Beyond Buildings

Why an integrated approach to buildings and infrastructure is essential for climate action and sustainable development

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The World Green Building Council (WorldGBC) catalyses the uptake of sustainable buildings for everyone, everywhere. Our mission is to transform the building and construction sector across three strategic areas — climate action, health & wellbeing, and resources & circularity. We are a global action network comprised of over 70 Green Building Councils around the globe.

The WorldGBC has developed this report with the generous support of the Dar Group and its member firms Dar, Integral Group, TY Lin, Perkins & Will and Currie & Brown to identify opportunities for how an integrated approach to the whole built environment is able to deliver change commensurate with the commitments of the Paris Agreement.

As members of the UN Global Compact, we work with businesses, organisations and governments to drive the ambitions of the Paris Agreement and UN Global Goals for Sustainable Development.

Through a systems change approach, our network is leading the industry towards a net zero carbon, healthy, equitable and resilient built environment.

The 70 Green Building Councils of the global network
Executive Summary
The built environment - both buildings and infrastructure - must be on a clear path to decarbonise by 2050 and have made significant progress by 2030.

Infrastructure and buildings share key commonalities and are interdependent in use - it’s important that we consider them together as part of a system.

Despite leadership in many areas, the overall built environment sector demands clear climate and sustainability targets, frameworks, and methodologies for all asset types, in all places. In many of the places most in need of infrastructure investment, the governance and delivery of projects needs greater alignment with climate and sustainability targets. The whole built environment needs a narrative for collective global action.

We need significant investment to deliver on these targets and to have trusted verified benchmarks to ensure these outcomes are achieved.

Both the building and the infrastructure sectors are on similar paths. We must work together to deliver these outcomes. WorldGBC and its members are here to help. Together we can deliver:

- Awareness: A shared ambition for stakeholders across all buildings and infrastructure sub-sectors, aligned to the demands of the 1.5°C climate trajectory;
- Development: Common principles for all asset classes and geographies to achieve sustainability goals;
- Action: The inclusion of aligned principles in public procurement, investor frameworks and the built environment industry for the delivery of all built assets.

This report calls for a more closely aligned approach to sustainable buildings and infrastructure in pursuit of our shared climate and sustainability ambitions.
The WorldGBC global network calls for following actions from the built environment industry:

**The development of a framework of principles**

A global framework of principles is required for accelerating sustainability performance, to be adapted and verified at the local level, that aligns to the 1.5° emissions trajectory and the UN SDGs, applicable to all asset types – all buildings and all infrastructure in all regions.

Fundamental to the roll-out of these principles will be:

- **Universal Coverage**: that all new vertical and horizontal built environment projects, in every sector and every jurisdiction, have a verifiable pathway to sustainable development: encompassing the principles of climate action, health & wellbeing and the circular economy.

- **Public Advocacy**: that public delivery agencies globally embed the requirements for climate action, health & wellbeing and the circular economy in the procurement of all new vertical and horizontal built environment projects.

- **Investor Advocacy**: that investors demand for climate action, health & wellbeing and the circular economy in the procurement of all new vertical and horizontal built environment projects.

- **Deep and unprecedented collaboration**: that the building and infrastructure industries consider the roles and responsibilities for embedding, assuring and delivering climate action, health & wellbeing and the circular economy in the built environment.
We are in a climate crisis. As scientific reports continue to confirm the anthropogenic contributions which are fuelling the extreme weather events of recent years, it is clear that we are in a planetary crisis where our natural systems are being stressed by human activity. \(^1\)
WE NEED TO ACT

We must decarbonise the built environment. It is where we live, work and play and is fundamental to the health and wellbeing of our global community. We direct many of our global resources into the built environment and it is crucial both to people and infrastructure throughout the world. It is also critical to us, both now and in the future, in helping our communities to be more resilient to climate change.

The relationship and interconnection between buildings and infrastructure is clear. Buildings cannot decarbonise without infrastructure, and the purpose of much infrastructure is to create and support places for people.

The green building sector has had more than three decades experience to set mechanisms, targets, and goals to deliver on climate action and has made significant progress. Investment frameworks, procurement methods, assurance schemes and advocacy networks exist to continue decarbonising the sector and can be leveraged across all built asset classes.

This report is a call to action for the built environment industry to respond to our society’s climate crisis, with both the building and infrastructure sectors acting together. We need urgent and agreed targets for the whole built environment sector, and we need collaboration from all leaders to achieve them.

In addition to this, we need both the private sector and the public sector to act and procure infrastructure and buildings better. Together we can drive a zero carbon, resilient, healthy and sustainable future. Our green building network, its members, partners and other organisations advancing sustainable infrastructure and buildings are ready to help.
THE WORLD GREEN BUILDING COUNCIL AND ITS NETWORK

The WorldGBC and its member Green Building Councils (GBCs) play a valuable role in tackling the challenges within the built environment today. Since its creation in 1993 following the UN Earth Summit of 1992, our membership of GBCs has flourished over 70 countries, representing a substantial portion of the global environment landscape.

The GBC network represents a collective membership of over 36,000 organisations. Their role is to communicate, educate advocate and support, and help key stakeholders to implement sustainable strategies and actions for the built environment. Each council adapts to its market needs and the prevailing governmental structure, which provides flexibility while also maintaining global consistency as its core.

The lessons of several decades of engagement with government and industry, and the platforms for advocacy across the built environment, place the network in a good position to align the discussion across the whole built environment. Based on this experience, the WorldGBC network recognises that a systemic approach is urgently needed for our industry. This is an approach that will look at both buildings and infrastructure as one system.

The current WorldGBC strategic priorities are as follows:

- **Climate action**: capturing both mitigation of, and adaptation and resilience to climate change. In June 2021, the WorldGBC published an Advancing Net Zero (ANZ) Status Report setting out key actions to undertake in order to decarbonise.

- **Health, wellbeing and social value**: protecting and enhancing health, wellbeing and equity at building, community and supply chain level, considering the intersection of both infrastructure and buildings. Six principles for a healthy sustainable built environment can be found in the recently published Health & Wellbeing Framework.

- **Resources and circularity**: the global network is exploring opportunities for resource efficiency and implementing a circular economy at building, infrastructure and supply chain scale.

This report included consultation with the WorldGBC network through a series of discussion papers and workshops, and includes a breadth of global initiatives already underway to consider the built environment as a whole.
WORLDGBC’S STRATEGIC IMPACT AREAS

WorldGBC’s strategy ‘Sustainable Buildings for Everyone, Everywhere’ uses the Sustainable Development Goals (SDGs) as a foundation of our strategy to support our global network to lead and drive transformative change in the built environment across three key areas of sustainability: climate action, health & wellbeing, and resources & circularity.

The North Star Goals offer milestones for the built environment that are key for establishing the vital trajectory for a sustainable future.

Health & wellbeing:
A built environment that delivers healthy, equitable and resilient buildings, communities and cities.

Climate action:
Total decarbonisation of the built environment.

Resources & clarity:
A built environment that supports the regeneration of resources and natural systems, providing socio-economic benefit through a thriving circular economy.
THE FACTS TODAY

• The urban built environment alone is responsible for 75% of annual global greenhouse gases emissions, with buildings alone accounting for 37%.

• Cities represent 80% of our global GDP. More than half of the population now lives in cities (56.2% in 2020) and it is expected to grow to 70% by 2050. Cities rely on buildings and infrastructure to function.

• Over the next 40 years, 230 billion square meters of new buildings will be constructed, the equivalent of a city the size of Paris, every week.

• Two thirds of these new constructions will be built in countries that do not have any building codes and all will be supported by new and emerging infrastructure solutions.

• In both newly-industrialised and low-income countries with booming populations (e.g. Africa, where the population is projected to increase by 42% by 2030 compared to 2015), the demand for new buildings will increase considerably.

• 40-50% of resources extracted for global materials are used for housing, construction and infrastructure.

• 75% of the infrastructure needed by 2050 still needs to be built.

• Globally, the need for infrastructure investment is forecast to reach $94 trillion by 2040, and a further $3.5 trillion will be required to meet the United Nations’ Sustainable Development Goals for electricity and water.

• In 2019, buildings on their own consumed 35% of our global energy consumption and 55% of our global use of electricity. However, following the first round of Nationally Determined Contributions (NDCs) published after the Paris Agreement only 136 countries mentioned buildings, 53 countries mentioned building energy efficiency, and 38 specifically called out building energy codes. Infrastructure also features in prominent country NDCs, including China and UAE.

• Green buildings will represent an $24.7 trillion investment opportunity in emerging markets by 2030. The building sector can play a critical role in enabling NDCs to meet individual and global climate targets.

• The UN reports that about USD $5.8 trillion is spent in the building and construction sector. The International Finance Corporation (IFC) identifies green buildings as one of the biggest global investment opportunities of the next decade.

• Buildings play an essential role in how human beings live and inhabit the planet. Therefore, how we design, build, operate, and maintain our buildings directly impacts both the environment and our health and wellbeing.

“Global surface temperature will continue to increase until at least the mid-century under all emissions scenarios considered. Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in carbon dioxide (CO2) and other greenhouse gas emissions occur in the coming decades.”

Intergovernmental Panel on Climate Change (IPCC), 2021
The International Targets Calling for Action

In 2015, the member states of the United Nations adopted the 17 Sustainable Development Goals (SDGs), our global priorities for a sustainable future. 11 of the 17 Goals directly relate to the built environment. All goals must be met by 2030.

That same year, the Paris Agreement was signed, committing to limit global warming to well below 2°C, and preferably to 1.5°C. This is known as the 1.5°C trajectory.

In 2018, this pathway was defined for the built environment as:

- By 2030;
  - All new buildings must be net zero carbon in operation and embodied carbon must be reduced by at least 40%, with leading projects achieving at least 50% reductions in embodied carbon;
  - With widespread energy efficiency retrofit of existing assets well underway.

- By 2050;
  - All new and existing assets must be net zero across the whole life cycle, including operational and embodied emissions.

The last five years have been focused on setting commitments in place across the globe (e.g. Europe to become net zero by 2050, China to become carbon neutral by 2060, and the USA to halve greenhouse gas emissions by the end of the decade).

The International Energy Agency (IEA) prepared a net zero by 2050 roadmap for the global energy sector. It has major implications for decarbonisation in buildings and infrastructure. It identifies major transition in building systems, transportation and electricity generation that are consistent with Net Zero by 2050. The implications of this roadmap should be aligned with common principles for the delivery of buildings and infrastructure projects.
DEFINING INFRASTRUCTURE

The Organisation for Economic Co-operation and Development (OECD) defines infrastructure as “transport, communication, electricity, safe water and sanitation, health infrastructure and other basic facilities”\(^\text{24}\).

This definition covers both horizontal and vertical infrastructure. While other definitions exist\(^\text{25}\), the OECD definition distinguishes two categories:

- **Horizontal Infrastructure**, which is composed mainly of:
  - Transportation: roads, railways, and bridges
  - Power & Communication: transmission facilities, electric lines, energy generation
  - Subterranean: pipelines, sewer, waterlines.

- **Vertical Infrastructure**, also called Social Infrastructure (buildings and spaces that facilitate the delivery of social services by governments and other service providers):
  - Buildings - hospital, public universities, public housing, etc.
  - Surface - parking areas, subsurface or structured facilities
  - Structure - any building foundation and site work that facilitate the delivery of buildings

The infrastructure sector is highly diverse. As a result, the efforts around resilience, carbon mitigation and circularity are different across sectors, markets and stakeholders.

Although the infrastructure and building sectors vary, they are certainly interdependent and have areas of overlap, primarily:

- **Interdependency in use** – despite their difference in purpose, together buildings and infrastructure comprise a shared urban ecosystem.
- **Shared construction supply chain** – buildings and infrastructure use broadly similar materials and operate similar processes of design of construction, with a shared material supply chain.
Section 2

**SHARED OPPORTUNITIES FOR BUILDINGS AND INFRASTRUCTURE**

Buildings and infrastructure are independent in many ways. Working in silo means that there is a risk of valuable opportunities being missed when addressing climate targets and sustainability goals.

**Carbon mitigation:**

Both sectors can’t decarbonise on their own, for example: buildings cannot become net zero if they are not supported by a decarbonised grid, while infrastructure cannot provide net zero energy if there’s no demand.

**Resiliency:**

Tackling resilience to climate impacts and other built environment and society stresses at individual asset level only won’t ensure a resilient community providing social value for all people if infrastructure is not also being considered.

**Health & wellbeing:**

Health, air quality, equity and biophilia are definitely tackled at building level, but we won’t get to meaningful outcomes if infrastructure doesn’t facilitate net zero transport and provide green and equitable social infrastructure.

**Resource & circularity:**

Because both sectors rely on similar supply chains, they share synergies and opportunities for material re-use to feed into a circular economy.

**Public procurement:**

Both sectors interact with governments and publicly-owned infrastructure and buildings (social infrastructure). Governments should be able to deliver public projects for both horizontal and vertical infrastructure that meet our climate and sustainability goals. They should also have access to the right methodology, benchmark and verification tools to act at scale.
Through this report, WorldGBC advocates for the need for collaboration to establish a clear path, and aligned global ambition and coverage for all built assets across all geographies.

"In Australia, there is increasing recognition of the need for collaboration to strengthen sustainability outcomes from physical infrastructure. ClimateWorks Australia estimates that infrastructure influences 70% of national emissions. This includes operational emissions directly under the control of infrastructure asset owners and operators, plus embodied and enabled emissions under the broader scope of influence of infrastructure decision-makers. A collaborative approach to systemic change in investment and operation processes is needed to deliver more sustainable and resilient infrastructure."

Climateworks 2020
1. Decarbonisation opportunities

- Electrification of buildings aligned with renewable energy procurement from energy sector.

- Electrification of public transit and private vehicles aligned with renewable energy procurement.

- Buildings and mobility supporting modal shift to zero emissions options like active transport.

2. Embodied emissions

- Material selection and resource extraction.

- Construction stage emissions reduction.

3. Resilience

- Decentralised networks relating to precincts of buildings.

- Modal diversity in transport systems.
HEALTH AND WELLBEING AT THE INTERSECTION OF BUILDING AND INFRASTRUCTURE

1. Air quality

- Electrification of buildings and transit together can remove fossil fuel combustion from energy generation.
- Electrification of public transit and private vehicles fossil fuel reduction from transport.
- Construction stage pollution reduction.

2. Active lifestyles

- Buildings and infrastructure supporting increased activity of occupants and local community.

3. Mental health and biophilia

- Green Infrastructure and nature in cities.
RESOURCES AND CIRCULARITY AT THE INTERSECTION OF BUILDING AND INFRASTRUCTURE

1. Durable building materials
   - Shared supply chains of concrete, steel, aluminium, bitumen and glass.

2. Circularity in utilities
   - Building waste streams and waste to energy or biogas opportunities and shared thermal systems.
   - Waste to protein innovation systems.

3. Products as a services
   - Mobility as a service allows transition from ownership model, towards a circular use of products.
   - Green infrastructure and buildings in cities.
There is a substantial opportunity to support the industry in responding to our climate targets with principles for the built environment that include both buildings and infrastructure. A more sustainable built environment represents better quality assets, maintained to a high standard, providing a better investment that offers cost savings across the lifecycle.
INVESTMENT IN THE BUILT ENVIRONMENT

Capital markets are one of the primary drivers for investment in the built environment and they establish the priorities for how much of the sector addresses climate and sustainability.

There is a substantial opportunity to support the industry in responding to our climate targets with industry principles across the built environment that include both buildings and infrastructure. A more sustainable built environment represents better quality assets, maintained to a high standard, providing a better investment that offers cost savings across the lifecycle.

In 2014, the Global Infrastructure Basel summit estimated that an annual global investment of $5 trillion would be required to create sustainable infrastructure to meet 2050 needs (confirmed by International Energy Agency26) with $1.2 trillion yet to be found annually27.

The Taskforce for Climate-related Financial Disclosures28 (TCFD) provides an important mechanism for investors to review the risk of assets and portfolios that relate to climate change, including: direct risk, (from climate-related events) transitional risk, (from changing regulatory environment with respect to emissions) reputational risk, (from supporting projects not aligned to climate goals) and litigation risk, (legal exposure as a result of climate inaction).

The TCFD supports a scenario-based approach to risk management, which could form the basis of greater consistency in risk management across the built environment industry.

The UN-convened Net Zero Asset Owners Alliance29 committed to transition investment portfolios to net-zero greenhouse gas (GHG) emissions by 2050. Aligned with the Science-based Targets Initiative (SBTi30), the Alliance intends to drive the development of industry best practice through their investment mandates.

The trajectory of engagement with sustainability in the financial sector is clear. Since 2014, global sustainable and environmentally responsible investments have increased by nearly 70% and now exceed $30 trillion31.

The global financial sector is expected to increasingly heighten sustainability ambition and expectation in response to investment opportunities around built assets. We believe that clear principles that integrate buildings and infrastructure will support these outcomes from the investment community.
CASE STUDY - LENDLEASE TCFD:

In 2018, Lendlease committed to incorporating the TCFD framework into its disclosure regime. To deliver this goal, Lendlease decided to prepare its own climate scenarios that were relevant and tailored to its business.

To do this, Lendlease took key data and indicators from ‘off the shelf’ scenarios based on IPCC climate projections, related research and created four different global warming scenarios that were relevant to its business. These ‘Pathways to the future’ provided a narrative on how the current world could unfold through the four scenarios ranging from ‘Transformation’, which outlined a 1.5°C outcome, to ‘Resignation’ which described a worse than 4°C outcome.

These scenarios helped drive difficult discussions with over 200 of their internal senior leaders during one-day ‘risk and opportunity workshops’.
PUBLIC PROCUREMENT FOR BUILDINGS AND INFRASTRUCTURE

A great deal of the world’s current and future infrastructure and buildings are procured with public resources. Public procurement is the process by which public money is spent for the construction and operations of vertical and horizontal infrastructure.

Public Procurement plays a fundamental role in achieving the UN Sustainable Development Goals (SDGs). Sustainable procurement has the potential to achieve all SDGs, and 82% of the targets, with the highest potential impact noted for SDG 11: Sustainable Cities and Communities. Public procurement has the power to pursue a variety of policy aims, specifically through sustainable public procurement (SPP).

Public procurement contracts can advance the sustainability agenda for infrastructure by adhering to principles of transparency, balancing financial and non-financial value and committing to net zero emissions plus wider environmental benefits. By valuing these benefits, it can promote small businesses, voluntary, community and social enterprise organisations and responsible businesses as well as contribute to further diversifying public supply chains.
CASE STUDY - HM GOVERNMENT INDUSTRIAL DECARBONISATION STRATEGY, UK MARCH 2021:

The Ten Point Plan for a Green Industrial Revolution

The Industrial Decarbonisation Strategy developed by the UK Government is the first strategy published by a major economy which sets out how industry can decarbonise in line with net zero, while remaining competitive and without pushing emissions abroad.

The main actions from the decarbonisation strategy focussed on public procurement are:

- Use public procurement to drive change. **Timeframe:** 2020s – 2050s
  > **Action in 2021/22:** Develop Clean Energy Ministerial initiative on coordinated public procurement action; publish Public Procurement Policy Statement.

- Support businesses to make greener choices. **Timeframe:** 2020s - 2050s
  > **Action in 2021/22:** Engage with businesses to understand how government can support changes in procurement practices and encourage consolidated demand via buyers’ alliances.

- Work with partners to create a coalition of countries committed to shared approaches to developing the market for low carbon products. **Timeframe:** 2021 – 2030
  > **Action in 2021/22:** Use COP26 and the G7 Presidency to seek joint commitments on using public procurement to drive Industrial Decarbonisation.

The UK Ten Point Plan for a Green Industrial Revolution and Green Paper on Transforming Public Procurement has preceded the publication of the national decarbonisation strategy.

The strategy is a roadmap of strategic objectives and signals to the industry, setting out how decarbonisation will happen through the supply chain, and the role the government will take in supporting and enabling this transition by making better choices in public procurement.
METHODOLOGY FOR ASSESSING PROCUREMENT SYSTEMS (MAPS)

The Methodology for Assessing Procurement Systems (MAPS) is an international standard and the universal tool to evaluate any public procurement system anywhere in the world. It is a universal tool for all public procurement systems at any level of government and for any country, regardless of the level of development, size or spend. Classed as a reform tool to improve the effectiveness and efficiency of public procurement, MAPS ensures transparency in the use of public funds and encourages dialogue.

MAPS is related to SDG Target 12.7 and SDG Target 16.6. MAPS is anchored in the 2015 Organisation for Economic Co-operation and Development (OECD) Recommendation of the Council on Public Procurement and is reflective of leading international procurement frameworks, such as the UN’s Commission on International Trade Law - Model Law on Public Procurement (2011) and the EU Directives on Public Procurement (2014).

MAPS assessment takes place on the key aspects of public procurement dealing with value for money, transparency, fairness, and good governance through a framework-based analysis. MAPS assessments have been conducted in dozens of countries around the world. The recent MAPS assessment on Norway publishing details on the country’s strong foundation for sustainable public procurement, alongside improvements recommended around implementation and uptake across the system.
BENCHMARKING SUSTAINABILITY FOR THE BUILT ENVIRONMENT

Over the last three decades, the built environment has seen numerous sustainability certifications emerge for buildings. Local GBCs alone have created over 40 certification programs and tools specific to their marketplace. By 2020, a total of over 3.5 billion square metres of green building space had been certified worldwide through the WorldGBC network — a tenfold increase in 10 years.

The infrastructure sector has seen sustainability certifications emerge for horizontal infrastructure (e.g. Envision, CEEQUAL, IS, SITES, RELI), as well as frameworks (e.g. PAS2080, FAST Infra, RICS) to advance sustainability principles. Supporting sustainable finance, established frameworks such as GRESB (Global Real Estate Sustainability Benchmark) provide ESG reporting for real assets in both buildings and infrastructure sectors. The growth in sustainable finance for real assets can be seen in new global initiatives such as the ‘Finance to Accelerate the Sustainable Transition-Infrastructure’ Initiative (FAST Infra).

The Science-based Targets Initiative (SBTi)\(^4\) provides a methodology and process for aligning organisational emissions reduction targets to the 1.5°C trajectory enshrined in the Paris Agreement — indicating the degree and speed they need to reduce their greenhouse gas (GHG) emissions to prevent the worst effects of climate change. Organisations across the built environment have successfully set science-based targets, including in the real estate, utilities, transportation and other built environment sectors. The SBTi also includes a sectoral approach that addresses some infrastructure sectors, including aviation, ICT, power and transport.

The scope of these global initiatives for buildings and infrastructure varies — some focus on climate change solely, some on resilience and some on circularity. There are also several multi-factor sustainability frameworks in many jurisdictions.

It is clear that the role of benchmarks, rating tools and certifications have hugely advanced the sustainability industry through raising awareness, ambition and performance tracking on a global scale.

These tools provide an important reference point for public procurement and capital markets establishing requirements for the construction actors and supply chains. There is clearly opportunity for more cohesion and efficiency in the current practice.

Ensuring all built environment targets are science-based, and benchmarking is performance-based with ongoing verifications, presents an opportunity for buildings and infrastructure seeking to pursue a common methodology for emissions reduction.
Our research has found that a global framework of principles is required for accelerating sustainability performance, to be adapted and verified at the local level, that aligns to the 1.5°C emissions trajectory and the UN SDGs, applicable to all asset types – all buildings and all infrastructure in all regions.

A clear set of common principles across investment and procurement in the built environment would support the rapid action being called for by global climate agreements at a time when urgency must be the priority. Providing shared targets for climate action and sustainable development can enable consistent outcomes to be embedded within contracts and procurement guidelines.
GLOBAL OPPORTUNITY FOR NEW INFRASTRUCTURE

The economic need for infrastructure:
There is a global opportunity for new infrastructure. It is underpinned by the huge latent demand for infrastructure investment to support the growth and prosperity of communities around the world. This demand over time is the largest in Asia and other emerging markets.

The built environment need for infrastructure:
The expected growth in built floor area supports this need for future infrastructure, with the largest predicted built environment growth in the global south.

Global governance for sustainable infrastructure ratings:
The existing infrastructure rating tools, CEEQUAL, Envision and the Infrastructure Sustainability tool show good coverage of established markets, but limited coverage in the places of greatest future growth.

The Green Building Councils (GBC):
The GBC network provides an opportunity for global coverage and consistency if it can effectively address infrastructure in an integrated manner with buildings.

Shaded countries have national Green Building Councils that are part of the World GBC Network.

2007 - 2015
2016 - 2040 (Current Trends)
2016 - 2040 (Investment need)

Regional share of global infrastructure investment, 2007 - 2040

Source: Oxford Economics

Global governance for sustainable infrastructure ratings:

Registered & certified projects
(1 dot = 10 registered and certified projects)

Source: Infrastructure Sustainability Council, Building Research Establishment and the Institute for Sustainable Infrastructure

Envision
CEEQUAL
ISCA

Floor Area Additions

Source: Architecture 2030

2040 - 2060
2030 - 2040
2017 - 2030

Scale
(Billion m²)

1
10
60
100
Towards A Shared Framework of Principles - A Pathway

Traditionally WorldGBC and Green Building Council (GBC) initiatives have been focused on buildings. Key voices in the network from GBCs across all regions are demonstrating leadership in transitioning to exploring change at a systemic level necessary for the transformation to a sustainable built environment.
TOWARDS A SHARED FRAMEWORK OF PRINCIPLES - A PATHWAY

In consultation for this piece of work, the approach to broaden the perspective of the network to include infrastructure and the whole built environment has received ample support in different consultation stages of this research.

At this important point in the journey toward a sustainable future, our society sits at an environmental tipping point. The degree to which we can change the trajectory of greenhouse gas emissions throughout this decade will shape the climate stability, and health and prosperity of people everywhere for long into the future.

To bring about meaningful change, our global built environment sustainability community must seek to speak with one voice - sending clear signals to institutions that build and renew our places, deliver our buildings and infrastructure as well as the supply chains upon which delivery depends.

This report presents the value of identifying a common framework of principles that can support the rapid adoption of best practice sustainability outcomes across the whole built environment. This is recommended as a next step of work, to be undertaken in collaboration with key actors across the built environment sector.
GLOBALLY AGREED PRINCIPLES

A first step will be to establish a common set of key principles that address the major challenges faced by the built environment. There are several key areas where consistent messaging across buildings and infrastructure is vital, with clear approaches needed for:

- Decarbonisation, that aligns with the needs of science and the trajectory of net zero whole-life carbon emissions reduction.
- Risk and resilience, and the mechanisms by which climate adaptation and resilience planning for infrastructure and buildings intersect.
- Circular economy and resource efficiency, in relation to the supply chains supporting all areas of the built environment including opportunities for the restoration of ecosystems in the built environment.
- Health, wellbeing and equity, considering asset users in the community and social impact across the supply chain.

SHARED ADVOCACY

Creating a shared advocacy agenda for the built environment. Working with policy makers and agencies to identify approaches to planning and project delivery that embed the principles for decarbonisation, resilience, health and circularity.

A shared advocacy agenda between buildings and infrastructure sectors should consider:

- The adoption of common principles across buildings and infrastructure for climate action, health and wellbeing and the circular economy.
- The inclusion of ambitious requirements for decarbonisation, resilience, health and the circular economy in all public assets.
- The alignment between planning, design, construction and the operational ESG requirements for all built asset classes, globally.
LEVERAGE THE STRENGTH OF THE NETWORK

Another key aspect of transforming the built environment is to recognise and leverage the position of the network of Green Building Councils (GBCs) and their membership.

With global coverage, relationships across the built environment value chain and deep experience in building and administering tools and frameworks, the network of GBCs provide an opportunity to move quickly. Speed of deployment is one of the under-recognised aspects of this challenge, as science demands we achieve a new decarbonisation trajectory in just one decade. Benefits of leveraging the GBC network include:

- Many GBCs have already started on this journey to an integrated approach to the built environment, and there is a strong foundation for shared learning in how to bring common principles to the whole sector.

The GBC network cannot do this alone, and a foundational part of the pathway is to establish and build relationships with those sustainability organisations active in the infrastructure sector. This report is firm in its recommendation for a collaborative approach to establishing alignment and global coverage in the consideration of sustainability in the built environment.

Moreover, it recommends further consultation and research be undertaken to establish a framework of principles that enable the delivery of sustainable building and infrastructure assets.

- GBCs are adept at formulating common methodology, clear benchmarks and mechanisms for verification for some of the most complex social and environmental challenges that are now so urgent.
- GBCs have been forced to answer both the technical questions of social and environmental impact and the industry questions of how to advocate for adoption in a jurisdictionally sensitive manner.
How the WorldGBC network influences infrastructure today
Here are some examples of initiatives that Green Building Councils (GBCs) have developed that demonstrate an integrated approach to sustainable development for both buildings and infrastructure.

**CASE STUDY - GBC SOUTH AFRICA:**

GBCSA’s vision is to go beyond green buildings and into green precincts, green regions and ultimately green cities.

The Advocacy arm of the GBCSA grows the green building knowledge that underpins membership, certifications and technical work at the organisation. This is achieved through strategic partnerships and collaborations which produce research and thought leadership content for the sector. They have already embarked on this journey mainly from a training point of view where we have a course on sustainable urban precincts. Through the strengthening of our advocacy approaches, GBCSA are at a point where we are initialising engagements on sustainable green infrastructure with the government. These conversations are linking that to green finance and the green recovery that will ultimately support green industries creating green resilient jobs that will feed into the circular economy.

**CASE STUDY - INDIA GBC:**

India GBC are addressing Green Transit Infrastructure as part of 3 exclusive rating programmes (for Metro projects, for Railway/Commuter Rail projects, for High Speed Rail projects). So far, 600+ transit facilities have adopted the rating programs.

India GBC had brought out the following 3 guidance documents for development authorities and developers to apply green concepts and planning principles in several Indian cities, resulting in reduced environmental impacts that are measurable and improving the overall quality of life:

1. IGBC Green Cities Rating (For greenfield cities) 2015
2. IGBC Green Cities Rating (For existing cities) 2017
3. IGBC Green Hill Habitat Rating (For Hill cities & towns) 2018

So far, India GBC Green Cities concept has been adopted by 20+ Indian cities including:

- Greenfield cities: New Town Kolkata, Sri City, Dholera Industrial City, GIFT City, Mahindra Industrial City in Gujarat & Tamil Nadu, Auric City, Reliance SEZ, Kandla SEZ, Pharmez city

- Existing cities: Rajkot, Visakhapatnam, Bhopal, Panchkula, Pune
CASE STUDY - GBCA (AUSTRALIA):

Melbourne Metro is a large scale infrastructure project that will deliver a new underground train line through Melbourne, with five associated large underground train stations.

The GBCA worked with the delivery agencies to embed Green Star requirements on each of the stations, and all are now committed to achieving 6 star Green Star ratings.

The 5 projects have each achieved a 6 star Green Star Design Review rating. The projects are implementing resilient design solutions and carbon mitigation measures within broader sustainability measures, while bonding together buildings and infrastructure (the stations are part of tunnel and rail infrastructure). Final Green Star certification is expected in 2025-26. This project is a great example of how Green Star can drive sustainability into an application where the built environment meets large infrastructure.

CASE STUDY - QATAR GBC:

Qatar GBC were involved in the Doha Metro project, through which 37 stations were built and operational, and all were certified - including the network itself.

A CEEQUAL design and build award was used to certify the Main Trunk sewage project.

In addition, an intensive addition to bike lanes and safe walking pathways opened 38km of shared pedestrian cycling.

With this information and case study, Qatar GBC has committed to sharing learnings with their members through education resources and training materials.
CASE STUDY - USGBC
MINNESOTA WILD AND EDMONTON OILERS / NHL STADIUM:

The Xcel Energy Center is the first NHL arena in the United States to earn LEED for Existing Buildings certification, located in St. Paul, the capital of the U.S. state of Minnesota.

The Center’s commitment to sustainability is visible to its more than 3 million annual visitors as soon as they set eyes on the solar photovoltaic array on the outside of the parking garage. A solar thermal array on the roof of the Center feeds clean energy into downtown St. Paul’s electric grid. The Center offsets its energy usage with wind energy purchased from its parent Xcel Energy.

Elsewhere, along with boosting its annual recycling rate to 60 percent, an organization-wide embrace of sustainability has resulted in more than 40% of employees taking some alternative form of transportation to work every day, while Wild players purchase their own offsets for the energy used at home games.

CASE STUDY - FINLAND GBC:

The City of Helsinki, which is a member of the Green Building Council Finland and their sustainable infrastructure committee.

This city has coordinated the utilisation of excess landmasses and aggregates in the construction of public infrastructure in Helsinki. These strategies have saved 8.2 million litres of fuel and avoided 20,200 tonnes of carbon emissions between 2014-2020.*
CASE STUDY - UKGBC:

UKGBC is one of 12 partners on the IGNITION project, alongside organisations from local government, universities and NGOs.

Supported by €4.5 million from the EU’s Urban Innovation Actions initiative, this ground-breaking project aims to develop innovative financing solutions for investment in Greater Manchester’s natural environment. This investment will help to build the city region’s ability to adapt to the increasingly extreme impacts of climate change.

The University of Salford’s Nature-based Solutions (NbS) ‘Living Lab’ has been developed as part of the IGNITION project. The Lab combines multiple nature-based solutions interventions simultaneously to create an integrated urban water management system that connects SuDS-enabled street trees and rain gardens with an extensive green-blue roof and a living wall. At the heart of the living lab sits two underground water tanks, which act as the collection point of excess rainwater – the water is reused onsite within its automatic irrigation system for the green roof and living wall, which provides a range of benefits including mitigating overheating risks and improving air quality.

CASE STUDY - COLOMBIA GBC:

Colombia GBC, as a local implementing partner of the BEA (Building Efficiency Accelerator) program for the cities of Bogotá, Cali and Montería, was in charge of leading the development of the program in these cities, and providing technical assistance to local authorities to meet the objectives.

For Bogotá, the pilot project was an urban renovation project called “Triángulo de Fenicia”. Through the project, sustainable urban planning recommendations that integrated buildings and infrastructure were defined, and put towards the city’s ‘eco-urbanism’ policy. This policy aims to build a resilient territory, and an adaptive city that mitigates climate change.
COMMON BARRIERS FOR CONSIDERATION

Our urgent need for climate action demands that every new built asset should be delivered in alignment to the targets of the Paris Agreement and Sustainable Development Goals.

The consultation process for this report identified several challenges that need to be tackled to create an aligned framework of principles that consider the interface of buildings and infrastructure.

1. Boundaries:

Emissions boundaries between buildings and infrastructure are complex – one asset’s scope 1 emissions are another’s scope 3 emissions and the boundaries of operational control can be challenging. Clear and consistent emissions boundary approaches between buildings, transportation and energy systems are an important consideration.

2. Baselines:

Business as usual reference cases are often based on mandatory national standards upon which percentage improvements are rewarded. The problem of differing local demands due to climate, capacity, and demand as well as a range of other factors may make such quantified comparisons impossible. Achieving common baselines that correspond to the needs of climate change trajectories and sustainable development are important in developing aligned principles across different asset classes.

3. Asset lifespan:

Different asset classes within the built environment have different lifespans and varying balance of embodied and operational impacts. Providing alignment and ability to compare different asset types for both buildings and infrastructure on both embodied and operational impacts is an important challenge to consider.

4. Approach to offsets:

At this point in history, even the most ambitious projects have residual emissions that must be offset to align with a net zero approach. Different offset approaches bring different levels of acceptability within the broader community and a variety of co-benefits. When considering the whole life carbon offsets required for any built asset, WorldGBC recommends ‘Advancing Net Zero Whole Life Carbon: Offsetting Residual Emissions from the Building and Construction Sector’ to provide a clear methodology that meets global expectations for emissions reduction.
COMMON BARRIERS FOR CONSIDERATION

Our urgent need for climate action demands that every new built asset should be delivered in alignment to the targets of the Paris Agreement and Sustainable Development Goals.

The consultation process for this report identified several challenges that need to be tackled to create an aligned framework of principles that consider the interface of buildings and infrastructure.

5. Assessment methodology of risks:

Climate risks present differently depending on sector and location. Different approaches to risk methodology cater to different industries, e.g., TCFD is framed for the financial sector and ISO14091 for organisation and assets. Better asset and portfolio-level risk management will need more sophisticated models and methodology to link buildings and infrastructure more effectively, including risk assessments that combine both quantified probabilistic modelling and qualitative impact descriptions, and consider the intersections of risk between buildings and infrastructure. Additionally, common methodology for long term risk analysis will support the industry as actors seek to embed long range impact management into the regulatory framework for development assessment.

6. Specific procurement challenges for public projects:

Identified by Infrastructure Australia and other leading actors, the major challenges for sustainable procurement include; lack of knowledge of sustainability within procurement, coupled with user difficulties from process overload plus expansive scope of sustainability; difficulty in both identifying and verifying sustainable products and services; presenting the need for new business models; and changing context in light of digitisation and aftermath of COVID-19. Additionally, there are fragmentation challenges within the approach to public and privately financed assets, with a strong investor approach led by GRESB for private infrastructure assets, but with a notable gap for public assets in both industry survey analyses and leadership in performance benchmarking.

7. Infrastructure Sector Complexity:

One of the biggest challenges to achieving consistent principles for climate action and sustainable development in infrastructure is the scale and diversity of the sector. With so many different asset types and mechanisms for supporting sustainable development, agreement on common principles has proven challenging. However there are several areas of overlap where commonality can be found: the need to switch from fossil fuels to renewable energy, the market signals on embodied emissions and resource use to supply chains and the need for broad benchmarking against the UN SDGs. While the details may change between sector responses, this report calls for a consultation to find common ground in the complexity between buildings and infrastructure.
This decade, the '20s, is pivotal. In the words of climate champion Christiana Figueres: "Before, we could not have done it, and after 2030, it will be too late." We have the narrowest of windows to change course.
This is the decade that counts if we want to stay below 1.5° of global climate warming. We call for a framework of principles, for both buildings and infrastructure, that covers built environment projects right across the planet, that inspires both public and investor advocacy, and enables deep and widespread collaboration, supported by the global network of Green Building Councils.

A decade is short, and very short if global institutional change is the goal. It is just an eye-blink in the lifespan of cities and of infrastructure. In terms of our industry, it is pirouetting on a pinhead. And that means we have to pull in the same direction, and we need to move forward with the whole system that comprises the built environment – both buildings and infrastructure.

If we are to succeed in this critical decade, a global framework of principles is required for accelerating sustainability performance, to be adapted and verified at the local level, that aligns to the 1.5° emissions trajectory and the UN SDGs, and is applicable to all asset types, to be co-created, agreed, and universally pursued.

This report sounds a call to action for our network and our partners. We must collaborate strongly and align our advocacy, our member networks and our tools, in support of a new trajectory toward urban sustainability.
We call for the development of a framework of principles; that the global institutions supporting sustainability in the built environment advocate for uniform principles for the assessment of climate action, health & wellbeing and the circular economy for new vertical and horizontal built environment projects in every region.

We believe that these principles will facilitate action on the below:

We call for universal coverage:
That all new vertical and horizontal built environment projects, in every sector and every jurisdiction, have a verifiable pathway to sustainable development - encompassing the principles of climate action, health & wellbeing and the circular economy.

We call for public advocacy:
That public delivery agencies globally embed the requirements for Climate Action, Health & Wellbeing and the Circular Economy in the procurement of all new vertical and horizontal built environment projects.

We call for investor advocacy:
That investors demand for Climate Action, Health & Wellbeing and the Circular Economy to be included in the procurement of all new vertical and horizontal built environment projects.

We call for deep and unprecedented collaboration:
That the building and infrastructure industry urgently consider the roles and responsibilities for embedding, assuring and delivering Climate Action, Health & Wellbeing and the Circular Economy in the built environment.

Our network of Green Building Councils, and our partners in the infrastructure sector, have an opportunity to mobilise rapidly and at global scale to align our messages and our advocacy efforts. We are ready to help and committed to action.

Join us.

“This is the decade that counts if we want to stay below 1.5° of global warming.”
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Dar
Dar Al-Handasah Consultants (Shair and Partners) is an international multidisciplinary consulting organisation in engineering, architecture, planning, environment, project and construction management, facilities management, and economics, founded in 1956. Dar is the founder of Dar Group, the Group’s firms are united by a commitment to deliver social and community impact. Over 18,500 professionals work with clients on projects in over 100 countries that contribute to the sustainable advancement of communities worldwide.

T.Y. Lin International - Infrastructure engineering
T.Y. Lin International is a multi-disciplinary engineering services firm known for delivering unique and challenging infrastructure projects worldwide. Established in 1954 in Los Angeles, California, T.Y. Lin International joined Dar Group in 1989. The firm has a global presence in bridges, roads & highways, aviation, rail and transit, buildings and water.

Integral Group - Building engineering
Integral Group is a global network of sustainable design professionals focused on “deep green” engineering and consulting for the highest-performing buildings in the world. Founded in 2008, the mission-driven company is a leader in corporate social and environmental responsibility, pursuing and achieving superior energy performance and high standards of health and well-being for clients worldwide.

Currie & Brown – Project management
Currie & Brown, one of the world’s top construction consultancies, provides a range of specialist skills, including cost management, project management, building surveying, and advising on public-private partnerships (PPPs). The global firm promotes sustainable development by working to optimise whole-life costs and minimise environmental impacts throughout project design, construction and operation.

Perkins&Will – Architecture and design
Perkins&Will is a global leader in the design of healthy, high-performing, sustainable environments. Since 1935, the firm is known for award-winning work in social infrastructure, urban design, transportation, and landscape architecture. Perkins&Will’s focus on diversity, equity, social responsibility, and community engagement has earned high accolades. The firm joined Dar Group in 1986.

Designed by Creative Concern
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