

In Collaboration  
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# Green Building Principles: The Action Plan for Net-Zero Carbon Buildings

INSIGHT REPORT  
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# Contents

Foreword	3
Executive summary	4
Introduction	5
Identifying market demand	6
Green Building Principles	7
<a href="#">Principle 1</a> Calculate a robust carbon footprint of your portfolio	8
<a href="#">Principle 2</a> Set a target year	10
<a href="#">Principle 3</a> Measure and record embodied carbon	13
<a href="#">Principle 4</a> Reduce embodied carbon	15
<a href="#">Principle 5</a> Energy optimization	17
<a href="#">Principle 6</a> Increase renewable energy supply	18
<a href="#">Principle 7</a> Maximize renewable energy procurement	19
<a href="#">Principle 8</a> Reduce emissions in your value chain	21
<a href="#">Principle 9</a> Carbon offsetting	23
<a href="#">Principle 10</a> Equitable cost-benefit sharing	25
What does your first year look like?	27
What does it mean to formally adopt the Principles?	27
Conclusion	27
Contributors	28
Acknowledgements	29
Endnotes	31

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# Foreword



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The cascade of global events over the last two years has greatly increased the urgent need to transform how we develop and manage the built environment. Collectively, as a society, as we grappled with how to stay safe indoors and adapt space to new ways of living and working, those of us within the World Economic Forum's real estate CEO community committed to driving industry transformation for a better future; a future where buildings and cities are more liveable, sustainable, resilient, and affordable. And to address sustainability and act on the urgency of climate change, we have developed the Green Building Principles to simplify the process of delivering net-zero carbon portfolios and accelerate action from our peers across every industry.

The current moment has presented an opportunity for reflection on what we prioritize in our economy, encouraging many governments and companies to pivot towards a green, sustainable recovery and boost global cross-sectoral climate action towards achieving the Paris Climate Agreement goals. While many organizations have made net-zero carbon

commitments, and many more continue to do so, the roadmap for delivering on these commitments is missing. The aim of these Green Building Principles and the Action Plan outlined in this document is to draw out a narrative of what it means to be net-zero carbon in real estate and distill key actions into a coherent set of globally standardized principles. By outlining the steps needed to implement a net-zero carbon commitment, companies can use these Principles and Action Plan to meet and exceed their climate commitments.

Our aspiration for this work is to provide companies, from real estate to technology to banking, with the tools they need to materially reduce the carbon footprint of the spaces they occupy, own and invest in.

We ask that leaders across every industry take immediate action by formally adopting these Principles and pledge to reduce building-related emissions by 50% by 2030 and to deliver net-zero carbon real estate portfolios no later than 2050.

# Executive summary

This Action Plan provides the necessary steps to deliver net-zero carbon real estate portfolios.

The World Economic Forum's global real estate CEO community has set out a vision and roadmap for the future of buildings and cities to become more [liveable, sustainable, resilient and affordable](#). To meaningfully reduce carbon emissions, the Green Building Principles, developed in conjunction with JLL, aim to support the transition of real estate portfolios across all industries, asset types and regions.

The world is warming at an alarming rate, setting humanity on an irreversible course of destruction if drastic action is not taken immediately. The Intergovernmental Panel on Climate Change (IPCC) sixth assessment report released in August 2021 reveals the sobering reality that Earth will likely reach and surpass the critical 1.5°C benchmark by 2052, or earlier, if the current rate of warming is not abated.<sup>1</sup> The report also states that warming is a direct result of emissions generated by humans and 38% of those energy-related emissions come from buildings (28% from operational emissions and 10% from materials and construction).<sup>2</sup>

The increasing global recognition of this existential threat has resulted in both countries and companies setting ambitious decarbonization targets ahead of the 2021 United Nation's (UN) Conference of the Parties (COP26). Many of these commitments from the private sector feed into the Race to Zero, the UN-backed global campaign to achieve net-zero carbon by 2050 at the latest. While expert guidance, ambitious targets and detailed commitments exist, delivering against these commitments for real estate portfolios remains complex. Research conducted by JLL has found that a common understanding of how to achieve net-zero carbon in real estate is the next critical step to advancing efforts.

The Principles and Action Plan outlined in this document aim to fill that void and offer implementation strategies to decarbonize buildings at a portfolio level. This Action Plan draws on existing recommendations and signposts to an array of current targets to deliver this set of Principles at a global level while allowing for adaptation to local contexts. Recognizing the wealth of targets, benchmarks and other forms of guidance for real estate already in existence, this Action Plan offers a framework to implement those targets and benchmarks.

This Action Plan explains the market need for such an effort and outlines the Principles and implementation strategies in detail.

The Green Building Principles:

1. Calculate a robust **carbon footprint** of your portfolio in the most recent representative year to inform targets.
2. Set a **target year** for achieving net-zero carbon by **2050** at the latest, and an interim target for reducing at least **50% of these emissions by 2030**.
3. Measure and record **embodied carbon** of new developments and major refurbishments.
4. **Maximize emissions reductions** for all new developments and major refurbishments in the pipeline to ensure delivery of net-zero carbon (operational and embodied) by the selected final target year.
5. Drive **energy optimization** across both existing assets and new developments.
6. Maximize supply of on-site **renewable energy**.
7. Ensure **100% off-site energy** is procured from **renewable-backed sources**, where available.
8. Engage with stakeholders with whom you have influence in your value chain to **reduce Scope 3 emissions**.
9. Procure **high-quality carbon offsets** to compensate for residual emissions.
10. Engage with stakeholders to identify joint endeavours and **equitably share costs and benefits** of interventions.

It is important to continue to emphasize the urgency of action and that while the target date deadline of 2050 is purposefully set to align with the Race to Zero, it is imperative to set as ambitious targets as possible.

Companies are encouraged to formally adopt the Principles and report progress on implementation annually. The Principles fully complement existing targets and commitments, helping to ensure a holistic approach to decarbonizing buildings.

# Introduction

## A common framework for delivering net-zero carbon for real estate portfolios.

### Background

The United Nations international climate negotiations (known as the Conference of the Parties (COP)) are held each year to review and revise ambition on mitigating climate change and adapting to its impacts. 2021's COP26 in Glasgow, the United Kingdom, is one of the most influential of these gatherings as it is the first time that countries will officially present how they will increase the ambition of their roadmaps to achieve the stated goal of the Paris Climate Agreement: to substantially reduce global greenhouse gas emissions in an effort to limit the global temperature increase in this century to 2°C above pre-industrial levels while pursuing the means to limit increase to 1.5°C.

These enhanced roadmaps are being pursued as part of the "ratchet mechanism" for the Paris Climate Agreement. The mechanism is an acknowledgement that initial roadmaps were not sufficient for achieving the goals of the Agreement and countries have consequently been working to raise their ambition and

identify solutions. Over the course of 2021, the private sector has been matching these efforts through the proliferation of net-zero carbon commitments and actions. Many of these commitments are captured through the Race to Zero, which aims to achieve net-zero carbon by 2050 at the very latest.

Actors across real estate are joining the Race to Zero through the various initiatives available, making ambitious commitments to decarbonize their buildings. The next step for delivering against these commitments, however, remains somewhat unclear for many. This lack of clarity is not due to a lack of guidance. There are many industry bodies globally that have provided excellent targets, benchmarks, and guidance documents on how to deliver elements of net-zero carbon. The piece that is missing is a common understanding of what is meant by net-zero carbon in real estate and a common framework outlining the steps to deliver an overarching net-zero carbon strategy.

### Action Plan purpose

This Action Plan provides that common framework for delivering net-zero carbon for real estate portfolios. It will draw on the range of guidance already available in the industry and will signpost readers to where further, more detailed advice can be found. It aims to be sufficiently precise without being overly prescriptive in order to provide the necessary flexibility that different regions, building types and company structures require.

#### BOX 1

#### Defining net-zero carbon

Achieving net-zero carbon is the process of ensuring that your company, on average, puts no emissions into the atmosphere.

A company is required to pursue all options to reduce its emissions to the extent possible and then use high-quality offsets for any remaining emissions to ultimately bring its emissions balance to zero. To achieve this, a hierarchy of actions should be pursued in the following areas: energy efficiency, renewable energy (on- and off-site), embodied carbon, and carbon offsetting.

Net-zero carbon differs from carbon neutrality in that net-zero carbon places a stronger emphasis

on maximizing all options along the net-zero carbon hierarchy before using carbon offsets, and when carbon offsets are used, they should be carbon removals (i.e. offsets that remove carbon from the atmosphere) as opposed to emissions reduction offsets (i.e. offsets that simply prevent new emissions from being released into the atmosphere).

There are some carbon neutrality frameworks – such as the PAS2060 certification – that do require an entity to demonstrate that it has taken other measures before using carbon offsets to obtain certification; however, this distinction applies in most scenarios.

# Identifying market demand

The first step in developing this Action Plan was identifying the unmet market demand.

There is a wealth of sound industry guidance available, covering requirements and targets under various elements of a net-zero carbon pathway. However, there is a need for a clear sequence of actions to make the transition to net-zero carbon, which the Principles and Action Plan deliver.

Elements of the net-zero carbon journey that have existing guidance are outlined in Figure 1 below. There is also detailed guidance available at the national level for some countries which has not been included in Figure 1 as this Action Plan looks at globally relevant guidance only.

FIGURE 1 Industry initiatives on net-zero carbon

Target/guidance	Carbon footprint/trajectory	Energy efficiency	Renewable energy	Embodied carbon	Carbon offsetting	Implementation plan
World GBC Net-Zero Carbon Buildings Commitment (Updated)	●	●	●	●	●	
World GBC Bringing Embodied Carbon Upfront				●		
Science Based Targets initiative (SBTi)	●					
Carbon Risk Real Estate Monitor (CRREM)	●	●				
International Living Future Institute's Net-Zero Carbon Certification	●	●	●	●	●	
Chartered Institution of Building Services Engineers (CIBSE) CB06		●				

Source: JLL (2021)

# Green Building Principles

The Green Building Principles outline the key steps that a company needs to take to deliver on its net-zero carbon commitment.

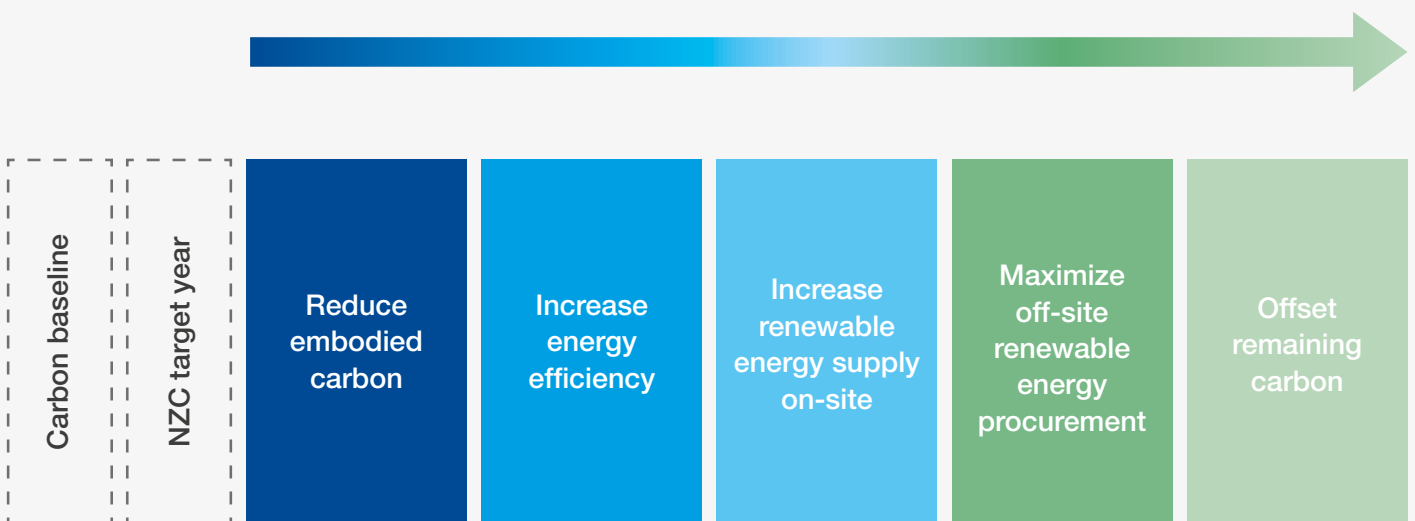
The Action Plan that accompanies these Principles sets out a “how-to” guide to deliver on each of these steps.

The Green Building Principles:

1. Calculate a robust **carbon footprint** of your portfolio in the most recent representative year to inform targets.
2. Set a **target year** for achieving net-zero carbon by **2050** at the latest, and an interim target for reducing at least **50% of these emissions by 2030**.
3. Measure and record **embodied carbon** of new developments and major refurbishments.
4. **Maximize emissions reductions** for all new developments and major refurbishments in the pipeline to ensure delivery of net-zero carbon (operational and embodied) by the selected final target year.
5. Drive **energy optimization** across both existing assets and new developments.
6. Maximize supply of on-site **renewable energy**.
7. Ensure **100% off-site energy** is procured from **renewable-backed sources**, where available.
8. Engage with stakeholders with whom you have influence in your value chain to **reduce Scope 3 emissions**.
9. Procure **high-quality carbon offsets** to compensate for residual emissions.
10. Engage with stakeholders to identify joint endeavours and **equitably share costs and benefits** of interventions.

These Principles combine to represent a framework that would enable a real estate portfolio to be considered net-zero carbon. This journey is visually represented in Figure 2:

FIGURE 2 Net-zero carbon (NZC) framework



Source: JLL (2021)

# Calculate a robust carbon footprint of your portfolio

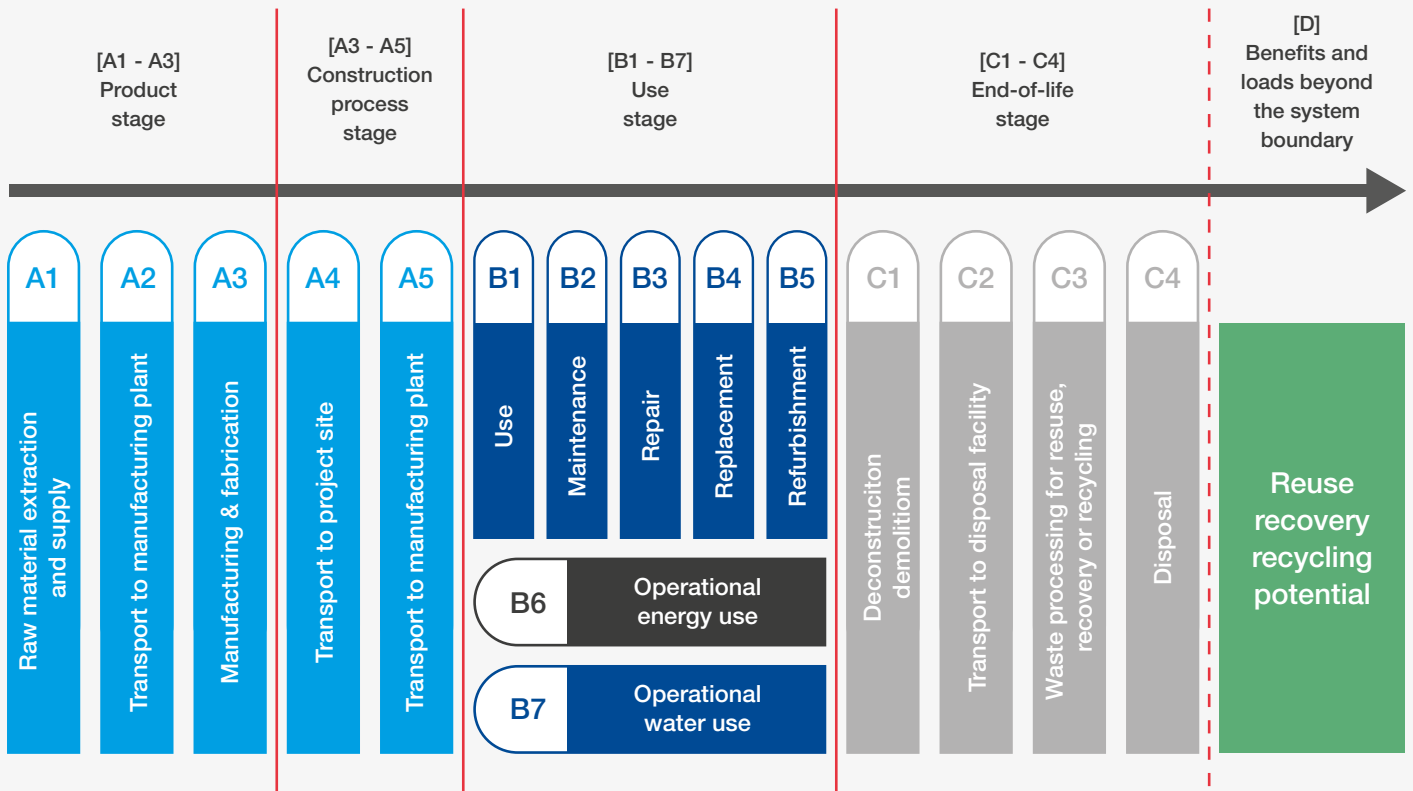
Calculate a robust carbon footprint of your portfolio in the most recent representative year to inform targets.

## Calculating a carbon footprint

A carbon footprint is a calculation or estimation of the carbon emissions associated with a business and can be broken down into Scope 1, 2 and 3 emissions. Simply put, Scope 1 emissions are generated by a company's direct combustion of fuel (e.g. natural gas), Scope 2 emissions are indirect emissions from purchased energy (e.g. electricity), and Scope 3 are all other indirect emissions that occur in a company's value chain. For most companies, the vast majority of

their carbon footprint is Scope 3. While all emissions should be measured and reduced by a company, for the purposes of this guidance, only the Scope 1-3 emissions of real estate assets should be covered; in other words, the whole life carbon of all buildings (Figure 3). With the exception of B6, the whole life carbon of buildings emissions are mostly Scope 3 emissions. It is not expected that a company measure A1-A5 for existing buildings.

FIGURE 3 Elements of whole-life carbon for a building



Source: [RICS](#) (2017)



Ideally, a carbon footprint should be set in the most recent year for which a company has available data. This will usually be the year previous to when the footprinting exercise is being undertaken. It is important to not set a carbon footprint that is too far in the past, as this allows a company to capitalize on gains that were external to its influence and could be perceived as greenwashing.

Although ideally, the carbon footprint should be in the most recent year, this year should also be representative of the business. Therefore, if the most recent year of data is one that does not accurately represent business operations, acquisitions, developments or similar, the company may wish to select an earlier year that is more representative. A key example of this is the use of data from 2020, which is not generally considered a representative year because COVID-19 drastically altered many businesses' operations. Once a carbon footprinting exercise is undertaken, this will represent the company's net-zero carbon baseline year.

Carbon footprinting is essential for developing an effective strategy as it helps companies identify the major sources of emissions. For instance, many companies will often first focus on their water and waste, and while both of these areas are important, they are not necessarily major contributors to emissions and therefore factors to prioritize as part of a net-zero carbon strategy.

**Refining your carbon footprint:** It is important to recognize that data will never be entirely perfect or complete, and some estimations are likely to be used in setting out a company's carbon baseline. There is a variety of benchmarks for operational energy and embodied carbon that can be used to support these estimations. In addition, while having as accurate a baseline as possible is important, placing undue emphasis on refining the baseline at the expense of acting should not be encouraged. It is expected that a company will continue to improve its data collection over time and should not use partial data as a reason for inaction. A sufficient baseline is one that has stated clearly what buildings are in scope, is transparent about the proportions of data that are actual versus estimated and makes a commitment to continue to improve data collection.

**Projecting the change in your footprint over time:** Once the emissions are calculated for the company's baseline year, they will need to be projected out to the net-zero carbon target year. These projections will need to account for various factors, including potential for grid decarbonization, energy efficiency improvements, renewable energy supply, acquisitions, developments, major renovations, and other relevant factors particular to the company. With the trajectory from baseline year to target year, the company will have an overview of the scale of emissions that they will need to bring to net zero.

**What is whole-life carbon?** Operational carbon + embodied carbon

**What is operational carbon?** Emissions produced from running a building

**What is embodied carbon?** Emissions produced to construct, transport, and assemble materials for a building

### What are scopes 1, 2 and 3?

Scope 1: Direct emissions from owned or controlled spaces

Scope 2: Indirect emissions from purchased energy

Scope 3: Indirect emissions from the value chain (commonly largest source of emissions)

### Relevant for:

- All: Understand your current and projected emissions.

## Principle 2

# Set a target year

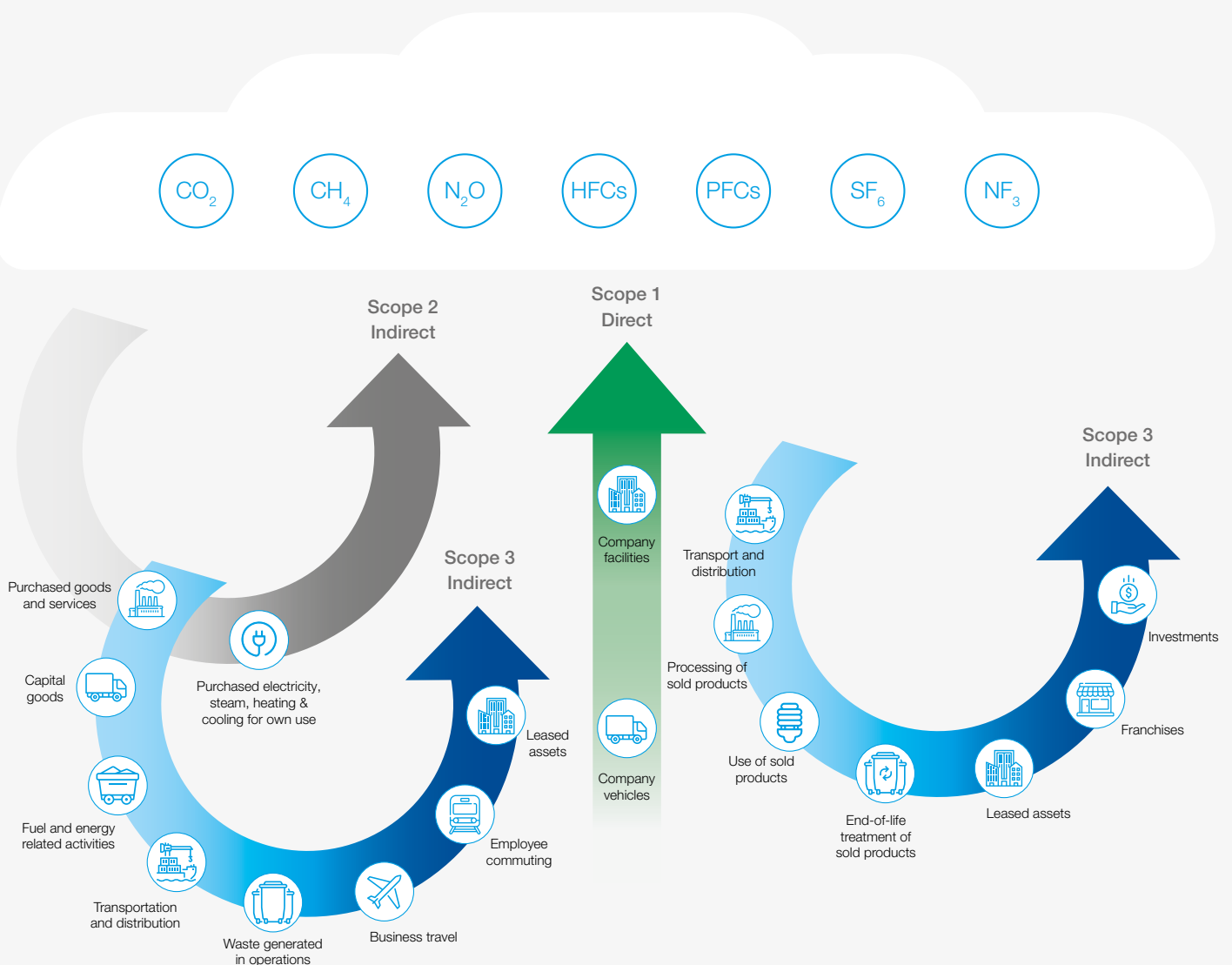
Set a target year for achieving net-zero carbon, by 2050 at the latest, and an interim target for reducing at least 50% of these emissions by 2030.

**Understanding the 2050 target:** The Race to Zero requires signatories to set targets to achieve net-zero carbon by 2050 at the very latest, with an interim target to halve emissions, ideally by 2030. This Action Plan suggests alignment with these target years since the majority of companies who are setting net-zero carbon plans are aligned with The Race to Zero. The Race to Zero has identified these target years to align

with the latest science from the [Intergovernmental Panel on Climate Change](#), which has identified that achieving net-zero carbon emissions by mid-century is essential to limit anthropogenic emissions.

Net-zero carbon targets should cover emissions from all material sources across Scope 1, 2 and 3 (Figure 4).

FIGURE 4 Scopes of emissions according to the GHG Protocol



Source: [https://www.ghgprotocol.org/sites/default/files/ghgp/standards\\_supporting/Diagram%20of%20scopes%20and%20emissions%20across%20the%20value%20chain.pdf](https://www.ghgprotocol.org/sites/default/files/ghgp/standards_supporting/Diagram%20of%20scopes%20and%20emissions%20across%20the%20value%20chain.pdf) (2020)

Even though the final target year for achieving net-zero carbon across the business is set as 2050, a business should aim to set an earlier target year for addressing their buildings. Multiple companies who are already publishing their plans have outlined earlier target years, some as early as 2030. There is a recognition that it may be more challenging for some companies to set earlier target years than others. Therefore, if a company chooses to set a target year that is further away, it is advisable that they explain why this is the earliest date that they can reasonably achieve net-zero carbon. To determine the most appropriate net-zero carbon target year, it is strongly recommended that a company first undertake a robust carbon footprint and trajectory setting exercise (see Principle 1).

**Alignment with the World Green Building Council (WorldGBC) target years:** If a company sets a target year for delivering the requirements of the Principles by 2030, they will be in alignment with WorldGBC's [Net Zero Carbon Buildings Commitment](#), and will be recognized under this leadership initiative for going further and faster to address emissions from their buildings portfolio.

If a company chooses a final target year beyond 2030, it should endeavour to reduce overall emissions by at least 50% by 2030. New developments constructed between the adoption of the Principles and 2030 should aim to be as close to net-zero carbon as possible (both operational and embodied) by 2030. This follows the recently updated guidance set out by WorldGBC in their [Net Zero Carbon Buildings Commitment](#).

**Importance of an interim target:** To avoid the postponement of meaningful action, this Action Plan asks companies to set an interim target and plan for reducing emissions by at least 50% by 2030. A company must demonstrate that they have taken significant action in all preceding steps in the net-zero carbon journey prior to offsetting, which is covered further in Principle 9. The Race to Zero campaign also advises a 7% year-on-year reduction in emissions and encourages reporting on emissions reductions separately from emissions reduced through offsetting.

While not required for the Principles and Action Plan, companies may choose to set an interim target date for all new developments to be net-zero carbon (i.e. all efforts are made to reduce embodied carbon emissions, any residual embodied carbon emissions are offset, and the building is designed to operate as efficiently as possible with maximum on-site renewable energy potential).

**When do I set a target year?** Companies should seek to set a final target year not to exceed 2050 (and interim target year) after conducting the carbon baseline and strategy development exercise outlined in Principle 1. This will allow the company to set ambitious and informed targets that are suitable for its portfolio. Companies can communicate that their target years can be brought forward in the future if circumstances change. It is strongly advised that any changes to company target years are only to shorten the timeline rather than postpone.



**What does it mean to be net-zero carbon in your target year?** Overall, this means that the company has achieved maximum reductions in operational and embodied carbon and then offset any residual emissions (see Principle 9). However, there are nuances as to how this will apply to different business types as follows:

**Rented space:** Occupiers that rent space should aim to have net-zero operational emissions by the determined final target year. This means working with building owners to calculate emissions, optimize energy efficiency, maximize renewable energy supply, and then offset any remaining emissions at the end of each year. If an occupier undertakes a major refurbishment, they should measure, reduce and offset any residual embodied carbon emissions (Principle 3 offers more guidance on what constitutes a major refurbishment).

**Owning space:** Owners of buildings will need to ensure net-zero operational emissions. This can be a challenge for building owners since they will often have limited, if any, control over spaces that are rented to tenants. In these spaces, the building owner should work with the tenant to identify options for reducing emissions and find equitable ways to share the costs of these interventions.

For embodied emissions, if the building was built before adopting the Principles, then the embodied carbon emissions are out of scope and reducing them is not necessary to adhere to the Principles. These buildings can be marketed as “operationally net-zero carbon” given the difficulty in measuring the embodied carbon of existing buildings. Some green building rating tools provide certification for validating a building’s net-zero performance, such as LEED Zero or DGNB’s (The German Sustainable Building Council) Carbon Neutral certification.

**Building acquisitions:** Companies should vet potential acquisitions to understand their energy intensity (for operational net-zero carbon) and ideally to understand what developers have done to reduce and offset embodied carbon (for embodied net-zero carbon of recently developed assets), and the implications for action required to transition the asset to be operationally net zero. These factors should weigh into the valuation process.

**Subletting building space:** In a scenario where space is sublet to another company,

the Principles require bringing that sublet space to net-zero carbon. The carbon accounting method substantiating the GHG Protocol will help avoid double counting. Bringing the space to net-zero carbon does not mean that the owner has to pay for all the changes needed. A proactive tenant engagement plan can ensure an effective split of costs and benefits between owner and occupier. For multi-let spaces, these can be more challenging to bring to net-zero carbon than single-let spaces and so it is possible for companies to set later target years for the former.

**Joint ventures or shared equity structures:** Companies should include within their scope and reduce the emissions of any building in which they have shared equity, or that is a joint venture, equivalent to their ownership share in those assets. In alignment with the guidance provided elsewhere in this Action Plan, companies should reduce emissions to the extent possible first before offsetting any residual emissions. Given there is not always full control over the assets in these structures, target years can vary to reflect that challenge (still not exceeding 2050). Plans for such assets can focus on stakeholder engagement strategies to effectively share information and costs for decarbonizing.

**Businesses with all of the above structures:** Most companies will have a mix of building types and ownership/rental structures. All buildings should be included in the carbon footprint to the extent possible. There will not always be clear visibility on future developments or acquisitions, so reasonable assumptions about projected growth should be made and included in the carbon footprint exercise (Principle 1). Companies can provide a caveat that this may change as they review their footprint periodically going forward.

**Financial responsibility of net-zero carbon interventions:** For a building to be considered net-zero carbon, it must achieve maximum reductions in operational and embodied carbon, with an annual net-zero operational emissions balance, with any residual emissions offset (using carbon removals, depending on the definition of net zero). This can be paid for entirely by one party or by multiple parties who all have shared interests. Finding innovative funding solutions is highly encouraged to facilitate the transition of the sector to net-zero carbon.

**Relevant for:**

- All: Define what is in scope.

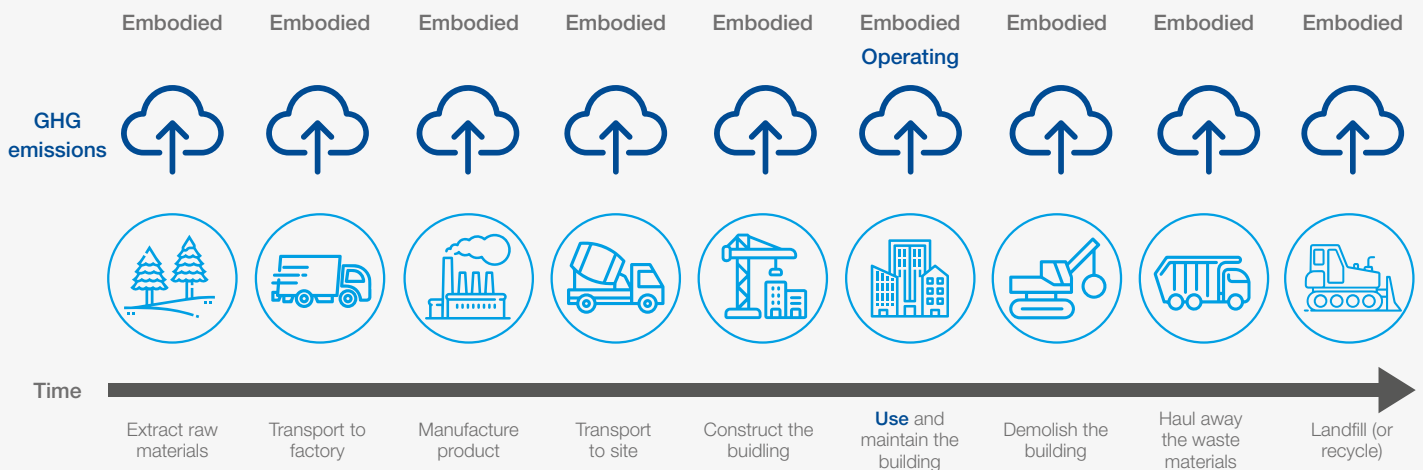
# Measure and record embodied carbon

Measure and record embodied carbon of new developments and major refurbishments.

**Defining embodied carbon:** Embodied carbon in new developments and major refurbishments refers to the carbon emissions that are produced primarily before a building becomes operational and when it is decommissioned. Emissions are typically generated by activities such as extraction of raw materials, transport to facilities, construction of a building, refurbishment and demolition and waste management at end-of-life. These emissions constitute a significant proportion of all emissions from the built environment. Around 38% of global emissions come from the building and construction sectors. Of this 38%, 10% come from embodied carbon. These emissions are estimated to account for close 50% of the entire carbon footprint of new construction between now and 2050.<sup>3</sup>

Embodied carbon emissions can sometimes be significantly higher than operational carbon emissions over the course of a building's lifespan (around 60 years). The most substantial portion of these embodied carbon emissions occurs prior to the building becoming operational. An overview of all embodied carbon in new developments and major refurbishments is outlined in Figure 5. Of these emissions, the upfront embodied carbon (i.e. the emissions associated with the construction of a building) is often the largest source of embodied carbon emissions for a built asset and presents the greatest opportunity for embodied emissions reductions. WorldGBC provides guidance on what these emissions are and how they can be reduced in their [Bringing Embodied Carbon Upfront](#) report.

FIGURE 5 Embodied carbon emissions in the built environment



Source: C40 (2017)

## Defining new developments and major refurbishments

A new development refers to the new construction of any asset type, including offices, homes, shopping centres and warehouses. There is not an international definition of what constitutes a major refurbishment. In Australia, the guidance suggests that any refurbishment, renovation, or restoration that impacts a floor area greater than 2,000 square

metres and/or that affects more than 50% of the net lettable area of a building, premises, or common areas can be considered a major refurbishment.<sup>4</sup> In London, the United Kingdom, major refurbishments are those that comprise ten or more dwellings or that have a floor area greater than 1,000 square metres.<sup>5</sup> Therefore, this Action Plan suggests that



a major refurbishment be considered one involving a floor area greater than 1,000 square metres (~10,700 square feet) unless local or national regulations or guidance indicate otherwise. Since there is no universal definition for what constitutes a major refurbishment, it may be more useful to

focus on the materials being replaced rather than the floor area. If companies choose to define major refurbishment in terms of materials, that also aligns with these Principles. Public disclosure of this process is encouraged, as is including smaller fit-outs in a company's net-zero carbon ambition.

## Measuring and recording embodied carbon

It is important to assess the embodied carbon associated with a new development or major refurbishment as early as possible in the building design process (ideally in the original design brief) to establish a carbon baseline and identify low carbon solutions in the design process when there is the greatest potential to reduce embodied carbon. As a result, this Action Plan focuses on embodied carbon for new developments and major refurbishments since the embodied carbon of existing buildings is very difficult to measure after construction and there are no options for reducing these emissions besides addressing them through offsetting. Despite the more limited measurement options with existing buildings, the redevelopment and reuse of existing structures offer the opportunity to tap into an embodied carbon bank, achieving even lower levels of embodied carbon overall.

Embodied carbon is quantified using whole life carbon assessments. Common tools for undertaking these assessments are the [One Click LCA](#) and [EC3](#). To undertake such an assessment, a company will need to collect the following information:

- Environmental Product Declarations (EPDs): These calculate the embodied carbon of

building materials in the product stages (A1-A3), some of the use stages (B1-B5), and the end-of-life stage (C1-C4) of the whole life carbon process (Figure 3). These are usually valid for five years. EPDs can be used to gain life cycle assessment credits in certification schemes, including LEED, BREEAM, DGNB, and HQM.

- Grid carbon factors: These are used to calculate the carbon emissions where necessary and will vary from country to country.

### Further resources

#### [WorldGBC's Bringing Embodied Carbon Upfront:](#)

Defines embodied carbon and lays out stakeholder actions and target years for reducing embodied carbon.

[RICS' Whole Life Carbon Assessment:](#) While this resource comes from the United Kingdom's context, it provides a useful review of methods for measuring embodied carbon and provides estimates/benchmarks of current embodied carbon intensities.

One Click LCA and EC3: Both of these are tools for measuring embodied carbon associated with the built environment.

### Relevant for:

- **Owners:** Measure embodied carbon emissions for new developments and major refurbishments.
- **Occupiers:** Measure embodied carbon for major renovations.
- **Investors:** Measure embodied carbon emissions for new developments and major refurbishments.

# Reduce embodied carbon

Maximize emissions reductions for all new developments and major refurbishments in the pipeline to ensure delivery of net-zero carbon (operational and embodied) by the selected final target year.

**Understanding building elements:** The first step to reducing embodied carbon is to understand the different elements of a building and its typical lifetime. Elements such as the foundation, structure, and façade will last considerably longer than the services, interior and other elements. Therefore, careful design and selection of materials will ensure durability and adaptability to future circumstances.

**Reducing embodied carbon:** There are many options for reducing embodied carbon, many of which take advantage of circular economy principles. A variety of options for reducing embodied carbon are outlined in the WorldGBC's report on [Bringing Embodied Carbon Upfront](#). The design phase is where the most impactful decisions can be made to reduce embodied carbon. Companies can consider refusing a new development project or demolition and, instead, finding ways to optimize or reuse existing space. Where a company chooses to proceed with a new development or major refurbishment, they can embed design for disassembly principles in which a building is designed to facilitate future changes, reuse and dismantlement for the recovery of systems, components, and materials.<sup>6</sup> They can also adopt the use of modular design, off-site assembly, and reduced on-site construction to reduce embodied carbon.

Companies can also make sure that they are selecting low-carbon materials. Some of the most carbon-intensive materials in the built environment are concrete, steel, and masonry. Various alternatives are gaining popularity, including cross-laminated timber. Where materials such as concrete are still needed, options for reducing their carbon intensity are increasing, including recycled concrete, which reduces the need for further sand extraction, or using concrete where a portion of the cement mix comes from crushed plastic bottles.

Buildings and their materials can be designed and selected to ensure maximum length and intensity of use as part of a whole life cycle approach.<sup>7</sup> This will ensure the most efficient use of materials,

and therefore, a reduced need for new materials. In addition, materials should be selected that are easily repairable to reduce waste.

**Co-benefits of a circular economy approach:** Many of the concepts outlined above are part of circular economy thinking – the concept of shifting away from a take-use-dispose economy to one that keeps materials in use for as long as possible. Circular economy thinking not only helps to reduce carbon emissions; it also provides opportunities for reducing resource demand and waste, increasing biodiversity gain, and mainstreaming health and well-being opportunities into the built environment.

**Determining when to offset:** For most new developments and major refurbishments, even if all steps are taken to limit embodied carbon, there will still be some remaining in any project. For a building to be considered net-zero carbon for embodied carbon, high-quality carbon offsets will be needed to negate residual emissions. Guidance on what are considered high-quality carbon offsets is outlined in Principle 9. To demonstrate that sufficient action has been taken to reduce embodied carbon prior to using carbon offsets, companies should undertake whole life cycle assessments to identify opportunities for reducing embodied carbon during the design phase and then document where the recommendations from these assessments have been implemented.

While the definition of net-zero carbon is evolving in some respects, the focus of embodied carbon reductions should be on new developments and major refurbishments. Therefore, this Action Plan does not recommend that companies seek to label existing buildings as fully net-zero carbon. These embodied carbon emissions would be considered out of scope, and these buildings should therefore be labelled as operationally net-zero carbon. Portfolios with existing buildings that are operational net zero will still be considered compliant with the final target year net-zero carbon goal for the Principles.

**Identifying appropriate targets.** There is a range of targets that a company can use as guidance. This list references some prominent ones but is not exhaustive.

[WorldGBC Bringing Embodied Carbon Upfront:](#) Provides a timeline for achieving key net-zero embodied carbon milestones.

[International Future Living Institute:](#) As part of their certification, particular benchmarks need to be achieved for embodied carbon to comply with the certification.

[Architecture2030 Challenge for Embodied Carbon:](#) Provides percentage target reductions as part of its challenge.

Commitments and Targets from national Green Building Councils are available, e.g. the [United Arab Emirates](#) and the United Kingdom, along with DGNB.

[Embodied carbon benchmarks for European Buildings:](#) Provides benchmark data for European buildings across five main building types.

### Why is reducing embodied carbon important?

Reducing embodied carbon reduces the need for offsets, helping reduce overall costs of carbon offsets. Therefore, there is an incentive to act sooner rather than later on embodied carbon.

### Relevant for:

- **Owners and developers:** Identify methods for reducing embodied emissions for new developments and major refurbishments.
- **Occupiers:** Identify methods for reducing embodied emissions for any major refurbishments and ideally for smaller fit-outs if desired.
- **Investors:** Engage with building owners and managers to ensure measures are being taken to reduce embodied carbon.





# Energy optimization

Drive energy optimization across both existing assets and new developments.

**Defining energy optimization.** Energy optimization is the implementation of both design and operational measures to ensure that a building is using the minimum energy required for the functions it needs to perform. The ambition of energy optimization measures varies. At the lowest level, maintenance measures can be implemented, such as renewing insulation of hot water pipework, increasing the frequency of filter replacement in air distribution systems, or adjusting start/stop times of plants. At an intermediate level, both proactive energy monitoring and retro-commissioning of buildings can take place. These interventions could include the installation of sub-metering, recalibration of temperature sensors, or rebalancing heating/cooling systems. At the highest level, companies could invest in capital projects such as the installation of a hybrid of fan coil units or of hybrid variable refrigerant flow systems. In tandem with energy-efficient technology, it is important to ensure that building services are electric, enabling them to benefit from renewable energy generation.

**Setting energy efficiency targets.** Companies should identify the targeted amount of energy that they are able to reduce as part of their net-zero carbon strategies. The expression of these targets will vary depending on whether buildings already exist or are new developments. This Action Plan will signpost key targets and benchmarks available. Companies often ask if they need to meet these targets exactly for each building they own, occupy or invest in to be considered net-zero carbon. This Action Plan suggests that companies need to demonstrate that they have made as much effort as possible to reach that target. If they demonstrate this and still cannot precisely achieve the target, they can still be considered compliant with this principle of the net-zero carbon hierarchy. Part of the reason for providing this nuance is that individual considerations will vary significantly. For instance, if a building is coming to the end of its lifespan and the proposed energy efficiency interventions are very costly for the efficiency gains,

then it would make more sense for the company to use that capital to invest in creating additional renewable energy capacity.

**Targets for existing buildings.** Companies can model the potential energy efficiency savings from a building based on energy performance certificates, sub-metered data, energy audits, and similar sources. Based on these, they can determine the possible percentage of savings, which are commonly expressed as either carbon intensity or energy intensity reductions. Carbon intensity savings are usually more significant because these can be achieved through both energy efficiency and increased renewable energy supply. The possible percentage of savings will vary by building type and location.

**Targets for new buildings.** New buildings should be designed in the most energy-optimized manner and to ensure that they can perform at the efficiency level for which they were intended to operate. There is a series of benchmarks available for energy efficiency in new developments, which are expressed in kWh/m<sup>2</sup>/year. They vary by building type and location, and a list of commonly used targets is available in the further resources section of this Action Plan.

**Identifying appropriate targets.** There is a range of targets that a company can use as guidance. This list references some prominent ones but is not exhaustive.

[CRREM Targets](#): CRREM provides targets for energy and GHG intensity by country, for each country within the EU and across multiple asset types, each year up to 2050.

[WorldGBC Target Tool](#): WorldGBC provides an overview of rating tools for some of the parts of the net-zero carbon hierarchy, including energy efficiency ratings.

## Relevant for:

- **Owners:** Optimize efficiency in directly managed spaces and engage occupiers to find solutions for indirectly managed spaces.
- **Occupiers:** Engage owners to find solutions to optimize efficiency and share sub-metered data, invest in efficient equipment, and use spaces in an efficient manner.
- **Investors:** Engage building owners and managers to ensure that measures are being taken.

# Increase renewable energy supply

Maximize supply of on-site renewable energy.

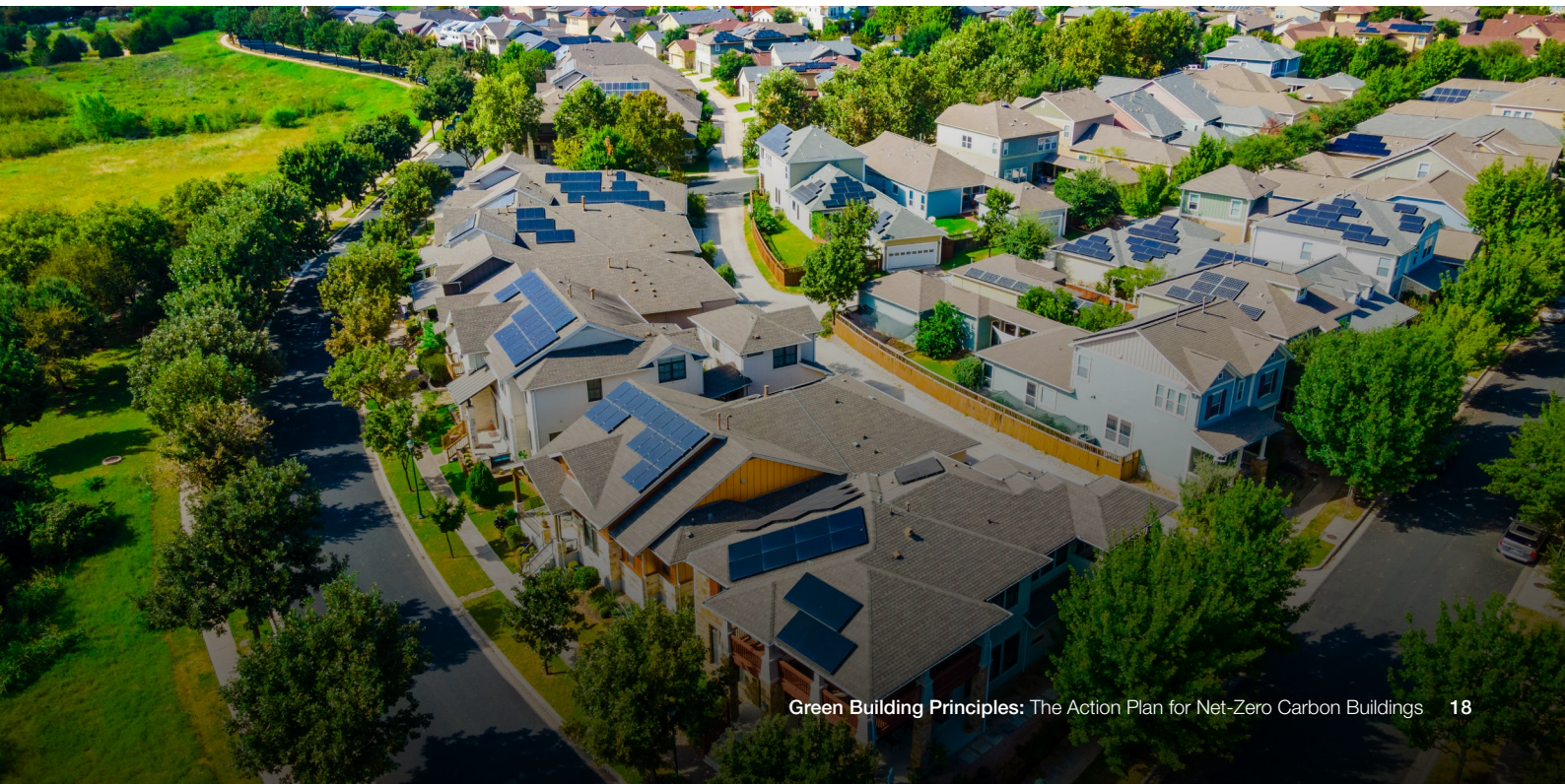
Even after all energy efficiency measures are implemented, there will still be a need for energy to power buildings. To comply with net-zero carbon, a company should ensure this energy comes from renewable sources. According to the International Renewable Energy Agency (IRENA), renewable energy includes all forms of energy produced from renewable sources in a sustainable manner, including bioenergy, geothermal energy, hydropower, ocean energy, solar energy, and wind energy.

Companies should first look to identify how much electricity they can generate themselves from renewable sources. There are usually two options for this. First, a company may look to develop an on-site Power Purchase Agreement (PPA). This is a bilateral contract between an energy developer and its beneficiary. The upfront costs can be high, however, so in the event a company cannot fund this themselves, they can explore the option of outsourcing the upfront cost to developers who can build and operate the renewable generating system and sell the energy back to the company.

On-site PPAs may not be logistically or financially viable for all companies. Therefore, the second option is through maximizing the potential for on-site solar photovoltaic (PV) panels. To determine the potential capacity, companies will need to measure the available rooftop area or, as an alternative, the available floor area. It is also possible to use desktop assessment services to provide estimates for the available area. Based on this, it is possible to determine the number of solar panels that can be installed and, therefore, how much energy can be generated. In some regions, ground-mounted solar PV panels can also provide co-benefits, such as shading. Barriers to installing on-site PV can include limited access to rooftop space based on the agreement with the tenants, existing equipment occupying space, or roofs that are not sufficiently strong to support solar PV systems. For these reasons, it is important to conduct initial on-site surveys. For engagement between building owners and tenants on options, there is further information on engagement plans later in this Action Plan.

## Relevant for:

- **Owners:** Identify on-site capacity and engage with tenants to install.
- **Occupiers:** Engage with building owners to install.
- **Investors:** Engage building owners and managers to install larger-scale capacity.



# Maximize renewable energy procurement

Ensure 100% off-site energy is procured from renewable-backed sources, where available.

For many companies, it will be unlikely that their entire energy demand can be met from on-site renewable sources. Therefore, identifying renewable sources from which energy can be procured is the next step. There are many types of renewable energy procurement contracts available and not all of them guarantee the same quality of renewable energy. Therefore, this Action Plan develops a hierarchy of renewable energy procurement options. These are based on the extent to which the source guarantees exclusivity and additionality, which are defined as:

- **Exclusivity:** The extent to which the company procuring the energy has a guarantee that they exclusively own the energy generated and that that energy is directly coming from a renewable source. There are some renewable energy providers who are generating renewable energy, but there is not always a guarantee through

certain certification programmes that the energy is coming directly to those paying for it.

- **Additionality:** Additional capacity refers to the idea that the renewable energy that a company procures would not have been created if it had not been specifically requested. The real estate sector is coalescing around the need for renewable energy to be additional, given the limited supply of renewable power via the main grid. It is known that current renewable availability is not sufficient to achieve global net-zero carbon targets by mid-century, hence the importance of creating additional capacity.

Allowances should be made given that renewable energy supply to the energy grid will vary from country to country. Companies can demonstrate their efforts to explore the various options available as part of their public disclosure.

## Renewable energy hierarchy

### Corporate or physical Power Purchase

**Agreements (PPAs):** these are bilateral agreements between an energy developer and a company looking to purchase that energy. Corporate or physical PPAs differ from the on-site PPAs referred to under the previous Principle in that the generation is located off-site. Corporate PPAs enable users to negotiate directly with the renewable developer on the building of a new utility-scale renewable generation facility and to purchase the generated power at a fixed price over a long period of time, usually for 15-20 years.

A suitable user will need to have a significant demand for power (of approximately 15 GWh per annum) and be able to project their electricity demands into the future with a decent degree of accuracy. Companies could explore the option to jointly develop a contract with a PPA provider to meet the minimum demand required.

PPAs meet both the exclusivity and additionality criteria. Limitations to consider are that PPAs have a lead time for contracts to be negotiated and the new generators to be built. In both cases, an

organization's electricity demand may not be met entirely, and therefore further options are required to meet the remaining, more variable demand.

**High-quality green tariffs:** These refer to energy contracts sold to energy users by utility companies that only source their energy from 100% renewable sources, usually via their own PPAs. High-quality tariffs ensure exclusivity of energy provision and additionality, even though the latter may be hard to prove. High-quality green tariffs are currently scarce in most countries and so may come at a notable premium. Nevertheless, they should be pursued to fill any residual electricity demand after on-site and off-site PPAs opportunities have been maximized.

**Standard or low-quality green tariffs:** This category refers to green tariffs available on the market, including energy bought on the wholesale market, which are attributed to renewable sources. While currently accepted as part of a net-zero carbon pathway, these tariffs are not considered best practice and should only be used as a last resort because they do not have guarantees of exclusivity or additionality.

**Other options:** This Action Plan acknowledges that there are many countries in which it is not viable to procure renewable energy from the grid. Where this is the case, companies can explore the option of using international renewable energy certificates (I-RECs) to claim the use of renewable electricity from low or zero-emissions sources. I-RECs represent transferable proof that one megawatt-hour (MWh) of electricity was produced from renewable energy sources and

added to an electrical grid. Purchasing an I-REC allows the buyer to claim consumption of one MWh of renewable energy. Preference should be placed on bundled I-RECs, which ensures additionality by funding future renewable energy generation over unbundled I-RECs, which only fund existing renewable energy generation. The [International REC Foundation](#) is a non-profit that provides a tracking standard for I-RECs around the world.

**Relevant for:**

- **Owners:** Procure high-quality renewable energy.
- **Occupiers:** Engage with building owners to support the procurement of high-quality renewable energy.
- **Investors:** Engage building owners and managers to source larger, longer-term procurement agreements.



# Reduce emissions in your value chain

Engage with stakeholders with whom you have influence in your value chain to reduce Scope 3 emissions related to buildings.

Emissions classified as Scope 3 are the emissions that a company indirectly impacts in its value chain. These emissions often comprise the most significant portion of emissions for a company, especially for building owners and developers. It is therefore important to identify ways to reduce these emissions, and this Action Plan suggests that stakeholders reduce them anywhere that they have influence and can engage with those who influence them directly.

This Action Plan refers only to Scope 3 emissions that are part of a building's value chain rather than the entirety of a company's Scope 3 emissions. The

latter needs to be reduced as part of a broader net-zero carbon strategy. However, this Action Plan only pertains to that of a building or portfolio of buildings. Companies are encouraged to undertake a Scope 3 emissions screening, identify significant sources, and develop plans for reducing emissions, starting with where they have influence.

The Greenhouse Gas (GHG) Protocol allocates Scope 3 emissions into 15 different categories (Cat). These categories and the activities they cover that would need to be decarbonized in accordance with the Principles are outlined in Figure 6 as follows:

FIGURE 6 GHG Protocol Scope 3 emissions categories

Scope 3 category	Activities included in a full Scope 3	Portion relevant to this Action Plan
Cat 1: Purchased goods and services	All company purchases, excluding travel, e.g. facilities management, contractors, lawyers and consultants.	All purchases related to real estate transactions and operation. Relevant for both development (embodied carbon – Principle 4) and non-development procurements (operational carbon, Principles 4–7).
Cat 2: Capital goods	All capital expenditures excluding operational expenses, e.g. construction materials such as steel and concrete.	Especially relevant for those building or buying new developments where a large source will be the embodied carbon of construction materials, such as steel and concrete (Principle 4).
Cat 3: Fuel energy-related activities	Emissions from extraction, production and transportation of fuels of energy, e.g. transmission and distribution losses from fuels and electricity purchased.	Relevant for developers who transport energy from the generation plant to the site and use energy during construction (Principles 6 and 7).
Cat 4: Upstream transportation and distribution	Emissions from logistics for developments, e.g. courier or logistics services.	Relevant for developers who undertake the logistics associated with developments (Principles 8 and 10).
Cat 5: Waste generated in operations	Available operational and construction waste, e.g. cables, pipes, contaminated soil.	Relevant, but usually not a significant emissions source.

Cat 6: Business travel	Includes travel from flights, taxis, rail, and personal vehicles.	Relevant for a full Scope 3 assessment, but not for this Action Plan.
Cat 7: Employee commuting	Includes regular journeys by employees from home to work.	Relevant for a full Scope 3 assessment, but not for this Action Plan.
Cat 8: Upstream leased assets	Emissions from building space leased from other companies not already included in Scope 1 or 2.	Relevant for building occupiers/tenants (Principles 8 and 10).
Cat 9: Downstream transport and distribution	Emissions from the transport of goods/services to end-user.	Not relevant as any building sold would probably not be transported. Any goods/services needing transport are relevant for a full Scope 3 assessment, but not for this Action Plan.
Cat 10: Processing of sold products	Emissions from goods/services that are processed further.	Not relevant as any building sold would likely not have elements that need to be further processed.
Cat 11: Use of sold products	Emissions from end-use of goods/services sold by the company.	Relevant for developers to account for expected operational emissions for any building sold over a lifetime (Principles 4–6 and 8–10).
Cat 12: End-of-life treatment of sold products	Emissions from waste disposal and treatment of sold products at end-of-life.	Relevant to developers and owners who will account for expected end-of-life emissions from a building sold.
Cat 13a: Downstream leased assets (operational control)	Emissions from occupier/tenant energy consumption with operational control.	Relevant to owners, operators and managers for the emissions of buildings leased to another organization since they have a high degree of influence over tenant emissions in leased spaces (Principles 4–8 and 10).
Cat 13b: Downstream leased assets (no control)	Emissions from occupier/tenant energy consumption with no operational control.	Relevant to owners, operators and managers to try to engage occupiers/tenants (Principles 8 and 10).
Cat 14: Franchises	Emissions from operation of franchises.	Relevant for a full Scope 3 assessment, but not for this Action Plan.
Cat 15: Investments	Emissions from operation of investments, including equity and debt investments and project finance.	Relevance to investors and investment managers for whom this can be a large proportion of their emissions (Principles 8 and 10).

#### What are scopes 1, 2 and 3 for emissions?

These are the way that emissions are classified according to the GHG Protocol, which delivers global guidance on the GHG emissions inventories.

Scope 1: All direct emissions from a company or assets under its control.

Scope 2: Indirect emissions from electricity purchased and use by a company.

Scope 3: All other indirect emissions from a company's activities occurring from sources that they do and do not control.

#### Relevant for:

- All: Undertake a Scope 3 screening to identify major sources.

# Carbon offsetting

Procure high-quality carbon offsets to compensate for residual emissions.

**Defining carbon offsets.** Carbon offsetting is the idea that the carbon emissions generated through an activity can be compensated for by financially supporting a project elsewhere that prevents or removes the equivalent amount of carbon from the atmosphere.

**Offsetting in the net-zero carbon hierarchy.** It is very likely that – even if a company undertakes all efforts on energy efficiency, renewable energy, and embodied carbon – they will still have emissions that they cannot avoid. Companies are allowed to use carbon offsetting to compensate for these emissions. Companies should demonstrate that they have made serious efforts to reduce their emissions by the previously outlined means first before they proceed to procure carbon offsets.

**Principles for high-quality carbon offsetting.** There have been claims of “greenwashing” with carbon offsetting in the past, some merited and some not. In response to this, the voluntary carbon market is making concerted efforts to define what constitutes high-quality carbon offsets, and markets are developing to ensure that all offsets transition towards a level of quality centred on the following principles, which are drawn from the [Oxford Principles for Net Zero Aligned Offsetting](#):

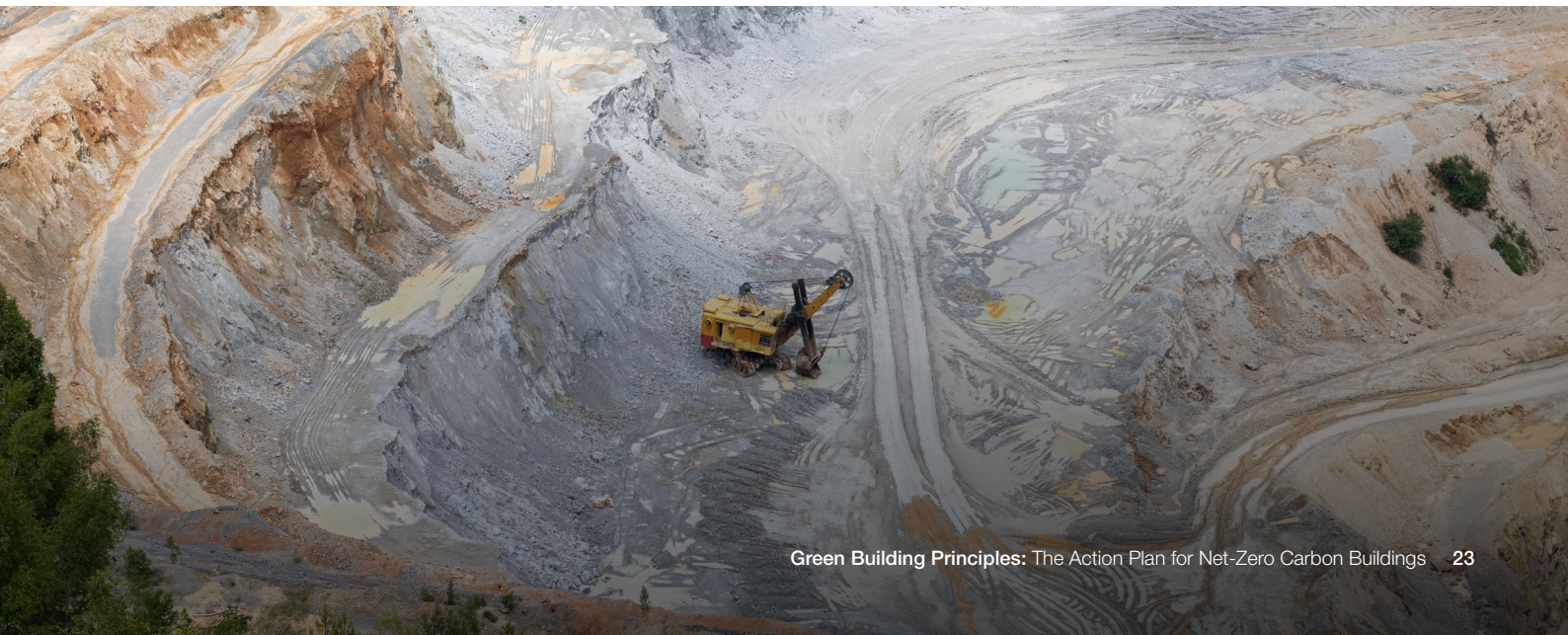
- **Additionality:** A carbon offset that would not have taken place without the direct support of a company, i.e. they are additional.
- **No unintended consequences:** A carbon offset that avoids unintended negative consequences, such as socioeconomic, land rights, or biodiversity side effects.

- **Transparency:** A carbon offset that is verified and publicly disclosed.
- **Permanent:** A carbon offset that ensures emissions are stored permanently. This means that the risk the emissions will be re-released into the atmosphere is minimized. For example, if a forestry project takes place in an area that is later unsustainably harvested for paper production, the stored emissions get re-released into the atmosphere, making the project invalid.

Companies should develop carbon offsetting strategies that ensure their offsets demonstrably meet all four of these criteria.<sup>8</sup>

**Transition from emissions reductions to carbon removals.** Offsets should increasingly transition to carbon removals. Currently, most offsets are a type of emission reduction (also known as “immediate offsets”), namely offsets that avoid the release of new emissions into the atmosphere. For instance, the provision of clean cookstoves to those who were previously using wood, charcoal, or coal would count as an emission reduction offset. These compensation offsets can provide additional social and environmental co-benefits that advance the UN Sustainable Development Goals as well as contributing to overall emissions reductions and sector decarbonization.

However, while these types of offsets will continue to be essential for years to come, there is a need to shift to carbon removal offsets (also known as permanent offsets), which remove emissions directly from the atmosphere, such as through afforestation or carbon capture and storage





(CCS) at industrial facilities. There are more high-technology carbon removal offsets, such as bioenergy with carbon capture storage (BECCS), which will require more investment and development in many cases. It is possible for companies to invest in the research and development of these technologies as part of a carbon offsetting strategy.

This transition is essential because even if we stopped emitting carbon right now, there is still such a vast quantity of emissions stored in the atmosphere that the warming trajectory would continue.

It is important to note that there is increasing recognition that an asset is only technically fully net-zero carbon if the offsets used actively remove carbon rather than just prevent emissions elsewhere. Given the market for carbon removal offset options is in its infancy, it may not be possible to meet this technical definition in the interim. However, as the market grows, as will the ability to fully meet net-zero carbon targets by 2050 in alignment with this evolved definition.

**For further reading, please see:**

WorldGBC's [Advancing Net Zero Whole Life Carbon](#)

**Relevant for:**

- **Owners:** Develop a carbon offsetting strategy and engage with tenants where appropriate.
- **Occupiers:** Develop a carbon offsetting strategy and engage with building owners where appropriate.
- **Investors:** Develop a carbon offsetting strategy for Scope 1 and 2 and engage building owners and managers to address Scope 3 emissions.



# Equitable cost-benefit sharing

Engage with stakeholders to identify joint endeavours and equitably share the costs and benefits of interventions.

While green buildings are increasingly recognized by the market as being more valuable, delivering net-zero carbon is a financial commitment. It goes above the current standard energy management plans that most companies have in place. One of the first questions companies will often ask is “Who pays?” This question is often asked by building owners and investors since the benefits of energy efficiency optimization and renewable energy supply are often gained by the occupiers. This split incentive in the industry is well known, and historically, attempts to share cost burdens across this divide have not been successful. However, with the momentum around net-zero carbon, many such initiatives are being revisited. This is essential to ensure the most equitable financial pathways towards delivering net-zero carbon.

It is important to note that in order to claim net-zero carbon, a company does not need to have paid for all the emissions reductions themselves. Companies are able to find the most appropriate mechanisms to share the costs of these interventions equitably with those who will benefit from them, be they the company's tenants, the building's owners, or managers. This Action Plan outlines some of the options for sharing the opportunities and financial implications of a net-zero carbon transition, and it is up to companies to determine the most constructive, equitable and logical path forward. These mechanisms include building owner/tenant engagement plans, green leases/clauses, and internal carbon pricing mechanisms.

## Property owner/tenant engagement plan

To overcome the split incentive between property owner and tenant, developing a proactive engagement plan is key.

Irrespective of whether a company is a building owner or a tenant, developing an engagement plan is an effective means of identifying the opportunities that exist for sharing costs and benefits. Often, companies will review clauses or leases too close to their renewal date to embed meaningful changes. Developing an engagement plan will help to identify key opportunities.

If a company is a building owner or managing agent, it is beneficial to develop a prioritization pipeline outlining which tenants and/or buildings to engage first. Priority tenants could be identified based on whether they already have a net-zero carbon commitment, another equivalent commitment (such as Science-Based Targets), or how energy-intensive they are, for example.

For building owners who are reviewing prospective new tenants, it may also be worth developing a

screening process for their energy consumption, energy efficiency, and net-zero carbon ambitions, which could then be added to the pre-letting checklist criteria.

Tenants can also look to develop an engagement plan with the building owner. As part of this plan, they would want to engage the owner well in advance of a lease extension and discuss, for example:

- Processes for collecting and sharing sub-metered data for the rented space to improve carbon modelling and assess needed interventions
- Access and cost-sharing for installing solar PV panels on the roof, or other renewable energy systems
- Cost-sharing for upgrades to the energy efficiency systems of a building

## Green leases and clauses

A key element of an engagement plan is reviewing the use of green leases and/or clauses. These are leases or clauses whereby the owner and the occupier undertake specific responsibilities and obligations regarding the sustainable operation or occupation of a property. These leases and clauses do not operate in isolation and are most effective as part of a broader engagement plan.<sup>9</sup>

Green clauses/leases will be most effective for companies looking to conduct energy efficiency upgrades, generate renewable energy on-site, procure renewable energy off-site, and share data about energy performance. These agreements take time to put in place and so engaging well in advance of a clause/lease renewal is essential. The process should also be highly collaborative.

## Internal carbon pricing

Internal carbon pricing (ICP) is the concept of placing a monetary value on greenhouse gas emissions within the business. This materially influences business strategy and financial flows to support the achievement of a company's net-zero carbon target. Internal carbon pricing has two key implementation mechanisms: shadow pricing and carbon fees.

**Shadow carbon prices** attach a hypothetical cost of emissions and do not collect any actual fees. Their purpose is to support profitability and risk assessments. For such prices to be most effectively implemented, enforcement criteria must be put into place so that the carbon price affects financial flows. For example, board members may be mandated to oppose business decisions where the carbon cost relative to projected revenues is too high. Another example is where the embodied carbon of a project is reduced if a carbon price is implemented in the consultation process by prioritizing the use of existing structures and materials.

**Carbon fees**, in contrast to shadow carbon prices, are mechanisms that directly affect financial flows. Carbon fees assign a fee against carbon emissions, for which the proceeds are generally used to fund carbon reduction projects, including research and development or the purchase of carbon offsets. They may also be used to reward efforts to decarbonize, for example, through remuneration linked to sustainability key performance indicators (KPIs). Similar to a green bond, many companies are ringfencing the funds collected by the carbon fee to be used specifically for carbon reduction projects, with the benefit of avoiding the administrative burden and costs of bond issuance. Companies are introducing carbon fees in a variety of ways. For instance, the carbon fee could be taken from profits at the end of a quarter or year, applied across the whole business or at the department level. Alternatively, each department can be assigned a certain carbon budget according to its activities, after which any additional emissions must be paid out of the departmental budget or profits. Departments may be able to trade emissions allowances internally in a cap-and-trade style system.

### Relevant for:

- **Owners:** Find appropriate opportunities for sharing costs and benefits with tenants, especially regarding energy efficiency, renewable energy, and carbon offsetting (where appropriate and needed).
- **Occupiers:** Find appropriate opportunities for sharing costs and benefits with the building owner, especially regarding energy efficiency, renewable energy, and carbon offsetting (where appropriate and needed).
- **Investors:** Find appropriate opportunities to engage building owners and managers, partners, and fund managers to identify long-term investment solutions.

# What does your first year look like?

There are many components involved in setting up a net-zero carbon programme. The most challenging part can often be knowing where to start. These are some of the priority actions that a company should consider in the first year of committing to becoming net-zero carbon.

- Formally adopt these Green Building Principles as part of your journey to delivering on your net-zero carbon goals.
- Sign up to a net-zero carbon commitment, such as through the Race to Zero initiatives and explore sector-specific initiatives such as WorldGBC's Net-zero Carbon Buildings Commitment or Climate Group's EP100.
- Calculate the emissions in your portfolio and project them out to your target year.
- Develop a net-zero carbon strategy that estimates the potential savings from energy efficiency, renewable energy, and embodied carbon.
- Develop a carbon offsetting strategy for how you will manage your residual emissions and at what point you will begin to purchase offsets.
- Develop a plan for integrating your net-zero carbon strategy into the material aspects of your business.
- Train your staff on what net-zero carbon is and the implications it will have for their business unit.

## What does it mean to formally adopt the Principles?

Adopting the Principles means pledging to implement the Principles in concert with any existing net-zero carbon commitments on all real estate assets by a chosen target date not to exceed 2050 and reporting on progress annually.

## Conclusion

The Principles and Action Plan offer a path for delivery on the ambitious and necessary targets that have been set by businesses globally. As emphasized throughout this Action Plan, urgency is critical, and all stakeholders have a role to play in making the built environment more sustainable.



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Global Chief Executive Officer, Urban Land Institute

**Cornel Widmer**

Managing Director and Head, Group Real Estate, Zurich Insurance Group

**Doug Wright**

President and Chief Executive Officer, Honeywell Building Technologies

# Further resources

GHG Protocol, [Overview of GHG Protocol scopes and emissions across the value chain](#)

RICS professional standards and guidance, United Kingdom, [Whole life carbon assessment for the built environment](#)

C40 Knowledge Hub, [Embodied Carbon of Buildings and Infrastructure: International Policy Review](#)

Better Buildings Partnership, [Design for Performance: A new approach to delivering energy efficient offices in the UK](#)

WorldGBC, [Bringing embodied carbon upfront](#)

RIBA, [2030 Climate Challenge](#)

Architecture 2030, [The 2030 Challenge for Embodied Carbon](#)

LETI, [Embodied Carbon Target Alignment](#)

Emirates Green Building Council, [Embodied Carbon Working Group Terms of Reference](#)

UKGBC, [Net Zero Carbon Buildings: A Framework Definition](#)

[Carbon Risk Real Estate Monitor \(CRREM\)](#)

UKGBC, Better Buildings Partnership and London Energy Transformation Initiative, [Net Zero Operational Carbon](#)

UKGBC, [Net zero carbon: energy performance targets for offices](#)

[The International REC Standard](#)

University of Oxford, [The Oxford Principles for Net Zero Aligned Carbon Offsetting](#)

Science Based Targets Initiative, [The Net-Zero Standard](#)

# Endnotes

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