JICA’s Assistance in low-carbon and climate-resilient transport infrastructure development in Asia

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1. **CO₂ emissions from the transport sector is one of the major sectors** in Japan, which accounts for approximately 17.9%.

2. **Private cars** is the biggest transport mode (46.2%), which emits the CO₂ among them.

(Source: Ministry of Land, Infrastructure, Transport and Tourism of Japan)
Rapid urbanization in Japan

1. Following the 1970s, the rapid urbanization has been accelerating in Tokyo, resulting from the economic growth.
2. The urban areas in 1972 was simply 10.3%, whilst those in 2011 was 23.5%. (See RED area)

[Year : 1972]  
(a) 1972

[Year : 2011]  
(d) 2011

Urban areas more than doubled in Tokyo metropolitan area over past 40 years

Source: Ministry of Land, Infrastructure, Transport and Tourism of Japan  
Bagan & Yamagata (2018)
Development of urban railways in Tokyo

1. With the rapid urbanization, **urban railway network has been also developed**, as the **railway is much more environmentally friendly transport mode**.

2. **Air-quality in Tokyo dramatically improved**.

1. Railway Development in Tokyo Metropolitan Area

   ![Map of Tokyo Metropolitan Area with railway network highlighted.]

   *Black line is the urban railway network*

2. Comparison of the air quality in Tokyo Metropolitan Area

   ![Comparative images of Tokyo in the 1980s vs. late 2010s.](https://example.com/)

   **Now we can see Mt. Fuji from Tokyo!**

   **(130km away!)**

Source: Ministry of Land, Infrastructure, Transport and Tourism of Japan
Rapid urbanization in developing countries

1. Rapid urbanization is accelerating in developing countries.
2. Due to the rapid urbanization and the increase in the number of private cars, the serious congestion occurs, resulting in deteriorating the environment conditions.

Rapid urbanization

Share of urban population in Asia and the Pacific has been increasing.

- **20%** in 1950s
- **48%** in 2018
- **55%** in 2030

Source: Asian Development Bank
Public Transportation share dramatically decreased in Jakarta, Indonesia, resulting from the economic development.

1. Modal share in Jakarta, Indonesia

![Modal Share Chart]

Source: HVS Result of SITRAMP (2002)  
ADS Result of JUTPI 2 (2018)

2. CO₂ emissions per person-km by transport modes

- **Private car**: 90g  
- **Motorbike**: 45g  
- **Bus**: 30g

Source: Japan Science and Technology Agency
Mitigation activities in Transport Sector

1. In order to mitigate the environmental conditions, there are several measures in the transport sector.
2. It is urgently required to establish the urban railway network in developing countries.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Mitigation activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel conversion</td>
<td>Bio-fuels</td>
</tr>
<tr>
<td></td>
<td>Natural gas</td>
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<tr>
<td></td>
<td>Electricity energy</td>
</tr>
<tr>
<td>Modal shift</td>
<td>Cargo transport modal shift</td>
</tr>
<tr>
<td></td>
<td><strong>Shift from private transport to public transport</strong></td>
</tr>
<tr>
<td></td>
<td>Promote none motorized transport</td>
</tr>
<tr>
<td>Energy efficiency</td>
<td>Vehicle maintenance</td>
</tr>
<tr>
<td></td>
<td>High efficiency vehicles</td>
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<tr>
<td></td>
<td>Fuel saving technology</td>
</tr>
<tr>
<td></td>
<td>Limit fuel consumption</td>
</tr>
</tbody>
</table>

Source: Ministry of Transport of Vietnam
Urban railway construction projects supported by JICA

1. **JICA supports the urban railway construction projects in many cities**, e.g. Bangkok, Jakarta, Manila, Ho Chi Minh City, Dhaka and Mumbai.
2. In 2019, Jakarta MRT started its operation. **More and more urban railway will be in operation in coming years.**

![Diagram of urban railway projects supported by JICA](image-url)
Estimated reduction in CO₂ emissions

Thanks to the establishment of the urban railway lines, it is estimated that the CO₂ emissions will decrease, due to the modal shift.

(1) Hanoi Line 1 - 54,541 CO₂ emission reduction per year
(2) Hanoi Line 2 - 39,614 CO₂ emission reduction per year
(3) HCMC Line 1 - 56,877 CO₂ emission reduction per year

<table>
<thead>
<tr>
<th>Type</th>
<th>Length (km)</th>
<th>Ridership (passenger/day)</th>
<th>Baseline emission (CO₂/year)</th>
<th>Project emission (CO₂/year)</th>
<th>Emission reduction (CO₂/year)</th>
<th>Emission reduction per passenger (kg/CO₂)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanoi Line 1</td>
<td>Estimation</td>
<td>23.7</td>
<td>542,772</td>
<td>144,138</td>
<td>30,473</td>
<td>113,664</td>
<td>0.57 MRI Study, 2011</td>
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<td>Hanoi Line 2</td>
<td>Estimation</td>
<td>27.2</td>
<td>535,000</td>
<td>135,016</td>
<td>30,147</td>
<td>104,869</td>
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<td>19.7</td>
<td>620,000</td>
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<td>114,485</td>
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<td>Jakarta South-North line</td>
<td>Estimation</td>
<td>23</td>
<td>629,900</td>
<td>175,535</td>
<td>59,967</td>
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<td>Bangkok, Airport Rail Link</td>
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<td>11,618</td>
<td>6,302</td>
<td>5,316</td>
<td>0.39 JWA/ALMEC Study, 2012</td>
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<td>Estimation</td>
<td>102</td>
<td>1,685,899</td>
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<td>Mumbai Metro One</td>
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<td>64</td>
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<td>75,732</td>
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<tr>
<td>Metro in Delhi, Kolkata, Chennai, and Bangalore</td>
<td>Actual Monitoring</td>
<td>-</td>
<td>-</td>
<td>720,000</td>
<td>-</td>
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<td>77,040</td>
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<td>0.23 JICA MRT-MRV Study</td>
</tr>
</tbody>
</table>

Source: JICA Study Project for MRV System Development in Urban Railway Sector In Vietnam
Construction is not enough!

JICA supports not only the railway construction. JICA also conducts various technical cooperation projects, realizing the sustainable, safe and user-friendly railway operation.

- Supporting the establishment of the railway institute
- Supporting the maintenance and service improvement
- Supporting the safety management
- Supporting the introduction of the IC card
- Supporting the master plan and feasibility study
Mobility Management is also important under COVID-19

1. It is important to **encourage people to use more public transportation**.
2. JICA conducts **Mobility Management** to teach people how to use public transportation.
3. Under the COVID-19, it is significantly important to disseminate people how to use public transportation in the safer manners.

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1. **Mobility Management**

   - Workshops for residents near bus stops

2. **Dissemination how to prevent COVID-19 in public transportation**

   - Workshops for children on the public transportation and its safety
   - Handwashing campaign by JICA
   - Public advertising in buses in Cambodia by JICA
Thank you very much!

~ Towards more environmentally friendly transportation ~

Sustainable Development Goals

1. NO poverty
2. Zero hunger
3. Good health and well-being
4. Quality education
5. Gender equality
6. Clean water and sanitation
7. Affordable and clean energy
8. Decent work and economic growth
9. Industry, innovation and infrastructure
10. Reduced inequalities
11. Sustainable cities and communities
12. Responsible consumption and production
13. Climate action
14. Life below water
15. Life on land
16. Peace, justice, and strong institutions
17. Partnerships for the goals