What the Latest Science on Mitigation of Climate Change means for Cities and Urban Areas (VIII)

SUMMARY FOR URBAN POLICYMAKERS

ABOUT SUP AR6 SUMMARY SERIES

The Summary for Urban Policymakers (SUP) convenes IPCC report authors (in their individual capacities) with local government officials, national governments and business communities to present findings from the IPCC climate reports in accessible and targeted summaries that can help inform and catalyze urgent action at the city and regional scales.

Volume III, *What the Latest Science on Mitigation of Climate Change means for Cities and Urban Areas*, focuses on urban mitigation actions that cities and local leaders can take.

KEY MESSAGES

- The global urban population is currently 4.5 billion and will touch 7 billion by 2050. Urban population will grow further along with an expansion in urban land area, 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.
- Urban climate change mitigation has a crucial role in determining the future of the global climate. Actions taken, or not, will lead to different emissions scenarios, and different futures. 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 while reducing global energy demand and limiting global emissions.
- 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 aging infrastructure and retrofit buildings. If unaddressed, these challenges could drive unsustainable emission growth from urban consumption and production through the 21st century.
- 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.
- Cities are diverse: across multiple dimensions such as their climate, economy, demography and resources. Hence, feasible and effective mitigation strategies vary considerably across cities.
- Cities of all types can accelerate systemic climate responses through five interconnected System Transitions: energy, urban and infrastructure, land and ecosystems; industry; and societal. Urban mitigation actions linked to these System Transitions can reach across multiple sectors, urban boundaries and regions.
- Cities and urban areas have a key role in the Energy System transition on the demand-side & supply-side. Compact urban form can reduce energy demand, and demand management can increase energy systems flexibility to accommodate more variable renewable energy sources.
- The Urban and Infrastructure System Transition 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 urbanization. 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

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- Land use change contributes 13-21% of GHG emissions. The Land and Ecosystems Transition 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.
- Cities can play an important role in the Industrial System Transition through spatial planning that limits material demand; design standards, building codes, efficient material procurement; and re-using and recycling waste. Coordinated value chains decarbonisation is necessary to reach net-zero industry CO_2 emissions.
- 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 System Transitions.
- 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.
- Enhanced mitigation that shifts development pathways towards sustainability can create new green job opportunities, raise incomes and reduce inequalities within and between countries.
- 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
- Trade-offs between mitigation and adaptation need to be addressed
  - Increasing urban density can reduce travel demand and hence emissions but increase vulnerability to heatwaves and flooding.
  - Urban electrification powered by hydropower, biofuel and nuclear sources can impact aquatic, coastal and marine ecosystems
- 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 behavior change, and innovation and technology are key levers to accelerate mitigation action.
- Implementing ambitious urban climate action needs active governance and coordination at multiple levels across a range of actors. Regional, national and international climate action has most impact when local governments partner and coordinate with all levels of government, the private sector and other non-state actors. This provides the legal and institutional basis to respond systemically to the mitigation agenda.
- Strengthening the financial capacity and credit worthiness of cities can expand the availability and access to climate finance, is crucial to successful urban mitigation. Cities, in partnership with national government and international financial institutions and markets can help mobilise climate finance across key sectors to enable mitigation and adaptation.
- Lifestyle and behavioural change is important to mitigate climate change supported by policy and system changes, including pricing, sustainable technology, and making low-carbon choices the default option. Public support for system changes improves when benefits and costs are shared, and when decision-making processes encourage trust.

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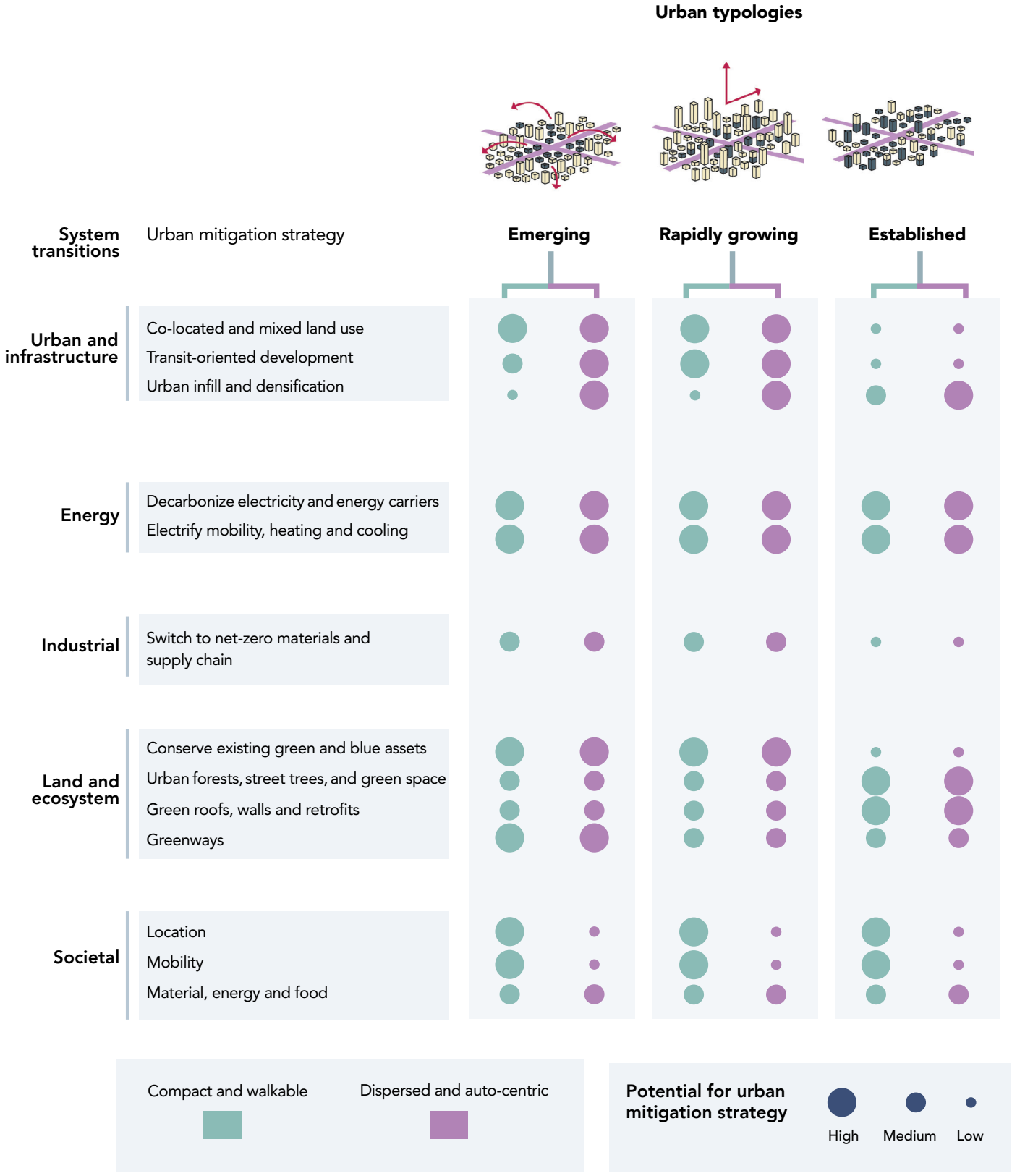
Figure 2: Potential of urban mitigation strategies across urban typologies (growth x form) and system transitions.



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