Net Zero Transition: How Cities Are Moving Towards Zero Carbon

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Introduction

BUS RAPID TRANSIT . NON-MOTORIZED TRANSPORT . TRANSIT-ORIENTED DEVELOPMENT TRANSPORT DEMAND MANAGEMENT . SUSTAINABLE URBAN DESIGN

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Emission from Transport Sector

GLOBAL ANTHROPOGENIC EMISSIONS ≈ 38 Gt CO₂

TRANSPORT EMISSIONS ≈ 8.8 Gt CO₂

ROAD TRANSPORT EMISSIONS ≈ 6.5 Gt CO₂

LEGEND

- RAIL
- AVIATION
- ROAD
- MARINE
- HEAVY-DUTY VEHICLES
- LIGHT-DUTY VEHICLES

Sources:
Shifting Mobility Paradigm

City for cars

Compact and Mixed Development

City for people

Electrified Mobility
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.
## Achieving High Shift

### LAND USE

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

<table>
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<tr>
<th>Techniques</th>
<th>Successful implementations</th>
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| 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

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<td>High quality footpaths</td>
<td>Chennai, India</td>
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| 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

### PUBLIC TRANSIT

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

**Techniques**

- Informal transportation modernized around multimodal public transport
- Expansion of frequent bus networks (residents live near frequent transit)
- Rapid transit network constructions and expansion (metro, light rail, and BRT)

**Successful implementations**

- Jakarta, Indonesia
- Seattle, USA
- 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**

- Pricing parking: reducing or eliminating on-street parking and disincentivizing off street
- Pricing emissions: charging a fee each when enters a zone based from emissions level
- Pricing congestion: requiring vehicles to pay a fee to enter or drive within an area

**Successful implementations**

- Sao Paolo, Brazil
- Mexico City, Mexico
- Milan, Italy
- London, England
- Singapore
We keep building cities for cars instead of people, car use increases, and most cars and vehicles are powered by fossil fuels.

All new motor vehicles are electric by 2040, worldwide. But cities are still built for cars instead of people.

We build dense, mixed-use cities focused on public transit, bicycling, and especially walking. But most motor vehicles are still powered by fossil fuels.

We build dense, mixed-use cities focused on public transit, bicycling, and especially walking. All new motor vehicles are electric by 2040.