

# Annex 1: 2021 GHG Emission Reporting Methodology

## QuadReal Property Group

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## 1. Background

QuadReal Property Group (QuadReal) tracks utility use across their portfolio, including office, retail, residential and industrial assets.

Energy Profiles Limited (EPL) prepared energy and emissions reporting for BCI properties previously managed by Bentall Kennedy in past years, summarizing progress in reducing energy / emissions across the overall property portfolio. Starting with the 2016 reporting year, EPL prepared emission reporting for QuadReal’s full portfolio, vs. a 2007 base year.

There are two goals for this exercise:

1. To determine the energy / emissions for the portfolio following the guidance of the GHG Protocol<sup>i</sup>, the industry standard for corporate disclosure purposes.
2. To understand the portfolio’s performance vs. historical years, normalized to remove the impact of outside influences such as changes to weather and occupancy, and exceptional tenant loads.

This document details the methodology used to derive the greenhouse gas (GHG) emissions reported by QuadReal for the 2021 emission reporting year.

## 2. Operational Boundaries

Operational boundaries define the parts of the operation, or ‘activities’, for which emissions will be reported. Emissions are reported for energy consumed across QuadReal’s Canadian portfolio.

Scope 1, 2 and 3 emissions resulting from the operation of properties are reported. Properties under development/redevelopment in the reporting year are excluded.

### Scope 1 Emissions

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

### Scope 2 Emissions

Scope 2 emissions are indirect emissions from purchased electricity, steam and chilled water that is consumed at properties, but generated elsewhere. Emissions from submetered tenant consumption are outside of QuadReal's organizational boundary, as discussed in Section 3, and are therefore not included as Scope 2 emissions.

### Scope 3 Emissions

Scope 3 emissions are reported tenant submetered energy consumption at properties. While submetered tenant consumption is outside of the organizational boundary, it is reported as Scope 3 (other indirect emissions) for completeness and comparability of overall emissions to historical years where submeter-based billing was not present.

## 3. Organizational Boundaries

Organizational boundaries define the approach to determining ownership or control over the energy and emissions reported for the property portfolio.

### Control Approach

Under the control approach, per the GHG Protocol, a company accounts for 100 percent of the GHG emissions from operations over which it has control. It does not account for GHG emissions from operations in which it owns an interest but has no control. Control can be defined in either financial or operational terms.

The financial control approach has been selected for the purposes of reporting QuadReal's emissions, defined as follows in the GHG Protocol:

*The company has financial control over the operation if the former has the ability to direct the financial and operating policies of the latter... a company is considered to financially control an operation if it retains the majority risks and rewards of ownership of the operation's assets*

QuadReal applies the interpretation of financial control as described in "Whose Carbon is it? GHG Emissions and Commercial Real Estate" issued by REALpac and ICF International (2010), which states the party that is directly responsible for the utility costs is a reasonable method for determining control, and in a situation where the owner pays for the utility costs directly and does not charge them back to individual tenants based on sub-metered consumption, the emissions belong to the owner. Further details of REALpac's interpretation can be found in Appendix B.

## Determining Responsibility for Emissions

The responsibility for emissions from utility consumption is that of the party responsible for paying the utility costs.

In general, utility accounts billed to QuadReal are defined to be within the financial control boundary. Utility accounts paid directly by the tenant are outside of QuadReal's financial control.

One exception is 'pass-through' utility accounts. Typically, these accounts exist at industrial properties or buildings with triple-net leases where the owner / property manager pays the utility bills as an administrative function only, but has no influence over utility use or building systems and the utility bills are subsequently charged back to the tenant(s) by QuadReal. In these cases, QuadReal does not have the authority to introduce financial or operating policies as they relate to the account, so they are treated as if the tenant were billed directly by the utility company.

## Submetered Consumption

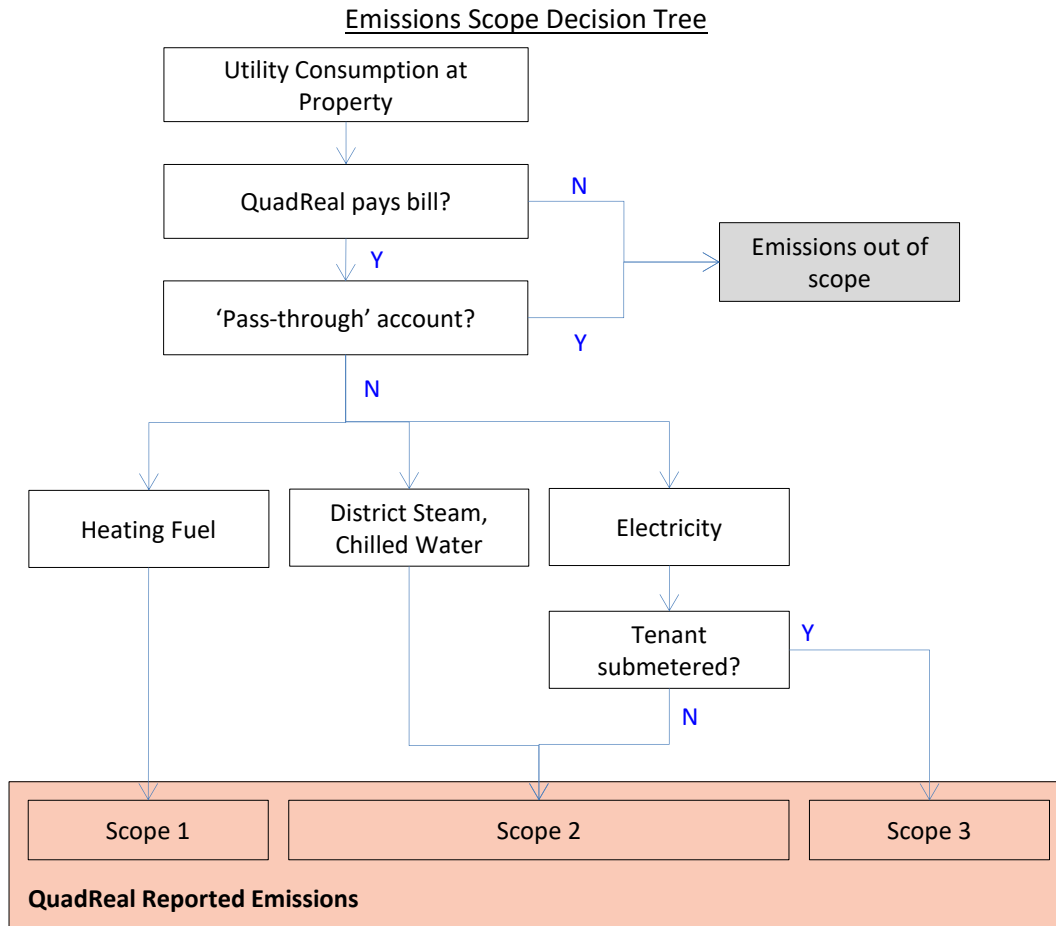
Submetered energy use billed to tenants by QuadReal is outside of QuadReal's organizational boundary, as recommended by REALPAC<sup>ii</sup>:

*Where sub-metering of tenants occurs, the party that is directly responsible for the utility costs is a reasonable method for determining control. For instance, if an owner installed electrical sub-metering for each tenant, and the tenants were responsible for payment of the electricity consumed, then it is far less likely that the owner is responsible for any associated emissions...*

Emissions from submetered energy use are however reported as Scope 3 emissions, as discussed in Section 2.

## 4. Application of Boundaries

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



## 5. Comparison to Historical Years

For comparative purposes, 2007 was selected as the base year, as it is the first year for which data is substantially complete. 2016 is also reported to show progress since the inception of QuadReal, and 2020 is reported to show year-over-year progress.

### Base Year Recalculation Policy

Energy and emissions are recalculated for the Base Year and each historical year, in keeping with the GHG Protocol, to account for the following factors:

1. Property acquisitions and divestments by QuadReal/BCI.
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. Changes to reporting methodology.

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>iii</sup> approach, meaning that buildings only owned for a portion of the reporting year (2021) are included in all historical years for the same period. Energy use, emissions, and 'effective' gross leasable area are all adjusted proportionately for the period of ownership in 2021.

## Treatment of Scope 2 Emission Factors in Historical Years

### 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 2021 NIR, used in the preparation of this emission report, contains annual electricity emission factors reflecting the electricity generation mix in each year from 2000-2019. Emissions could be calculated in two ways:

Method 1: Using the 2021 NIR annual emission factors for the corresponding year for each year prior to 2019, and the 2019 emission factors to report 2019-2021 emissions

Method 2: Using the 2019 emission factors for all years

This is an important issue, as the difference in provincial emission factors can vary by 60% year-over-year. There is no specific guidance in the GHG Protocol as to which approach should be used.

An international survey of other available standards and industry practices in addition to an informal survey of local industry experts suggests that a best practice has not emerged in this regard. Specific guidance is limited to that from climate registries, whose objectives are markedly different from that of an independent corporate entity such as QuadReal.

QuadReal has opted to use Method 1 for the purposes of the corporate reporting.

## 6. Treatment of Water and Waste

### Water Consumption

Water consumption at properties is reported using the same approach used for reporting energy consumption and emissions, i.e. according to the GHG Protocol. GHG emissions, however, are not reported for water consumption as part of QuadReal's GHG footprint.

### Waste Generation

Waste generated at properties and sent to landfill is reported using the same reporting approach as used for reporting energy consumption and emissions, i.e. according to the GHG Protocol. GHG emissions, however, are not reported for waste generation as part of QuadReal's GHG footprint.

Properties previously managed by Bentall Kennedy began reporting on waste in January 2008. 2007 waste data is assumed to be equal to that of 2008.

Properties previously managed by GWL and RealStar tracked waste data in some cases, starting at different times. The data provided by QuadReal was reported as received with missing months estimated based on available data from the applicable property. This data is excluded from normalized results (see Section 9) as the source of data could not be confirmed.

Landfilled waste is reduced at some properties that send trash to Waste-to-Energy (WTE) facilities where it is used to generate electricity. QuadReal's waste haulers provide estimates as to the percentage of trash that goes to WTE facilities. In cases where estimates are not provided by haulers, it's assumed that all trash goes to landfill.

To conservatively estimate the amount of trash sent to WTE facilities, it was assumed that 10% of the material sent to WTE facilities still ends up in landfill.

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

$$\text{Landfilled trash} = \text{trash weight produced by site} - 0.9 * \text{trash weight sent to WTE facility}$$

Waste used for power production at WTE facilities is not included in this report on the basis that the trash is used as a fuel source, as opposed to being wasted.

## 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.

### Renewable Energy Credits

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

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

In January 2015, the World Resource Institute published the GHG Protocol Scope 2 Guidance<sup>iv</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 QuadReal properties have chosen to purchase via contractual instruments. This approach does account for REC purchases.

In light of this guidance, both location-based and market-based emissions are reported for QuadReal'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.

#### 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 2016-2021 and accounted for in the reporting year are Green-e certified and specify 100% wind power. Green-e has stated publicly that their certified RECs meet the Quality Criteria requirements<sup>v</sup>. RECs purchased for QuadReal properties before 2016 do not meet the Quality Criteria as they do not convey the direct GHG emission rate attribute associated with the unit of electricity produced, and are therefore excluded from reporting.

## 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, it has been assumed that the contracted renewable energy volume was delivered to the grid linearly over the specified number of years, starting at the date the contract was executed.

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 (Scope 3).

## Market-based emissions calculations

Market-based emissions are calculated as follows, in accordance to 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% wind generation sources.
2. For all other electricity consumed at a property, emissions are calculated using the appropriate regional emission factor.<sup>vi</sup>
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).

## 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 portfolio to offset Scope 1 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 Estimation

There are two situations in which utility data is estimated:

1. Properties where utility data is tracked but some bills (recent or historical) are missing.
2. Properties that are within the reporting boundary, but utility data is not tracked.

### Missing Utility Bills

#### Data Gaps

Best efforts are made to collect actual utility consumption from utility bills or utility meters for all properties/accounts. When gaps exist in verifiable utility data, 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.

### **Baseline Consumption**

Where verifiable utility data is not available for the 2007 base year, the earliest available consecutive 12 months of billed consumption is assumed for 2007 through to the earliest available bill.

Energy/emissions data from 2007-2016 is not available for the industrial properties previously managed by GWL. Historical usage is therefore estimated based on 2017 consumption for these properties.

### **‘Not Tracked’ Properties**

For some properties within the reporting scope, utility data is not available for reporting. In these cases, where QuadReal-paid utility accounts are known to exist, consumption is estimated based on the average energy use intensity of a representative sample of properties from the same asset class.

For properties within the reporting scope where there are known to be no QuadReal-paid utility accounts, consumption is set to zero.

### **Missing Waste Data**

Where waste data is incomplete for a given site, missing data is estimated based on available data from the same site.

## **9. Reporting Normalized Results**

To understand the change in energy use and emissions intensity excluding the impact of outside influences, a detailed variance analysis is performed to calculate ‘normalized’ results.

### **Reporting Periods**

This analysis is performed for two reporting periods and corresponding sub-sets of properties:

1. 2021 vs. 2020, for properties managed from for the duration of 2020-2021
2. 2021 vs. 2007, for properties managed from for the duration of 2007-2021

In other words, properties acquired since 2021 and 2007, respectively, are not included in the analyses. New developments, however, are included in normalized results.

The impact of the following factors on energy use and emissions is calculated and subtracted from the results determined per the GHG Protocol:

1. Weather and occupancy
2. Exceptional tenant loads
3. Changing emission factors

### **Normalization for Weather**

2007 and 2020 energy and emissions are normalized to reflect 2021 weather conditions using a linear regression analysis of energy/water consumption for each utility account as a function of heating degree



hours (for accounts providing heating energy) and cooling degree hours (for accounts providing cooling energy) using hourly weather data from Environment Canada for the closest weather station to each property.

### **Normalization for Leased/Occupied Space**

2007 and 2020 energy and emissions are normalized to reflect 2021 occupancy levels. For office buildings, normalization accounts for Occupant Density, Operating Hours and Leased Space, where data is available.

### **Exceptional Tenant Loads**

Some tenants in QuadReal's portfolio have exceptional loads such as data centres over which QuadReal has no control. Where exceptional tenant loads are submetered and consumption data is available for the reporting period (2007-2021/2020-2021), they are removed from the normalized results such that increases or decreases from, for example, the addition or removal of large computer loads, do not affect the normalized results.

### **Changing Emission Factors**

QuadReal's emissions are calculated using year-specific emissions factors (Method 1, as specified in Section 5) for reporting per the GHG Protocol. When reporting normalized results, however, emissions for all years are reported using the 2019 emission factor to remove the impact of changes to the provincial electricity supply mix from the analysis.

## 10. Emission Factors

Provincial emission factors are published by Environment Canada. The factors used are 2019 values from Canada's Greenhouse Gas Inventory 2000 – 2019, published in 2021. The following table provides the source for each emission factor used.

### Emission Factors and Sources - Canada

#### Electricity

Year	gCO <sub>2</sub> e/kWh						
	AB	BC	MB	NS	ON	QC	SK
2007	920.0	19.2	13.5	940.0	210.0	3.5	750.0
2016	760.0	12.0	1.8	670.0	40.0	1.2	660.0
2019-2021	620.0	18.6	1.2	710.0	30.0	1.2	660.0

Source: Canada's Greenhouse Gas Inventory 1990–2019 (NIR 2021).

#### Natural Gas

Year	gCO <sub>2</sub> e/m <sup>3</sup>						
	AB	BC	MB	NS	ON	QC	SK
2007-2021	1,939.4	1,937.4	1,897.4	1,912.4	1,899.4	1,898.4	1,840.4

Source: Canada's Greenhouse Gas Inventory 1990–2019 (NIR 2021).

#### Deep Lake Water Cooling (ON)

Year	gCO <sub>2</sub> e/ton-h ON
2007	65.6
2016	41.4
2020	19.9
2021	22.3

Source: 2020 EPL Enwave Study, NIR 2021; incl. distribution losses

#### Steam

Year	gCO <sub>2</sub> e/lb	
	BC	ON
2007-2010	82.2	74.3
2016	83.2	74.3
2020	87.4	71.4
2021	87.4	76.6

Source: ON - 2020 EPL Study of Enwave DLWC and Steam System;  
BC - Gas factors from NIR 2021. Assume 75% plant efficiency.

#### Heating Oil

Year	gCO <sub>2</sub> e/l NS
2007-2021	2,762.9

NIR 2021 Part 2, Table A6.1-4

#### Hot Water

Year	gCO <sub>2</sub> e/MWh	
	AB	BC
2007-2017	233,970.4	66,000.0
2018-2021	233,970.4	70,000.0

Gas factors from NIR 2021 Part 2, Table A6.1-1, A6.1-2. Assumed 80% plant efficiency

BC - 2020 City of Vancouver report on SEFC NEU 2021 customer rates

## 11. Glossary of Terms

Base Year	the earliest year selected for inclusion in reporting for comparative purposes, as per Section 5
Effective GLA	gross leasable area, prorated for the period of ownership in the reporting year. Note that for GRESB/SASB reporting, the GLA is not prorated, as per GRESB reporting rules.
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 (World Resources Institute, 2004)

<sup>ii</sup> Whose Carbon Is It? GHG Emissions and Commercial Real Estate (Real Property Association of Canada, 2010)

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

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

<sup>vi</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. Green-e has published Residual Mix Emission Rates for North America, however these factors correspond to NERC Regions which are not consistent the more regionally specific and widely accepted provincial factors from Environment Canada. As such, the provincial factors have been used in place of Residual Mix factors for the purposes of this report.