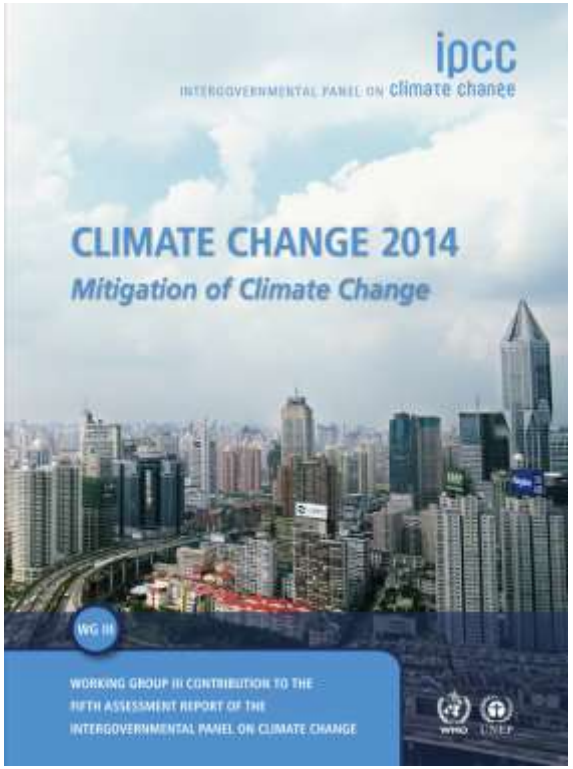
Human Settlements and Climate Change Mitigation:

Key findings from the latest IPCC WG3 report



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Key messages

- Our ability reduce global GHG depends on what kind of cities and towns we will build and how urban dwellers embrace carbon mitigation

- A large window of mitigation opportunities lie in guiding new urbanization in next 2-3 decades- urban areas are yet to be built

- Existing city initiatives are meaningful but results are yet unclear, actions are yet limited in scope → but there are large opportunities to mitigate through
  - a) systemic and integrated mitigation options, and
  - b) considerations to co-benefits and best practices

- For designing and implementing climate policies effectively - institutional arrangements, governance mechanisms, and financial resources all should be aligned with the goals of reducing urban GHG emissions

Urbanization is associated with increases in income and higher urban incomes correlated with higher energy and GHG emissions

- 71-76% of energy-related global CO2 emissions are from urban areas/cities
- City consumption driven upstream emissions makes cities even more important
- Cities in developing countries have, generally, higher per capita CO2 emissions than respective national averages – majority of new urbanization will be in these areas
- Emissions and contribution of sources vary greatly across cities – direct comparison often does not tell us much - cities are different from nation states

No single factor explains the large variations in city per-capita city emissions within and across countries

- Influenced by physical, economic and social drivers specific to each city
- Individual technology drivers and activities are relatively better understood- systemic factors and integrated effects of drivers are less understood
- Spatial drivers are important- especially the collective influence of urban density, land-use mix, connectivity and accessibility

Density is necessary but not sufficient condition for lowering urban emissions

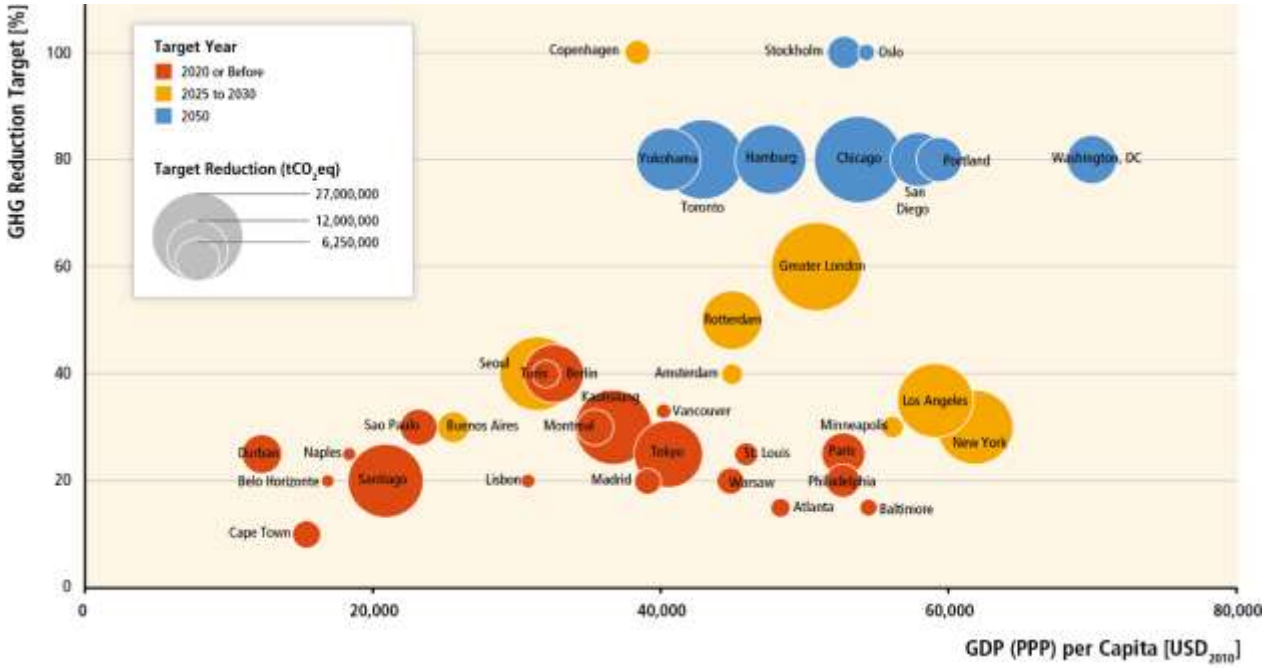
Higher density

Mixed land-use

Better connectivity

Better accessibility to people and places

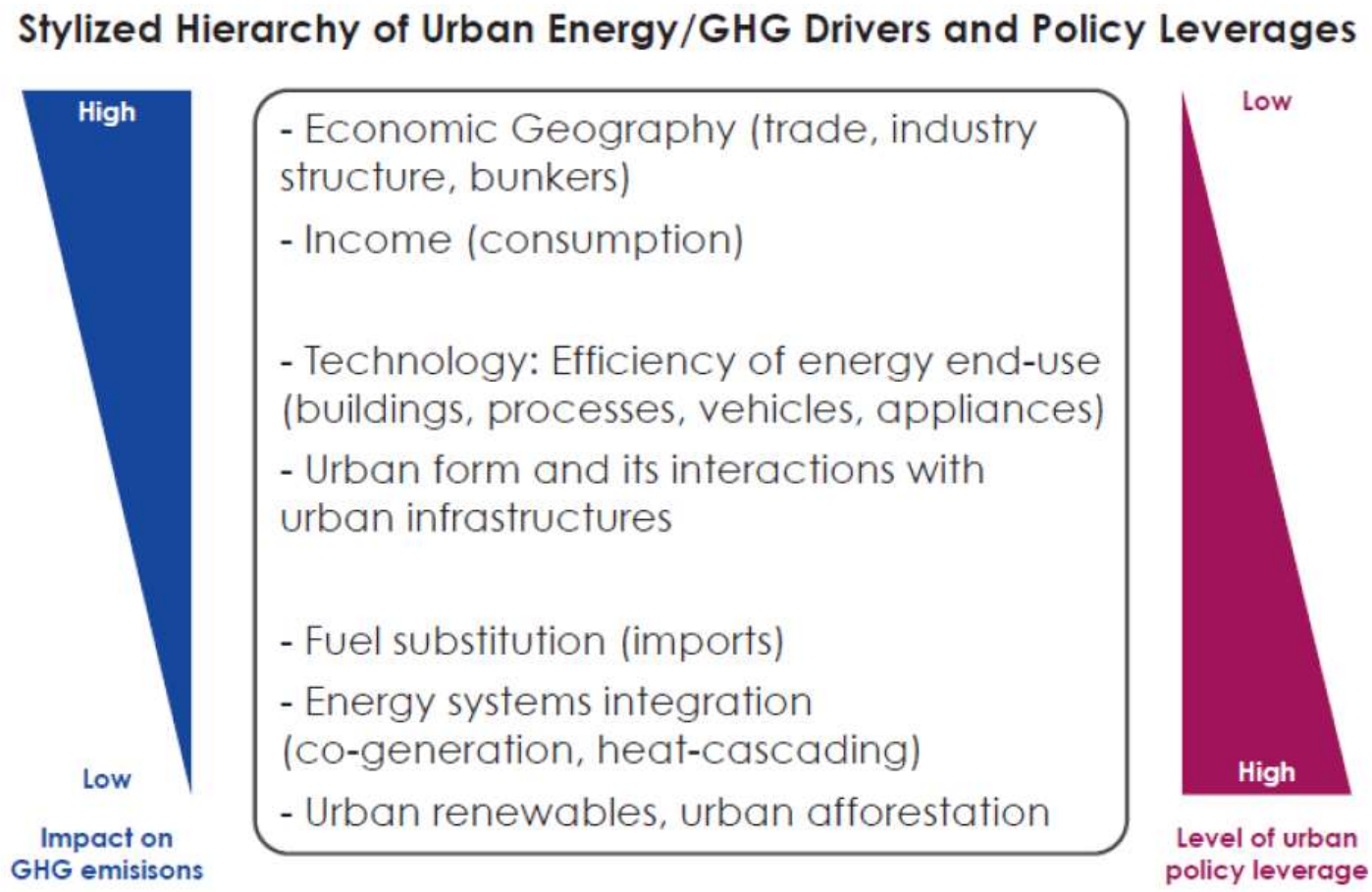
Thousands of cities are undertaking Climate Action Plans and mitigation commitments



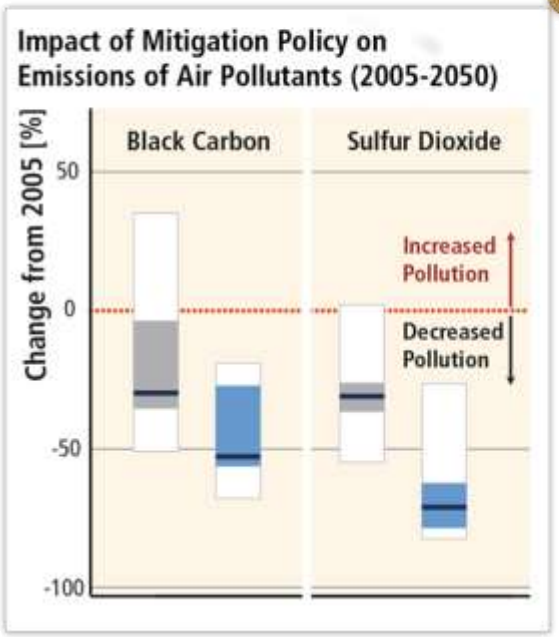
- Little systematic assessment on their level of implementation & the extent to which reduction targets are being achieved
- Focused largely on energy efficiency
- Limited consideration to land-use planning strategies and other cross-sectoral, cross boundary measures

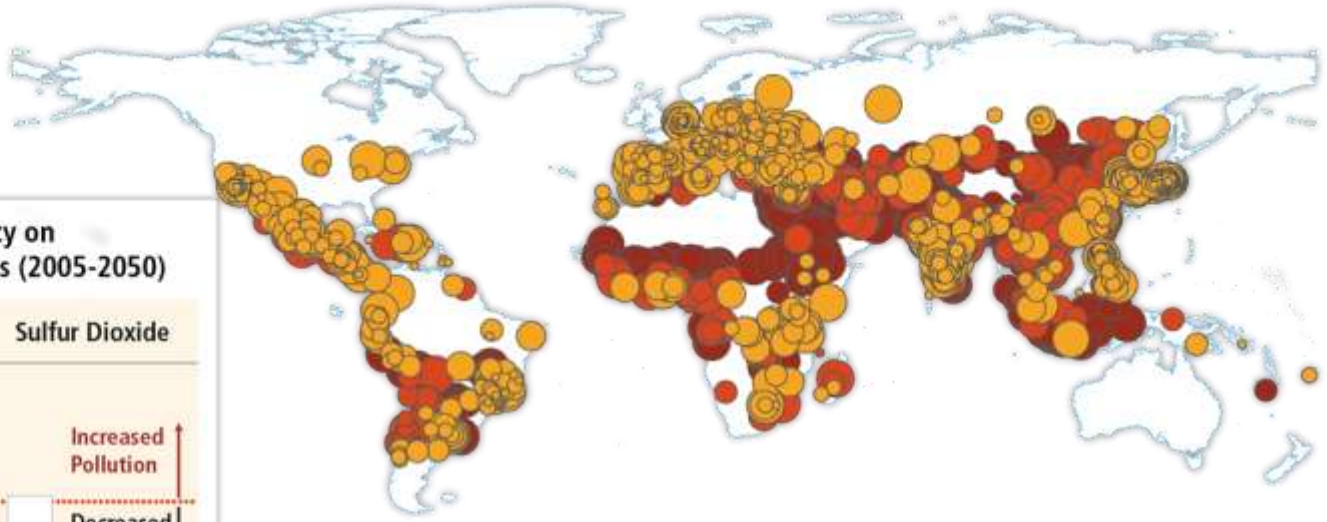
Yet, their aggregate impact on urban emissions is uncertain

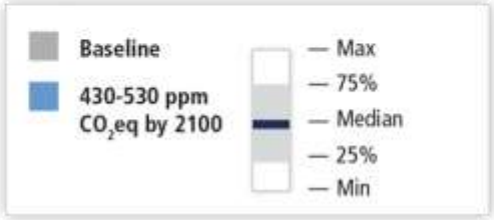
In urban decisions making, policy leverages do not often match with largest mitigation opportunities in cities



Action on urban-scale mitigation often depends on the ability to relate climate change mitigation efforts to local co-benefits



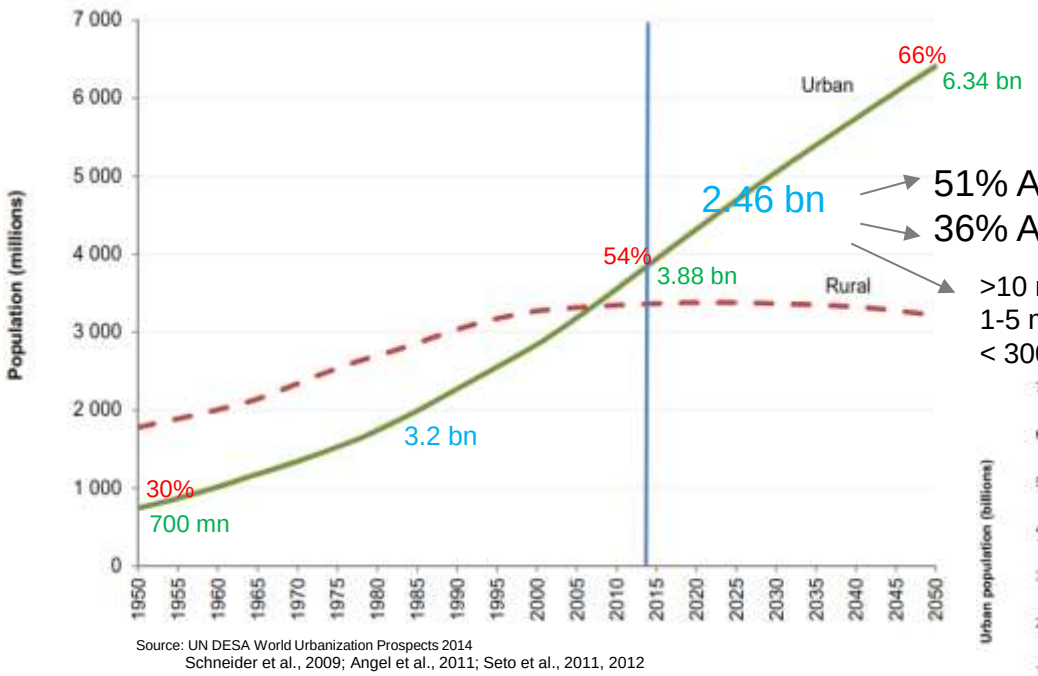




- **Successful implementation of urban-scale climate change mitigation strategies can provide health, economic and air quality co-benefits**

Implications of future urbanization

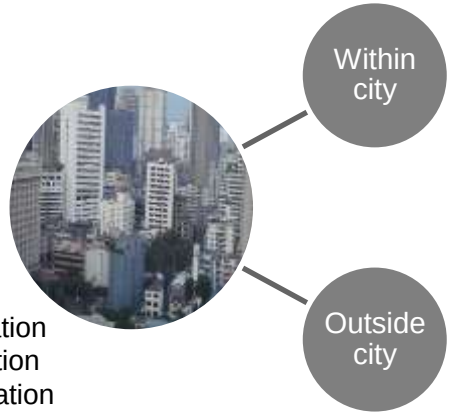
- Urban land could expand up-to 3 time in 2000-30
- 55% of global land in 2030 is expected to be developed in 2000-30

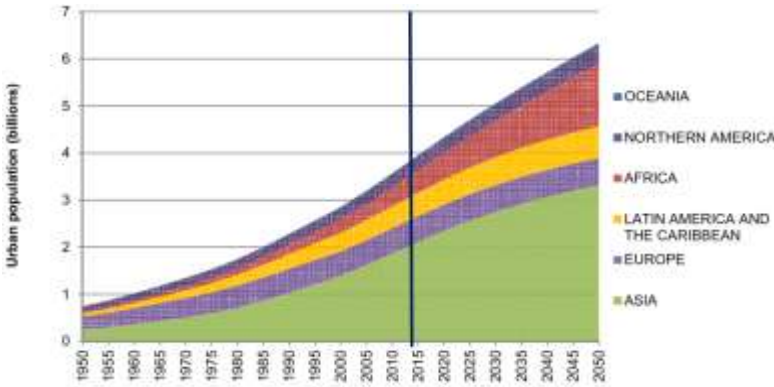


Source: UN DESA World Urbanization Prospects 2014
Schneider et al., 2009; Angel et al., 2011; Seto et al., 2011, 2012

51% Asia
36% Africa

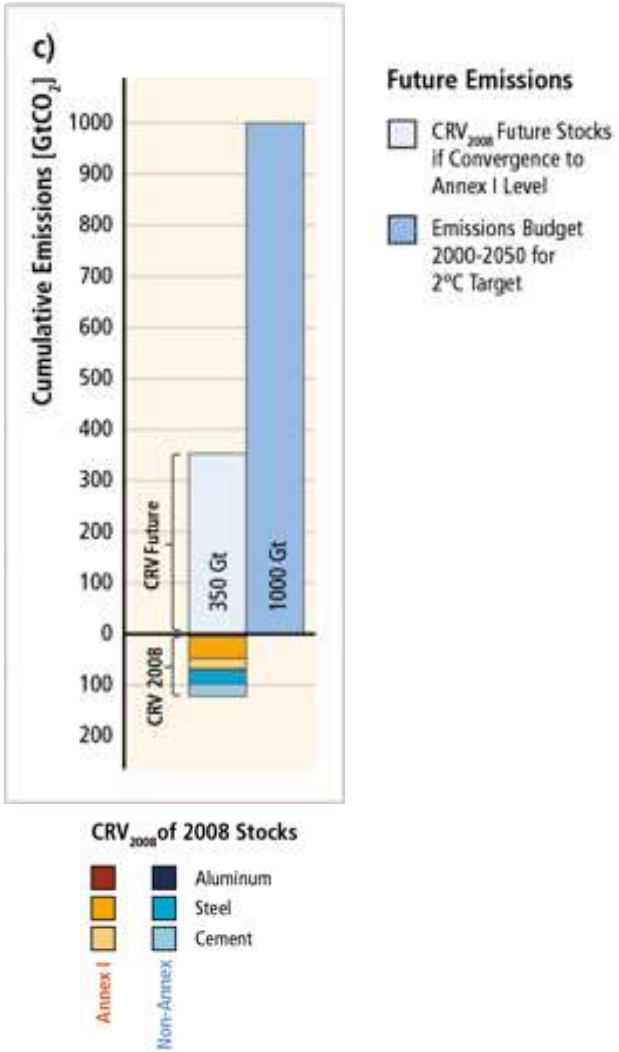
>10 mn city-agglomeration
1-5 mn city-agglomeration
< 300 th city-agglomeration





- Two sources of emissions: Materials stock; usage of infrastructure
- Problem of “Lock-in”of energy and emissions pathways

Future infrastructure in rapidly urbanizing regions demand large emissions



- The existing infrastructure stock of the average Annex-I resident (2008) is @
  - 3 times of the world average
  - 5 times of the average non-Annex I resident

- If non-Annex I countries catch up with Annex-I for per capita infrastructure stock → will result in significant future emissions

→ Amount to over 1/3rd of total emission budget that we have left in 2000-2050 to stay under 2°C

‘Governance paradox’

- ‘Systemic changes’ have large mitigation opportunities but hindered by current patterns of urban governance, policy leverages and persisting policy fragmentation

- Governance and institutional capacity are scale and income dependent

  The largest opportunities for GHG emission → where bulk of urban growth will take place (small cities and low income areas) → where governance and institutional capacities are weakest.

- The feasibility of spatial planning instruments for climate change mitigation is highly dependent on a city’s financial and governance capability

Key opportunities

- Guiding new urbanization in next 2-3 decades → large opportunity but fast closing too
- Going beyond Incremental change → to transformative change
  - Better climate change action plans and implementations
  - Deploying far-reaching market-based solutions coupled with planning, such as pricing
  - Large opportunities for systemic and integrated solutions
- Overcoming the size, governance and income dependency of successful mitigation options, possibly through capacity building
- Overcoming the governance limitations and policy fragmentations
- Smoothening the entry points to climate agenda: Demonstrating the best practice technologies and local co-benefits of urban-scale mitigation actions

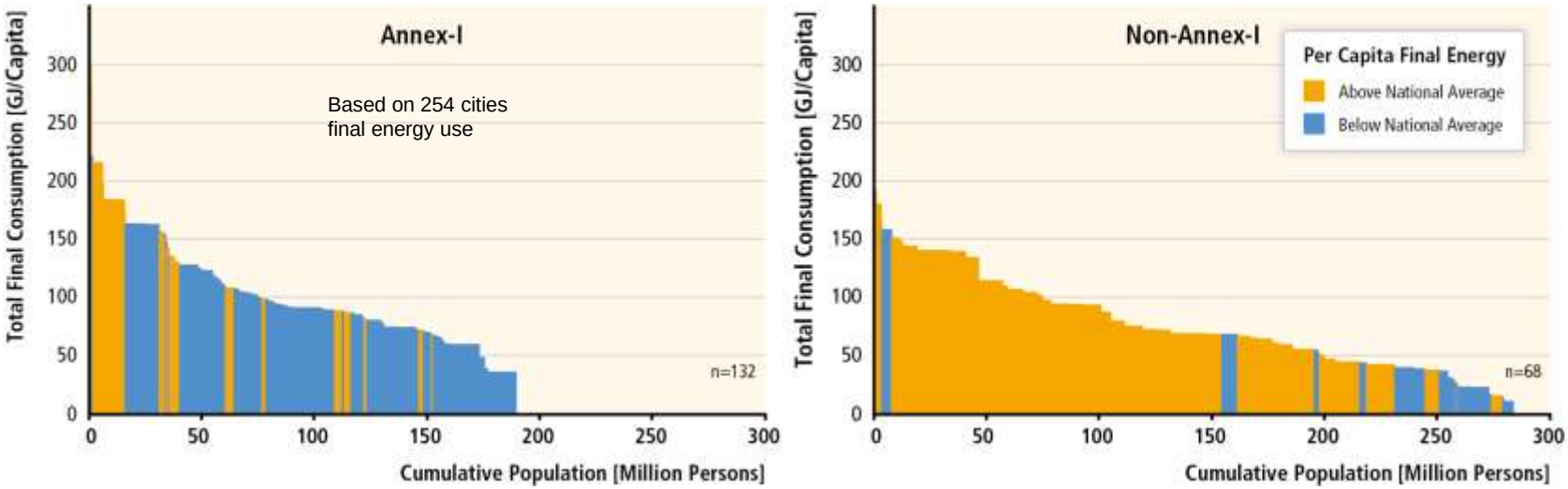
For further information

www.mitigation2014.org

Implications of urbanization

- Urbanization-income nexus → higher urban incomes correlated with higher energy and GHG emissions

- Cities in developing countries have, generally, higher per capita final energy use and CO2 emissions than respective national averages – majority of new urbanization will be in non-Annex



The feasibility of spatial planning instruments for climate change mitigation is highly dependent on a city's financial and governance capability