Addressing Air Pollutant and Climate Relevant Emissions in the Transport Sector

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Moderator:
Angela Enriquez, World Resources Institute-EMBARQ

Presenter:
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Transport Program Manager, Clean Air Asia
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SOME HOUSEKEEPING ITEMS

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SOME HOUSEKEEPING ITEMS (CONTINUED)

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- A video/audio recording of this webinar and slide decks will be available at:

  ledsgp.org/transport
AGENDA

- Overview of the LEDS Global Partnership & Transport Working Group
- Presentation by Clean Air Asia
- Questions and Answers
- Closing Remarks
- Survey
LEDS GLOBAL PARTNERSHIP
Advancing Climate-Resilient Low Emission Development Around the World

Mission
Harness the collective knowledge and resources of governments, donors and international organizations, and practitioners in scaling up and strengthening implementation of climate-resilient low emission development around the world.

Objectives
- **Strengthen quality, coordinated support, and leadership** of climate-resilient low emission development strategies by countries in all regions
- **Foster effective implementation** of LEDS
- **Spur development of new LEDS** by additional national and sub-national governments

Launched in 2011, the LEDS GP now catalyzes action and collaboration across more than 120 countries and international organizations.
LEDS GP ORGANIZATIONAL STRUCTURE

IMPROVED LEDS

REGIONAL PLATFORMS
define priorities, lead peer learning, and support delivery

STEEERING COMMITTEE
sets strategic direction

GLOBAL WORK STREAMS
Provide technical support and training

SECRETARIAT
coordinates implementation

Africa LEDS Partnership
Asia LEDS Partnership
Latin America and Caribbean Platform

LEDS Planning
LEDS Analysis Models and Tools
Finance
Sectors
EXAMPLES OF LEDS GP SUPPORT

Peer learning and knowledge sharing
- Global and regional workshops and trainings for more than 800 practitioners on LEDS planning, analysis, finance, and sectoral programs

Technical collaboration
- Transportation and Development Impacts Assessment (DIA) toolkits and country assistance
- National LEDS Finance Strategies with Colombia, Peru, and Chile
- No cost expert assistance available on LEDS analysis, finance, and sector measures to all members
  - e.g. support to Mauritius on solar hot water program, Bhutan on transport options, Indonesia on budget allocation, Cambodia on green fund, and Cote D’Ivoire on bio-energy

Understanding and analysis of LEDS benefits
- Application of DIA visual tool with Ghana, Kenya, and Montenegro
- Broader portfolio of shared LEDS communication resources under development

Learn more at: www.LEDSGP.org
LEDS Transport Working Group

Leaders
- EMBARQ, the sustainable urban mobility initiative of WRI Ross Center for Sustainable Cities
- United States National Renewable Energy Laboratory (NREL)
- United Nations Environment Programme (UNEP)

Global
- LEDS Transport Toolkit (ledsgp.org/transport)
- Webinars
- Global events and trainings

Regional
- Workshops that serve the specific needs of that region
- Matchmakers for knowledge sharing

Local
- Deep dive, in-country support for governments on specific transport issues and policies
  - Workshops with peer experts
  - Technical assistance
- Remote Expert Assistance on LEDS (REAL)
Supporting countries with implementing new vehicle emission fuel quality standards

This webinar is part of a training brought to you by the LEDS Transport Working Group, in partnership with the United Nations Environment Program (UNEP) and Clean Air Asia. The series will include*:

- Improving air quality and reducing climate impacts from the transport sector
- Roadmap for implementing new fuel economy standards: Case of Mexico
- Case study presentation: Introduction of Euro IV fuel
- Innovative financing solutions for low carbon transport projects to improve air quality

*Topics may be subject to change
Addressing Air Pollutant and Climate Relevant Emissions in the Transport Sector

Presenter:
Alvin Mejia
Transport Program Manager, Clean Air Asia
alvin.mejia@cleanairasia.org
Outline

1. Drivers for increasing emissions from the transport sector
2. Impacts on emissions and relevant issues
3. Framework for addressing air pollutant and GHG emissions from the sector
4. Examples of key considerations: trade-offs
To promote better air quality and livable cities by translating knowledge to policies and actions that reduce air pollution and greenhouse gas emissions from transport, energy and other sectors.
About Clean Air Asia

- Clean Air Asia Partnership is a UN recognized partnership of more than 250 organizations in 31 countries in Asia and worldwide and 8 Country Networks (China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, and Vietnam), and is supervised by a Partnership Council.

- Clean Air Asia acts as the Secretariat of the Clean Air Asia Partnership and is a registered non-stock non-profit organization headquartered in Manila, and with offices in Beijing and Delhi.

- We were established as the premier air quality network for Asia by the Asian Development Bank, World Bank and USAID in 2001, and we operate since 2007 as an independent non-profit organization.
What we aim for

- Reduced air pollution and greenhouse gas emissions
- Improved health
- Energy savings
- Livable cities

Clean Air Asia as a trusted CHANGE MAKER
- Decision makers use reliable analysis, knowledge, data and effective tools to understand the problems and identify solutions
- Stakeholders at the city, national and regional level cooperate better through networks & partnerships
- Policies and programs are in place that are science-based, stakeholder inclusive, and effective

Outcomes

Clean Air Asia Programs

- Air Quality and Climate Change
- Low Emissions Urban Development
- Clean Fuels and Vehicles
- Green Freight and Logistics

Input from Clean Air Asia Partnership and other partners
• Transportation → service provision, moving people and goods
• Transportation as a significant sector in energy consumption
• Significant global and local environmental impacts (e.g. GHGs and air pollutant emissions)
• Importance in overall economic efficiency
Motorization Trends

Source: Crist, Philippe. OECD Trends : Transport, a powerpoint presentation delivered at the Steering Committee meeting for the ITPS Long-Term action plan for Low Carbon Transport held in February 2012 in Bali Indonesia. Data is from World Bank, UN Statistics,
Case of Southeast Asia
Vehicles – Asia

- Asia: 460.4 million vehicles (2010)
  - at current annual average growth rates, number of vehicles in Asia will double in less than 7 years

- Private passenger vehicles dominate (88%)
  - two-wheelers (67%) & passenger cars (21%)
  - expected to double in next 5 to 7 years

- It will take ~10 years for buses to double
Growth of Urban Agglomerations

Growth Rate
- <1%
- 1.3%
- 3.5%
- 5%+

City Population
- 500 - 750 thousand
- 750 - 1000 thousand
- 1-5 million
- 5-10 million
- 10 million or more

United Nations, 2014
Continued Increase in Transport Activity

Private modes will dominate passenger travel

Freight transport will heavily be dominated by trucks
Air Pollution and Transportation

- 3.7 million deaths attributable to ambient (outdoor) air pollution
- Around 88% of these deaths occur in low- and middle-income (LMI), representing 82% of the world population.
- Outdoor air pollution is carcinogenic to humans (Group 1). Sufficient evidence that exposure to outdoor air pollution causes lung cancer.
- Particulate matter, a major component of outdoor air pollution, was also classified as carcinogenic to humans.

Source: GIZ BMZ, WHO. 2011., Global Burden of Disease and WHO IARC
Burden – Air Pollution

**Figure 1.** Total deaths (’000) attributable to AAP in 2012, by region

AAP: Ambient air pollution; Amr: America, Afr: Africa; Emr: Eastern Mediterranean, Sear: South-East Asia, Wpr: Western Pacific; LMI: Low- and middle-income; HI: High-income.

WHO 2014
Air Quality Snapshot

<table>
<thead>
<tr>
<th>PM$_{10}$ Concentration (µg/m$^3$) in 2013</th>
<th>Developing cities</th>
<th>Developed cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;150</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>100-150</td>
<td>45</td>
<td></td>
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<tr>
<td>70-100</td>
<td>32</td>
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<tr>
<td>50-70</td>
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<td>30-50</td>
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<td>25</td>
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<td>20-30</td>
<td>11</td>
<td>8</td>
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<tr>
<td>&lt;20</td>
<td>4</td>
<td>9</td>
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</tbody>
</table>

Number of cities (Total: 227)

Source: Clean Air Asia, 2015
PM2.5 Snapshot

Karagulian et al. (2015)
Shares of Diesel in Road Transport

IARC: DIESEL ENGINE EXHAUST CARCINOGENIC

Lyon, France, June 12, 2012 — After a week-long meeting of international experts, the International Agency for Research on Cancer (IARC), which is part of the World Health Organization (WHO), today classified diesel engine exhaust as carcinogenic to humans (Group 1), based on sufficient evidence that exposure is associated with an increased risk for lung cancer.
Impacts of Vehicle Emission Standards
Energy and GHG: Transport in Asia
GHG Emissions from the Transport Sector

Source: IPCC WG III AR5, 2014
“Integrating air pollution abatement and climate change mitigation policies offers potentially large cost reductions compared to treating those policies in isolation” - IPCC
GHG and Air Pollution in Indian Cities

Per Capita CO₂ and Per Capita PM Emissions

- Indian cities show strong correlation between emissions of air pollutants and GHGs
- As cities grow in size, transport emissions increase
- Importance of catching cities early before they start to grow

Avoid

Activity
How much is the reduction in travel demand?

Shift

Structure
Was there a shift towards more environmentally-friendly modes?

Improve

Intensity
Was there an improvement in fuel efficiency?

Factor of emissions
Was there are reduction in the emission factor? (e.g. shift to lower carbon intensive fuel?)
Example: Analysis of Options - Jeepney

<table>
<thead>
<tr>
<th>Alternative Technology</th>
<th>Benefits (USD)</th>
</tr>
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<tbody>
<tr>
<td>Electric Jeepneys</td>
<td></td>
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<tr>
<td>(Baseline Scenario)</td>
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<tr>
<td>Electric Jeepneys</td>
<td></td>
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<tr>
<td>(LEDS Scenario)</td>
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<tr>
<td>Euro 4 Diesel Jeepneys</td>
<td></td>
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<tr>
<td>Euro 4 LPG Jeepneys</td>
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<tr>
<td>Diesel-Electric Hybrid Jeepney</td>
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<tr>
<td>Euro 4 Diesel Minibus</td>
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<tr>
<td>Euro 4 Diesel Bus</td>
<td></td>
</tr>
</tbody>
</table>

- Initial Investment
- Operational Savings
- GHG Savings
- Health Benefits
- Tax Collections
- Employment Income generated

Source: Biona, Mejia, Tacderas, Dematera (forthcoming)
Examples: Metro System

- Can lead to substantial air pollutant reduction due to mode shifts
- Construction GHG emissions from infrastructure development are significant for such large projects
- MRT construction was found to emit about 20% of the total emissions (ADB, 2010)
Example: Fossil fuel switch options for public transport: CNG

- New CNG buses can substantially cost more than the diesel counterparts; infrastructure costs associated with CNG distribution and delivery are significant.
- Significant reductions in pollutants such as PM vs traditional diesel.
- CH4 emissions from the production, distribution of CNG may negate the climate benefits.
Example: Off-hour deliveries

- Air Pollutant concentrations may increase if diesel trucks are only allowed to travel at night time due to lowered mixing heights and poor ventilation (case to case)
“Improve” Policies Dominating

- Freight-trucks
- ITS
- Control of imported vehicles
- Biofuel
- Idling
- Vehicle scrapping
- Fuel improvement
- Loading
- Emission standards/controls
- Vehicle inspection
- Fuel economy/efficiency
- 2w/3w improvement
- Alternative fuel vehicles-promotion
- Alternative fuel vehicles-technology
- Subsidy for public transport
- Promotion of rail for freight
- Passenger rail
- Bus/BRT
- Car sharing
- NMT
- Road pricing
- Parking
- TOD
- Promotion of intermodality
- Travel demand management
- Land Use Planning
- Vehicle population control
- Information technology

Brunei
Cambodia
Indonesia
Laos
Malaysia
Myanmar
Philippines
Singapore
Thailand
Vietnam
High Shift Scenario lowers total costs in all categories

- Vehicle purchase costs (all modes)
- System infrastructure costs (road, rail)
- Vehicle and system operating costs
- Fuel costs (liquid fuel, electricity)

Cumulative Savings of $100 trillion 2010-2050

Key Considerations and Take-aways

- Transportation is, and will continue to be a key sector: air pollution, climate issues
- Policy challenge for developing countries: service provision first
- Change of paradigm in intervention assessment is needed to include broader impacts
- Different solutions at different levels
- Different solutions for different contexts
- Trade-offs exist, but can be balanced
Clean Air Asia leads efforts to enable Asia’s

1000+ CITIES

to reduce both air pollution and CO2 emissions and thereby contribute to more livable and healthy cities with blue skies and low carbon footprint. We help to reduce emissions through policies, plans, programs, and concrete measures that cover air quality, transport and industrial emissions and energy use.

WHAT WE DO

- AIR QUALITY & CLIMATE CHANGE
- CLEAN FUELS & VEHICLES
- GREEN FREIGHT & LOGISTICS
- LOW EMISSIONS URBAN DEVELOPMENT
Fostering the air quality community in Asia
Better Air Quality (BAQ) Conferences

http://baqconference.org/
TIME FOR Q&A

Questions ?
SURVEY

- How did we do?
- Your feedback is important!
YOUR PARTICIPATION IS APPRECIATED

Thank You!
Contact:

transport@ledsgp.org

An audio recording of this webinar will be available at:

ledsgp.org/transport