries

Operational boundaries define the parts of the operation, or 'activities', for which emissions will be reported. Emissions are reported for energy and water consumed and waste generated across select assets under management (corresponding properties owned by the Sun Life, Prime, ILP, and BGO-Diversified funds). Emissions for other equity and debt strategies is not reported at this time, given the limited availability of whole-building data. The four funds covered in reported emissions represented around 44% of AUM in 2019 (BGO's baseline year) and around 38% of AUM in 2022.

Scope 1, 2 and 3 emissions resulting from the operation of properties are compiled at the asset level, as described in sections 2.1 - 2.3, below. The underlying scope 1, 2, and 3 emissions of the real estate investments comprise the Scope 3, category 15 emissions reported by BGO related to its AUM.

### 2.1 Scope 1 Emissions

Scope 1 emissions are direct emissions that originate at asset managed properties. These include natural gas and fuel oil consumption for space heating, water heating and, in some cases, cooking. Emissions from refrigerants used on-site are outside of the reporting scope as noted in section 2.5.

### 2.2 Scope 2 Emissions

Scope 2 emissions are indirect emissions from purchased electricity, steam and chilled water that is consumed at asset managed properties, but generated elsewhere.

### 2.3 Scope 3 Emissions

Brightly calculates partial coverage of two categories of Scope 3 emissions, as defined by the GHG Protocol Value Chain Reporting Standard<sup>iii</sup>, for buildings in BGO's asset managed portfolio:

- Category 4 (upstream transportation and distribution) emissions related to water use,
- Category 5 (waste generated in operations),

## 2.4 Greenhouse Gases Included in Inventory

Reported emissions are in units of tonnes of CO<sub>2</sub> equivalent. Emission factors (section 10) include emissions impacts of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. Other gases outlined in the Kyoto Protocol, including HFCs, PFCs, SF<sub>6</sub>, and NF<sub>3</sub>, are not included due to limitations in the availability of data.

## 2.5 Inventory Exclusions

Of the relevant emissions applicable to BGO's asset managed portfolio, the following sources are not included in the 2022 reporting year:

**Fugitive emissions from refrigerants:** Information regarding chiller specifications and refrigerant types is not readily available data that is tracked. Fugitive emissions from refrigerants are anticipated to be of low materiality.

**Uncharacterized Scope 3 emissions:** Scope 3 emissions from purchased goods and services, life-cycle fuel- and energy-related activities (including SF<sub>6</sub> emissions from electricity transmission infrastructure), upstream transportation and distribution of purchased products (apart from water), and downstream wastewater treatment are not reported as reliable data cannot currently be obtained.

# 3. Organizational Boundaries

Organizational boundaries define the approach to determining ownership or control over the energy and emissions reported for the property portfolio and can be classified as financial control, equity share, or operational control.

BGO reports energy and emissions using the financial control approach. The GHG Protocol defines financial control as having the ability to direct the financial and operating policies of the operation, with a view to gaining economic benefits from its activities.

## 3.1 BGO's Financed Emissions

As an asset manager of private real estate equity, to the extent feasible, BGO reports emissions associated with its AUM under Scope 3, Category 15 (Investments), applying the PCAF Global GHG Standard when measuring and disclosing emissions. The PCAF standard is aligned with the GHG Protocol. Utilizing PCAF's framework helps reduce the uncertainty in our emissions impact, however some methodological choices, interpretations, and assumptions are required. These are documented below.

Per the guidance of PCAF, BGO's financed emissions are equivalent to the Scope 1, 2, and 3 emissions of the emissions of the investments (BGO's clients' property-level emissions, see section 3.1.1 below), adjusted (if necessary) by an **attribution factor**.

PCAF defines the attribution factor for emissions at a building as:

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

(with  $b$  = building)

With the note that for investors, the numerator is the investment amount. Thus, for equity investments in real estate by funds managed by BGO:

- For directly financed real estate, where the BGO-managed fund owns 100% of a property, then BGO would include 100% of emissions.
- For jointly owned properties, the attribution factor would reflect ownership share.

### 3.1.1 Emissions Inventories for BentallGreenOak Assets Under Management

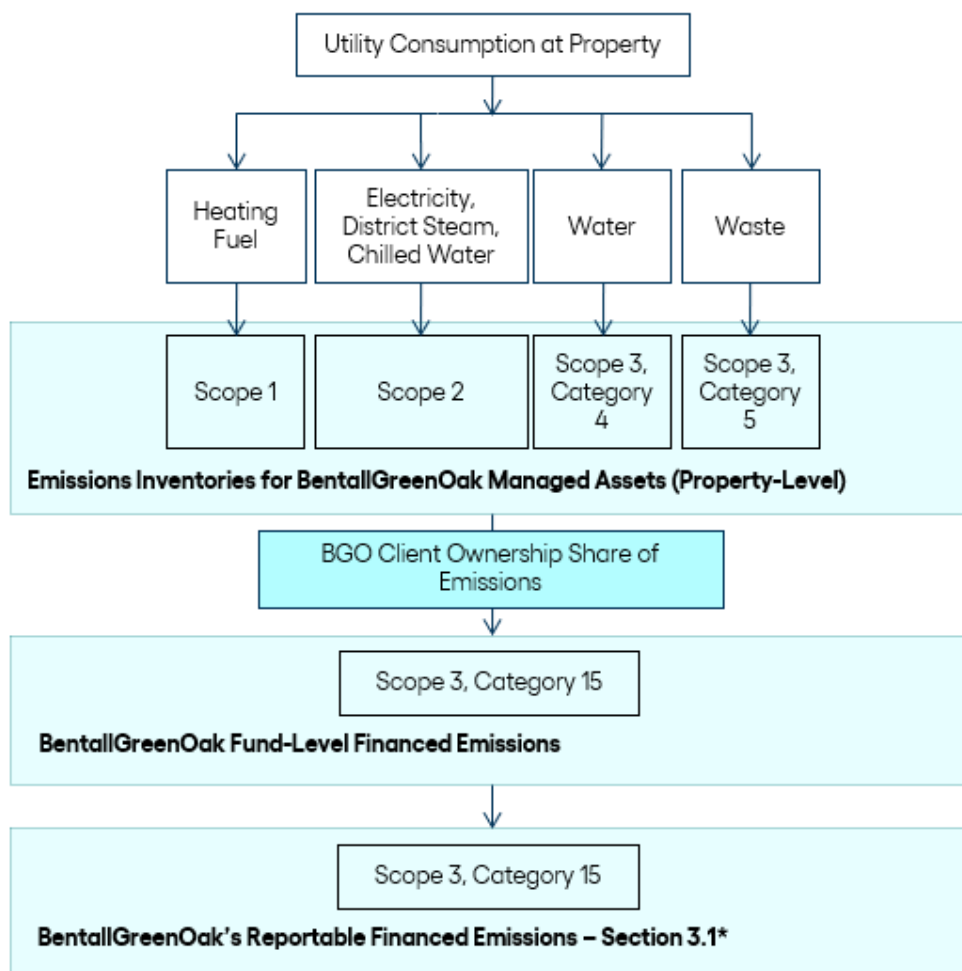
To calculate BGO’s financed emissions, emissions inventories (including Scope 1, 2, and 3 emissions) are required for each BGO asset under management. Per the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard<sup>iii</sup> for reporting emissions from leased assets, the responsibility for emissions associated with leased assets depends on the economic substance of the lease (capital or operating) and the choice of organizational boundary approach. Under the financial control approach, emissions associated with an operating lease are categorized as follows:

*Lessor has ownership and financial control, therefore emissions associated with fuel combustion are scope 1 and use of purchased electricity are scope 2.*

Following the GHG Protocol description above, the lessor of commercial, residential, and industrial spaces, have financial control at directly financed real estate investment properties. Therefore, for the purposes of calculation of the emissions of individual BGO-managed real estate assets, all fuel and energy-related emissions is classified as Scope 1 and 2 at the property level, including where the tenant pays for utilities directly or via submetering.

## 4. Application of Boundaries

The boundaries defined above are applied to utility consumption based on the following decision tree.



\* Financed emissions reported per Section 3.2 are calculated per the PCAF Global Standard as the product of building emissions and an **attribution factor**. For joint-venture (JV) equity investments, the attribution factor ultimately represents the BGO-managed fund’s equity share in the property. At JV properties where the BGO fund is the controlling partner, the total Scope 1, 2, and 3 emissions reported by the equity investor will differ from the Scope 3 financed emissions reported by BGO (section 3.1) due to the application of the attribution factor.

## 5. Comparison to Historical Years

For comparative purposes, BGO reports GHG emissions relative to a 2019 Base Year. This method has been selected to align with the baseline of the 2030 interim targets set by BGO as part of its commitment to the Net Zero Asset Managers initiative.

### 5.1 Base Year Recalculation Policy

Energy and emissions are recalculated for the Base Year and each historical year to account for the following factors:

1. Property acquisitions and divestments by BGO clients.
2. Properties or accounts owned in the base year, but previously excluded from scope.
3. Corrections to historical data based on availability of more accurate information.
4. More recently published emission factors.
5. Changes to reporting methodology.

Any historical energy or emissions quantity included in BGO's disclosure which is affected by one of these factors is re-calculated for 2022 reporting, irrespective of the significance. In cases where historical data is not available, historical consumption is estimated based on the best data available. The base year is not recalculated to account for new property developments or demolitions.

Adjustments for acquisitions / divestments are treated using the 'Same-year, Pro-rata'<sup>iv</sup> approach, meaning that buildings only owned for a portion of the reporting year (2022) are included in all historical years for the same period. Utility use, waste, emissions, and 'effective' gross leasable area are all adjusted proportionately for the period of ownership in 2022.

### 5.2 Treatment of Scope 2 Emission Factors in Historical Years

#### 5.2.1 Canada

Electricity emission factors vary over time as the generation mix throughout Canada changes. Environment Canada publishes a 'National Inventory Report' (NIR) each year. The 2022 NIR, used in the preparation of this emission report, contains annual electricity emission factors reflecting the electricity generation mix in each year from 2000-2020. Emissions could be calculated in two ways:

Method 1: Using the 2022 NIR annual emission factors for the corresponding year for each year prior to 2020, and the 2020 emission factors to report 2020-2022 emissions

Method 2: Using the 2020 emission factors for all years

Method 1 has been applied to allow an accurate assessment of year-to-year changes in emissions. Water emission factors are dependent on electricity emission factors and are therefore also affected by this choice of calculation method. This is a change relative to BGO's reporting for the 2021 emissions reporting year, for which Method 2 was applied.

#### 5.2.2 USA

The US Environmental Protection Agency (EPA) periodically publishes the Emissions & Generation Resource Integrated Database (eGRID), specifying electricity emission factors. The 2020 values from eGRID2020, published in 2022, are used to report 2020-2022 emissions. The eGRID2019 factors published in 2021 are used to report 2019 emissions. Residual mix data from green-e is used for market-based reporting.

## 6. Treatment of Waste

BGO began reporting emissions generated from waste in 2008. Emissions are reported for waste that is sent to landfill only. No emissions are reported for recycled or composted waste.

In 2019-2020, some BGO properties sent waste to Waste-to-Energy (WTE) facilities, where it was used to generate electricity.

In order to conservatively estimate emissions from trash sent to WTE facilities, it is assumed that 10% of the material sent to WTE facilities still ends up in landfill.

Emissions are calculated using the following formulas for properties that send trash to WTE facilities:

**Landfilled waste**            trash weight produced by site – 0.9 \* trash weight sent to WTE facility

**Emissions**                landfilled trash \* waste emission factor

Emissions produced from power production at WTE facilities are not included in this report on the basis that the trash is used as a fuel source, as opposed to being wasted. Analogously, a natural gas producer would not report emissions from the combustion of fuel at generating stations to which it sells fuel. Emissions from the combustion of waste at WTE facilities would be accounted for in the electricity emission factor for the region in which the power is generated.

## 7. Renewable Energy Credits and Carbon Offsets

Renewable Energy Credits and Carbon Offsets are two distinct mechanisms used to reduce GHG emissions. This section details how each is handled with respect to emission reporting.

### 7.1 Renewable Energy Credits

Renewable Energy Credits (RECs) represent the rights to the environmental benefits from generating electricity from renewable sources. RECs have been purchased properties in the BGO managed portfolio and are reported using the Market-based Approach, as discussed below.

#### 7.1.1 Market-based Approach vs. Location-based Approach

In January 2015, the World Resource Institute published the GHG Protocol Scope 2 Guidance<sup>v</sup>, defining two approaches to emission reporting and specifying that emissions should be reported using both approaches (dual reporting), effective as of the 2015 reporting year.

- The location-based approach reflects the average emissions intensity of grids on which energy consumption occurs and does not account for REC purchases or any other contractual instruments.
- The market-based approach reflects the emissions from electricity that BGO has chosen to purchase via contractual instruments. This approach does account for REC purchases.

Considering this guidance, both location-based and market-based emissions are reported for BGO's portfolio. Base Year and historical year market-based emissions have been calculated based on the GHG Scope 2 Guidance, as per the Base Year Recalculation Policy detailed in Section 5.

#### 7.1.2 Quality Criteria

The GHG Protocol Scope 2 Guidance, discussed in Section 7.1, sets out 8 'Quality Criteria' for the inclusion of contractual instruments, such as RECs, in market-based accounting.

RECs purchased in 2019-2022 and accounted for in the 2022 reporting year are registered via the Western Renewable Energy Generation Information System (WREGIS), the M-RETS Renewable Electricity Platform, or the North American Renewables Registry, and meet the Quality Criteria. Other

RECs purchased for individual properties from 2019-2021 are Green-e certified and specify 100% wind power. Green-e has stated publicly that their certified RECs meet the Quality Criteria requirements<sup>vi</sup>.

### 7.1.3 Volume Allocation

REC contracts typically specify the volume of RECs purchased in one of two ways:

1. As a percentage of a building's electricity consumption
2. As a fixed amount, approximating a percentage of the building's total electricity (or in some cases total energy) use over a specified number of years.

In cases where a fixed volume of RECs are purchased, there are often no start and end dates associated with the agreements; the contracts confirm only the amount of renewable energy that will be delivered to the grid and a number of years for which the contract applies. In these cases, assumptions have been made as to the intended start date of application of the RECs – often corresponding to a particular calendar year (January 1<sup>st</sup> – December 31<sup>st</sup>).

In cases where RECs cover common area and tenant electricity use at a property, RECs are first applied to the common area consumption and the remainder are applied to tenant consumption.

### 7.1.4 Market-based emissions calculations

Market-based emissions are calculated as follows, in accordance with the GHG Protocol Scope 2 Guidance:

1. Electricity consumption at a property for which RECs are purchased is reported as having zero emissions, given that all RECs reported are from 100% renewable sources.
2. For all other electricity consumed at a property, emissions are calculated using the appropriate "residual mix" emission factors, where available<sup>vii</sup>. Residual mix emission factors represent the emissions from the grid, after discounting reductions achieved by RECs sold on the market. Residual mix emission factors were available for the first time for the US in 2019 based on 2017 data.
3. In cases where RECs are purchased for more than 100% of a property's electricity consumption, emissions from electricity are reported as zero (i.e. negative emissions are not reported).

## 7.2 Carbon Offsets

Carbon Offsets, or Verified Emissions Reductions, are direct reductions in GHG emissions that can be purchased to 'offset' property emissions. Unlike RECs, Carbon Offsets are purchased in units of 'tonnes of CO<sub>2</sub> equivalent' (tCO<sub>2</sub>e) and are not related to electricity purchased or consumed at a property. Carbon Offsets are purchased for some properties in the BGO portfolio to offset Scope 1 and 2 emissions. Offsets are subtracted from the total location-based and market-based emissions to report 'Net location-based' and 'Net market-based' emissions.

## 8. Utility Data Sources

The primary activity data for calculation of GHG emissions for BGO's real estate portfolio is building utility consumption, i.e. heating fuel (natural gas or oil), electricity, and water use. Reported utility data is retrieved in one of four ways:

1. Utility consumption (heating fuel, electricity, and water) billed by utility vendors. Utility consumption is retrieved directly from utility bills or from utility vendor data portals. Generally, utility bill data availability is limited to landlord-paid utility accounts.
2. Manual meter readings through Brightly's Meter Reader Mobile (MRM) application. Periodic meter readings for utility accounts not paid by BGO are made using the MRM application, supported by a timestamped photograph of the meter.
3. Aggregated whole-building utility consumption data made available through a mandatory or voluntary government benchmarking program, received directly from the utility vendor or a government agency.
4. Utility consumption collected by property managers at properties where utility bills are not tracked or processed by Brightly, entered directly into ENERGY STAR Portfolio Manager. Brightly retrieves this utility consumption data from Portfolio Manager and reports it as is – this data is not checked for anomalies or validated against utility bills by Brightly.

## 9. Utility Data Estimation and Data Quality

Where building utility data has not been retrieved by one of the sources described in section 8, it is estimated. Details on the methodology used to estimate data are outlined below.

### 9.1 Missing Utility Bills

Best efforts are made to collect actual utility consumption from utility bills or utility meters for all properties/accounts. Where verifiable utility data is not available, consumption is estimated based on a linear regression of available utility data and actual weather data. In the case of non-weather dependent accounts, historical consumption is assumed to be equal to recent year consumption.

### 9.2 Incomplete MRM Reading Data

With manual meter readings, Brightly can calculate consumption starting from the first uploaded meter reading through until the latest meter reading uploaded. If the first meter reading available was after the beginning of the reporting period, or the latest meter reading was before the end of 2022, some data must be estimated. Consumption is estimated based on a seasonally weighted average of historical consumption.

### 9.3 Prior-Year Whole Building Benchmarking Data

If 2021 data for whole building utility use is available as part of a benchmarking program, however the 2022 reporting year data is not yet available, 2022 consumption is estimated to be equal to 2021 consumption.

### 9.4 'Not Tracked' Properties

For some properties within the reporting scope, utility data is not available for reporting. In these cases, building energy use is estimated based on average utility use intensities (specific to individual building types) from Natural Resources Canada (NRCan)<sup>viii,ix</sup>, the US Energy Information Administration (EIA)<sup>x,xi</sup>, and ENERGY STAR<sup>xii</sup>, as summarized in the tables below. For parking garages, as applicable average intensities were not available from these sources, estimated utility use was based on an average of similar properties in Brightly's database.



### Assumed Energy and Water Intensities for Buildings in Canada without Actual Utility Data Available

Utility	Building Type	Average Intensity	Unit	Source
Electricity	Office	18.4	kWh/ft <sup>2</sup>	NRCan SCIEU Table 1 – Building characteristics, energy use and energy intensity by primary activity, 2014, NRCan SCIEU Table 7 – Share of fuel types by primary activity, 2014
Electricity	Enclosed Retail	15.6		
Electricity	Other Retail	15.6		
Electricity	Industrial or Warehouse	9.1		
Electricity	Medical	19.2		
Electricity	Mixed-Use	15.6		
Electricity	Multi-Res	11.4		
Electricity	Parking Garage	1.5		
Natural Gas	Office	10.8	ekWh/ft <sup>2</sup>	NRCan SCIEU Table 1 – Building characteristics, energy use and energy intensity by primary activity, 2014, NRCan SCIEU Table 7 – Share of fuel types by primary activity, 2014
Natural Gas	Enclosed Retail	13.3		
Natural Gas	Other Retail	13.3		
Natural Gas	Industrial or Warehouse	12.1		
Natural Gas	Medical	13.9		
Natural Gas	Mixed-Use	13.8		
Natural Gas	Multi-Res	10.2		
Natural Gas	Parking Garage	2.9		
Water	Office	54.9	L/ft <sup>2</sup>	US EIA CBECs Table W1. Water consumption in large commercial buildings, 2012
Water	Enclosed Retail	42.8		
Water	Other Retail	42.8		
Water	Industrial or Warehouse	12.5		
Water	Medical	59.1		
Water	Mixed-Use	77.2		
Water	Multi-Res	200.6		
Water	Parking Garage	9.4		
				ENERGY STAR Portfolio Manager Technical Reference: ENERGY STAR Water Score for Multifamily Housing in the United States, October 2017
				Average from Brightly database.

### Assumed Energy and Water Intensities for Buildings in the USA without Actual Utility Data Available

Utility	Building Type	Average Intensity	Unit	Source
Electricity	Office	13.6	kWh/ft <sup>2</sup>	US EIA CBECs 2018, Table C22. Electricity consumption totals and conditional intensities by building activity subcategories
Electricity	Enclosed Retail	12.2		
Electricity	Other Retail	15.2		
Electricity	Industrial or Warehouse	5.8		
Electricity	Medical	14.9		
Electricity	Mixed-Use	12.6		
Electricity	Multi-Res	6.9		
Electricity	Parking Garage	1.5		
Natural Gas	Office	5.6	ekWh/ft <sup>2</sup>	Total Energy Intensity from US EIA CBECs 2018 Table C12, Sum of major fuel consumption totals and gross energy intensities by building activity subcategories, minus electricity intensity from CBECs Table C22.
Natural Gas	Enclosed Retail	2.9		
Natural Gas	Other Retail	3.1		
Natural Gas	Industrial or Warehouse	3.1		
Natural Gas	Medical	3.6		
Natural Gas	Mixed-Use	8.0		
Natural Gas	Multi-Res	5.7		
Natural Gas	Parking Garage	2.9		
Water	Office	54.9	L/ft <sup>2</sup>	US EIA CBECs Table W1. Water consumption in large commercial buildings, 2012
Water	Enclosed Retail	42.8		
Water	Other Retail	42.8		
Water	Industrial or Warehouse	12.5		
Water	Medical	59.1		
Water	Mixed-Use	77.2		
Water	Multi-Res	200.6		
Water	Parking Garage	9.4		
				ENERGY STAR Portfolio Manager Technical Reference: ENERGY STAR Water Score for Multifamily Housing in the United States, October 2017
				Average from Brightly database.

## 9.5 Tenant Data Estimation

In many cases, the utility data tracked on Eco Tracker does not represent whole-building use, as tenants manage a portion of the utilities. In some of these cases, whole-building data is available through either a government benchmarking program or via MRM readings. However, when data coverage is not available for tenant utilities, the tenant portion of the building's consumption is estimated.

To estimate the tenant portion of utilities (where Brightly already tracks some utility use controlled by the landlord), a fraction of the building energy intensities listed in the previous section is assumed to correspond to tenant usage, according to the building type. The assumed tenant percentages used for North American assets are shown below. For reference, the resulting assumed tenant intensities for properties in Canada are presented as well, based on the whole-building intensities in section 9.4.

Assumed Tenant Utility Consumption Intensity by Building Type (Canada)

Utility	Building Type	Whole Building Intensity	Assumed Tenant Percentage	Assumed Tenant Intensity	Unit
Electricity	Office	18.36	10%	1.84	kWh/ft <sup>2</sup>
	Enclosed Retail	15.56	55%	8.56	kWh/ft <sup>2</sup>
	Other Retail	15.56	90%	14.00	kWh/ft <sup>2</sup>
	Industrial and Warehouse	9.10	93%	8.42	kWh/ft <sup>2</sup>
	Multi-Use	15.59	10%	1.56	kWh/ft <sup>2</sup>
	Medical	19.16	10%	1.92	kWh/ft <sup>2</sup>
	Parking Garage	1.53	0%	0.00	kWh/ft <sup>2</sup>
	Multi-Res	11.38	40%	4.55	kWh/ft <sup>2</sup>
Gas	Office	1.04	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>
	Enclosed Retail	1.28	65%	0.83	m <sup>3</sup> /ft <sup>2</sup>
	Other Retail	1.28	90%	1.15	m <sup>3</sup> /ft <sup>2</sup>
	Industrial and Warehouse	1.17	90%	1.05	m <sup>3</sup> /ft <sup>2</sup>
	Multi-Use	0.51	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>
	Medical	1.34	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>
	Parking Garage	0.28	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>
	Multi-Res	0.98	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>
Water	Office	0.05	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>
	Enclosed Retail	0.20	10%	0.02	m <sup>3</sup> /ft <sup>2</sup>
	Other Retail	0.04	35%	0.01	m <sup>3</sup> /ft <sup>2</sup>
	Industrial and Warehouse	0.01	75%	0.01	m <sup>3</sup> /ft <sup>2</sup>
	Multi-Use	0.08	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>
	Medical	0.06	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>
	Parking Garage	0.01	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>
	Multi-Res	0.20	0%	0.00	m <sup>3</sup> /ft <sup>2</sup>

The assumed tenant percentages are based on data available for properties tracked by Brightly.

## 9.5.1 Assumed Gross Floor Area

The energy and water intensities in sections 9.4-9.5 are used to estimate whole-building utility use based on building area. Precise gross floor areas (GFA) inclusive of enclosed common areas are not available for all BGO managed assets, however gross leasable areas (GLA) are known. To generate reasonable estimates of total building utility use, GFAs have been estimated based on GLAs. Appendix 3a of the GRESB Real Estate Reference Guide<sup>xiii</sup> provides a range of typical common area ratios (common area ft<sup>2</sup> / GFA) for each property sub-type. Brightly uses the midpoint of this range for the applicable property sub-type for each BGO asset to estimate GFA.

Assumed Common Area Ratios for GFA Estimation

GRESB Property Sub-Type	GRESB Common Area Ratio Range		
	Minimum	Maximum	Midpoint
Retail, Shopping Center	0.2	0.3	0.25
Industrial, Other	0.01	0.05	0.03
Manufacturing	0.01	0.05	0.03
Industrial park	0.01	0.05	0.03
Medical office	0.2	0.3	0.25
Family homes	0.01	0.1	0.055
High-rise multi-family	0.2	0.3	0.25
Low-rise multi-family	0.2	0.3	0.25
Mid-rise multi family	0.2	0.3	0.25
Senior homes	0.15	0.35	0.25
Data center	0.01	0.1	0.055
Mixed use, Office/Industrial	0.05	0.3	0.175
Mixed use, Office/Retail	0.05	0.3	0.175
Mixed use, Other	0.05	0.3	0.175
Self-storage	0.05	0.15	0.1
High-rise office	0.2	0.3	0.25
Low-rise office	0.2	0.3	0.25
Mid-rise office	0.2	0.3	0.25
Office, Other	0.2	0.3	0.25
Retail, Lifestyle Center	0.01	0.05	0.03
Retail, Other	0.01	0.15	0.08
Retail, Strip Mall	0.01	0.05	0.03
Retail, Warehouse	0.01	0.05	0.03
Parking (indoors)	0.05	0.35	0.2
Distribution warehouse	0.01	0.05	0.03
Distribution warehouse, refrigerated	0.01	0.05	0.03

## 9.6 Data Quality Scoring

The PCAF Global Standard provides a data estimation hierarchy, assigning five “data quality scores” to differing options for building emissions data calculation or estimation. Their definitions are shown below.

PCAF Data Quality Scoring for Financed Emissions in Corporate Real Estate

Data Quality	Options to estimate the financed emissions	When to use each option
Score 1	Option 1: Actual building emissions	1a 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.
Score 2		1b 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.
Score 3	Option 2: Estimated building emissions based on floor area	2a 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.
Score 4		2b 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.
Score 5	Option 3: Estimated building emissions based on number of buildings	3 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.

Source: Table 5-14, The Global GHG Accounting & Reporting Standard Part A: Financed Emissions. Second Edition. (Partnership for Carbon Accounting Financials, December 2022)

The data calculated for BGO falls into several of these categories.

- Where actual utility data is available and a supplier-specific emission factor is listed in Section 10 (i.e. for some district utilities in Canada), these emissions are assigned **Score 1**.
- Where actual utility or waste data is available and a regional average emission factor is used, these emissions are assigned **Score 2**.
- Where missing utility data is estimated per sections 8.1, 8.2, or 8.3, the estimated energy data is building specific. We therefore expect these estimations to be more accurate than estimations based on energy labels and floor areas (option 2a), but less accurate than actual primary data (option 1b). These emissions are assigned **Score 3**.
- Where missing utility data is estimated for the whole building or for tenant spaces per sections 8.4 and 8.5, the estimation methodology aligns with option 2b. These emissions are assigned **Score 4**.

Each building’s emissions may contain components with different data quality scores – for example when partial utility data is available, allowing for some emissions to be calculated with Score 2, while the remainder are estimated with Score 3. The aggregate data quality score for the building is the weighted average (by emissions mass) of the applicable scores for each component. Overall, the data quality score for BGO’s 2022 emissions is 2.8. It is expected that this will improve over time with BGO’s efforts to collect more comprehensive utility data from properties with tenant-controlled utilities.

## 10. Emission Factors

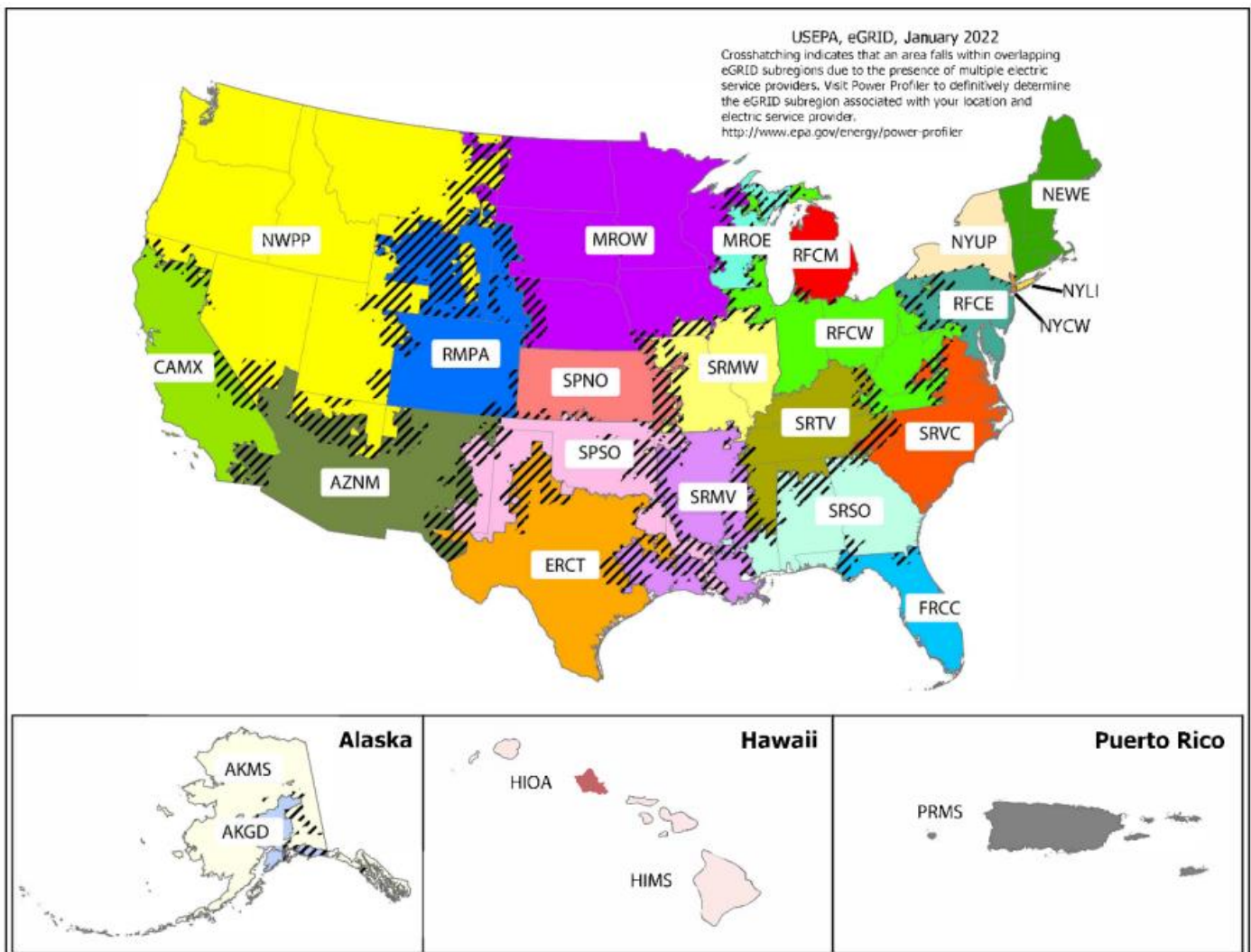
Emissions were calculated using emission factors from publicly available sources wherever possible. The following sections detail the emission factors used for Canada and the US along with the source for each factor.

### 10.1 United States

Electricity emission factors are regionally specific. The US Environmental Protection Agency (EPA) periodically publishes the Emissions & Generation Resource Integrated Database (eGRID). eGRID assigns electricity emission factors to 'eGRID subregions', shown in the figure below, based on the generation resource mix. The factors used for reporting are the 2020 values from eGRID2020, published in 2022.

Emission factors for water all also regionally specific since they are partially based on the pumping energy used to deliver water to the properties.

EPA eGRID Subregions



Source: eGRID Technical Guide with Year 2020 Data, Appendix B (United States Environmental Protection Agency, 2022)

## 10.1.1 Electricity

The following table provides the electricity emission factors used for properties in the United States.

Electricity Emission Factors – US

eGRID Region	Electricity Location-based Emission Factor (gCO <sub>2</sub> e/kWh)		Electricity Market-based Emission Factor (gCO <sub>2</sub> e/kWh)	
	2019	2020-2022	2019	2020-2022
AKGD	508.4	500.9	513.7	503.4
AKMS	250.1	243.2	250.1	243.2
AZNM	434.0	385.6	435.2	386.4
CAMX	206.5	233.8	210.3	239.3
ERCT	395.7	372.9	422.4	412.4
FRCC	392.1	380.2	395.0	382.5
HIMS	542.3	522.1	542.3	522.1
HIOA	774.5	755.5	774.5	755.5
MROE	686.1	696.6	686.1	696.6
MROW	501.9	447.5	525.3	473.3
NEWE	224.0	241.8	224.9	242.6
NWPP	326.5	273.9	335.0	281.3
NYCW	251.8	288.5	251.8	288.5
NYLI	552.9	550.1	552.9	550.1
NYUP	105.7	106.4	105.7	106.4
PRMS	700.0	729.6	707.7	729.7
RFCE	316.8	297.3	316.9	297.4
RFCM	542.9	526.1	543.2	526.8
RFCW	487.3	449.4	487.5	450.3
RMPA	567.2	522.4	582.0	533.1
SPNO	488.8	435.8	524.2	478.9
SPSO	456.6	424.5	540.5	492.4
SRMV	367.2	336.8	368.0	337.9
SRMW	723.9	676.5	727.5	685.7
SRSO	441.8	392.0	444.8	394.2
SRTV	433.4	380.7	433.5	380.8
SRVC	308.1	284.1	309.4	285.9

## 10.1.2 Water

Emission factors for water are also regionally specific since they are partially based on the electrical pumping energy used to deliver water to the properties. The emission factors applied for water are based on the eGRID electricity emission factors summarized above along with assumed energy intensities of upstream pumping and treatment of water, from Wakeel et al. (2016)<sup>xiv</sup> and Maas (2009)<sup>xv</sup>.

Water Emission Factors - US

eGRID Region	Water Emission Factor (gCO <sub>2</sub> e/m <sup>3</sup> )	
	2019	2020-2022
AKGD	488.1	480.8
AKMS	240.1	233.4
AZNM	416.7	370.2
CAMX	1,104.8	1,250.9
ERCT	379.9	358.0
FRCC	376.5	365.0
HIMS	520.6	501.3
HIOA	743.6	725.2
MROE	658.7	668.8
MROW	481.8	429.6
NEWE	215.0	232.1
NWPP	313.5	262.9
NYCW	241.7	276.9
NYLI	530.8	528.1
NYUP	101.5	102.1
PRMS	672.0	700.4
RFCE	304.2	285.4
RFCM	521.2	505.0
RFCW	467.9	431.5
RMPA	544.6	501.5
SPNO	469.2	418.4
SPSO	438.4	407.5
SRMV	352.5	323.3
SRMW	695.0	649.4
SRSO	424.1	376.3
SRTV	416.1	365.4
SRVC	295.7	272.7

### 10.1.3 Heating Fuels and Steam

Emission factors applied for heating fuels and steam in the United States are summarized below. There was no year-to-year variation in the applied emission factors from 2019-2022.

#### Heating Fuel and Steam Emission Factors and Sources – US

Utility Type	eGRID Region	2019-2022 Emission Factor	Unit of Measure	Source
Natural Gas	All	1,931.4	gCO <sub>2</sub> e/m <sup>3</sup>	AP 42, Fifth Edition, Volume I Chapter 1.4: Natural Gas Combustion
Oil	All	2,705.4	gCO <sub>2</sub> e/L	ENERGY STAR Portfolio Manager Technical Reference: Greenhouse Gas Emissions (December 2022)
Propane	All	1,561.5	gCO <sub>2</sub> e/L	ENERGY STAR Portfolio Manager Technical Reference: Greenhouse Gas Emissions (December 2022)
Steam	All except NYCW	79.3	gCO <sub>2</sub> e/lb	ENERGY STAR Portfolio Manager Technical Reference: Greenhouse Gas Emissions (December 2022)
	NYCW	53.6	gCO <sub>2</sub> e/lb	New York City Local Law No. 97

### 10.1.4 Waste

Waste emission factors reflect the methane released by the decay of organic carbon in landfilled waste.

#### Waste Emission Factors and Sources – US

2019-2022 Waste Emission Factor (gCO <sub>2</sub> e/kg)	Source
1,666.5	USA National Inventory Report 1990-2015 & National Inventory Report 1990-2018



## 10.2 Canada

Emission factors for electricity, natural gas, and oil are sourced from Environment and Climate Change Canada's *National Inventory Report*<sup>xvii</sup>. The National Inventory Report (NIR) is Canada's annual submission to the UN Framework Convention on Climate Change.

### 10.2.1 Electricity

The following table summarizes the electricity emission factors from Table A-13 of Part 3 of the 2022 NIR.

Electricity Emission Factors - Canada

Province	Electricity Emission Factor (gCO <sub>2</sub> e/kWh)	
	2019	2020-2022
AB	630.0	590.0
BC	18.0	7.3
MB	1.2	1.1
NB	300.0	290.0
NL	27.0	24.0
NS	690.0	670.0
NT	170.0	180.0
ON	26.0	25.0
PE	300.0	290.0
QC	1.2	1.5
SK	670.0	580.0
YT	100.0	580.0

### 10.2.2 Water

The emission factors applied for water are based on the electricity emission factors summarized above along with assumed energy intensities of upstream pumping and treatment of water from Maas (2009).

Water Emission Factors - Canada

Province	Water Emission Factor (gCO <sub>2</sub> e/m <sup>3</sup> )	
	2019	2020-2022
AB	803.9	752.8
BC	23.0	9.3
MB	1.5	1.4
NB	382.8	370.0
NL	34.5	30.6
NS	880.4	854.9
NT	216.9	229.7
ON	33.2	31.9
PE	382.8	370.0
QC	1.5	1.9
SK	854.9	740.1
YT	127.6	127.6

### 10.2.3 Heating Fuels

The emission factors for natural gas provided in Annex 6 of Part 2 of the 2022 NIR differ by province and indicate changes in emissions intensity over time related to the presence of complex hydrocarbons in marketable natural gas. The emission factors used for 2022 reporting are summarized below.

Natural Gas Emission Factors - Canada

Province	Natural Gas Emission Factor (gCO <sub>2</sub> e/m <sup>3</sup> )
	2019-2022
AB	1,973.4
BC	1,977.4
MB	1,926.4
NB	1,932.4
NL	1,932.4
NS	1,932.4
NT	1,977.4
ON	1,932.4
PE	N/A
QC	1,937.4
SK	1,931.4
YT	1,977.4

The emission factor for oil from Annex 6 of the 2022 NIR is as follows:

Oil Emission Factor - Canada

Province	Oil Emission Factor (gCO <sub>2</sub> e/L)
	2019 - 2022
All	2,762.9

### 10.2.4 District Energy

Where available, emission factors for district energy (including steam, hot water, and chilled water) are obtained from the supplier. Otherwise, the emission factor for Canadian Steam from ENERGY STAR Portfolio Manager's Technical Reference for Greenhouse Gas Emissions is used. The emission factors and sources for Steam are summarized below.

Steam Emission Factors and Sources - Canada

Province	Steam Emission Factor (gCO <sub>2</sub> e/lb)				Source
	2019	2020	2021	2022	
All except BC, ON	105.7	105.7	105.7	105.7	ENERGY STAR Portfolio Manager Technical Reference: Greenhouse Gas Emissions
BC	89.9	87.4	90.8	90.8	2021 Creative Energy GHG Calculator for Customers
ON	74.9	71.4	76.6	76.6	2019, 2020, and 2021 Enwave EPL Studies

Enwave Energy Corporation operates a district chilled water system in downtown Toronto which uses water from Lake Ontario to deliver cooling energy to buildings. Emission factors for this district “deep lake water cooling” system are determined annually.

Deep Lake Water Cooling Emission Factors and Sources - Canada

Province	Deep Lake Water Cooling Emission Factor (gCO <sub>2</sub> e/ton-h)				Source
	2019	2020	2021	2022	
ON	25.0	20.1	22.5	22.5	National Inventory Report (NIR); 2019, 2020, and 2021 Enwave EPL Studies

## 11. Glossary of Terms

Base Year	The earliest year selected for inclusion in reporting for comparative purposes, as per Section 5
GLA	Gross leasable area
Effective GLA	Gross leasable area, prorated for the period of ownership in the reporting year and the equity share of the owner for whom emissions are being reported.
GFA	Gross floor area
WTE	Waste to energy, as described in Section 6
kWh	Kilowatt-hours of electricity
ekWh	Equivalent kilowatt-hours (all energy types)
ekWh/ft <sup>2</sup>	Equivalent kilowatt-hours per square foot of Effective GLA
GHG	Greenhouse gases, for the purposes of this report: CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
CO <sub>2</sub> e	Carbon dioxide equivalent
gCO <sub>2</sub> e	Grams of carbon dioxide equivalent
tCO <sub>2</sub> e	Metric tons of carbon dioxide equivalent
tCO <sub>2</sub> e /1,000ft <sup>2</sup>	Metric tons of carbon dioxide equivalent per 1,000 square feet of Effective GLA

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<sup>i</sup> The GHG Protocol – A Corporate Accounting and Reporting Standard, Revised Edition (World Resources Institute, 2004)

<sup>ii</sup> The Global GHG Accounting & Reporting Standard Part A: Financed Emissions. Second Edition. (Partnership for Carbon Accounting Financials, December 2022)

<sup>iii</sup> Corporate Value Chain (Scope 3) Accounting and Reporting Standard: Supplement to the GHG Protocol Corporate Accounting and Reporting Standard (World Resources Institute, 2011)

<sup>iv</sup> Base year recalculation methodologies for structural changes - Appendix E to the GHG Protocol Corporate Accounting and Reporting Standard – Revised Edition (World Resources Institute, 2005)

<sup>v</sup> GHG Protocol Scope 2 Guidance – An amendment to the GHG Protocol Corporate Standard (World Resources Institute, 2015)

<sup>vi</sup> Green-e Energy Summary of WRI Scope 2 Guidance (Centre for Resource Solutions, 2015)

<sup>vii</sup> As per the GHG Protocol Scope 2 Guidance, where available, ‘Residual Mix Emission Rates’ should be applied to electricity not purchased via contractual instruments (e.g., RECs) to avoid double counting of renewable energy attributes. Residual Mix factors are not published for Canada. As such, the provincial factors have been used in place of Residual Mix factors for the purposes of this report.

<sup>viii</sup> NRCAN Survey of Energy Consumption of Multi-Unit Residential Buildings (SECMURBs) Table 7: Energy Consumption of Multi Unit Residential Buildings (MURBs), Source of Energy, 2018

<sup>ix</sup> Survey of Commercial and Institutional Energy Use (SCIEU) Table 1 – Building characteristics, energy use and energy intensity by primary activity, 2014

<sup>x</sup> EIA Residential Energy Consumption Survey (RECS) Table CE1.1: Summary annual household site consumption and expenditures in the U.S.—totals and intensities, 2015

<sup>xi</sup> EIA Commercial Buildings Energy Consumption Survey (CBECS) Table C12: Sum of major fuel consumption totals and gross energy intensities by building activity subcategories, 2018

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- <sup>xii</sup> ENERGY STAR Portfolio Manager Technical Reference: ENERGY STAR Water Score for Multifamily Housing in the United States, October 2017
- <sup>xiii</sup> 2023 Real Estate Standard and Reference Guide (GRESB, 2023)
- <sup>xiv</sup> Energy consumption for water use cycles in different countries: A review. Applied Energy 178 (Wakeel et al., 2016)
- <sup>xv</sup> Greenhouse Gas and Energy Co-Benefits of Water Conservation (Maas, 2009)
- <sup>xvi</sup> National Inventory Report 1990-2020: Greenhouse Gas Sources and Sinks in Canada (Environment and Climate Change Canada, 2022)