Co-benefits potential of low-carbon urban mobility: Experiences from the SOLUTIONS project

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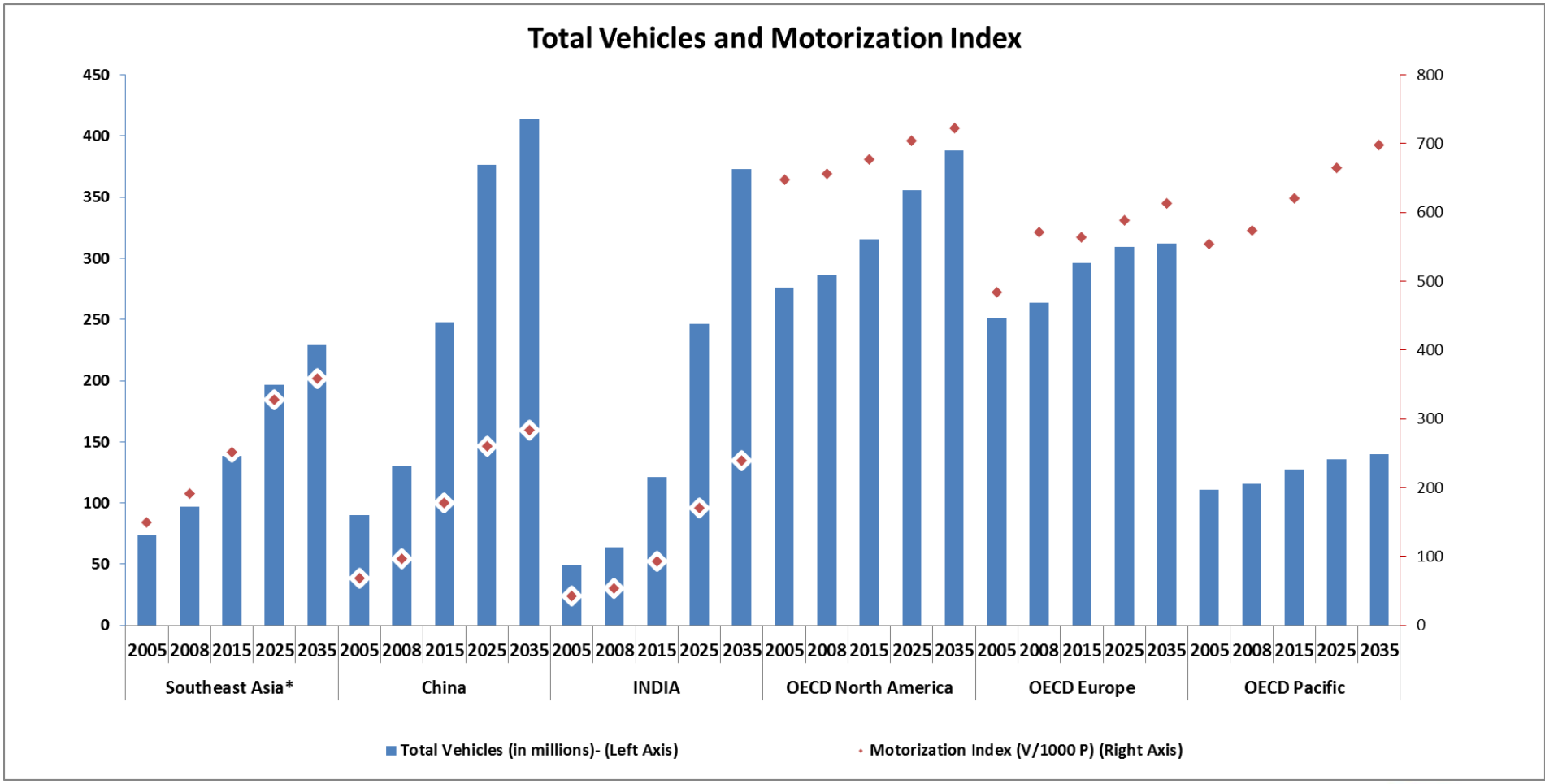
SOLUTIONS: The project and team

- Funded under the Seventh Framework Programme (FP7) of the European Commission.
- Consortium Partners: 27 Partners from 18 countries in Europe, Asia, Latin America and Africa
- Duration: May 2013 – October 2016
- Regional focus: Europe, Asia, Latin America, Mediterranean Partner Countries

SOLUTIONS - key actions

- Deployment of innovative sustainable transport solutions
  - Feasibility studies
  - Knowledge sharing events
  - Development of project proposals
  - Capacity building
- Transfer to innovative transport solutions
  - Identify key innovations and examine transferability
- Promoting innovative platforms for knowledge exchange, such as the Urban Electric Mobility Initiative (UEMI)

The Issue


Total Vehicles and Motorization Index
450
400
350
300
250
200
150
100
50
0
800
700
600
500
400
300
200
100
0
2005 2008 2015 2025 2035 2005 2008 2015 2025 2035 2005 2008 2015 2025 2035 2005 2008 2015 2025 2035 2005 2008 2015 2025 2035 2005 2008 2015 2025 2035
Southeast Asia*
China
INDIA
OECD North America
OECD Europe
OECD Pacific
Total Vehicles (in millions)- (Left Axis)
Motorization Index (V/1000 P) (Right Axis)

CO
Carbon monoxide

SO_2
Sulfur dioxide

NOx
Nitrogen oxides

O_3
Ozone

VOCs
Volatile organic compounds

Pb
Lead

PM
Particulate matter

Air toxics

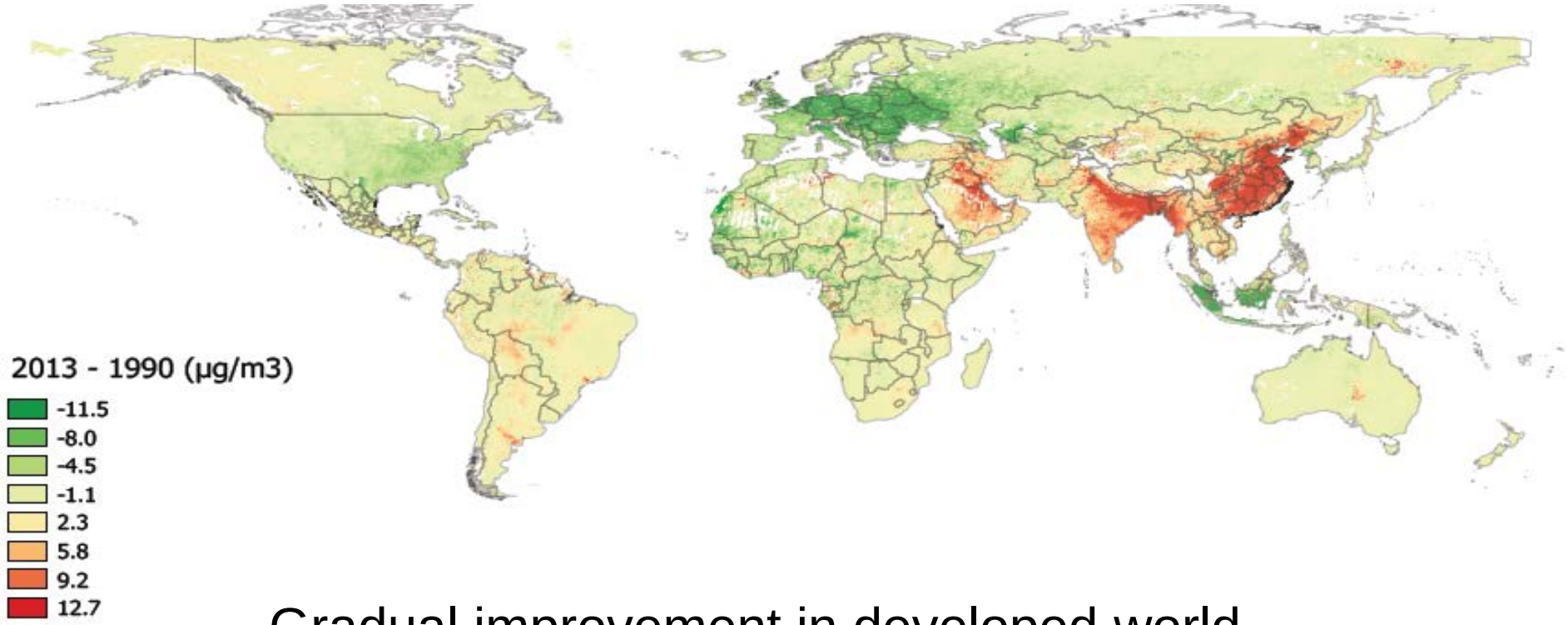
criteria pollutants

- **contamination of the air with harmful or poisonous substances**
- **emissions of unwanted chemicals or other materials, which exceeds the capacity of natural processes to convert or disperse them**

http://media.canada.com/b17a5268-e809-4db2-a8[illegible]b-0[illegible]fc4e00d03e/m1x00198_9.jpg

1990 – 2013 Change in Annual Average $PM_{2.5}$

Enhanced ground monitoring and other data
Leading to higher quality estimates



Gradual improvement in developed world,
Worsening in developing Asia, elsewhere

Source: O'Keefe (2015). Science to Inform Air Quality Decisions in the Developing World Global Burden of Disease 2013 . A powerpoint presentation delivered at a brown bag session at the Asian Development Bank

Solutions

Six clusters

Public transport	• Metro systems • Bus rapid transit • Fuel switch: CNG & LPG
Transport infrastructure	• Dedicated bus lanes • Pedestrian infrastructure
City logistics	• Promotion of off-hour deliveries
Sustainable urban mobility plans	• Integrated public transport planning
Network and mobility management	• Parking management • Traffic management
Clean vehicles	• Fuel switch: Electric vehicles

Cluster 1: Public transport

- **Metro systems** are efficient in terms of carbon savings, **producing low GHG emissions per passenger per mile**. Emission savings are greater with higher ridership

- Emissions from **BRT** are largely based on bus occupancy, and bus technology, fuel type, the environmental impacts of mass transit systems such as BRT lies in the changes in modal split (Wright and Fjellstrom 2005)

- Fuel switch: LPG taxis, CNG bus

Walkways

- Can prevent the shift of **short walking trips** towards motorized modes such as 2 wheelers and 3 wheelers

- It can serve as a **feeder system** whereby people can completely avoid short motorized trips for interchanges between various modes of transport (e.g. usage of motorized three-wheelers from BRT station to MRT station)

Off-hour deliveries by urban freight trucks

- **Increases efficiency of freight as they avoid congestion during daytime**
- City circumstances must be considered. In Delhi, a study showed that lower air mixing heights and poor ventilation at night (prevent proper dispersion), coupled with high truck activity at night, contribute towards the increasing concentrations of pollution (Guttikunda, 2009),

Integrated public transport planning

- Ultimately an **enabler** for encouraging "**shifts of travel**" towards public transport, as well as the "avoidance" of **lengths of travel**

- **shortened travel distances and improved efficiencies of the public transport** network – thus attracting more people towards the usage of public transport modes – as well as positively influencing non-motorized modes

- **Socio-economic benefits** in reducing congestion, improving accessibility and mobility, saving time, and increasing productivity, reducing health costs from increased active transport and reduced air pollutant emissions

Cluster 5: Network and mobility management

Parking management reduces emissions by

- **making vehicle operations more efficient** (i.e. less fuel wasted in finding parking spaces if information is provided)
- **shifting of private motorized trips** to alternative modes if parking regulations become restrictive enough (coupled with good public transport systems)
- **discouraging the trips altogether** (e.g. for leisure trips that are optional).

Cluster 5: Network and mobility management

- Increase in parking supply tends to increase automobile commuting and reduce transit and ride sharing ((Mildner, Strathman and Bianco 1997). Weinberger and Levinson (2003), for example, concludes that a 1% increase in downtown parking supply results to reduced transit ridership by 0.77%.
- Reducing parking demand by increasing the costs of parking, or making regulations stricter and enforcement better, can be coupled with other strategies such as public transport improvement, in order to better encourage shifting of trips towards public modes
- Frank, et al. (2008) found that a 10% increase in parking price reduces automobile mode shares by 0.7% and increases demand for carpooling by 0.8%, biking by 2.7% walking by 0.9% and transit by 3.71%

Cluster 6: Clean vehicles

- **Electric vehicles that purely run on electricity** do not have tailpipe emissions, but emissions from the power generation process must be taken into account. It must generate electricity from sustainable sources.

- **Hybrid electric vehicles** which combines the utilization of **an internal combustion engine** and **an electric motor** have significant benefits in terms of fuel efficiencies and emissions performance.

- Issues regarding **battery usage** and **disposal** are still significant for electric vehicle penetration

- Does not address the congestion issue

Opportunities towards implementation

- **Integrating co-benefits and air quality improvements**

- Reduced congestion
- Reduced pollution
- Cost savings
- Improved equity
- Reduced health costs
- Generated jobs
- Accessibility to jobs, health care services by low-income groups

• Finding innovative ways to engage the public

- Representation in transport planning
- Social inclusivity and equity: Improvements in access and mobility of underserved and vulnerable groups
  - Low-income groups are heavily dependent on NMT
  - Wheelchair-accessible transportation and sidewalks
  - Those with limited mobility include pregnant women, children and elderly

Thank you!

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