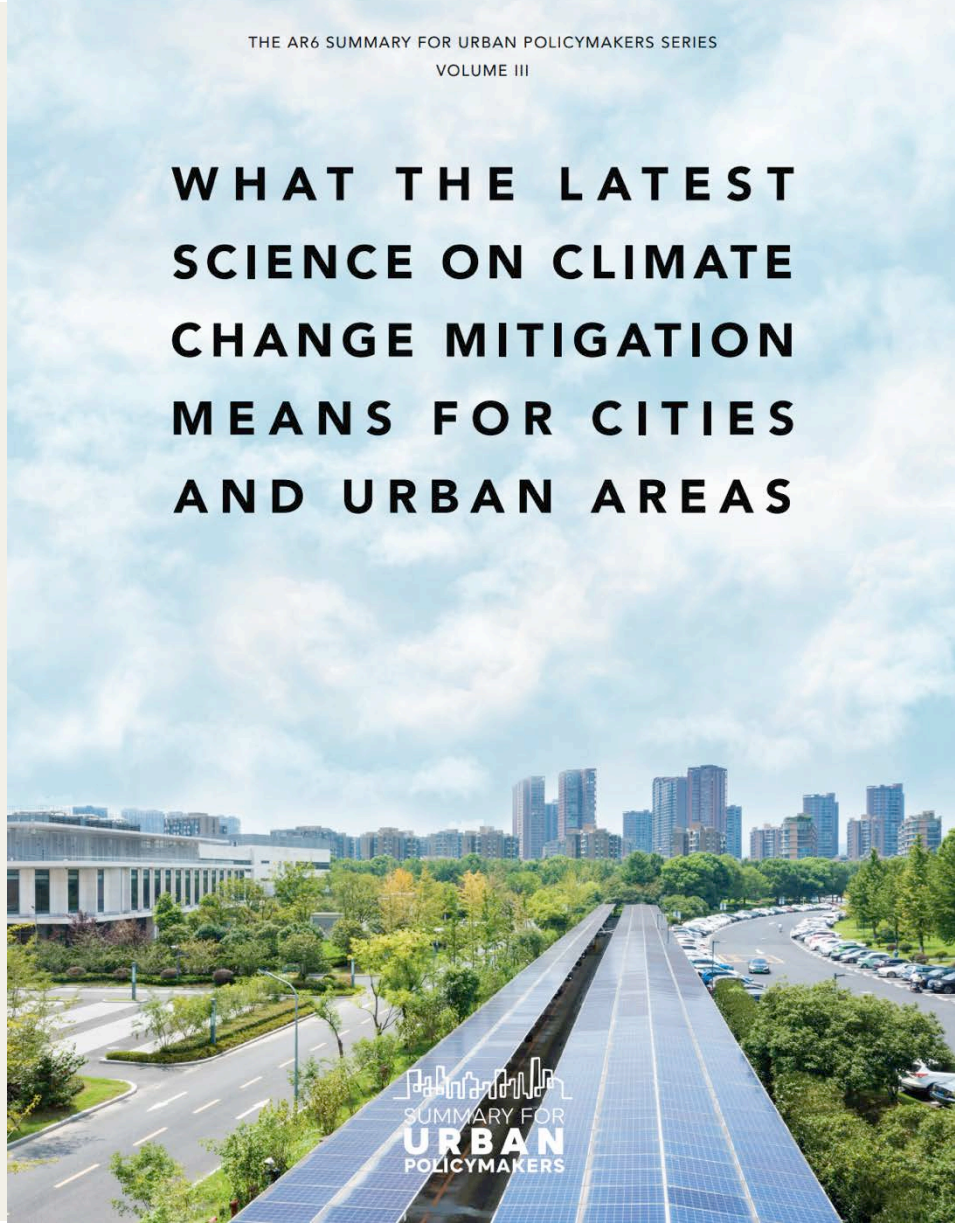
The Summary for Urban Policymakers of the IPCC Sixth Assessment Report (AR6)

What the Latest Science on Mitigation of Climate Change Means for Cities and Urban Areas

Jim Skea

Co-Chair, IPCC Working Group III

CoP27, Sharm El-Sheikh | 11th November 2022



SUMMARY FOR URBAN POLICYMAKERS

Federal Ministry for Economic Affairs and Climate Action

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

iihs® INDIAN INSTITUTE FOR HUMAN SETTLEMENTS

RESILIENCE FIRST

RESILIENCE RISING

Tokyo, Japan

The global urban population is currently 4.5 billion and will touch 7 billion by 2050 and will grow further, over the 21st century.

This will lead to a rise in demand for resources, infrastructure and services, that the Urban and Infrastructure transition could address to limit emissions.

Image credits: Victor Deweerdt / Unsplash

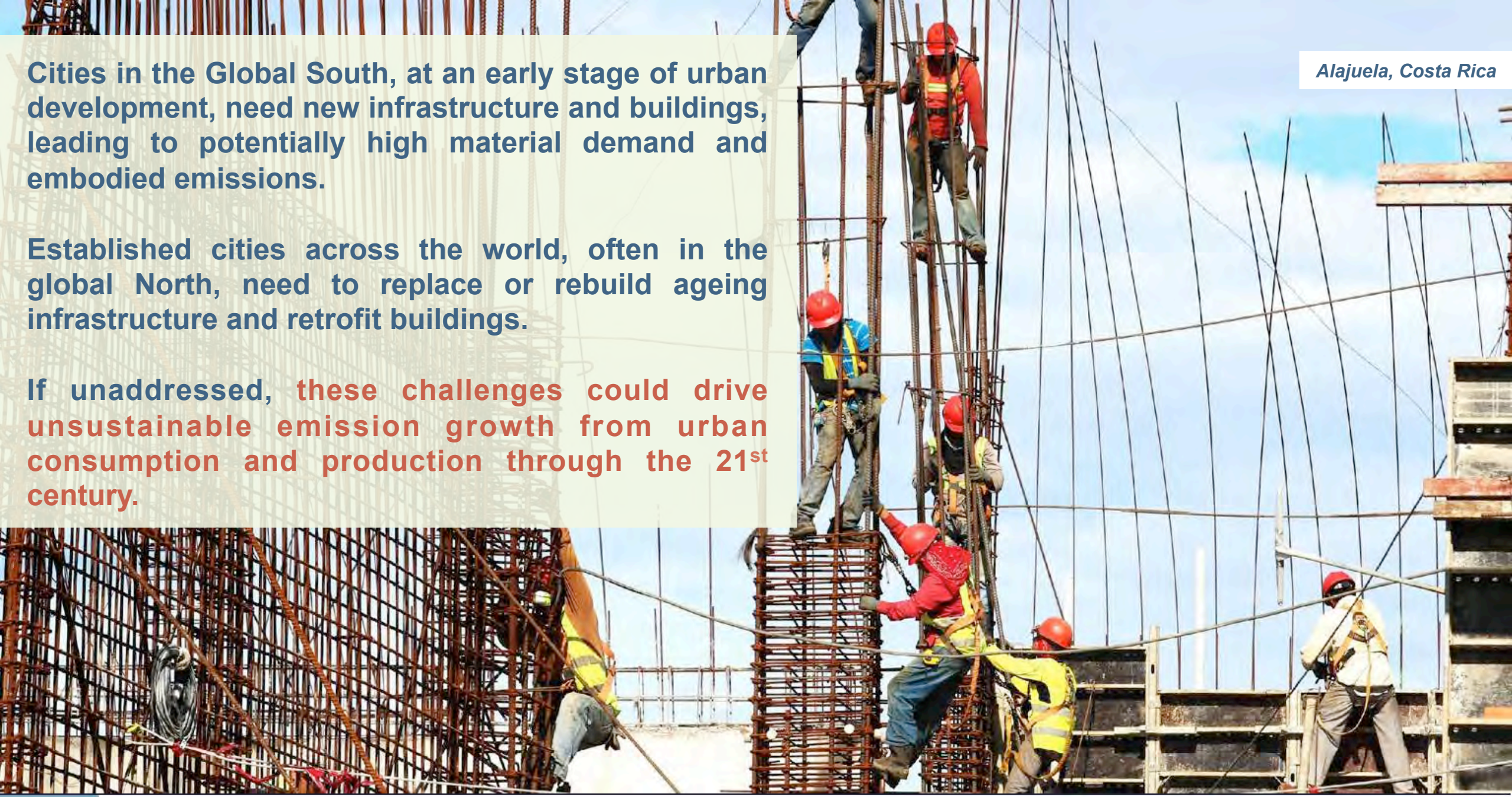
San Francisco, USA

Urban climate change mitigation has a crucial role in determining the future of the global climate.

How cities and urban areas are planned, designed, built, retrofitted, managed and powered will influence urban GHG emissions.

A large share of people in low-emitting countries lack access to modern energy and mobility services. Eradicating extreme poverty, energy poverty, and providing decent living standards can help achieve sustainable development.

Image credits: Daniel Abadia/ Unsplash



Alajuela, Costa Rica

Cities in the Global South, at an early stage of urban development, need new infrastructure and buildings, leading to potentially high material demand and embodied emissions.

Established cities across the world, often in the global North, need to replace or rebuild ageing infrastructure and retrofit buildings.

If unaddressed, these challenges could drive unsustainable emission growth from urban consumption and production through the 21st century.

Image credits: Victor Deweerdt / Unsplash

Federal Ministry for Economic Affairs and Climate Action
giz
GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY
iihs
RESILIENCE FIRST
RESILIENCE RISING

An **Avoid-Shift-Improve (ASI) framework can support climate mitigation** across urban and other systems, with an emphasis on demand-side climate mitigation.

Avoid actions help limit emissions via individual behavioral and lifestyle changes, and redesigning service provisioning.

Shift actions accelerate choices to competitive low-carbon technologies and service-provisioning systems

Improve actions help increase end-use efficiency of technologies in and across urban systems

Figure 1: Mitigation potential of demand-side options by 2050

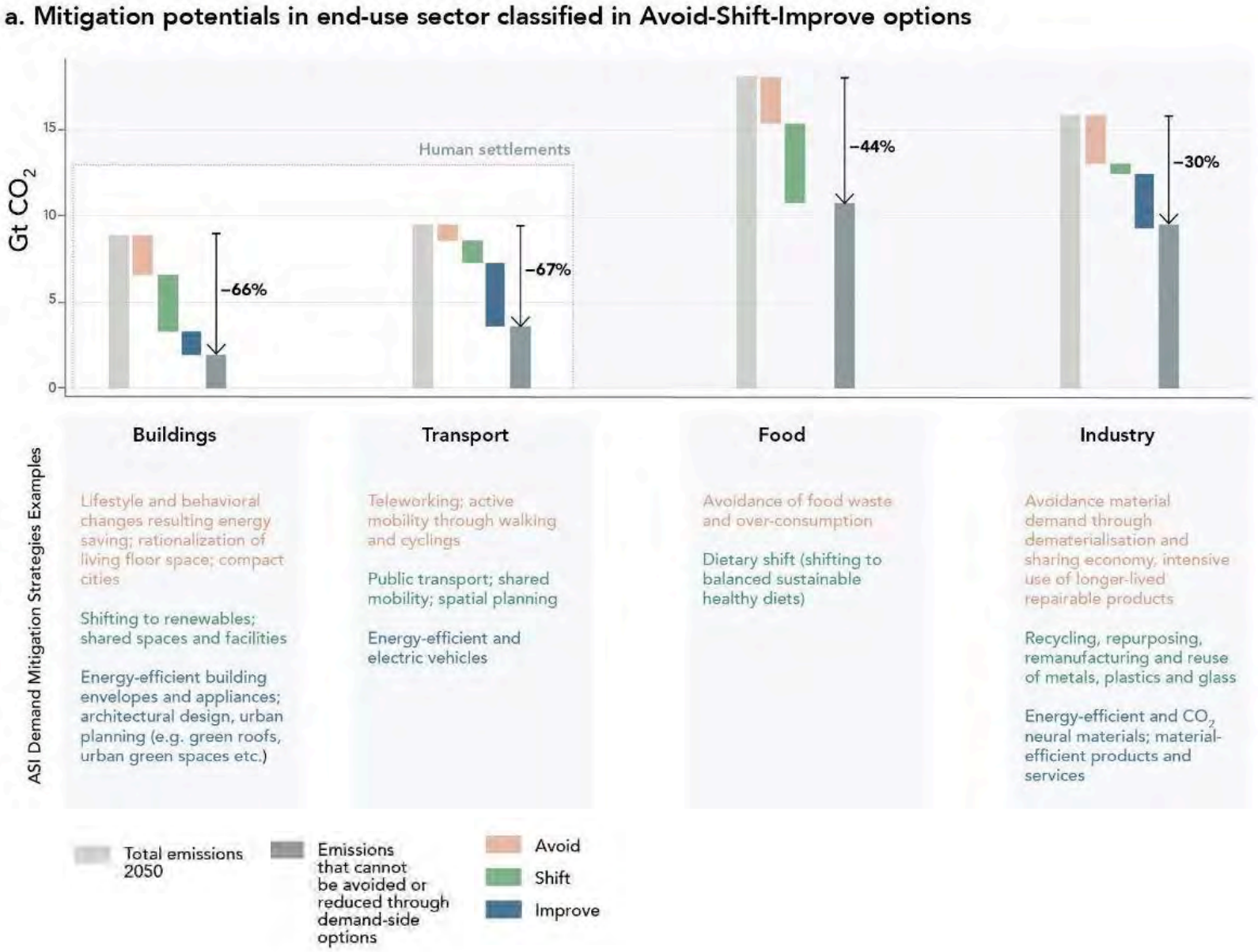


Figure Source: A re-interpretation of data underlying IPCC AR6 WGIII, Summary for Urban Policymakers, Figure SPM.6

Cities are diverse: across multiple dimensions such as their climate, economy, demography and resources. **Hence, feasible and effective mitigation strategies vary considerably across cities.**

Urban and Infrastructure Systems Transitions brings together a range of energy, buildings, transportation, and land use options.

The feasibility and effectiveness of these options is mediated by urban land use and spatial form and state of urbanisation. This includes whether the city is:

- an **Emerging City** building its infrastructure
- a **Rapidly Growing City** with new infrastructure
- an **Established City** with existing infrastructure

Figure 2: Potential of urban mitigation strategies across urban typologies (growth x form) and system transitions.

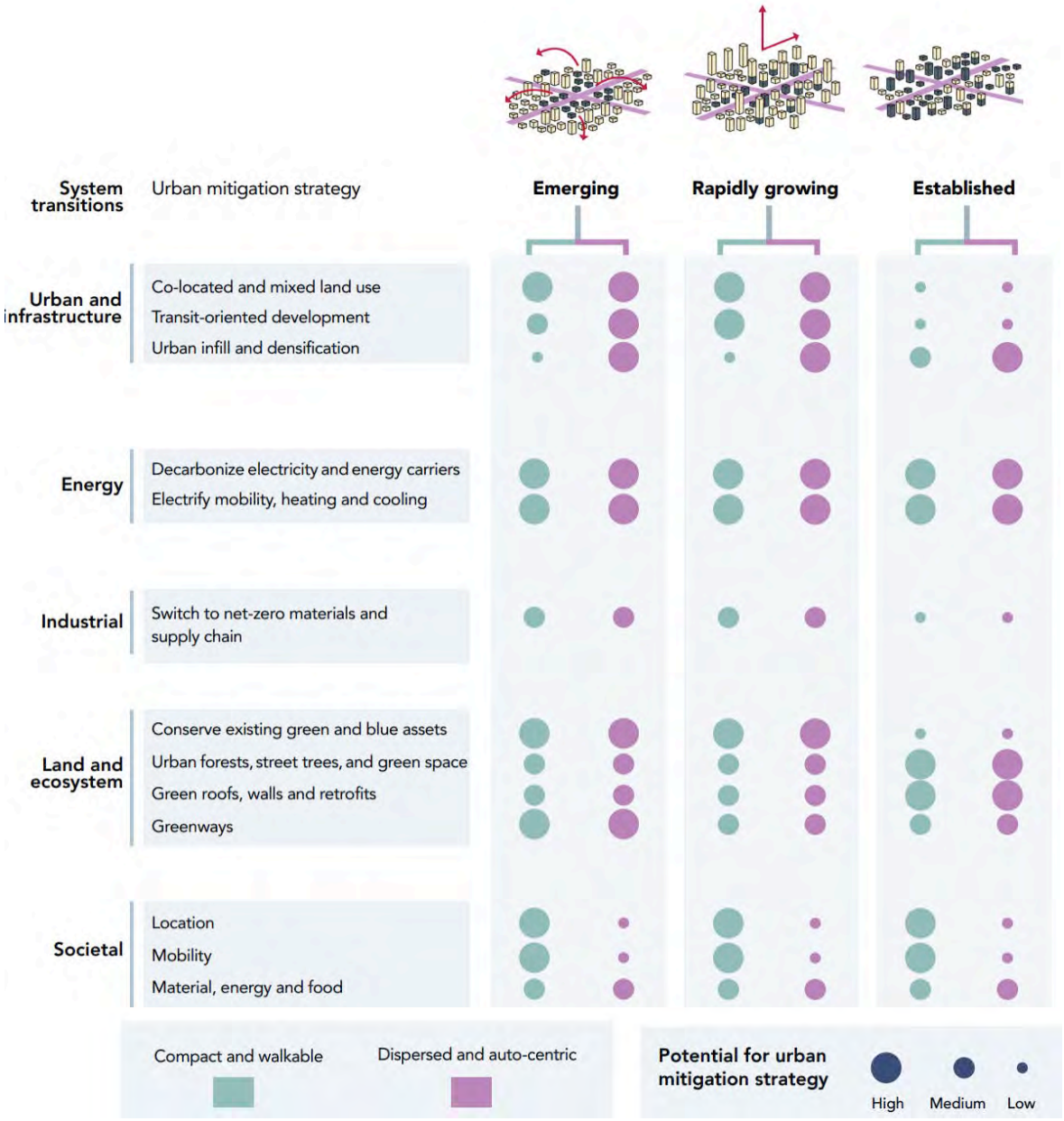


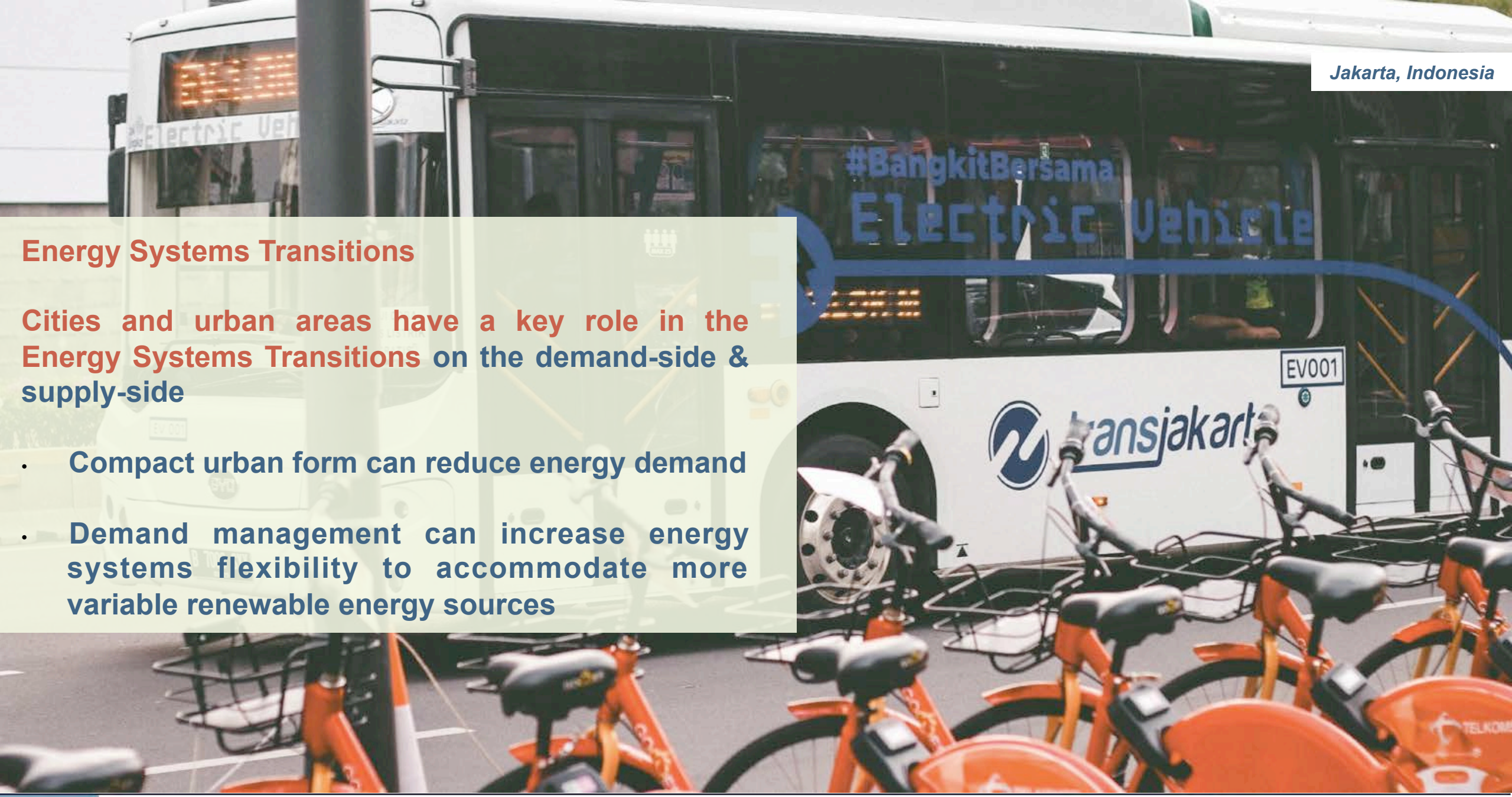
Figure Source: Derived from IPCC AR6 WGIII, Chapter 8, Figure 8.20, Figure 8.21.

Ho Chi Minh City, Vietnam

Cities of all types can accelerate systemic climate responses through five interconnected Systems Transitions: energy, urban and infrastructure, land and ecosystems; industry; and societal.

Urban mitigation actions linked to these Systems Transitions can reach across multiple sectors, urban boundaries and regions.

Image credits: Peter Nguyen / Unsplash



Jakarta, Indonesia

Energy Systems Transitions

Cities and urban areas have a key role in the Energy Systems Transitions on the demand-side & supply-side

- **Compact urban form can reduce energy demand**
- **Demand management can increase energy systems flexibility to accommodate more variable renewable energy sources**

Image credits: Pradamas Gifarry / Unsplash

Land and Ecosystems Transitions

Land use change contributes 13-21% of GHG emissions.

The Land and Ecosystems Transitions can reduce emissions and climate impacts by expanding local urban green and blue infrastructure and promoting urban farming that limits transport and food waste.

The urban land and ecosystems can also be an important carbon sink, if properly managed.

Mandaue City, Philippines

Image credits: Mark Linel Padecio / Climate Visuals Countdown

Industrial Systems Transitions

Cities can play an important role in the Industrial Systems Transitions through spatial planning that limits material demand; design standards, building codes, efficient material procurement; and reusing and recycling waste.

Coordinated value chains decarbonisation is necessary to reach net-zero industry CO_2 emissions.

Image credits: Jenny Parkins

Societal Transitions

Demand-side strategies across all sectors, can reduce emissions by 40-70% by 2050.

Societal Transitions are needed to accelerate these strategies and implement the Systems Transitions.

Amsterdam, Netherlands

Image credits: sabina fratila / Unsplash

There are multiple feasible mitigation options and synergies between mitigation action and sustainable development across key urban sectors and approaches such as urban planning.

Among these, energy efficiency and expanding renewable energy have multiple sustainable development benefits.

Expanding clean energy and public transport use can improve SDG outcomes on health, employment, energy security and equity.

Figure 3: Overall feasibility of mitigation options and synergies and trade-offs between sectoral mitigation options and the SDGs

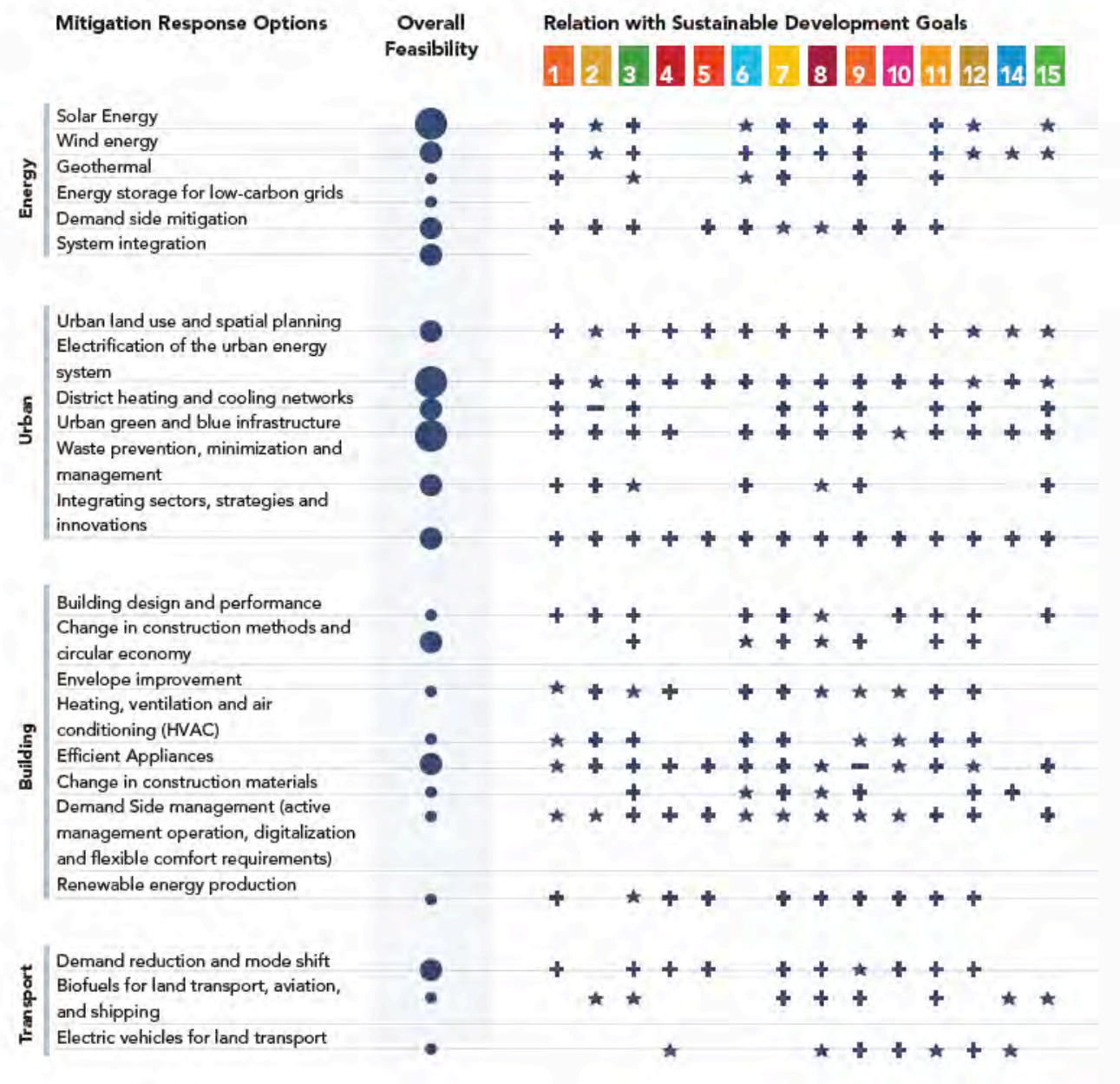


Figure Source: Derived from IPCC AR6 WGIII, Summary for Policymakers, SPM.8

Enabling Conditions

Enabling Conditions promote or advance systems transitions and ultimately transformation. They play a critical role in enabling widespread, effective and accelerated implementation.

Urban policy and planning, governance, finance, lifestyle and behaviour change, and innovation and technology are key levers to accelerate mitigation action.

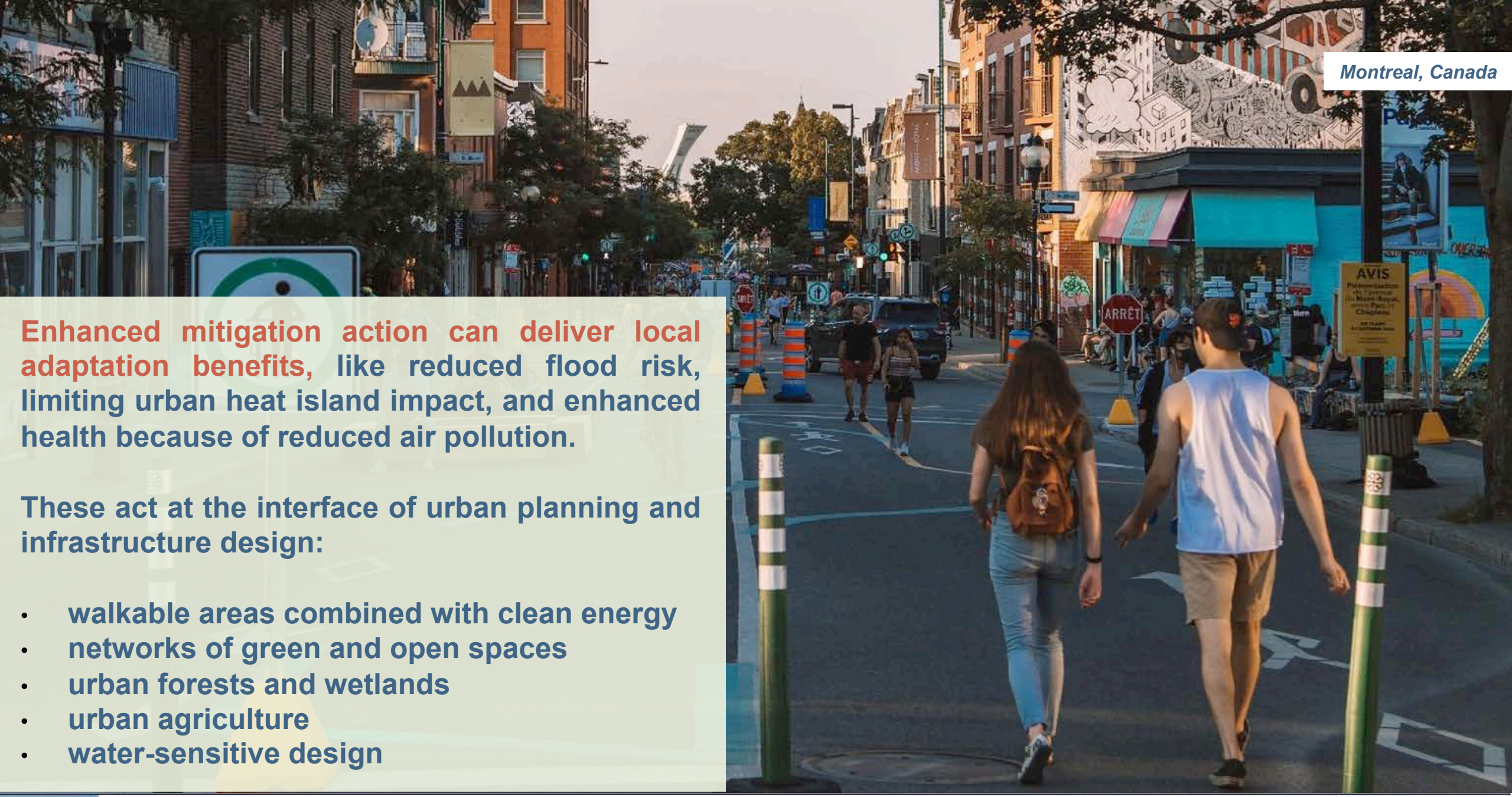
Hangzhou, China

Image credits: Paul Starkey / Ashden

Enhanced mitigation that shifts development pathways towards sustainability can create new green job opportunities, raise incomes and reduce inequalities within and between countries.

Brighton, UK

Image credits: Ruth Knight



Montreal, Canada

Enhanced mitigation action can deliver local adaptation benefits, like reduced flood risk, limiting urban heat island impact, and enhanced health because of reduced air pollution.

These act at the interface of urban planning and infrastructure design:

- walkable areas combined with clean energy
- networks of green and open spaces
- urban forests and wetlands
- urban agriculture
- water-sensitive design

Image credits: Jamshed Khedri / Unsplash

Athens, Greece

Trade-offs between mitigation and adaptation need to be addressed

- Increasing urban density can reduce travel demand and hence emissions but increase vulnerability to heat waves and flooding
- Urban electrification powered by hydropower, biofuel and nuclear sources can impact aquatic, coastal and marine ecosystems

Image credits: AMISOM / Alamy Stock Photo

Cairo, Egypt

Cities can implement aggressive and ambitious mitigation policies while contributing to sustainable development. Pursuing mitigation and adaptation actions together can promote Climate Resilient Development and improve enhancing human and planetary health. Our climate is our future.

Image Credits: Sherif Moharram / Unsplash

AUTHORS

Mustafa Babiker (Saudi Arabia)
Coordinating Lead Author, Chapter 12, IPCC AR6 WGIII
Lead Author, Chapter 4, IPCC Special Report on 1.5°C
Saudi Aramco

Amir Bazaz (India)
Contributing Author, Chapter 4, IPCC Special Report on 1.5°C
Indian Institute for Human Settlements

Paolo Bertoldi (Italy)
Lead Author, Chapter 9, IPCC AR6 WGIII
Lead Author, Chapter 4, IPCC Special Report on 1.5°C
European Commission

Felix Creutzig (Germany)
Coordinating Lead Author, Chapter 5, IPCC AR6 WGIII
Mercator Research Institute on Global Commons and Climate Change

Heleen De Coninck (Netherlands)
Coordinating Lead Author, Chapter 16, IPCC AR6 WGIII
Coordinating Lead Author, Chapter 4, IPCC Special Report on 1.5°C
Eindhoven University of Technology

Kiane De Kleijne (Netherlands)
Chapter Scientist, Chapter 12, IPCC AR6 WGIII
Contributing Author, Chapter 4, IPCC Special Report on 1.5°C
Radboud University

Shobhakar Dhakal (Thailand)
Coordinating Lead Author, Chapter 2, IPCC AR6 WGIII
Asian Institute of Technology

Stuti Haldar (India)
Indian Institute for Human Settlements

Kejun Jiang (China)
Lead Author, Chapter 3, IPCC AR6 WGIII
Coordinating Lead Author, Chapter 2, IPCC Special Report on 1.5°C
Energy Research Institute

Şiir Kılkış (Turkey)
Lead Author, Chapter 8, IPCC AR6 WGIII
The Scientific and Technological Research Council of Turkey

Ian Klaus (USA)
Series Editor of the SUP Series
Chicago Council of Global Affairs

Jagdish Krishnaswamy (India)
Coordinating Lead Author, Chapter 7, IPCC Special Report on Climate Change and Land
Indian Institute for Human Settlements

Shuaib Lwasa (Uganda)
Coordinating Lead Author, Chapter 8, IPCC AR6 WGIII
Lead Author, Chapter 6, IPCC Special Report on Climate Change and Land
Global Center on Adaptation

Leila Niamir (Iran/Austria)
Chapter Scientist and Contributing Author, Chapter 5, IPCC AR6 WGIII Report
International Institute for Applied Systems Analysis

Minal Pathak (India)
Scientist, IPCC WGIII Technical Support Unit
Ahmedabad University

Joana Portugal Pereira (Brazil)
Lead Author, Chapter 4, IPCC AR6 WGIII
Coordinating Lead Author, Annex C, IPCC AR6 WGIII
Universidade Federal do Rio de Janeiro

Aromar Revi (India)
Coordinating Lead Author, Chapter 18, IPCC AR6 WGII and Chapter 4, IPCC Special Report on 1.5°C
Indian Institute for Human Settlements

Joyashree Roy (India/Thailand)
Coordinating Lead Author, Chapter 5, IPCC AR6 WGIII and Chapter 5, IPCC Special Report on 1.5°C
Asian Institute of Technology

Karen C. Seto (USA)
Coordinating Lead Author, Chapter 8, IPCC AR6 WGIII
Yale University

Chandni Singh (India)
Lead Author, Chapter 10, IPCC AR6 WGII
Author, Cross-Chapter Paper 2, IPCC AR6 WGII
Indian Institute for Human Settlements

Shreya Some (India)
Contributing Author Chapter 17, IPCC AR6 WGIII Report and Chapter 5, IPCC Special Report on 1.5°C
Scientist, IPCC WGIII Technical Support Unit
Asian Institute of Technology

Linda Steg (Netherlands)
Lead Author, Chapter 6, IPCC AR6 WGIII
Lead Author, Chapter 4, IPCC Special Report on 1.5°C
University of Groningen

Diana Ürge-Vorsatz (Hungary)
Vice-Chair, Working Group III, IPCC
Central European University

REVIEW EDITORS

Priyadarshi R. Shukla (India)
Co-Chair, Working Group III
IPCC

Jim Skea (UK)
Co-Chair, Working Group III
IPCC