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CLIMATE POSITIVE PROOF POSITIVE

SELECTED CLIMATE-POSITIVE APPROACHES AND PROOF-POSITIVE RATING AND BENCHMARKING SYSTEMS FOR SUSTAINABLE REAL ESTATE

Greater China Research

CUSHMAN & WAKEFIELD
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CLIMATE
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Executive Summary

According to an estimate by the United Nations, globally, the built environment is responsible for around 40% of energy and carbon emissions.

The built environment can reduce its emissions by going net zero, but some real estate enterprises today are looking to go climate positive, an initiative that goes above and beyond. Here, net zero carbon emissions are achieved and surpassed whereby an environmental benefit is produced by eradicating additional carbon dioxide (CO2) from the atmosphere.

Once the total carbon footprint is calculated, as well as what needs to be counteracted to become carbon neutral, then an additional measurement number, such as an extra 10% for example, can then be tagged on to estimate what is needed to go climate positive.

How enterprises actually achieve climate positivity can differ. Usually, however, they meet the requirements via a mixture of:

- Improving energy efficiency;
- Shifting to renewable energy;
- Using renewable materials;
- Cutting wastage;
- Backing local production to reduce transportation emissions;
- Utilising electric transportation;
- Investing into offsetting projects, such as reforestation, that remove CO2 from the atmosphere, and;
- Purchasing carbon credits.

Buildings can realise climate-positive results in a number of ways, including:

- The choice of building location;
- The choice of building design and energy modelling;
- The usage of eco-friendly, low carbon, reused or recycled materials;
- The minimisation of material and operational wastage;
- The maximisation of structural efficiency;
- The use of building insulation;
- The regular maintenance of plant, machinery, sensors and devices and ensuring these systems have the latest technology;
- The use of greenhouse gas (GHG) emissions reduction systems;
- The use of renewable energy;
- The use of intelligent energy management systems;
- The maximisation of water use reduction, and;
- The re-use/renewal of the building upon current-use obsolescence.

Rating and benchmarking systems that are used to positively prove how sustainable real estate is and how sustainable an enterprise is, (and if any are able to achieve a climate-positive outcome), are many. Two systems that have gained market traction recently, however, are:

- At the enterprise level – The Task Force on Climate-Related Financial Disclosures (TCFD), and;
- At the real estate level – The Global Real Estate Sustainability Benchmark (GRESB).

The TCFD system allows enterprises to recognise and disclose climate-related risks and opportunities so as to enable informed decision-making for investors, lenders, insurers and other related participants. The use of the TCFD system will aid enterprises as they ascertain and handle transition and physical climate risks.

GRESB assesses the environmental, social and governance (ESG) performance of real assets, which include real estate. In terms of environmental issues, the rating system encourages enterprises to reduce GHG emissions, lessen wastage, and conserve water and energy.

Introduction

Our report begins by considering and explaining what climate positive is and means. Secondly, our report looks at a number of selected climate-positive approaches for sustainable real estate. Thirdly, our report examines two proven rating and benchmarking systems that can go some way to help enterprises achieve their climate-positive goals, and they are:

- At the enterprise level – The Task Force on Climate-Related Financial Disclosures (TCFD), and;
- At the real estate level – The Global Real Estate Sustainability Benchmark (GRESB).

What is climate positive?

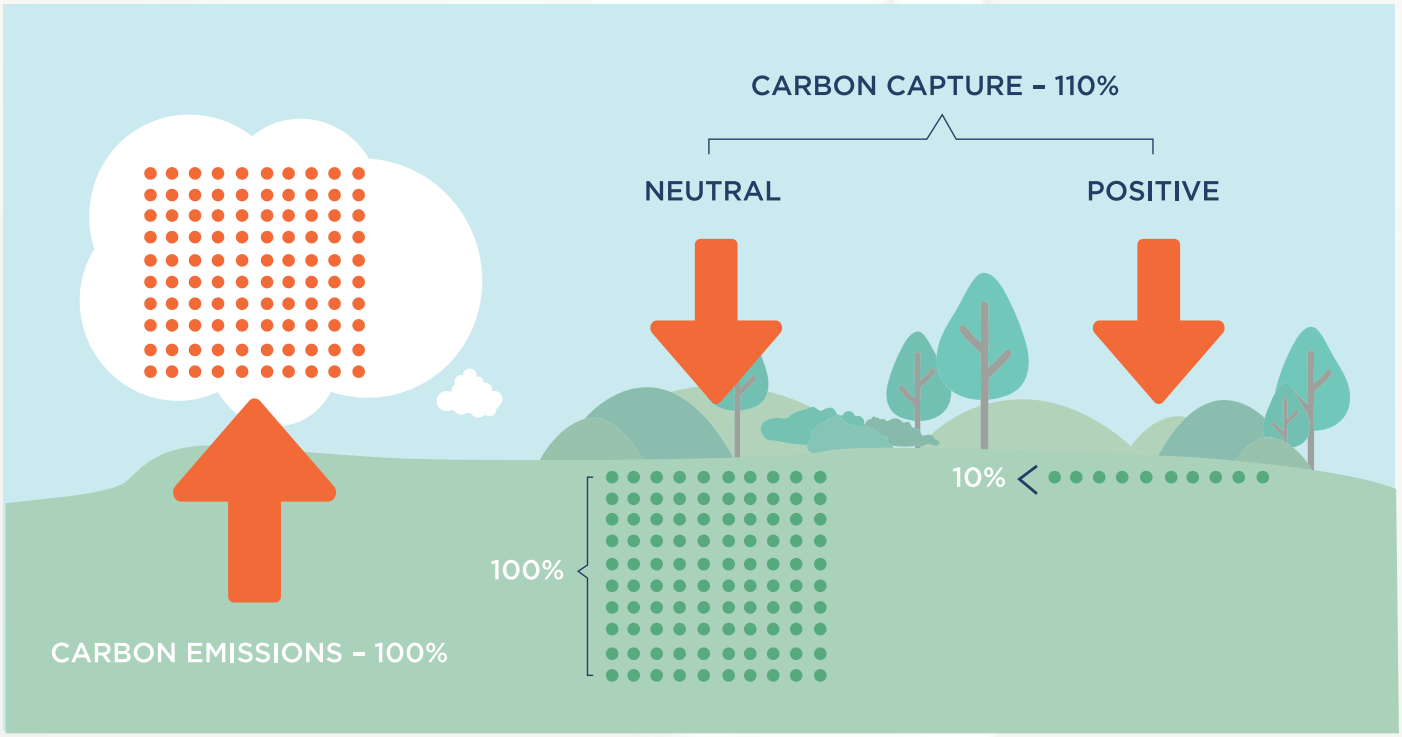
Climate positive is an initiative that goes above and beyond. Here, net zero carbon emissions are achieved and surpassed whereby an environmental benefit is produced by eradicating additional carbon dioxide (CO2) from the atmosphere.

The first stage is to apply a carbon accounting framework to whatever it is the programme is trying to take in hand. For instance, if a building product manufacturer wants to develop a climate neutral or positive product, they must determine the total carbon footprint of that product. The carbon footprint covers everything from the energy needed to source the original materials as well as to produce, supply, use and dispose of the product – to the emissions related to product original materials sourcing as well as product production, usage and disposal.

Each activity that is needed to make/use/dispose of a building product or sustain a real estate-related enterprise or development is given an 'emissions factor', which is founded on each activity's global warming potential (GWP). Because the carbon footprint is what is finally being gauged, the GWP of each activity is changed to a CO2 measurement so they can all be totalled.

Once the total carbon footprint is calculated, as well as what needs to be counteracted to become carbon neutral, then an additional measurement number, such as an extra 10% for example, can then be tagged on to estimate what is needed to go climate positive (Figure 1).

Figure 1: The basic workings of climate positive



Source: Cushman & Wakefield Research

How enterprises actually achieve climate positivity can differ. Usually, however, they meet the requirements via a mixture of:

- Improving energy efficiency;
- Shifting to renewable energy;
- Using renewable materials;
- Cutting wastage;
- Backing local production to reduce transportation emissions;
- Utilising electric transportation;
- Investing into offsetting projects, such as reforestation, that remove CO2 from the atmosphere, and;
- Purchasing carbon credits.

Lastly, the advantage of climate-positive programmes and schemes is the overflow advantages they produce for other people, enterprises, or localities that may not have the resources or plans to lessen their own carbon footprints. Here, their own carbon footprints are able to be offset by those currently up-and-running and successful climate-positive programmes and schemes.

Selected climate-positive approaches for sustainable real estate

Buildings can realise climate-positive results in a number of ways, including:

- The choice of building location;
- The choice of building design and energy modelling;
- The usage of eco-friendly, low carbon, reused or recycled materials;
- The minimisation of material and operational wastage;
- The maximisation of structural efficiency;
- The use of building insulation;
- The regular maintenance of plant, machinery, sensors and devices and ensuring these systems have the latest technology;
- The use of greenhouse gas (GHG) emissions reduction systems;
- The use of renewable energy;
- The use of intelligent energy management systems;
- The maximisation of water use reduction, and;
- The re-use/renewal of the building upon current-use obsolescence.

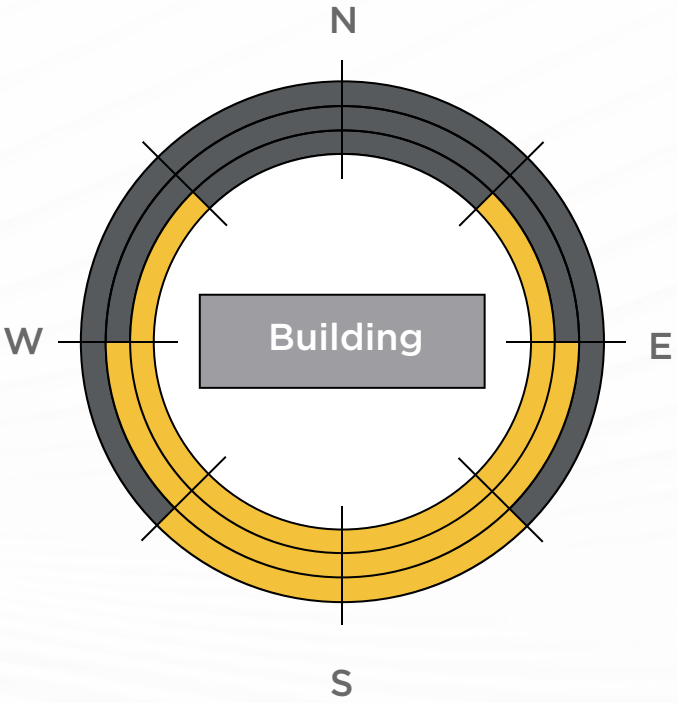
Choice of building location

A building's location has a big impact on its general carbon footprint. Highly efficient buildings in general should be aligned along an east-west axis, thereby amplifying any north- and south-facing glazing natural lighting and thermal effect. Whether the building is built and located in shade or not, at a certain latitude or at a certain altitude can also affect the lighting and thermal dynamics of the building and therefore the amount of energy used and emissions generated to normalise the interior building living comfort level (Figure 2).

Moreover, where a building is constructed will also influence the carbon footprint and the possibility for carbon build-up in the landscape due to many factors, including impact on the natural environment if the building is built in a rural 'green' area, or the proximity of the source of the building materials used and the distance to the construction site, when considering carbon emissions from building material transportation.

Additionally, siting the building near public transportation can reduce its carbon footprint due to the enhanced public transport travel convenience offered and at hand to the building's inhabitants/users at any given time.

Figure 2: Sunlight intensity and optimal orientation for a small apartment in the northern hemisphere



Note: Optimal interior room layout: Living rooms and bedrooms positioned on the southern side, with stairs, bathroom, lobby and utility areas to the northern side

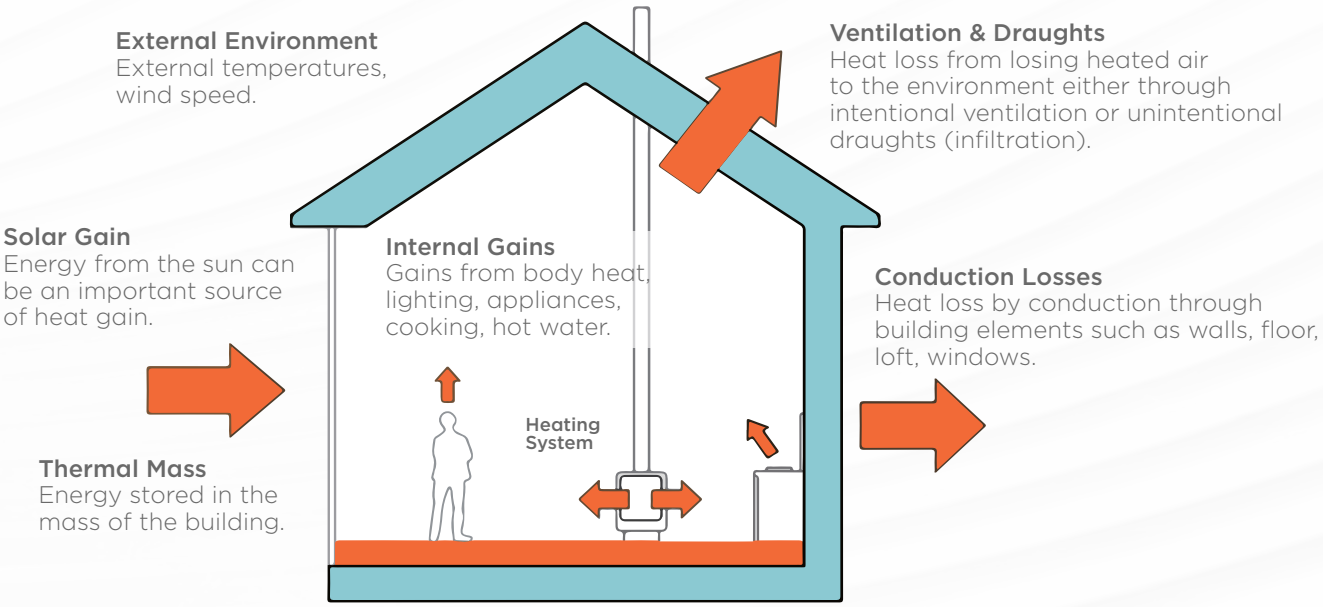
Source: First in Architecture, Cushman & Wakefield Research

Choice of building design and energy modelling

Initial building design and then energy modelling early in the course of design can allow for the determination of design optimisation to realise a significant reduction in energy consumption and future carbon emissions. By taking into account the footprint, building materials, and building systems good design which has been energy modelled can produce impactful results. For example:

- A slim footprint in an optimally orientated building can exploit natural lighting and views while lessening solar heat gain, and;
- Open space design can lessen the amount of interior material used (Figure 3).

Figure 3: A simple building energy model



Source: OpenEnergyMonitor, Cushman & Wakefield Research

Eco-friendly, low carbon, reuse or recycled materials

Eco-friendly building materials

If a building can employ a wooden structure in place of steel and concrete, or wood sidings as opposed to vinyl, the building can lessen the amount of embodied carbon in the project. In many instances, it might not be possible to elude the use of carbon-intensive products altogether, such as metals, plastics, etc., however, the building might be able to employ slightly lower carbon-intensive substitute materials.

Carbon sequestering materials are also alternatives, which can be employed by a building. Utilising agricultural products that sequester carbon can have a significant bearing on how much embodied carbon is entrenched in a project. Wood is an obvious choice. However, a building can also consider other possibilities, such as straw or wool insulation, which are annually renewable.

Low carbon concrete

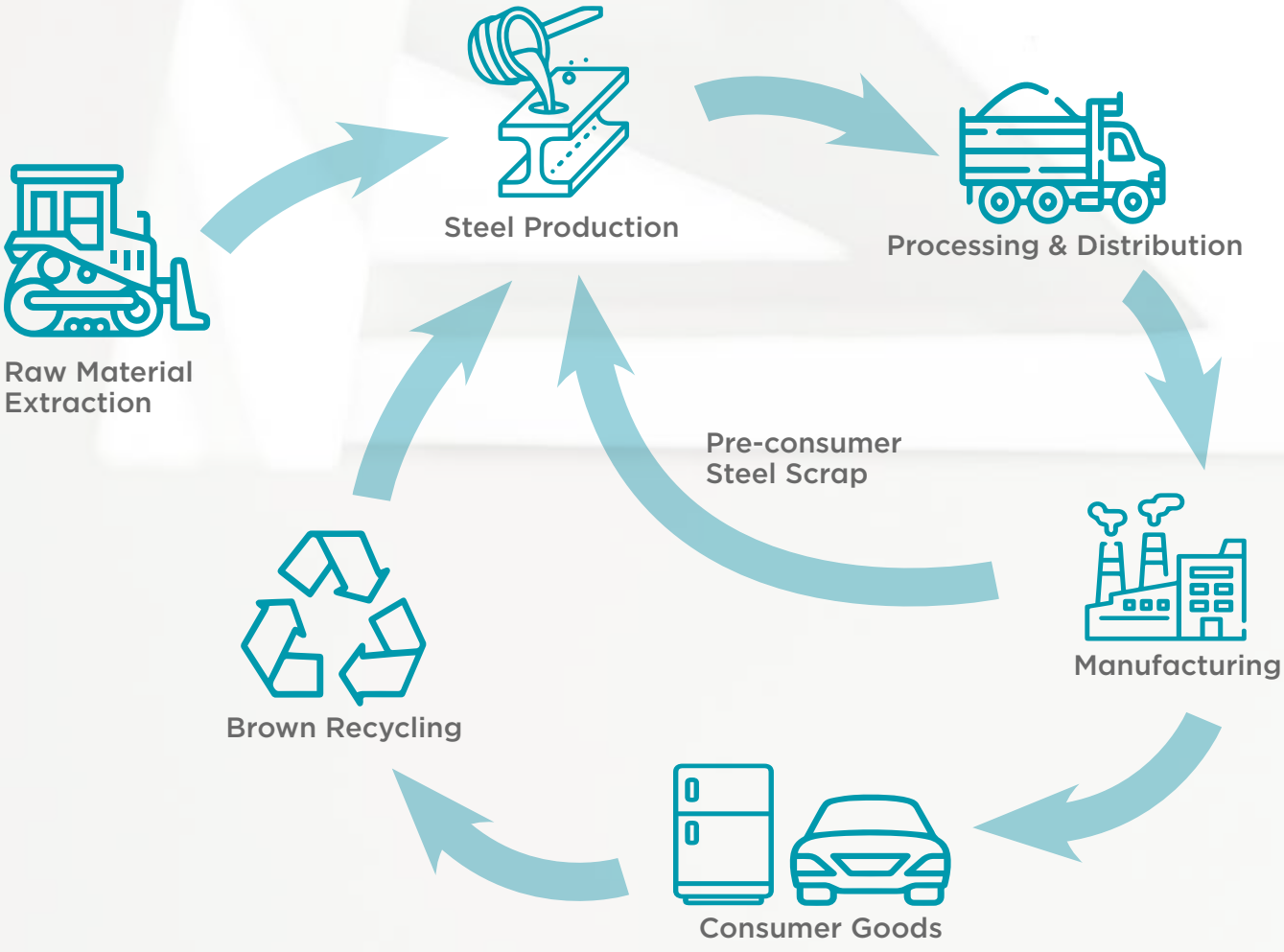
Getting back to the point about the use of lower carbon intensive substitute materials, low carbon concrete is an example. Emissions per ton might not be high for concrete, however, its weight and general usage make concrete the largest source of embodied carbon in most building projects. Lower carbon concrete mixes can be created by mixing fly ash, slag, calcined clays, or even lower-strength concrete where practicable.

Reused and recycled building materials

The re-use of building materials can be employed in a building project. Bricks, metals, broken concrete, or wood are all examples. Recovered building materials usually have a lower embodied carbon footprint than newly produced building materials, as the carbon used to manufacture them has already been consumed. With recovered wood for instance, the energy that would have been used in felling the tree, transporting it to the mill, and processing it, would not only be saved but the tree that was never felled would still be sequestering carbon.

A building project can also try to use recycled building materials when undertaking construction. Recycled steel is one example. Virgin steel, in particular, can have an embodied carbon footprint that is five times larger than that of high-recycled content steel (Figure 4).

Figure 4: Steel recycling



Source: Brown Recycling, Cushman & Wakefield Research

Minimise material and operational waste

Material waste

Designing and producing building materials in modules can lessen wastage. It's preferable for a building project to consider common sizes for common building materials. For example, for a wooden building project, conventional material sizes for common building materials include:

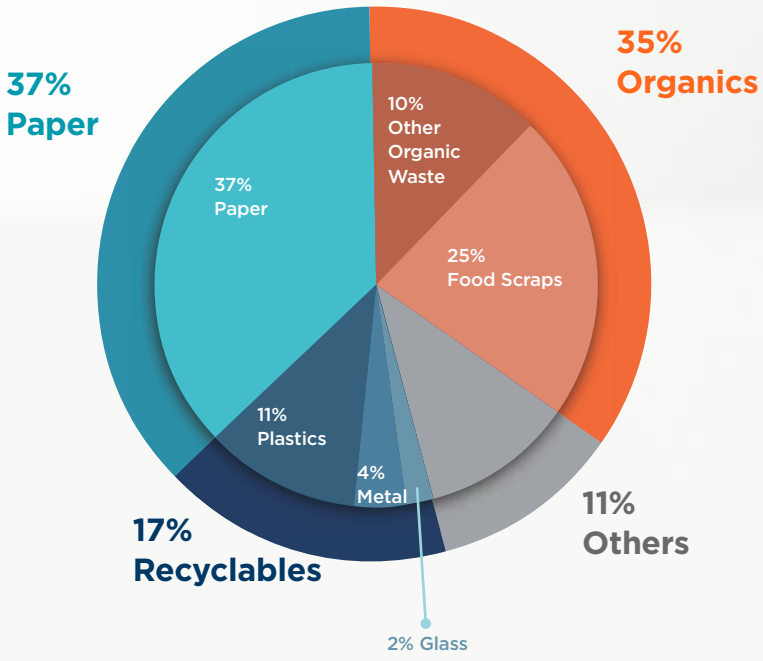
- 4x8 plywood;
- 12-foot gypsum boards;
- 2-foot increments for wood framing, and;
- Pre-cut structural members.

Operational waste

When operational, buildings, particularly public and commercial buildings, can minimise wastage and subsequent carbon emissions in many ways, including:

- Establishing exact goals for lessening the volume of wastage;
- Performing recurring reviews targeted at lessening wastage, and;
- Installing systems that reuse waste materials (Figure 5).

Figure 5: The make-up of commercial building operational waste in New York City (2012)



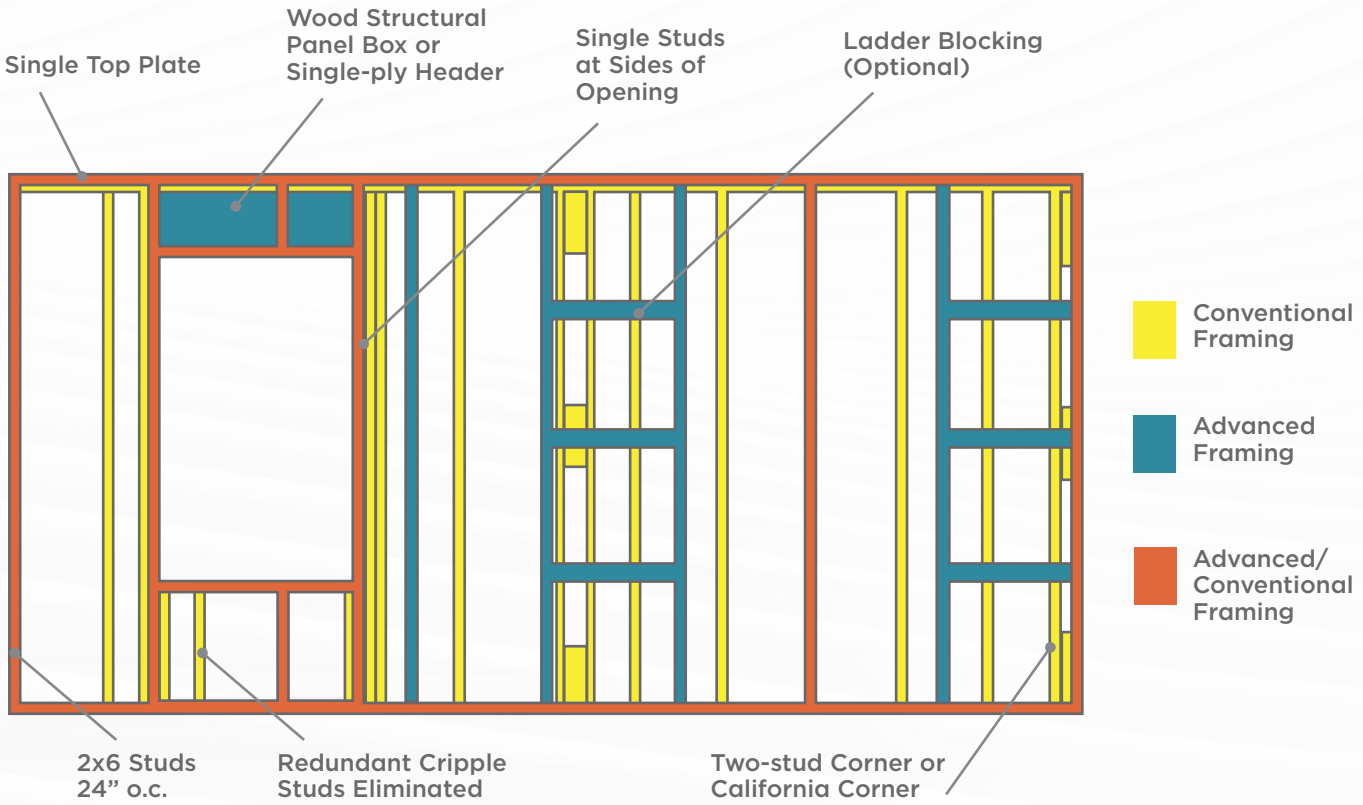
Source: Zero Waste Design, Cushman & Wakefield Research

Maximise structural efficiency

As most of a building's embodied carbon is in the structure, a building project should try to realise optimum structural efficiency. This can be achieved in a number of ways, including the utilisation of:

- Optimum value engineering wood framing methods;
- Efficient structural sections, and;
- Slabs (Figure 6).

Figure 6: Optimal vs typical wood framing



Source: Remodelling, Cushman & Wakefield Research

Furthermore, a building project can try to use fewer finished materials. Utilising polished concrete slabs as finished flooring, for example, saves the embodied carbon from carpet or vinyl flooring finishing. Unfinished ceilings are an additional possible source for embodied carbon savings.

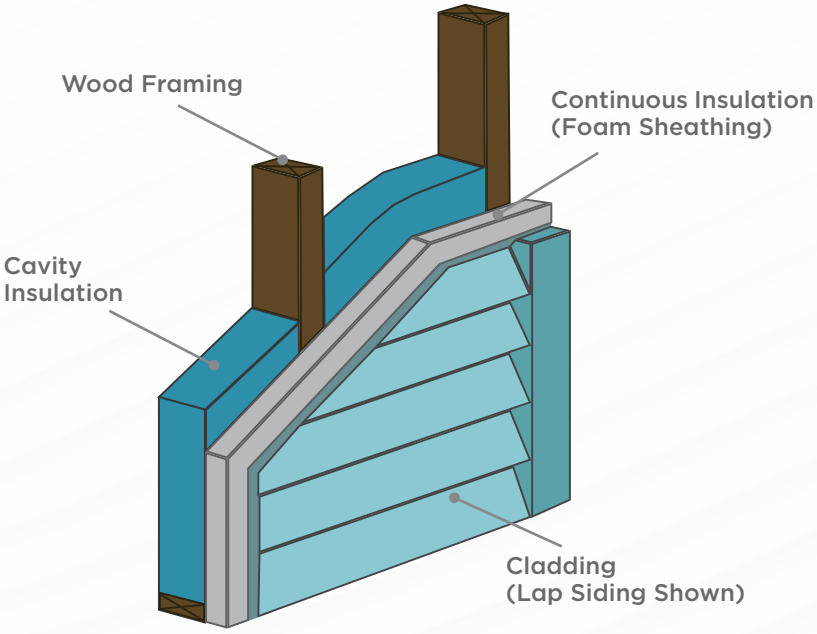
Building Insulation

A building can use continuous insulation to reduce the energy used for interior thermal comfort optimisation, and therefore, the associated carbon footprint created by the associated energy usage. Continuous insulation is insulation that is uninterrupted across all building structural members without thermal bridges other than fasteners and service openings. It is fitted to the interior, exterior or is integral to any opaque surface of the building. Continuous insulation offers:

- Thermal;
- Air;
- Water, and;
- Vapour...

...control layers in one system (Figure 7).

Figure 7: Continuous insulation



Source: continousinsulation.org, Cushman & Wakefield Research

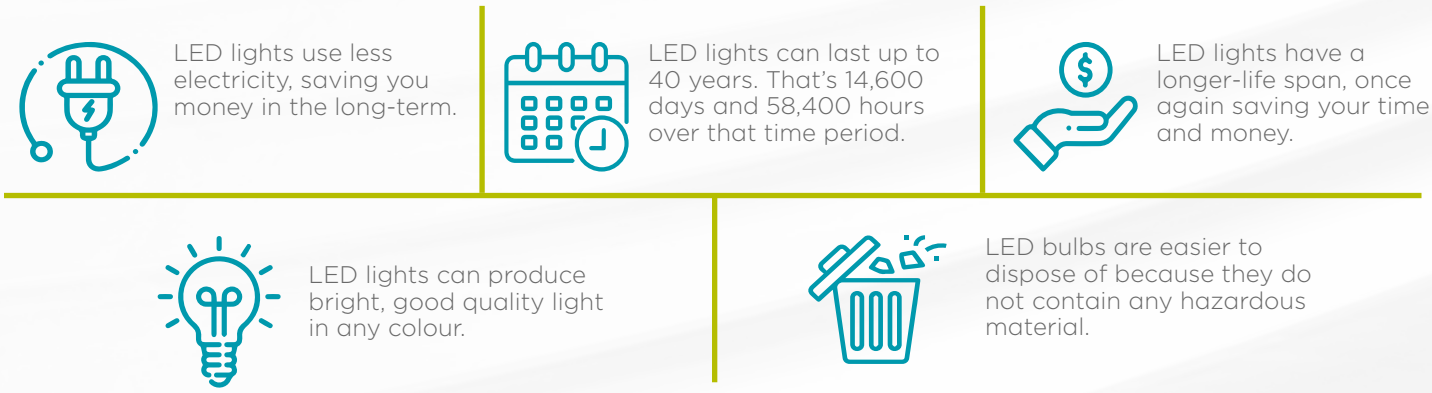
Plant, machinery, sensors and devices maintenance and usage of the latest technology

Plant and machinery, such as heating, ventilation and air conditioning systems (HVAC) that are frequently maintained and updated, can assist in lessening a building's carbon footprint by being as efficient as they can be in terms of energy usage. A building can even employ sensors that gauge air quality to ascertain how much ventilation (and energy usage) is needed.

Light-emitting diode (LED) lighting

Usage of the latest technology can also assist in reducing energy usage and the carbon footprint of a building. Lighting, for example, can account for as much as 40% of the energy used in some commercial buildings. When natural light cannot fulfil the full lighting needs of a building, the latest LED lighting can be employed to make up for the difference in lighting levels. According to the Climate Group, LED lighting generally realises energy savings of between 50 and 70% in comparison to conventional lighting (Figure 8).

Figure 8: Selected benefits of LED lighting



Source: Greener Ideal, Cushman & Wakefield Research

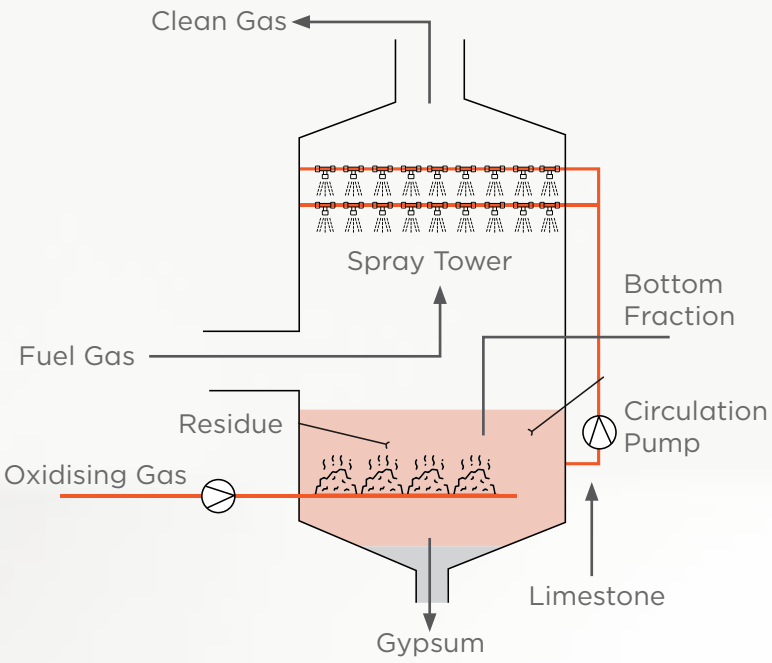
Greenhouse gas (GHG) emissions reduction systems

A scrubber is an example of one such GHG emissions reduction system. Scrubbing is the broad term associated with flue gas treatment procedures. There are both liquid- and solid-type gas treatment procedures that are a function of the physical and chemical properties of the pollutant being removed. Among others, they include:

- Wet scrubbers;
- Dry scrubbers;
- Adsorbents, and;
- Mercury removal.

Additionally, related to scrubbers, there are also variants, such as electrostatic precipitators and desulfurising processes. (Figure 9)

Figure 9: A typical scrubber system



Source: Chegg, Cushman & Wakefield Research

Renewable energy use

While lessening energy use is critical, one of the biggest moves towards the creation of climate-positive buildings is the shift towards the usage of renewable energy. There are a number of sources of renewable energy, but the main ones include:

- Solar power;
- Wind power;
- Hydropower;
- Geothermal power;
- Tidal power, and;
- Biomass power.

Solar power

Sunlight is one of the earth's most plentiful and freely obtainable energy resources. Over a one-hour period, the amount of solar energy that touches the earth's surface is more than the world's total energy requirements for around a whole year. While it seems to be the perfect renewable energy source, the amount of solar energy that can be utilised differs according to the weather, the time of day, the season, and the geographical location (Figure 10).

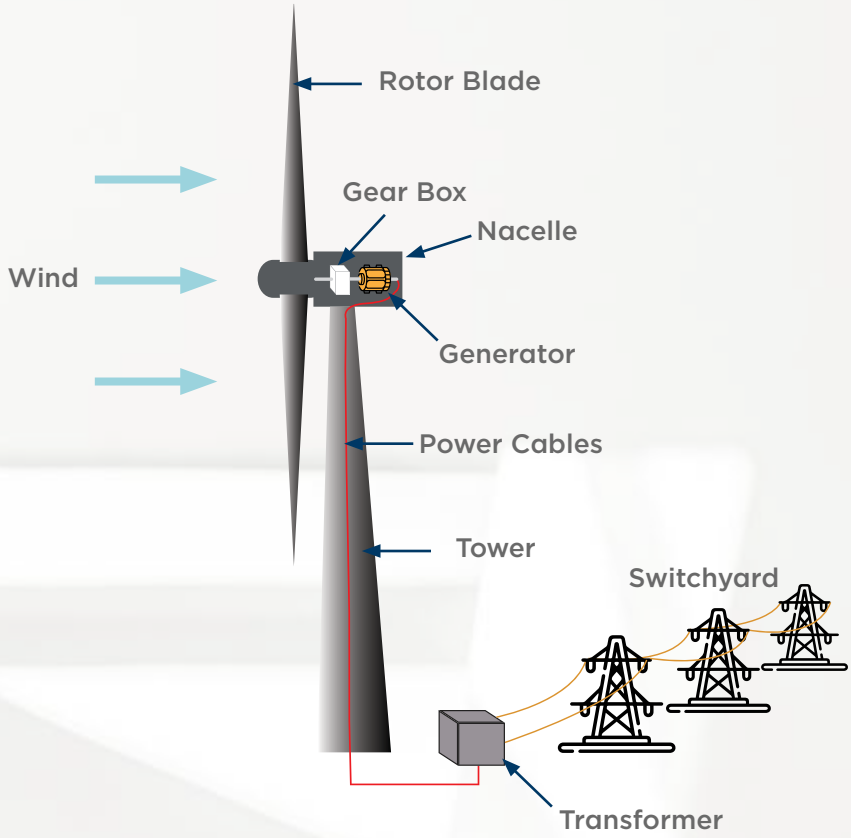
Figure 10: Selected benefits of solar power

Source: 661 Solar, Cushman & Wakefield Research

Wind power

Wind is also an abundant source of renewable energy. Here, turbines which drive generators to produce electricity are powered by wind. This subsequently generated electricity can be used to power the connected building or fed into a national grid to power a community of buildings (Figure 11).

Figure 11: A typical wind turbine system

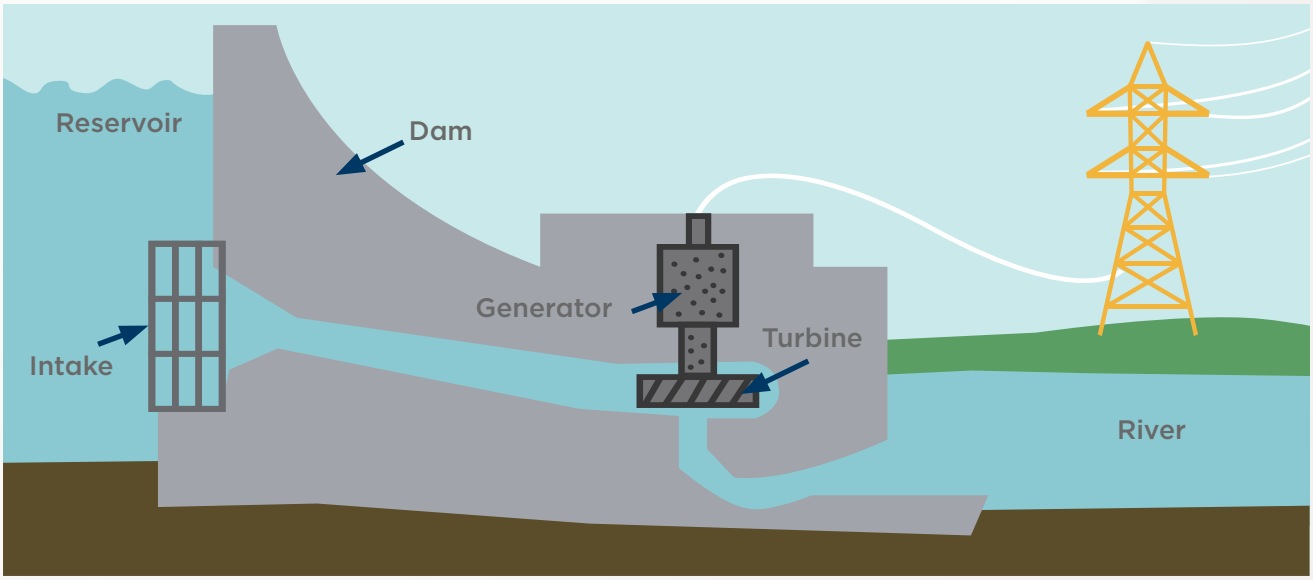


Source: Mechanical Booster, Cushman & Wakefield Research

Hydropower

As another clean energy resource, hydropower has been commercially developed to a large extent. Here, a dammed reservoir can be utilised to produce a reliable and steady flow of water that drives a turbine which produces electricity (Figure 12).

Figure 12: A simplified hydroelectric dam system

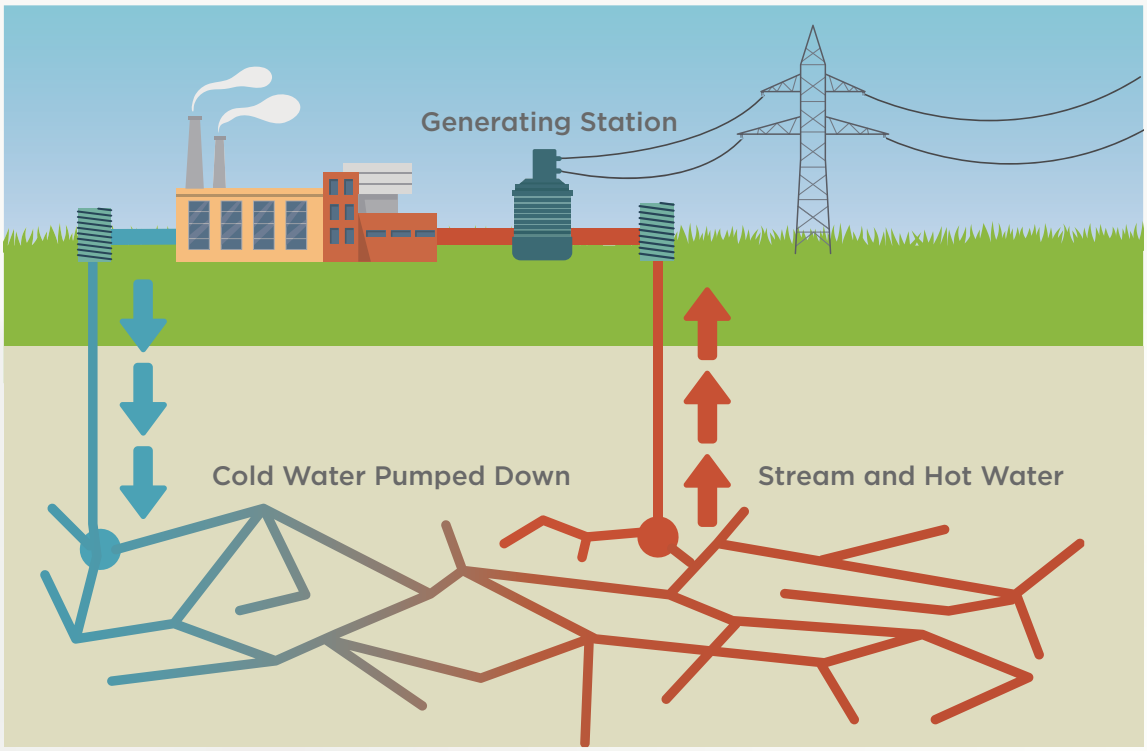


Source: U.S. Environmental Protection Agency, Cushman & Wakefield Research

Geothermal power

Geothermal energy garners natural heat below the earth's surface and uses it to heat water that produces steam which drives turbines to produce electricity. Geothermal energy can also be used to directly heat buildings (Figure 13).

Figure 13: A geothermal power generating system

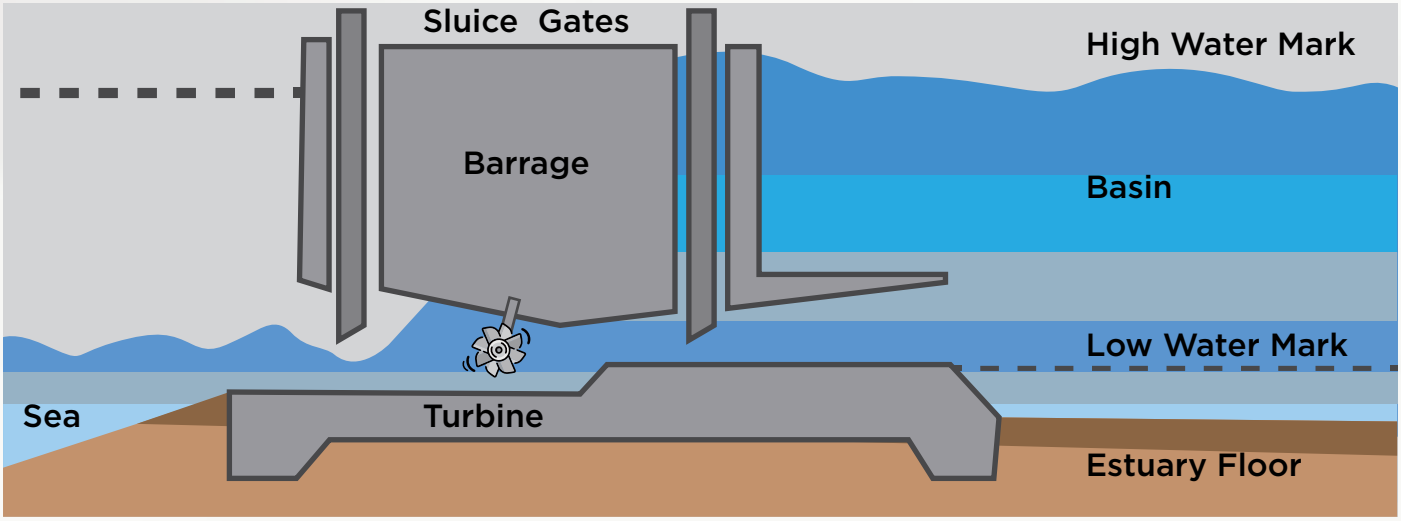


Source: Green and Growing, Cushman & Wakefield Research

Tidal power

This is an additional method by which hydro energy can be produced. It harnesses the twice-daily tidal currents to power turbine generators to produce electricity. Though tidal flow isn't continuous, it has the advantage of being highly predictable (Figure 14).

Figure 14: A straightforward tidal power system

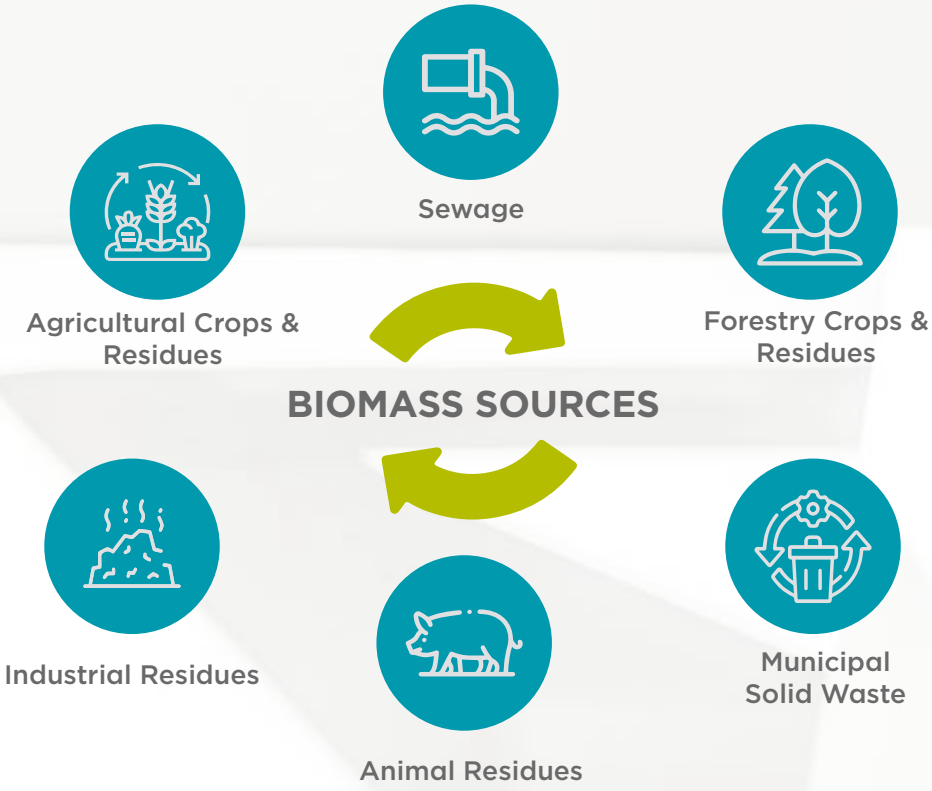


Source: The Earth Project, Cushman & Wakefield Research

Biomass power

In this case, renewable plant and animal matter are transformed into fuel, which is then used to generate electricity in a cleaner and more efficient manner than in the case of fossil fuels. Additionally, by transforming agricultural, industrial and domestic renewable waste into solid, liquid and gas fuel, biomass is able to produce power at a much lower economic and environmental cost than other traditional forms of power generation (Figure 15).

Figure 15: Selected sources of biomass fuel



Source: Government of Canada, Cushman & Wakefield Research

Intelligent energy management systems

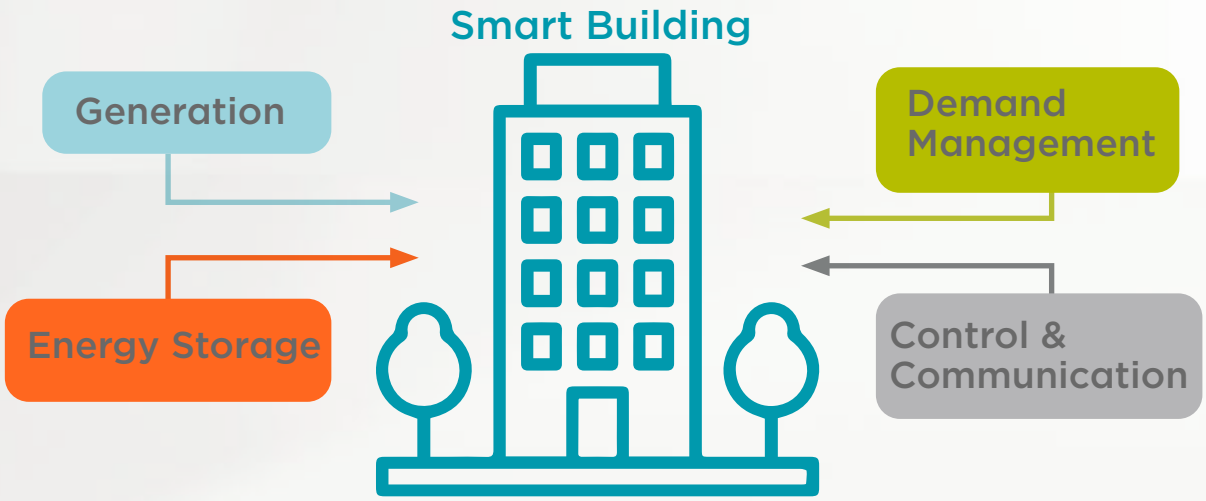
With the advancement in smart technology, there is now increased interest from real estate in general for smart building energy management systems to keep costs down and secure sustainability targets. According to the International Energy Agency, residential appliances and equipment, for example, comprise 30% of all energy consumption in OECD countries and indirectly add to 12% of energy generation-associated CO2 emissions. These numbers emphasise the importance of managing energy use in order to protect the environment and achieved sustainability goals.

When considering smart building energy management, there are many considerations to take into account, but three major purposes are:

- The reduction/management of building energy usage;
- The reduction of energy costs while maintaining/increasing user/visitor comfort and productivity, and;
- The improvement in sustainability without negatively impacting standards of living.

Smart building energy management systems offer an integrated platform for managing building energy usage. They facilitate the efficient use of electricity resources. The utilisation of generally distributed sensors allows for the monitoring of ambient temperature, lighting, room occupancy and other inputs necessary for the efficient management of climate control, security and lighting systems (Figure 16).

Figure 16: Elements of a smart building energy management system

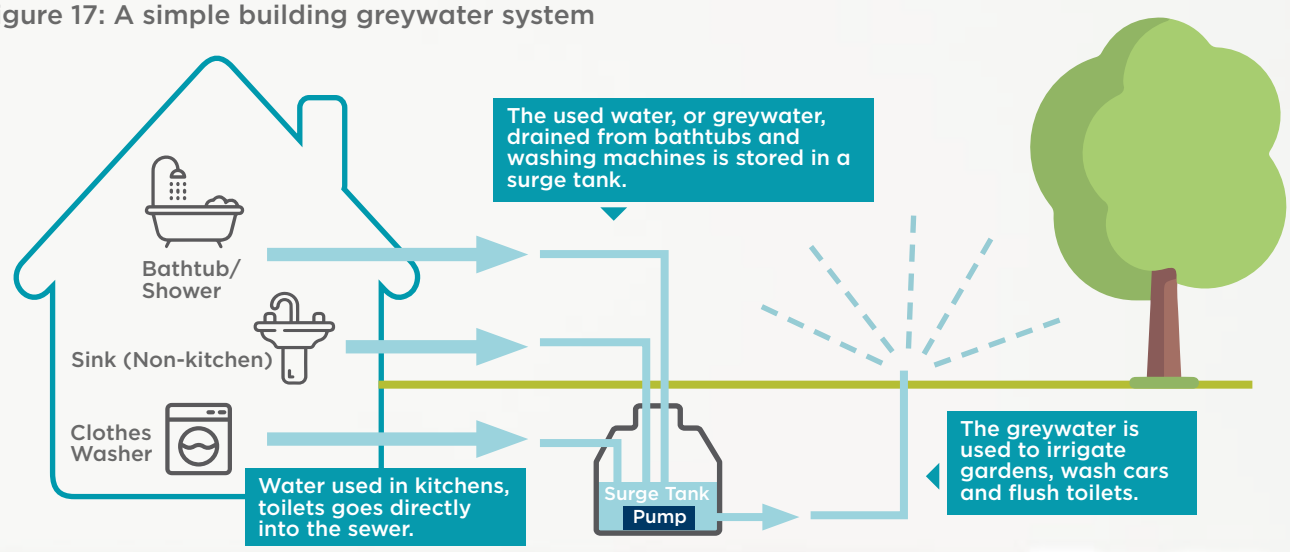


Source: Science Direct, Cushman & Wakefield Research

Water usage

An added key aspect impacting a building's carbon footprint is the supply, treatment and utilisation of water. As such, plumbing should be well maintained to avoid water loss. High efficiency toilets would also help with water usage reduction. However, it is the usage of a greywater water reuse system which would have the most positive impact on an operational building's water usage reduction strategy. This system is able to considerably lessen a building's need for fresh clean water by redirecting any wastewater for various other uses, such as toilet flushing or plant irrigation (Figure 17).

Figure 17: A simple building greywater system



Source: SFGate, Cushman & Wakefield Research

Building reuse/renewal

According to the American Institute of Architects (AIA), reuse/renewal projects can save between 50% and 75% in embodied carbon emissions when compared to building a new building. This is very much the case if the foundations and the structure of the existing building have been well-maintained since most of the embodied carbon exists there. Generally speaking, where there is a remaining building which can be reused, then work should be directed towards recreating a building that is not only sustainable and energy efficient, but one that can yield substantial positive benefits throughout its extended life.

Proof-positive rating and benchmarking systems for sustainability

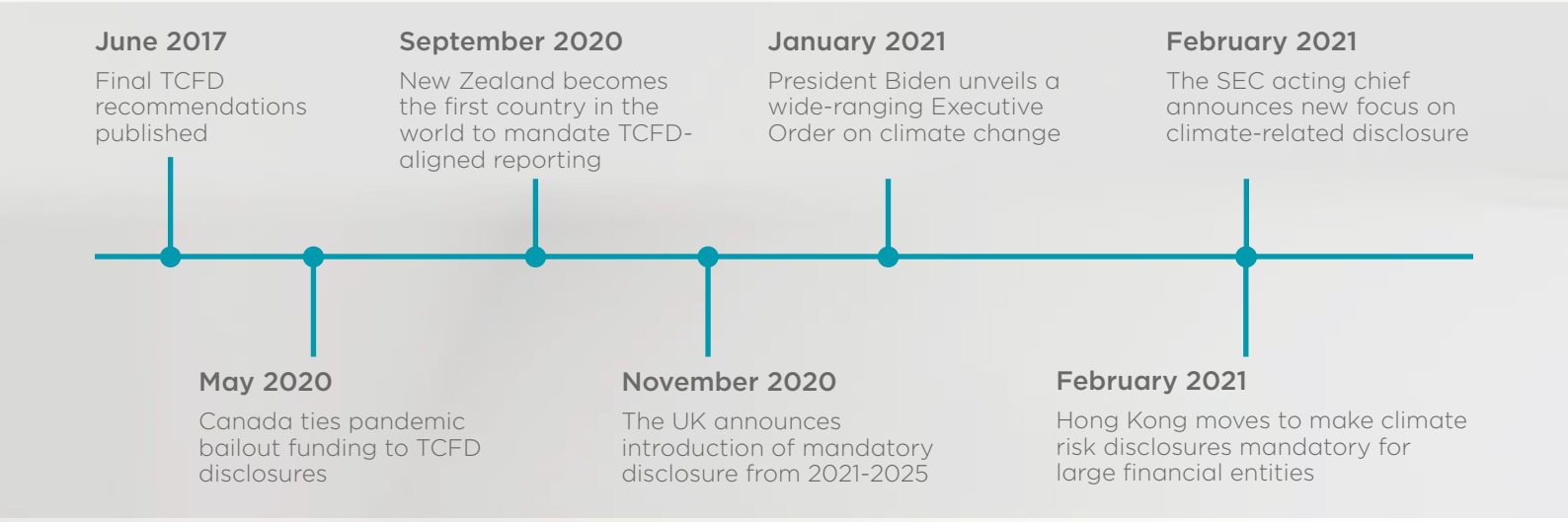
Rating and benchmarking systems that are used to positively prove how sustainable real estate is and how sustainable an enterprise is, (and if any are able to achieve a climate-positive outcome), are many. Two systems that have gained market traction recently, however, are:

- At the enterprise level – The Task Force on Climate-Related Financial Disclosures (TCFD), and;
- At the real estate level – The Global Real Estate Sustainability Benchmark (GRESB).

The Task Force on Climate-Related Financial Disclosures (TCFD)

Today, there is mounting demand for climate-related financial information by investors that is decision-useful. Given this demand, as of 6 October 2021, according to the Task Force, its own organisation had over 2,600 supporters globally, including 1,069 financial institutions, responsible for assets of $194 trillion which have pledged to involve some of the world's largest corporations in buttressing their climate-related disclosures by applying TCFD suggestions and proposals. TCFD supporters now span 89 countries and jurisdictions and nearly all sectors of the economy, with a combined market capitalisation of over $25 trillion (Figure 18).

Figurer 18: TCFD – Adoption momentum



Source: Verisk Maplecroft, Cushman & Wakefield Research

TCFD – A background

The TCFD system allows enterprises to recognise and disclose climate-related risks and opportunities so as to enable informed decision-making for investors, lenders, insurers and other related participants. The use of the TCFD system aids enterprises as they ascertain and handle physical and transition climate risks.

Aligned with the Global Real Estate Sustainability Benchmark (GRESB) (which is examined in more detail in the next subsection of the report), the TCFD system focuses on the physical and transition risks that can be mapped to the Climate Disclosure Standards Board (CDSB) Framework and the Sustainability Accounting Standards Board (SASB)'s climate framework. Physical risks embrace extreme weather events, such as drought or flooding, and the long-term effect of rising average global temperatures, while transition risks take account of the global transition to a low-carbon economy, new regulations, and innovations in energy efficiency.

Additionally, the employment of scenario analysis is advocated under the strategy pillar of the TCFD framework. The principle behind the scenario analysis is to examine how an enterprise might work under various future states, in this case, as a reaction to exact sets of climate-related risks. There are two sets of scenarios, including transition scenarios (such as specific pathways of energy regulatory developments) and physical scenarios (such as certain pathways of atmospheric GHG concentrations and their implications on water risk) (Figure 19).

Figure 19: TCFD – The framework

Source: TCFD, Cushman & Wakefield Research

Steps to adoption

If considering TCFD adoption and implementation, there are a number of initial steps enterprises could initially take and some of the main ones include:

- Launch a sustainability committee;
- Set up sustainability working groups under the sustainability committee;
- Create and advance sustainability strategies that tackle the physical and transition climate-related risks and opportunities, and;
- Establish key performance indicators (KPIs) and goals to examine and realise the efficacy of the sustainability strategy.

TCFD – What's next?

Since the COP26 meeting in Glasgow in 2021, one significant development has been the formation of a new International Sustainability Standards Board (ISSB) to develop, in the public interest, an all-embracing global baseline for high-quality disclosure standards to meet the needs of investors. The TCFD system will complement and play an integral role in this scheme alongside other related benchmarking systems, such as the Science Based Targets initiative (SBTi).

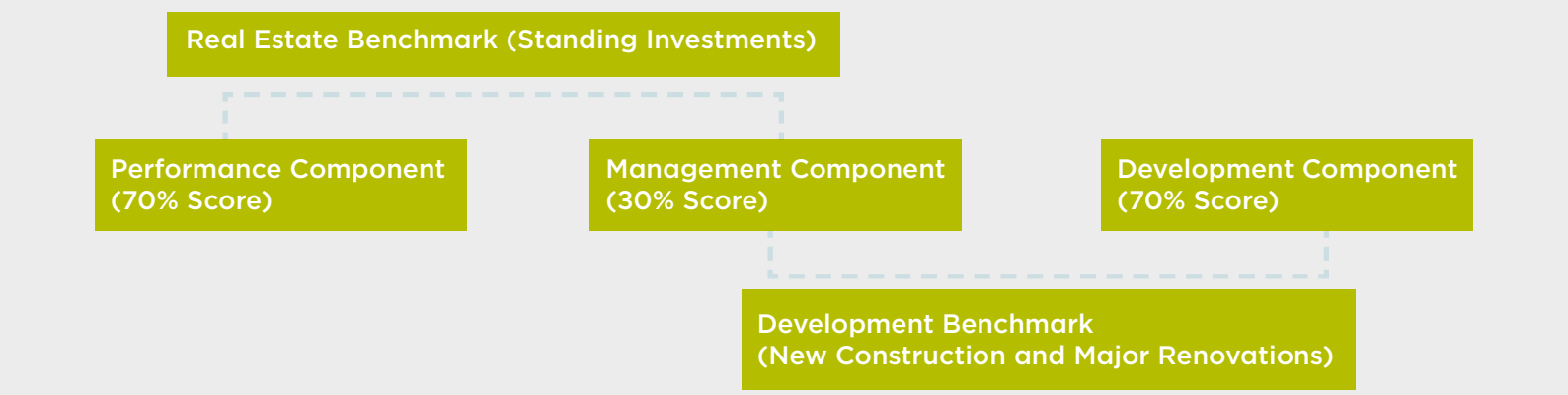
The Global Real Estate Sustainability Benchmark (GRESB)

GRESB is a sustainability performance rating system that is aligned with the TCFD system but has a greater focus on the built environment and is now widely used by real estate enterprises, funds, investors, and banks. In 2021, more than US$5.7 trillion in gross asset value across 117,000 assets was ascertained via the GRESB rating system.

GRESB – A background

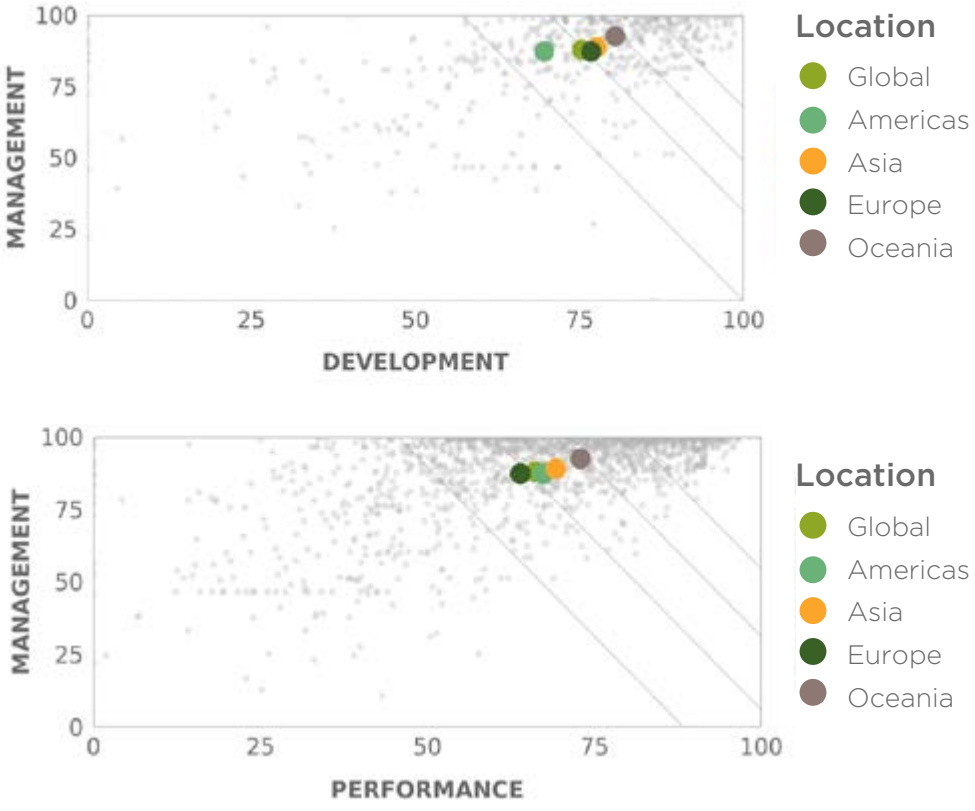
GRESB assesses the environmental, social and governance (ESG) performance of real assets, which include real estate. In terms of environmental issues, the rating system encourages enterprises to reduce GHG emissions, lessen wastage, and conserve water and energy. Founded on a 5-star scoring system representing the portfolio's rating against its contemporaries, the benchmark is utilised to heighten the performance of real estate portfolios and the global real-estate property sector, and subsequently, appeal to investor capital (Figure 20, Figure 21, Figure 22, Figure 23 and Figure 24).

Figure 20: The GRESB benchmark



Source: GRESB, Cushman & Wakefield Research

Figure 21: GRESB regional scores



Source: GRESB, Cushman & Wakefield Research

Figure 22: GRESB aspects-Standing Investments

- Leadership 86%
- Policies 96%
- Reporting 84%
- Risk Management 84%
- Stakeholder Engagement 89%
- Risk Assessment 76%
- Targets 81%
- Tenants & Community 77%
- Energy 63%
- Greenhouse Gas 70%
- Water 60%
- Waste 52%
- Data Monitoring & Review 64%
- Building Certification 55%

Source: GRESB, Cushman & Wakefield Research

□ - 2020 ■ - 2021

Figure 23: GRESB aspects – Development

- Leadership 85%
- Policies 96%
- Reporting 80%
- Risk Management 83%
- Stakeholder Engagement 88%
- ESG Requirements 92%
- Materials 70%
- Building Certification 55%
- Energy 61%
- Water 84%
- Waste 93%
- Stakeholder Engagement 83% (Development)

Source: GRESB, Cushman & Wakefield Research

□ - 2020 ■ - 2021

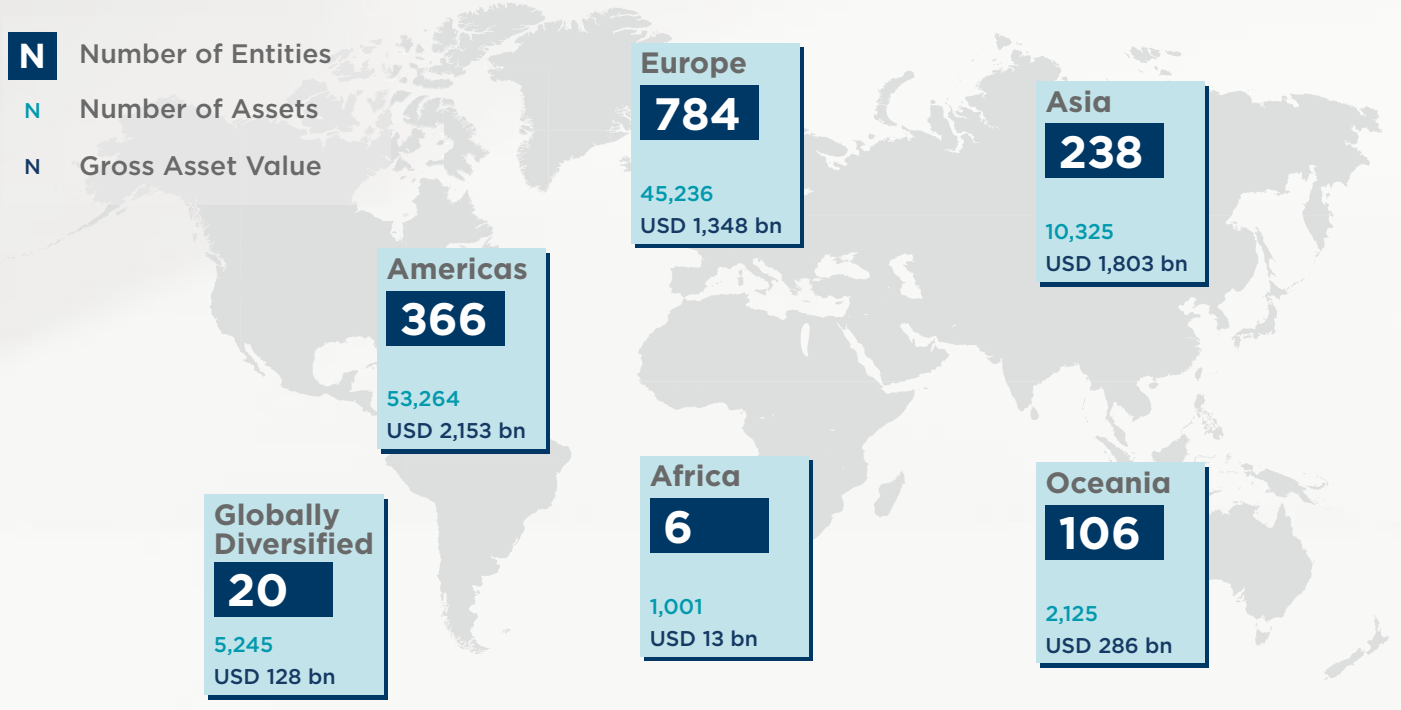
Figure 24 GRESB rating and score example

Source: GRESB, Cushman & Wakefield Research

GRESB users

Data is garnered at the portfolio level for private property funds and developers, property companies, and direct real estate investors. What's more, GRESB data is utilised by around 1,520 institutional and financial investors, who combined have assets in excess of US$5.7 trillion of assets under management (Figure 25).

Figure 25: GRESB – Benchmark size and assets location globally (2021)



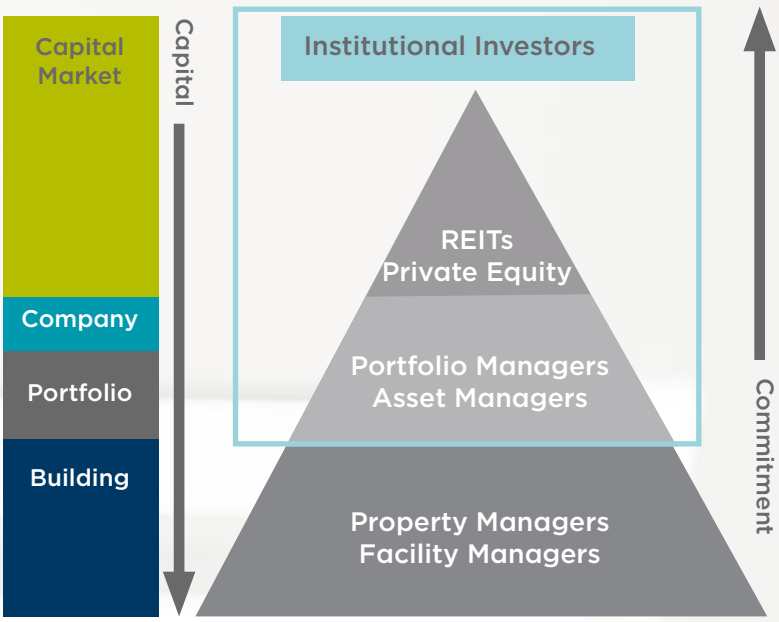
Source: GRESB, Cushman & Wakefield Research

Why engage GRESB?

There are many reasons why enterprises are using the GRESB rating system, including:

- GRESB offers institutional investors the data and information required to examine and manage the sustainability risks associated with their real estate and infrastructure investments;
- GRESB helps push environmental, social and governance matters to the forefront of business decision-making;
- Shareholder value is enhanced with the advancement in sustainability performance, and;
- GRESB-engaged enterprises are recompensed with more efficient, more sought-after properties, as well as greater returns and reduced risk (Figure 26).

Figure 26: GRESB engagement



Source: GRESB, Cushman & Wakefield Research

One company that has continued to advance sustainability performance is Global Logistics Properties (GLP) and one of the company's projects that exemplifies this is the GLP Baoshan Park in Shanghai, which has been awarded the LEED v4.1 O+M EB (Existing Buildings Operations and Maintenance) Platinum Level certification (Figure 27 and Case Study 1 in the Appendix).

Figure 27: Global Logistics Properties (GLP) Baoshan Park, Shanghai timeline

2014	Started construction.
2016	Put into operation.
2020	Awarded the Shanghai Water-saving Enterprise Certification and Shanghai Safety Standardisation Level 3 Enterprise Certification.
2021	Asset portfolio including GLP Baoshan Park ranked No.2 in GRESB's assessment of opportunity funds for unlisted companies in the industrial real estate sector in China.
01/2022	Awarded LEED v4.1 O+M EB (Existing Buildings Operations and Maintenance) Platinum certification.

Source: Cushman & Wakefield Research

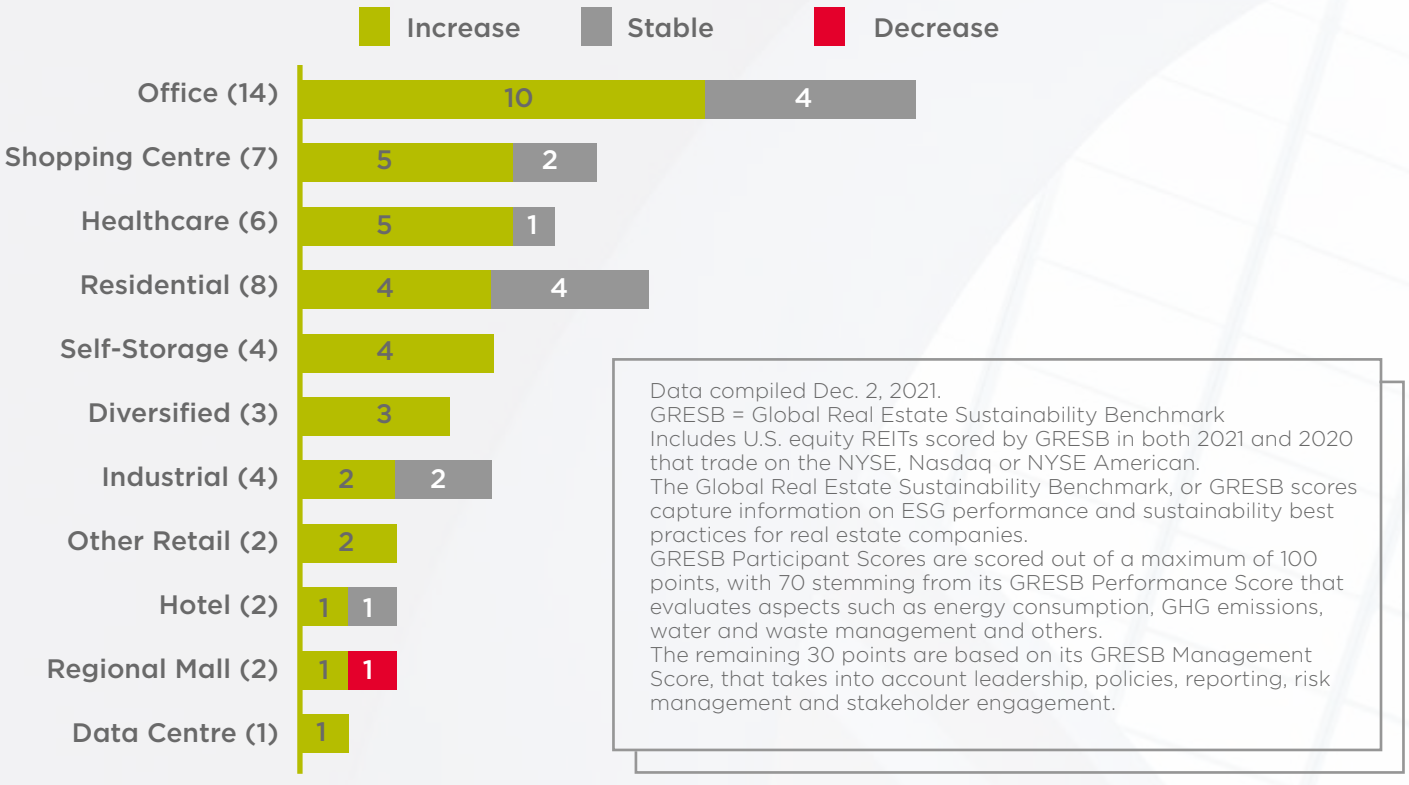
GRESB and real estate investment trusts (REITs) performance

According to the University of Cambridge, REITs with higher GRESB scores better their contemporaries in terms of returns. In addition, the same findings demonstrated that when adjusted for risk, there is a meaningful correlation between REITs' portfolio sustainability indicators and their performances in the stock market.

Data employed by the University of Cambridge was derived from a GRESB Survey of more than 442 sustainability ratings for global REITs between 2011 and 2014. The study demonstrated that a REIT's returns on assets (ROA) and returns on equity (ROE) have a considerable positive relationship with its general GRESB score. Specifically, ROA was seen to amplify by 1.3% for each 1% rise in a REIT's GRESB score. ROE, in the meantime, was seen to amplify by 3.4% for each 1% rise in the GRESB score.

What's more, 2021 GRESB data for REITs in the U.S. shows that since adopting the GRESB rating system, REITs by property sector in the region have seen a marked improvement in their GRESB scores, and subsequently their degree of sustainability (Figure 28).

Figure 28: GRESB participant score trends by REIT property sector (2021)



Source: GRESB, S&P Global Market Intelligence, Cushman & Wakefield Research

Key Takeaways

In terms of climate positive, net zero carbon emissions are attained and exceeded whereby an environmental benefit is generated by eliminating additional CO2 from the atmosphere.

Buildings can realise climate-positive results in a number of ways, including:

- The choice of building location;
- The choice of building design and energy modelling;
- The usage of eco-friendly, low carbon, reused or recycled materials;
- The minimisation of material and operational wastage;
- The maximisation of structural efficiency;
- The use of building insulation;
- The regular maintenance of plant, machinery, sensors and devices and ensuring these systems have the latest technology;
- The use of GHG emissions reduction systems;
- The use of renewable energy;
- The use of intelligent energy management systems;
- The maximisation of water use reduction, and;
- The re-use/renewal of the building upon current-use obsolescence.

Two climate positive-associated rating and benchmarking systems that have acquired market interest of late are:

- At the enterprise level – The Task Force on Climate-Related Financial Disclosures (TCFD), and;

- At the real estate level – The Global Real Estate Sustainability Benchmark (GRESB).

The TCFD system enables enterprises to identify and disclose climate-related risks and opportunities so as to allow for informed decision-making by investors, lenders, insurers and other related participants. The utilisation of the TCFD system will assist enterprises as they determine and manage transition and physical climate risks.

GRESB evaluates the environmental, social and governance (ESG) performance of real assets, which include real estate. In terms of environmental issues, the rating system encourages enterprises to reduce GHG emissions, lessen wastage, and conserve water and energy.

Appendix Case Study

GLP Baoshan Park Shanghai

A representative development for a new generation of smart, efficient and zero-carbon logistics parks in China

2014 – Present

Summary:

In 2022, GLP Baoshan Park in Shanghai was awarded the LEED v4.1 O+M EB (Existing Buildings Operations and Maintenance) Platinum Level certification. The park is now one of the few logistics parks in the world to receive this highest level of green operation certification. The park is also the largest comprehensive logistics park with this certification in China. Along with the development and operation of this park, GLP continues to play a leading role in the development of quality supply chain infrastructure. This development not only acts as an industry quality benchmark but also provides both zero-carbon solutions for the whole industry, and benefits (including climate positive gains) to environmental sustainability overall.

Overview:

- With a total gross floor area of 243,000 sq m, GLP Baoshan Park reduced its carbon emissions by 2,500 tons in 2021 through various carbon reduction measures.
- Benefiting from the integrated solutions provided by GLP's multiple platforms, the park has successfully demonstrated best practice solutions to the whole industry in China while achieving carbon neutrality in its own operations.
- Among the company's platforms, GLP's Asset Service Platform (ASP) has rich experience in park operation and management, as well as a history of implementing effective smart approaches.
- GLP's ASP incorporates the CarbonXpert system which integrates the Internet of Things (IoT), big data and artificial intelligence to support Net-Zero measures.
- The company's renewable energy platform – Pufeng – makes full use of roof-mounted distributed photovoltaic panels, which provide green energy to the park.

Timeline of major events / milestones reached:

2014	Started construction.
2016	Put into operation.
2020	Awarded the Shanghai Water-saving Enterprise Certification and Shanghai Safety Standardisation Level 3 Enterprise Certification.
2021	Asset portfolio including GLP Baoshan Park ranked No.2 in GRESB's assessment of opportunity funds for unlisted companies in the industrial real estate sector in China.
01/2022	Awarded LEED v4.1 O+M EB (Existing Buildings Operations and Maintenance) Platinum certification.

How It Was Done:

Smart park platforms:

- The park contains technology from GLP's ASP as well as the platform's smart management standards structure. The AMS (the park's Asset Management System developed by GLP) allows for the integrated and full lifecycle control of the park and its facilities. The park also provides one-stop smart park services, covering access, security, fire protection, and energy consumption. Artificial intelligence (AI) innovation has been incorporated in its technological and digital approaches to ensure efficient operation and overall high environment, health and safety (EHS) standards.
- The park's intelligent meteorological warning platform, developed by ASP, connects forewarning signals from the Meteorological Administration to the GLP Intelligent Operation Centre (IOC) in real time, and allows the park to implement preventive measures in advance to minimise any possible damage caused by typhoons, heavy rainfall, or flooding. This significantly improves the park's risk resistance capability.
- Utilising a 'sponge city' platform and efficient water-saving technologies, as well as the creation of a rainwater recycling system for re-irrigation, the park is able to reduce the amount of water it uses.

The CarbonXpert system:

- The CarbonXpert system provides digital carbon inventory tools, carbon reduction strategies and process management, carbon asset management and other services for the park. The system reduces carbon emission intensity and operating costs via automatic and efficient accounting, data modelling, emission reduction scenario analysis, operation simulation and scheme optimisation. The implementation and usage of this system promotes carbon neutrality and sustainable development, which is visible, manageable, and plannable.
- Integrated into the system, roof-mounted photovoltaic panels provide green energy on a daily basis.
- Under the system, the park provides charging services for new energy electric vehicles, which equates to 3,200 charges per year.
- Associated with the system, the park is equipped with 312 main energy-saving LED lights, which reduce the amount of energy used by 50% to 60% when compared to the use of traditional incandescent lamps.
- Meanwhile, linked to the system, the green planting area now has a total size of 31,000 sq m within the overall park.

Incubation and innovation:

- The park provides a vast number of application scenarios and collaborates with customers to innovate, incubate, test, and validate new business models and frontier technology. It's currently testing a Robotics as a Service (RaaS) system, energy storage devices, cleaning robots and inspection drones.

Impact:

In 2021, GLP Baoshan Park achieved over 2,500 tons of carbon emissions reduction through multiple strategies.

- The park's roof-mounted photovoltaic panel system generated 2,750 MWh in green power over the year, which is equivalent to a 2,176-ton reduction in carbon emissions.
- The charging service for new energy electric vehicles was able to reduce carbon emissions by 36.9 tons over the course of the year, which is equivalent to 260,000 km travelled by a typical internal combustion engine powered car.
- Energy-saving LED green lighting was able to reduce carbon emissions by 57.8 tons over the year.
- Meanwhile, the park's green plants were estimated to absorb about 45 tons of carbon throughout the year.
- The 'sponge city' system and other efficient water-saving technologies were able to reduce the usage of municipal water by approximately 3,500 tons throughout the year.

Key Takeaways:

- GLP Baoshan Park represents a new generation of smart, efficient, zero-carbon parks, which is aligned with China's overall carbon neutrality goals.
- In the meantime, GLP will continue to build zero-carbon parks and share its in-house developed tools and experience.
- By doing this GLP hopes to provide zero-carbon solutions across the industry and create benefits (including climate positive gains) to further environmental sustainability.

Business Contacts

Alton Wong
Head of Advisory Services
Valuation and Advisory
Services, Greater China
Co-head of Sustainability
Services, Greater China
alton.yw.wong@cushwake.com

Corrine Chen
Acting Head of Project &
Development Services, West China
Acting Co-head of Sustainability
Services, Greater China
corrine.c.chen@cushwake.com

RESEARCH TEAM

James Shepherd

Head of Research
Greater China
james.shepherd@cushwake.com

Sabrina Wei

Head of Research
North China
sabrina.d.wei@cushwake.com

Xiaoduan Zhang

Head of Research
South China
xiaoduan.zhang@cushwake.com

Ivy Jia

Head of Research
West China
ivy.jia@cushwake.com

Wendy Hsueh

Head of Research
Taiwan
wendy.hj.hsueh@cushwake.com

Keith Chan

Head of Research
Hong Kong
keith.chan@cushwake.com

This report was authored by Shaun Brodie, Head of Occupier Research, Greater China & Head of Research, East China and designed by Tenny Shen. Analysis support was provided by Vivian Liu and Larry Sang.

To better serve our clients our China Research Team has established Centres of Excellence in various focus areas, such as Capital Markets, Industrial, Logistics and Retail. Shaun leads the Research Centre of Excellence for Greater China Occupier Research. If you have any queries related to Occupier Research in Greater China, please contact:

Shaun Brodie

Head of Occupier Research
Greater China
shaun.fv.brodie@cushwake.com

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