DECARBONISATION ROADMAP

EXPO CITY DUBAI

01 FOREWORD

Cities are significant sources of greenhouse gas emissions, accounting for more than 60 per cent of global carbon dioxide (CO_2) emissions but covering only 2 per cent of the world's land surface. Many cities have recognised the importance of climate change mitigation in urban areas and are developing aggressive action plans and setting ambitious targets to decarbonise all activities within their boundaries, including those of governments, workforce, businesses and residents.

With this increasing global emphasis on decarbonising cities, we at Expo City Dubai have developed a decarbonisation roadmap based on global best practice that forms the foundation of our broader sustainability strategy. This comprehensive plan provides a holistic approach to decarbonisation at an urban scale to deliver a positive social, environmental, and economic impact on the city.

Our work began with a review of relevant greenhouse gas (GHG) accounting protocols and standards and benchmarking against other leading cities to ensure a comprehensive view of all relevant impacts. Following this, we opted to include all geographic-based emissions as suggested in the BASIC+ framework of the **Global Protocol for Community Scale GHG Inventories (GPC)**, as well as consumptive emissions as defined in the Direct Plus Supply Chain Framework of the **PAS2070 Standard**.

Our decarbonisation roadmap defines long-term targets, supported by interim targets designed to drive action in the short- and medium-term.

Our targets are in line with international best practice and will contribute to national and global climate goals with the support and engagement of key stakeholders.

Transparency and continuous monitoring with the identification of areas for improvement are core to our approach. We will update and publish our carbon inventory annually and engage external auditors to ensure our progress remains on track, and will adjust as necessary to ensure we achieve our long-term goal of net zero by 2050.

We will share further details of initiatives that fall under this decarbonisation roadmap as we progress, and our success stories and learnings will be included in Expo City's annual sustainability reports, published in line with third-party reporting frameworks.

A message from Her Excellency Reem Al Hashimy

UAE Minister of International Cooperation
and CEO of Expo City Dubai Authority

"Our roadmap supports the UAE's Net Zero by 2050 strategic initiative, as well as global climate goals, and will take practical and scalable action to maximise our positive impact"

From the significance placed on environmental stewardship by our nation's Founding Father, the late Sheikh Zayed, to the United Arab Emirates becoming the first country in the region to ratify the Paris Agreement and adopt a net zero target, the UAE has established itself as a future-focused, inclusive, collaborative and pioneering force in the fight against climate change.

Sustainability was deeply embedded in Expo 2020 Dubai's values, guiding every decision to make ours one of the most sustainable World Expos in history and leave a meaningful, lasting legacy. Now, the site that hosted a World Expo for the first six months of its life is transitioning into a thriving, people-centric city of the future – a blueprint in sustainable urban living that is well positioned to push the envelope even further.

Expo City Dubai maintains and builds upon the shared ethos of environmental responsibility – from construction, architecture and operations, to offering a space and an ecosystem for responsible and like-minded citizens and businesses to call home, while engaging with one another and with the world.

As we continually strive to do better, to raise the bar, and encourage others to join us in creating a better future for all, we have developed a comprehensive sustainability strategy, which takes a holistic approach across the built environment, social progress and sustainable thinking. Our decarbonisation roadmap, and in particular our pledge to become net zero by 2050, is an integral part of this.

Our plans support the UAE's Net Zero by 2050 strategic initiative, as well as global climate goals, and will take practical and scalable action, creating opportunities for knowledge sharing and greater collaboration to maximise our positive impact. It is this belief in the power of human ingenuity and a firm commitment to driving collective action that will lead to a brighter, more sustainable future for all.

A message from Matt Brown

Chief – Sustainability, Expo City Dubai

"Our decarbonisation roadmap reflects our belief that Expo City will only realise its full potential if it remains resolute and purposeful in addressing climate change"

The need to take meaningful action on climate change is critical if we are to secure a sustainable future for our planet. Concerted action – by cities, as well as states, corporates and individuals – is required if we are to overcome this challenge. Expo City Dubai, with its unique opportunity to balance environmental, social and economic sustainability from conception to delivery, aims to lead by example.

We are proud to set out our decarbonisation roadmap, which reflects our belief that Expo City – like all entities – will only realise its full potential if it remains resolute and purposeful in addressing climate change.

In line with national and global climate goals, we are setting out our pathway to becoming net zero by 2050, with interim targets to keep us on track in the short- and medium-term.

Demonstrating our commitment to responsible, conscious growth, we have also set goals to reduce embodied carbon in the built environment, illustrating our status as an evolving urban centre and a hub in the Dubai 2040 Urban Master Plan.

Built for the world, Expo City is integrating decarbonisation into its business and urban development strategy from the very beginning, and doing so in a way that engages every stakeholder. We are creating a city with the greatest consideration for our planet, but also cultivating a community that will be engaged in its resilience and growth.

The city's design and delivery are guided by the principles of sustainable urban development, blending passive strategies with technology-based solutions, and we maintain a regenerative mindset where we will continually seek opportunities to not only stop harming the environment, but to heal it. Our innovation ecosystem will be home to solution-oriented organisations that align with our values of sustainability and collaboration, and our city will enable residents and visitors to do their part as well.

Our plans are ambitious, and we know that overcoming climate change cannot be achieved by one player alone. Retaining the irrepressible spirit of Expo 2020 Dubai, Expo City Dubai will reinforce Dubai and the UAE's strength in hosting the world and driving cooperation. Our decarbonisation activity will be carried out with transparency and a willingness to exchange knowledge, with opportunities to connect and learn from each other, and the agility to identify challenges or areas for improvement, and course-correct for greater impact.

We welcome friends and peers, old and new, to be part of our journey and let us be part of theirs. By working together, we are confident that we can safeguard a safer and healthier planet for future generations.

02 CARBON ACCOUNTING FOR CITIES

Carbon accounting for cities

Inventory type

Greenhouse gas (GHG) accounting for cities is a continuously evolving field. Following a review of current standards and best practice, we identified two distinct approaches to city-wide GHG inventories:

- **Geographic-based inventories** quantify the annual emissions resulting from activities within the community's geographic boundary. Depending on the protocol, this may include some emissions that are generated outside of the boundary as a result of activities within the community's geographic boundary, such as out-of-boundary transportation.

- **Consumptive inventories** quantify emissions from materials, products, food and other goods consumed within the community boundary, regardless of where emissions actually occur.

Our benchmarking review showed that leading cities are utilising a geographic-based inventory, with some going further to include a consumptive inventory for a more comprehensive understanding of their carbon impact.

Protocols and standards

Although multiple carbon accounting standards exist, the most relevant guidance documents and protocols for Expo City are:

- **The Global Protocol for Community-Scale GHG Inventories (GPC)**, Version 1.1, 2021. The GPC is the protocol most used by cities for geographic-based inventories. In the GPC, the term 'city' refers to geographically discernible subnational entities, such as neighbourhoods, communities, townships, and cities. Expo City, as an urban centre, meets this definition.

- **The PAS 2070 Specification**, which is aligned to the GPC and provides a methodology for consumptive inventories for cities to report upstream emission source categories.

Expo City's GHG inventory covers all direct and indirect GHG impacts from the city's development and operations. Specifically, we are reporting all GHG emission sources consistent with the BASIC+ framework of the GPC as well as the value chain sources specified in the Direct Plus Supply Chain framework of PAS 2070.

Boundary of Expo City Dubai

Expo City Dubai will join leading cities and complete both geographic-based and consumptive inventories using these standards.

03 BASELINE TARGETS

Emission sources for cities

The Expo City Dubai GHG emission inventory includes the emission sources identified in the GPC and PAS 2070, and will set targets for annual operational carbon as well as separate targets for the optional embodied carbon in the built environment.

Using the GPC, the **geographic-based emissions** will include all emission sources within the geographic boundary of Expo City, including electricity, fuels, water, in-boundary transport and waste generation as well as emissions from out-of-boundary transport and upstream emissions from fuels and electricity.

Using PAS 2070, the **consumptive emissions** will include embodied carbon from construction materials, food and beverage and relevant categories of goods.

Emission Source	BASIC+ Framework of GPC	Direct Plus Supply Chain framework of PAS 2070
Energy consumption (fuel and electricity)	✓	
Intra-city transport emissions	✓	
Waste disposal	✓	
Trans-boundary transport emissions	✓	
Upstream fuel and energy-related activities	✓	
Industrial process and product use	✓	
Agriculture, forest and land use	✓	
Embodied carbon of food and beverages		✓
Embodied carbon of select goods categories		✓
Embodied carbon of construction		✓

Baseline and net GHG inventories

Business as Usual vs. Sustainable Expo City Dubai

Expo City Dubai's carbon inventory was developed by quantifying two scenarios:

1. A Business as Usual (BAU) scenario which Expo City has used to establish its Baseline GHG Inventory. BAU is a counterfactual scenario estimating emissions that would occur without Expo City's sustainability strategy and decarbonisation roadmap. The BAU baseline will be used to set reduction targets as well as assess the combination of strategies that enable us to achieve those targets.

2. A 'Sustainable Expo City Dubai' scenario which quantifies total GHG emissions, inclusive of reductions, removals. and offset activities resulting from the implementation of Expo City's sustainability strategy and decarbonisation roadmap.

Expo City's net GHG emissions are then calculated by comparing the figures from these two scenarios.

As a new and growing city without a historical baseline, Expo City developed a hypothetical baseline scenario as a means to predict our future emissions and to develop relevant strategies to reduce those emissions. We acknowledge that measuring against a hypothetical BAU baseline is subjective and is not a favoured, science-based approach for GHG target-setting, so as we move forward with our decarbonisation efforts, we will align with the evolving guidance outlined by the Science Based Targets Network and measure GHG emissions per capita, which will allow us to track progress based on emissions and population data, rather than measuring against a hypothetical baseline only.

As best practice for GHG accounting for cities is developing, we will continue to adjust our approach as new guidance becomes available.

Targets for operational carbon

Expo City's **operational carbon** includes all emission sources from the geographic boundary consistent with the BASIC+ framework of the GPC as well as the embodied carbon of food and beverage and other goods as specified in the Direct Plus Supply Chain framework of PAS 2070.

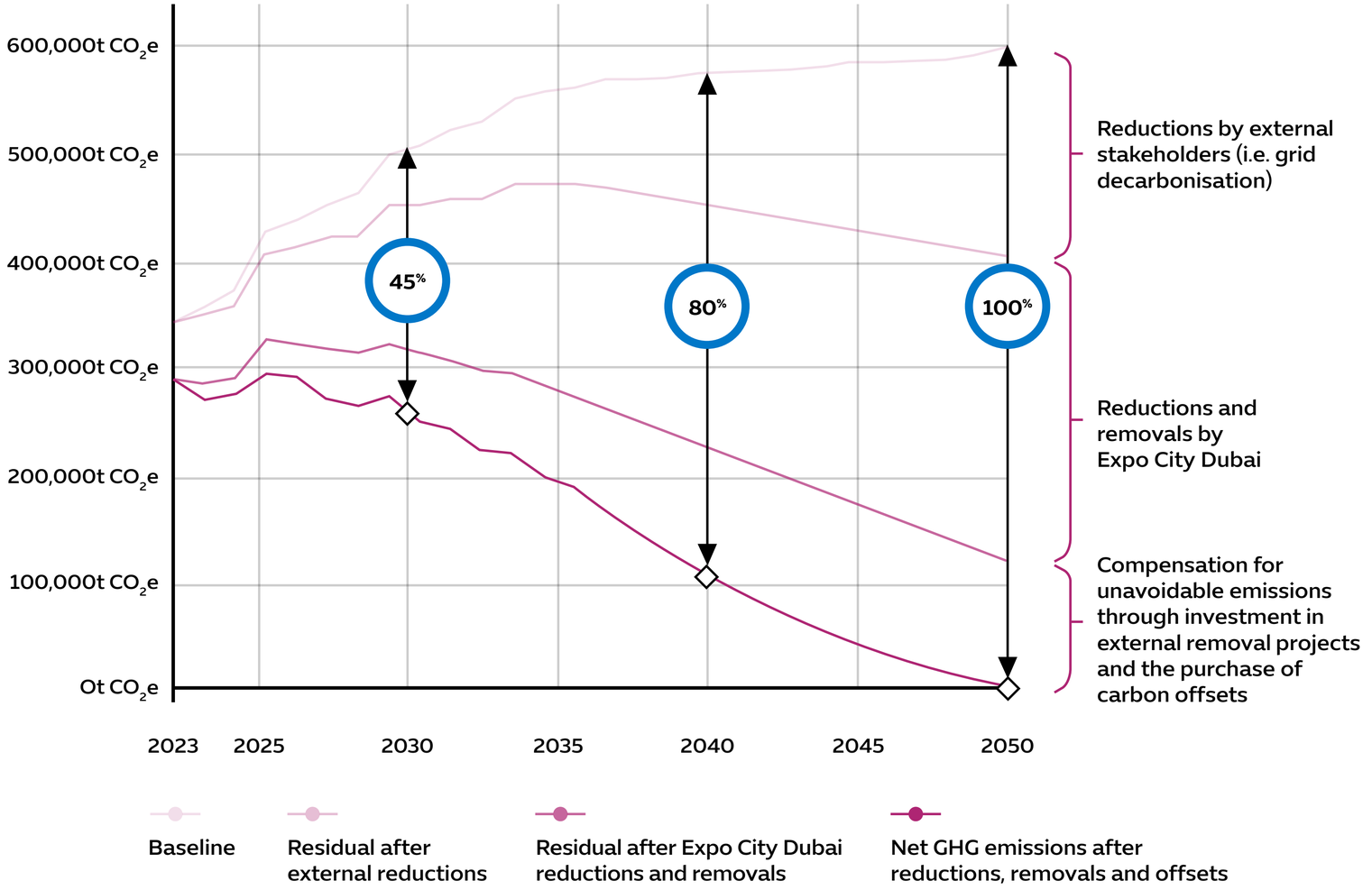
The GHG inventory documents current-year operational GHG emissions and forecasts future emissions based on development plans and anticipated population growth. We will update our inventory annually and refine the future forecasts as Expo City's masterplan evolves and the city grows, making more data available.

Expo City is committed to doing its part to limit climate change to a 1.5°C scenario. In addition to setting a long-term target for 2050, we are also setting interim targets to ensure we make meaningful progress now and as we develop as a city.

45%
decrease
from the BAU baseline
by 2030

80%
decrease
from the BAU baseline
by 2040

NET ZERO
100% decrease
from the BAU baseline
by 2050



Targets for embodied carbon in the built environment

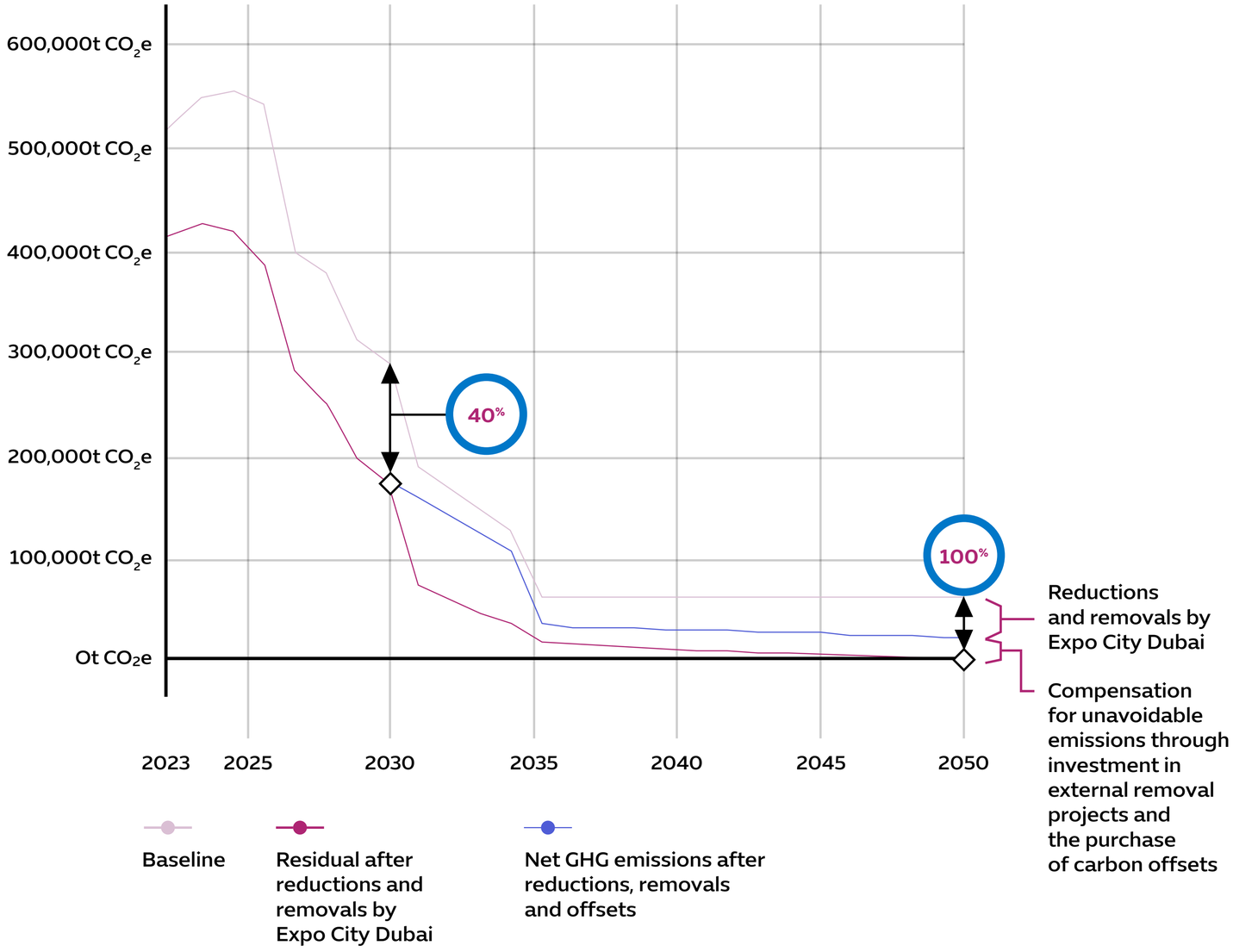
The inclusion of **embodied carbon** in the built environment is optional in the GPC, and most cities do not include this category of emissions in their GHG inventories. Expo City Dubai, as a new and developing community, believes it is critical to set targets to reduce these over the coming years as the city develops.

We have estimated the embodied carbon of the built environment based on Expo City's planned development and our own historical data from the construction of the existing assets at Expo City and will update our forecasts as new data becomes available.

40%
decrease
in embodied carbon in the built environment from the BAU Baseline **by 2030**

100%
decrease
in embodied carbon in the built environment from the BAU baseline **by 2050**

These targets are consistent with the guidance provided by the World Green Building Council, a global action group that advocates for sustainable and decarbonised built environments.



04 APPROACH AND IMPLEMENTATION

Approach and implementation

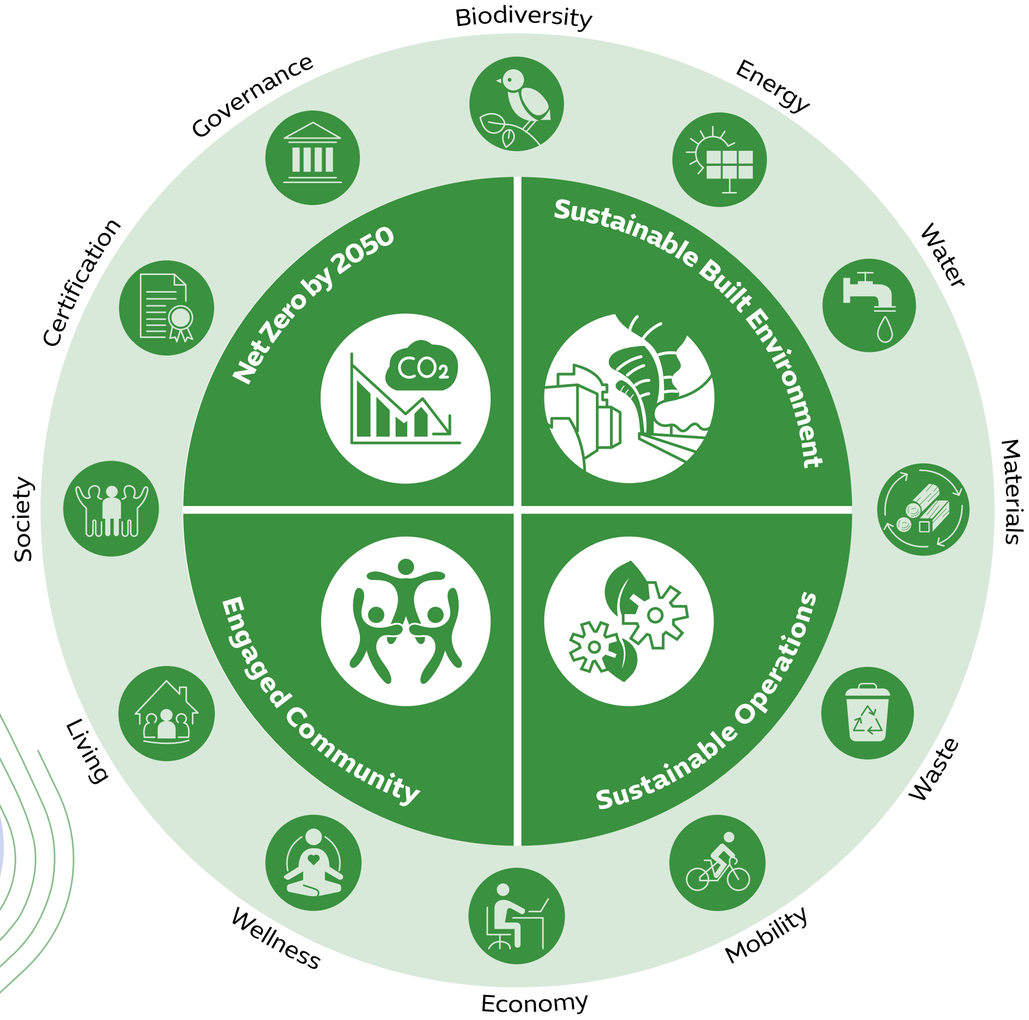
Expo City Dubai is committed to the principles of sustainable urban development and our approach fully integrates sustainability into the way the city is built and operated, as well as the way the community is engaged.

Decarbonisation is the common thread that runs through the entire strategy, culminating in the city's long-term net zero carbon goal by 2050. To achieve this goal, we will implement programmes and initiatives that reduce or remove GHG emissions throughout our value chain. We work with key stakeholders and our community to become a model of sustainable urban living that is designed from the ground up for the minimisation of GHG emissions.

The goal of Expo City's carbon management programme is to effectively measure and reduce the direct and indirect emissions created by the city's residents, workers, and visitors, which aligns with industry best practice and the universal call to take action against climate change.

This effort builds off the highly successful sustainability programme implemented for Expo 2020 Dubai. Many benefits of that effort carry over to Expo City, including existing energy-efficient buildings, water conservation efforts, innovative waste diversion and management systems, and standards and programmes for reducing embodied carbon of new buildings.

Strategic objectives and focus areas



Decarbonisation roadmap

Decarbonisation at an urban scale is a long-term challenge. To be successful, long-term planning and a clear roadmap is required to ensure that key stakeholders understand the importance and timing of their actions. Expo City Dubai has already begun this journey and is committed to taking the necessary actions to achieve its decarbonisation goals.

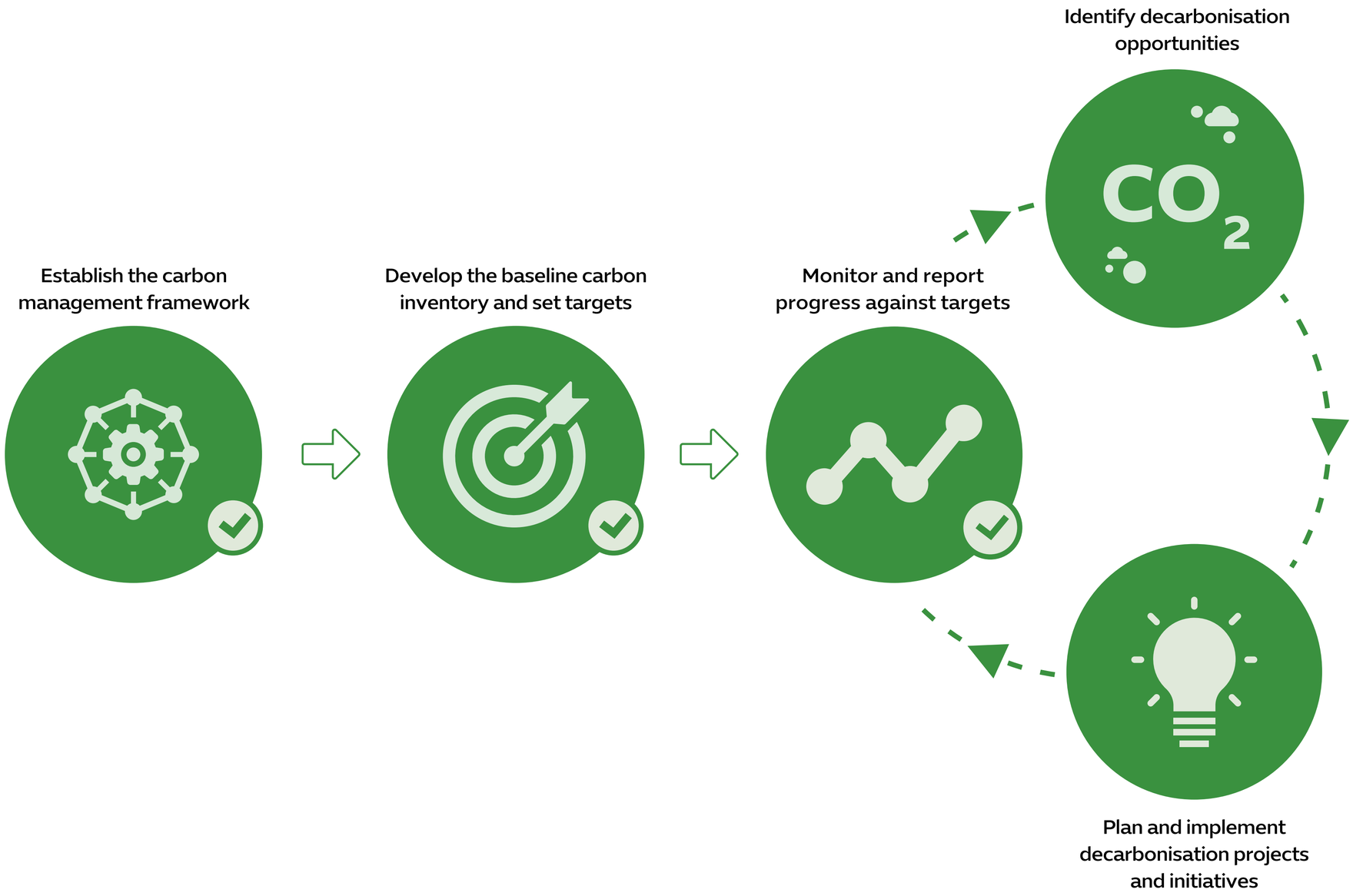
By selecting GPC and PAS 2070 for its inventories, completing the GHG Inventory Management Plan and baseline carbon inventory, and setting short-, medium- and long-term targets, the first two milestones on the roadmap have been completed.

We are now moving into the phase that requires the following steps to be repeated and reported on annually:

- Continually collect data and report on progress towards decarbonisation targets and recommend corrective action as needed. We will also engage third-party auditors to ensure our approach remains aligned to international best practice

- Identify emissions reduction, removal, and offset opportunities

- Select, plan and implement decarbonisation projects and initiatives



Decarbonisation opportunities

Decarbonisation opportunities exist throughout the value chain as Expo City Dubai builds, operates, and engages with its community. Following global best practice, Expo City Dubai will prioritise reduction and removal strategies, but offsets will be necessary to compensate for categories of emissions where the city has very little influence over the emission source, such as out-of-boundary transportation and the embodied carbon of construction materials.

Business as Usual scenario

STEP 1

REDUCE emissions

- Energy and water efficiency
- Low-carbon materials
- Circular economy
- Low carbon transport
- Waste management
- Renewable energy (on-site and off-site)

Residual emissions after reductions

STEP 2

REMOVE emissions

- Urban tree planting
- Soil management
- Carbon capture and storage
- Carbon absorbing materials

Residual emissions

STEP 3

OFFSET emissions

(purchase of carbon credits or development of offset projects)

- Nature-based solutions (e.g. afforestation, mangrove restoration, ocean-based concepts, sea kelp, soil management)
- Technology-based solutions (e.g. carbon capture and storage, direct air capture, carbon mineralisation)
- Community-based projects (e.g. clean cook stoves, community solar farms, clean water access)

Reduce emissions

Key Performance Indicators (KPIs) across Expo City Dubai's sustainability strategy will be critical to drive the reduction of the direct and indirect emissions included in Expo City's geographic-based and consumptive carbon inventories. The KPIs will become more stringent over time to further reduce emissions to achieve our interim and long-term targets.

Energy

- Reduce energy consumption (buildings, infrastructure, operations, events, cooling)
- Increase use of clean energy (on-site and near site renewable energy generation and storage)

Water

- Reduce water consumption (efficient systems, metering, awareness and education, behaviour change)
- Increase use of recycled water for potable and non-potable use

Materials

- Increase material efficiency (build with less, use less, efficient design and details)
- Increase use of low-carbon and local materials (concrete, steel, natural materials)

Mobility

- Reduce transport emissions within the city boundary (walking, micro-mobility)
- Reduce transport emissions outside the city boundary (metro, 'green' vehicles, live and work at Expo City)

Waste

- Reduce waste overall (generate less and capture value through circular economy at Expo City)
- Minimise waste sent to landfill (effective stakeholder engagement to reduce, reuse and recycle)

Remove emissions

Removing emissions is a critical part of Expo City Dubai's decarbonisation roadmap and we will explore both nature-based and technology-based solutions that may become feasible over time.

While the opportunities to remove emissions within Expo City's physical boundary are limited, we will implement these solutions where possible. We will also work with external stakeholders to create or co-develop carbon removal projects in the UAE and elsewhere.

Nature-based solutions

- Carbon sequestration through tree planting
- Carbon sequestration through soil enhancement (using biochar, composting, and other enhancement techniques)
- Enable removal strategies through ecological improvements, micro-climate, 'green' infrastructure, urban farming, and other interventions
- Mangrove protection/restoration
- Seagrass protection/restoration
- Kelp and ocean sequestration

Technology-based solutions

- Direct air capture and storage
- Direct air capture and utilisation
- Carbon-absorbing materials
- Biogas capture/use (e.g. dairies, landfills, anaerobic digesters)
- Industrial processes
- Carbon capture and geologic storage
- Other Negative Emissions Technologies (NETs)

Offset unavoidable emissions: UAE-based and global

A wide range of carbon offset types exist in the global markets with distinction between avoidance and removal offsets. Some offsets create positive impacts on communities, local economies and the natural environment in addition to reducing/removing emissions. We have categorised these as follows:

- **Commodity offsets** are from offset projects that can provide large quantities of offsets at a lower cost, such as large-scale solar farm and wind farms

- **High-quality offsets** are typically from small scale, community-based projects that provide social and environmental benefits in addition to carbon avoidance or removal and are typically priced higher than commodity offsets

- **Nature-based offsets**, such as mangrove restoration, represent a category of projects that typically produce these higher-value attributes

Expo City will purchase offsets to compensate for categories of emissions where we have limited control, such as out-of-boundary transportation and the embodied carbon of construction materials, or where no options currently exist for reducing emissions to zero at the source (e.g. concrete production). Offsets will be purchased after reduction and removal opportunities have been maximised and will include a mix of all three types of offsets, all thoroughly verified and aligned with the highest global standards of excellence.

Renewable energy projects

Integrated conservation and sustainable economic development projects

Mangrove restoration projects

Stakeholder engagement to unlock decarbonisation opportunities

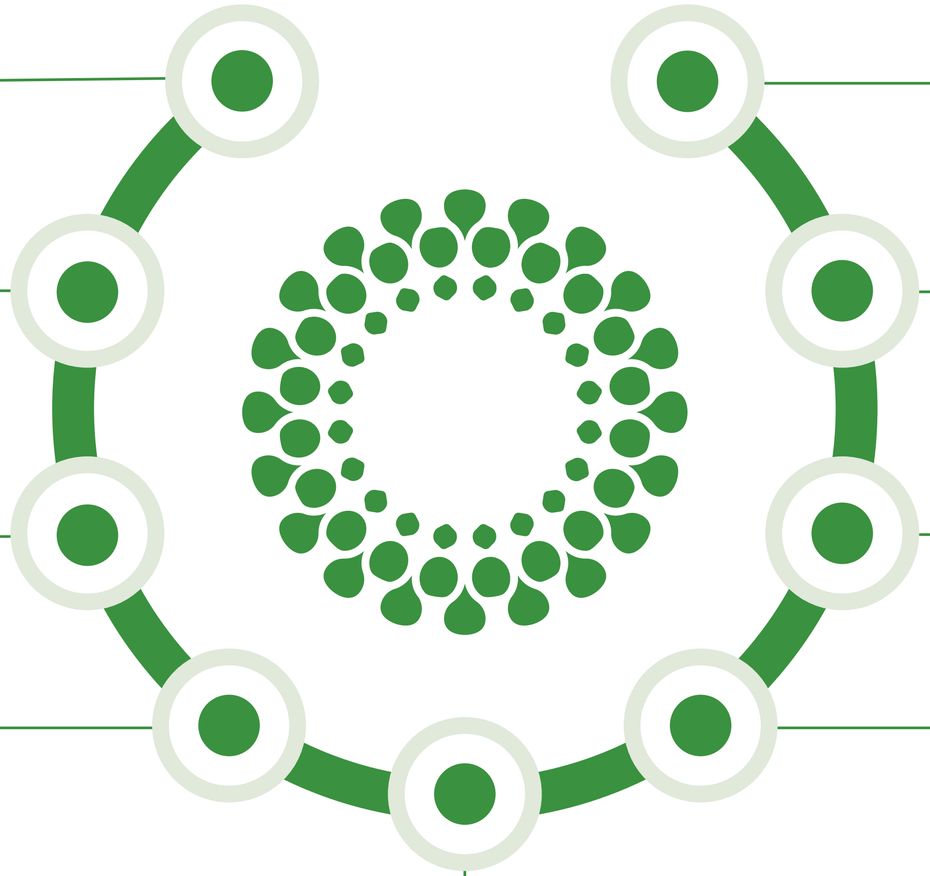
Decarbonisation at an urban scale cannot be achieved by any single entity. Expo City Dubai will work with it stakeholders and community members to decarbonise all aspects of the building, operations, and daily life within the city.

Local government
- The Government of Dubai and its entities, including water and electricity (utilities), transport and planning etc.

Individuals
- Residents
- Staff
- Visitors

Corporations
- Commercial tenants
- Industrial tenants

Civil society
- Community organisations that can help promote the transition to net zero



Investors
- Private investors
- State-owned finance Institutions
- Multilateral climate funds

Academia
- Universities
- Educational institutions

Ministries and federal government
- UAE Ministries in coordination with private sector institutions

Other organisations
- Technologies and solutions
- Research and development (R&D) innovation hubs

City development
- Manufacturers, infrastructure, food producers, waste management within and outside the city boundary

Transparency and reporting

Monitoring and reporting

Expo City Dubai will update its GHG inventory management plan regularly to ensure that our roadmap is aligned to the latest standards, guidance, and international best practice for GHG accounting for cities.

We will also update our GHG inventory report annually to monitor and track progress against our interim and long-term targets.

This is critical to ensure Expo City has the opportunity to identify risks and opportunities early and make necessary adjustments to the decarbonisation roadmap, in order to remain on track to achieve our goals.

Third-party audits

Decarbonisation and carbon accounting for cities is still a relatively new field that will continue to see changes in standards, protocols, and guidance over the coming years.

In this dynamic environment, it is very possible that a city could unintentionally fall out of alignment with global best practice in its approach or reporting. To mitigate this risk, Expo City will periodically engage independent third parties to review our approach to ensure it aligns with global best practice and that our inventory is complete, accurate and transparent.

05 TECHNICAL APPENDIX

Emissions impacts and ability to control

The Expo City Dubai GHG emission inventory includes the emission sources identified in the GPC and PAS 2070. As part of the inventory analysis, we have identified which categories have the highest impact on the overall inventory as well as Expo City's level of control over the emission sources.

Emissions impact:

- **High**: represents more than 20% of total inventory
- **Medium**: represents 5-20% of total inventory
- **Low**: represents less than 5% of total inventory

Ability to control:

- **High**: Expo City can fully influence reduction measures for this source
- **Medium**: Expo City can indirectly influence reduction measures for this source
- **Low**: Expo City has very limited or no ability to influence reduction measures for this source

Our understanding of the impact and level of control was critical to the development of our decarbonisation roadmap and the setting of achievable interim and long-term targets.

Geographic inventory (mandatory)	GHG source category	Anticipated emissions impact	Expo City's level of control
Following the GPC BASIC+: Includes all BASIC sources with the addition of emissions from out-of-boundary transport and upstream emissions from fuels and electricity Other 'Scope 3' emissions are not included in GPC at this time	**Electricity consumption**	**High**	**Medium**
	Onsite fuel use	**Low**	**Medium**
	Water consumption	**Low**	**Medium**
	Refrigerant leakage	**Low**	**Medium**
	Upstream fuel	**Low**	**Medium**
	Upstream electricity	**Low**	**Medium**
	Onsite transportation	**Low**	**High**
	Out-of-boundary transportation	**High**	**Low**
	Waste management	**Medium**	**Medium**
Consumptive inventory (optional)	**GHG source category**	**Anticipated emissions impact**	**Expo City's level of control**
Following the PAS 2070 specification for the assessment of GHG emissions of a city Value chain: Includes embodied carbon from food and beverage, relevant categories of goods, and construction materials	Embodied carbon – food and beverage	**Low**	**Low**
	Embodied carbon – other goods	**Medium**	**Low**
	Embodied carbon in the built environment	**High**	**Low**

Expo City's GHG Inventory will include all emissions sources defined in the BASIC+ Framework of the GPC as well as the optional value chain sources specified in the Direct Plus Supply Chain framework of PAS 2070.

Science Based Targets for cities

A Science Based Target (SBT) is an organisation-specific GHG reduction pathway consistent with allowable global GHG budgets, usually aligned with the 1.5°C end point. The science is not exact, but all models agree on the most important conclusions:

- We must rapidly decarbonise between now and approximately 2030-2035 to stand a chance of meeting the 1.5°C end point

- A flatline reduction between now and net zero 2050 might achieve well below 2°C, but not 1.5°C

- If we delay progress for another 10 years, it will be too late, and no amount of subsequent GHG reduction will keep temperature increases below 1.5°C

Expo City is following the principles outlined in the Science Based Targets Network (SBTN) guidance, but we have identified some challenges that we will need to address where we do not fully align. For example, SBTN suggests that cities measure reductions against a 2015 base year, but Expo City did not exist in 2015. In fact, the construction of the built environment that Expo City has inherited from Expo 2020 Dubai only started in 2015 and Expo City was only recognised by local government authorities as Expo City in September 2022.

There are many new and growing cities around the world that will face similar challenges. Expo City Dubai will drive forward toward our goals and adjust our approach as necessary as global best practice evolves to address this and any other issues.

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

The Science Based Target Initiative (SBTi), developed in partnership with CDP, UNGC, WRI, and WWF, is the most quoted guidance/requirements for SBTs and net zero. SBTi provides sector-specific guidance for industry and business, but specifically excludes cities.

SCIENCE BASED TARGETS NETWORK

GLOBAL COMMONS ALLIANCE

The Science Based Target Network is an association of 60-plus NGOs, businesses, and consultancies that has programmes covering multiple sectors, including cities. SBTN guidance is less definitive than SBTi, but considers future growth, and recognises the complexity of reducing emissions owned/controlled by others typical in a city GHG inventory. The SBTN guidance references the GPC.

Reference standards and protocols

Standards and protocols	Definition
GHG Protocol Corporate Standard	The GHG Protocol Corporate Standard established the “scopes” framework for corporate accounting, dividing emissions into scope 1 (territorial), 2 and 3 to fully cover all the relevant corporate activities and avoid double counting within the same inventory.
GHG Protocol: Global Protocol for Community Scale GHG Inventories (GPC)	An Accounting and Reporting Standard for Cities Version 1.1. The GPC was released in 2014 by the World Resource Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) for the quantification of the carbon footprint for communities and cities.
GHG Protocol Mitigation Goal Standard	An accounting and reporting standard for national and subnational greenhouse gas reduction goals
European Standard EN 15978	A quantification standard that specifies the calculation method based on Life Cycle Assessment (LCA) and other quantified environmental information, to assess the environmental performance of a building and specifies the means for reporting and communication of the assessment outcome.
PAS 2070: Specification for the assessment of greenhouse gas emissions of a city	A comprehensive approach to assessment of GHG emissions of a city or rural area that outlines two approaches to emissions quantification: one that builds on GPC and adds in value chain emissions and one fully focused on consumption activities within the city boundary.
"Bringing Embodied Carbon Upfront: Coordinated action for the building and construction sector to tackle embodied carbon"	A report by the World Green Building Council (World GBC) which demands radical cross-sector coordination to revolutionise the buildings and construction sector towards a net zero future and tackle embodied carbon emissions.

Abbreviations

Abbreviations	Definition
AFOLU	Agriculture, forestry and other land use
CDM	Clean Development Mechanism
CH_4	Methane
CER	Certified Emission Reduction
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
EF	Emission factor
GHG	Greenhouse gas
GPC	Global Protocol for Community-scale Greenhouse Gas Inventories
GWP	Global warming potential
HFCs	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change

Abbreviations	Definition
IPPU	Industrial processes and product use
NETs	Negative Emissions Technologies
N_2O	Nitrous oxide
NF_3	Nitrogen trifluoride
NGO	Non-governmental organisation
PFCs	Perfluorocarbons
SBTi	Science Based Targets Initiative
SBTN	Science Based Targets Network
SF_6	Sulphur hexafluoride
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

Terminology and definitions

Term	Definition
Baseline (as defined in the GPC)	A hypothetical scenario for what GHG emissions, removals or storage would have been in the absence of the GHG project or project activity
BASIC (from the GPC)	An inventory reporting level that includes all scope 1 (territorial) sources except from energy generation, imported waste, IPPU, and AFOLU, as well as all scope 2 sources
BASIC+ (from the GPC)	An inventory reporting level that covers all BASIC sources, plus scope 1 (territorial) AFOLU and IPPU, and scope 3 in the stationary energy and transportation sectors
Boundaries	GHG accounting and reporting boundaries can have several dimensions, i.e. organisational, operational, geographic, business unit, and target boundaries. The inventory boundary determines which emissions are accounted and reported by the company. A key step in any GHG inventory is to define the organisational boundaries, or which facilities or operations are included, and the operational boundaries, thus which direct and indirect emissions related to the activities within the organisational boundaries are included.
Business As Usual (BAU) scenario	A counterfactual scenario estimating emissions that would have occurred without decarbonisation strategies. In the context of a city using the GPC, this is also consistent with the definition of the “baseline”
Carbon capture	See GHG capture
Carbon credit	See carbon offset
Carbon Dioxide Removal (CDR)	CDR measures refer to processes that remove CO_2 from the atmosphere by either increasing biological sinks of CO_2 or using chemical processes to directly bind CO_2
Carbon offset	A carbon offset represents a metric tonne of CO_2 equivalent that is avoided or sequestered outside the GHG accounting boundary, which can be used to compensate for a metric tonne of residual GHG emissions occurring within the accounting boundary
Carbon neutrality	Condition in which an entity has balanced out the GHG emissions attributed to it via emissions reductions measures, GHG removals or offsets exclusively claimed by the entity, such that the net contribution to global CO_2 emissions is zero, over a declared time period
Carbon sequestration	The uptake of CO_2 and storage of carbon in biological sinks or geological sinks, thus preventing release of CO_2 to the atmosphere
Clean Development Mechanism (CDM)	One of the original carbon offset certification and trading programmes as established by the UNFCCC
City (as defined in the GPC)	Used throughout the GPC to refer to geographically discernible subnational entities, such as communities, townships, cities and neighbourhoods
City boundary (as defined in the GPC)	See 'geographic boundary'

Consumptive GHG inventory	Quantifies the annual emissions resulting from consumption of all goods and services by the city inclusive of all lifecycle stages: production (upstream), use and end of life (downstream). For Expo City, the consumptive inventory will include the value chain sources specified in the Direct Plus Supply Chain framework of PAS 2070
CO_2 equivalent (CO_2e)	A metric used to estimate the total climate impact from emissions of one or more GHGs, by converting the emissions of more potent GHGs to an equivalent mass of CO_2 based on the GWP of each
Decarbonisation	A loosely defined term used to refer to efforts to reduce, eliminate, or offset GHG emissions from a company, city or programme
Decarbonisation roadmap	A technological, financial, and management pathway that, if achieved, would reduce GHG emissions to target levels. It is thus the basis for the portfolio of projects and actions required, but must be revisited on a regular basis
Direct emissions	GHG emissions from sources that are owned or controlled by the reporting entity
Direct reduction	Reduction of gross emissions as a result of a lowered emission activity
Double counting	Two or more reporting entities claiming the same emissions or reductions in the same scope, or a single entity reporting the same emissions in multiple scopes
Embodied emissions (also known as embodied carbon)	GHG emissions resulting from energy consumption to extract, refine, process, transport and fabricate a material or product (including buildings)
Embodied carbon (as defined in EN 15978)	Carbon emissions associated with materials and construction processes throughout the whole lifecycle of a building or infrastructure
Emission	The release of GHGs into the atmosphere
Emission factor(s)	A factor that converts activity data into GHG emissions data (e.g. kg CO_2e emitted per litre of fuel consumed, kg CO_2e emitted per kilometre travelled, etc.)
Fugitive emissions	Releases of air pollutants or GHGs other than those through a smoke stack, vent pipe, or tailpipe. Examples include leakage of CH_4 through fittings and measurement devices on hydrocarbon pipelines, leakage of CO_2 and CH_4 through the covers on solid waste landfills, leakage of refrigerants and fire suppressants, or emissions of CO_2, CH_4, and N_2O from wastewater treatment lagoons
Geographic boundary (as defined in the GPC)	A geographic boundary that identifies the spatial dimensions of the inventory's assessment boundary, this geographic boundary defines the physical perimeter separating in-boundary emissions from out-of-boundary and transboundary emissions
Geographic-based GHG inventory	Quantifies the annual emissions produced within and optionally, across, the community's geographic boundaries due to community activities. For Expo City Dubai, the geographic-based inventory will include all GHG emission sources consistent with the BASIC+ framework of the GPC
Global warming potential (GWP)	A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of mass, such as kg or tonne, of a given GHG relative to one unit of CO_2

Green power	A generic term for renewable energy sources and specific clean energy technologies that emit fewer GHG emissions relative to other sources of energy that supply the electric grid. Includes solar photovoltaic panels, solar thermal energy, geothermal energy, landfill gas, low-impact hydropower, and wind turbines
Greenhouse gas inventory (as defined in the GPC)	A quantified list of a city's GHG emissions and sources
Greenhouse gases (GHGs)	For the purposes of the GPC, GHGs are the seven gases covered by the UNFCCC: carbon dioxide (CO_2); methane (CH_4); nitrous oxide (N_2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF_6); and nitrogen trifluoride (NF_3)
Greenhouse gas emissions	Emission into the atmosphere of any of the GHGs defined by the UNFCCC
Direct reduction	Reduction of gross emissions as a result of a lowered emission activity
In-boundary	GHG emissions occurring within the established geographic boundary
Indirect GHG emissions	GHG emissions that are a consequence of the activities or operations within the defined organisational boundaries, but which are released from sources owned or controlled by other parties
Inventory boundary	Identifies the gases, emission sources, geographic area, and time span covered by the GHG inventory
Gross emissions	Include all relevant emissions within a GHG accounting boundary in all covered scopes (e.g. BASIC or BASIC+) and do not take into account any GHG emissions reductions from carbon credits purchased or sold
Life cycle analysis	Assessment of the sum of a product's environmental impacts (e.g. GHG emissions) at each step in its life cycle, including resource extraction, production, use and waste disposal
Negative emissions	Negative emissions can be achieved through the removal of GHGs from the atmosphere by deliberate human activities
Negative Emissions Technologies (NETs)	NETs remove CO_2 from the atmosphere
Net emissions	Gross emissions minus all applicable GHG emissions reductions claimed from carbon credits purchased outside the boundary, plus GHG emissions from sold carbon credits resulting from projects within the boundary
Net zero emissions	Condition in which an entity reduces its GHG emissions following science-based pathways to a residual level, with any remaining GHG emissions attributable to the entity being fully neutralised by removals exclusively claimed by that entity, within the value chain or through purchase of valid offset credits over a declared time period

Offsetting	A mechanism for cancelling out GHG emissions by developing, funding, or financing carbon credit projects that avoid or sequester GHG emissions outside of the city GHG accounting boundary
Operational emissions (also know as operational carbon)	GHG emissions resulting from the operation of buildings, equipment and vehicles including use, management and maintenance activities
Out-of-boundary	GHG emissions occurring outside of the established geographic boundary
Renewable Energy Credit (REC)	A type of energy attribute certificate used in several countries. In the US, a REC is defined as representing the property rights to the generation, environmental, social, and other non-power attributes of renewable electricity generation. RECs are a different tool from carbon credits and the two should neither be conflated nor considered interchangeable.
Reporting	Presenting data to internal and external users such as regulators, the general public or specific stakeholder groups
Reporting year	The year for which emissions are reported
Scope 1 GHG emissions (Corporate GHG inventory)	All direct emissions from sources that are owned or controlled by the reporting entity
Scope 1 GHG emissions (Geographic-based GHG inventory)	GHG emissions from sources located within the city boundary
Scope 2 GHG emissions (Corporate GHG inventory)	Energy-related indirect emissions from generation of purchased electricity, steam and heating/cooling consumed by the reporting entity
Scope 2 GHG emissions (Geographic-based GHG inventory)	GHG emissions occurring as a consequence of the use within the city of electricity generated outside the city e.g. heat, steam and/or cooling
Scope 3 GHG emissions (Corporate GHG inventory)	All other indirect emissions that are a consequence of the activities of the reporting entity
Scope 3 GHG emissions (Geographic-based GHG inventory)	All other GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary
Science Based Targets Initiative (SBTi)	SBTi lays out guidelines regarding reduction pathways for companies and corporations in certain sectors, but it does not include guidance for cities or districts
Science Based Targets Network (SBTN)	SBTN provides guidance and indicative targets for cities using a per capita emissions approach in recognition that growth of city populations will inevitably occur


Find out more
expocitydubai.com
EXPO
CITY
DUBAI