

Health & Wellbeing Framework

Six Principles
for a Healthy,
Sustainable Built
Environment

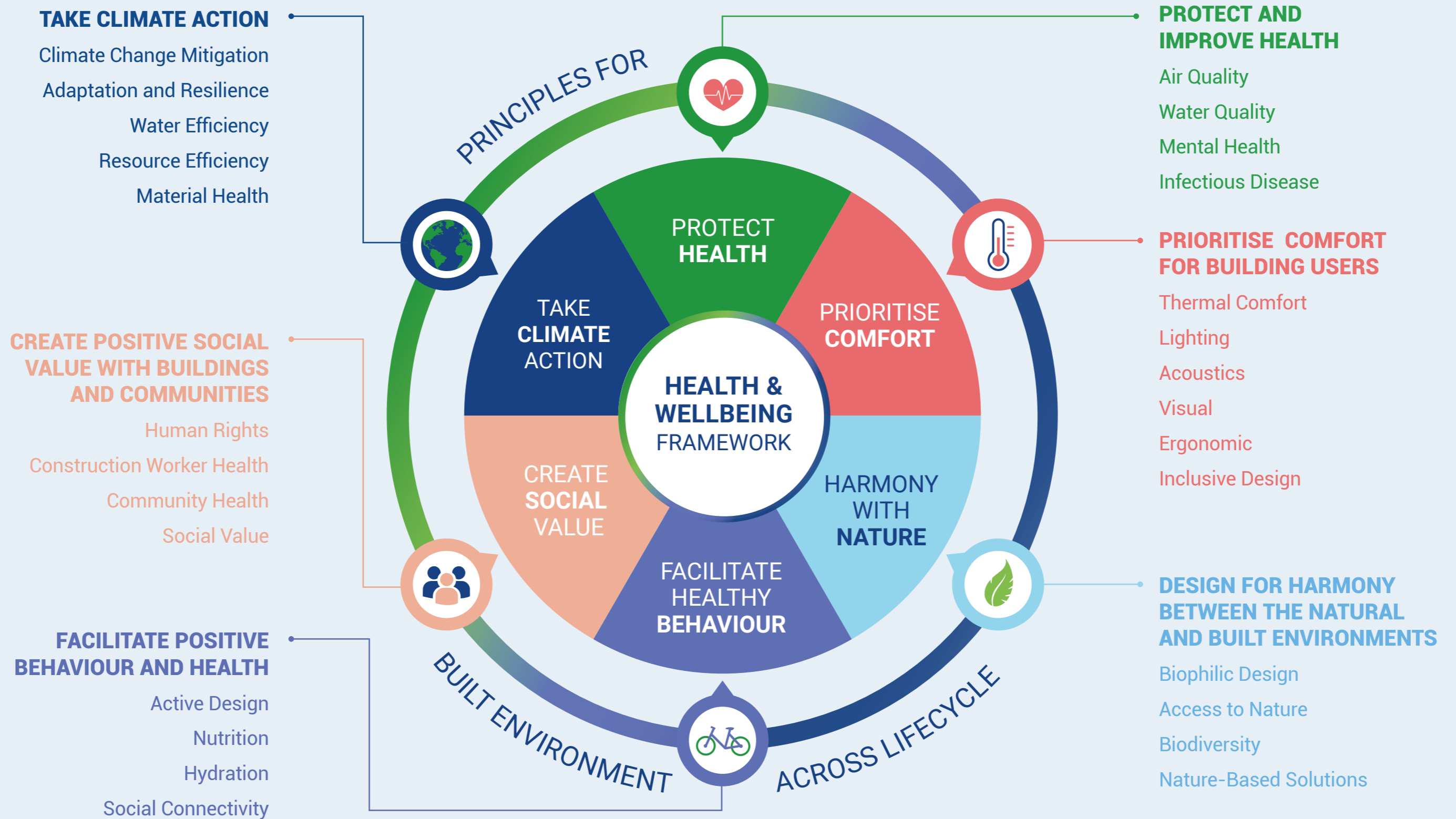
EXECUTIVE REPORT

November 2020



The WorldGBC Health & Wellbeing Framework

Six Principles for a Healthy, Sustainable Built Environment



Discover WorldGBC's Health & Wellbeing Framework at worldgbc.org/health-framework

About WorldGBC

The World Green Building Council (WorldGBC) catalyses the uptake of sustainable buildings for everyone, everywhere.

Transforming the building and construction sector across three strategic areas – climate action, health and wellbeing, and resources and circularity – we are an action network comprised of around 70 Green Building Councils (GBCs) around the globe. 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 WorldGBC Health & Wellbeing Framework has been developed in partnership with the Better Places for People project Steering Committee and members of our network, building on the work in this area from our GBCs to date. The Framework serves to continue progressing this topic. The full version of the Framework has references to solutions that can be provided by the GBC network.

Discover WorldGBC's Health & Wellbeing Framework at worldgbc.org/health-framework

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Introduction

There are few issues relating to human health, wellbeing and quality of life that are not impacted, directly or indirectly, by the attributes of our built environment.

The built environment has a major influence on our quality of life. It underpins our communities, as it includes all types of buildings and the urban infrastructure that supports our daily lives - our homes, schools, workplaces, hospitality - and forms the foundation that makes our cities great places. However, buildings can also be silent adversaries to our own health and wellbeing.

It is time to unlock the huge potential that the building and construction sector can have in improving human health and quality of life. The industry needs to address its responsibility regarding the quality of our indoor environment, our mental and physical health, and influence on our behaviour. These considerations must also embrace the people involved along all stages of the building lifecycle, from the health of construction workers to the environmental impacts of how we source materials, construct and operate our buildings.

Health and wellbeing is a fundamental human right for all people.

The principles that underpin this framework consider broad socio-economic and environmental determinants of health for all people connected to the lifecycle of buildings and infrastructure - not only users or occupiers. This represents a new position for the WorldGBC network. We are proud to champion this ambitious transformation.

Cristina Gamboa
CEO, WorldGBC



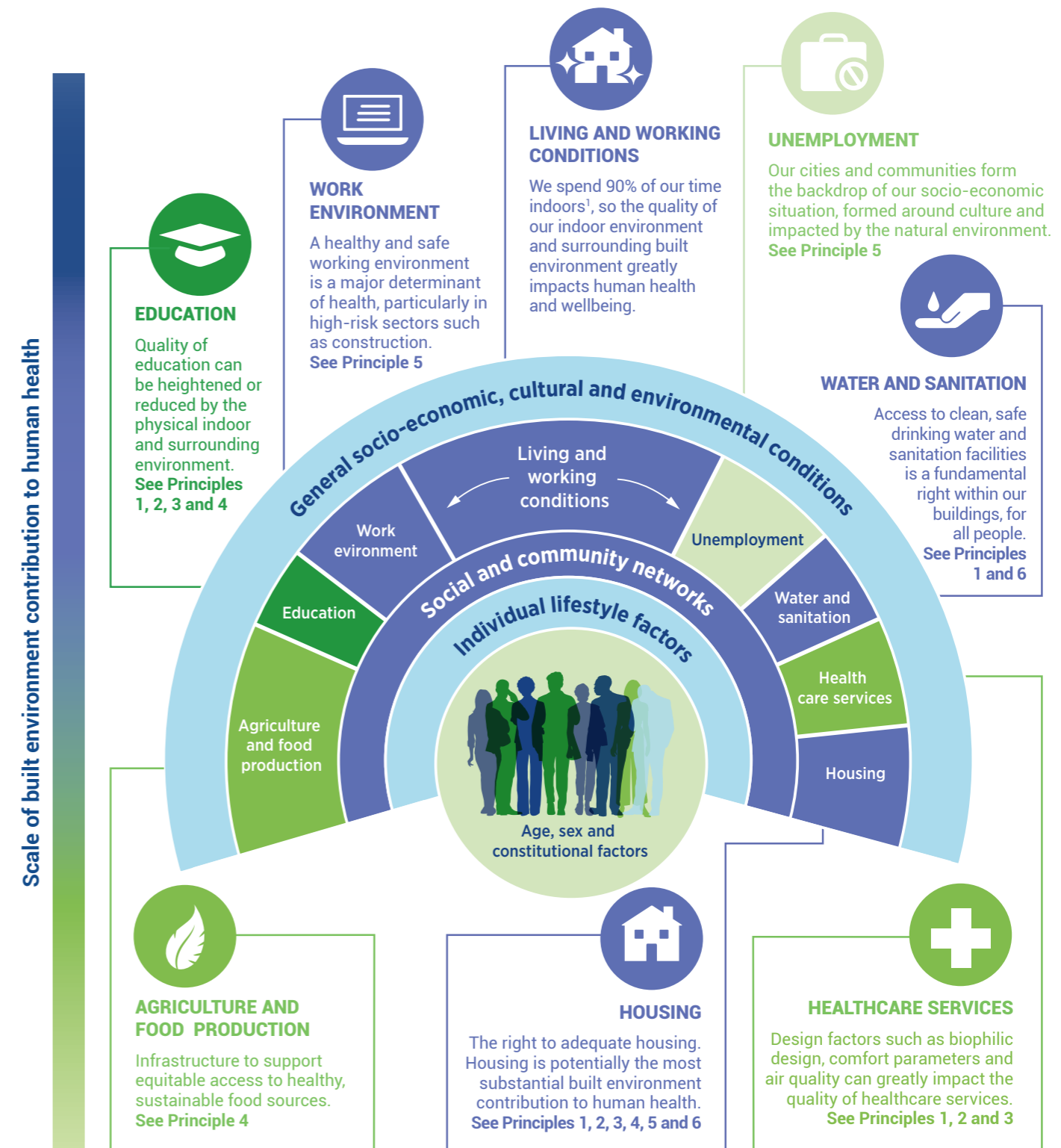
Mapping the determinants of health relating to the built environment

WorldGBC aims to catalyse change in industry ambition and transform the meaning of health and wellbeing for the sustainable building movement and wider sector. The WorldGBC Health & Wellbeing Framework equips the industry with the guidelines and tools to begin this fundamental transition.

The Framework is a high-level educational resource, structured across six core principles for health and wellbeing in the built environment. The principles are conceptual, allowing them to be universally applicable for an international audience and diverse range of stakeholders. It can be used by actors across the value chain, from designers to occupiers, construction firms to policymakers.

The goal of the initiative is to expand the scope and meaning of health and wellbeing for the industry and mobilise action-oriented solutions to the health and wellbeing challenges directly impacted by the building and construction sector. The full, digital version of the Framework is available at worldgbc.org/health-framework, which includes additional information on each sub-principle, including outcomes, strategies and benchmarks.

Determinants of health relating to the built environment



Based on Dahlgren-Whitehead 'Rainbow model', 1991.

Redefining health and wellbeing

Health and wellbeing in the sustainable building movement: the light bulb moment

Over the past decade, stakeholders from businesses to policymakers have started to recognise that the quality of our built environment, indoors and outdoors, impacts strongly how we feel, the way we behave, and even our susceptibility to health risks.

Building rating tools including, or focused on, health and wellbeing have catalysed this increase in global awareness. A focus on enhancing productivity in the workplace has been a core driver, with the private sector recognising a business case for a health-focused indoor environment that supports the wellbeing and capabilities of the human capital within. The impact of the COVID-19 pandemic has heightened this awareness of the impact of the built environment on people's mental and physical health.

Awareness of human health and wellbeing has had a transformative impact on the design and operation of buildings in the past decade. **However, health and wellbeing in the sustainable building sector has for too long focused primarily on the building occupant.**

This focus on productivity has left other areas of health and wellbeing underdeveloped. The financial co-benefits of a healthy built environment have created such a powerful driver for sustainable buildings that the focus of design interventions for health have inadvertently shifted into one sector of society (in many cases, the people who may not have been most in need of dedicated health interventions).

The WorldGBC network recognises that the industry is ready for change. Topics such as social equity and value, community resilience to the climate emergency and nature-based solutions are rising in the sustainability agenda. Global recognition of the UN's Sustainable Development Goals has led to the appreciation of a more holistic view of sustainability. Both public and private sectors are recognising a responsibility for all sectors to tackle the three pillars: the social, economic and the environmental elements of sustainability. The built environment must do the same.

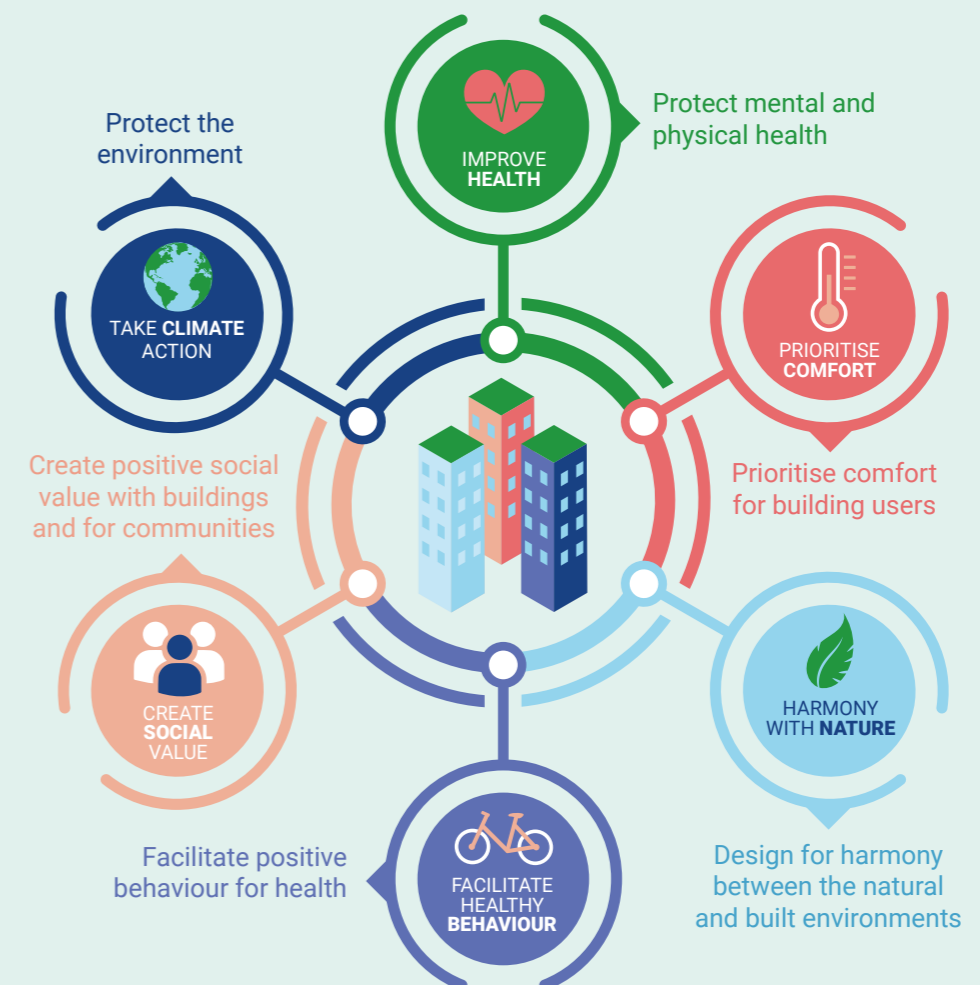
Our methodology for change

WorldGBC has led a two-year global consultation to redefine the scope of health and wellbeing in the built environment sector.

Our consultation has demonstrated that the built environment sector is ready to expand the focus of health and wellbeing into all sectors of society. A technical working group of Green Building Councils (GBCs) and industry partners was assembled to analyse determinants and drivers of health and wellbeing in the built environment and assemble key themes into a set of principles.

Our research involved focused engagement from GBCs, GBC members, public and private sector partners and policymakers from across the WorldGBC network. Through this extensive input, we believe our Framework offers a representative set of health and wellbeing principles for the sustainable built environment movement globally. We thank the dedicated members of the Health and Wellbeing Framework Taskforce, the full GBC Steering Committee, and the expert peer review panel for their support of this ambitious project.

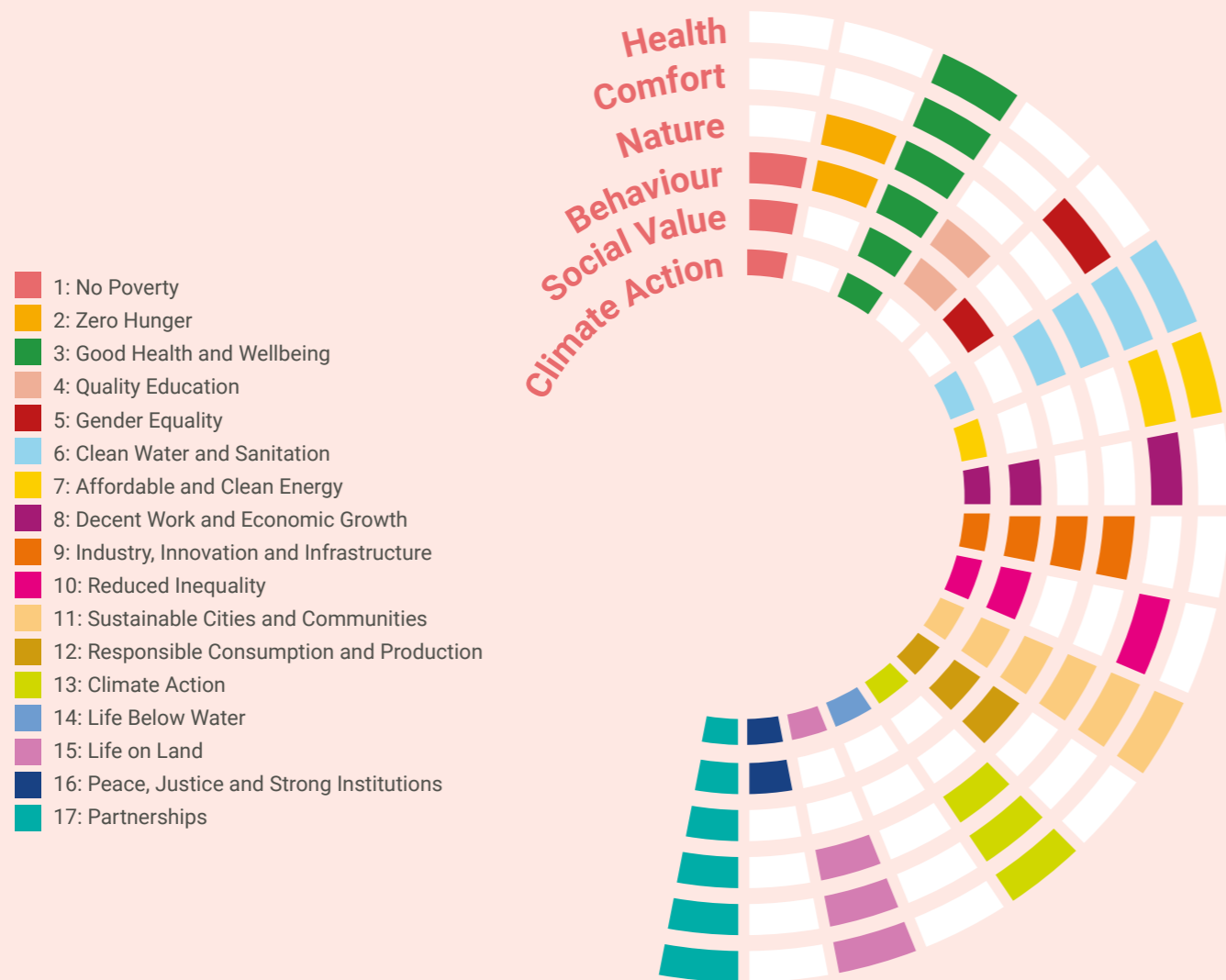
WorldGBC Health & Wellbeing Framework The Six Principles



Key outcomes for the industry

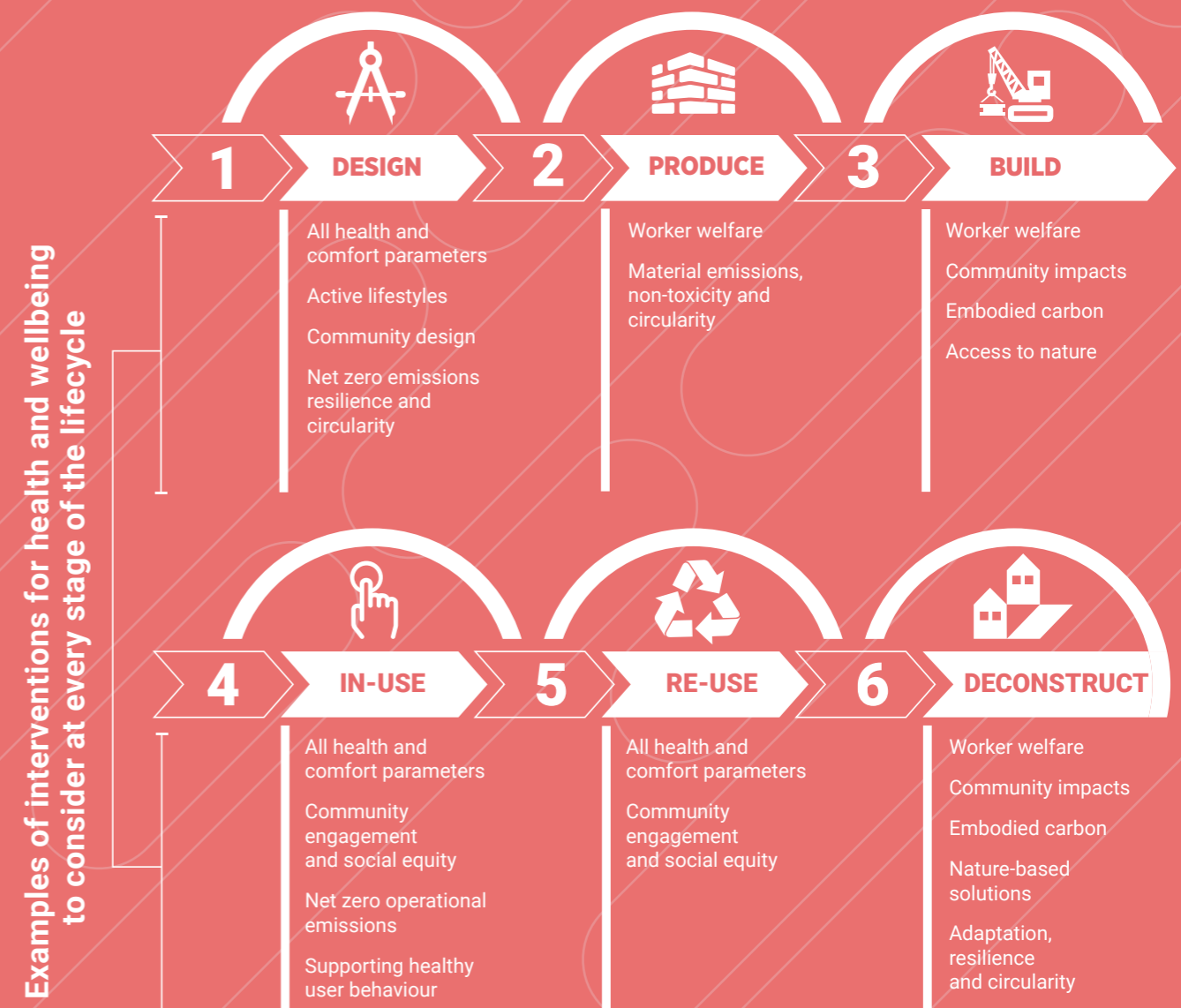
WorldGBC is proud to announce ambitious new outcomes for the building and construction sector based on the principles of the Health & Wellbeing Framework. These include the inclusion of broader socio-economic and environmental determinants of health, and the drive for improving public and environmental health across the whole lifecycle of the building.

Human health, wellbeing and quality of life is impacted by social, economic and environmental factors, demonstrated through mapping against the UN Global Goals for Sustainable Development



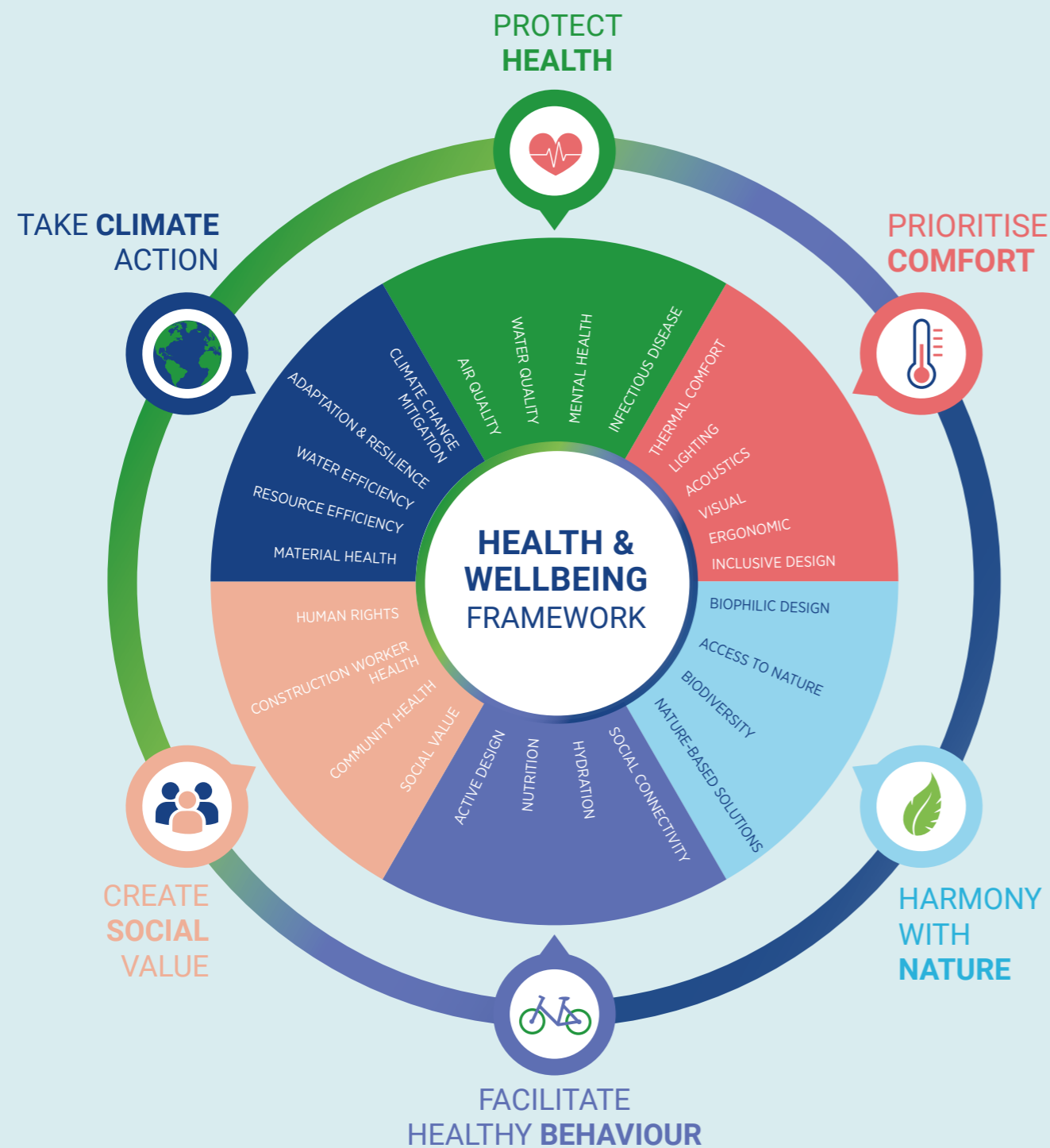
All people across the building lifecycle should have their health protected and enhanced

Our Framework principles call for the building and construction sector to take a whole lifecycle approach to human health and wellbeing, as people's quality of life is impacted at all stages.



The WorldGBC Health & Wellbeing Framework

Six Principles for a Healthy, Sustainable Built Environment



Principles Explained

Through six headline principles, the WorldGBC Health & Wellbeing Framework provides detailed information on the key aspects of human health, wellbeing and quality of life that relate to the built environment sector throughout the lifecycle.

Each principle is explained in the following section. A short synopsis of each sub-principle is presented to outline the challenge and opportunity of each element of the built environment relating to human health and wellbeing.

This Executive Report provides an overview of the key topics. See the full version of the Framework at worldgbc.org/health-framework.

PROTECT AND IMPROVE HEALTH

1.1 Maintain air quality at appropriate levels to minimise health risks

Air pollution is considered to be the greatest environmental threat to human health, causing approximately seven million deaths each year.² Polluted air increases mortality risk from stroke, heart disease, pulmonary disease, lung cancer and respiratory infections.³ Our buildings and cities expose people to indoor air pollution and, at all stages of the building and construction lifecycle, contribute to the ambient (outdoor) pollution crisis.

INDOOR AIR QUALITY

Studies suggest people spend 90% of their time indoors.⁴ Therefore, exposure to pollutants within the home and indoor environments can be highly damaging to health. The primary causes of indoor air pollution are:

HOUSEHOLD AIR POLLUTION FROM SOLID FUEL COMBUSTION

3.8 million premature deaths are attributed to household air pollution annually,⁵ primarily due to the use of solid fuels and kerosene, which create toxic particulate matter through combustion. In developing nations, where alternative sources of fuel can be scarce, around 3 billion people worldwide lack access to clean or modern energy services for cooking.⁶ Exposure to particulate matter can cause cardiovascular and respiratory disease and strokes.⁷

HOUSEHOLD COOKING

Gas stoves are used by millions worldwide for heating and cooking, and often considered the 'clean and safe' upgrade from solid fuel combustion. However, pollutants from gas appliances can lead to heightened nitrogen dioxide levels, which can worsen respiratory conditions such as asthma.⁸

VOLATILE ORGANIC COMPOUNDS

Volatile organic compounds (VOCs) are pollutants from building materials and household items. Exposure to these pollutants can be concentrated in an indoor environment, and trigger health issues such as nausea, headaches, or respiratory issues.⁹

BIOLOGICAL CONTAMINANTS

Often linked to building quality, infiltration of air through cracks in the building façade (exterior) can cause damp, leading to mould and fungi growth within walls. The mould and fungi release airborne microbial pollution within indoor air.¹⁰ Research has shown that asthma risk increases by up to 40% when occupants live in homes with mould.¹¹

OUTDOOR AIR

Infiltration from outdoors has also been identified as a significant health risk for people within buildings, with studies showing that 65% of exposure to outdoor air pollution occurs indoors.¹²

AMBIENT AIR POLLUTION

MANUFACTURING FOR BUILDINGS

Manufacturing of building materials is a major source of air pollution, notably the production of bricks. 11% of carbon emissions are attributed to the global building construction industry.¹³ Polluting brick kilns contribute up to 20% of global black carbon emissions. Emissions from production are further increased by transportation to global markets.¹⁴

BUILDING CONSTRUCTION

The release of toxic dusts from construction sites, which may originate from silica or hardwood, are recognised as having carcinogenic properties, creating localised extreme health hazards to construction workers and people living nearby.¹⁵

OPERATIONAL BUILDINGS

28% of global energy-related carbon emissions are attributed to operational buildings, predominantly from energy used for heating, cooling and lighting.¹⁶ Fine particles (PM2.5) are emitted from the combustion of fuels to power our buildings.¹⁷ In the developing world, the use of traditional cookstoves, open fires or kerosene lamps for heating, cooking and lighting within homes is responsible for up to 58% of black carbon emissions worldwide.¹⁸

1.2 Maintain water quality at appropriate target to minimise health risks

Access to clean and safe drinking water and sanitation facilities is a fundamental right within our buildings, for all people worldwide.

SANITATION

Lack of access to sanitation is a leading risk factor for infectious disease. One-third of the world's population, 2.4 billion people, has no access to improved sanitation. 40% of the world does not have access to basic handwashing facilities.¹⁹

WATER QUALITY

Health risks may arise from consumption of water contaminated with infectious agents and toxic chemicals.²⁰ Contaminated drinking water is estimated to cause 485,000 deaths each year, primarily in the least developed countries.²¹

Even in developed nations, research highlights that water quality may pose health risks: in 2015, over 18 million Americans were exposed to water with lead violations.²² Micro plastics are an additional source of contamination.²³

1.3 Support and enhance mental and social health through considered building design

The global burden of mental health illnesses is significant and can be substantially impacted by built environment factors such as comfort factors, daylight, access to nature and community interaction. It is estimated that the life expectancy among those with mental illness is over 10 years shorter compared to those without mental illnesses.²⁴

1.4 Reduce the transmission of infectious disease within the built environment

The COVID-19 (coronavirus) pandemic has awakened the industry to the risk of transmission in the indoor environment from coronavirus, other infectious diseases and possible future pandemics. As of October 2020, over 1 million people have died from the COVID-19 pandemic worldwide.²⁵

Ventilation and filtration strategies can play a role in reducing disease transmission. Increasing the amount of air from outside and the rate of air exchange can dilute virus particles indoors. However, high air flow could also stir up settled particles and return to the air.²⁶

Research demonstrates the importance of lessening exposure to air pollution, particularly of particulate matter (PM). The Harvard School of Public Health has identified that a small increase in long-term exposure to PM2.5 leads to a 8% higher COVID-19 death rate.²⁷ Clean surfaces, appliances and working conditions may also play a role in limiting disease transmission within indoor environments.

PRIORITISE COMFORT FOR BUILDING USERS

2.1 Ensure consistent thermal comfort to enhance wellbeing with awareness of varying occupant needs

Thermal comfort is a primary indicator of human wellbeing. Thermal comfort can affect people's mood, performance and productivity, with research showing a correlation between perceived comfort and productivity.²⁸ This is particularly true of overheating, which can create the need for mechanical cooling interventions. This can lead to an increase in emissions from energy expenditure and refrigerant technologies. Humidity control also affects comfort and the spread of disease.

Population susceptibility to climate change is increasing, heightening exposure to both dangerous heat and cold temperature events across the world. In 2015, 175 million additional people were exposed to heat waves compared to average years,²⁹ causing heat related illness, cardiovascular disease and other chronic diseases. Conversely, continual exposure to cold temperatures increases the risks of cardiovascular, respiratory and rheumatoid diseases and may also negatively impact mental health.

Globally, extreme temperature events are increasing in frequency, duration, and magnitude and this trend is predicted to continue.³⁰

2.2 Maintain exemplary lighting to enhance wellbeing, prioritising natural and energy-efficient solutions

Natural light regulates our body's circadian rhythms, impacting sleep quality and therefore health overall.

Within a building, insufficient light exposure or exposure to light at night can disrupt the occupants' circadian rhythms, making it more difficult to maintain healthy sleep patterns. Inadequate lighting can create eye strain and cause headaches. Studies have shown that exposure to natural light during the working day leads to 46 minutes more of sleep each night.³¹ Conversely, workers in windowless environments report poorer sleep quality,³² which has consequential negative effects on worker productivity.

Direct sunlight can provide beneficial solar gain, reducing heating requirements in temperate climates. Allowing daylight into buildings can help prevent damp, mould and bacterial growth, lowering the risk of asthma and other respiratory diseases.³³

2.3 Maintain acoustic comfort within appropriate parameters

Prolonged exposure to noise can lead to serious health effects, including cardiovascular diseases, elevated blood pressure, cognitive impairment and mental health problems as well as sleep disturbances.³⁴ The WHO has reported that noise is the second largest environmental cause of health problems, following air quality.³⁵

Environmental noise causes approximately 16,600 cases of premature death in Europe each year, with almost 32 million adults estimated to suffer annoyance and over 13 million adults estimated to suffer sleep disturbance.³⁶ Exposure to air traffic noise has also been linked to a negative impact on educational performance in students.³⁷

2.4 Consider wider comfort indicators to avoid occupant wellbeing risk

Wider comfort indicators experienced within and around buildings include olfactory, ergonomic and visual comfort. Olfactory discomfort from unpleasant odours can trigger eye, nose and throat irritation, nausea, and headaches. Repetitive tasks and visual discomfort can strain muscles and ligaments, leading to decreased occupant health and wellbeing.

Wider comfort indicators can also extend to consider a 'flourish factor', which includes psychological impacts of interior design and aesthetics, colour, character, layout, functionality, space, access to views, nature and greenery.³⁸

2.5 Ensure inclusive design of the built environment

Recent publications estimate that 15% of people worldwide have a disability,³⁹ of whom 2-4% experience significant difficulties in functioning. Blindness and vision impairment are particularly prevalent, estimated to affect at least 2.2 billion people around the world.⁴⁰ This proportion of disability in the global population is increasing, due partially to improvements in measurement capabilities to assess disabilities, but also the ageing global population. The global population aged 60 years or over has doubled since 1980.⁴¹

Design for inclusivity requires planning for access and use by as many people as possible, considering age, gender and disability.⁴² An inclusive environment must apply to buildings, their surrounding open spaces, and local urban infrastructure and services.

DESIGN FOR HARMONY BETWEEN THE NATURAL AND BUILT ENVIRONMENTS

3.1 Ensure occupant access to nature within building, providing biophilic benefits

By 2050, the percentage of the global population living in urban areas is set to increase to close to 70%.⁴³ With advancing urbanisation, the human species is becoming increasingly distanced from nature. The incorporation of nature into the indoor environment is referred to as biophilic design, connecting people to nature both inside and outside buildings. Interaction with nature in and around buildings enhances a sense of wellbeing by addressing our innate psychological need to be part of natural world. Biophilic design can reduce stress, enhance creativity and clarity of thought, improve our wellbeing and even progress healing.⁴⁴

Biophilic design aspires for buildings and cities to progress development in symbiosis with vegetation (nature-based solutions).

Studies of the benefits of access to nature demonstrate an 8% increase in office worker productivity, higher rates of learning and improved test results in education spaces, and less crime attributed to areas with access to nature.⁴⁵

3.2 Ensure occupant access to nature outdoors, encouraging biodiversity within site footprint and surroundings

There is significant evidence to demonstrate the positive impacts of green space and biodiversity on human health and wellbeing. Biodiversity contributes to the livability of our increasingly urbanised cities. The human benefits of urban green space include reduced morbidity and improved physical health outcomes, improved mental wellbeing, increased social cohesion and the provision of ecosystem services such as air cooling and air quality.⁴⁶

Access to good quality green space can facilitate healthier behaviours and more active lifestyles, associated with positive health outcomes, including improvements in mental health and wellbeing, increased longevity, lower body mass index (BMI) and obesity levels and higher levels of physical activity.⁴⁷

Access to green space is often impacted by socio-economic factors. People living in the most deprived areas are less likely to live near green spaces.⁴⁸ An inequitable distribution of parks and other green spaces could exacerbate health inequalities if people on lower incomes, who are already at greater risk of preventable diseases, have poorer access.⁴⁹

FACILITATE POSITIVE BEHAVIOUR AND HEALTH

4.1 Design to promote activity, indoors and outdoors, to encourage physical health of occupants

The built environment can influence people's activity levels and lifestyles, and consequently physical health. In 2016, 1.9 billion adults were overweight,⁵⁰ of whom approximately one third were obese. This equates to around 13% of the world's adult population.

Physical inactivity and sedentary behaviours are risk factors for non-communicable diseases such as cardiovascular diseases, diabetes, musculoskeletal disorders and some cancers.⁵¹ Physical inactivity is estimated to cause more than 5 million premature deaths annually across the globe, representing 9% of all deaths.⁵² Research has found that low levels of neighbourhood walkability were positively associated with more sedentary lifestyles.⁵³

4.2 Encourage beneficial lifestyle practices for occupants, including nutrition, hydration and social connectivity

NOURISHMENT

Nourishment is essential to good health. Evidence shows the importance of nourishment in preventing and controlling non-communicable diseases and preventable chronic diseases.⁵⁴ Changes in the production and distribution of food have meant highly processed and sugar rich foods are in greater

supply. Estimates suggest that globally, most people do not consume the recommended daily amount of fruits and vegetables, and this is leading to over 1.7 million deaths each year.⁵⁵

'Food Deserts' are regions that have less access to healthy food, broadly due to socio-economic factors such as income or location. People who live in food deserts are at higher risk of diet-related conditions, such as obesity, diabetes, and cardiovascular disease.⁵⁶

HYDRATION

Without water, humans can only survive for a few days.⁵⁷ Within the built environment our priority must be to maintain a safe and sustainable supply of clean water, as outlined in Principle 1.2, consumed in necessary quantities to maintain human health, and maximise wellbeing.

SOCIAL CONNECTIVITY

Our buildings and communities can be designed in a way that fosters social interaction.⁵⁸ The WHO has demonstrated the link between social interaction and health.⁵⁹

Social connection improves physical health and psychological well-being, whereas loneliness is associated with a 26% increase in the risk of premature mortality.⁶⁰ Studies have suggested that strong social connections lead to 50% higher likelihood of longevity, and people who feel more connected to others have lower rates of anxiety and depression.⁶¹

CREATE POSITIVE SOCIAL VALUE WITH BUILDINGS AND COMMUNITIES

5.1 Protect human rights relating to health through the building and construction lifecycle

The Universal Declaration of Human Rights includes the following areas relating to the building lifecycle: worker rights and freedoms, including mitigation of risks of forced labour, safe working conditions and fair remuneration, land security, gender equality, right to adequate standard of living and to own a decent home, and participation in and duties to the cultural life of community.⁶²

Companies should undertake human rights due diligence measures to ensure their operations respect human rights and do not contribute to human rights abuses.⁶³

EMPLOYMENT RIGHTS AND QUALITY FOR SUPPLY CHAIN AND CONSTRUCTION WORKERS

There is a considerable variation of human rights practices and standards within the built environment industry. This includes those manufacturing raw materials, often in dangerous, exploitative, and highly polluting environments, and those working on construction sites. Within the building and construction industry, reports of lack of diversity in the workforce, and minimal representation of those from marginalised communities are common.⁶⁴ In many countries, a high proportion of construction workers are migrants, who are at heightened risk of exploitation.

RIGHTS AND QUALITY FOR BUILDING OCCUPANTS

Quality standards should be met for all building types, however the right to adequate housing is a particular social consideration with direct impact on occupant health and wellbeing. This right includes criteria such as security of tenure, affordability, habitability and accessibility, defined fully by UN Habitat.⁶⁵

5.2 Commit to protecting health and wellbeing of people in the construction industry

The construction industry employs approximately 7% of the global workforce and accounts for approximately 13% of global GDP.⁶⁶

Construction workers have severely heightened physical health risks. Exposure to hazardous substances, such as silica dust, can cause lung and other cancers, and respiratory and cardiovascular disease.⁶⁷

In the United Kingdom, construction has the largest burden of occupational cancer amongst the industrial sectors, accounting for over 40% of occupational cancer deaths and cancer registrations.⁶⁸ Construction workers are also at higher risk of mental health issues. In Australia, a construction worker commits suicide every second day.⁶⁹ Some 20% of all cases of ill health in the sector are due to work-related stress, depression and anxiety, and as a consequence, over 400,000 working days are lost each year.⁷⁰

Additionally, construction is an industry where working into later life can be challenging.⁷¹ A sustainable building and construction industry must be supportive of the ageing global population, creating safe and healthy work environments ensuring that practitioners are offered both professional security and personal safety.

5.3 Provide long term value to communities and improve local quality of life

Health and wellbeing in the built environment has for too long focused primarily on the occupants of a building. The built environment impacts stretch to those who live in the surrounding areas, and so must also be considered.

Benefits to the local economy and associated social impacts from operational buildings and construction may include a positive multiplier effect to local business, gentrification of communities, provision of employment and development of community facilities. However, negative social impact is often created or overlooked through development, and can include community segregation, loss of culture and even an increase in crime. During construction, retrofit or deconstruction phases, the physical issues created by development – such as air, noise, light pollution – must also be considered and mitigated.

SOCIAL VALUE, JUSTICE AND FAIRNESS

Inequality in the distribution of income and consequent quality of life affects countries of all levels of wealth and development. Communities and cities are where inequality in health, wellbeing and quality of life can be most apparent.

Larger urban populations will increase pressure on existing infrastructure systems including provision of adequate housing and services, access to resources, and societal, system and environmental resilience. In societies struggling with population pressures, the health, wellbeing and quality of life of marginalised communities or vulnerable groups must be recognised as a risk. The buildings and infrastructure of our cities can contribute to these problems or they can provide solutions.⁷²

SOCIAL RESILIENCE

Social equity and fairness must extend to ensuring that all people are equally resilient to challenges. The COVID-19 pandemic has highlighted the difficulties and disadvantaged outcomes the built environment can trigger or enhance. Some of the many examples worldwide include the disproportionate death tolls in informal housing settlements, such as favelas in Brazil,⁷³ the racial disparity in death tolls that are closely linked to social determinants of health⁷⁴, and limited access to healthcare facilities which is considered a contributory factor to heightened death tolls of indigenous people and other marginalised communities.⁷⁵

TAKE CLIMATE ACTION

6.1 Commit to net zero whole-life carbon emissions to contribute to climate change mitigation

Climate change is termed by the WHO as 'the greatest global health threat of the 21st century'.⁷⁶ Between 2030 and 2050, climate change is predicted to lead to approximately 250,000 additional deaths each year. The economic cost of these health impacts is estimated to be US \$2-4 billion per year by 2030.⁷⁷

With the building and construction sector responsible for 39% of global carbon emissions,⁷⁸ and the global building stock expected to double in size by mid-century,⁷⁹ addressing emissions across the lifecycle is urgent. The substantial increase in new buildings will see a dramatic rise in embodied carbon – the emissions associated with materials and construction processes throughout the whole lifecycle of a building or infrastructure.⁸⁰

Within occupied buildings, cooling is a growing issue that can lead to competing priorities between environment and human health, wellbeing and development. Cooling technologies, such as refrigeration and air conditioning, emit large quantities of hydrofluorocarbons (HFCs), a potent collection of greenhouse gases with 1,000 to 9,000 times greater capacity to warm the atmosphere than carbon dioxide.⁸¹ Cooling is now understood to be the cause of around 10% of global warming and growing rapidly.⁸²

The volume of HFCs in the atmosphere is increasing at a rate of 8-15% per year due to population growth and urbanisation, and their use is likely to increase as our climate warms further due to climate change.⁸³ 2.3 billion people across the world are expected to soon purchase an air conditioning unit or fridge, and it is expected that choices will be limited to inefficient and highly emitting appliances in less developed nations.⁸⁴

6.2 Encourage resilience strategies in preparation for climate change and extreme weather events

Every year natural disasters kill around 90,000 people and affect close to 160 million people worldwide,⁸⁵ often in the most vulnerable nations.⁸⁶ Natural disasters displace more people than conflict and violence.⁸⁷ Data shows that flooding caused most disasters between 1994 and 2013, accounting for 43% of all recorded events and affecting nearly 2.5 billion people.⁸⁸ Today, more people are at risk than 50 years ago; construction in flood plains, earthquake zones and other high-risk areas has increased the likelihood that a routine natural hazard will become a major catastrophe.

Additionally, climate change is understood to lead to increased frequency and severity of extreme weather events.⁸⁹ Conscious design of the built environment with climate resilience strategies and adaptation to

6.3 Use water efficiently, working to avoid local shortage crises

Nearly 1.8 billion people, or a quarter of the world's population, are veering towards a water crisis in the coming years, with the majority of the seventeen nations most affected located in the Middle East and North Africa.⁹⁰ The ongoing rise in global population will continue to place pressure on this finite resource.

Water is used at all stages of a building's lifecycle, from the extraction of raw materials, in manufacturing, during construction, in the operational and in the demolition/retrofit/reconstruction process. The highest use of water is typically during the in-use phase of buildings.⁹¹

Water in developed countries is pumped, purified, treated, and heated before it reaches building occupants. This process greatly increases the amount of energy used. Domestic hot water usage alone is responsible for 35 million tonnes of greenhouse gas emissions in the UK, representing around 5% of national energy use.⁹² Wasting water wastes the energy that is used to prepare it.

6.4 Ensure safe, healthy, and circular use of materials across the building lifecycle

Modern life has brought hazardous chemicals into our homes and lives through everyday products such as clothing, electronics and food packaging, and can increase the risk of serious illness. Exposure to toxic or polluting materials is an environmental and public health concern across all stages of the built environment lifecycle, from the production of materials to buildings in occupation and beyond.

CIRCULAR MATERIAL USE

The concept of circular material use, and 'cradle to cradle' principles, is recognised globally as sustainability best practice for the built environment, considering both heavy materials utilised in construction and materials within building interiors.

The implementation of circular principles in five core industry areas worldwide could eliminate emissions on a scale equivalent to those generated by all transport globally.⁹³ Heavy industries (cement, steel, aluminium) represent three of the five core areas in

this research, and are substantial contributors to the embodied emissions of building and infrastructure projects, emphasising the major role the building and construction industry must play.

Materials within buildings should operate as part of a circular economy of material re-use. Materials should be 'low-emissive', meaning they mitigate risk of poor indoor environmental quality through the release of airborne pollutants, such as Volatile Organic Compounds. Circular material use calls for re-use and recycling of existing resources, however, hazardous chemicals that currently exist within the built environment must be extracted through retrofit and deconstruction work, allowing reuse of non-contaminated materials only.

NON-HAZARDOUS CHEMICALS

Man-made toxic chemicals are common ingredients in many everyday products,⁹⁴ and studies show serious long-term impacts on human health due to this continued exposure. Scientists have linked the fact that men in the Western world produce half as much sperm as they did 40 years ago to exposure to toxic chemicals,⁹⁵ and that exposure to toxic chemicals can increase the risk of breast cancer in women.⁹⁶ Other studies link exposure to toxic chemicals to attributable IQ loss and intellectual disability in children.⁹⁷ Many of the hazardous substances in widespread use are replaceable with safer alternatives. The building and construction industry can support the transition to safer chemicals being used and developed.

DESIGNING OUT WASTE

The disposal and treatment of waste is a growing burden and increasingly difficult for cities to tackle. From 2000-2012, waste generated in cities doubled, and is expected to nearly double again to 2.2 billion tonnes by 2025⁹⁸ because of increasing population, urbanisation, and changing consumption patterns. The waste problem is most severe in urbanising regions and developing countries, where collection and disposal services do not exist or cannot cope with increasing levels of waste. Consequently, waste is either disposed in open and uncontrolled dumpsites, or openly burned. This represents the third largest man-made source of methane.⁹⁹ Unmanaged waste may also become a breeding ground for microbes and toxins that contaminate the air, soil, and water.¹⁰⁰

Using the Framework

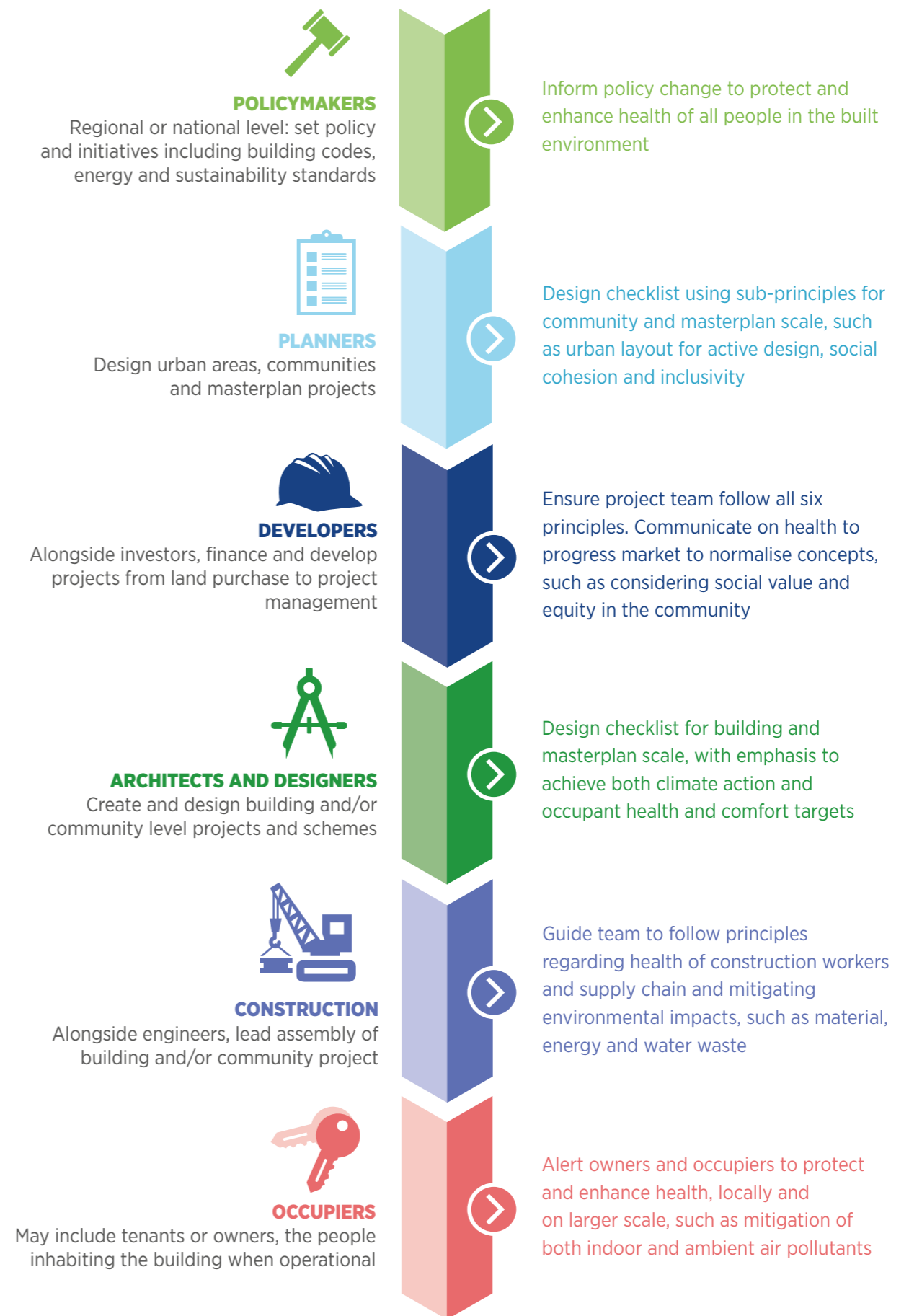
The Health & Wellbeing Framework can be used in a diverse range of ways, intended for use by all actors across the building and construction lifecycle.

An educational resource: The full digital version of the Framework (available at worldgbc.org/health-framework) offers detailed information around each of the six principles, and sub-principles within. A live resource library has been created through consultation with the WorldGBC global network, including academic articles and building rating tools, and is regularly updated to ensure presentation of most relevant information.

A design stage checklist: The sub-principles of the Framework can be utilised as a checklist for design teams at early stages of project planning and throughout implementation to ensure that human health and wellbeing considerations are being addressed for building or community scale projects.

A stepping stone to certification: The Framework can act as a stepping stone to comprehensive national or international building certifications, which offer third-party validation of implementation of health and wellbeing strategies against standardised benchmarks. A global list of rating tools is available at: worldgbc.org/rating-tools.

An advocacy tool: Building and community level strategies can be analysed by city or regional scale policymakers to map alignment against building, construction and urban planning policies, design codes and standards, and highlight potential gaps in human health and welfare protection.



Next steps for health and wellbeing in the built environment

The World Green Building Council network is proud to champion ambitious leadership around the expanding scope of health and wellbeing in the built environment. However, this work is far from over.

The next steps for health and wellbeing from the WorldGBC global network and industry include:

Socialisation of the expanded scope and targets for health and wellbeing

In this decade of climate emergency, many of the environmental priorities need to be implemented with urgency at policy and project level, with low-carbon design and operation standardised across the industry. Similarly, from a socio-economic perspective, concepts including social equity and justice, community engagement, transforming behaviours and human lifestyle and increasing access to nature need to be normalised, and supported by industry education and tools to facilitate practical implementation.

Measuring progress for a healthy, sustainable built environment

We need consistent metrics for health and wellbeing to track progress on a global level, but also account for the diverse range of determinants of health that can impact gross data, such as life expectancy or death rates. Within the digital version of the Framework, a range of benchmarks and indicators are presented as an interim step to equip project, city or national level measurements and tracking of health and wellbeing parameters.

Localising health

Human health and wellbeing is a highly personal situation, but research on determinants of health emphasises the role of our buildings and community surroundings, including culture, economic development and environmental factors that can be shared on regional or national scales. We recognise the Framework principles will have different weights of importance across different geographies. Therefore, the role of the WorldGBC network, operating in around 70 countries through the Green Building Councils and their members, is to demonstrate leadership around identifying and pursuing national and regional priorities for health and wellbeing in the built environment, building on the available resources and progress on the topic led by GBCs to date.

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Framework Gold Supporters:



Framework Silver Supporters:



Join Us

WorldGBC invites everyone to join us in utilising the Health & Wellbeing Framework as a tool to catalyse our future to a sustainable built environment that protects and enhances the health of people and planet. Contact your local GBC or WorldGBC to put into practice the principles set out in this framework.

For the full version of the WorldGBC Health & Wellbeing Framework, please visit the WorldGBC website at: worldgbc.org/health-framework.



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