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Net Zero Transition:
How Cities Are Moving Towards Zero Carbon

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Emission from Transport Sector

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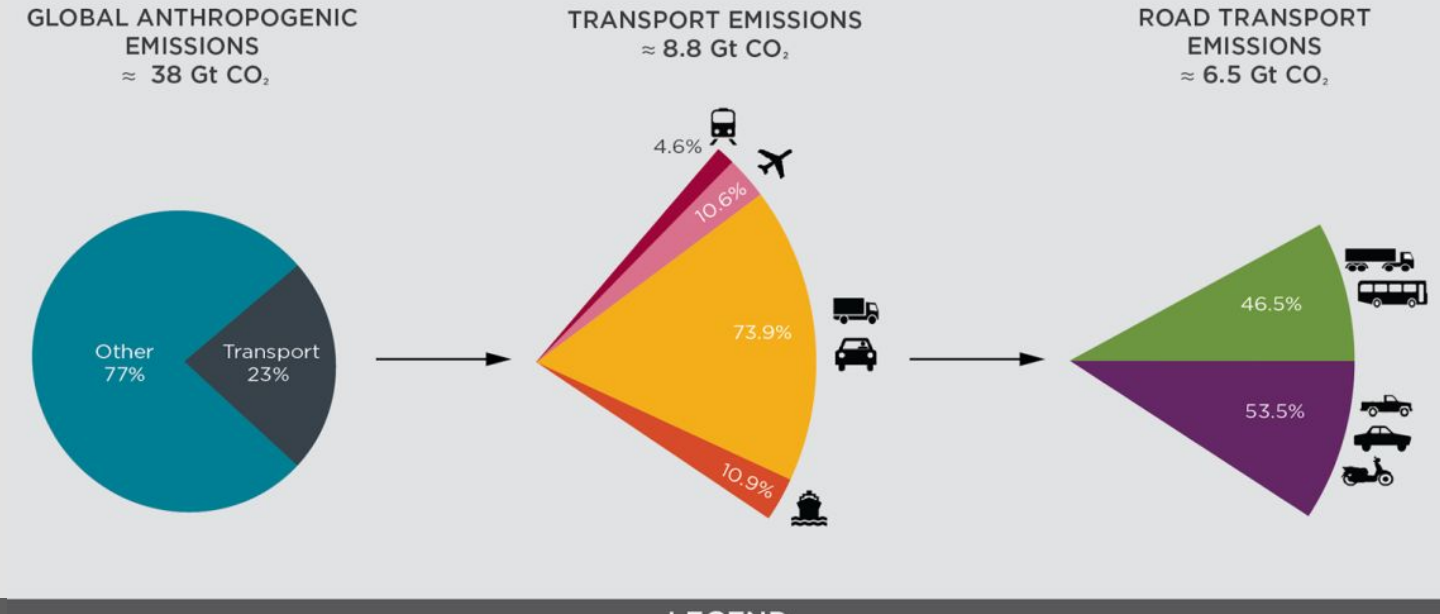

Sources:
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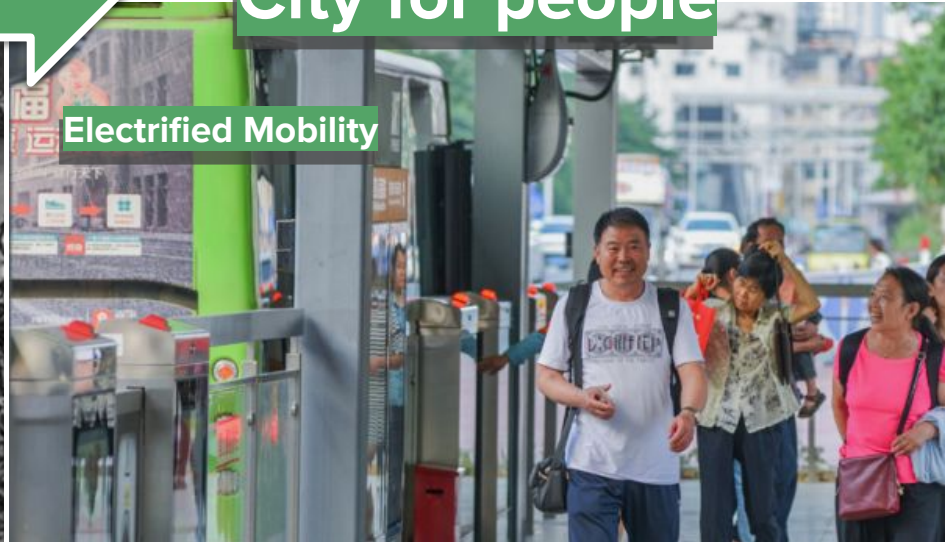
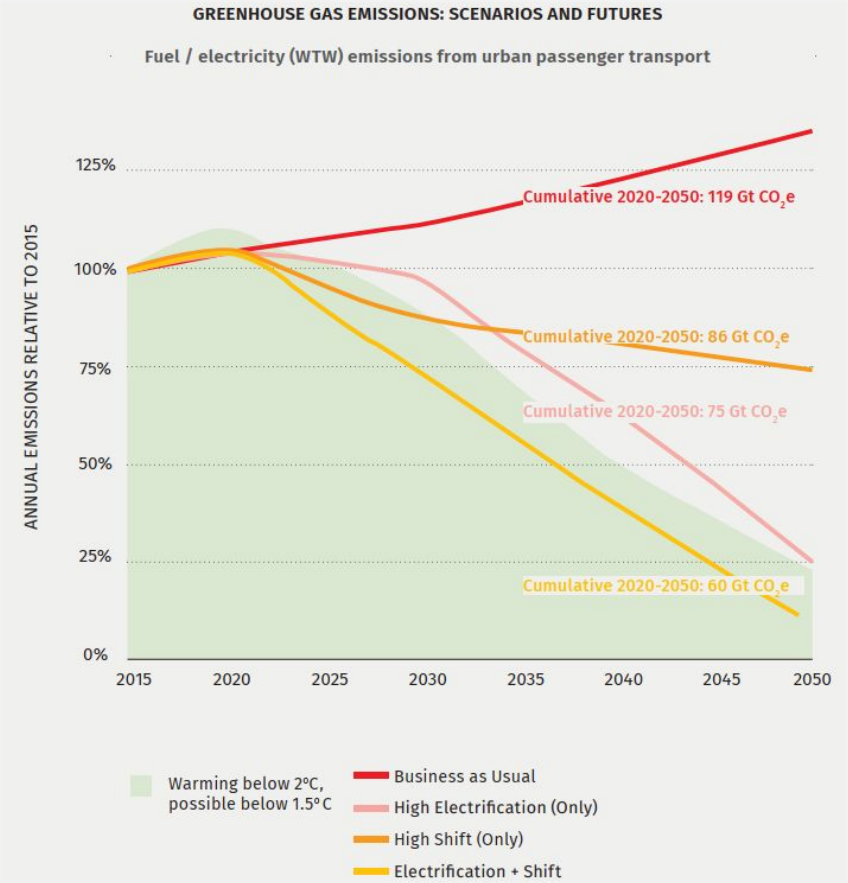
IPCC (2014). Summary for Policymakers. Climate Change 2014, Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Shifting Mobility Paradigm

City for people



Greenhouse Gas Emissions Reduction

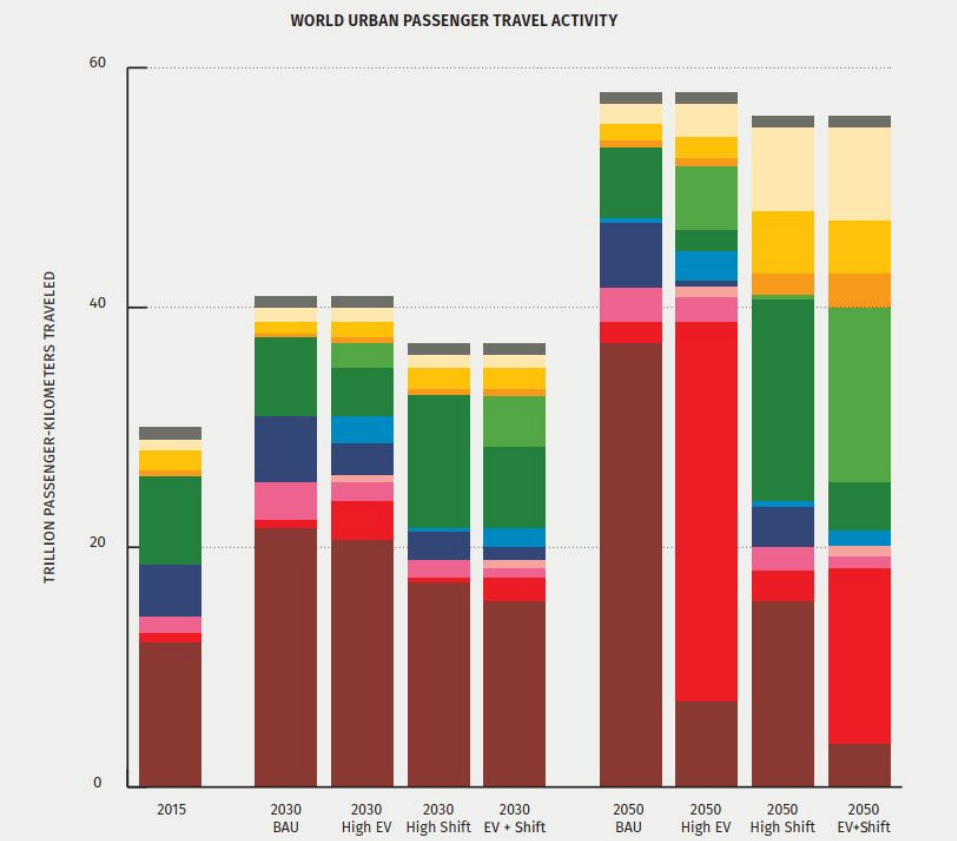


To limit global warming less than 2°C, carbon emissions from world energy sector must fall to less than about 20% of their 2015 levels by 2050

Among the four scenarios, **only *Electrification + Shift* will achieve greenhouse gas reductions** consistent with the *Sustainable Development Scenario* (possibly limiting global warming less than 2°C - 1.5°C)

**The scenario is still not taken into account the construction, maintenance, and disposal of the vehicle*

Greenhouse Gas Emissions Reduction



High electrification exhibits the **same general modal split as BAU** (but with the different source of power from electricity)

High Shift illustrates more compact development resulting in **reduction in global urban travel demand**. Walking and cycling will seen a significant increase modal split.

Electrification + shift scenario has by far **the lowest extent of ICE car travel by 2050**

Walking
Rail
2/3-Wheeler EV
Shared car ICE
E-bike
Bus EV
2/3-Wheeler ICE
Private car EV
Bicycle
Bus ICE
Shared car EV
Private car ICE

BAU = Business as Usual | **EV** = Electric vehicle | **EV+Shift** = Electrification+Shift | **High EV** = High Electrification
ICE = Internal combustion engine.

Strategy to Implement

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Achieving High Shift

LAND USE

The principle of land use for sustainable mobility are compactness and mixed use planning

Techniques	Successful implementations
15 minutes neighborhoods (everybody lives within short walk of their daily needs)	Paris, France Singapore
Zoning reform to permit and encourage high-density development on any property	Portland, USA
Transit oriented development strategies to concentrate population, jobs, and services	Curitiba, Brazil

WALKING AND BICYCLING

Walking and bicycling are the most energy-efficient modes of transportation. These modes provide first/last mile connectivity and modes on their own

Techniques	Successful implementations
High quality footpaths	Chennai, India
Dedicated, physically protected, connected bicycle networks	Bogota, Colombia Seville, Spain
Public bike-share systems, including e-bike that integrated with public transit	Hangzhou, China Mexico City, Mexico

Strategy to Implement

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Achieving High Shift

PUBLIC TRANSIT

A massive increase in public transit compensates for more than half decrease in car travel

Techniques	Successful implementations
Informal transportation modernized around multimodal public transport	Jakarta, Indonesia
Expansion of frequent bus networks (residents live near frequent transit)	Seattle, USA
Rapid transit network constructions and expansion (metro, light rail, and BRT)	Tehran, Iran Jakarta, Indonesia

CAR CONTROL

Push strategy to make driving private vehicle inconvenience with various pricing techniques that can be allocated for the development of sustainable mobility

Techniques	Successful implementations
Pricing parking: reducing or eliminating on-street parking and disincentivizing off street	Sao Paolo, Brazil Mexico City, Mexico
Pricing emissions: charging a fee each when enters a zone based from emissions level	Milan, Italy
Pricing congestion: requiring vehicles to pay a fee to enter or drive within an area	London, England Singapore

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