Decarbonising Cities: International Experiences and Opportunities for Electric Mobility

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Transforming transport is fundamental

Global transport emissions 2018: ca. 8 Gt CO₂

Business-as-usual (BAU) and required reductions under 2°C and 1.5°C scenarios (simplified)

Source: Authors’ figure, historic emissions based on data from IEA (2016), projections based on data from Gota et al. (n.d.)/SLOCAT Knowledge Base.
Vietnam’s Climate Targets and Transport

- **Transport** is responsible for **18% of total emissions**
- **Overall target**: Emission reduction of 9% (unconditional) against BAU and 27% (with international support)
- **Transport is subsumed under energy** (5.5% unconditional, 11% conditional).
- 5 of the 12 energy-related mitigation measures target transport:
  - Changing freight transportation models;
  - Restructuring the transportation market;
  - Shifting from private to public means of transport;
  - Shifting from conventional fuels to biofuel, natural gas and electricity;
  - Improving the energy efficiency of transport vehicles;

**Impact**

Improvements in vehicle fuel economy have most impact, **reducing 5.0 million tons CO₂ in 2030**.
Mainstreaming the electric vehicle market has the second highest reductions; **3.5 million tons CO₂ in 2030**.
Vietnam’s Air Quality

- 60,000 premature deaths per year linked to air pollution (WHO)
- Air pollution costs the Vietnam economy about USD 10 billion every year – 5% to 7% of GDP (JICA)!

![Graph showing Annual Mean of PM Levels in Hanoi and HCMC in 2016 (μg/m3)](image)

- PM Levels
- WHO Recommendation
Sustainability benefits of e-mobility

**Noise**

- For high speeds, tyre sound dominates combustion engine sound, making EV just as noisy as combustion engines. The thresholds are:
  - 25 km/h for **passenger cars**
  - 50 km/h for **trucks and busses**
- EV have **great effects for buses** and in urban areas with low, speeds

**Air Pollution**

- Locally, no local air pollutants are emitted from the tailpipe
- Particulate matter from tyre abrasion, however, continues

**Structural**

- Less dependency on oil imports
- Early promotion of an innovative and sustainable industry sector
- **Opportunity for local manufacturing**
E-mobility is one piece in the decarbonisation puzzle
Cities are key for EV adoption!

- **rail/ tram**
  - ![rail/ tram](image1)
  - © GIZ

- **public transport**
  - ![public transport](image2)
  - © www.cities-today.co

- **governmental/ company/ tourism fleets**
  - ![governmental/ company/ tourism fleets](image3)
  - © www.silicon.de

- **private cars**
  - ![private cars](image4)
  - © Knese

- **two-wheelers**
  - ![two-wheelers](image5)
  - © Knese

- **three-wheelers**
  - ![three-wheelers](image6)
  - © ABB

- **x-sharing/ taxi/ ridehailing**
  - ![x-sharing/ taxi/ ridehailing](image7)
  - © Knese

- **urban freight**
  - ![urban freight](image8)
  - © www.cargohopper.nl
Challenges for EV deployment need to be addressed

• High upfront investment costs (vehicles and infrastructure), but cheaper total cost of ownership

• Lack of standardization (securing interoperability)

• Different operations

• New ways to procure (requirements on vehicles, equipment, operation services)

• New market players (energy providers)

• Battery recycling

→ Comprehensive strategy is needed to enable e-mobility roll-out
Example: E-Mobility Strategy in Chile

Joint strategy of Ministries of Energy, Transport and Environment

5 strategic pillars with detailed actions:

1. Regulation and standards
2. Public transport
3. Promotion of research and capacity building
4. Initial impulses (pilots, fleet renewal, incentives)
5. Knowledge and information transfer

Electric mobility targets (recently updated in NDC 2020):

- **2022**: 10x electric vehicles circulating
- **2040**: 100% urban public transport electric
- **2050**: 60% private vehicles electric
  - 100% electric taxis
  - 60% commercial vehicles electric
Example: Electric fleet in Santiago de Chile

**Biggest fleet** of e-buses in Latin America (676)

- Energy consumption is 76% less than for diesel buses
  - Total charging 3-4 hours
  - Range of 250 km
- Maintenance need is 40% less than for diesel busses

→ Lower operating costs outweigh the higher initial investments costs over the lifetime of the busses

**New business model:**

- **Energy provider** finances the electric buses, provides charging infrastructure and electricity through leasing scheme with **operator**
- **bus manufacturer** provides buses and maintenance guarantee
- **Government** provides long-term guarantees and ticket subsidies

→ Public private partnership helps overcome upfront costs and sharing of financial risks

Sources: Simonetti (2019), Ministry of Transport, Chile; World Bank (2020)
Challenges and Solutions for the introduction of electric buses in Berlin (since 2015)

- Frist trials with electric buses since 2015
  - 135 buses ordered since 2018
  - Double-deckers remain challenging

- Regular operation since 2019 (137 buses)
  - Need for review of operating strategies providing for affordable bus transport
  - Introduction of comprehensive software systems for disposition, charging processes and maintenance

Challenges:
- Market-availability of vehicles
- Lack of established standards, especially for quick-charging systems and software backend
- Conversion of existing and construction of new depots
- Range limitation (150km) of depot loaders and the resulting additional vehicle requirements
- Need for review of operating strategies providing for affordable bus transport
- Introduction of comprehensive software systems for disposition, charging processes and maintenance

Solutions:
- 135 buses ordered since 2018
- Switch to pantograph opportunity charging technology
- Construction of new depots and conversion started
- Opportunity chargers established + New vehicle schedules consider charging times
- Introduction of IVU.timetable + IVU.run with live-monitoring and machine learning

Challenges according to Daniel Hesse (Leiter Vorstandsstab Infrastruktur alternative Antriebe Berliner Verkehrsbetriebe, BVG) (https://www.behoerden-spiegel.de/2020/01/10/bis-2030-soll-berlins-oepnv-emissionsfrei-sein/)
Key recommendations

1. Start now
2. Create political will, awareness & broad stakeholder participation
3. Develop a vision, a strategy and an action plan for implementation of e-mobility (incl. steering & governance structure)
4. Establish the necessary legal and fiscal framework
5. Build up capacities (planners, mechanics, electricians, etc.)
6. Initiate cooperations between energy and mobility sector, between public and private actors – new business models
7. Show feasibility with demonstration projects
NDC Transport Initiative for Asia

Outcome

Countries in Asia work on comprehensive strategies to decarbonize transport

→ Project financed by the International Climate Initiative

Partners:

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) mbH
WORLD RESOURCES INSTITUTE
International Transport Forum
icct
Agora Weltethos
LOCAT Partnership
RENO21
Project components – NDC Transport Initiative for Asia

Identifying pathways

I.1 Enhanced national climate & pollutant emissions strategies

I.2 Peaking roadmap & stakeholder platform in a province

Fostering key actions

II.1 National stakeholder platform for decarbonizing transport

II.2 Improved deployment framework for e-mobility

III.1 Enhanced NDC and systems for monitoring and reporting

III.2 Clean transport policies: EVs, urban mobility & fuel economy

International outputs: Learning in Asia and beyond
NDC Transport Initiative for Asia in Vietnam

**Goal**

Strengthen the policy framework to promote the low carbon development and GHG emission reduction in transport contributing to implement the NDC of Vietnam

**Objectives**

- **Online MRV system for mitigation measures**
  
  Develop an online MRV system for mitigation measures to reduce GHG emissions in the transport sector.

- **GHG emission mitigation scenarios**
  
  Build GHG emission mitigation scenarios for the transport sector up to 2050 in the direction of low carbon development with the aim to integrate them into Vietnam’s NDC 3 (submission to UNFCCC foreseen in 2025).

- **Legal documents on energy efficiency for road vehicles**
  
  Formulate legal documents on energy efficiency for road vehicles (priority is given to setting fuel economy for passenger cars, motorcycles).

- **Piloting measures to incentivize the use of electric vehicles**
  
  Design and support piloting measures to incentivize the use of electric vehicles (in line with the NDC objectives of GHG emission reduction in the transport sector) and integrate in the action plan of a specific city including gender mainstreaming.

- **Advancing E-mobility development**
  
  Build mechanisms, policies and roadmaps to advance E-mobility development at national level and city level.

- **Capacity development**
  
  Enhance the capacity of officials from MOT regarding the international debate on low carbon transport in response to climate change.
Let’s face the challenge together

Charging Infrastructure

Services

Regulatory framework

Demand for EVs

Supply of EVs

New capacities and human capital

Source: Soler (2020), Ministry of Energy, Chile
THANK YOU FOR YOUR ATTENTION!

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