

# The Frontier Line

Net zero carbon in real estate:  
a complex trajectory

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Part one

# About us

Frontier has been at the forefront of institutional investment advice in Australia for over 25 years and provides advice on \$600 billion of assets across the superannuation, charity, public sector, insurance and university sectors.

Frontier's purpose is to empower our clients to advance prosperity for their beneficiaries through knowledge sharing, customisation, technology solutions and an alignment and focus unconstrained by product or manager conflict.



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# Introduction

“The greenest building is the one that already exists.”

– Carl Elefante, Former President of the American Institute of Architects

The real estate industry is one of the biggest carbon emitters, contributing close to 40% of global carbon emissions.<sup>1</sup> All stakeholders, specifically managers and developers, must collaborate at every level to decarbonise and achieve net zero by 2050. Alignment of this common goal would be significantly enhanced, in Frontier’s view, by linking remuneration structures of senior investment professionals to both financial and ESG goals, including tracking against decarbonisation targets.

While several global bodies and governments have set net zero carbon (NZC) targets, the real estate industry’s key challenge is implementation. At present, the construction and investment management industries lack widespread technological solutions to measure and reduce carbon emissions. So, the prospect of achieving a NZC outcome by 2050 appears daunting even as governments continue to legislate towards net zero. Government regulators (Securities and Exchange Commission or SEC, Australian Prudential Regulatory Authority or APRA) are continuing to scrutinise stakeholders. Closer to home, the Australian Government committed to a net zero target by 2050 ahead of the COP26 conference in Glasgow in November 2021. This has been augmented by the Labor Government’s Powering Australia program, which aims to cut Australia’s emissions by 43% by 2030.

**Our two-part paper seeks to understand the trends, challenges, and accepted pathways for the industry. Part one takes a deep dive into the real estate sector and how it aligns with net zero. Part two delves into how investment managers are actually tackling net zero targets, their plans to achieving it and reasons for any disparity in their progress.**



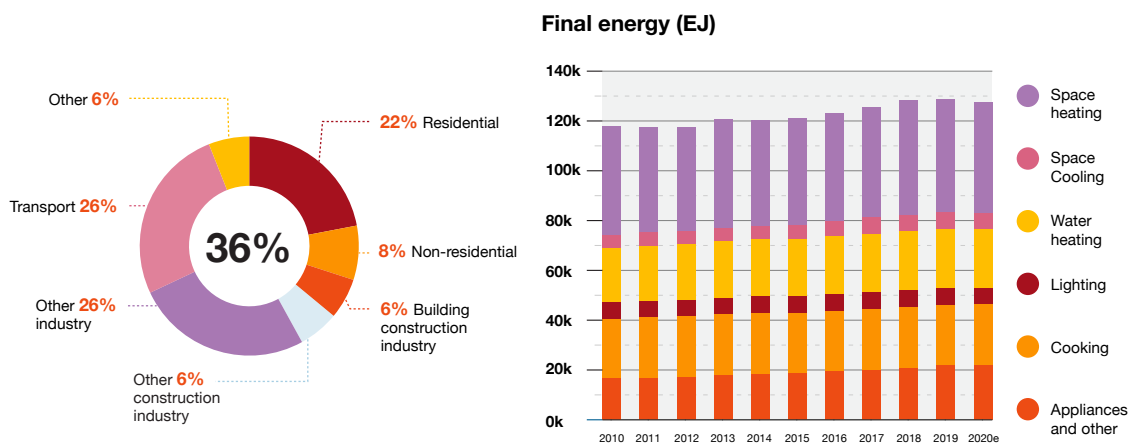
<sup>1</sup> Global Alliance for Buildings and Construction, “2020 Global Status Report for Building and Construction”, 2020

# Tackling carbon emissions in real estate

The real estate industry will continue to have an increased focus on the global net zero agenda. Of the 40% of global emissions that are attributable to the built environment, building operations accounts for around 70% and the remaining 30% ascribed to embodied carbon – the building materials used within both new and refurbished buildings.<sup>2</sup>

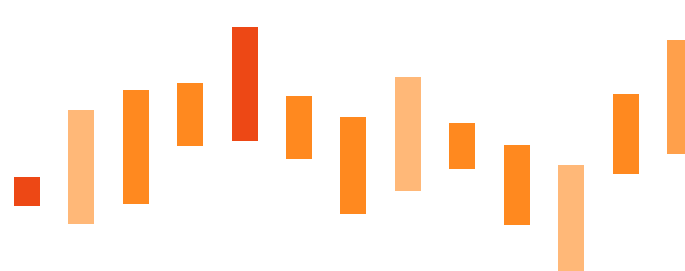
The International Energy Agency (IEA) estimates carbon emissions will need to decrease by approximately 50% by 2030, therefore requiring a 6% per annum emissions reduction, to meet its NZC target. The IEA breakdown of energy usage in 2020 (Chart 1) underscores the pervasiveness of energy usage across the building sector.

**Chart 1:** Global share of buildings and construction final energy (left) and by end use (right) (2020)



Source: IEA 2021, Global Alliance for Buildings and Construction

Notes: “Building construction industry” is the portion (estimated) of overall industry devoted to manufacturing building construction materials such as steel, cement and glass. Buildings construction industry related energy use is shown in Panel B in the chart on the right side.



<sup>2</sup> Global Alliance for Building construction industry, “2020 Global Status Report for Building construction industry”, 2020

Given the high energy usage highlighted by the IEA, the World Green Building Council (WGBC) is calling for the global real estate industry to meet the dual goals of:

- “All new buildings must operate at net zero carbon from 2030: Net zero carbon buildings must become standard business practice as soon as possible, so we build right from the start; avoid the need for future major retrofits; and prevent the lock-in of carbon emitting systems for decades to come; and
- 100% of buildings must operate at net zero carbon by 2050: Existing buildings require not only an acceleration of current renovation rates, but these renovations must be completed to a net zero carbon standard so that all buildings are net zero carbon in operation by 2050”.<sup>3</sup>

The achievement of these WGBC goals would be a historic milestone. However, the achievement comes with a significant requirement for ongoing investment in existing assets and their associated building infrastructure. Substantial capital expenditure is required to retrofit existing stock to reduce emissions, with estimates that 80% of already existing building stock will be around in 2050.<sup>4</sup> Energy efficiency renovations of existing stock will need to reach 3% per annum to ensure we meet net zero by 2050, with most mature cities’ refurbishment rate currently only at 1% to 2% per annum.<sup>5</sup> So, the industry would need to double or even triple the rate at which existing buildings are being retrofitted. This appears to be more of a

stretch than ever, with increasing costs due to supply shortage of building materials as well as labour constraints.

- Several gateway cities, such as Los Angeles, Paris, and New York, have enacted emissions reduction legislation, holding corporate property owners and managers accountable with severe penalties for those failing to comply. For example, New York City Local Law 97 (enacted in 2019) places a carbon cap on most large buildings and requires the City Council to work with the mayor’s office and other agencies including the department of environmental protection (EPA). Energy consumption and efficiency of a building is evidenced by its EPA ENERGY STAR score (the score is a measurement of the energy grade on a scale of 1 to 100 and translated to an energy grade which is represented with a letter between A and F. An A indicates the building is among the top 15% in energy efficiency). Building owners and managers are subject to civil penalties if they fail to report or breach caps.
- London has strict 2030 NZC targets, with new buildings requiring whole life-cycle carbon analysis and subsequent abatement strategies. Two skysire developments were recently rejected due to, among other reasons, too much embodied carbon emission within the concrete foundations. The Mayor of London noted in his rejection of the planning application that “designers should be taking all possible measures to minimise the embodied carbon”.



<sup>3</sup> WorldBCG, [www.worldgbc.org/thecommitment](http://www.worldgbc.org/thecommitment)

<sup>4</sup> WorldBCG, “Bringing Embodied Carbon Upfront”, 2019

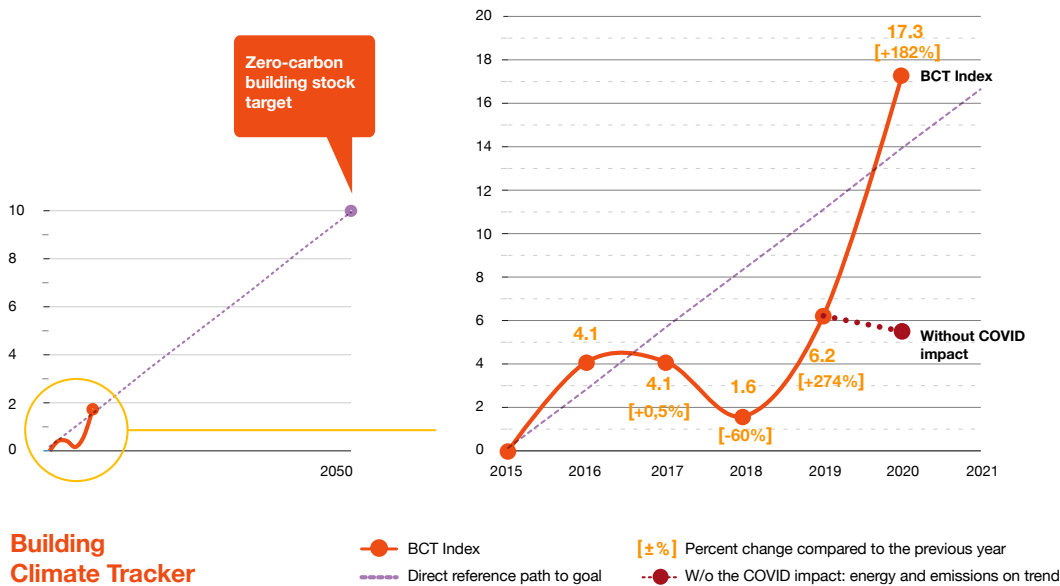
<sup>5</sup> World Economic Forum, “A Framework for the Future of Real Estate”, 2021; JLL, “Decarbonizing Cities and Real Estate”, 2022

## Current trajectory of emissions reductions

While carbon emissions from the built environment continue to rise, data shows the sector is becoming more efficient, albeit gradually, with a reduction in the growth rate of emissions even as the take-up of floor area increases. In 2019, operational emissions experienced the first decline in growth, since 2010. While there was a large decline in 2020, this was a result of COVID-19 lockdowns, and therefore, should be treated as an outlier rather than a base reference point going forward.

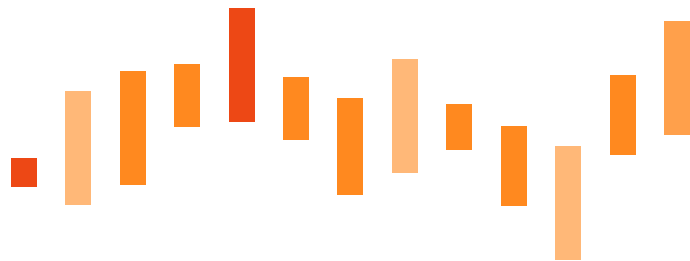
To track the progress of the total building stock towards net zero, the Buildings Performance Institute Europe created the global Building Climate Tracker Index. According to the data released, the industry lags the index when removing the impacts of COVID-19. The index, which uses a scoring scale from 0 to 100 to reach net zero by 2050, places the 'without COVID-19 impacts' in 2019, close to 5 points behind the direct reference path to the net zero goal. Due to the opaqueness of the global market, there is a large degree of uncertainty associated with the tracker, illustrating availability of clear and transparent data will form a key element in moving towards net zero.

**Chart 2:** Direct reference path to a net zero carbon building stock target in 2050



Source: Buildings Performance Institute Europe, Global Alliance for Buildings and Construction

NB: The tracker uses 40 indicators across: energy efficiency, building energy codes, green building certification, NDCs with building sector action, renewable energy share in final energy in global buildings, building sector energy unit intensity and CO<sub>2</sub> emissions.



## Why is net zero important?

Buildings failing to meet net zero standards will be left behind and risk becoming stranded. Decreased tenant demand and an inability to trade will reduce investor returns. Table 1 highlights the value drivers for the 'green premium'. There is also mounting evidence buildings with higher energy ratings tend to attract a return premium.

**Table 1:** Green premium versus brown discount

### Value drivers – green premium

- ✓ Increased tenant demand
- ✓ Increased occupancy
- ✓ Shorter reup time on leases
- ✓ Lower operating expenses and higher NOI
- ✓ Rental premium
- ✓ Cap rate compression
- ✓ Reduced regulatory risk
- ✓ More freedom to access debt financing

### Value detractors – brown discount

- ✗ Lower tenant demand
- ✗ Regulatory compliance (e.g. NABERS, TCFD)
- ✗ Increased insurance premium and lower NOI
- ✗ Carbon and resource risk
- ✗ Increased climate risk from floods, fire, drought
- ✗ Reputational risk
- ✗ General obsolescence risk
- ✗ Constraint in accessing financing

Source: abrdn, INREV, Frontier



Knight Frank recently reported that prime office buildings in Melbourne and Sydney with a NABERS (National Australian Built Environment Rating System) rating of 5+ have attracted a 17.9% price premium on sale to equivalent unrated buildings. Prime Central London office buildings with a BREEAM (Building Research Establishment Environmental Assessment Method) 'Excellent' rating also recorded a 10.5% price premium on sale compared to 10.1% premium for BREEAM 'Very Good' ratings.<sup>6</sup> Another meta-analysis of 42 studies conducted by Dalton and Furest in 2018, concluded that a sales and rental premium exists for green certified real estate, as shown in Table 2.<sup>7</sup>

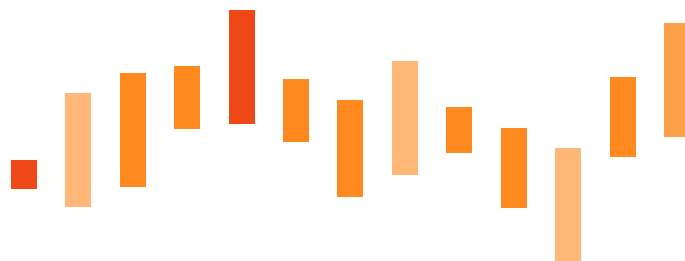
**Table 2:** Green certification premium

Green certification premium	Overall	Commercial	Residential
Rental premium	6.0%	5.4%	8.2%
Sales premium	7.6%	11.5%	5.5%

Source: Dalton and Furest, JLL

The construction and building industry, along with the real estate industry, remains fragmented in approach but from our conversations with industry practitioners, consultation across several industry bodies is underway to standardise best practice. Developers, construction companies, and asset owners can all have an active role in facilitating a more effective transition to net zero.

While there are many unanswered questions and new challenges which arise daily, the first challenge is to understand how carbon emissions are measured, what major emissions needs to be tackled, and how asset owners are placed to address these problems.



<sup>6</sup> Knight Frank Active Capital, "Trends in Global Real Estate Investment"

<sup>7</sup> Dalton and Furest, "The 'green value' proposition in real estate", 2018



# Understanding Scope 1, 2 and 3 emissions in real estate

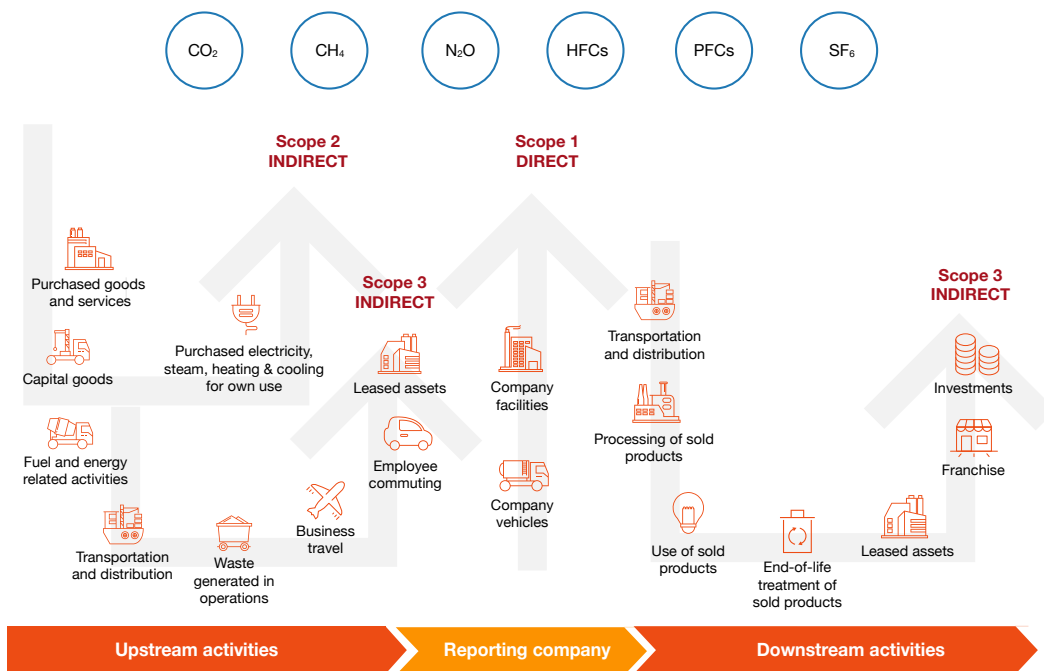
Emissions are classified as Scope 1, Scope 2, and Scope 3, as defined by the Greenhouse Gas Protocol (GHG Protocol), which is a widely used greenhouse gas accounting standard. In real estate, the emissions scopes can be defined as:

**Scope 1** – direct emissions, typically from on-site combustion or the use of vehicles.

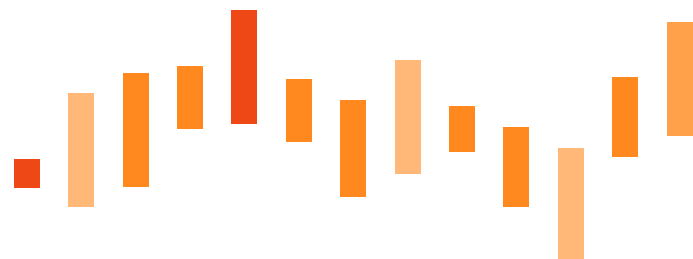
**Scope 2** – indirect emissions, from the purchase of energy, such as electricity, to power the building itself, from an operator’s point-of-view, e.g. air-conditioning, lighting of common areas.

**Scope 3** – indirect emissions, which come from upstream (i.e. the acquiring of goods and services, such as building material and construction) and downstream activities (i.e. the selling of goods and services, such as tenant-controlled electricity and supplier-related emissions). There are also small incidental Scope 3 emissions such as waste production and air travel.

**Chart 3:** GHG Protocol and definition of Scope 1 and 2 and 3 emissions



Source: WRI/WBCSD Corporate Value Chain Accounting and Reporting Standard

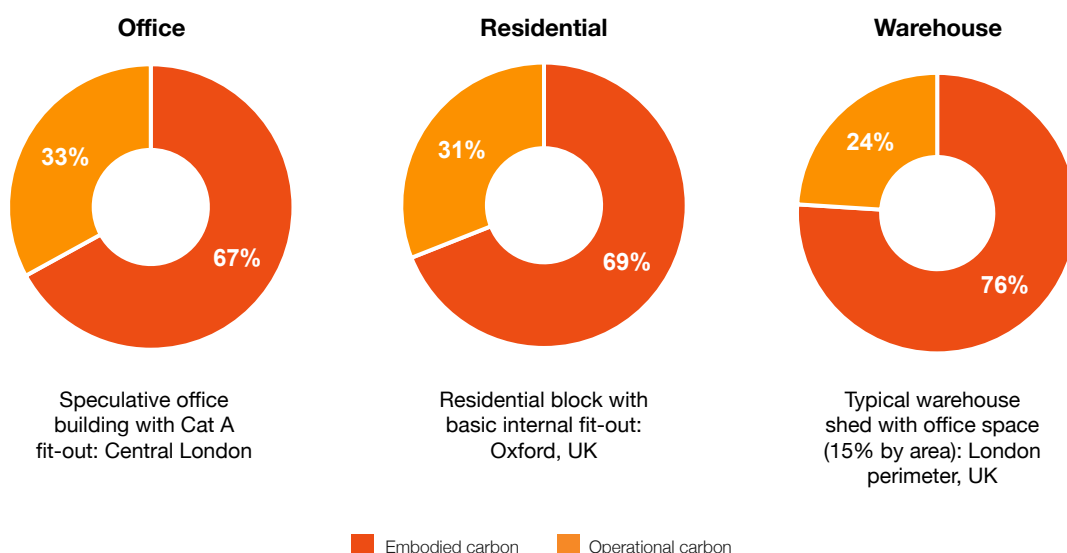


## The challenge that awaits – Scope 3 emissions

Scope 3 emissions also cover what is defined as ‘embodied carbon’, the cradle-to-grave emissions from the processing, procurement, installation of building materials and construction, maintenance, repairs, and demolition of the building. These are typically measured from the planning, development, and construction (cradle) through to demolition (grave) of a building. However, measuring embodied carbon is not without its challenges, including whether it considers the demolition and disposal of the building, recycling of the material post demolition and the construction and ongoing maintenance.<sup>8</sup>

As depicted in Chart 4, embodied carbon can account for over 50% of total carbon emissions over the carbon lifecycle of a building, particularly when considering reduction in operating emissions. Production of concrete, steel and aluminium, which are predominately used in the built environment, are responsible for 23% of total global carbon emissions.<sup>9</sup> The amount of embodied carbon will vary between the type of real estate developed, the ongoing maintenance requirements and energy efficiency of the underlying design. As seen in the chart, embodied carbon can differ by up to approximately 10% of total emissions depending on the type of building.

**Chart 4:** Breakdown of embodied and operational carbon in different real estate sub-sectors



Source: UKGBC, ShareAction

<sup>8</sup> RICS, “Whole life carbon assessment for the build environment”

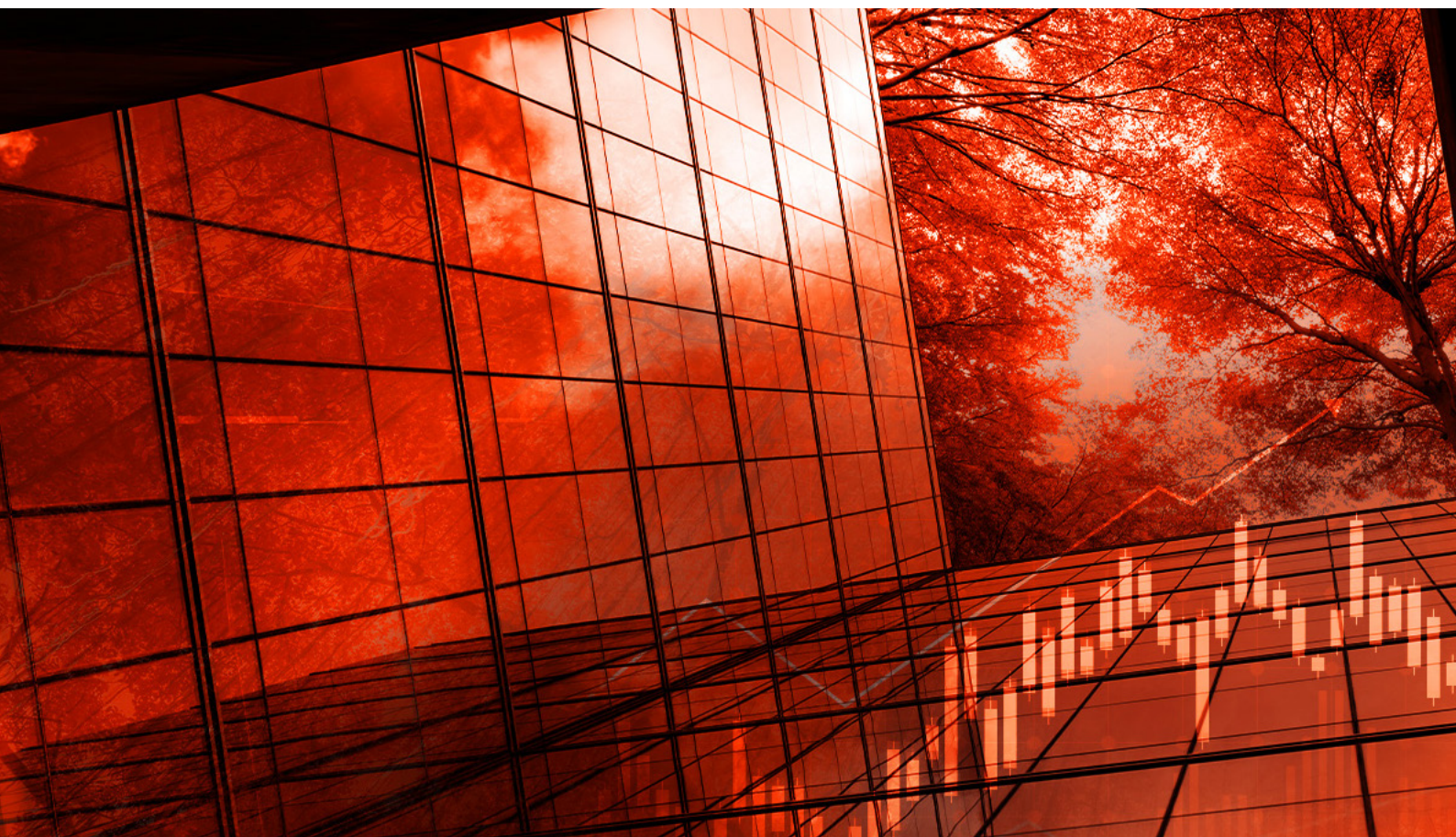
<sup>9</sup> architecture2030.org

Regional divergences exist, with the United Kingdom leading most other geographies when it comes to whole-building carbon lifecycle analysis. As a part of London's NZC 2030 target, the New London Plan Guidance has recently been adopted and outlines the life-cycle carbon reporting requirements when assessing a new strategic development for approval. The Guidance adopts the standards set out by the Royal Institute of Chartered Surveyors (RICS), providing investor certainty. Additionally, LEED (Leadership in Energy and Environmental Design) certification, a sustainability accreditation system, provides credits for reduction in embodied carbon, resulting in embodied carbon analysis being commonplace throughout the United Kingdom.

To tackle the issues pertaining to embodied carbon, developers and real estate owners need to consider materials used in the design process. To reach the goal of net zero embodied carbon, developers must consider:

- *reuse* of recycled materials and designing for deconstruction
- *reducing* the amount of material used and seeking to optimise the design specifications
- *sequester*, including considering the use of materials, such as timber.<sup>10</sup>

Companies such as The Footprint Company have established tools that provide carbon emission data on building materials and usage to be able to calculate total embodied carbon. Asset owners and developers are also working with specialist firms and architects to understand new design requirements. Once actual carbon emissions from building design are accounted for, the remaining carbon emissions can be balanced using carbon offsets (discussed in Part two), although use of offsets should ultimately be the last resort. Overall, asset owners and fund managers cannot ignore the problem of embodied carbons and will need to carefully consider the impact of new developments and refurbishments.



<sup>10</sup> <https://architecture2030.org/why-the-building-sector/>

# Challenges with standards, disclosure and data

There is a wide disparity in standards, disclosure, and data collection and regulations relating to climate across industry bodies and regulators. COP26 in Glasgow set the stage for the creation of a consistent framework for capital markets and companies to comply with mandatory climate disclosure, climate stress testing, science-based transition plans, portfolio alignment and frameworks to wind down stranded assets.

Real estate owners and managers will face continued pressure on data collection and disclosure requirements. To ensure compliance and consistency, there are several standardised reporting frameworks which are gradually becoming mandatory in parts of the world. This includes the Taskforce for Climate-related Financial Disclosures (TCFD), NABERS in Australia, Green Star from the World Green Building Council (WGBC) and Global Real Estate Sustainability Benchmark (GRESB) as the global standard for benchmarking.

None of these frameworks seek to disclose company and asset-level net zero targets and committed pathways. Many remain fixated on policies and processes, or like NABERS, measuring energy efficiency. Without a clear pathway to reach net zero, many of these commitments remain just targets. To be effective, these frameworks will need to consider long-term and intermittent targets and the plan to reach net zero.



# Reaching for net zero

Frontier believes a holistic program is required to reach net zero. Such a program will seek to increase operational efficiency, optimise electricity usage, and substitute technologies and electricity sources with renewables or low carbon options. The real estate industry should be applying a technological overlay in measuring a building's carbon footprint to create a clearer pathway to net zero targets.

Technological advancements mean real-time carbon tracking makes it possible to match building electricity use to real-time carbon intensity. Few managers are investing in property-related technological solutions. Incremental asset level improvements alone are unlikely to make a meaningful contribution toward achieving NZC target dates. We expect industry leaders will support and invest in 'proptech' ventures in underlying start-ups to drive efficiency gains from real-time consumption data, innovative building systems and real-time transition to renewable energy.

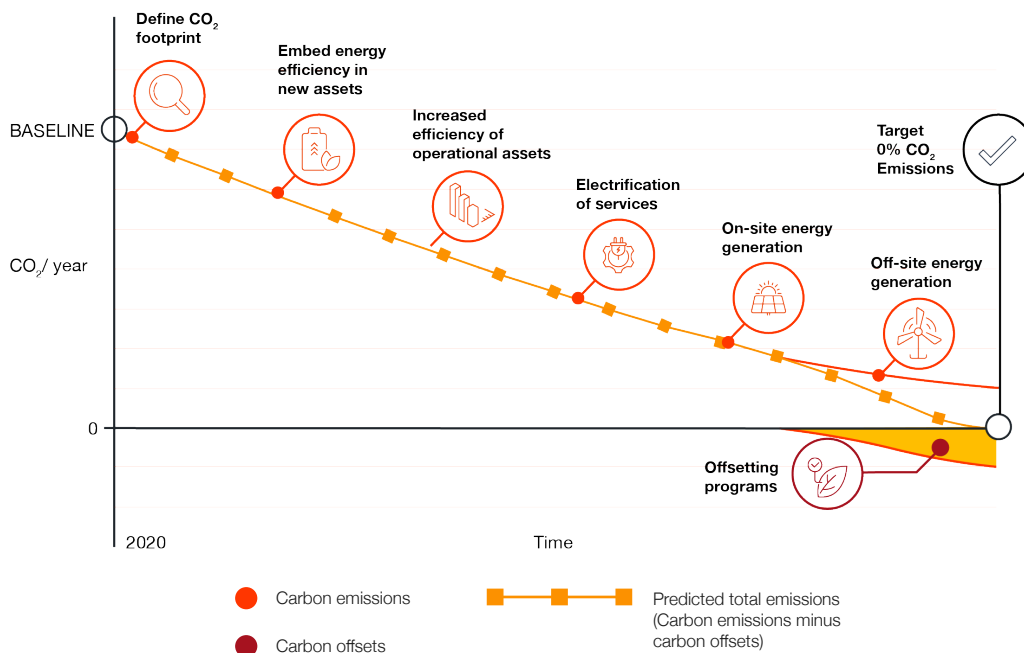
Additionally, carbon offsets and sequestration should be used to abate carbon emissions where there is no suitable economic alternative, rather than as a key emissions reduction strategy.

WSP Australia, a global engineering consulting firm, has illustrated a decarbonisation pathway from operations, as set out in Chart 5. Many real estate managers are considering emissions reductions utilising a similar pathway which is pleasing (Part two of this paper provides more detail).

While the approach below considers real estate generally, each sub-sector will have different driving factors when it comes to energy usage. For example, industrial energy use for operations is almost always tenant-controlled, therefore, engagement with tenants will be critical to ensuring a smooth net zero transition. Managers and asset owners can incentivise tenants to engage with them by creating energy efficient buildings.

Typical options include installing solar panels and electric vehicle charging stations, bundling power purchase agreements for renewable energy to offer cheaper sources of electricity to tenants and helping tenants on their own net zero journey. Mapping each asset's sources of carbon emissions will be critical to achieving net zero across the asset class.

**Chart 5:** Example of decarbonisation pathway for real estate



Source: WSP Australia

# Managers' journey – a sneak peak

Investors can help drive change and challenge investment managers to disclose their progression in greater detail. Part Two of this paper reports the net zero journey of a select number of managers. We think these insights will enable investors to better drive conversations with managers and hold them accountable.

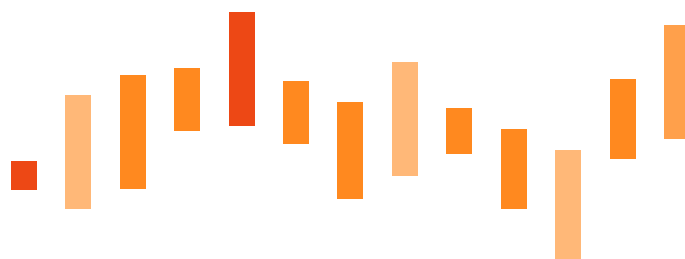
Table 3 highlights a cross-section of managers surveyed by Frontier and is a good proxy for the progression across peers.

**Table 3:** A select number of managers and their net zero targets

	Scope 1 and 2 targets	Scope 3 targets
Manager 1 (Australian)	Net zero by 2025	Absolute zero by 2040
Manager 2 (Australian)	Carbon neutrality already achieved in 2020 <sup>NB</sup>	N/A
Manager 3 (Australian)	Net zero by 2030	Still in development
Manager 4 (International)	70% reduction from current levels of Scope 1 and 2 emissions by 2025 (no formal net zero target)	N/A
Manager 5 (International)	Net zero by 2030	Net zero across the value chain by 2040
Manager 6 (International)	Net zero by 2040	Net zero 2040 goal includes Scope 3 emissions

Source: Managers, Frontier

NB: Carbon neutrality is defined as when an organisations emissions are balanced and when the emissions produced are calculated and then offset via carbon offsetting projects. It differs from net zero carbon, which seeks to reduce the absolute carbon emissions, while minimising the use of offsets.



# The final word



The real estate industry accounts for close to 40% of global carbon (CO<sub>2</sub>) emissions attributable to building operations and embodied carbon. The industry continues to improve towards decarbonisation with peak bodies, regulators, governments, and investors all driving net zero goals.

Yet, challenges remain and all stakeholders must collaborate toward the common goal. Alignment of purpose could be significantly enhanced, in Frontier's view, by linking remuneration structures of senior investment professionals to both financial and ESG goals, including tracking against decarbonisation targets.

As momentum builds, there is significant opportunity for managers and investors to continue to invest in the space, however, investors should be aware managers are at differing levels of advancement. Incremental asset level improvements alone are unlikely to make a meaningful contribution toward achieving NZC target dates. We expect industry leaders will support and invest in proptech ventures in underlying start-ups to drive efficiency gains.

Frontier recommends clients consider the following actions for real estate portfolios:

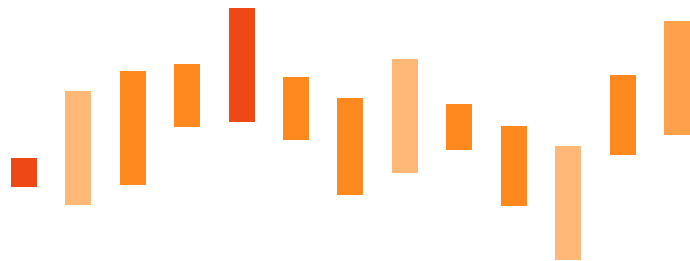
- Initial and periodic reviews of portfolios to identify gaps and specifically NZC manager progress or other ESG related aspects.
- Where appropriate, consider managers with strong affiliation with energy transition and proptech solutions.

**We continue to monitor the sector and identify compelling strategies. We are happy to chat with clients as we progress our research. Frontier can help assess any new investment opportunities, or an assessment of the ESG credentials of your current real estate portfolio.**



#### Want to learn more?

If you want to learn more about real estate investment or net zero carbon initiatives more generally, Frontier can help. Please reach out to your consultant or a member of the Real Assets Team.





## Frontier

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