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MSCI Private Real Estate ESG Metrics Calculation Methodology

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Contents

1 Introduction

This document outlines the methodology used to calculate and maintain ESG information ("MSCI Private Real Estate ESG Metrics") that is published within MSCI private real estate products. MSCI Private Real Estate ESG Metrics are used in tools to understand and measure climate risk at the portfolio and sector level and to assess climate related risks and opportunities.

As of the date of this document, this data is not used in the construction of any MSCI Real Estate Indexes or MSCI Real Estate BMR Benchmarks[1].

[1] MSCI Property Indexes or Property Fund Indexes that have been permissioned for regulated use under Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indexes used as benchmarks ("BMR"). See the MSCI index regulation page for more information on the MSCI Real Estate BMR Benchmarks.

2 Data Collection and MSCI ESG Research

The calculation of MSCI Private Real Estate ESG Metrics uses MSCI Private Real Estate data and research products provided by MSCI ESG Research.

2.1 MSCI PRIVATE REAL ESTATE DATA

MSCI assembles a set of comparable information on real estate portfolios. Emissions & Energy Use and Revenue Exposure data are generally provided to MSCI by or on behalf of the managers of the real estate investment portfolios concerned. As with all private markets, data provision is voluntary, and MSCI Private Real Estate ESG Metrics does not fully cover each market.

In addition to data as part of the calculation of MSCI Property Indexes, market information and analytics, MSCI is also collecting ESG specific data. Details and definitions related to the data can be found in the MSCI Global Data Standards for Real Estate Investments.

The below table describes the data used as part of the MSCI Property Indexes which are used for MSCI Private Real Estate ESG Metrics.

Examples of Data Used in Property Index Calculation

Data category	Examples of data used for calculating Property index performance
Valuation	Capital value based on a valuation
Revenue flows	Gross income
Geographical location	Address, postcode, city, country, longitude and latitude
Size	Floor area (based on net lettable floor area)
Property classification	Detailed property type
Ownership	Ownership share

Source: MSCI Property Indexes Methodology

The below table describes the ESG data used for the calculation of MSCI Private Real Estate ESG Metrics.

Specific Data Used for MSCI Private Real Estate ESG Metrics

Data category	Data used for calculating ESG Metrics
GHG Emissions	Greenhouse Gas (GHG) Emissions Whole Building and Outdoor Spaces: Scope 1, Scope 2: Location-Based, Scope 2: Market-Based and Scope 3: Tenant, Total
Energy Use	Total Whole Building Energy Consumption in kWh
Data coverage	GHG Emissions Coverage and Energy Use Coverage
Building quality	Building quality certificates including Energy Performance Certificate (EPC) and Nearly Zero-Energy Building
Other	Share of non-vegetated surface area, Waste sorting facilities, Share of virgin raw building materials

Source: MSCI Global Data Standards for Real Estate Investment

2.2 GREENHOUSE GAS (GHG) EMISSIONS DEFINITIONS

For GHG (carbon) emissions reporting, MSCI uses the below definitions[2], which are also used as part of the data collection:

- Scope 1

  Scope 1 GHG emissions are all the direct emissions from landlord owned and/or controlled facilities generated by real estate assets including both whole building (lettable/leasable and common spaces) and outdoor spaces. This includes the GHG for common parts areas, vacant spaces, as well as GHG emissions for landlord controlled let areas (i.e. included in service charges) when applicable.

- Scope 2 (Location-Based)

  Scope 2 GHG emissions are all indirect emissions from landlord purchased energy generated by the real estate assets including both whole building and outdoor spaces. The Location-Based method reflects the emissions related to purchased energy and uses a Location-Based grid emission factor to compute the emissions (therefore the grid average emission factor). This includes the Scope 2 GHG for common parts areas, vacant spaces, as well as GHG emissions for landlord controlled let areas (i.e. included in service charges) when applicable. The Location-Based emissions will be used for total emissions reporting. This needs to cover all Scope 2 purchased energy consumption and will not be combined with the Scope 2 Market-Based

[2] See the MSCI Global Data Standards for Real Estate Investment for the data provision definitions.

emissions data to calculate the total Scope 2 emissions to avoid double counting for the purchased energy.

- Scope 2 (Market-Based)
  Scope 2 GHG emissions are all indirect emissions from landlord purchased energy generated by the real estate assets including both whole building and outdoor spaces. The Market-Based method reflects the emissions related to purchased energy similar to the Scope 2 Location-Based GHG emissions, but by using the actual emission factors to compute the GHG emissions from the purchased energy which has been purposefully chosen (or through lack of choice). The Scope 2 Market-Based emissions will be used as the secondary data for the use of emissions data. This needs to cover all Scope 2 purchased energy consumption and will not be combined with the Scope 2 Location-Based emissions data to calculate the total Scope 2 emissions to avoid double counting. This includes the Scope 2 GHG for common parts areas, vacant spaces, as well as GHG emissions for landlord controlled let areas (i.e. included in service charges) when applicable.
- Scope 3 (Tenant)
  Scope 3 GHG emissions generated by the operation of real estate assets whole building and outdoor spaces which are tenant controlled only which includes both direct emissions from owned and/or controlled facilities and all indirect emissions from purchased energy by the tenants. This includes the GHG emissions for all tenant controlled areas when applicable and could include whole buildings for single let/net lease buildings including common parts areas. If all emissions are landlord controlled (part of Scope 1 and Scope 2) the emissions should be provided as 0 to avoid double counting. This figure should not include embodied carbon or other elements of Scope 3 emissions.

2.3 SPECIFIC DATA TREATMENT PRACTICES AND ASSUMPTIONS

In certain situations where data is partly available or unavailable, data may be derived from sources other than the real estate data provider, for example MSCI ESG Research. This section describes the data treatment practices applied by MSCI in these cases.

2.3.1 SCALING-UP OF PARTIAL PROVIDED DATA

In certain situations, data might only be available for partial buildings/assets (e.g., tenants energy consumption and GHG emissions). MSCI will, in these situations, scale-up the data provided on GHG emissions and energy intensity and for the calculation of the MSCI Climate Value-at-Risk. The scaling-up will be done based on the energy consumption and GHG emissions data coverage (%) as provided by the clients. The

scaling-up will make results comparable amongst assets within a portfolio, but also for aggregated reporting.

2.3.2 ENERGY USAGE TO DERIVE GHG EMISSIONS

In certain circumstances the GHG emissions might not be available, but energy consumption data will be provided to MSCI. In those cases, MSCI will use a Grid Emission factor (either provided or based on MSCI ESG Research market specific proxy data) to derive the GHG emissions.

2.3.3 PROXY DATA FOR GHG EMISSIONS AND ENERGY USE

In certain circumstances, only partial asset specific energy or emissions data can be provided or (at times) data is not provided at all. In those cases, MSCI will use proxy data provided by MSCI ESG Research. The proxy energy use and GHG emissions will be calculated based on the floor area (adjusted for the ownership share).

2.4 MSCI ESG RESEARCH

The calculation of MSCI Private Real Estate ESG metrics uses research provided by MSCI ESG Research. The following MSCI ESG Research product is used for the calculation: MSCI Real Estate Climate Change Metrics. Data provided by MSCI ESG Research can be divided into two categories: (1) proxy data for GHG Emissions & Energy Use (2) Climate Change Metrics.

MSCI will use proxy data provided by MSCI ESG Research. The proxy energy use and GHG emissions are used to calculate absolute energy use and GHG emissions based on the floor area (adjusted for the ownership share).

MSCI Real Estate Climate Change Metrics is designed to support investors seeking to achieve a range of objectives, including measuring and reporting on climate risk exposure, implementing low carbon strategies, and factoring climate change research into their risk management processes.

For more details on MSCI Real Estate Climate Change Metrics, refer to https://www.msci.com/climate-change-solutions.

3 Description of MSCI Private Real Estate ESG Metrics

The list and descriptions ofMSCI Private Real Estate ESG Metrics published by MSCI is provided below. The detailed definitions for the metrics and their calculation methodology are included in section 4 of this document.
The environmental factors can be divided into three categories: Greenhouse gas (GHG) Emissions & Energy Use, Revenue Exposure and Climate Scenario Analysis.

3.1 GHG EMISSIONS & ENERGY USE

ESG Metric Name	ESG Metric Description
Absolute GHG Emissions	Measures the GHG emissions for: • Scope 1 • Scope 2: Location-Based • Scope 2: Market-Based • Scope 3: Tenant-Provided All apportioned by ownership share.
GHG Emissions Scope 1 and Scope 2	Measures GHG Emissions of Scope 1 and Scope 2 (Location-Based) where both scope emissions are provided. Apportioned by ownership for those assets.
GHG Emissions Scope 3 (Tenant-Scaled-up)	Measures GHG Emissions of Scope 3 (Tenant-Provided) and scaled-up[3] by the Scope 3 Tenant Whole Building - Estimated Coverage % Emissions to reflect the total emissions in the case data is provided partially. Apportioned by ownership share.
GHG Emissions Total - Provided Data	Measures GHG Emissions of reported Scope 1, Scope 2 (Location-Based) and Scope 3 (Tenant-Provided) or Whole Building GHG emissions as provided without scaling-up. Apportioned by ownership share.
GHG Emissions - Total (Scaled-up)	Measures Total GHG Emissions provided and in the case data is provided partially scaled-up[4] by using the Coverage (%) Whole Building GHG Emissions or the Scope 3 (Tenant) Whole Building Estimated Coverage % Emissions to reflect the total emissions. Apportioned by ownership share.

[3] See section 2.3.1 for more information on the approach to scale-up partial provided data.

[4] See section 2.3.1 for more information on the approach to scale-up partial provided data.

ESG Metric Name	ESG Metric Description
GHG Emissions Emissions Total – incl. proxy	Measures the sum of GHG Emissions – Total (Scaled-up) and in the case not sufficient data is provided to determine the GHG Emissions - Total (Scaled-up), the GHG emissions will be derived by using proxy data[5]. Apportioned by ownership share.
GHG Intensity by Capital Employed	Measures the carbon efficiency of a portfolio, defined as the absolute GHG emissions of the portfolio per $M of Average Capital Employed.
GHG Intensity by Gross Income	Measures the carbon efficiency of a portfolio, defined as the absolute GHG emissions per $M of Gross Income Receivable (excl. Recoveries).
GHG Intensity by Owned Area	Measures the carbon efficiency of a portfolio, defined as the absolute GHG emissions per m² of Owned Area (based on net lettable area at ownership share).
Coverage (Scope1 and Scope2 Emissions)	Exposure to assets with reported Scope 1 and Scope 2 (Location-Based) GHG emissions as a portion of the total portfolio.
Coverage (Total Emissions)	Exposure to assets with reported Scope 1, Scope 2 (Location-Based) and Scope 3 (Tenant-Provided) or Whole Building GHG emissions as a portion of the total portfolio.
Absolute Energy Use - Provided Data	Measures Energy Use both landlord controlled (Scope 1 and Scope 2) and tenant controlled (Scope 3). Total Energy Use without scaling-up. Apportioned by ownership share.
Total Energy Use - Scaled-up	Measures Total Energy Use provided and in the case data is provided partially scaled-up[6] by using the Energy Coverage (%) Total Energy Consumption to reflect the total energy use. Apportioned by ownership share.
Total Energy Use - incl. Proxy	Measures the sum of Total Energy Use - Scaled-up and in the case not sufficient data is provided to determine the estimated energy use the energy use will be used derived by using proxy data[7]. Apportioned by ownership share.
Coverage (Energy Use)	Exposure to assets with reported Energy Use as a portion of the total portfolio.

[5] See section 2.3.3 for more information on the approach to use proxy data.

[6] See section 2.3.1 for more information on the approach to scale-up partial provided data.

[7] See section 2.3.3 for more information on the approach to use proxy data.

3.2 REVENUE EXPOSURE

ESG Metric Name	ESG Metric Definition
Efficient Real Estate Assets: EPC A and NZEB	Exposure to assets that have either an Energy Performance Certificate (EPC) of A (for assets built before 31/12/2020) or is a Nearly Zero-Energy Building (for assets built after 31/12/2020) as a portion of the total portfolio for which the building quality certifications are known.
Inefficient Real Estate Assets: EPC C or below and non-NZEB	Exposure to assets that have a EPC of C (for assets built before 31/12/2020) or below or are not a Nearly Zero-Energy Building (for assets built after 31/12/2020) as a portion of the total portfolio for which the building quality certifications are known.
Coverage (EPC and NZEB)	Exposure to assets for which a EPC (for assets built before 31/12/2020) or the Nearly Zero-Energy Building (for assets built after 31/12/2020) classifications are provided as a portion of the total portfolio.
Waste Production in Operations	Share of real estate assets not equipped with facilities for waste sorting and not covered by a waste recovery or recycling contract as a portion of the total portfolio.
Coverage (Waste Production)	Exposure to assets for which Waste Production indicators are provided as a portion of the total portfolio.
Raw Materials consumption for new construction & major renovations	Share of raw building materials (excluding recovered, recycled and biosourced) compared to the total weight of building materials used in new construction and major renovations.
Coverage (Raw Materials)	Exposure to assets for which Raw Materials consumption for new construction & major renovations are provided as a portion of the total portfolio.
Land Artificialisation	Share of Non-Vegetated Surface Area (surfaces that have not been vegetated on the ground, as well as on roofs, terraces and walls) compared to the total surface area of the plots.
Coverage (Land Artificialisation)	Exposure to assets for which Land Artificialisation are provided as a portion of the total portfolio.

3.3 CLIMATE SCENARIO ANALYSIS

ESG Metric Name	ESG Metric Definition
Policy Climate VaR (Whole Building)	Transition Risks (also known as regulatory or policy risk) are assessed based on the GHG (carbon) intensity of an asset. The GHG emissions are based on either: (1) reported Scope 1, Scope 2 (Location-Based) and Scope 3 (Tenant-Scaled-up) excluding outdoor spaces; (2) whole building GHG emissions scaled-up excluding outdoor spaces; or (3) proxy data if insufficient data has been provided. Any lag behind the national decarbonisation targets (based on 2°C AIM CGE Temperature scenario) is summed and multiplied by a modelled future carbon price to calculate the forecasted potential cost to the year 2100 of emissions which are then discounted to their NPV.
Physical Climate VaR	An aggregated downside or upside potential based "worst-case" (95th percentile) value at risk (aggressive scenario), expressed as a percentage of the real estate capital value, assuming trends to 2100 in extreme cold, extreme heat, wildfire, coastal flooding, fluvial flooding, and tropical cyclones continue along a Business-As-Usual pathway.
Aggregated Climate VaR	Represents the overall risk exposure to climate change. The Climate VaR represents the combined Policy Climate VaR and the Physical Climate VaR.
Warming Potential	MSCI ESG Warming Potential methodology refers to the IPCC (Intergovernmental Panel on Climate Change) goal of limiting the global temperature increase to 2°C or lower. The metric provides insights into the alignment or misalignment with the climate goals of the Paris Agreement.

4 Calculation of MSCI Private Real Estate ESG Metrics

The disclosure of MSCI Private Real Estate ESG Metrics aims to facilitate meaningful comparisons[8].

4.1 DATA USED FOR THE CALCULATION

To determine MSCI Private Real Estate ESG Metrics, a set of comparable information on real estate portfolios are compiled. Property data are generally provided to MSCI by (or on behalf of) the managers of real estate investment portfolios.

4.2 CALCULATION DETAILS AND FORMULAS FOR GHG EMISSIONS AND ENERGY USE

This section shows how the different data is combined and aggregated to derive each of the MSCI Private Real Estate ESG Metrics. MSCI Private Real Estate Data is used when sufficient GHG Emissions and Energy Use data is provided. When no or insufficient data is provided MSCI ESG Research proxy data is used.

4.2.1 ABSOLUTE GHG EMISSIONS

Absolute GHG Emissions: Scope1

$$\sum_{i=1}^{n}((GHGSCOPE1WB_i + GHGSCOPE1OUT_i)\ x\ (OWNERSHIPSHARE_i/100))$$

Where:

i	Assets within portfolio for which GHG Scope 1: Whole Building – Emissions has been provided.
$GHGSCOPE1WB_i$	GHG Scope 1: Whole Building - Emissions for $Asset_i$ during the period;
$GHGSCOPE1OUT_i$	GHG Scope 1: Outdoor Spaces - Emissions for $Asset_i$ during the period;.
OWNERSHIPSHARE	The percentage ownership at contract share for $Asset_i$, including 100% if the asset is wholly owned.

[8] None of the MSCI Property Indexes or Property Fund Indexes that have been permissioned for regulated use under Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indexes used as benchmarks ("BMR") take into account ESG factors. There are no significant benchmarks, EU Climate Transition or EU Paris-Aligned benchmarks in the MSCI property and property fund benchmark families as of the date of this report. See the MSCI index regulation page for more information on the MSCI private real estate BMR benchmarks.

Absolute GHG Emissions: Scope2-Location Based

$$\sum_{i=1}^{n}((GHGSCOPE2WB_i + GHGSCOPE2OUT_i)\ x\ (OWNERSHIPSHARE_i/100))$$

Where:

i	Assets within portfolio for which GHG Scope 2: Location-Based Whole Building – Emissions has been provided.
$GHGSCOPE2WB_i$	GHG Scope 2: Location-Based Whole Building - Emissions for $Asset_i$ during the period;
$GHGSCOPE2OUT_i$	GHG Scope 2: Location-Based Outdoor Spaces - Emissions for $Asset_i$ during the period;.
OWNERSHIPSHARE	The percentage ownership at contract share for $Asset_i$, including 100% if the asset is wholly owned.

Absolute GHG Emissions: Scope1 and Scope2

$$\sum_{i=1}^{n}(GHGSCOPE1_i + GHGSCOPE2LOC_i)$$

Where:

i	Assets within portfolio for which emissions data has been provided for Scope 1 and Scope 2 - Location-Based.
$GHGSCOPE1_i$	GHG Scope1 (Whole Building and Outdoor Spaces)- Emissions for $Asset_i$ during the period;
$GHGSCOPE2LOC_i$	GHG Scope2: Location-Based (Whole Building and Outdoor Spaces) - Emissions for $Asset_i$ during the period;.

Absolute GHG Emissions: Scope3 (Tenant–Provided)

$$\sum_{i=1}^{n}((GHGSCOPE3TENWB_i + GHGSCOPE3TENOUT_i)\ x\ (OWNERSHIPSHARE_i/100))$$

Where:

i	Assets within portfolio for which GHG Scope 3: Tenant - Whole Building – Emissions has been provided.
$GHGSCOPE3TENWB_i$	GHG Scope 3: Tenant – Whole Building Emissions for $Asset_i$ during the period;
$GHGSCOPE3TENOUT_i$	GHG Scope 3: Tenant – Outdoor Spaces Emissions for $Asset_i$ during the period;
OWNERSHIPSHARE	The percentage ownership at contract share for $Asset_i$, including 100% if the asset is wholly owned.

Absolute GHG Emissions: Scope3 (Tenant–Scaled-up)

$$\sum_{i=1}^{n}\left(\frac{GHGSCOPE3TENPROV_i}{SCOPE3TENCOV_i}\right)$$

Where:

i	Assets within portfolio for which GHG Scope 3: Tenant - Whole Building – Emissions has been provided.
$GHGSCOPE3TENPROV_i$	Absolute GHG Emissions: Scope 3 (Tenant–Provided) for $Asset_i$ during the period;
$SCOPE3TENCOV_i$	The portion of the Absolute GHG Emissions: Scope 3 (Tenant) emissions for which GHG emissions data is provided.

Absolute GHG Emissions Total – Provided Data

$$\sum_{i=1}^{n}(GHGSCOPE1_i + GHGSCOPE2LOC_i + GHGSCOPE3TENPROV_i + ((GHGTOTWBPROV_i + GHGTOTOUTPROV_i)\ x\ (\frac{OWNERSHIPSHARE_i}{100}_i)))$$

Where:

i	Assets within portfolio for which either full or partial total emissions data has been provided (this could be either by detailed emissions Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant or Total Whole Building emissions).
$GHGSCOPE1_i$	Absolute GHG Emissions: Scope 1 for $Asset_i$ during the period, applicable for assets for which emissions data is provided both Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant;
$GHGSCOPE2LOC_i$	Absolute GHG Emissions: Scope 2 (Location-Based) for $Asset_i$ during the period, applicable for assets for which emissions data is provided both Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant;
$GHGSCOPE3TENPROV_i$	Absolute GHG Emissions: Scope 3 (Tenant–Provided) for $Asset_i$ during the period, applicable for assets for which emissions data is provided both Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant;
$GHGTOTWBPROV_i$	Absolute GHG Emissions: Total Whole Building– Provided for $Asset_i$ during the period, applicable for assets for which emissions data is missing for either Scope 1, Scope 2 - Location-Based or Scope 3 -Tenant;
$GHGTOTOUTPROV_i$	Absolute GHG Emissions: Outdoor Spaces – Provided for $Asset_i$ during the period, applicable for assets for which emissions data is missing for either Scope 1, Scope 2 - Location-Based or Scope 3 -Tenant;
$OWNERSHIPSHARE_i$	The percentage ownership at contract share for $Asset_i$, including 100% if the asset is wholly owned, applicable for assets for which emissions data is missing for either Scope 1, Scope 2 - Location-Based or Scope 3 -Tenant.

Absolute GHG Emissions Total (Scaled-up)

$$\sum_{i=1}^{n}(GHGSCOPE1_i + GHGSCOPE2LOC_i + GHGSCOPE3TENSCAL_i + \left(\frac{(GHGTOTWBPROV_i + GHGTOTOUTPROV_i)\ x\ (OWNERSHIPSHARE_i/100_i)}{GHGTOTWBCOV_i}\right))$$

Where:

i	Assets within portfolio for which either full or partial total emissions data has been provided (this could be either by detailed emissions Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant or total emissions).
$GHGSCOPE1_i$	Absolute GHG Emissions: Scope 1 for $Asset_i$ during the period, applicable for assets for which emissions data is provided both Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant;
$GHGSCOPE2LOC_i$	Absolute GHG Emissions: Scope 2 (Location-Based) for $Asset_i$ during the period, applicable for assets for which emissions data is provided both Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant;
$GHGSCOPE3TENSCAL_i$	Absolute GHG Emissions: Scope 3 (Tenant–Scaled-up) for $Asset_i$ during the period, applicable for assets for which emissions data is provided both Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant;
$GHGTOTWBPROV_i$	Absolute GHG Emissions: Total Whole Building– Provided for $Asset_i$ during the period, applicable for assets for which emissions data is missing for either Scope 1, Scope 2 - Location-Based or Scope 3 -Tenant;
$GHGTOTOUTPROV_i$	Absolute GHG Emissions: Outdoor Spaces – Provided for $Asset_i$ during the period, applicable for assets for which emissions data is missing for either Scope 1, Scope 2 - Location-Based or Scope 3 -Tenant;
$OWNERSHIPSHARE_i$	The percentage ownership at contract share for $Asset_i$, including 100% if the asset is wholly owned, applicable for assets for which emissions data is missing for either Scope 1, Scope 2 - Location-Based or Scope 3 -Tenant.
$GHGTOTWBCOV_i$	The portion of the Absolute GHG Emissions: Total Whole Building emissions for which GHG emissions data is provided, applicable for assets for which emissions data is missing for either Scope 1, Scope 2 - Location-Based or Scope 3 -Tenant.

Absolute GHG Emissions Total – incl. Proxy

$$\sum_{i=1}^{n}(GHGTOTSCAL_i + (OWNEDAREA_i x\ GHGPROXY_i))$$

Where:

i	Assets within portfolio for which either full or partial total emissions data has been provided (this could be either by detailed emissions Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant or Total Whole Building emissions) as well asset for which the owned area is available.
$GHGTOTSCAL_i$	Absolute Total GHG Emissions – Scaled-up for $Asset_i$ during the period, applicable for assets for which emissions data is missing for either Scope 1, Scope 2 - Location-Based and Scope 3 -Tenant or Total Whole Building emissions;
$OWNEDAREA_i$	Owned Area in m² (based on letable area at ownership share) for $Asset_i$ during the period, applicable for assets for which $GHGTOTSCAL_i$ data is unavailable;
$GHGPROXY_i$	The GHG Emissions Proxy data per m² as provided by MSCI ESG Research for $Asset_i$, applicable for assets for which $GHGTOTSCAL_i$ data is unavailable.

Coverage (Scope1 and Scope2 emissions)

$$\sum_{i=1}^{n}(AVGCAPEMP_i\ x\ GHGSCOPE12COV_i)\ /\ \sum_{i=1}^{n} CVGCAPEMP_i$$

Where:

i	Assets within portfolio.
$AVGCAPEMP_i$	Average monthly capital employed (captial value + capital expenditure) for $Asset_i$ during the period.
$GHGSCOPE12COV_i$	GHG Emissions Coverage Factor equals to 1 if emissions data has been provided for both Scope 1 and Scope 2 - Location-Based, otherwise equals to 0;

Coverage (Total Emissions)

$$\sum_{i=1}^{n}(AVGCAPEMP_i \; x \; GHGTOTALCOV_i) \; / \; \sum_{i=1}^{n} AVGCAPEMP_i$$

Where:

i	Assets within portfolio.
$AVGCAPEMP_i$	Average monthly capital employed (captial value + capital expenditure) for $Asset_i$ during the period.
$GHGTOTALCOV_i$	GHG Emissions Coverage Factor equals to 1 if data is provided on either detailed emissions (Scope 1, Scope 2 - Location-Based and (partial) Scope 3 -Tenant) or Total Whole Building emissions, otherwise equals to 0;

4.2.2 ABSOLUTE ENERGY USE

Absolute Total Energy Use – Provided Data

$$\sum_{i=1}^{n}(ENERGYUSETOTWB_i) \; x \; (OWNERSHIPSHARE_i/100_i)$$

Where:

i	Assets within portfolio for which Total Energy Consumption Whole Building has been provided.
$ENERGYUSETOTWB_i$	Total Whole Building Energy Consumption for $Asset_i$ during the period;
$OWNERSHIPSHARE_i$	The percentage ownership at contract share for $Asset_i$, including 100% if the asset is wholly owned.

Absolute Total Energy Use – Scaled-up

$$\sum_{i=1}^{n}\left(\frac{(ENERGYUSETOTWB_i \; x \; (OWNERSHIPSHARE_i/100)}{ENERGYUSETOTWBCOV_i}\right)$$

Where:

i	Assets within portfolio for which Total Energy Consumption Whole Building has been provided.
$ENERGYUSETOTWB_i$	Total Whole Building Energy Consumption for $Asset_i$ during the period;
$OWNERSHIPSHARE_i$	The percentage ownership at contract share for $Asset_i$, including 100% if the asset is wholly owned.
$ENERGYUSETOTWBCOV_i$	The portion of the Absolute Total Energy Use: Total Whole Building emissions for which Energy consumption data is provided

Absolute GHG Emissions Total – incl. Proxy

$$\sum_{i=1}^{n}(ENERGYUSETOTSCAL_i + (OWNEDAREA_i x\ ENERGYUSEPROXY_i))$$

Where:

i	Assets within portfolio for which either full or partial total Total Energy Use data has been provided as well asset for which the owned area is available.
$ENERGYUSETOTSCAL_i$	Absolute Total Energy Use – Scaled-up for $Asset_i$ during the period, applicable for assets for which full or partial total energy consumption data;
$OWNEDAREA_i$	Owned Area in m² (based on letable area at ownership share) for $Asset_i$ during the period, applicable for assets for which $ENERGYUSETOTSCAL_i$ data is unavailable;
$ENERGYUSEPROXY_i$	The Energy Consumption Proxy data per m² as provided by MSCI ESG Research for $Asset_i$, applicable for assets for which $ENERGYUSETOTSCAL_i$ data is unavailable.

Coverage (Energy Use)

$$\sum_{i=1}^{n}(AVGCAPEMP_i\ x\ ENERGYUSECOV_i)\ /\ \sum_{i=1}^{n} AVGCAPEMPV_i$$

Where:

i	Assets within portfolio.
$ENERGYUSECOV_i$	Energy Use Coverage Factor equals to 1 if either full or partial Total Energy Use data has been provided, otherwise equals to 0;
$AVGCAPEMP_i$	Average monthly capital employed (captial value + capital expenditure) for $Asset_i$ during the period.

4.2.3 GHG EMISSIONS & ENERGY USE INTENSITY

Both the Absolute GHG (Carbon) Emissions Intensity (in kgCO2) as well as the Energy Use Intensity (kWh) is expressed using different metrics and could be expressed as:

- Per invested capital based on the Capital Employed (Average monthly capital employed (captial value + capital expenditure) during the period.
- Per Gross Income (Summation of Gross Income Receivable (excl. Recoveries) during the period)
- Per m² Owned Area (Net Lettable area at ownership share at the period- end) for those assets where the Net Lettable area has been provided.

4.3 CALCULATION DETAILS AND FORMULAS FOR REVENUE EXPOSURE

Efficient Real Estate Assets: EPC A and NZEB

$$\sum_{i=1}^{n}(CV_i \; x \; EPCANZEB_i) \; / \; \sum_{i=1}^{n} CV_i$$

Where:

i	Assets within portfolio for which the assets have either an energy performance certificate (EPC) for assets built before 31/12/2020 or nearly zero-energy building (NZEB) indication for assets built after 31/12/2020;
$EPCANZEB_i$	Building Quality Factor equals to 1 if the asset has an energy performance certificate (EPC) of A for assets built before 31/12/2020 or nearly zero-energy building (NZEB) indication of YES for assets built after 31/12/2020, otherwise equals to 0;
CV_i	is the capital value for $Asset_i$ at period end.

Inefficient Real Estate Assets: EPC C or below and non-NZEB

$$\sum_{i=1}^{n}(CV_i \; x \; INEFFICIENTRE_i) \; / \; \sum_{i=1}^{n} CV_i$$

Where:

i	Assets within portfolio for which there is either an energy performance certificate (EPC) for assets built before 31/12/2020 or nearly zero-energy building (NZEB) indication for assets built after 31/12/2020;
$INEFFICIENTRE_i$	Building Quality Factor equals to 1 if the asset has an energy performance certificate (EPC) of C or below for assets built before 31/12/2020 or nearly zero-energy building (NZEB) indication of number for assets built after 31/12/2020[9], otherwise equals to 0;
CV_i	is the capital value for $Asset_i$ at period end.

[9] As defined in Final Report on draft Regulatory Technical Standards with regard to the content, methodologies and presentation of disclosures pursuant to Article 2a(3), Article 4(6) and (7), Article 8(3), Article 9(5), Article 10(2) and Article 11(4) of Regulation (EU) 2019/2088.

Coverage (EPC and NZEB)

$$\sum_{i=1}^{n}(CV_i \, x \, BUILDQF_i) \, / \, \sum_{i=1}^{n} CV_i$$

Where:

i	Assets within portfolio.
$BUILDQF_i$	Building Quality Factor equals to 1 if the asset has either an energy performance certificate (EPC) for assets built before 31/12/2020 or nearly zero-energy building (NZEB) indication for assets built after 31/12/2020, otherwise equals to 0;
CV_i	is the capital value for $Asset_i$ at period end.

Waste Production in Operations

$$\sum_{i=1}^{n}(CV_i \, x \, WASTEPROD_i) \, / \, \sum_{i=1}^{n} CV_i$$

Where:

i	Assets within portfolio for which the Waste Sorting Facilities indication is provided;
$WASTEPROD_i$	Waste Production in Operations Factor equals to 1 if the asset has no facilities for waste sorting and not covered by a waste recovery or recycling contract, otherwise equals to 0;
CV_i	is the capital value for $Asset_i$ at period end.

Coverage (Waste Production)

$$\sum_{i=1}^{n}(CV_i \, x \, WASTESORTF_i) \, / \, \sum_{i=1}^{n} CV_i$$

Where:

i	Assets within portfolio;
$WASTESORTF_i$	Waste Sorting Facilities Factors equals to 1 if for the asset the Waste Sorting Facilities indication has been provided, otherwise equals to 0;
CV_i	is the capital value for $Asset_i$ at period end.

Raw Materials Consumption for New Construction & Major Renovations

$$\sum_{i=1}^{n}(CExp_i \; x \; RAWMAT_i) \; / \; \sum_{i=1}^{n} CExp_i$$

Where:

i	Assets within portfolio for which the share of virgin raw building materials is provided;
$RAWMAT_i$	Share of virgin raw building materials (excluding recovered, recycled and biosourced) compared to the total weight of building materials used in new construction and major renovations for $Asset_i$ during the period;
$CExpV_i$	Capital expenditure (excl. transaction activity, including improvement and development expenditure) during the period.

Coverage (Raw Materials)

$$\sum_{i=1}^{n}(CExp_i \; x \; RAWMATF_i) \; / \; \sum_{i=1}^{n} CExp_i$$

Where:

i	Assets within portfolio;
$RAWMATF_i$	Raw Building Materials Factor equals to 1 if for the asset the share of raw building materials weight has been provided, otherwise equals to 0;
$CExpV_i$	Capital expenditure (excl. transaction activity, including improvement and development expenditure) during the period.

Land Artificialisation

$$\sum_{i=1}^{n}(OWNEDAREA_i \; x \; NONVEG_i) \; / \; \sum_{i=1}^{n} OWNEDAREA_i$$

Where:

i	Assets within portfolio for which the Share of non-vegetated surface area is provided and requires that the floor area is available;
$NONVEG_i$	Share of non-vegetated surface area (surfaces that have not been vegetated in ground, as well as on roofs, terraces and walls) compared to the total surface area for $Asset_i$ at the period end;
$OWNEDAREA_i$	Owned Area in m² (based on letable area at ownership share) at period end;

Coverage (Land Artificialisation)

$$\sum_{i=1}^{n}(OWNEDAREA_i \, x \, NONVEGF_i) \, / \, \sum_{i=1}^{n} OWNEDAREA_i$$

Where:

i	Assets within portfolio for which a floor area is available;
$NONVEGF_i$	Non-Vegetated Surface Area Factor equals to 1 if the asset share of non-vegetated surface area has been provided, otherwise equals to 0;
$OWNEDAREA_i$	Owned Area in m² (based on letable area at ownership share) at period end;

4.4 CALCULATION DETAIL AND FORMULAS FOR CLIMATE SCENARIO ANALYSIS

Policy Climate VaR (Whole Building)

$$\sum_{i=1}^{n} POLVARC_i \; / \sum_{i=1}^{n} CV_i$$

Where:

i	asset with Policy Climate VaR available, which requires that the floor area is available, have a postive Capital Value and are not a development;
$POLVARC_i$	is the discounted forecasted Policy Climate VaR costs to the year 2100 (reported as negative amounts) for $Asset_i$ based on 2°C AIM CGE Temperature scenario at period end. The costs have a ceiling of 100% of the capital value for $Asset_i$ at period-end;
CV_i	is the capital value for $Asset_i$ at period end.

Physical Climate VaR

$$\sum_{i=1}^{n} PHYVARC_i \; / \sum_{i=1}^{n} CV_i$$

Where:

i	asset with Physical Climate VaR available, which requires that a geo-location is available, have a postive Capital Value and are not a development;
$PHYVARC_i$	is the discounted forecasted Physical Climate VaR costs to the year 2100 (reported as negative amounts) for $Asset_i$ based on aggressive scenario at period end. The costs have a ceiling of 100% of the capital value for $Asset_i$ at period-end;
CV_i	is the capital value for $Asset_i$ at period end.

Aggregated (Overall) Climate VaR

$$(POLVAR + PHYVAR)$$

Where:

POLVAR is the Policy Climate VaR based on 2°C AIM CGE Temperature scenario at period end;

PHYVAR is the discounted Physical Climate VaR based on aggressive scenario at period end;

If the Aggregated Climate VaR exceeds 100% it will be reported with a ceiling of 100%.

Warming Potential

$$\sum_{i=1}^{n}(TEMP_i \, x \, CV_i) \, / \, \sum_{i=1}^{n} CV_i$$

Where:

i asset with Temperature available, which requires that the floor area is available and have a postive Capital Value;

$TEMP_i$ is the Warming Potentail for $Asset_i$. The curve has a floor and ceiling of 1.3°C and 6°C;

CV_i is the capital value for $Asset_i$ at period end.

5 APPENDIX I: ESG Data Description

The list of ESG datapoints provided by MSCI ESG Research and used for the ESG metrics calculation is provided below.

Field Name	Factor Description
$ENERGYUSEPROXY_i$	The Energy Consumption Proxy data per m² on a market and sector basis.
$GHGPROXY_i$	The Greenhouse Gas (GHG) Emissions Proxy data per m² on a market and sector basis.
$POLVARC_i$	Is the discounted Policy Climate VaR costs for Asset i based on 2°C AIM CGE Temperature scenario at period end. The costs have a ceiling of 100% of the capital value for Asseti at period-end.
$PHYVARC_i$	Is the discounted Physical Climate VaR costs for Asset i based on aggressive scenario at period end. The costs have a ceiling of 100% of the capital value for Asset i at period-end.
$TEMP_i$	Is the Warming Potential for Asset i. The curve has a floor and ceiling of 1.3°C and 6°C

6 APPENDIX II: Versioning Table

Version	Publication Date	Key Changes
V1.0	December 2021	First version of MSCI Private Real Estate ESG Metrics Calculation Methodology document.

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