Global Climate Action
United Nations Climate Change

Marrakech Partnership

CLIMATE ACTION PATHWAY

HUMAN SETTLEMENTS

Action Table

2021

ACTION TABLE STRUCTURE AND APPROACH

The Human Settlements Action Table outlines a set of necessary stakeholder actions to be taken in 2021, 2025, 2030 and 2040 to accelerate the transition to net-zero carbon, healthy and resilient human settlements. It focuses on two key aspects of human settlements: the **built environment** and **waste and consumption** within human settlements. It addresses actions for all stakeholders to take, since everyone must play their part, if we are to keep global warming to within 1.5^{o}C.

See the Marrakech Partnership Climate Action Pathway Human Settlements Executive Summary for an overview of these two aspects of human settlements, including a 2050 vision statement, system transformation summaries, key milestones for the built environment, and built environment progress and facts and figures.

For the **built environment**, the stakeholder actions are categorized into two impact areas: **"Whole-life carbon mitigation"** and **"Adaptation and resilience"**. The "Whole-life carbon mitigation" impact area (impact area 1) addresses the emissions released at all life cycle stages (from product manufacturing, construction and use, to end of life, reuse and recycling) of buildings and infrastructure projects, new and existing. Taking a whole-life decarbonization approach, rather than focusing on operational and embodied emissions separately, is important to ensure that total project carbon emissions are minimized, now and in the future. The "Adaptation and resilience" impact area (impact area 2) includes actions that stakeholders can take to make the communities and buildings we live in, and the infrastructure we use, whether new or existing, resilient to future climate shocks. Identifying vulnerability, adapting to changes in climate and future proofing of buildings and infrastructure are themes that are explored in this impact area. The proposed built environment actions link strongly to the Energy, Industry, Transport, Land Use, Finance, Water and Resilience Marrakech Partnership pathways, as built environment decarbonization and resilience are intrinsically connected to and reliant upon parallel transformation in these other sectors.

For **waste and consumption** in human settlements, the stakeholder actions are categorized into three impact areas: "**Zero-waste cities**", "**1.5 ºC living**" and "**Social equity**". The "Zero-waste cities" impact area (impact area 3) actions set out steps needed to achieve zero discharges to land, water or air across all activities in human settlements through the implementation of five circular economy strategies: recover, reduce, reuse, rethink and regenerate. "1.5 ºC living" (impact area 4) addresses actions required to reduce the GHG emissions intensity of citizens' lifestyles to achieve a net-zero world and limit global warming to 1.5 ºC through changes to everyday practices. "Social equity" (impact area 5) includes actions that tackle access to low-carbon services and infrastructure, increase participation in developing and owning decarbonization and resilience solutions, and provide opportunity in the form of education and employment. The waste and consumption actions have strong links with all other Marrakech Partnership pathways, as they cover themes that cut across sectors within human settlements.

This Action Table document is designed to have global applicability, but as the relevance and urgency of some actions may vary by geography and organization type, it should also be used as a framework for the development of tailored regional, national, city, district and organization pathways[1].

Cross-cutting lever: localizing climate financing

Local climate action is a theme that cuts across all Marrakech Partnership pathways, as changing local patterns of production and consumption is essential in accelerating towards net zero emissions and resilience in all sectors and in all parts of the world. This can include revalorizing traditional lifestyle and settlement patterns developed over centuries of slow co-evolution of human communities and their environment. Although the inception, planning and delivery of local climate action is led by local and regional governments (LRGs) in collaboration with local stakeholders, national governments and financial institutions have a key role in supporting LRGs' commitments and action.

Key-actions national governments and financial institutions should take, as prerequisites for local climate action, are:

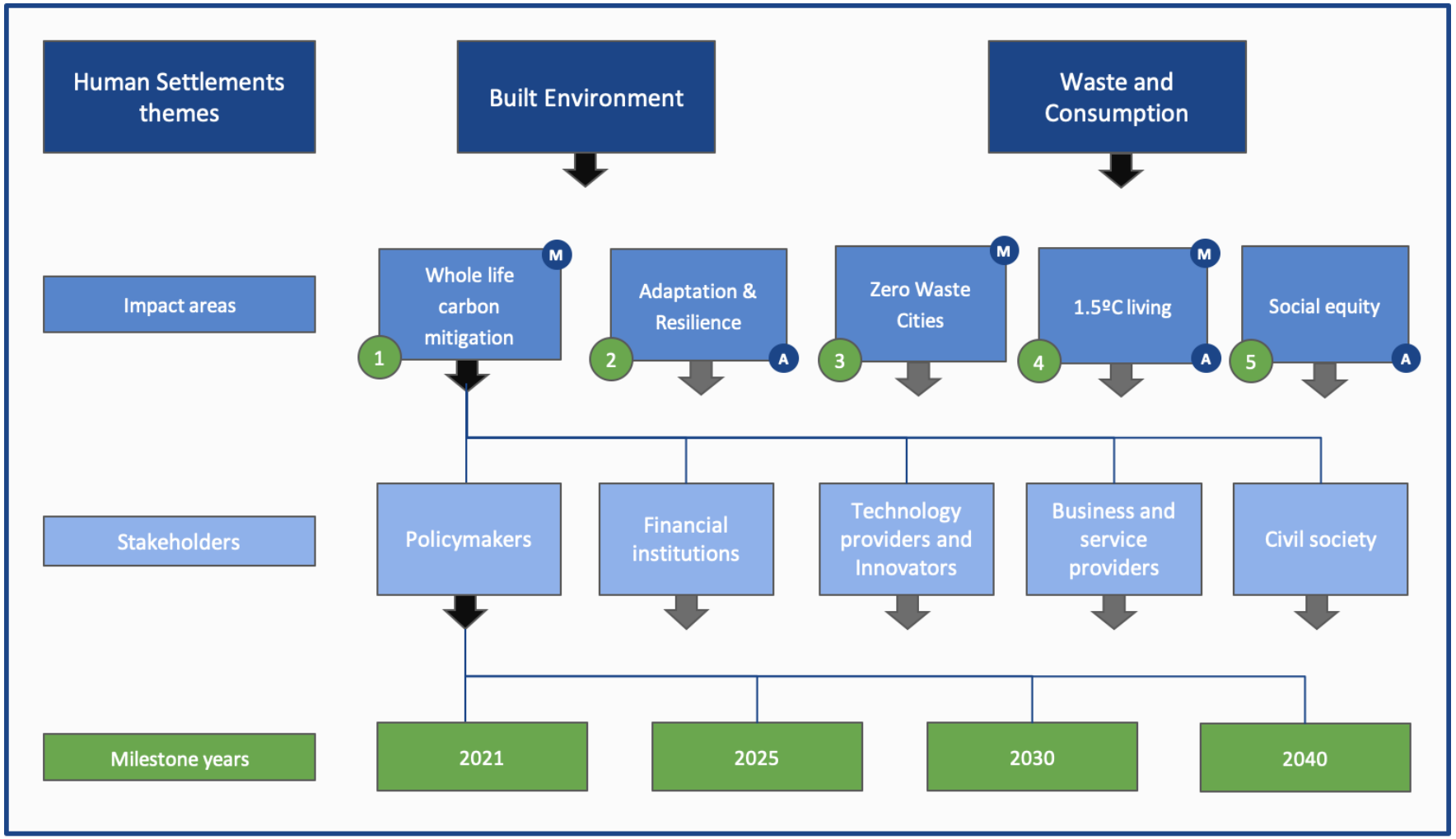
1. Implementing vertical integration of climate policies, based on structured dialogues with LRGs. For example, integrating LRG actions in Nationally Determined Contributions (NDCs) and National Action Plans; creating dedicated institutional fora for where public and private institutions would gather to enhance local climate action.
2. Fostering institutional frameworks and financial and fiscal incentives for climate action at all levels (local, regional and national). For example, creating an enabling environment for low-carbon procurement processes, implementing effective fiscal decentralization, and encouraging local innovation on new financial models and instruments.
3. Developing knowledge and capabilities in financial engineering and providing technical assistance and earmarked resources to support LRGs in expert project preparation. For example, creating domestic hubs of financial expertise ("FinHubs") for local climate action financing, guarantees and credit enhancement mechanisms or institutions for local projects.
4. Strengthening already existing domestic financial intermediaries, such as subnational development banks, to act as domestic entry points for channelling subnational climate financing to local and regional projects.

[1] For a deeper analysis of the sector, the GlobalABC Regional Roadmaps for Buildings and Construction bring a set of policy and technology targets and timelines that can support regions, countries and cities in developing their own tailored strategy for decarbonizing the built environment.

These actions[2] can be embedded in an overarching call for a "Global Action Framework for Localizing Climate Finance" that would inspire and guide national governments and other public and private partners in supporting LRGs in taking local climate action. These recommendations will be included in the Marrakech Partnership Finance Pathway[3] when released.

[2] See the references in the "further references" section below the action tables of each impact area for more information on these actions.
[3] The Marrakech Partnership Finance Pathway will be launched in 2021.

HUMAN SETTLEMENTS STRUCTURE



M Mitigation component

A Adaptation & Resilience component

BUILT ENVIRONMENT CHANGE LEVERS

Action and collaboration are needed immediately from all stakeholders to achieve the paradigm shift to a net-zero, efficient and resilient built environment. If action is not taken today, we risk locking emissions and vulnerability into our buildings and infrastructure that will become increasingly costly to mitigate in the future.

To decarbonize the built environment, whole-life carbon emissions (operational and embodied) must be assessed and tracked on all new and existing developments to determine how best to minimize emissions while ensuring adaptation and resilience for the future. System decarbonization requires demanding less material, minimizing energy use, and implementing low-carbon and renewable heating, cooling, material and construction technologies at scale, while promoting the decarbonization of the energy, transportation, and material manufacturing sectors (e.g. steel and cement) in parallel. These sectors have their own themes and respective pathways in the Marrakech Partnership structure. The interventions needed to reach net zero will vary from project to project and can range from using ultra-low-impact refrigerants for cooling (see cooling pathway), implementing passive design measures, installing electric building energy systems powered by renewables, and reusing existing materials, all considering a whole life cycle carbon perspective.

The built environment has great inertia due to its complexity and fragmented value chain. In addition to the need for individual stakeholders implementing the actions presented in this document, radical collaboration across all stakeholders at the project and sector scales is needed to find solutions that will transform it. The supply chain must align around zero-carbon solutions and work in collaboration to deliver them. Many of these solutions already exist, but finance and policy intervention are needed to support and accelerate their implementation.

Policymakers

In most countries, policies that regulate or drive net-zero built environment are severely lacking. More than two thirds of the buildings constructed between now and 2050 are expected to be built in countries that do not have any building energy codes. All countries need to include specific measures in their Nationally Determined Contributions (NDCs), introduce or strengthen building codes, and implement policies that enable the creation of appropriate financial instruments and incentives, while upskilling the workforce, to drive down emissions and embed resilience in buildings and infrastructure. Countries also need to commit to international political processes that enhance climate action and impact, such as the Kigali Amendment to the Kyoto Protocol. By sending strong policy signals, governments level the playing field and accelerate decarbonization in this sector. Progressive emission targets and regulations must be based on real operational performance and construction emissions from assets, and deep energy retrofit must be increased and incentivized. Countries, cities and regions need to undertake comprehensive climate risk and vulnerability mapping to support resilience strategies which ensure the adaptation of existing built assets and the integration of resilience measures into all new construction. Local

governments must also implement planning policy that prioritizes reuse and refurbishment of existing assets, avoids demolition, and ensures that any new development provides high social value, embeds resilience and minimizes whole-life carbon as standard practice.

Financial institutions

In finance, investors are beginning to realize the value of low-carbon and resilient assets as they are less risky. However, this growing interest has not yet filtered into the project delivery chain. Investors must advocate for government action through policy and regulation, which are needed to make the transition to net-zero investible. In the meantime, financial institutions must set investment criteria based on whole-life carbon emissions and resilience, invest in low-carbon technologies to bring them to scale, and create financial mechanisms that stimulate demand for energy-efficient retrofit and net-zero carbon buildings. Maximizing the value of existing assets, materials, and products in the built environment through reuse and refurbishment, as part of a circular economy, presents great emission reduction and investment potential that the financial market should capitalize on. In addition, financing institutions and investors shall better integrate local climate action projects as a key and innovative asset class, and help bringing this market niche to its full potential. Specific financial engineering and instruments are still required to better address local climate projects' needs and size in terms of financial design, de-risking and creditworthiness: their expertise in bringing to life climate deals as a cutting-edge asset class in the past would definitely be a game changer in that field.

Technology providers and innovators

Technology providers and innovators have a crucial role to play in enabling the transformation of the built environment. The products, systems, business models and techniques they develop and bring to scale, whether a new application of an existing technology or something entirely new, will impact the effectiveness of the actions taken by all other stakeholders. Digital solutions will be a key part of driving decarbonization through data collection and sharing, enabling other stakeholders to minimize emissions and embed resilience, for example by enabling the reporting of as-built embodied carbon from construction projects and real-time tracking and automated optimization of operational building performance. They must work closely with all stakeholders in the project value chain to ensure that their innovations and technologies are appropriate to the local context (and not necessarily high-tech), implementable, and address any barriers to decarbonization and embedding resilience.

Business and service providers

Businesses have a growing desire and awareness of the need to shift to a net-zero built environment. Business-led initiatives to push this agenda forward are growing in size and number, yet many businesses are risk-averse, which can prevent them from leading change and innovating. Support from finance and policy is needed to mitigate financial risk and provide incentives to accelerate the transformation that businesses can deliver. In the meantime, businesses must demand zero-carbon buildings, invest in low-carbon technologies, influence collaborators, advocate for policy, upskill their workforce in low-carbon design and construction, assess, minimize and track emissions, and embrace circular economy principles on all projects. As an immediate step, businesses must commit to achieving net zero across their activities, supported by clear short, medium, and long-term targets and transparent progress-reporting; as well as advocate and collaborate across the supply chain, especially the harder sectors to abate, to do the same.

Civil society

In civil society, all individuals must be aware of the contribution of building emissions across the whole lifecycle of the building, both on the operational side and their building carbon footprint, what behaviours they can change to reduce this, and what the associated financial and well-being co-benefits are if such behaviour changes are adopted at scale. On the embodied emissions side, they must be aware that low-carbon, as well as locally sourced materials can significantly reduce the emissions related to a building. These changes in behaviour and mindset need to be perceived as desirable to penetrate all sectors that service society, such as healthcare and education, and could be achieved by tracking and displaying live operational carbon emissions and cost performance (e.g. using smart meters). Minimizing demand on energy and water in buildings must become the new daily normal, and those who can, must demand electrification and low-carbon, deep energy-efficiency retrofit of their existing buildings. The media and communities can help inform and shift citizens' mindset by highlighting the adverse impacts of not making these habitual changes.

For the Waste and Consumption Change Levers, refer to page 58.

BUILT ENVIRONMENT SYSTEM MAP

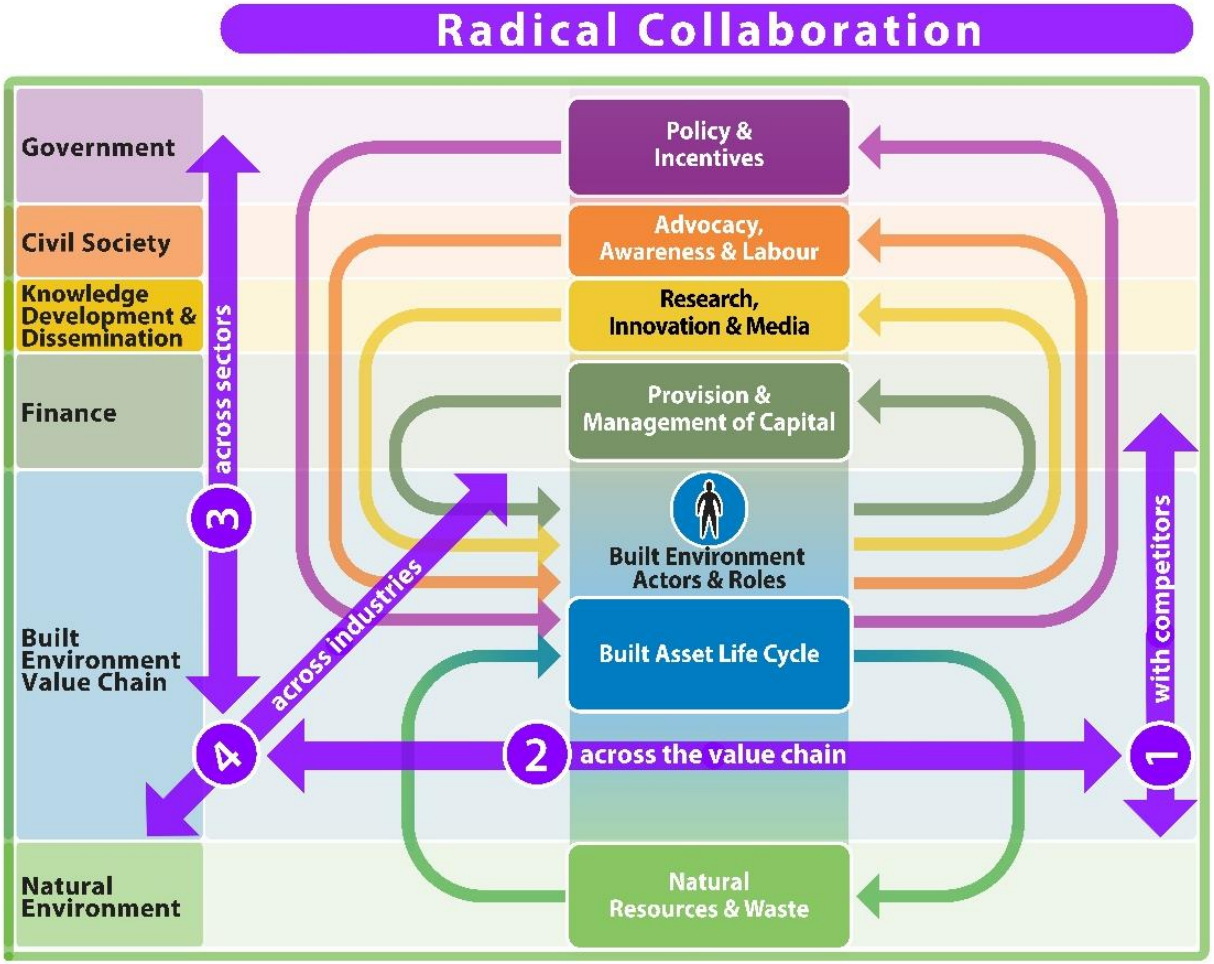
Currently the buildings and construction sector accounts for almost 40 per cent of global energy and process-related carbon emissions.[4] According to the Intergovernmental Panel on Climate Change (IPCC) special report on *Global Warming of 1.5°C*, restricting climate change to 1.5°C would need "rapid and far-reaching" changes around energy use, industry and buildings design, as well as the wider planning of cities and infrastructure. The built environment must also be resilient, as by 2050, over 970 cities could be subjected to extreme heat, 500 cities could suffer from lack of water availability, and over 570 cities could be impacted by sea-level rise.[5] In the face of this, around 40 per cent of buildings[6] and 75 per cent of infrastructure[7] that are predicted to exist in 2050 have yet to be built, and the built assets that already exist require retrofit to bring them to net-zero standards. System transformation is needed to decarbonize and make the built environment resilient to avoid these effects.

Built environment actors are galvanizing around the following overarching decarbonization objectives:

- By **2030**, the built environment should halve its emissions, whereby 100 per cent of new buildings must be net-zero carbon in operation, with widespread energy efficiency retrofit of existing assets well underway, and embodied carbon must be reduced by at least 40 per cent, with leading projects achieving at least 50 per cent reductions in embodied carbon.
- By **2050,** at the latest, all new and existing assets must be net zero across the whole life cycle, including operational and embodied emissions.

The open-source Race to Zero Built Environment Systems Map, elements of which can be seen below, shows the key stakeholder groups in the built environment, including policymakers, businesses, investors, innovators and citizens, and how they influence each other. The map enables the exploration and visualization of individual and collective roles and goals in the transition to a net zero built environment and so creates a platform for radical collaboration. The stakeholder actions required to meet the overarching objectives above are included in the action tables in impact areas 1 and 2 in the following section.

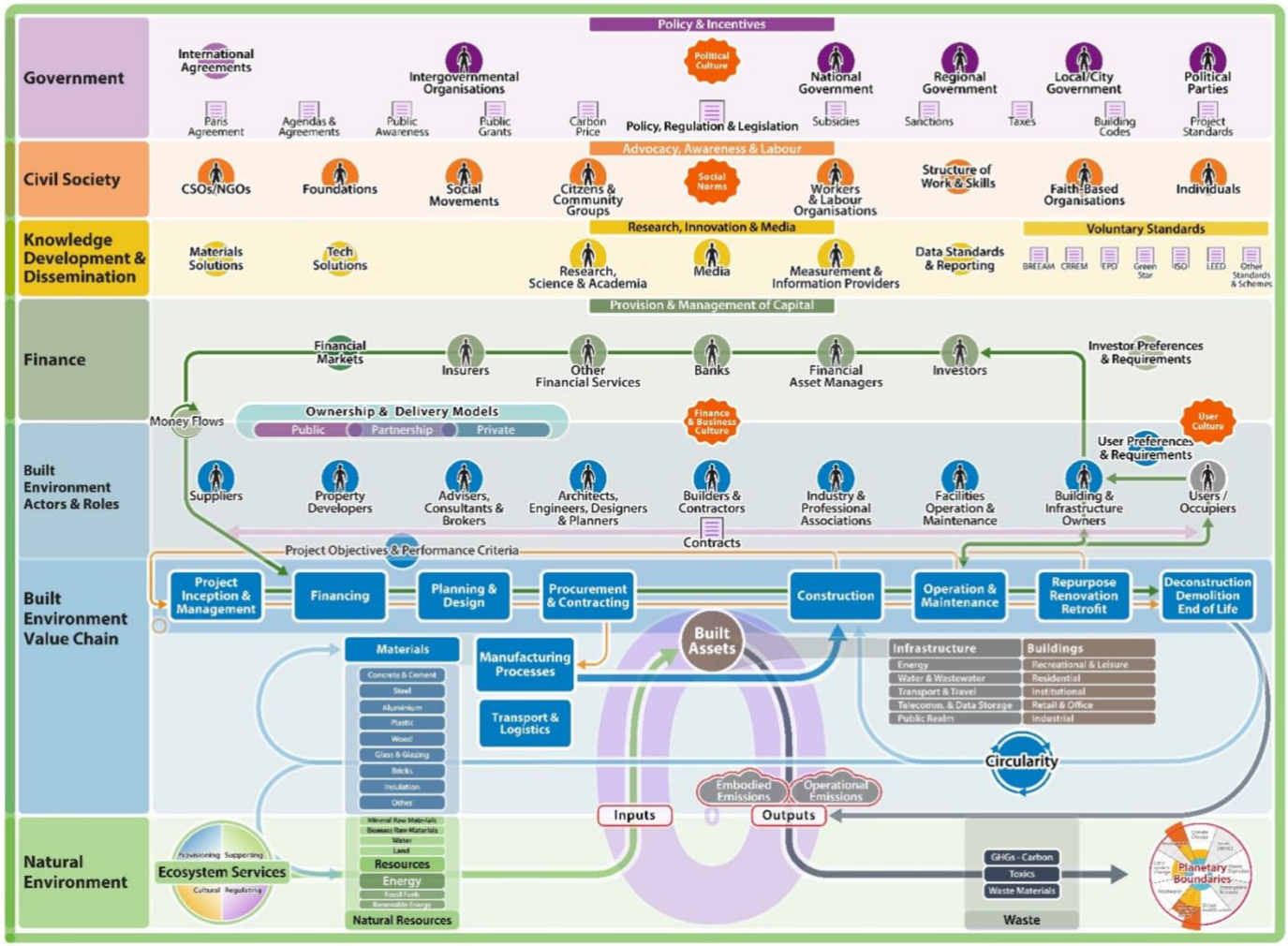
[4] Global Alliance for Buildings and Construction (GlobalABC). 2020. Global Status Report for Buildings and Construction
[5] C40 Cities. 2018. The Future We Don't Want
[6] Carbon Trust. 2009. Building the future, today
7 Global Infrastructure Basel. 2014. 4th Summit Report



Source: [Race to Zero Built Environment Systems Map]

BUILT ENVIRONMENT SYSTEM MAP

RACE TO ZERO BREAKTHROUGHS BUILT ENVIRONMENT



Source: [Race to Zero Built Environment Systems Map]

SUMMARY OF ACTIONS BY STAKEHOLDER GROUP				
Policymakers (national, subnational, local levels)	**Financial Institutions**	**Technology Providers and Innovators**	**Business and Service Providers**	**Civil society**
• Include specific measures to address the emissions from the Built Environment in NDCs • Establish roadmaps for a net zero built environment and develop supporting policies and targets, in coordination with key stakeholders across the value-chain • Develop and implement mandatory building codes that reduce both operational and embodied emissions • Mandate life cycle assessment (LCA) on during design and construction to minimise whole life carbon emissions of projects • Collect as-built embodied carbon emissions data and monitor operational carbon emissions to inform development of performance benchmarks • Drive widespread deep energy retrofits aligned to net zero carbon standards • Use urban planning to minimise resource (materials and energy) use whilst meeting the needs and improving health and wellbeing of communities	• Institutional investors commit to transition their investment portfolios to net zero by 2050 at the latest • Institutional investors set net zero targets across whole life cycle for their real assets portfolios and disclose on progress • Institutional investors increase investment in climate solutions to support meeting net zero carbon targets • Channel and incentivise investment into energy efficient new buildings and retrofits • Governments and International Financial Institutions support the transition to net zero	• Develop and widespread use of digital solutions to accurately measure and automatically optimise built asset operational performance in real time; and measure and freely share as-built embodied carbon emissions over the asset life cycle • Develop and widespread use of low carbon construction processes and materials Develop energy efficient and clean energy solutions for the built environment • Enabling low carbon operation and maintenance of built assets	• Businesses across the built environment value chain commit to net zero and decarbonise assets under their control • Corporate occupiers decarbonise the buildings they occupy collaborating with building owners • Developers, architects, engineers, contractors and asset managers/owners assess, minimise and report project emissions through design, construction, and use, prioritising emissions released before 2050 • All businesses across the value chain collaborate to develop and use new viable, low carbon solutions for buildings and infrastructure • Developers, architects, engineers, and contractors demand better environmental practice and lower carbon technologies and innovations from the supply chain • Developers, architects, engineers, and contractors reduce water and energy use in households and buildings	• Citizens change behaviour to minimise operational emissions from domestic and non-domestic buildings

• Implement water and energy efficiency in households and buildings Implement policy to decarbonise energy supply • Implement policy to ratchet the energy performance standards of appliances Implement policy and use procurement power to drive demand for low embodied carbon / GWP and products and materials that fit into the circular economy • Implement policy to drive the adoption of circular economy principles in the built environment • Governments lead by example by decarbonising municipal buildings and public projects across the life cycle			• Develop skills to enable the transition to a net zero built environment	

WASTE AND CONSUMPTION CHANGE LEVERS

The following three impact areas are suggested for shifting waste and consumption patterns: zero-waste cities; 1.5 °C living; and social equity.

Zero-waste cities

Cities that conserve all resources by means of responsible production, consumption, reuse and recovery of products, packaging, and materials without burning or discharges to land, water or air that threaten the environment or human health can be called zero-waste cities. There are a number of different critical moments where a zero-waste approach could comprehensively reduce the amount of GHG emissions being emitted and therefore reduce the volume of emissions that are the largest drivers of climate change worldwide. These critical stages include:

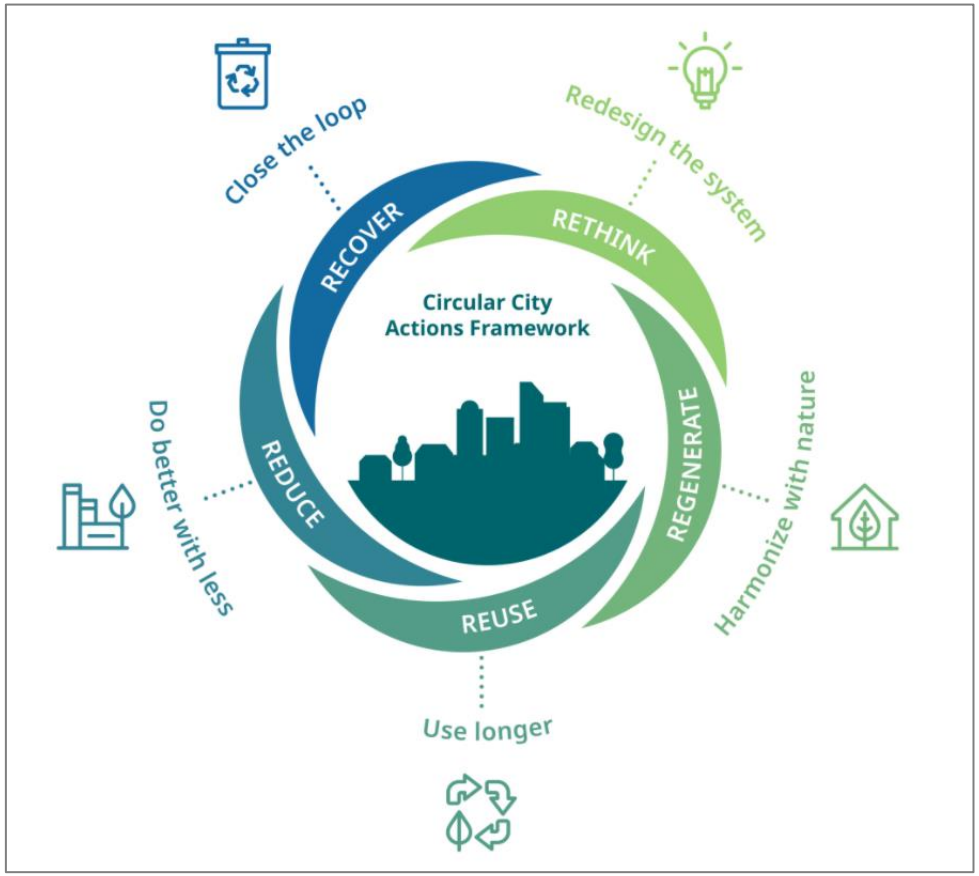
1. Extract – The stage when natural resources are extracted from the planet, for example drilling for oil or gas, the production and manufacturing of crops in agriculture, sourcing timber for construction or the mining of minerals.
2. Process – Once extracted and sourced, these raw materials typically then undergo industrial processing so that they can be successfully adapted into modern commodities, such as producing metals from ores, plastic from oil, and cement from limestone.
3. Manufacture – Once these materials have been refined and processed, they can then be used explicitly for the production, manufacturing and assembly of everyday products that we use in modern society, ranging from large-scale construction of roads and houses to the production of fashion garments and food packaging.
4. Distribute – These finished products can in turn be used to provide services and access to products that satisfy the needs of modern society, such as communication services, retail, transport and many more needs which are embedded within the world we live in today.
5. Use – Products should be designed to be circular, that is, following design principles that encourage durability, repairability, reusability and recyclability. Further, harmful effects on climate and environment in their use phase should be considered. This means that GHG emissions caused by products during use should be minimized and eventually eliminated by increasing energy efficiency and the use of clean energy. Escape of chemical and synthetic pollutants into the environment during the product use phase should be avoided by using ‘safe by design’ principles in product design.
6. Post-use stage – A zero-waste approach ensures that products and materials continue to retain their value and have a functional use within an economy that is circular. If products and materials cannot be reused, repaired or recycled, they will have a negative impact on our efforts to address and mitigate climate change, by dispersing into the environment as unrecoverable waste or adding to GHG emissions.

For cities and municipalities wishing to reduce their impact on the environment and climate by transitioning to a more circular economy, regenerate, rethink, reuse, reduce and recover strategies can form the basis of a climate change mitigation plan at the local level. These strategies are part of the ICLEI Circular City Actions Framework, which provides urban changemakers with five complementary strategies they can use to start working towards a more circular system. The framework is action-based to provide users with concrete strategic directions and showcase the desired outcomes of each strategy.

These five complementary strategies and their sub-strategies address the different roles that local and regional governments play, from public service delivery to cooperation with local stakeholders, asset management, urban planning and regulation. They can be applied to all production, consumption and waste management processes influenced by the city or its residents and are most effective when implemented in parallel. They can be used in stakeholder consultations to illustrate what the circular economy looks like at the local level and jointly identify relevant interventions.

The ICLEI Circular City Actions Framework consists of the following strategies:

1. **Rethink** - Redesign the system: Structurally support circular systems, rethink how value chains are organized and phase out linear incentives.
2. **Regenerate** - Harmonize with nature: Ensure all infrastructure and production-consumption systems positively contribute to local resource and nutrient cycles and respect ecosystems' regeneration rates.
3. **Reuse** - Use longer: Extend the use of existing resources, products and infrastructure.
4. **Reduce** - Do better with less: Design infrastructures, processes and products to minimize material and energy consumption and waste generation during production, use and end of life.
5. **Recover** - Close the loop: Enable the recovery of materials at their end of life and facilitate their reintroduction in production processes.



Source: ICLEI Circular Development Pathway

1.5° Living

It is a commonly accepted fact that changes in consumption patterns and dominant lifestyles are a critical and integral part of the solutions package to address climate change. Recent studies such as the Institute for Global Environmental Strategies 1.5-Degree Lifestyles report illustrate the scale of the sustainable living challenge: the need for reductions of over 80 per cent in GHGs by 2050 from today's intensity of lifestyles. This study proposes that we need to aim for per-capita lifestyle carbon footprint targets of 2.5 tonnes of carbon dioxide equivalent (tCO_2eq) by 2030, 1.4 tCO_2eq by 2040 and 0.7 tCO_2eq by 2050. A global phase-out and minimization of fossil fuel burning is required, and efforts especially in Industrialized countries are of high priority.

Similarly, shifting to renewable forms of energy production can enable us to achieve only a bit more than half of the required reductions in global GHG emissions. In order to tackle the remaining half, consumption patterns and dominant lifestyles need to be shifted with the support of circular economy interventions. Consumer choices for eco-designed products need to be available and accessible, waste within product chains and end-of-product-life need to be eliminated, keeping materials in use needs to be made easy for consumers, and regenerative forms of living need to be supported.

Cities, where consumption and production meet, provide the perfect leverage points for enabling 1.5 °C living. A few leading cities are taking action by integrating circularity into their own procurement of goods and municipal services, enabling circular business models to flourish, making resource-efficient products more accessible, creating awareness among city dwellers, and empowering citizen-led initiatives. These concentrate on three priority domains – nutrition, housing and mobility – which cover the majority (approx. 75 per cent) of city dwellers' carbon footprints.

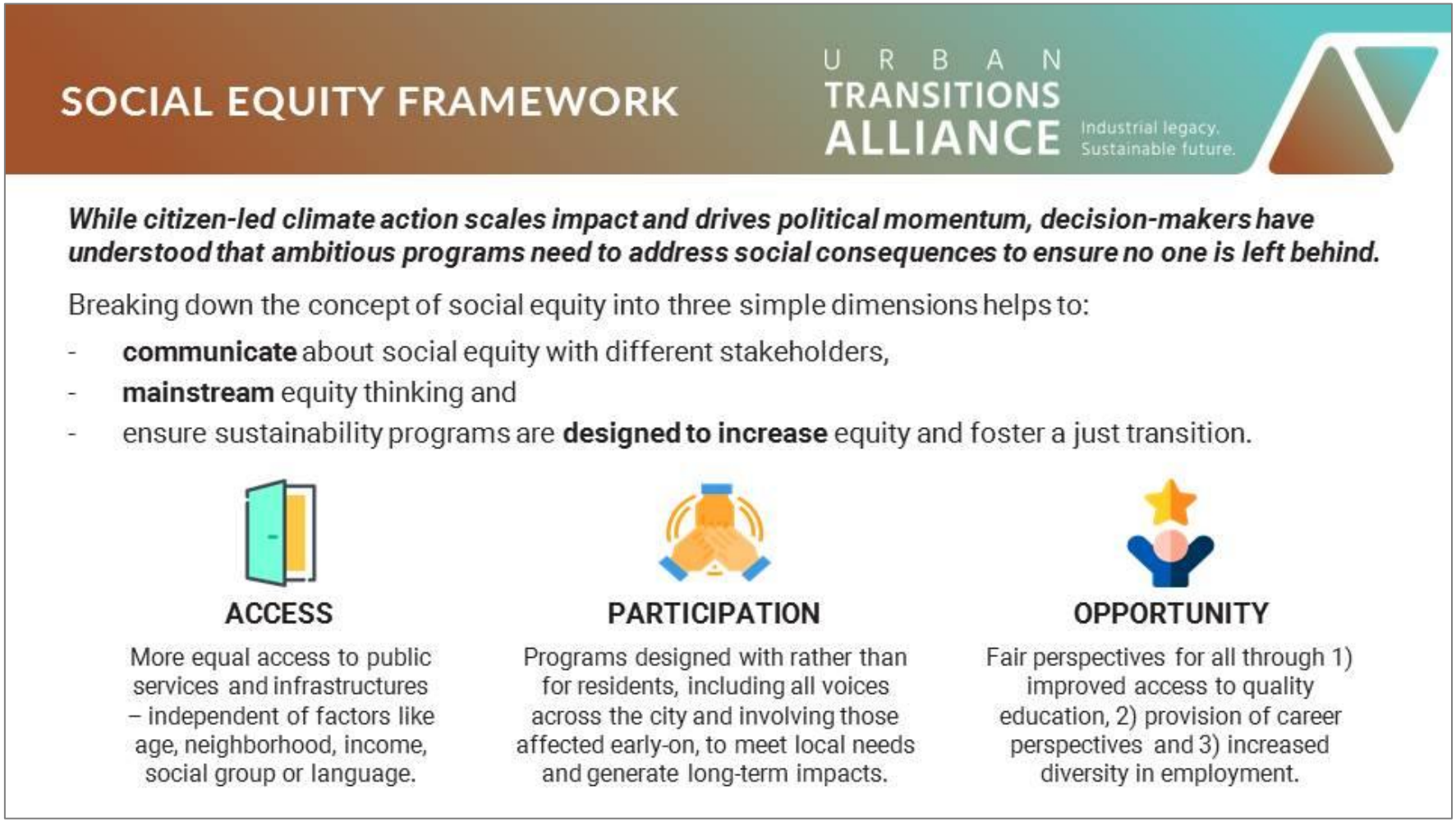
A person's choices operate within broader contexts that enable or constrain action, including physical environments, cultural conventions and social norms. As the 2020 United Nations Environment Programme Emissions Gap Report found, "Changes to underlying social and cultural norms are more difficult to accomplish than transitory behavioural changes, but once established they are likely to be more durable and to support a wider range of low-carbon lifestyles". Today, traditional lifestyles developed over centuries of slow co-evolution of human communities and their environment compete with less place-adapted and more carbon-intensive contemporary patterns of living. Arts, culture and heritage experts, advocates and operators should be enlisted to aid in the design of 1.5 °C pathways, emphasizing an ethic of conservation and reuse and the non-material dimensions of human well-being like creativity and social participation.

Social equity

A growing political consensus is forming globally that climate action needs to systematically incorporate social equity considerations. Cities have been integrating equity frameworks into their climate planning and developing innovative tools and approaches to ensure implementation. In all cases, collaboration with residents and local stakeholders is a key component to ensure that different needs are considered and no one is left behind on the path to more climate-friendly urban environments.

When analysing equity-focused programmes, three different dimensions or pathways to address inequalities emerge. These are by no means mutually exclusive; very often, programmes succeed best when all three aspects of the social equity framework are considered early on:

1. Access – Depending on factors like age, neighbourhood, income, gender, social groups and language, among other things, not all residents have the same access to public services and infrastructures. Local governments can strengthen inclusive access by considering affordability, different target groups and contact points for support. Very often, a mapping of accessibility per neighbourhood is a useful step to identify gaps and needs for improvement.
2. Participation – This dimension refers to the governance aspect of equitable design, emphasizing both the involvement of residents in the process and the engagement of underrepresented voices. The more programmes are designed with rather than for residents, involving those affected early on, the more they meet local needs and generate long-term impacts. This can be ensured through active outreach and citizen-led engagements like co-creation, which also increase public acceptance and ownership.
3. Opportunity – Unfortunately, current education and employment systems still perpetuate social inequalities, pre-defining questions of access and freedom of choice. To offer fair perspectives for all, local governments are targeting (1) equal access to quality education early-on; (2) provision of career perspectives through training and support programs; and (3) increased diversity in employment in public institutions and through procurement tools and stakeholder cooperation. In strengthening the local labour market, key questions relate to connecting available talent and skills to employer's needs as well as to the quality and sustainability of jobs created.



Source: Urban Transitions

Impact 1

WHOLE LIFE CARBON MITIGATION

MITIGATION

Nexus

ACTIONS:	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)				
Include specific measures to address the emissions from the Built Environment in Nationally Determined Contributions (NDCs)	• Countries enhance their NDCs and ensure they are compatible with a 1.5-degree pathway, specifically addressing built environment emissions and targeting net zero across the lifecycle of all projects by 2050. • Governments ensure that local and subnational climate actions are clearly incorporated into NDCs and national action plans	• Countries revise their NDCs, further extending the scope and ambition of actions to decarbonise the built environment across the lifecycle • NDCs cover 100% of the emissions from the built environment • Countries put in place measurement, reporting and verification (MRV) mechanisms, identifying baselines that support tracking progress, including in NDC implementation	• Countries revise their NDCs, increasing the scope and ambition of actions to decarbonise the built environment across the lifecycle • Countries continuously track progress through MRV processes, addressing gaps in implementation and raising ambition where possible.	• Countries revise their NDCs, increasing the scope and ambition of actions to decarbonise the built environment across the lifecycle that aligns with reaching a net zero built environment by 2050 at the very latest.

1. Policymakers	By 2021	By 2025	By 2030	By 2040
Establish roadmaps for a net zero built environment and develop supporting policies and targets, in coordination with key stakeholders across the value-chain	• Leading countries, cities and regions have a comprehensive net zero carbon roadmap for the built environment, with a clear policy trajectory in place addressing operational and embodied emissions over the whole life cycle.	• The biggest emitting countries, cities and regions have a comprehensive net zero carbon roadmap for the built environment, with a clear policy trajectory in place addressing operational and embodied emissions over the whole life cycle. • Implement policies and progressive operational emissions targets based on performance data that specify all new buildings must be net zero in operation by 2030. • Implement policies and progressive embodied carbon targets, based on collected data, striving for at least 30% embodied emissions reduced in new buildings, major retrofits, and infrastructure projects.	• All countries, cities and regions have a comprehensive net zero carbon roadmap for the built environment, with a clear policy trajectory in place aiming to halve built environment emissions, whereby all new buildings are net-zero operational carbon, existing assets have widespread energy efficiency retrofit well underway, and new construction and major renovation under direct control have net-zero embodied carbon.	• All countries, cities and regions review and revise their roadmaps to ensure alignment with achieving a net zero built environment by 2050. • Policies and targets that specify all new and existing assets must be net zero across the whole life cycle, including operational and embodied emission are in place.
Develop and implement mandatory building codes that reduce both operational and embodied emissions	• Countries, especially high growth countries, introduce or strengthen building energy codes and building codes that address material efficiency and embodied carbon. • Put in place a building code improvement cycle that strengthens the performance requirements every three to five years.	• All countries have in place performance-based building energy codes for all new & existing buildings that require all new buildings to operate at net zero carbon and retrofits to be net zero carbon ready. • All countries have building codes that include requirements to increase material efficiency and achieve at least 30% embodied emissions reduction in new buildings, major retrofits, and infrastructure projects. • Governments have tools or mechanisms to easily assess compliance with building codes.	• Building codes are improved with more stringent requirements for whole life carbon emissions.	• All countries have in place buildings codes addressing emissions across the lifecycle that align with the target for all buildings and infrastructure to be net zero by 2050.

1. Policymakers	By 2021	By 2025	By 2030	By 2040
Mandate life cycle assessment (LCA) on during design and construction to minimise whole life carbon emissions of projects	• Leading cities, regional and/or national governments implement planning policy that requires LCA during design and construction • Governments partner with other stakeholders to develop national embodied carbon factor databases and plan to for it to be periodically updated as more data becomes available. • Work with NGOs / industry coalitions to close key LCA information gaps and establish or confirm adoption of existing LCA methodology or standards.	• All cities, regional and/or national governments implement planning policy, or other mechanisms, that mandates LCA during design and construction • Governments partner with other stakeholders to ensure national embodied carbon factor databases cover the most widely used constriction products • Programs are in place to build capacity of the informal building sector to use LCA to minimise emissions • Set ambitious regulations on LCA for building projects based on circular economy principles.	• Governments partner with other stakeholders to ensure that national material embodied carbon factor databases cover all constriction products. • Governments work with other stakeholders to update LCA standards if necessary • Governments reinforce implementation and regulation on LCA for building projects based on circular economy principles.	
Collect as-built embodied carbon emissions data and monitor operational carbon emissions to inform development of performance benchmarks	• Governments put in place programs to mandate reporting and disclosure of as-built embodied carbon emissions, energy performance and operational carbon emissions data. • Governments work with technology providers and businesses to set up embodied and operational emissions data collection infrastructure. • Governments partner with other stakeholders to develop performance benchmarks based on the collected data.	• Governments mandate reporting and disclosure of as-built embodied emissions, energy performance and operational carbon emissions data. • Embodied and operational carbon data collection mechanisms are functional. • Governments promote widespread use of building passports to capture building information, such as materials and embodied carbon. • Update performance benchmarks based on the collected data.	• Governments require that building passports are created for all new buildings. • All households in formal settlements have access to real time operational performance data • Update performance benchmarks based on the collected data.	• The collection of as-built embodied carbon data and in-use performance and operational carbon data from all buildings and infrastructure projects is automated.

1. Policymakers	By 2021	By 2025	By 2030	By 2040
Drive widespread deep energy retrofits aligned to net zero carbon standards	• Governments put in place regulatory frameworks that incentivize energy efficient retrofit aligned to net zero carbon standards • Governments create and promote national training programmes to upskill the existing workforce and create job opportunities in the retrofit of existing buildings to net zero carbon ready standards. • Governments commit to rapidly scaling up renovation rates, targeting at least 3% by 2030. • Governments prioritise energy efficiency in buildings as part of COVID-19 economic recovery plans	• Governments have in place comprehensive energy efficiency requirements for all major refurbishments and renovations • Governments have in place national incentives for large scale energy retrofit (commercial and residential) • Governments continue to scale up training programmes to upskill the existing workforce and create job opportunities in the retrofit of existing buildings to net zero carbon ready standards. • National, subnational and local governments have in place a set of fiscal and non-fiscal incentives to support SMEs, households, developers and operators in prioritizing renewable energy and electrification solutions for retrofit.	• Governments ensure that retrofit rates are at least 3%. • Governments update energy efficiency requirements for all major refurbishments and renovations.	• Governments increase retrofit rates and have plans in place to complete the retrofit of all existing buildings that are not net zero carbon ready.
Use urban planning to minimise resource (materials and energy) use whilst meeting the needs and improving health and wellbeing of communities	• See Transport Pathway • Develop frameworks to analyse what buildings and infrastructure are needed to cater for a community • Local governments include district energy planning into urban planning and neighbourhood design.	• See Transport Pathway • Implement planning policy that ensures optimal use of the existing building stock in a community, by prioritising better use, repurpose, & retrofit, ensuring their optimal use before new buildings are considered. • Prioritise green infrastructure to serve both as amenity space and infrastructure for water management, minimising flood risk, and minimising hard landscaping to reduce demand for material	• See Transport Pathway	• See Transport Pathway

1. Policymakers	By 2021	By 2025	By 2030	By 2040
Use urban planning to minimise resource (materials and energy) use whilst meeting the needs and improving health and wellbeing of communities	• Local governments advance urban (re)development and investments in new infrastructure, linked with integrated urban planning, transit-oriented development and more compact urban form that supports public transport, cycling and walking.	• Local governments establish embodied carbon standards at neighbourhood level.		
Implement water and energy efficiency in households and buildings		• Establish water balance (a numerical account of how much water enters and leaves the boundaries of a project) standards for new buildings •	• Introduce local restrictions on water consumption and policies requiring efficient plumbing.	• 100 percent of residential and commercial users heat water through solar water heaters
Implement policy to decarbonise energy supply	• See the Energy pathway • Develop a set of fiscal and non-fiscal incentives to support SMEs, households, developers and operators in prioritizing on-site renewable energy and electrification solutions for retrofit and new build.	• See the Energy pathway • National, local and subnational governments have in place a set of fiscal and non-fiscal incentives to support SMEs, households, developers and operators in prioritizing renewable energy and electrification solutions for retrofit and new build.	• See the Energy pathway	• See the Energy pathway
Implement policy to ratchet the energy performance standards of appliances	• See the Cooling pathway • Establish product performance ladders for appliances	• See the Cooling pathway • Widespread use of appliances with mandatory Minimum Energy Performance Standards (MEPS) and labelling. • Product performance ladders - labels-incentives' policies to drive GWP reduction alongside energy efficiency gains in place in largest cooling countries and regions (China, India, South East Asia, US, EU, MENA).	• See the Cooling pathway • Widespread use of appliances with mandatory High Energy Performance Standards (HEPS) and labelling.	

1. Policymakers	By 2021	By 2025	By 2030	By 2040
Implement policy and use procurement power to drive demand for low embodied carbon / GWP and products and materials that fit into the circular economy	• See the Industry Pathway for decarbonisation of steel, cement & concrete, plastic and aluminium production • Governments adopt policies that promote holistic solutions to minimise impacts of construction materials based on circular economy principles. • New commitments from leading countries on accelerated uptake of ultra-low GWP refrigerants • Public authorities include life-cycle requirements in tenders for public construction projects influencing circularity of materials	• See the Industry Pathway for decarbonisation of steel, cement & concrete, plastic and aluminium production • See Cooling Pathway for industry actions for ultra-low GWP refrigerants • Mandate Environmental Product Declarations (EPDs) and mandatory labelling systems for key materials and components • Piloting of circular, zero-emission public construction sites through a strong market consultation process • Set targets for circular procurement of construction materials • Promote resource efficient and circular design, use of low carbon materials, and low-to-zero waste construction sites for all new projects and major retrofit.	• See the Industry Pathway for decarbonisation of steel, cement & concrete, plastic and aluminium production • Mandate Environmental Product Declarations (EPDs) and mandatory labelling systems for all materials and components	• See the Industry Pathway for decarbonisation of steel, cement & concrete, plastic and aluminium production
Implement policy to drive the adoption of circular economy principles in the built environment	• Governments partner with other stakeholders to develop performance benchmarks and sector targets that include the use of materials with low-embodied carbon. • Governments support upskilling and training programmes for the workforce to be able to work with circular processes and products	• National and local policies aligned and focused on circular economy principles • Fiscal incentives for material recovery and sustainable waste management in place • Governments set national policy aimed at improving recycling and reprocessing systems • Governments set national policy that drives reuse and refurbishment in preference to demolition and new construction	• Governments put in place mandatory design for (dis)assembly guidelines and implement mandatory construction waste reuse.	

1. Policymakers	By 2021	By 2025	By 2030	By 2040
Implement policy to drive the adoption of circular economy principles in the built environment		• Training and upskilling programmes are introduced, scaled-up and made available to formal and informal workers		
Governments lead by example by decarbonising municipal buildings and public projects across the life cycle	• Governments of leading nations, regions and cities commit to decarbonise municipal buildings and public projects in line with the targets set out in the 'built environment system transformation' section of this document, aiming to be ahead of the targets • Governments commit to piloting low-carbon scalable innovations to inspire wider uptake. • Governments set up large scale municipal building retrofit programs • Governments ask and provide whole life carbon information on their buildings and prioritize construction with low emissions.	• Governments are piloting low-carbon innovations on municipal buildings that will take the built environment to net zero carbon by 2050. • Governments have begun to execute large scale municipal building retrofit programs • Governments adopt low-carbon procurement policies that require high energy efficiency building systems, ultra-low GWP refrigerants, and low-carbon materials, aligning with circular economy principles and meeting regional best practice environmental standards • All governments implement whole life carbon targets for new public buildings, large public renovations and infrastructure.	• Governments increase the rate of retrofit of municipal buildings and public projects • Low-carbon procurement policies are revised to be made more stringent • Governments update whole life carbon targets for new public buildings, large public renovations and infrastructure.	• Governments further increase the rate of retrofit of municipal buildings and public projects • Low-carbon procurement policies are revised to be made more stringent • Governments update whole life carbon targets for new public buildings, large public renovations and infrastructure.

ACTIONS:	By 2021	By 2025	By 2030	By 2040
2. Financial Insitutions				
Institutional investors commit to transition their investment portfolios to net zero by 2050 at the latest	• Commit to transition investment portfolios to net zero emissions by 2050 at the latest and align with relevant industry roadmaps • Commit to setting and publishing interim targets every 5 years, aligned with Paris Agreement	• Transparently disclose performance and progress against targets • Publish interim targets	• Monitor and increase ambition to accelerate the transition of investment portfolios towards net zero emissions by 2050. • Transparently disclose performance and progress against targets • Publish interim targets	
Institutional investors set net zero targets across whole life cycle for their real assets portfolios and disclose on progress	• Assess carbon and energy intensity of built environment assets using Carbon Risk Real Estate Monitor (CRREM) model or equivalent standard to determine alignment with 1.5ºC pathway • Set targets for percentage of assets under management (AUM) in net zero or net zero-aligned assets • Work with other stakeholders to set indicators for whole life cycle emissions. • Institutional investors engage with investee companies across the built environment value chain to set net zero targets by 2050 • Investors in companies across the built environment value chain require reporting as a condition of investment through industry initiatives and benchmarks such as GRESB, CDP and TCFD	• Increase % of AUM that is invested in net zero or aligned assets • Transparently disclose transition plans and progress • Screen new investments using the CRREM model or equivalent standard to assess alignment • Mainstream use of whole life cycle indicators for financial decisions. • Finance and investment institutions use circular economy principles as basis for funding and investment decisions. •	• Increase % of AUM that is invested in net zero or aligned assets • Transparently disclose transition plans and progress • Progressively screen all investments using the CRREM model or equivalent standard to assess alignment • Only finance new projects and buildings that operate at net zero carbon and have reduced embodied carbon by 40%	• Increase % of AUM that is invested in net zero or aligned assets • Transparently disclose transition plans and progress • Only finance new buildings and infrastructure projects that are net zero across the lifecycle including operational and embodied emissions.

2. Financial Institutions	By 2021	By 2025	By 2030	By 2040
Institutional investors increase investment in climate solutions to support meeting net zero carbon targets	• Assess current allocation to climate solutions and set target to increase investment. • Increase investment in climate solutions such as renewable energy to grow the supply side of net zero solutions • Work with the relevant stakeholders to understand the financial needs per sector and current barriers	• Increase investment in climate solutions such as renewable energy to grow the supply side of net zero solutions • Report on climate solutions allocation as percentage of AUM (aligning with EU taxonomy criteria)		
Channel and incentivise investment into energy efficient new buildings and retrofits	• Use programmes such as the Programme for Energy Efficiency in Buildings (PEEB) offering financing options for investment in energy efficient buildings • Finance institutions develop and launch new financial solutions that overcome the barriers faced in scaling up energy efficient retrofits and new construction • Finance institutions provide long-term capital for retrofit projects and new construction, e.g. through Property Assessed Clean Energy (PACE) financing, where appropriate • Incentivise the retrofit of buildings through providing green mortgages which offer a lower interest rate, or an increased loan amount tied to improving energy efficiency.	• Finance institutions put in place finance mechanism to pool large scale retrofit programs. • Finance institutions put in place financing mechanisms that facilitate and incentive the uptake of renewable energy generation/ clean energy solutions in buildings • Governments and finance institutions collaborate for wide-spread PACE financing, in relevant target markets.	• Finance institutions include energy efficiency criteria in all refurbishment efforts • Finance institutions include energy efficiency criteria in all buildings-related loans	

2. Financial Institutions	By 2021	By 2025	By 2030	By 2040
Governments and International Financial Institutions support the transition to net zero	• Bilateral/multilateral development country assistance strategies include operational carbon mitigation component • Upgrading of Subnational Development Banks (SDBs) to act as intermediaries and support institutions to subnational access to climate financing: The Global Alliance for SDBs sets its roadmap for action in different continents and creates momentum for better integration in the "glocal" climate finance value chain and channelling by 2021. • Public finance institutions put in place financial incentives for green zoning and energy efficiency performance standards, as well as district energy considerations • Governments create conditions for greening the financial system, through regulation, disclosure requirements, mandatory KPIs	• National, subnational and local governments as well as finance institutions include and earmark specific budgets on local and subnational climate action planning and implementation by 2025. • Governments and finance institutions dedicate financing for guarantees and credit enhancement mechanisms for local and subnational climate action projects by 2025. • SDBs produce expert data on subnational climate finance fluxes and play a key role in the resilience of the financing cycle of local net zero projects/action plans. • Governments create and support domestic climate finance expertise hubs ("FinHubs") offering local governments the adapted professional advisory support to climate-compliant project preparation and deal closing, and connecting local and regional governments to existing project preparation facilities and initiatives, and technical assistance supply, including for local financial engineering innovation	• SDBs are systematised entry points for enhancing subnational climate financing to local projects - The Global Alliance for SDBs has allowed to build solid domestic pipelines of projects and have expanded the market segment for subnational climate financing for both public and private investors, at both domestic and international levels. • Finance expertise hubs "FinHubs" have enhanced significantly the quality of projects presented to public and private investors and initiated a complete renewal of financial models, instruments and solutions available on the market.	

ACTIONS:	By 2021	By 2025	By 2030	By 2040
3. Technology Providers & Innovators				
Develop digital solutions to: a) accurately measure and automatically optimise built asset operational performance in real time; and b) Measure and freely share as-built embodied carbon emissions over the asset life cycle	• Make building management systems available and affordable in parts of the world where they are not currently used to track buildings energy and emissions performance. • Work with material manufacturers, suppliers and contractors to develop solutions that enable the accurate tracking of real product supply chain emissions due to manufacture, transportation and installation on site. • Make tools available that facilitate a standardised approach to embodied carbon measurement at the product and asset level in all parts of the world. • Develop regional, national or international project carbon emissions databases to collect data from all new and existing projects	• Ensure that real embodied and operational carbon measurement solutions exist that are scalable in all parts of the world and tailored to the regional context. • Carbon emissions database technology is ready to be implemented in all countries around the world. This must be coordinated with the needs of businesses, policymakers and the finance community. • Supply chain emissions tracking solutions are available for materials that are most widely used and contribute most to global warming (steel, concrete, timber, glass, aluminium) • All commercial buildings and infrastructure assets around the world must have access to real time monitoring of operational performance. • NGOs / networks / researchers Implement standardized embodied carbon calculation methods, design tools and guidance • NGOs / networks / researchers contribute to establishment of databases and help set benchmarks for adoption by industry or by policy, also looking at national platform, like MRV platforms to track the progress and accessible, as an agreed and adopted method by all to ensure consistency across.	• All tools that estimate carbon emissions used in project design stages are informed by real emissions and supply chain behaviour data, where appropriate. • Supply chain emissions tracking is available for all products used on construction sites • All households around the world have access to real time monitoring of operational performance, e.g. through smart meters, so that they can manage their consumption.	• Ensure that all countries around the world have access to the solutions that allow for built environment carbon emissions to be tracked and feed into operational management and design, whilst informing policy and investment decisions.

3. Technology Providers & Innovators	By 2021	By 2025	By 2030	By 2040
Develop low carbon construction processes and materials	• See the Industry Pathway for decarbonisation of steel, cement & concrete, plastic and aluminium production • See Cooling Pathway • Research institutions increase R&D on scalable, locally adapted, low carbon construction solutions that implement circular economy principles • Prioritise R&D focused on developing and scaling solutions for material processing and reuse, reducing demand for new materials • Prioritise R&D focused on reducing the embodied carbon footprint of key components, systems and appliances of the built environment	• See the Industry Pathway for decarbonisation of steel, cement & concrete, plastic and aluminium production • See Cooling Pathway • Design and construction methods for optimizing material use and prioritising low-carbon material • All research institutions with programmes looking at solutions from the built environment	• See the Industry Pathway for decarbonisation of steel, cement & concrete, plastic and aluminium production • See Cooling Pathway • Development of low-carbon local alternatives for materials and techniques with preference for use local materials rather than imports when appropriate	• See Cooling Pathway • All electricity used in manufacturing is from renewable or low carbon sources • All forms of energy used are from renewable or low carbon sources and all process carbon emissions are mitigated. • All refrigerants are ultra-low GWP
Develop energy efficient and clean energy solutions for the built environment	• See Energy Pathway • Research institutions increase R&D on scalable locally adapted solutions for low operational carbon assets • Innovators prioritise R&D on zero-emissions and energy-positive buildings in developing countries • R&D in energy efficiency (e.g. building design), and clean energy solutions including district energy, microgrid, smart grid and district energy solutions • Technology providers engage in R&D urban planning solutions that deliver high energy efficiency	• See Energy Pathway • Technology providers make available automation and machine learning capabilities to efficiently balance energy supply and demand through smart grids. • Ensure affordable energy storage solutions are available at all scales of renewable energy generation (household, community, city and regional) • Passive and hybrid strategies identified for all bioclimatic regions and specific building types, with considerations for shading, windows, insulation, lighting, among others	• See Energy Pathway	• See Energy Pathway

3. Technology Providers & Innovators	By 2021	By 2025	By 2030	By 2040
Develop energy efficient and clean energy solutions for the built environment		• Adoption of Building Management Systems and Energy Management Systems to improve the overall management of the building system controls.		
Enabling low carbon operation and maintenance of built assets		• Technology and innovation providers put in place product-service systems approach for buildings. • Develop ways of feeding real asset operational performance data and as-built embodied carbon data into design tools.	• Develop biomass and waste heat recovery strategies, electrification of processes, switch to cleaner fuels including hydrogen	
4. Business and Service Providers				
Businesses across the built environment value chain commit to net zero and decarbonise assets under their control	• Business set and implement short-, medium-and long-term science-based targets to reduce the whole life carbon footprint of built structures toward net-zero emissions. • Collaborate with clients, suppliers and all actors across the built environment to ensure targets are met and to drive net-zero construction and renovation measures • Businesses set net zero commitments, and sign up to relevant industry commitments (e.g. World Green Building Council's Net Zero Carbon Buildings Commitment and the Science Based Targets initiative), supported by roadmaps and targets	• All Green Building Councils / NGOs certification schemes include net zero operational and embodied carbon requirements • Transparently disclose performance and progress against targets • Publish interim targets	• Transparently disclose performance and progress against targets • Publish interim targets	

4. Business & Service Providers	By 2021	By 2025	By 2030	By 2040
Businesses across the built environment value chain commit to net zero and decarbonise assets under their control	• Businesses track and report energy and carbon emissions performance of assets under their control. • Businesses commit to voluntary reporting initiatives.			
Corporate occupiers decarbonise the buildings they occupy collaborating with building owners	• See industry (retail) Pathway • Companies assess the buildings they occupy and identify opportunities to decarbonise the buildings, working with the building owners. • Companies implement green lease clauses with building owners.	• See industry (retail) Pathway • Corporate occupiers advocate for or set procurement standards for low/ net zero carbon buildings to drive market demand. • Corporate occupiers advocate for and set procurement standards for low embodied carbon/ circular buildings to drive market demand.	• See industry (retail) Pathway • Companies require all new buildings they occupy to be net zero carbon in operation and major renovation under direct control have net-zero embodied carbon.	
Developers, architects, engineers, contractors and asset managers/owners assess, minimise and report project emissions through design, construction, and use, prioritising emissions released before 2050	• Business and government collaborate to develop baseline and set incremental targets on whole life carbon emissions in $kgCO_2/m^2$. • Asset developers show leadership by setting project briefs that demand net zero carbon buildings and infrastructure • All businesses influence project collaborators to prioritise minimising carbon emissions on projects • Developers and architects promote business models focused on zero-emission buildings. • Voluntary benchmarking systems with certification are in place for commercial typologies tracking performance and comparing that performance with other buildings	• Businesses and governments collaborate to implement building passports for all buildings. • All developers set embodied carbon reduction targets • Design companies propose best practice embodied carbon reduction targets and implement circularity principles • All design companies publicly share lifecycle assessment data • Infrastructure providers adopt business models for low-carbon infrastructure. • All developers require mandatory disclosure of supply chain data and track construction site emissions	• All construction sites are highly resource and energy efficient and, along with site-related transport processes, are powered by renewable energy • Design companies propose requirements for all projects to be 100% net zero embodied carbon, with minimum 50% reduction in embodied carbon by design and not offsets. • All project teams contribute their embodied carbon data at the end of the design stage, and at the end of the construction stage	• Developers only build projects that have net zero lifecycle carbon (including embodied carbon).

4. Business & Service Providers	By 2021	By 2025	By 2030	By 2040
Developers, architects, engineers, contractors and asset managers/owners assess, minimise and report project emissions through design, construction, and use, prioritising emissions released before 2050	• Private sector prioritise energy efficiency and renewable energy when developing neighbourhoods • All designers commit to relevant industry roadmaps and have integrated low embodied carbon design at conceptual design stage • Businesses set standards for new developments prioritizing high levels of energy efficiency/ clean energy use. • All developers commit to relevant industry roadmaps and require disclosure of supply chain data for structural elements			
All businesses across the value chain collaborate to develop new viable, low carbon solutions for buildings and infrastructure	• See Industry Pathway • All manufacturers and suppliers commit to relevant industry roadmaps and have developed carbon reduction targets and with timelines set to achieve net zero embodied carbon by 2050.	• See Industry Pathway • Manufacturers work with the rest of the delivery chain to	• See Industry Pathway • All manufacturers have declared their entire standard product portfolios via EPDs	• See Industry Pathway
Developers, architects, engineers, and contractors demand better environmental practice and lower carbon technologies and innovations from the supply chain	• Demand EPDs for key products used on projects • Require that companies supplying products have a roadmap in place to reach net zero by 2050 in line with a 1.5 degrees global warming scenario • Water heating being responsible for a quarter of residential energy use worldwide, […]	• Commit to including requirements in specifications for suppliers to produce EPDs for all products used on a project. • Include carbon caps on products included in specifications	• Include carbon caps on products included in specifications	

4. Business & Service Providers	By 2021	By 2025	By 2030	By 2040
Developers, architects, engineers, and contractors reduce water and energy use in households and buildings	• […] increase marketing of solar water heaters as supplement to conventional electric and gas boilers in homes and businesses. • Product labelling on water efficiency fixtures and appliances can inform consumer choices, while incentives, namely rebates on purchases of efficient appliances and fixtures, can encourage voluntary action • Create awareness of best management practices (BMPs) for net zero water buildings that emphasize closed-loop systems, ultra-efficient measures to reduce system demands, small-scale management systems, fit-for-purpose water use and diverse, locally appropriate infrastructure.			• 81-92 percent adoption of low-flow taps and showerheads by 2050 could reduce carbon dioxide emissions by 1-1.6 gigatons, by reducing energy consumption for heating wasted water.
Develop skills to enable the transition to a net zero built environment	• Create training courses on calculating and minimising carbon emissions on projects • Leading companies to make this training course mandatory for all employees • Contractors and builders to develop systems to improve skills in retrofitting and refurbishing existing buildings • Embodied and operational carbon emissions measurement and minimisation are a core part of every built environment-related university course	• Make training courses mandatory for all employees • Provide training on implementation of circular economy principles • Embodied and operational carbon emissions are a core part of every built environment-related course • A key criterion of professional qualification with all built environment institutions is an awareness and ability to address carbon emissions		

ACTIONS:	By 2021	By 2025	By 2030	By 2040
5. Civil Society				
Citizens change behaviour to minimise operational emissions from domestic and non-domestic buildings	• Citizens minimise demand for energy in all buildings they use, at home, at work and in leisure • Homeowners take advantage of government schemes to encourage energy efficient retrofit of homes • Households shift to clean energy providers. • Citizens purchase appliances with high energy efficiency ratings			

EXISTING INITIATIVES

Race to Zero	Race To Zero is a global campaign to rally leadership and support from businesses, cities, regions, investors for a healthy, resilient, zero carbon recovery that prevents future threats, creates decent jobs, and unlocks inclusive, sustainable growth. All members are committed to the same overarching goal: achieving net zero emissions by 2050 at the very latest. The objective is to build momentum around the shift to a decarbonized economy ahead of COP26, where governments must strengthen their contributions to the Paris Agreement. This will send governments a resounding signal that business, cities, regions, and investors are united in meeting the Paris goals and creating a more inclusive and resilient economy. It aggregates net zero commitments from a range of leading networks and initiatives across the climate action community. These networks and initiatives define the substantive criteria that businesses, cities, states and regions, investors, universities, and others setting net zero targets are required to meet.
GlobalABC – Regional Roadmaps	The GlobalABC Regional Roadmaps for Buildings and Construction are a product of a highly consultative process, we had more than 700 experts engaged in the development process, refining them each time with more data and examples from the region. It presents policy and technology targets and timelines, as well as key actions under eight priority areas which range from urban planning to new buildings, building retrofits, building operations, systems, materials, resilience and clean energy, in the quest of harnessing the sector's enormous opportunities for decarbonization and achieving the sustainable development goals These roadmaps present both, a framework and a process that can be used at the national level and support the buildings and construction sector's Race to Zero by 2050.
C40 – Net Zero Buildings Declaration and Clean Construction Forum	The Net Zero Carbon Buildings Declaration, focused on cities' commitments for net zero carbon buildings, highlights buildings' importance for climate change mitigation and for meeting the goals set out by the Paris Agreement on climate change. It flags that buildings, on average, account for roughly half of cities' total greenhouse gas (GHG) emissions. Mayors from 28 cities around the world have signed the Net Zero Carbon Buildings Declaration developed with the C40 Cities network. Signatories undertake to ensure that new buildings will operate at net zero carbon by 2030, and pledge that all buildings will operate at net zero carbon by 2050. In addition, some cities have committed to ensuring all new and existing municipal buildings are net zero carbon by 2030.
WorldGBC – Net Zero Carbon Buildings Commitment	The Net Zero Carbon Buildings Commitment (the Commitment) challenges business, organisations, cities, states and regions to reach net zero carbon in operation for all assets under their direct control by 2030, and to advocate for all buildings to be net zero carbon in operation by 2050. By setting ambitious 'absolute' targets, the Commitment aims to maximise the chances of limiting global warming to below 2 degrees, and ideally below 1.5 degrees, by drastically reducing operational carbon from buildings. The Commitment provides a framework to develop globally ambitious yet locally relevant, flexible and universally viable solutions for buildings within their portfolio, city, state or regional boundary. It sets actions to reduce energy demand and achieve net zero carbon through renewable energy and offsets (as a last resort). For businesses, the Commitment is one of three pathways available to join EP100.

EP100	EP100 brings together a growing group of energy-smart companies improving their energy productivity to lower their emissions and improve their competitiveness. EP100 is led by the Climate Group in partnership with the Alliance to Save Energy. Their mission is to lower global energy demand and accelerate the clean energy transition. By integrating ambitious energy targets into business strategy, leading companies are driving innovation in energy efficiency and increasing competitiveness while delivering on emissions reduction goals. Commitments: Double energy productivity, Implement an energy management system, Net zero carbon buildings (ref WGBC).
Mission 2020	Mission 2020 team is an extended network of individuals from organizations around the world who have taken the Mission on as their own. This extensive network is continuously growing, with people contributing every day to the descent of global emissions by 2020. In support of this ever-growing team, Mission 2020 is coordinated by a group of experienced diplomats, campaigners and strategists from around the globe, working across the six milestone areas to help deliver immediate breakthroughs on emissions reductions. One of the Missions focus on buildings and infrastructure.
Construction Declares Climate and Biodiversity Emergency	Construction Declares is a global petition uniting all strands of construction and the built environment. It is both a public declaration of our planet's environmental crises and a commitment to take positive action in response to climate breakdown and biodiversity collapse. Since May 2019, over 6000 Structural, Civil and Building Services Engineering practices, Landscape Architects, Contractors and Project Managers in over 25 countries across all continents have committed to strengthening their working practices to create more positive impact through architecture and urbanism.
International Coalition for Sustainable Infrastructure (ICSI)	ICSI's mission is to mobilize an engineering-led coalition to make resilience and sustainability a cornerstone of every decision in the infrastructure lifecycle in every community around the globe. ICSI will identify and address the biggest barriers to action that have prevented us from working together for a sustainable, resilient and inclusive future. Their action tracks focus on funding and financing, innovation, leadership and whole-of-life costs, and guidance, tools and standards.
Mission Innovation	Mission Innovation is a global initiative working to accelerate clean energy innovation. Mission Innovation has a series of Innovation Challenges (ICs) that are global calls to action aimed at accelerating research, development and demonstration (RD&D) in technology areas that could provide significant benefits in reducing greenhouse gas emissions, increasing energy security and creating new opportunities for clean economic growth.
Rocky Mountain Institute – Pathways to Zero	RMI is driving early movers in the buildings industry on a path to—or beyond—net zero energy by working with individual buildings, districts, cities, and portfolios to significantly reduce energy use, and powering them with renewable energy sources cost-effectively while also supporting dynamic grid interface. We're doing this by helping owners "lead by example," with pioneering demonstration projects that show net zero can be achieved profitably and uncover new sources of value, while also publishing key insights that were learned through these projects so others are inspired and activated to follow suit.

Programme for Energy Efficiency in Buildings (PEEB)	PEEB aims to significantly transform the building sector by promoting sustainable building design and construction. PEEB combines financing for energy efficiency in large-scale projects with technical assistance through policy advice and expertise for building sector professionals. PEEB is catalysed by the Global Alliance for Buildings and Construction (GABC). PEEB was initiated by the governments of France and Germany at COP22, and combines the expertise of its implementing agencies Agence Française de Développement (AFD), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and Agence de l'Environnement et de la Maitrise de l'Energie (ADEME). PEEB is working with its first five partner countries Mexico, Morocco, Senegal, Tunisia and Vietnam.
Super-efficient Equipment & Appliance Deployment (SEAD)	SEAD partners are working to create a common technical foundation to allow governments to more easily adopt cost-effective appliance efficiency policies and programs. Broader market transformation efforts—including incentives, awards, and procurement programs—seek to further accelerate the global pace of progress for energy-efficient equipment and appliances. Activities include: Increase partner participation and engagement; Highlight the benefits and urgency of energy-efficient equipment and appliance policies among participating governments; Increase awareness.
FMDV – Global Alliance for Subnational Development Banks (SDBs)	Subnational Development Banks (SDBs) are national public institutions which mandate is to provide financial products and services to local and regional governments (LRGs). The Global Alliance for SDBs launched by FMDV is an innovative multi-stakeholder coalition of SDBs, Central governments, LRGs networks and development partners for professional intermediated access to climate finance for LRGs. The Global Alliance is an intercontinental and decentralized forum. It is led by Cameroon, and RIAFCO (the African Alliance of Subnational Development Banks) for Africa and supported by African Development Bank and FMDV. In Latin America and the Caribbean, it is led by Banco de Desenvolvimento de Minas Gerais (BDMG), the French Development Agency (AFD), FMDV and the Institute for Sustainable Development and International Relations (IDDRI)
Subnational Climate Finance Expertise Hub - "FinHubs" (FMDV and Kingdom of Morocco)	Together with the Local and Regional Governments Directorate-General (DGCT) of Moroccan Ministry of Interior, and the 2 national associations of Local and regional Governments (AMPCC, ARM), FMDV has launched a subnational climate upgrading programme for institutional, strategic and technical support to all public and private institutions in Morocco working to enhance LRGs climate action. The programme has launched a national Climate Commission on Human Settlements gathering all domestic stakeholders and solutions providers, and is implementing a subnational climate finance hub of technical experts to support the design, preparation and financing of climate local and regional projects. This Climate FinHub for subnational action is an innovative methodology and instrument that will be replicated in other Global South countries.
UNCDF/UCLG/FMDV – International Municipal Investment Fund (IMIF) and Technical Assistance Facility (TAF)	An end-to-end project preparation facility (TAF) to support local governments to build their capacity, create an enabling policy environment to attract investment capital, and to generate a pipeline of revenue generating investments that will be financed by the IMIF, independently managed by Meridiam.

FMDV – Projects coaching and Matchmaking Forums to connect local projects with potential investors	The LRGs Project Coaching and Matchmaking Forum aims at strengthening access to financing for local governments through peer-to-peer cooperation and projects coaching, connecting the demand side for projects led by central and local governments on sustainable urban services and infrastructure with the supply side for technical and financial solutions from DFIs, investors and service providers.

FURTHER REFERENCES

Intergovernmental Panel on Climate Change (IPCC) – Special Report: Global Warming of 1.5°C	IOPD/UCLG/ENDA/FMDV/Kota Kita – Contributions of Participatory Budgeting to climate change, adaptation and mitigation
GlobalABC 2020 Global Status Report for Buildings and Construction	One Planet network, International Resource Panel (IRP) and UN Environment Programme (UNEP) - Catalysing Science-Based Policy Action on Sustainable Consumption and Production: The Value-Chain Approach and its Application to Food, Construction and Textiles
WGBC – Bringing Embodied Carbon Upfront	GlobalABC – Regional Roadmaps for Buildings and Construction (Africa | Asia | Latin America)
WBCSD – Scaling the Circular Built Environment: pathways for business and government	GlobalABC – Adopting Decarbonization Policies for Buildings and Construction
C40, Arup and University of Leeds – In-focus report on Buildings and Infrastructure	GlobalABC – A Guide to Incorporating Buildings Action in NDCs
C40 – Clean Construction Policy Explorer	International Resource Panel – Resource Efficiency and Climate Change Material: Efficiency Strategies for a Low-Carbon Future
United Nations Environment Programme (UNEP) – Emission Gap Report 2020	FMDV/COMSSA – The City Climate Finance Landscape in Sub-Saharan Africa

WBCSD – Building System Carbon Framework	FMDV/AFD – The Potential Catalytic Role of Subnational Pooled Financing Mechanisms
International Finance Corporation (IFC) – Green Buildings: A Finance and Policy Blueprint for Emerging Markets	International Energy Agency (IEA) – The Critical Role of Buildings
ICLEI and Eurocities - Public Procurement of Circular Construction Materials, European Commission	Embodied Carbon in Construction Calculator (EC3)
C40 guide: How to reduce embodied emissions in municipal construction and lead by example	C40 guide: How to start deconstructing and stop demolishing your city's buildings
C40 Knowledge Hub: resources on buildings and construction	Built Environment System Map

Impact 2

BUILT ENVIRONMENT – ADAPTATION & RESILIENCE

ADAPTATION /RESILIENCE

Nexus

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• Local governments undertake inventory of current state of city infrastructure identifying weak spots/high-impact areas for resilience and climate mitigation and opportunities for cross-sectoral optimization, and further synergies of policies, investment and strategies across all spheres of government. • Governments put in place actions on risk-sensitive and shock-responsive social protection systems and safety nets for the most vulnerable. • Governments include funding needs for buildings energy and water usage data collection and analysis included in annual budgets.	• All levels of government undertake city-wide climate hazards and vulnerability assessment, which consider vulnerable populations. • Governments develop basic climate risk and vulnerability mapping and monitor national and local strategy for resilience • Governments prepare for an increase in frequency and severity of climate disasters, according to results of risk and vulnerability mapping • Governments establish urban design requirements that incorporate sustainable urban drainage systems and green zoning at neighbourhood level. • Cities adopt a cross-sectoral approach and jointly consider grey, green and blue infrastructure when undertaking renewal/upgrade/new developments in city infrastructure.	• Local governments widely adopt early warning systems that are available and accessible by all, especially the most vulnerable population • All local governments include resilience measure in building codes. • Most local governments have taken concrete actions on the ground in delivering nature-based solutions to reduce heat island effects and to increase resilience to extreme weather including creating further green spaces and equitable access to all • All governments guarantee transparency on short-, medium- and long-term climate risks, e.g. exposure of the plot of land to flooding, marine submersion, and vulnerability of the building investment, particularly to heat waves (e.g. green building certification).	

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• National and subnational governments develop long-term, integrated resilience plans and disclose these, with attention to urban, peri-urban and rural linkages, and invest on capacity building at national and subnational levels, towards a common understanding of the concepts of resilience and integrated planning, including for more effective coordination, and analysis • Local governments adopt policy to prioritize low- carbon, resilient eco-districts approach for all new district development. • Cities put in place policy to consider resilience whenever undertaking renewal/upgrade/new developments in city infrastructure. • Governments have policy in place for use of vacant buildings for vulnerable groups. • Governments include informal settlements, vernacular architecture and heritage buildings in their climate resilience strategy • Local governments prioritize nature-based solutions to reduce heat island effects and to increase resilience to extreme weather, including creating further green spaces and equitable access to all. • National Governments develop open source databases on climate risk and vulnerability and model climate change at local level, based on a systems […]	• Local governments undertake city-wide climate hazards and vulnerability assessment, which consider vulnerable populations. • Local governments at high-risk location have resilience included into their building codes • Governments have strategies in place for adaptation in most vulnerable buildings • Cities at high-risk location have resilience standards embedded to building codes • Local governments in high-risk areas include resilience in their building codes • Governments leverage procurement of construction and infrastructure projects to integrate nature-based solutions. • Governments, in cooperation with stakeholders across the value chain, integrate climate resilience and adaptation into existing curriculum for both existing professionals & students • National and local governments introduce coordination mechanisms such as resilience agencies and officers to coordinate across siloed sectoral departments • National and sub-national governments apply resources and strengthen multi-stakeholder collaboration around adaptive learning with regards to climate risk, vulnerability assessment, emergency response strategies.	• All national governments monitor and evaluate national and local strategy for resilience • All governments include resilience measure in building codes. • All governments have informal settlements, vernacular architecture, and heritage buildings included in their climate resilience strategy • All levels of government have wide use of adaptive learning methods regarding climate risk, vulnerability assessment, emergency response strategies and governance.	

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• […] perspective and taking into consideration the need for territorial governance • Governments carry out scenario analysis and planning to understand the impact of climate-change induced uncertainties on the long-term planning of infrastructure. • Governments set policies to regulate private sector actors involved in built environment, including incentives (financial or otherwise) to influence private sector behaviour to meet climate resilience objectives. • Governments provide effective mechanisms for communities to engage with government on the built environment. • Governments work to create enabling policy environment to de-risk investment and support innovation, and with financial institutions, develop bankable projects for adaptation. • Governments work to mainstream people-centered, bottom-up approaches that incorporate disaggregated communities with local knowledge into a balanced, multilevel disaster risk management and governance structure • Governments establish an **enabling policy and regulatory environment** for financial institutions to invest in the resilience of human settlements	• National and regional governments coordinate across jurisdictions to reduce fragmented approaches to risk reduction. • Governments plan for development and disaster relief and recovery that substantially increase the availability of and access to multi-hazard early warning systems. • Local governments continually promote adoption of nature-based solutions to reduce heat island effects and to increase resilience to extreme weather including creating further green spaces and equitable access to all		

	By 2021	By 2025	By 2030	By 2040
2. Financial Institutions	• Financial institutions encourage the development of appropriate financial instruments/products to finance resilience investments in human settlements, including microfinancing for resilience investments at the household level. • Governments and national, regional and international finance institutions have in place project preparation facilities focused on subnational infrastructure projects, with attention to early-stage project development and resilience assessment. • Investors embed TCFD (Task Force on Climate-Related Financial Disclosures) recommendations and publicly disclose on their climate-related risks and opportunities • Investors actively engage with holdings to encourage management of climate-related risks, ensuring a resilient built environment • Bilateral/multilateral development country assistance strategies include resilience component • Financial institutions and governments invest in enhancing their capacity to assess and integrate climate risk into financial decision-making processes, including environmental and social safeguard standards and to appraise the economic and financial aspects of nature-based solutions for reducing climate risk	• Finance institutions fund SMEs that provide climate adaptation intelligence (i.e. enhance knowledge and understanding about the context-specific risks and impacts of climate change) or adaptation products and services (i.e. enhance ability to adapt to and/or build resilience to climate change) • Financial institutions and governments have municipal bonds in place for resilience investments		

	By 2021	By 2025	By 2030	By 2040
2. Financial Institutions	• Insurance companies and financial institutions develop insurance products that address the climate risks of infrastructure, businesses, local governments and households • Financial institutions and insurance companies create appropriate financing and insurance products for SMEs that will allow them to invest in their own resilience			
3. Technology Providers and Innovators	• Technology providers coordinate with companies on release of buildings water and energy usage data that inform decision-making and investments • Innovators provide solutions to enable buildings water and energy usage data collection and analysis where they may not be currently measured. • Technology providers contribute to robust monitoring, maintenance, and renewal of essential utility infrastructure, with effective contingency planning. • Technology providers to innovate effective and inexpensive methods for regular monitoring and analysis of relevant data to inform city planning and strategies.	• Technology providers engage in R&D into climate proof infrastructure above and below ground. • Technology providers engage in R&D into cross-sectoral approaches when upgrading/ renewing city infrastructure • Tech providers to have robust, effective mechanisms in place to protect the information and operational technology systems on which a city is dependent. • Tech providers address climate risk and resilience of the most vulnerable inhabitants (e.g. low-tech mobile early warning system)	• Technology providers work closely with civil society organizations and sub-national governments to empower and scale community-based solutions, as well as local technology providers and innovators.	

	By 2021	By 2025	By 2030	By 2040
3. Technology Providers and Innovators	• Technology providers contribute to improving capacity of businesses, governments, and households to assess, understand and act on climate risk • Technology providers and innovators advance urban water-energy-food nexus in technologies and approaches • Technology providers and governments establish centres/ parks/ labs for innovation in adaptation and resilience.			
4. Business and Service Providers	• Private sector includes resilience considerations when developing neighbourhoods, with attention to the needs of vulnerable populations/ communities. • Business work with governments adopting holistic, resilient urban planning business models considering green, blue, and grey infrastructure • Businesses embed TCFD recommendations and publicly disclose on their climate-related risks and opportunities. • Architects, engineers and designers ensure that climate change adaptation is considered on every project by adjusting design parameters based on the predicted climate during the design life of the project, designing adaptable and flexible assets that can manage uncertainty and taking a systems approach that considers interdependencies.	• Infrastructure providers adopt business models for resilient infrastructure. • Private sector embarks upon effective reform of overarching frameworks and champions reforms towards minimum lot areas, maximum building heights, plot coverage ratios and land use restrictions, while safeguarding green space and avoiding the displacement of disadvantaged residents. • Technology providers to have robust, effective mechanisms in place to protect the information and operational technology systems on which a city is dependent. • Businesses adopt resilient building and infrastructure standards and codes • Businesses focus in technology solutions for resilience in buildings, like building envelope efficiency and thermal comfort systems that can reduce the impact of extreme climatic conditions.	• Businesses further incorporate climate risk and resilience strategies in their business models and corporate strategies, broadening the scope to cover social resilience as well. • Businesses systematically use models or standard clauses ensuring the integration of adaptation within contracts or consultation dossiers, and thus guaranteeing the clarity of the expected responsibilities and the risks covered. • Businesses mobilize funding for adaptation all over the value chain, to reduce future costs and anticipate adaptation measures.	

	By 2021	By 2025	By 2030	By 2040
4. Business and Service Providers	• Engineering develops and uses hourly meteorological data over a year as a set of reference data integrating the different IPCC scenarios and/or regularly taking into account the latest extreme episodes (for climate variables whose direction of change is known). • Businesses address the specific needs of the informal sector, also coupled with specific actions towards SMEs. • Businesses form and gather in forums that have a strong focus on resilience investments. Existing business forums adopt resilience as a key area of focus, sharing best practice on climate risk management in their specific context. • Businesses adopt Nature Based Solutions whenever possible and appropriate			
5. Civil Society	• Communities collect and share expertise, lessons learned from local practice practices to support national resilience governance and strategy • Communities share knowledge to increase awareness and preparedness for unexpected events, to allow all to take appropriate decisions in the face of shocks and stresses.	• Communities get organized into community networks that promote further urban resilience, with better understanding and response to changing needs. • Civil society engages in social structures providing support at individual, household, and local community level.		

	By 2021	By 2025	By 2030	By 2040
5. Civil Society	• Communities engage with city decision-making and stakeholder consultation inclusively and constructively, working on public awareness and education campaigns that can target, among other things, water & energy demand-side management, emergency response and what to do, opportunities to invest in their own resilience • Civil society organisations organize networks that work across a range of issues/sectors, that can be mobilised during the implementation of emergency response plans/disaster risk management plans. • Civil society organizations help build capacities in communities to support their meaningful engagement on resilience, as well as advance awareness raising and conscientization campaigns • Community members are involved in the planning and implementation of resilience urban upgrading schemes to enhance their understanding of risks and harness their knowledge of the environment in which they live.			

EXISTING INITIATIVES

GlobalABC – Regional Roadmaps	The GlobalABC Regional Roadmaps for Buildings and Construction are a product of a highly consultative process, we had more than 700 experts engaged in the development process, refining them each time with more data and examples from the region. It presents policy and technology targets and timelines, as well as key actions under eight priority areas which range from urban planning to new buildings, building retrofits, building operations, systems, materials, resilience and clean energy, in the quest of harnessing the sector's enormous opportunities for decarbonization and achieving the sustainable development goals These roadmaps present both, a framework and a process that can be used at the national level and support the buildings and construction sector's Race to Zero by 2050.
International Coalition for Sustainable Infrastructure (ICSI)	ICSI's mission is to mobilize an engineering-led coalition to make resilience and sustainability a cornerstone of every decision in the infrastructure lifecycle in every community around the globe. ICSI will identify and address the biggest barriers to action that have prevented us from working together for a sustainable, resilient and inclusive future. Their action tracks focus on funding and financing, innovation, leadership and whole-of-life costs, and guidance, tools and standards.
The Resilience Shift	Resilience Shift exists to inspire and empower a global community to make the world safer through resilient infrastructure.
The Global Commission on Adaptation (GCA)	The GCA moves communities, cities and countries to proactively prepare for the disruptive effects of climate change with urgency, fierce determination and foresight, so we can take advantage of the best, most cost-effective options, reduce risk and come out stronger. Action Tracks include water, cities and infrastructure.
UN Habitat – Building Climate Resilience of the Urban Poor (BCRUP)	Aims to enhance the resilience of those living in slums and informal settlements in developing countries, targeting, by 2023, 150 million slum dwellers in 140 'hot-spot' cities across 50 countries, and scaling this up to reach 600 million slum dwellers by 2030. Partners in the Initiative aim to mobilize USD 15.2 billion over a first phase for 4 years
Asian Cities Climate Change Resilience Network (ACCCRN)	ACCCRN aims to enable poor, marginalized, and otherwise vulnerable people in Asia's emerging cities, to be included and supported in the systems and processes driving urbanization and emerging resilience- building measures. Objectives are to amplify local voices, facilitating collaboration among practitioners, supporting community initiatives for resilience, and connecting stakeholders to join hands in building urban resilience.

Closing the Investment Gap in Sustainable Infrastructure (CIG)	A country-led, facilitated approach in which developing countries work with the private sector and other investors in preparing their ''investment'' pitches and enhance their bankable projects. The approach targets a largely untapped pool of funds and minimises demand for public capital or credit enhancement.
Leadership of Urban Climate Investments (LUCI)	Aims to accelerate the scale-up and leverage climate finance for climate friendly urban infrastructure. committed to accelerate, scale-up and leverage finance for climate-friendly urban infrastructure, by: Strengthening the capacity of 2000 cities in project preparation by 2025. Linking 1000 climate smart urban infrastructure projects to finance by 2025. Enabling 100 climate smart urban infrastructure projects to successfully use new national and international financing mechanisms by 2025. Strengthening national framework conditions, including the capacity of National Development Banks (NDBs) to support urban infrastructure projects.
Global Alliance for Urban Crises	The Global Alliance for Urban Crises is a multi-disciplinary, collaborative community of practice working to prevent, prepare for and effectively respond to humanitarian crises in urban settings. Focus on ensuring that initiatives focused on building urban resilience incorporate components on resilient response and recovery from crises, and that they leverage greatest impact in cities most at risk of humanitarian emergencies.
Making Cities Resilient	Aim to support sustainable urban development by promoting resilience activities and increasing local level understanding of disaster risk. The objectives are to: 1. raise awareness of the benefits of reducing urban risks. 2. Invest wisely 3. Build more safely.
Global Facility for Disaster Reduction and Recovery (GFDRR)	The Building Regulation for Resilience Program develops and promotes activities to increase regulatory capacity and promote healthier and safer built environments. By leveraging good practice in building regulation as part of a strategy to reduce both chronic risk and disaster risk, it aims to set developing countries on the path to effective reform and long-term resilience.
Coalition for Urban Transitions	The Coalition for Urban Transitions is the leading global initiative helping national governments unlock the economic power of inclusive, zero-carbon cities. Aim to drive a shift away from business-as-usual by empowering national governments with the evidence-based rationale and policy tools they need to prioritise more compact, connected, clean urban development
Finance to Accelerate the Sustainable Transition-Infrastructure (FAST-Infra) initiative	HSBC has been working with the International Finance Corporation, the OECD and others to mobilise infrastructure investment in emerging markets, through our Finance to Accelerate the Sustainable Transition-Infrastructure (FAST-Infra) initiative. This aims to develop a consistent labelling system for sustainable infrastructure investment.

100 Resilient Cities	Helping cities around the world become more resilient to physical, social, and economic shocks and stresses. Cities in the 100RC network have been provided with the resources necessary to develop a roadmap to resilience along four main pathways: Financial and logistical guidance for establishing an innovative new position in city government, a Chief Resilience Officer, who will lead the city's resilience efforts; Development of a robust Resilience Strategy; Access to solutions, service providers, and partners from the private, public and NGO sectors who can help them develop and implement their Resilience Strategies; and Membership of a global network of member cities who can learn from and help each other.
Resilient Cities Network	Resilient Cities Network co-creates urban solutions to address complex and interrelated urban challenges, so that cities and communities thrive. It consists of cities that are committed to building and investing in urban resilience, located in five geographical regions: Africa, Asia Pacific, Europe and Middle East, Latin America and the Caribbean, and North America.
City Resilience Index	The City Resilience Index has been designed to enable cities to measure and monitor the multiple factors that contribute to their resilience. Structured around 4 dimensions: Health and wellbeing, Economy and society, Infrastructure and environment, Leadership and strategy
Global Real Estate Sustainability Benchmark (GRESB)	GRESB assesses and benchmarks the Environmental, Social and Governance (ESG) performance of real assets, providing standardized and validated data to the capital markets. The Resilience Module is an optional supplement and addresses transition and physical risk. It has both real estate and infrastructure assessments.
Resilience First for businesses	Resilience First provides strategic thinking and advocacy to improve business resilience. It helps business communities to better manage risk through partnerships and practical solutions.
Global Resilience Partnership	GRP is an inclusive and diverse Partnership of organisations joining forces towards a world where vulnerable people and places are able to thrive in the face of shocks, uncertainty and change. GRP achieves collective impact by adding value to the work of its individual partners through innovation and scaling, shared learning, convening diverse voices, and advancing knowledge. GRP is currently comprised of more than 60 organisations, which bring together a broad range of skills, capacities, and perspectives, and provides powerful collaboration opportunities.
City Resilience Program	The City Resilience Program (CRP) – a partnership between the World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR) – is a multi-donor initiative aimed at increasing financing for urban resilience. The CRP's vision is resilient cities with the capacity to plan for and mitigate adverse impacts of disasters and climate change, thus enabling them to save lives, reduce losses and unlock economic and social potential. The aim of the Program is to catalyze a shift from a primarily siloed, single-stream city-level resilience operations approach to longer term, more comprehensive, multi-disciplinary packages of technical and financial services, building the pipeline for viable projects at the city level that, in turn, build resilience.

FMDV – Global Alliance for Subnational Development Banks (SDBs)	SDBs are national public stakeholders with the mandate to provide financial services to local governments. The Global Alliance is a multi-stakeholder coalition of SDBs and Central governments and development partners for professional intermediated access to climate finance for Local and Regional Governments, led by Cameroon, RIAFCO (the African Alliance of Subnational Development Banks) and FMDV – LUCI initiative.
UNCDF/UCLG/FMDV – International Municipal Investment Fund (IMIF) and Technical Assistance Facility (TAF)	An end-to-end project preparation facility (TAF) to support local governments to build their capacity, create an enabling policy environment to attract investment capital, and to generate a pipeline of revenue generating investments that will be financed by the IMIF, independently managed by Meridiam.
FMDV – Projects coaching and Matchmaking Forums to connect local projects with potential investors	Strengthen access to funding for local governments through city to city cooperation and projects coaching, connect the demand side for projects lead by central and local governments on sustainable urban services and infrastructure with the supply side for technical and financial solutions from DFIs, investors and service providers.
FMDV – Living Labs to test pilot and demonstrate low carbon solution	Development of small-scale innovation to test the technical, economics and financial models to evaluate and prepare the scale up investment phase. It lowers the investment risks, attract potential investors and ensure the appropriation by the local authorities and the final users.
Coalition for Disaster Resilient Infrastructure (CDRI)	The Coalition for Disaster Resilient Infrastructure (CDRI) is a partnership of national governments, UN agencies and programmes, multilateral development banks and financing mechanisms, the private sector, and knowledge institutions that aims to promote the resilience of new and existing infrastructure systems to climate and disaster risks in support of sustainable development.
Buildings and Climate Change Adaptation - A Call for Action	This is the first output of the GlobalABC “adaptation” working group which addresses challenges of climate change adaptation and the benefits of initiatives in the real-estate, building, and construction sector, establishing a common strategic vision on climate change adaptation and its priorities.

FURTHER REFERENCES

Intergovernmental Panel on Climate Change, Special Report: Global Warming of 1.5°C	GlobalABC | Adopting Decarbonization Policies for Buildings and Construction
2020 Global Status Report for Buildings and Construction	GlobalABC Buildings and Climate Change Adaptation: a Call to Action
WBCSD - Construction and Building Materials TCFD Preparer Forum	CDP Report, Cities at Risk: Dealing with the pressures of climate change
GlobalABC Regional Roadmaps for Buildings and Construction (Africa | Asia | Latin America)	WBCSD: Business Climate Resilience: Thriving Through the Transformation
City Resilience Index	The Resilience Shift – Resilience Primers
ICLEI - Public Procurement of Nature-Based Solutions - Addressing Barriers to the Procurement of Urban	C40 - Integrating Climate Adaptation: A toolkit for urban planners and adaptation practitioners C40 policy brief: Reducing climate change impacts on municipal buildings C40 policy brief: Reducing climate change impacts on new buildings

Impact 3

WASTE AND CONSUMPTION – ZERO WASTE

MITIGATION

Nexus

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• Make zero waste commitments that set specific goals for the mid and long-term that reduce the volume of waste generated by focusing on waste prevention instead of management [Zero Waste Europe] • Encourage cities to take a territorial governance approach when defining actions on waste and consumption.to ensure a systematic approach inclusive of neighbouring peri-urban and rural areas [FAO] • Ensure that policy measures for COVID recovery prioritizes the transition to a circular economy [FAO]	• Collect waste composition data and set collection & reduction targets for carbon intensive materials in waste [ICLEI]. • Development and capacity building for implementing segregated waste collection schemes (organics/ recycling/residuals) by 2030 [C40] • Integrate circular thinking in waste management plans [Zero Waste Europe] • Invest in quality collection points for citizens and businesses to donate a higher volume of reusable materials/products [Zero Waste Europe]	• Implement segregated waste collection schemes (organics/recycling/residuals) [C40]Further develop and upscale circular business model supporting programs • Integrate circular thinking in waste management plans • 50 per cent reduction of primary resource consumption of procured goods • Increase proportion of municipal solid waste collected and managed in controlled facilities out of the total municipal solid waste generated (SDG 11.6) [UN-HABITAT]	• Monitor collection & reduction targets for carbon intensive materials in waste • Implement circular public procurement plans driving eco-design in public infrastructure and services • Aim for 100% of tenders include criteria on circularity • Total waste generated within the community / region is 50% less than in 2020 [Zero Waste Europe]

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• Increase awareness on circular economy action plans, material leaks and circularity scan by embedding circulariy as a priority within all communications [ICLEI] • Research and prepare plans to leverage public procurement to implement circularity • Increased awareness and implementation of circular thinking in waste management plans, municipal services and urban development [ICLEI] • Pilot local initiatives that accelerate the transition to a circular economy, such as deposit return schemes for packaging, reusable nappy systems etc. [Zero Waste Europe] • Design circular business model-supporting programs and run capacity building programs for businesses. Support these with local initiatives to encourage zero waste business models [ICLEI] • Raise awareness around existing circular economy initiatives in their jurisdictions, run campaigns to encourage new habits among citizens (EMF), including by mobilising arts, culture and heritage channels [Climate Heritage Network].	• Set targets for food waste reduction (SDG12) and outline the policies that will help achieve these targets • Eliminate single use plastic packaging [AEPW] • Introduce legally binding targets on construction and textile waste reduction • Advocate for national / regional legally binding targets on the % of reusable packaging and materials placed onto the market [Zero Waste Europe] • Set mandatory criteria for circularity in public procurement for high-carbon impact products and services • Put in place the appropriate infrastructure required for a circular economy such as asset-sharing infrastructure, waste collection systems, treatment facilities, material banks, disassembly and recycling centres [EMF] • International Trade Policies & Standardisation [EMF] • Establish targets and ensure frameworks are in place for circularity in public procurement - X% of public spending towards circular products, materials, business models • Include voluntary circularity criteria in flagship public procurements	• Residual waste generation is at least 75% lower than the baseline measurement year of 2020 [Zero Waste Europe] • At least 90% of waste is collected for reuse & recycling [Zero Waste Europe] • Non-recyclable materials restrictions [C40]	

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• Assess fiscal measures such as tax breaks to stimulate circular economy activities (e.g. repair, share, reuse), tax reductions on the use of secondary materials, charges and tariffs to incentivize behaviour change, or fines • Leverage bans to prohibit the circulation of goods and materials that are problematic [EMF] • Collect data on municipal solid waste composition, generation and management in controlled facilities, as well as identify intervention areas to increase circularity (Rethink, Regenerate, Reduce, Reuse, Recover strategies) [ICLEI] • Prohibit single-use plastic and packaging to be used in any public space or event, replaced with reusable alternatives [Zero Waste Europe] • Do not invest in or extend existing capacity of harmful disposal methods, such as waste-to-energy incineration, which only lock-in the need for continued waste generation. [Zero Waste Europe] • Ensure arts, culture and heritage agencies are engaged are engaged to address cultural dimension of zero waste cities [Climate Heritage Network]	• Implement fiscal measures such as tax breaks to stimulate circular economy activity, charges and tariffs to incentivize behaviour change, or fines that penalize those who continue to generate the most waste • Ensure that 100% of organic waste generated is captured and either composted (home or community) or used in anaerobic digestion processes [Zero Waste Europe] • Provide vocational support and training to workers from traditional waste management sectors so that their skills can be kept and utilised for circular solutions instead [Zero Waste Europe] • Capture data on the volume of GhG emission savings from both the reduction in waste treated and via prevention measures [Zero Waste Europe] Capture data on the economic benefits that the zero waste strategy has bought to the local authority, including cost savings from an optimised waste management system to new jobs being created in sustainable sectors [Zero Waste Europe]		

	By 2021	By 2025	By 2030	By 2040
2. Financial Institutions	• Ensure that any financial support for COVID recovery prioritizes the transition to a circular economy [Zero Waste Europe] • Develop credit lines and investment facilities for alternative building materials • Develop innovative financing tools for waste collection, reduction, recovery. • Co-financing/public-private financing to support circular economy related projects, circular economy incubator and investment programmes – especially those that are high potential but high risk	• Ensure no funding is provided that extends or renews the capacity of environmentally harmful disposal methods (landfill, waste-to-energy incineration) [Zero Waste Europe] • Scale up financial assistance that's offered to SMEs and industries which operate circular business models [Zero Waste Europe] • Rapidly increase the amount of funding available to local authorities (E.G. grants, loans, seed funding etc) to allow the implementation of zero waste strategies [Zero Waste Europe] • No subsidies or financial support is provided to companies that base their business model on the extraction of fossil-fuels [Zero Waste Europe]	• No subsidies or financial support is provided to companies which do not implement circular business models [Zero Waste Europe] • New partnerships exist with local authorities that jointly finance zero waste projects [Zero Waste Europe] • Develop financial products and solutions tailored to conservation and reuse of older and historic buildings, such as green mortgages, green loans and green bonds and into whole life-cycle carbon assessments linked to financing for circular solutions [Climate Heritage Network]. • Promoting financing and other policies so that craft and other local products can reach local markets [Climate Heritage Network].	
3. Technology Providers and Innovators	• Support mechanical recycling technology transfer firstly in Asia and Africa • Develop new and promote existing circular solutions that allow materials/products to be reused rather than disposed of [Zero Waste Europe]	• Use public procurement of innovation to get support for the creation of novel products and services	• Emphasise traditional building technology, craft and other forms of traditional knowledge as exemplars of place-based, low carbon knowledge to be scaled out in support of contemporary circular economy models [Climate Heritage Network].	
4. Business and Service Providers	• Scale-up capacity building among business service providers on eco-design • Embed Extended Producer Responsibility (EPR) in waste management plans • Embed awareness of circular design into innovation teams	• Adjust existing business models or implement new models that are closed-loop, through deposit returns or reverse logistics & collection [Zero Waste Europe]	• Volume-based waste collection fees and/or incentives [C40]	

	By 2021	By 2025	By 2030	By 2040
4. Business and Service Providers	• Integrate circular economy into company strategy • Pilot, innovate and invest in circular materials, products, and business models • Run corporate communication campaigns and public awareness campaigns in order to establish trust in secondary products and materials, help users accept access-over-ownership business models etc. • Support IWM via Alliance to End Plastic Waste • Take part in market dialogue opportunities with the public sector • Scale up capacity in arts, culture and heritage agencies, and Indigenous peoples' organizations for circular economy models in arts, performance and cultural institutions [Climate Heritage Network] • Measure and value the embodied carbon conserved and the GHGs avoided through the use and adaptive reuse of existing buildings while also recognising the co-benefits associated with safeguarding heritage values in the built environment [Climate Heritage Network].	• Include creative and craft actors, makers and innovators, as part of strategies to re-localizing production-consumption processes; extending sustainability labels/logos to craft products [Climate Heritage Network]		

	By 2021	By 2025	By 2030	By 2040
5. Civil Society	• Build capacity and provide TA on circular thinking in waste management and policy instruments, including development of tools and frameworks [EMF] • Convene stakeholders (alongside local government) at the local level to stimulate collaboration around circular economy opportunities [EMF] • Participatory involvement of citizens as zero waste auditors or consultants to help the design and implementation of zero waste policies [Zero Waste Europe] • Advocate for a post-COVID-19 gradual shift of individual consumption goods and services towards climate-friendly practices in terms of GHG emission reductions and risks (e.g. Good Life Goals) [FAO].	• Ensure major shift (50 % of population) of individual consumption of goods and services to climate-friendly practices in terms of GHG emission reductions and risks	• Ensure full shift (90 % of population) of individual consumption of goods and services to climate-friendly practices in terms of GHG emission reductions and risks in line with SDG 12.1 [FAO].	

EXISTING INITIATIVES

NAZCA initiative	The Non-state Actor Zone for Climate Action (NAZCA) is an online portal hosted by the United Nations Framework Convention on Climate Change (UNFCCC). It highlights actions that cities, companies, investors, and regions – non-state actors – are taking to address climate change.
C40 Zero Waste Declaration	Signatory cities to the C40 Advancing Towards Zero Waste Declaration have committed to accelerate the transition towards a zero waste future. These cities have pledged to take ambitious, measurable and inclusive actions to reduce municipal solid waste generation and improve materials management, to reach two goals: (1) Reduce municipal solid waste generation per capita by at least 15% by 2030 compared to 2015, and (2) Reduce the amount of municipal solid waste disposed to landfill and incineration by at least 50% by 2030 compared to 2015, and increase the diversion rate away from landfill and incineration to at least 70% by 2030.
Cities Climate Finance Leadership Alliance (CCFLA)	The Cities Climate Finance Leadership Alliance (CCFLA) is a coalition of more than forty organizations actively working to accelerate investment into sustainable infrastructure. [1] The Alliance brings together a wide range of public and private institutions.
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Leadership for Urban Climate Investment (LUCI)	The Leadership for Urban Climate Investment (LUCI) is an initiative under the ICLA track offering a comprehensive and transformative approach in sealing gaps in the investment value chain by establishing a global financing framework through synergies between countries, international and national financial institutions, international organisations, climate institutions and funds, and other partners. The initiative also seeks to achieve subnational financing through supporting bankable projects, capacity building of national and subnational development banks, and improving financing options.
Planners for Climate Action	Planners for Climate Action is a cooperative initiative born at the 23rd Conference of Parties (COP-23) to the UN Framework Convention on Climate Change (UNFCCC), in Bonn on 11 November 2017. The initiative, convened by UN-Habitat, is comprised of associations of planning practitioners and planning educators, collectively representing tens of thousands of planners worldwide, as well as other partners active in this area.

Urban-LEDS project	The Urban-LEDS project addresses integrated low emission and resilient development in more than 60 cities in 8 countries: Brazil, India, Indonesia and South Africa (from Phase I) and countries added in Phase II: Bangladesh, Colombia, Lao PDR and Rwanda. In addition to these countries, 16 European cities will act as source cities and support peer-to-peer exchange and cooperation.
One Planet Network Sustainable Public Procurement Programme	The One Planet Network Sustainable Public Procurement (SPP) programme is a voluntary global multi-stakeholder partnership in which various parties - governmental, non-governmental, public and private, agree to work together in a systematic way with the aim to promote and accelerate the implementation of sustainable public procurement globally as a way to ensure sustainable consumption and production patterns.
Living Prospects	Living Prospects (LP) was established in 2007 as a boutique consultancy promoting a green economy transition. Beyond integrating circularity into its company strategy, LP supports locally-led initiatives such as the WASTE RREACT project implementing diverse recycling systems in seven Western Balkan regions, the E-HORECA WANET project promoting a complementary sustainable waste management system for city economies based on tourism in Greece and Albania, and the ECOWAVES project city-port waste management systems in the Adriatic sea.
Urban Transitions Alliance	The Urban Transitions Alliance is designed for ambitious cities with industrial legacies to share knowledge, discover new solutions and better navigate their urban transitions towards a sustainable and equitable future. A global network of industrial legacy cities who have all committed to realizing sustainable and inclusive urban transitions, paving the way for other industrial cities to follow. A living knowledge hub of innovative policies and projects, investigating how sustainability programs can be designed to benefit all residents and increase equity. A service and support tool for cities to access the expertise, research and collaborative space they need for existing and future transition plans.
Green Circular Cities Coalition	Green Circular Cities Coalition in 2019, presenting a platform to connect cities, experts, businesses and relevant stakeholders to shift the mindset from “waste management” towards “resource management”, reduce waste, and increase circularity via experiences exchange and mutual learning.
WIEGO - Waste Pickers	Waste pickers collect household or commercial/industrial waste. They may collect from private waste bins or dumpsters, along streets and waterways or on dumps and landfills. Some rummage in search of necessities; others collect and sell recyclables to middlemen or businesses. Some work in recycling warehouses or recycling plants owned by their cooperatives or associations.
PREVENT Waste Alliance	The PREVENT Waste Alliance is financed by the German Federal Ministry for Economic Cooperation and Development (BMZ) and its main objectives are to contribute to waste minimisation and to maximize the reutilization of the world resources, particularly in low and middle-income countries

Waste Wise Cities by UN-Habitat	Waste Wise Cities was launched by UN-Habitat in 2018 with a call to action to enhance solid waste management and resource efficiency in the world's cities. Cities and local governments that join Waste Wise Cities commit to its 12 principles of sustainable waste management, including the 5Rs (Rethink, Reduce, Refuse, Reuse and Recycle). They are supported by Affiliates (any other institution working towards the principles).
Zero Waste International Alliance	The Zero Waste International Alliance (ZWIA) is a group of environmental professionals dedicated to working towards a world without waste through public education and practical application of Zero Waste principles. By disseminating knowledge and providing support to its members ZWIA is promoting the implementation of Zero Waste Principles in various aspects.
Ellen MacArthur Foundation	The Ellen MacArthur Foundation was launched in 2010 to accelerate the transition to a circular economy. Since its creation, we have emerged as a global thought leader, establishing the circular economy on the agenda of decision makers across business, government, and academia.
Alliance to End Plastic Waste	The Alliance to End Plastic Waste is an industry-led member organisation that seeks to promote plastic waste reduction around the world to address the challenge to end plastic waste in the environment.
ICLEI Circulars Platform	Circular Development is one of the five strategic pathways of ICLEI providing guidance for sustainable urban development. ICLEI Circulars platform gathers the latest knowledge on circular economy interventions at local and regional government levels around the world, provides materials for awareness raising, offers capacity building and implementation support on circular development actions and policies, shares inspiring stories from the leading cities and facilitates peer-to-peer exchange.
Circular Cities Declaration (ICLEI)	The European Circular Cities Declaration is designed to help accelerate the transition from a linear to a circular economy in Europe, and thereby create a resource-efficient, low-carbon and socially responsible society. It aims to: (I) Allow local and regional governments across Europe to communicate their commitment to supporting the circular transition; (II) Provide a shared vision of what a "circular city" is; (III) Underline the critical role which local and regional governments need to play in making this transition happen; (IV) Establish a community of committed organisations to share their experiences, challenges and successes. The Declaration has been developed by a broad partnership of stakeholders to ensure that the vision and commitments contained are ambitious, yet achievable, and reflect the needs of all.
Zero Waste Cities by Zero Waste Europe	The Zero Waste Cities programme works with nearly 400 European municipalities who have made zero waste commitments, helping local authorities design and implement effective, community-centred waste reduction policies. Operated by Zero Waste Europe, the zero waste cities approach provides local authorities with a framework to create community systems and policies that do not generate waste in the first place. It is behind the majority of Europe's best performing local authorities for low waste generation, supplemented by high recycling rates and impactful waste prevention measures.

Zero Waste Cities Certification	The world's first Zero Waste Cities (ZWC) Certification is a robust, supportive, and impactful system aiming to promote local-led solutions across Europe. The Certification encourages municipalities to commit to more ambitious goals and, at the same time, to implement greener and more sustainable policies and solutions regarding waste management and circular economy practices. This independent, third party assessed certification standard is based on over 10 years of expertise and close contact collaborations with more than 400 European Municipalities, who have committed to zero waste principles and circular economy implementation.
More Circularity, Less Carbon	The More Circularity, Less Carbon campaign was born to celebrate the anniversary of ACR+ and push further its message, determined to make the link between circular economy and climate mitigation. The campaign will run from November 2019 to November 2025, seeing ACR+ members and all other interested local authorities taking steps at their level to reduce the carbon emissions linked with local resource management by 25% by 2025. It intends to show that cities and regions are crucial players to reduce the carbon footprint of several key sectors by implementing ambitious yet feasible actions to prevent losses and waste, extend the lifetime of products, and close the loops of materials.
Circle City Scan Tool	The Circle City Scan Tool is an online open access tool which aims to support cities in using data to identify priority areas for shifting resource management from linear to circular, and scoping their options with the aid of inspiring case studies from around the world. The tool is being developed as an ongoing collaboration between Circle Economy, ICLEI, Ellen MacArthur Foundation, Metabolic and UNEP.
Climate Heritage Network	The Climate Heritage Network is a global network of organisation committed to using arts, culture and heritage to help communities achieve the ambitions of the Paris Agreement. Its members include governments at all levels, universities, business, and civil society.
One Planet City Challenge	The One Planet City Challenge is our invitation to cities to join WWF on an ongoing mission: the creation of cities that enable people to live in balance with nature now and in the future. Cities drive global GDP and generate the majority of the world's carbon emissions. Yet cities also project human hope, ingenuity, and creativity. The OPCC format creates friendly competition between cities while celebrating the best and brightest ideas, actions, people, and policies. WWF reviews cities' progress and assesses whether actions align with the Paris Agreement.
Plastic Smart Cities	Plastic Smart Cities is a WWF initiative that supports a no plastic in nature agenda. Since 2018, the initiative has supported cities and coastal centers in taking bold action to stop plastic pollution, with a goal to reduce plastic leakage into nature by 30% by 2025. The initiative seeks to grow to 1,000 Plastic Smart Cities, achieving no plastic in nature by 2030.

One Planet- International Resource Panel Task Group on Catalysing science-based-policy action on Sustainable Consumption and Production	The Task Group comprised of the International Resource Panel and One Planet network aims to catalyse science-based policy action on sustainable consumption and production, thereby providing actionable insights on the management of natural resources in relation to the 2030 Agenda for Sustainable Development. To achieve this, the task group takes a sectoral focus and applied the value-chain approach. The value-chain approach anchors natural resource use and environmental impacts within the socio-economic reality of production and consumption, and uncovers actionable insights on how the management of resources is connected with the 2030 Agenda for Sustainable Development. The approach is applied to Food, Construction and Textiles so far.

FURTHER REFERENCES

ISWA	International Resource Panel
Ellen MacArthur Foundation: Completing the Picture: How the Circular Economy Tackles Climate Change City Governments and their role in enabling a circular economy transition	ICLEI Circulars: Leading Circular City linking circular economy interventions to climate neutrality action plans: Circular Turku Circular City Actions Framework
Catalysing science-based policy action on sustainable consumption and production: The value-chain approach & its application to food, construction and textiles	

Impact 4

WASTE AND CONSUMPTION – 1.5ºC LIVING

MITIGATION/ ADAPTATION /RESILIENCE

Nexus

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• Increased awareness on urban consumption as a key driver of global GHG emissions and the role of local governments to tackle them. • Encourage cities to take a territorial governance approach when defining actions on waste and consumption.to ensure a systematic approach inclusive of neighbouring peri-urban and rural areas [FAO]. • Address intersection of land use, territorial planning, mobility and 1.5 living, including learning from dense, walkable historic settlement patterns and promoting the creative dimensions of mobility [Climate Heritage Network]	• Prepare consumption-based inventories integrating them into the NDCs. • Integrate per-capita lifestyle carbon footprint targets of 2.5 (tCO2e) by 2030, 1.4 by 2040, and 0.7 by 2050 into national and climate action plans. • Make pledges in priority areas of consumption (sustainable diets, mobility, housing) • Connect climate targets to procurement strategy and timeline [ICLEI] • Raise awareness about the power of green public procurement and start practicing it in high-impact procurements [ICLEI]	• Revise per-capita lifestyle carbon footprint targets of 1.4 (tCO_2e) by 2040, and 0.7 by 2050 • Establish per-capita emissions trading schemes.	

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• Expanded data collection and analysis about energy efficiency, materials use and waste, and water management in old and historic buildings in order to enable robust metabolism assessments [Climate Heritage Network]. • Improved insights into benefits for a city and its residents in cutting consumption-based emissions. • 1.5ºC Living campaigns (Finland, Japan already in 2020). • Start monitoring the impact of sustainable procurement on emission reduction	• Ensure at least 200 cities have addressed the role of the arts, culture, heritage and creativity in changing consumption patterns to achieve 1.5° Living [Climate Heritage Network]. • Develop policy mix to decrease emission from consumption in high-income cities by two third [ICLEI]. Revise the per-capita lifestyle carbon footprint targets set in 2019 i.e. 2.5 (tCO_2e) by 2030, 1.4 by 2040, and 0.7 by 2050.		
2. Financial Institutions	• Support the development of green taxonomies for sustainable investment (e.g. EU Taxonomy Climate Delegated Act)			
3. Technology Providers and Innovators	• Innovation and partnerships for low-carbon technologies			
4. Business and Service Providers	• Encourage businesses to commit to actions in line with the 1.5° goal • Enable people to eat more plant based options and reduce food waste in canteens, school feeding programs [C40]			

	By 2021	By 2025	By 2030	By 2040
5. Civil Society	• Advocate for a post-COVID-19 gradual shift of individual consumption of food, goods and services towards climate-friendly practices in terms of GHG emission reductions and risks (e.g. Good Life Goals) [FAO].	• Ensure major shift (50 % of population) of individual consumption of food, goods and services to climate-friendly practices in terms of GHG emission reductions and risks [FAO].	• Ensure full shift (90 % of population) of individual consumption of food, goods and services to climate-friendly practices in terms of GHG emission reductions and risks in line with SDG 12.1 [FAO].	

EXISTING INITIATIVES

NAZCA initiative	The Non-state Actor Zone for Climate Action (NAZCA) is an online portal hosted by the United Nations Framework Convention on Climate Change (UNFCCC). It highlights actions that cities, companies, investors, and regions – non-state actors – are taking to address climate change.
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Green Circular Cities Coalition (ICLEI)	Green Circular Cities Coalition in 2019, presenting a platform to connect cities, experts, businesses and relevant stakeholders to shift the mindset from “waste management” towards “resource management”, reduce waste, and increase circularity via experiences exchange and mutual learning.

ICLEI – Climate Neutrality Framework	Through the low emission pathway, local and regional governments step up to achieve climate neutrality and deliver on global climate goals. Our vision of climate neutrality is a holistic process that includes ambitious climate change mitigation and adaptation at home and additional contributions to global climate processes and mechanisms.
C40 – Deadline 2020	Deadline 2020 is the first significant routemap for achieving the Paris Agreement, outlining the pace, scale and prioritization of action needed by C40 member cities over the next 5 years and beyond.
Urban Pathways	Urban Pathways is supporting Low Carbon Plans for Urban Basic Services in the context of the New Urban Agenda, implemented by UN-Habitat in cooperation with UN Environment and the Wuppertal Institut. The project follows a structured approach to boost Low Carbon Plans for urban mobility, energy and waste management services in pilot and replications cities, working on concrete steps towards a maximum impact in cities to global climate change mitigation efforts and sustainable and inclusive urban development. More information at https://www.urban-pathways.org/
Shift 1.5	Sitra Shift 1.5 is a community of practice to empower organizations around the world to inspire and support individuals to live good and sustainable lifestyles. The goal of Shift 1.5 is to help change-maker teams to make everyday climate actions locally aspirational to all people, turn the huge CO2 reduction potential of individuals into action and inspire people to become change makers in their everyday life and in all their roles; to equip change accelerators, with tested and proven methods; and to create a community of practitioners who can help each other and share lessons learned to improve our change making methods.
1.5 Degree Life Campaign	By 1.5-degree life we mean a lifestyle that is sustainable and climate friendly - a lifestyle that does not accelerate climate change or overconsume nature. 1.5 degrees refers to the objectives of the Paris Agreement, In collaboration with Turku Youth Council, the City of Turku challenges you to share your best everyday climate tips by means of video art. Turku has challenged the Yokohama city, Nagano city and Obuse town to take part of the competition simultaneously in Japan. https://www.turku.fi/en/carbon-neutral-turku/15-degree-life Here are the winning videos: https://www.turku.fi/en/news/2021-04-06_three-generations-won-turku-climate-video-competition
More Circularity, Less Carbon	The More Circularity, Less Carbon campaign was born to celebrate the anniversary of ACR+ and push further its message, determined to make the link between circular economy and climate mitigation. The campaign will run from November 2019 to November 2025, seeing ACR+ members and all other interested local authorities taking steps at their level to reduce the carbon emissions linked with local resource management by 25% by 2025. It intends to show that cities and regions are crucial players to reduce the carbon footprint of several key sectors by implementing ambitious yet feasible actions to prevent losses and waste, extend the lifetime of products, and close the loops of materials.

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FURTHER REFERENCES

IGES – 1.5°C Lifestyle	IPCC Special Report on 1.5oC Summary for Urban Policy Makers
The Future of Our Pasts: Engaging Cultural Heritage in Climate Action	UNEP - IGES - HotorCool Future Lifestyles Project
UN Emissions Gap Report chapter 6 on equitable low carbon lifestyles	Cambridge Sustainability Commission on Scaling Behaviour Change

Impact 5

WASTE AND CONSUMPTION – SOCIAL EQUITY

ADAPTATION & RESILIENCE

Nexus

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• Equity thinking is mainstreamed in policy design to ensure the creation of risk-sensitive and shock-responsive social protection systems [FAO]. • Introduction of social protection systems as part of COVID-19 recovery programmes to ensure a right to food for all [FAO]. • Individuals and groups affected have a voice and are included in policy design early-on • Public administrations and decision-makers receive equity trainings to ensure common understanding and language • Market policies enable economic diversification and localization to diversify employment opportunities	• Climate policies and interventions are designed to 1) enable access for all, 2) foster participation and co-creation and 3) offer equal opportunities for all • Social protection programmes to ensure a right to food for 50% of the population [FAO]. • Leverage the procurement process to support gender equality, fair working conditions and social enterprises • Actions to address the climate crisis must not further disadvantage people and communities who already experience significant inequalities; and secondly, that actions to create a safer and more sustainable city must also be aimed at building a just and more equal city	• Social protection programmes to ensure a right to food for 90% of the population [FAO].	• Social protection programmes to ensure a right to food for 100% of the population [FAO].

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)	• Integrate social responsibility into public procurement strategy • Sustainability and social justice must go together, both locally and globally	• Enlist arts, culture and heritage sector to encourage inclusive local co-creation of green transition planning [Climate Heritage Network]. • Use cultural strategies to address just transition by supporting community-based prioritisation and documentation of the effects of structural changes, for example by taking account of impacts on losses of traditional livelihoods and other elements of cultural significance. Use public accessible cultural institutions such as libraries and as platforms for bringing communities together to elaborate such plans [Climate Heritage Network]. • Memorialising the historic contributions of affected regions, communities, groups, and sectors to the carbon-based economy can also facilitate moving beyond them by transition to a post-carbon economy. Cultural heritage can support this outcome by documenting, valuing, and celebrating carbon-heritage in ways that support the pride of local communities and tangible and intangible traditions, for example through community archiving [Climate Heritage Network]. • Craft heritage and traditional livelihoods can support contemporary re-skilling and economic diversification for job creation and enhanced economic, environmental, and social resilience [Climate Heritage Network].		

	By 2021	By 2025	By 2030	By 2040
1. Policymakers (national, subnational, local levels)		• Promote low-carbon urban mobility solutions, including intermodal transportation and integrated transport systems, that facilitate equitable access for all to a diversity of good, service and cultural activities [Climate Heritage Network].		
2. Financial Institutions	• Societal costs of inequalities are recognized • Finance tools and funding methods are developed and mainstreamed to strengthen equity outcomes, e.g. participatory budgeting, socially responsible public procurement, Social Impact Bonds, tax incentives for equity-conscious investments • Transparency and accountability in public financial management are strengthened • Include regions and sectors dependent on unsustainable levels of GHG intensive production (including areas overdependent on tourism) in Just Transition finance Mechanism [Climate Heritage Network]	• Green Investment can deliver multiple benefits – for instance, housing retrofit co-benefits local jobs to reduce carbon emissions and deliver affordable warmth for residents, which is a winning combination.		
3. Technology Providers and Innovators		• Intervention and rapid mobilisation of science, technology and finance which has been set against the virus being harnessed for the climate emergency.		

	By 2021	By 2025	By 2030	By 2040
4. Business and Service Providers	• Social entrepreneurship and social innovation are fostered through targeted policies as well as education and support programs • Training and job opportunity programs offer entry support for new employments fields to contribute to a just transition • Employers are encouraged / bound to ensure diversity of staff and quality jobs • Mobilize the culture, art, music, heritage and design sectors to address the cultural dimensions of just transition, including using craft, trades and traditional livelihoods to support contemporary re-skilling and economic diversification for job creation and enhanced economic, environmental, and social resilience [Climate Heritage Network].			
5. Civil Society	• CSOs and are invited and empowered to contribute to policymaking • Civil society is strengthened through support and training opportunities • Time and capacity investments of civil engagements are recognized and accounted for	• To advocate for and strengthen social equity is not considered as “turf” of civil society / social organizations, but as joint task of all parts of society and public institutions		

Source: [Urban Arenas for Sustainable and Just Cities]

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Thriving Cities Initiative	The Thriving Cities Initiative (TCI) has been developed by Circle Economy in collaboration with Kate Raworth and C40 to downscale the doughnut economic model to the city level. The programme has thus far been piloted in Amsterdam, Philadelphia and Portland, and takes city stakeholders on a journey toward creating socially-just and ecologically-safe futures.
Circular Jobs Initiative	The Circular Jobs Initiative (CJI) is a knowledge centre that aims to ensure the transition to the circular economy is positive for work and workers.
Urban Transitions Alliance	Launched in 2017, the Urban Transitions Alliance is a city network and knowledge-exchange hub of innovative urban transition policies and projects. With an overarching social equity focus, it supports industrial legacy cities from across the globe to identify common challenges, share knowledge and develop equitable solutions to successfully guide their individual sustainable transitions.
Green Circular Cities Coalition	Green Circular Cities Coalition in 2019, presenting a platform to connect cities, experts, businesses and relevant stakeholders to shift the mindset from “waste management” towards “resource management”, reduce waste, and increase circularity via experiences exchange and mutual learning.
Urban Arenas for Sustainable and Just Cities	The UrbanA project is distilling innovative urban solutions for sustainable & just cities. This is a co-creative process with city-makers and city-thinkers.
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FURTHER REFERENCES

GCoM – Global Task Force Joint Declaration	Right to the City
Circle Economy - Circular Jobs Initiative	Closing the skills gap: vocational education and training for the circular economy
Thriving Cities Initiative	Creating city portraits: a methodological guide from the Thriving Cities Initiative
European Cultural Heritage Green Paper (chapter on cultural heritage and ensuring a just transition)	

CONTRIBUTIONS

Under the leadership of the High-Level Champions and through the Marrakech Partnership for Global Climate Action, the development of this Climate Action Pathway was led by the Global Alliance for Buildings and Construction | UN Environment Programme and ICLEI in collaboration with ACR+, BIM Africa, C40 Cities, Carbon Disclosure Project (CDP), Carbon Trust, Circle Economy, Climate Chance, Climate Heritage Network, Climate Policy Initiative, Climate Policy Initiative, Cool Coalition, Ellen MacArthur Foundation (EMF), FAO, FMDV, French Ministry of Environment, Global Covenant of Mayors for Climate & Energy (GCoM), Living Prospects, Ministry of Ecological Transition of France, Programme for Energy Efficiency in Building (PEEB), Reall, Regions20, Regions4, Sitra, SWITCH-Asia SCP Facility., The Climate Group, UN Habitat, United Nations Environment Programme (UNEP), World Business Council for Sustainable Development (WBCSD), World Green Buildings Council (WGBC), and WWF.