Spatial Planning and Low Carbon Infrastructure

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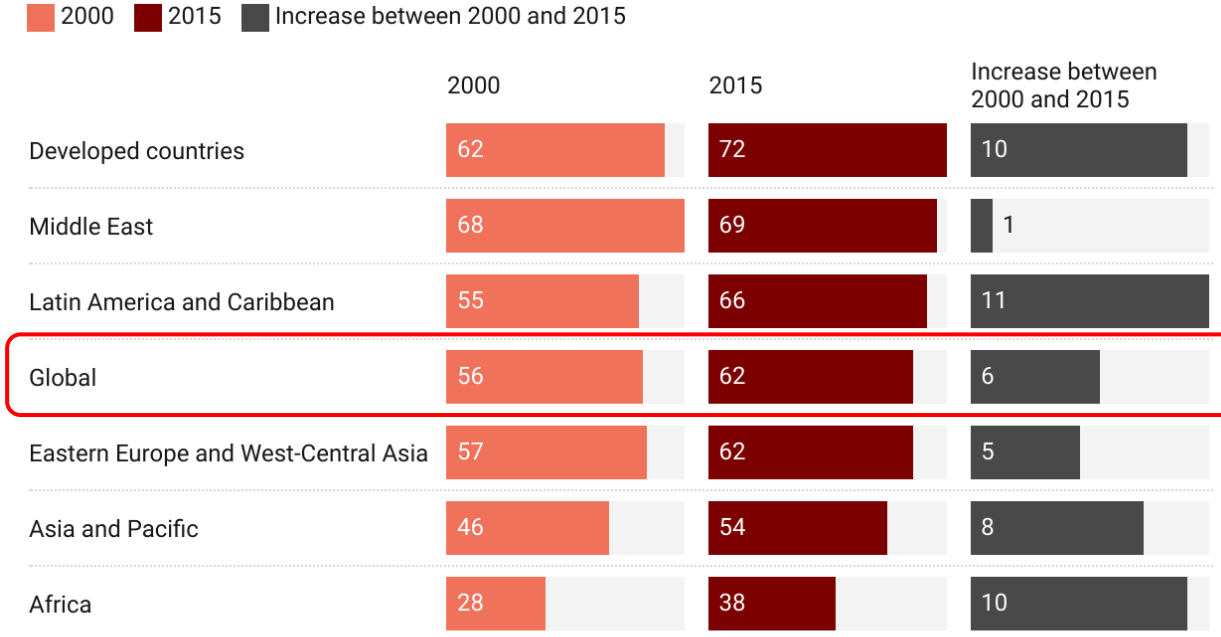
Overview

Where are cities today?	• Urban emissions and key features
What are the drivers of urban emissions?	• Level of development, urban density and sprawl, land use patterns
What is to be done?	• Spatial planning: Compact cities → Transport, land use • Low carbon infrastructure → Efficiency and service provisioning

Where are cities today?

Share of Urban Emissions as Proportion of Total Regional Emissions

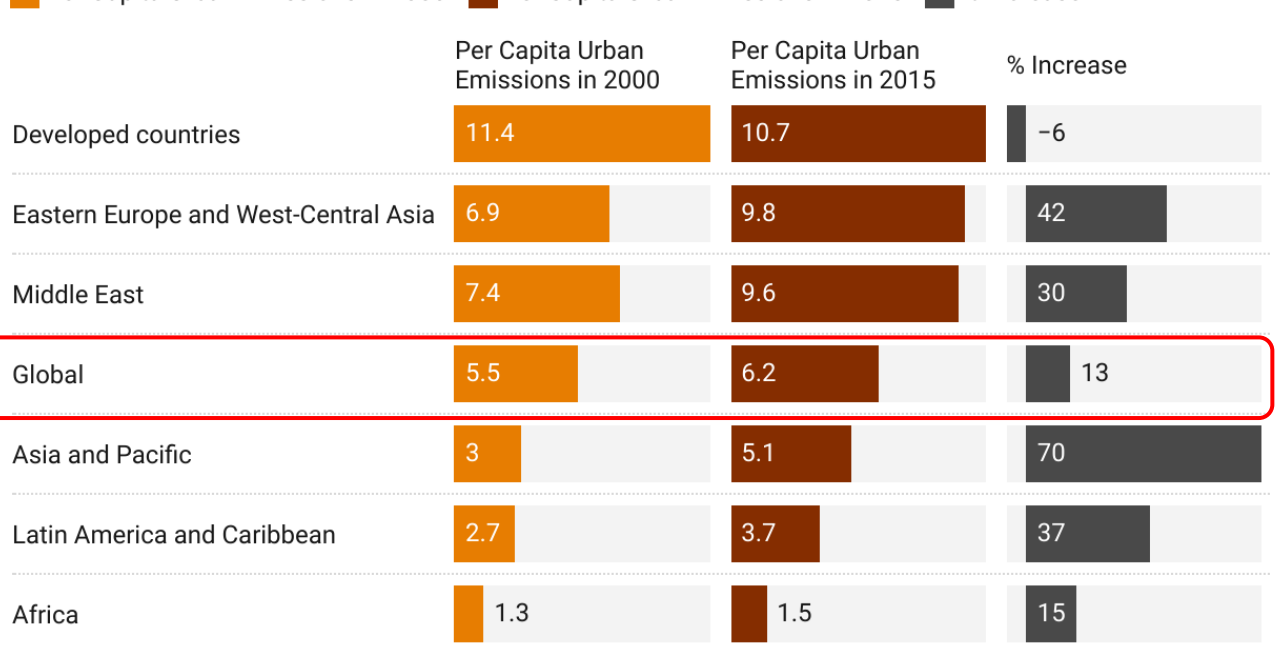
Values in %



Source: IPCC, AR6, Working Group-III, Chapter 8 • Created with Datawrapper

Per Capita Urban Emissions

Emission values in tCO2-eq per person



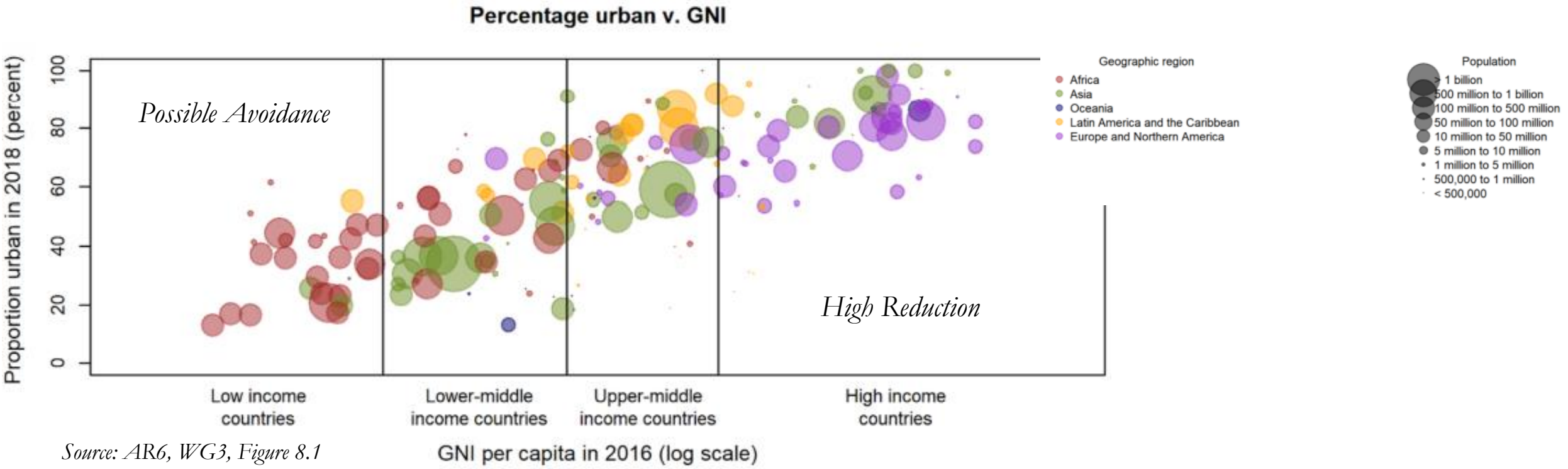
Source: IPCC, AR6, Working Group-III, Chapter 8 • Created with Datawrapper

In 2020 urban emissions were estimated to be about 67–72% of the global share.

Very high regional variation – high growth in developed regions despite starting from high baseline

There is a positive and strong correlation between the urbanisation level and gross national income.

High-income → ~80% ; Low-income countries→ ~30%. (AR6, WG3, Chapter 8)

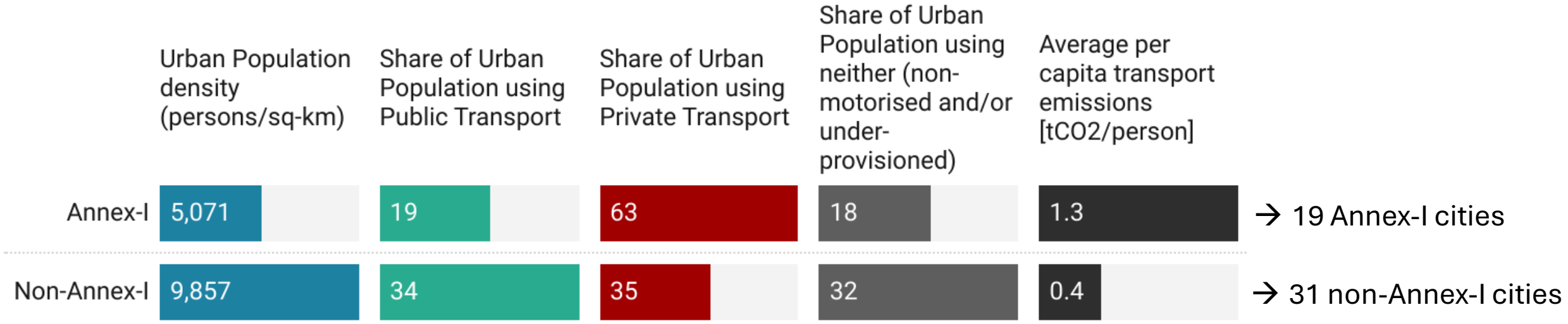


Source: AR6, WG3, Figure 8.1

- Energy for buildings, transportation, industry, and other sectors is a major source of urban GHG emissions (Gurney et al. 2015) → Higher in regions with higher urbanization (Figure 8.1, WG3)

- Mitigation frameworks
  - High urbanization/high urban emissions (developed countries)→ Service provision + **emissions reduction**
  - Emerging/Ongoing urbanization (developing countries) → Infrastructure building + Service provision + **emissions avoidance**

Drivers: Development, Urban Density, Policy framework



	Urban Population density (persons/sq-km)	Share of Urban Population using Public Transport	Share of Urban Population using Private Transport	Share of Urban Population using neither (non-motorised and/or under-provisioned)	Average per capita transport emissions [tCO2/person]
North America	3621	7%	90%	4%	2.3
Europe	5342	29%	39%	31%	0.45
China+	6374	36%	26%	38%	0.36
South Asia	16315	35%	27%	38%	0.24

IPCC AR6 → Integrated spatial planning to achieve compact and resource efficient urban growth through co-location of higher residential and job densities, mixed land use, and transit-oriented development (TOD) could reduce GHG emissions between 23% and 26% by 2050 compared to the business-as-usual scenario (robust evidence, high agreement, very high confidence)

Urban Density: Spatial planning/re-design

For established cities (developed countries) .....*(8.6.1, WG-3, AR6)*

Encouraging modal shift for transport, electrification

Infilling and densifying urban areas - prioritising compact and mixed-use neighbourhoods

Replacing, repurposing, or retrofitting building stock - retrofitting buildings with state of the art deep-energy retrofit measures could reduce emissions of the existing stock by about 30–60% (Creutzig et al. 2016a) and in some cases up to 80% (Ürge-Vorsatz et al. 2020) (Section 8.4.3).

Rapidly growing and emerging cities (developing countries)

Service provisioning remains important… large developmental deficits

Low-carbon development through improved spatial planning, encouraging mixed land-use, efficient building design; avoid trade-offs with under-provisioning of amenities

Mass-transit systems → affordability, accessibility, reliability must be ensured; avoid trade-offs with conditionality of finance

Adverse global macro-economic trends can impact urban climate action negatively

Thank you

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