Professional Standards Paper

# Implementing a Net Zero Carbon Strategy

> Developing a net zero carbon strategy involves setting targets at both portfolio and asset level, with an emphasis on strategic considerations, defining scope, collecting data, assessing costs, and integrating relevant criteria into underwriting processes.

> Operational net zero carbon can be achieved by focusing on practical measures, including prioritising the reduction of energy usage, and maximising on-site renewable energy generation. Carbon offsetting should only be considered as a last resort.

> Transparency and standardised reporting in the transition to net zero carbon are essential as what constitutes net zero is still evolving. There is a need for a universally accepted definition within the real estate industry.

## Introduction

In 2021, INREV released its paper entitled The Impact of Net Zero Carbon, to help drive decarbonisation actions among INREV members and the broader real estate industry. The paper established a generic definition of NZC[1] and outlined the steps that should be considered when developing NZC strategies and targets.

Acknowledging the diverse factors influencing the setup and implementation of net zero plans, this new paper aims to provide a deeper understanding of the practical aspects involved in developing a NZC strategy and explores the challenges in achieving its implementation goals. We focus here on operational carbon, but also emphasise the importance of considering embodied carbon.

For sake of clarity, this paper covers only carbon emissions from tenant operations when calculating Scope 3 emissions. It does not address embodied carbon, due to current measurement challenges. INREV plans to collaborate with the industry to advance the definition and measurement of embodied carbon in the future.

[1] Within this paper net zero carbon is abbreviated to NZC

Given the various perspectives within real estate, there is currently no standardised industry definition for NZC. Assets and portfolios in different geographical locations may have different market and regulatory expectations.

For instance, some governments are developing country-specific definitions of what constitutes a NZC building. This might conflict with science-based frameworks such as CRREM[2] but is likely to become widely adopted in that local market.

While highlighting the importance of NZC goals and commitments, this paper acknowledges the challenges these can present, especially in decarbonising existing buildings. Despite these challenges, the transition to NZC potentially presents opportunities for creating new sources of value, as the demand from investors for sustainable and low-carbon buildings is only expected to increase. In those markets that are already seeing a rapid shift towards sustainability, buildings that are performing poorly against energy or carbon expectations may face reduced values or brown discounts, while energy efficient and resilient buildings may well command higher rents due to growing tenant demand. Beyond market shifts, changes in customer behaviour and evolving legislation may also impact the valuation of real estate assets. In this environment, investment managers will need to systematically analyse such transition risks and integrate them into a roadmap to NZC as part of their overall business strategy.

[2] Carbon Risk Real Estate Monitor

# Operational net zero carbon definition

In the previous paper, we defined NZC in real estate as zero or negative carbon emissions from all activities related to building development, ownership, and servicing. However, since this paper focuses on the operational phase of a building, our definition is limited to operational NZC.

**Operational NZC** for real estate is achieved when the net carbon emissions from a building's operational activities and tenant energy usage is reduced to zero or are negative. This involves minimising energy use, maximising on-site renewable energy production, procuring green energy and offsetting any remaining carbon emissions.

Off-site energy provision will still be required in most instances, even when energy efficiency and on-site renewables have been maximised. Opting for renewable Power Purchase Agreements (PPA) or green energy procurement reinforces the commitment to reducing carbon emissions.

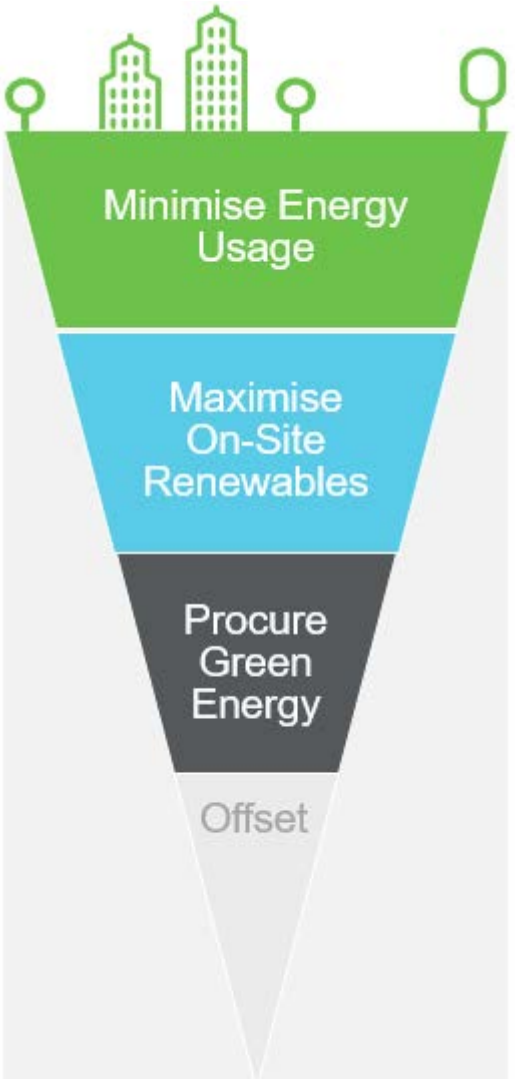
This definition includes operational carbon emissions from all Scopes, with Scope 3 emissions specifically limited to real estate ownership and tenant energy consumption (see details on Scopes in Appendix 1 and refer to Appendix 2 for Whole Building Life-cycle.), and does not consider other sources of carbon emissions, such as F-gases[3], water consumption or company emissions. However, it is recommended to include F-gases and water consumption emissions if these are deemed material and form a significant part of the total emissions in the portfolio.

While this is a base definition, it is worth noting that there are strategies and frameworks in the industry where this definition does not apply or where carbon offsetting is not permitted. It is therefore important to prioritise the following principles before green energy procurement and any essential carbon offsetting can take place. First, focusing on minimising energy usage to fall below the adopted science-based pathway, such as the CRREM EUI[4] pathway. This entails addressing all energy use, regardless of its source. Second, maximising on-site renewable energy, particularly by prioritising solar or wind power on and around the building, to cover the remaining energy needs.

[3] See Appendix for more detail on F-gases.

[4] Energy Use Intensity

**Figure 1 Energy Hierarchy**



Although this energy hierarchy is generally accepted in the industry, there are specific areas lacking consensus, such as:

- Whether on-site renewables can be taken into account and 'netted off' the EUI to determine whether the building has achieved the required level of energy efficiency.
- Whether off-site renewable can be taken into account in determining whether the building has reached the required level of carbon efficiency.
- Whether carbon offsets can be used at all for the remaining operational carbon emissions.

See more details regarding on-site and off-site renewables in Appendix 4.

Investment managers should be transparent about the NZC definition they are using, particularly in relation to the above points.

**Figure 2 Scope 1, 2, and 3 Visualisation**


## Operational vs embodied carbon

Carbon emissions are typically divided into two main groups: operational carbon and embodied carbon. Operational carbon arises during a building's use, involving energy and water consumption and waste generation. For the purposes of this paper, water consumption and waste generation are not considered. Real estate investors currently prioritise operational carbon as there are often more reliable datasets available and it is incorporated into recognised frameworks such as GRESB[5] and the GHG Protocol[6]. Embodied carbon emissions encompass the total GHG[7] emissions produced in the creation, maintenance, and disposal of a built asset. These include 'upfront embodied carbon, related to the extraction, manufacturing, transportation, and assembly of building materials, and 'downstream embodied carbon' linked to materials and processes during use and end-of-life treatment.

[5] Global Real Estate Sustainability Benchmark

[6] GHG Protocol revised retrieved from https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

[7] Greenhouse Gas

# Developing a net zero carbon strategy

The global push towards sustainability and combatting climate change has led to the rise of NZC pledges across various industries. This section emphasises the importance of transparency in fulfilling such pledges, outlining key components to consider for real estate.

When committing to NZC, it is essential to regularly monitor consumption data to ensure the strategy is effective. The strategy will likely require ongoing adjustments to keep alignment with the 1.5 degree pathway outlined in the Paris Climate Agreement. Continuous improvement is also necessary to meet evolving investor and government requirements. This involves additional resources, frameworks and benchmarks influenced by scientific advancements, innovations in technology and market changes. It also emphasises the need for the industry to be quick and adaptable in turning commitments into action and staying on track with NZC.

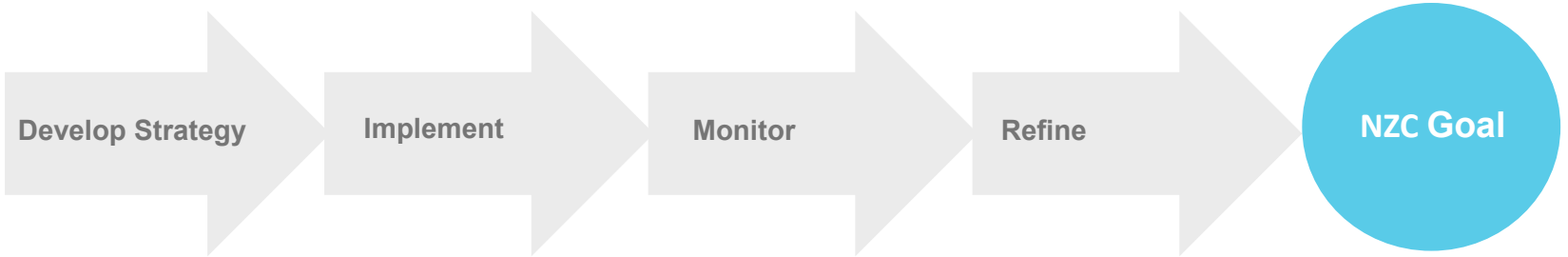
To accurately measure and represent the performance of the portfolio regarding its carbon emissions and the related pathways, multiple NZC frameworks, science-based targets and pledges have been developed. These schemes cover a range of criteria related to their approaches to achieving NZC. We examined and outlined the most common frameworks within the real estate industry (refer to Appendix 3, Figure 4), such as CRREM, SBTi, and the NZC Pathway by BBP .

## Absolute vs relative targets

Carbon reduction targets can be divided into two groups: relative targets and absolute targets. Each has its own distinct purpose and applications.

Relative targets involve setting emissions reduction goals in relation to a baseline year. For instance, organisations often commit to reducing their energy intensity or carbon intensity per unit of output (often the floor area). This means that the reduction targets are tied to a specific year in the past, typically called the baseline year, with the goal of decreasing emissions relative to that baseline. When choosing the baseline year, it is crucial to be confident in the data coverage and quality for analysing energy usage in that specific year as well as to take account of changes in the portfolio due to acquisitions or disposals.

In contrast, absolute targets do not rely on comparison with a specific baseline year, but rather focus on achieving a specified level of performance on measures such as EUI or carbon intensity, irrespective of past performance (for example in alignment with CRREM pathways). Absolute targets are particularly useful when the primary concern is safeguarding assets, such as property, investments, or operations. The choice between relative and absolute targets often depends on the particular sustainability frameworks or reporting standards that an organisation adopts.



## Transparency and standardised reporting

Clear communication about NZC pledges is important for real estate investors. Transparency enhances credibility in fulfilling NZC pledges, encouraging others to take similar ambitious actions. Key information to be considered includes:

- The specific definition of NZC adopted. This may vary depending on asset types, location, portfolio type or vehicle structure. It is necessary to clarify the scope, including the contribution of renewable energy and any offsets and reference external decarbonisation pathways used for the assessment.
- Projected year for the portfolio to reach NZC.
- The stranding risk (average year) and data coverage percentage in accordance with science-based pathways for energy and $CO_2$. For some sectors and locations, reporting on such data may not be feasible yet, as science-based pathways are currently not established for all sectors and are still undergoing refinement for specific regions.
- Intermediate milestones. These could include descriptions of changes to investment processes, timetable for implementing efficiency measures, carbon and / or energy efficiency interim goals, and targeted percentage of NZC buildings by specific dates.
- Plans for asset retrofits to reduce energy consumption and increase renewable energy at the short, mid, and long-term. Currently, accurately estimating the costs of such plans and executing them is challenging. As investors and managers increasingly adopt NZC pathways, it is anticipated that industry standard approaches to asset retrofits will emerge and reporting will become more straightforward. These plans should be reported in compliance with the INREV Sustainability Reporting Guidelines (Ref: RG72 and RG73).

Comprehensive reporting against all of these areas is aspirational and is what investment managers should be working towards rather than what they would be expected to cover in the early stages of their NZC journey. Transparency involves clearly disclosing information on emissions, which builds trust with stakeholders such as investors, tenants, and regulatory authorities.

Successfully implementing NZC strategies relies not only on accurate and reliable data collection but also on the effective and meaningful analysis of that data. Independent validation ensures transparency and allows for corrective action. Data quality tools such as the PCAF[8] data quality score may be useful for evaluating the reliability and accuracy of GHG emission data

ESG SDDS

INREV has developed the ESG Standard Data Delivery Sheet (SDDS) to support the disclosure and reporting of ESG performance and progress towards NZC. This new reporting template enhances transparency by assisting managers in disclosing ESG information and standardising the reporting of ESG KPIs for real estate investment vehicles, while also having the potential to automate data exchange. The ESG SDDS covers the required and recommended ESG KPIs outlined in the INREV Reporting Guidelines and incorporates data fields at both the vehicle and asset levels. It references some of regulatory requirements such as SFDR and can be linked to external data sources including GRESB.

[8] Partnership for Carbon Accounting Financials

# Key considerations at the portfolio level

Developing a NZC strategy at portfolio level requires careful planning, data-driven decisions, and a commitment to sustainability goals. The following eight steps outline how to navigate the complexities of transitioning to an operational NZC portfolio:

1. **Determine scope** - The first step in developing a NZC strategy at the portfolio level is to determine the scope. This entails deciding which assets should be prioritised in the strategy and what emissions will be accounted for. It is essential to establish clear criteria for inclusion and to consider factors like vehicle and property type, location, size, and level of discretion for the manager.

   **Challenges:** Real estate portfolios often consist of various types of property, such as residential, commercial, industrial, retail, and are situated across various geographical locations. Each type has different energy usage patterns and challenges, making it difficult to apply a one-size-fits-all solution. Achieving a unanimous consensus amongst investors may also prove challenging for various types of investment vehicle structures implementing a NZC strategy. In certain cases, this is dependent on the extent of discretion granted to managers.

2. **Determine definition and EU threshold**s - Defining NZC at the portfolio level is crucial, and a widely adopted framework for this in Europe is CRREM. In addition, it is essential to determine the approach to handling emissions from both off-site and on-site energy resources, as well as the utilisation of carbon offsets.

   **Challenges:** Investment managers may have varying levels of discretion over their portfolios, facing distinct risk profiles and investment styles, such as Core, Value Add, or different products, such as Debt. Each type comes with unique challenges, as well as varying possibilities to influence investment decision making, making it difficult to apply one singular NZC definition to multiple portfolios.

3. **Data collection** - Accurate and up-to-date data is the backbone of any effective NZC strategy. Collecting data on energy consumption, emissions, and other relevant sustainability metrics for each property is essential. This data will help in assessing current environmental performance and in identifying areas for improvement.

   **Challenges:** Privacy restrictions and complex ownership structures make it challenging to collect accurate data from

all relevant sources, leading to incomplete portfolio coverage. In such cases, using high-quality data estimates (considering seasonality, type of building and reliable historic data) can be a helpful interim solution to start the journey toward NZC.

4 **Assessment of costs, barriers, and enablers across the portfolio** - Data assessment allows stakeholders to understand the financial implications of transitioning to NZC and to identify challenges or opportunities that could arise during implementation. These projections will inform the decision-making process.

- **Challenges:** Determining the financial implications of transitioning to NZC, including the costs of energy-efficient retrofits and renewable energy installations, can be complex. Accurate cost estimation is necessary for budgeting and planning. In addition, securing the necessary funding for NZC initiatives can be challenging, especially for managers with limited financial resources, as energy-efficiency measures are often not fully incorporated into property valuations. Identifying financing options early and securing forward looking investments is recommended.

5 **Hold-sell analysis** – Evaluating costs and benefits is essential in making decisions to buy, hold or sell assets. Properties that align with NZC goals may become more attractive, while others may be considered for disposal. This information can be used as input for the portfolio strategy.

- **Challenges:** Balanced and well-informed decisions should be made on which properties are to be earmarked for energy-efficient retrofits and which are best to dispose of if the required NZC steps do not align with the portfolio's overall strategy. However, selling properties that do not align with NZC goals may also carry risks, such as potential capital losses or a smaller pool of interested buyers. Deciding when and how to dispose of such assets requires careful consideration.

6 **Integration into underwriting** - Incorporating NZC criteria into the underwriting process may involve adjusting financial models, risk assessments and valuation methods to account for sustainability factors. Impacts of the NZC strategy on long-term asset value should be considered.

- **Challenges:** The cost to transition buildings to NZC and the return on investment will need to rely on estimation and assumptions which may make it necessary to take a scenario approach.

7 **Setting development and/or refurbishment standard** - Clear sustainability standards for properties that require development or refurbishment should be established. This includes energy-efficient designs, renewable energy integration and the use of low-carbon materials. Ideally, all new construction and renovation projects will align with NZC objectives.

- **Challenges:** As market expectations and regulatory definitions of what constitutes a NZC building evolve, these standards will need to be updated.

8 **Incorporation of low/mid-cost measures into annual business planning** - To make steady progress towards NZC goals, low and mid-cost measures can be integrated into annual business planning. This could include energy efficiency upgrades, renewable energy installations, or as a last resort, carbon offsets.

- **Challenges:** Systematising the roll out of these measures is likely to be organisationally challenging, particularly for managers with large and diverse portfolios. See Chapter 5 for practical implementation challenges at asset level.

# Practical ways to implement a net zero carbon strategy at asset level

A NZC strategy at asset level comprises two parts. The first involves direct actions that managers can control, such as managing capital expenditures, choosing building materials and opting for sustainable procurement methods. Such actions can be optimised to reduce carbon emissions.

The second part involves influencing tenant behaviours that managers cannot directly control, such as particular fit-out decisions and operational hours. These factors can significantly affect carbon footprints. Green lease agreements with tenants and collaboration with external stakeholders like construction partners, utilities, and district heating providers are therefore integral to advancing toward the NZC goal.

Balancing emissions, with the core goal of reducing these to a zero or negative level over time, can be challenging for investment managers with diverse portfolios, comprising various building types with different energy intensities and usage. Some assets may have a limited impact on the overall emissions of the portfolio due to the size of the asset, but they might still become stranded in the short term. The decision to postpone the transition of such assets should consider economic feasibility. In some cases, it may not make immediate economic sense to invest in retrofitting or transforming these assets. Clear communication of such decisions to stakeholders is crucial, especially in the case of residential assets with many tenants and different lease agreements.

A potential issue arises with addressing asset level NZC goals through an overarching strategy such as buying off-site renewable energy. The investment risk lies at the asset level if it fails to meet the NZC goal. To mitigate this risk at the asset level, it is essential to recognise that each property or project must align with the NZC definition. While the pace at which each asset progresses towards NZC may vary, the overall aim is for each asset to eventually reach the target. Managing risks at the asset level and regularly evaluating progress will support the portfolio-level NZC goal.

To successfully navigate the complexities of transitioning a diverse real estate portfolio to NZC, managers should conduct a comprehensive assessment at asset level and consider the following factors, amongst others:

- **Property type**
- **Geographic location**
- **Ownership structure**
- **Local legislative obstacles**

This enables the development of tailored strategies that match the distinct goals and requirements of different assets of the portfolio.

Implementing a NZC strategy should be guided by the following hierarchy of actions, including but not limited to:

**1. Reduce energy demand** – The quickest and most cost-effective option. To reduce energy demand, building energy use can be optimised, by replacing lightbulbs with LED, single glazing with double glazing, improving insulation, and incorporating efficient HVAC systems.

**Challenges:** Tenants may not always be willing to cooperate in implementing these changes during their lease.

**2. Reduce energy consumption** – Reduce energy consumption by introducing smart systems, engaging tenants, installing dimmer switches, and phasing out or substituting products and processes. Technology can be used to reduce energy consumption and reduce wasted energy.

**Challenges:** Tenant engagement can be challenging, for example when tenants rely on high-consumption appliances. This may present barriers to immediate energy reductions and require thoughtful approaches to address consumption patterns. Balancing energy reduction efforts with the needs and preferences of tenants is a crucial aspect of the overall strategy.

**3. Onsite renewable energy** – Increase renewable energy generated on-site by employing PV panels or using on-site wind or solar energy, resulting in a lower reliance on the grid or transferring power back into the grid.

**Challenges:** Installing solar panels often requires roof renovation or reinforcement, adding to the project's complexity and cost. Local grid capacity may not be equipped to handle additional energy inputs from renewable sources.

**4. Offsite renewable energy** – Purchasing renewable energy from the grid such as green wind or hydro power energy, with demonstrable additionality.

**Challenges:** Identifying and partnering with reliable renewable energy providers and ensuring that the energy purchased is indeed from renewable sources and meets additionality criteria may require due diligence and careful selection.

Depending on the location and jurisdiction, there may be regulatory and policy hurdles that affect the procurement of off-site renewables. Compliance with renewable energy purchase requirements and navigating local regulations can be complex.

**5. Offsetting any remaining emissions** – Offsetting $CO_2$ emissions by demonstrating reductions on removals through climate change mitigation projects that are not directly linked to the company's operation but have been funded using carbon credits.

**Challenges**: As carbon offsetting does not reduce emissions at source and the actual effects cannot be foreseen, offsetting should only be considered as a last resort after all the above options have been explored. Ensuring the credibility of the offset projects and their true additionality and selecting projects that align with the organisation's environmental goals and values can be a significant challenge.

# Conclusion

This paper discusses the challenges in achieving operational NZC in the real estate industry focusing on factors such as transparency, standardised reporting, and strategic planning at both the portfolio and asset level. It offers insights and perspectives into both top-down and bottom-up approaches for a successful NZC strategy implementation. Key considerations involve defining scope, collecting and analysing data, and integrating NZC criteria into underwriting processes. Investment managers can start by reducing energy demand and consumption and incorporating renewable energy sources. Prioritising these factors is essential for a net zero transition in the real estate industry. The operational NZC definition provided in this paper is a baseline and market participants should strive to include all carbon emissions related to the activities associated with their specific assets and portfolios. To fully address the environmental impact of real estate, the focus should extend to embodied carbon and other GHG emissions throughout the lifecycle of buildings.

It is highly desirable to move toward a universally accepted definition of net zero, but achieving this remains challenging due to the diversity of strategies and market characteristics. This complexity highlights the evolving nature of the issue.

The paper serves as a guide in recognising implementation challenges related to NZC strategies and emphasising the need for collaborative efforts as the real estate industry strives for a sustainable and environmentally responsible future.

# Appendix

## Appendix 1) NZC scopes

Amongst the actors in the real estate industry, there is often confusion about who is responsible for which sort of carbon emissions and who needs to report on them. Therefore, organisational, or operational boundaries and GHG Scopes are two tools that can be used to define responsibility for carbon emissions.

Organisational or operational boundaries define the extent to which a company identifies emissions associated with its operations and how far the ownership and control of the emissions is transferred from one company to another.

GHG Scopes determine levels of direct and indirect emissions and help to avoid the double counting of the same emissions by two or more companies. The GHG Protocol has defined three scopes for classifying the GHG emissions of a company:

**Scope 1:** Emissions from sources that are owned or controlled by the asset owner. This includes natural gas consumption in assets owned or controlled by the reporting company.

**Scope 2:** Emissions from purchased electricity, heat, steam, or cooling consumed by the company or landlord-controlled spaces but generated elsewhere. When reporting Scope 2 emissions in real estate, it is essential to understand the difference between the location-based and market-based emissions that are both reported by market participants. The distinction between location-based and market-based emissions relates to how these indirect emissions are calculated:

- Location-based emissions are based on the physical location of the real estate property. This approach calculates emissions using the average emissions factor for the grid or energy supply in the region where the property is situated.
- Market-based emissions, on the other hand, consider any specific contracts or purchases of renewable or low-carbon energy made by the real estate entity. This approach considers emissions reductions or offsets associated with green energy procurement.

**Scope 3:** Emissions that occur due to the operations of the organisation but are not directly owned or controlled by the organisation. This includes all energy use in tenant-controlled spaces. The reporting levels of Scope 3 can be divided into upstream and downstream emissions.

- Scope 3 emissions in real estate assets should at least focus on the operational carbon of the building (B6 and B7 from the whole life cycle of a building, see Appendix 2, Figure 3). This includes emissions associated with heating, cooling, lighting, and other day-to-day operational activities by the tenant within the building. It is considered a crucial component of any comprehensive sustainability strategy for real estate assets, as operational emissions often form a significant portion of the overall carbon footprint of a property.

If it is decided to focus on the GHG pathway, F-Gases should be included in the scope. If F-gases are not yet included, assets should be compared to $CO_2$ pathways.

F-gases

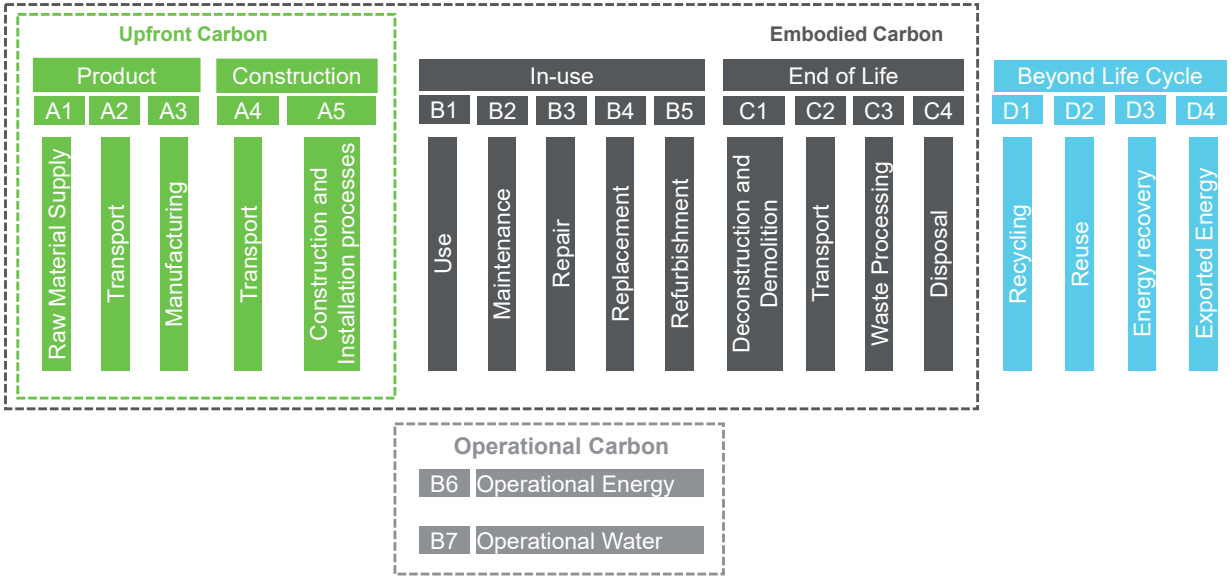
Fluorinated gases are also referred to as F-gases. These are man-made and are used in different industrial applications such as refrigerators or air-conditioning in buildings. F-gases are potent greenhouse gases that have a global warming result that is 23,000 times more than that of Carbon dioxide ($CO_2$). As part of its policy in fighting climate change, the European Union is taking regulatory measures to control F-gases (ref: European Environmental Agency).

When reporting GHG emissions, companies should provide information on the scope of their pathway in terms of investment boundaries and emissions boundaries. According to the GHG Protocol, a clear description of the value chain and the boundaries should be provided, together with the extent to which carbon is accounted for, and the rationale for the selection. Reporting requirements for Scopes 1 & 2 are not open to discussion and should always be included. Due to the challenge of collecting data (most commonly reflecting privacy regulations and the lack of tenant consent), Scope 3 emissions are often difficult and expensive to measure. However, when they are measured, Scope 3 carbon emissions tend to dominate those of real estate companies, ranging up to 99% of total property emissions. Therefore, especially when making NZC pledges, Scope 3 emissions should be monitored and reported.

The current optional character of Scope 3 emissions and the choice organisations have regarding which emissions to select can create inconsistency in their reporting. This becomes challenging when different reporting frameworks provide conflicting guidelines for Scope 3 emissions. As an illustration, the GRESB reporting framework imposes strict boundaries on tenant emissions, prohibiting estimations, while the GHG Protocol mandates the estimation of missing data to ensure a comprehensive overview.

## Appendix 2) NZC scopes

**Figure 3 Whole Building Life Cycle**



## Appendix 3) Mapping major net zero schemes/framework

**Figure 4 Mapping Major NZC Schemes - Source IPF, Pathways to Net Nero Carbon Emissions in International Real Estate Investment, 2022**

| Net Zero Schemes | SBTi 1.5° pathway | LEED Zero | ILFI ZC Certification | UKGBC NZC Buildings Framework | SBTi - Net Zero Standard | WGBC NZCBC | CRREM | NZAOA | LETI | ULI Greenprint NZG | NZIF | BBP Climate Commitment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Launch Year | 2016 | 2018 | 2018 | 2019 | 2021 | 2016 | 2018 | 2019 | 2019 | 2020 | 2021 | 2019 |
| Coverage | Global | USA | Global | UK | Global | Global | Europe and Selected Other Countries | Global | UK | Global | Global | Global |
| Standard / Performance Criteria / Commitment | Standard | Standard | Standard | Standard | Standard | Standard | Performance Criteria | Performance Criteria | Performance Criteria | Performance Criteria | Performance Criteria | Commitment |
| Emissions Scope | All Scope 1, 2 and 3 | Operational Carbon and Carbon from Occupant Transportation | All Scope 1, 2 and 3 | Scope 1, 2 and partial Scope 3 | All Scope 1, 2 and 3 | Scope 1, 2 and partial Scope 3 | Scope 1, 2 and Partial Scope 3 | All Scope 1, 2 and 3 | All Scope 1, 2 and 3 | Scope 1 and 2 | Scope 1, 2 and Partial Scope 3 | Scope 1, 2 and Partial Scope 3 |
| Organistion / Building Level | Both | Building | Both | Building | Both | Both | Building | Org. | Building | Building | Org. | Both |
| Operational / Embodied Carbon | Both | Operational | Both | Both | Both | Both | Operational | Operational | Both | Operational | Reverts to CRREM | Both |
| Existing / New Build | Both | Existing | Both | Both | Both | Both | Both | Reverts to SBTi | Both | Existing | | Both |
| Asset Types Covered | All | All | All | All | All | All | Multiple | | Residential, Offices, Schools | All | | All |
| Targets | Carbon Reduction | No Targets | Carbon Reduction | Absolute Energy Target (Offices) | Carbon Reduction | Embodied Carbon Reduction | Absolute Carbon and Energy Targets | | Absolute Energy and (Embodied) Carbon Targets | Carbon Reduction | | No Targets |
| Key Market Users | Asset Owners | Developers | Asset Owners | Asset Managers | Asset Owners | Asset Managers | Investors | Asset Owners | Developers | Asset Managers | Asset Owners | Asset Managers |

## Appendix 4) CRREM and its considerations

CRREM is widely used across the real estate industry in Europe and the UK. Like other science-based decarbonisation pathways, CRREM continues to evolve, as evident from its recent inclusion of F-gases in the scope. There are limitations in coverage and how the pathways can guide the built environment toward achieving NZC goals. CRREM currently does not address embodied carbon or include all asset types. This may pose challenges, potentially leading to labeling of some buildings as stranded assets without adequate consideration of the embodied carbon footprint.

**Stranding risk:** Stranded assets are considered properties that will be increasingly exposed to the risk of early economic obsolescence due to climate change because they will not meet (potential) future regulatory efficiency standards or market expectations.

However, it is important to note that whilst an asset may be 'stranded' according to this definition, that does not mean that it will not have market value. Investors will need to consider what their tolerance is for stranded assets within their portfolios and take a view on when such potential stranding is likely to equate to a loss of market value in different sectors and locations.

**On-site and off-site renewables:** Under the CRREM framework, only on-site generated and used renewable energy can reduce carbon intensity when assessing a building against the CRREM decarbonisation curve. When assessing a building against the CRREM energy use intensity curve, the source of the energy (renewable, grid, on-site or off-site) is irrelevant. This can lead organisations away from any form of green energy procurement or PPA and would also lessen the importance of on-site renewable energy generation. However, it is important to recognise that investors and occupiers often value on-site renewable energy, while it is generally accepted that renewable PPAs stimulate the green energy transition. On-site and off-site renewable energy are therefore likely to be key components of many real estate owners' paths to achieving NZC.

**Figure 5: Decarbonisation and Energy Reduction Pathway for the Netherlands (ref: CRREM)**