

FUTURES WE WANT



WE WANT
RESILIENT
AND
JUST
FUTURES
WE WANT

Built Environment

Visions of feasible, desirable and resilient net-zero futures

BUILT ENVIRONMENT IN 2050

As part of the 'Futures We Want' project, academics and citizens in six global regions – the Arabian Peninsula, Brazil, India, Jamaica, Kenya, and the UK – shared their vision of a net-zero climate-resilient future, with built environment emerging as a key theme for some.

BUILT ENVIRONMENT IN 2050

Across four thematic documents, we explore content from our regional research and workshops in parallel, so that we can start to build a picture of how the built environment might look different in 2050. We explore:

- > People's hopes and desires when it comes to their homes and communities by 2050
- > The critical role homes, buildings and cities will play in protecting people globally from the effects of climate change
- > How technology, design and urban planning can reduce greenhouse gas emissions and change the way we live

ABOUT THESE VISIONS

This document presents visions of our relationship with Built Environment in 2050. These visions are not a prediction of exactly what will happen. The goal is to paint a picture of the challenges, changes, and opportunities that a net-zero, climate-resilient world could bring.

The visions are composites, bringing together:

- > Evidence and insights, gathered by academics in each of the regions in focus for this project
- > Workshop inputs from a cross sections of citizens in each region – with representation from government, civil society, youth, industry and Indigenous populations.

This document combines evidence and insights with the stakeholder views, organised according to themes that were common across regions. Throughout the document, evidence and insights are included in the form of regional illustrations of the some of the challenges and solutions relating to a net zero and climate resilient 2050. Workshop inputs are clearly signposted to show where these solutions are especially desirable. Pull-out quotes reflect the ideas and opinions shared in the workshops with in-region stakeholders, and while some are captured verbatim, others reflect the spirit of the views shared.

Discover more about the project online at WWW.FUTURESWEWANT.WORLD



KEY THEMES

The built environment is intrinsically linked to the climate: its carbon footprint, its ability to withstand more challenging and unpredictable weather, and its ability to help people lead low-carbon lives. Its design plays a large role in informing a climate-resilient 2050; by then, our built environment might look and feel very different.

From greener cities that are designed to create cool, comfortable streets, to smart technologies that reduce the energy consumption of homes, a range of innovations and interventions will become the norm by 2050. When combined, they will not only help to give people a sense of safety and security in the face of a changing climate, but will also enable more sustainable lifestyles.

Workshops for the project showed that people want to see the benefits of a better built environment - from new economic opportunities to enhanced biodiversity. There is also a desire to make sure that developing countries and marginalised communities can engage with the transition in an equitable way.

KEY THEMES

RESILIENCE AGAINST EXTREME WEATHER

By 2050, homes will need to provide resilient and sustainable protection against tropical storms, floods, heatwaves and other extreme weather events. For example, in India, increasingly severe storms (especially cyclones) will cause more damage to infrastructure and livelihoods, and further intensify saltwater intrusions in storm surges. Meanwhile, in Jamaica, which is already highly vulnerable to tropical storms, affordable and sustainable building materials like bamboo may be used in storm-proof building designs, to provide protection against the elements. Protection will also come from the restoration and preservation of natural storm barriers, such as mangrove swamps and sand dunes. This is critical both to providing enduring shelter, and to reducing the costly rebuilding that storm damage brings.

In the Arabian Peninsula, climate change will demand expensive building upgrades to protect against rising sea levels, dust storms, and other extreme weather events. Costs for building owners and users could reach up to \$834 million per year in UAE by 2050.



WHAT PEOPLE SAID

JAMAICA

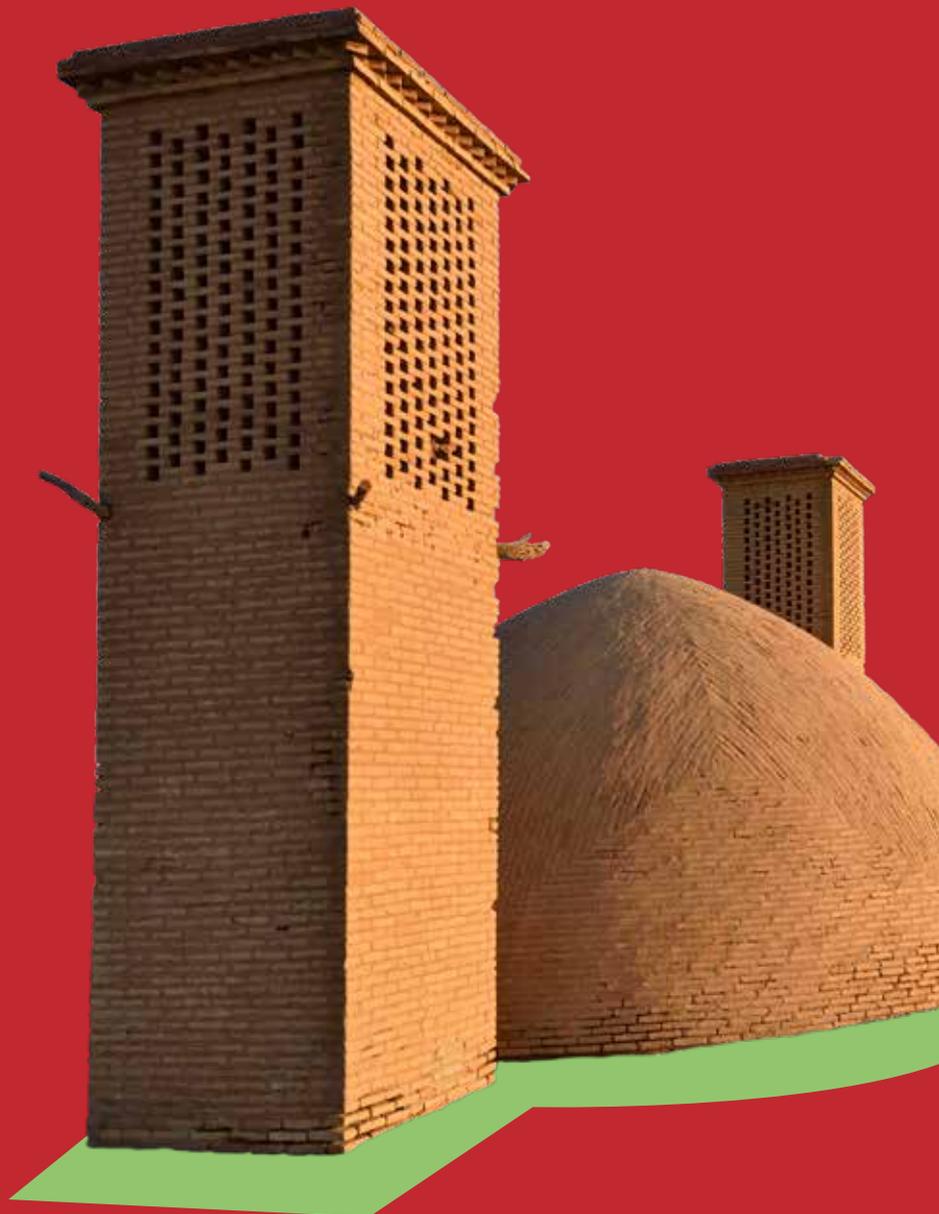
“Right now we live in fear every hurricane season as we don’t know what is going to come. If we had a more climate resilient economy we could be less fearful, with a greater sense of wellbeing”

– WORKSHOP PARTICIPANT

KEY THEMES

KEEPING COOL

As temperatures rise, both old and new technologies can help keep buildings comfortable. In the Arabian Peninsula and Africa, traditional architecture designs including cooling wind towers can provide an alternative, or a supplement, to active cooling, helping to protect against the intense heat. Increasingly, air conditioning systems will be powered by local renewable energy sources such as rooftop solar. In places like India and Brazil, where rural populations and those living in informal settlements currently have limited access to power grids, this may be essential for liveability by 2050 as temperatures rise.



WHAT PEOPLE SAID ARABIAN PENINSULA

**“WE NEED A MORE
ENERGY EFFICIENT
WAY TO IMPROVE
COOLING CAPACITY
AND WITHSTAND
HEAT STRESS”**

– WORKSHOP PARTICIPANT

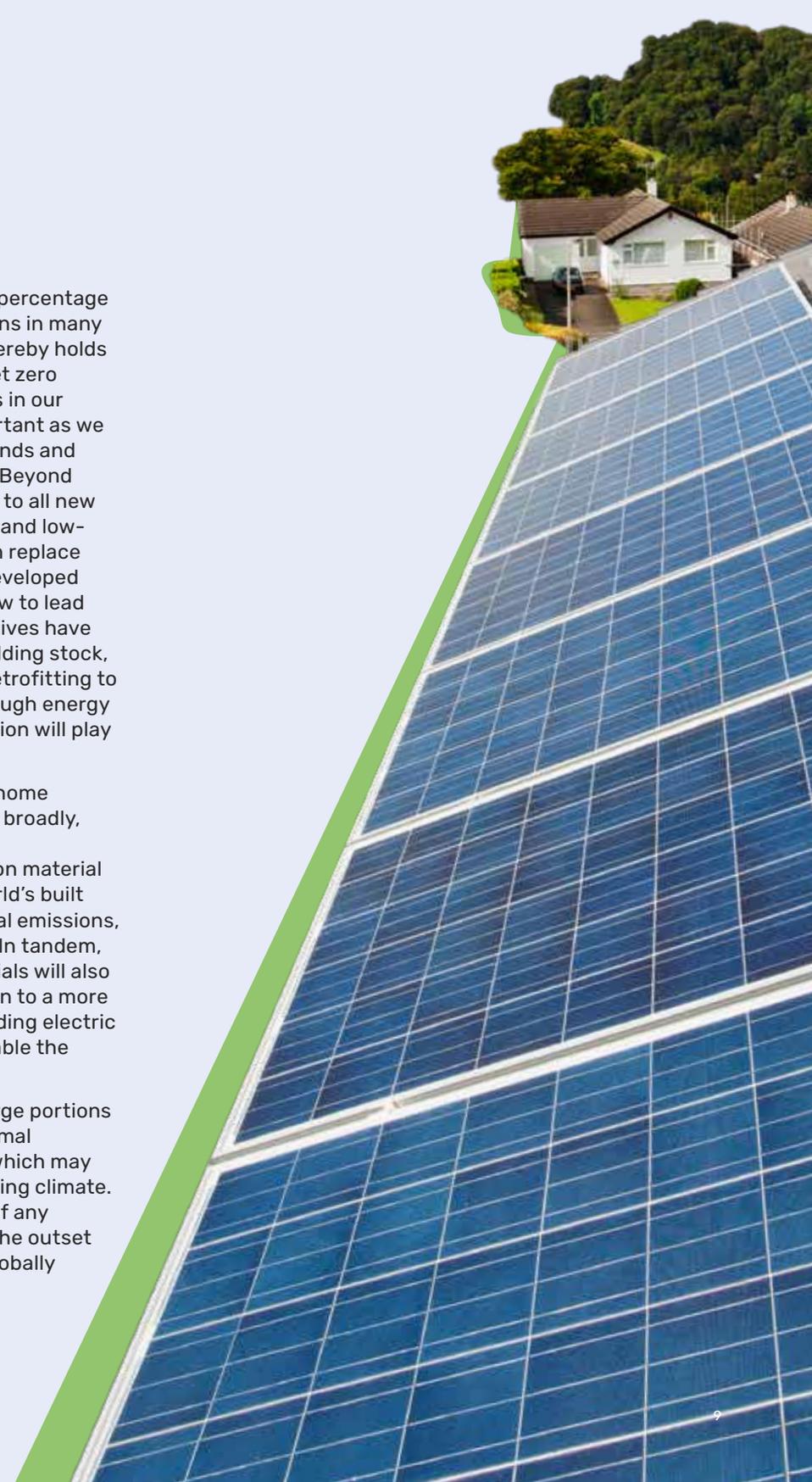
KEY THEMES

NEW TECHNOLOGIES, NEW MATERIALS

The built environment is responsible for a big percentage of direct and indirect greenhouse gas emissions in many regions – 40% in the UK, for instance – and thereby holds significant potential for contributing to the net zero transition. Smart, energy-saving technologies in our homes are likely to become increasingly important as we approach 2050, both to manage energy demands and to create comfortable internal environments. Beyond this, more ambitious standards will be applied to all new buildings to design-in efficiency. Heat pumps and low-carbon gas boilers, such as biogas boilers, can replace the role of natural gas or solid fuel heating. Developed countries like the UK may need to consider how to lead the way and encourage rapid adoption; incentives have a role to play because of the unusually old building stock, the cost of the technology and the need for retrofitting to achieve net zero. Reducing energy usage through energy efficiency measures such as improved insulation will play a key role in reducing emissions.

The choice of methods and materials used in home construction, and the built environment more broadly, also need to be reconsidered. Technologies to decarbonise the manufacture of a construction material like cement, which underpins much of the world's built environment and is responsible for 5% of global emissions, must be applied and scaled well before 2050. In tandem, local, sustainable timbers and recycled materials will also play an important role. Financing the transition to a more circular economy will play a big part here: funding electric arc furnaces in the UK for instance, would enable the country to recycle steel.

Some nations will need to renew or replace large portions of their built environment – for example, informal settlements are home for millions of people, which may become increasingly uninhabitable in a changing climate. The energy efficiency and embodied carbon of any replacement stock must be considered from the outset if new buildings are to be compatible with a globally net-zero, climate-resilient future.



WHAT PEOPLE SAID

THE UK



“By 2050 I expect to have installed lots of new low-carbon technologies into my home”

– WORKSHOP PARTICIPANT

KEY THEMES

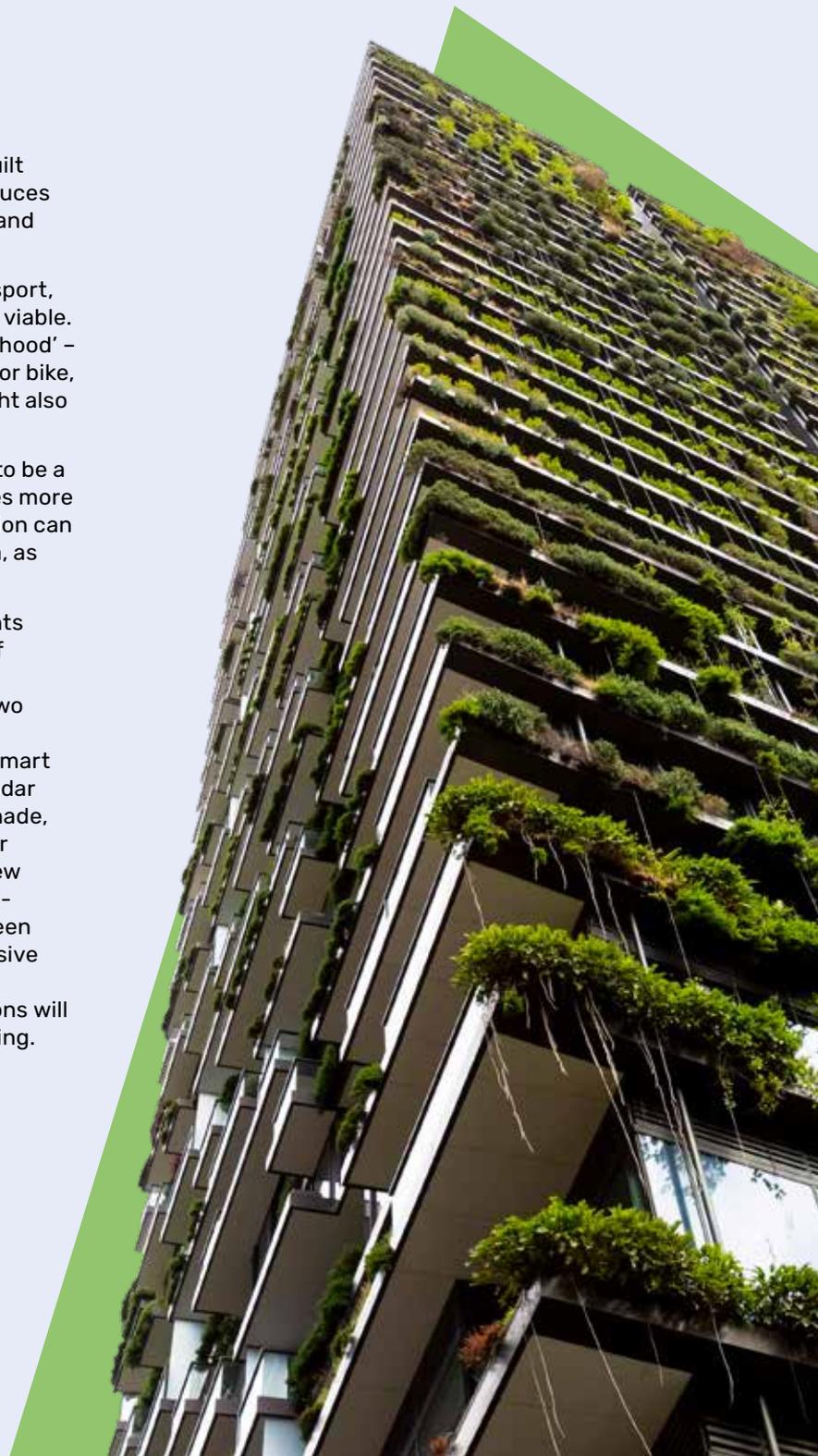
RETHINKING THE CITY

Simple interventions can make existing cities and built environments more liveable. Urban tree planting reduces street temperatures, both by providing more shade and through transpiration cooling.

Enhanced infrastructure may also make active transport, such as walking and cycling, more popular and more viable. For instance, the concept of a '15-minute neighbourhood' – where daily essentials are within easy reach by foot or bike, thus encouraging more sustainable behaviour – might also become more commonplace by 2050.

A shift away from petrol and diesel vehicles is likely to be a key part of our path to 2050. This will also make cities more liveable: from Delhi to Dubai to London, urban pollution can contribute to a range of health problems like asthma, as well as increasing street temperatures.

In some parts of the world, planned city developments demonstrate a perspective on one possible future of sustainable urban development. Masdar City, in the UAE, and the Kingdom of Saudi Arabia's NEOM, are two examples. Both concepts explore what a future city could look like, mixing traditional architecture with smart energy and water management technologies. In Masdar City, deliberately narrow streets will provide more shade, reducing surface temperatures. Meanwhile, plans for NEOM envisage a megacity that serves as a major new regional hub for commerce, innovation, and tourism – powered entirely by clean energy, with extensive green public spaces, no surface roads and cars, and extensive underground public mass transit systems. Building technologies such as 3D printing and circular solutions will support sustainable and resource efficient green living.

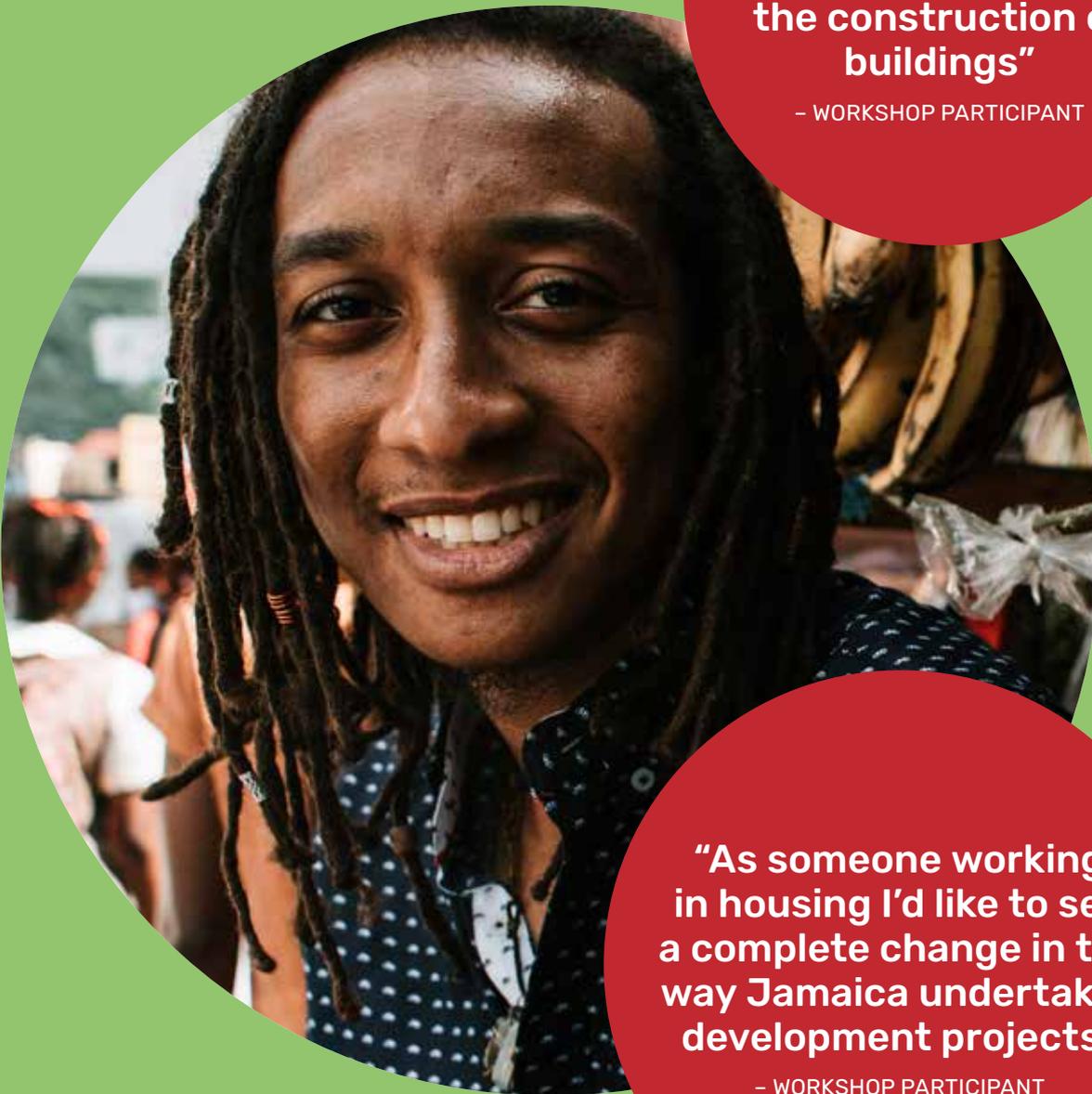


WHAT PEOPLE SAID

JAMAICA

“I want us to have mandatory climate resilient policies for the construction of buildings”

– WORKSHOP PARTICIPANT



“As someone working in housing I’d like to see a complete change in the way Jamaica undertakes development projects”

– WORKSHOP PARTICIPANT

WHAT PEOPLE SAID

KENYA



"I'D LIKE TO SEE GREEN CITIES,
WITH MORE USE OF RENEWABLE
RESOURCES - ESPECIALLY
IN THE TRANSPORT INDUSTRY"

- WORKSHOP PARTICIPANT

WHAT PEOPLE SAID

INDIA



“I hope that green infrastructure is part of city planning, to help purify the air and protect from heat waves and flooding”

– WORKSHOP PARTICIPANT

WHAT PEOPLE SAID THE UK

**“I HOPE THAT MORE
GREEN SPACES WILL
HELP MAKE LIFE
HEALTHIER, COOLER
AND MORE PLEASANT
IN THE UK”**

- WORKSHOP PARTICIPANT

KEY THEMES

BUILDING A JUST TRANSITION

Globally, access to comfortable and safe living environments is currently unequal, as well as within countries and regions. On top of this, the immediate impact of climate change will vary hugely around the world: low-lying coastal regions in the tropics, for example, will be at a much higher risk of storm damage.

Workshops for the project demonstrated a hope that a net-zero economy would be a more inclusive economy, that benefitted more communities by 2050. There are many opportunities to raise living standards, create work, and enhance biodiversity while also reducing emissions - especially in informal communities in regions including India, Brazil and Kenya. However, we could also see socio-economic discrepancies. There is a risk that - owing to their current circumstances and locations - already disadvantaged groups could be further disadvantaged by the impacts of climate change. For example, it has been shown that a lack of wind-resistant building materials in homes, most likely because of existing poverty, results in substantial increases in poverty after a hurricane.

A globally net-zero, climate-resilient world will need to address these problems, facilitating the transition to more resilient and more sustainable built environments globally, and particularly in poorer and developing countries.



WHAT PEOPLE SAID

BRAZIL

"I'D LIKE TO SEE AN
ECONOMY THAT IS
SOCIALY FAIRER AND
MORE ENVIRONMENTALLY
SUSTAINABLE"

– WORKSHOP PARTICIPANT

WHAT PEOPLE SAID JAMAICA

“Jamaica isn’t just Kingston.
I want people in rural areas to
have the same level of services
as people in the cities”

– WORKSHOP PARTICIPANT

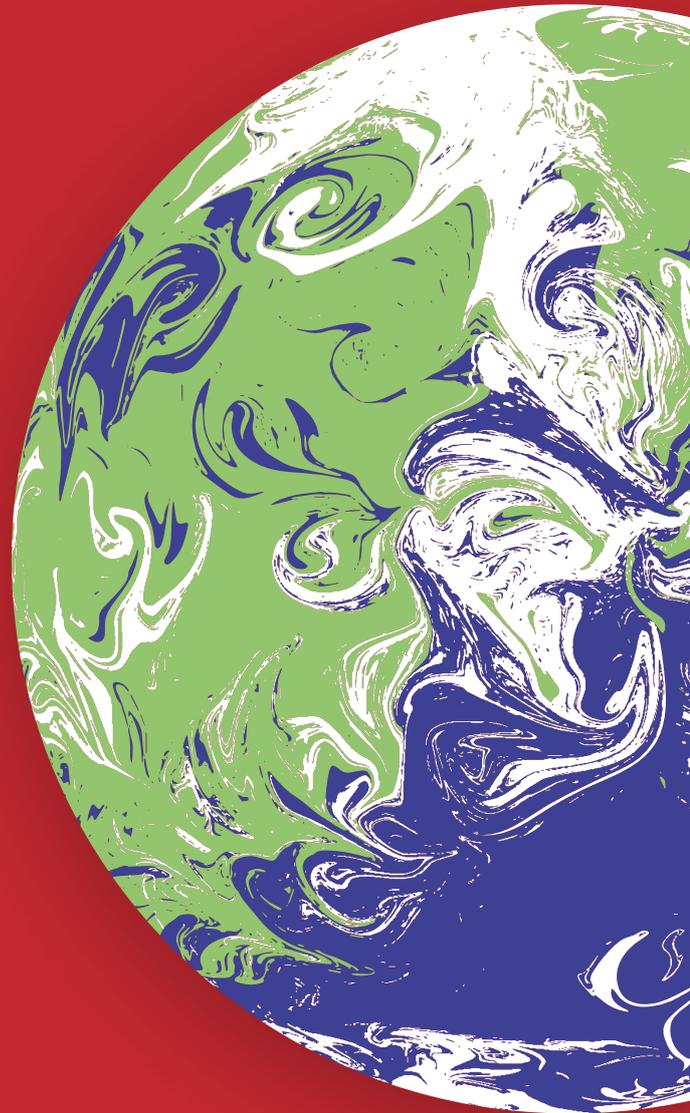
CONVERSATION STARTERS

This project is a thought experiment, offering more access to leading-edge science from around the world, and a window into people's hopes, fears and ideas for a net-zero, climate-resilient future. It's designed to give citizens a voice, and policymakers a more international and more inclusive perspective.

By profiling some of the solutions and innovations where the built environment is concerned, this document aims to inspire action on climate change around the world.

QUESTIONS TO START THE CONVERSATION INCLUDE:

- > How can better connectivity between natural and built environments help our neighbourhoods to be more climate resilient? How can policy help accelerate this integration?
- > What needs to shift so that new, lower-carbon building materials move into the mainstream by 2050?
- > What role do more robust building standards (for homes and infrastructure) play in our journey to a net-zero 2050?
- > How do we start designing, building and retrofitting our homes, to enable both efficiency and resilience to the effects of climate change?
- > What needs to happen to make sure that today's disadvantaged communities are not further disadvantaged by climate change?



ABOUT THIS PROJECT

This report is part of a set of visions commissioned in 2021 by the UK ahead of their COP26 Presidency. These visions aim to explore what the future could look like in a climate-resilient, net-zero world. They highlight some of the innovations that could make this future a reality, and explore what science can tell us about the wide-ranging benefits of achieving this future.



THE VISIONS COVER:

- > A series of cross-cutting themes: Water, Land and Food, Energy and Built Environment.
- > Six regions: the Arabian Peninsula (specifically focused on the Kingdom of Saudi Arabia and the United Arab Emirates), Brazil, India, Jamaica, Kenya, and the UK.

They were chosen to reflect the diversity of challenges and opportunities in building a sustainable future.

WHAT WE DID

These visions were created in three stages between April and August 2021:

- > An international collaboration of experts from the six regions, coordinated by the University of Cambridge, gathered existing research from around the world on science & innovation solutions which could support a global transition to a resilient, net-zero future, including information around their impact and wide-ranging benefits.
- > The findings of these experts were shared with groups of citizens, from each of the six regions, who were then asked to share their hopes and ideas for their own region in a resilient, net-zero world. These citizens came from a variety of groups and backgrounds, with representation from industry, youth groups, civil society, government and Indigenous populations.
- > The science from the experts and the ideas and perspectives from the citizens were brought together to create these visions.

ACKNOWLEDGEMENTS

We would like to thank the in-country experts and our workshop participants without whom this project would have been impossible.

Thank you all for your generosity, thoughtfulness, and enthusiasm.

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- > Prof Steve Evans

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