Decarbonising Cities: International Experiences and Opportunities for Electric Mobility

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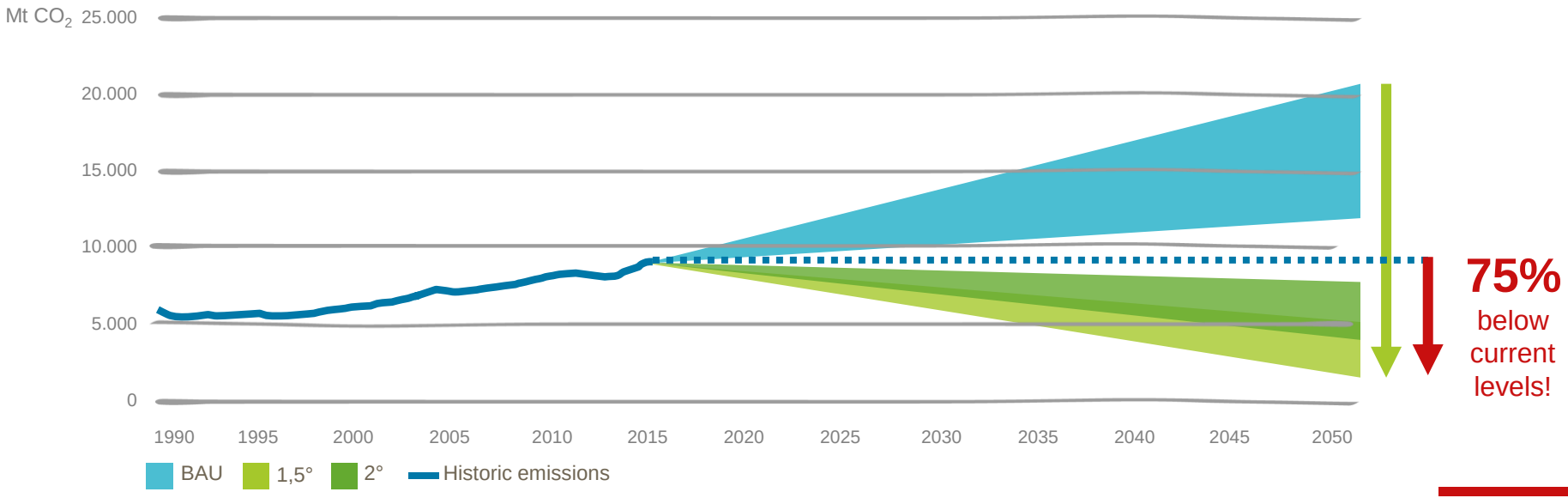
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Transforming transport is fundamental

Global transport emissions 2018: ca. **8 Gt CO_2**

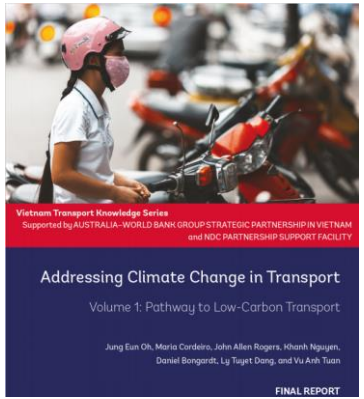
Business-as-usual (BAU) and required reductions under 2°C and 1.5°C scenarios (simplified)



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;

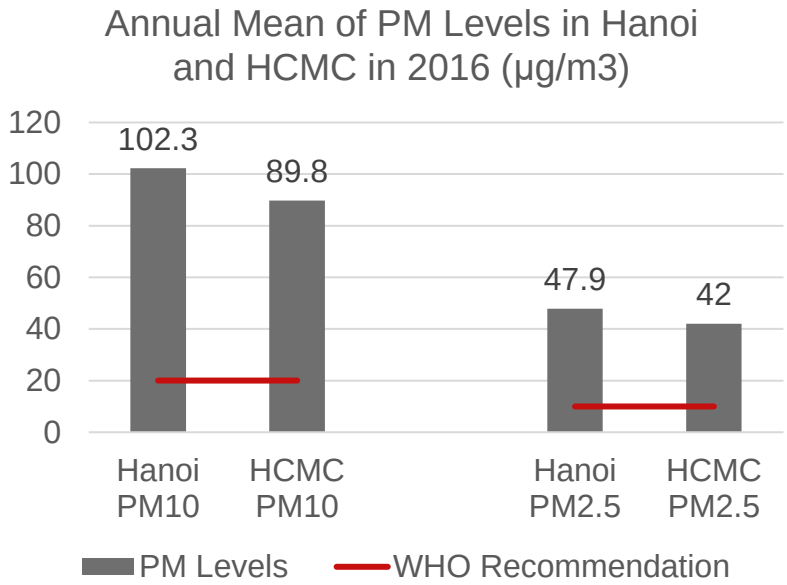


Impact

Improvements in vehicle fuel economy have most impact, **reducing 5.0 million tons CO_2 in 2030.**
Mainstreaming the electric vehicle market has the second highest reductions; **3.5 million tons CO_2 in 2030.**

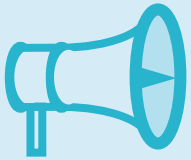
Vietnam‘s Air Quality

- 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)!



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

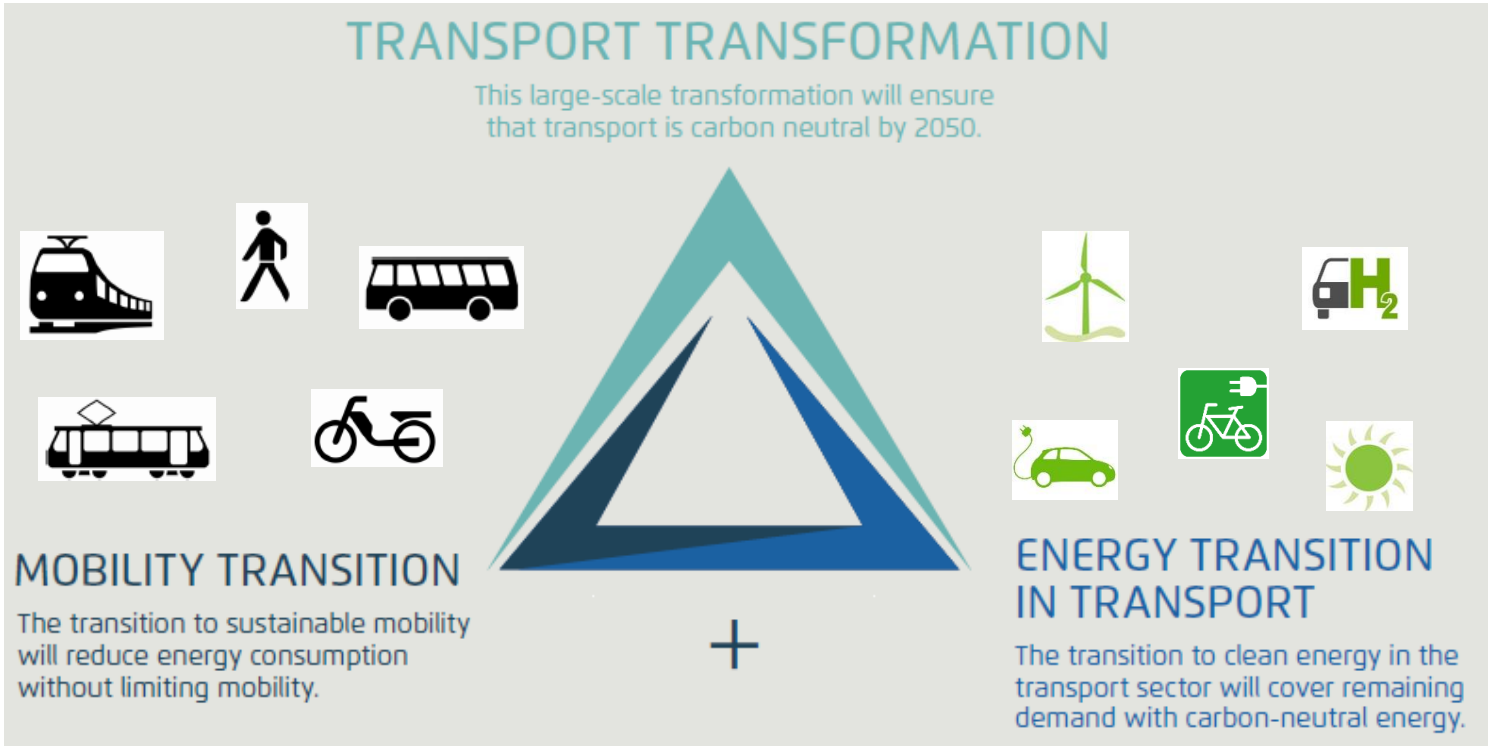
Air Pollution

- 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



Source: Agora Verkehrswende

Cities are key for EV adoption!

rail/ tram

public transport

governmental/
company/ tourism fleets

private cars

two-wheelers

three-wheelers

x-sharing/ taxi/
ridehailing

urban freight

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

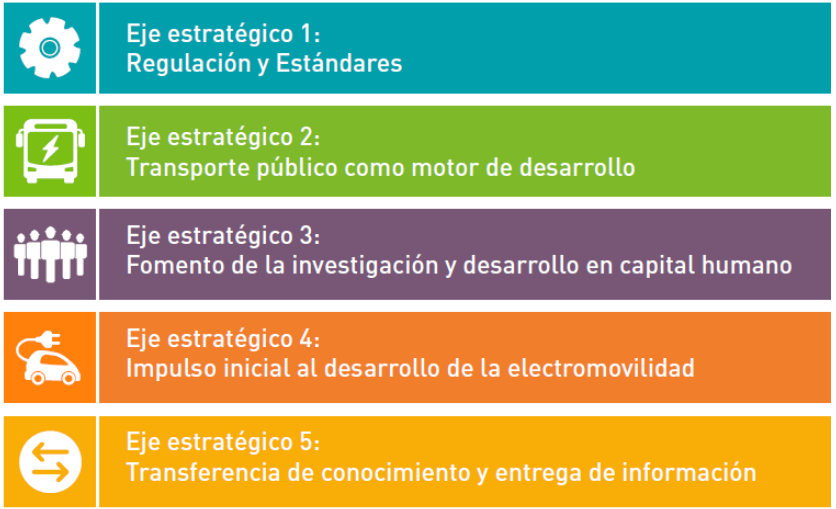
→ **Comprehensive strategy is needed to enable e-mobility roll-out**

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 reneweal, 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 busses
  - 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 electricty 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)

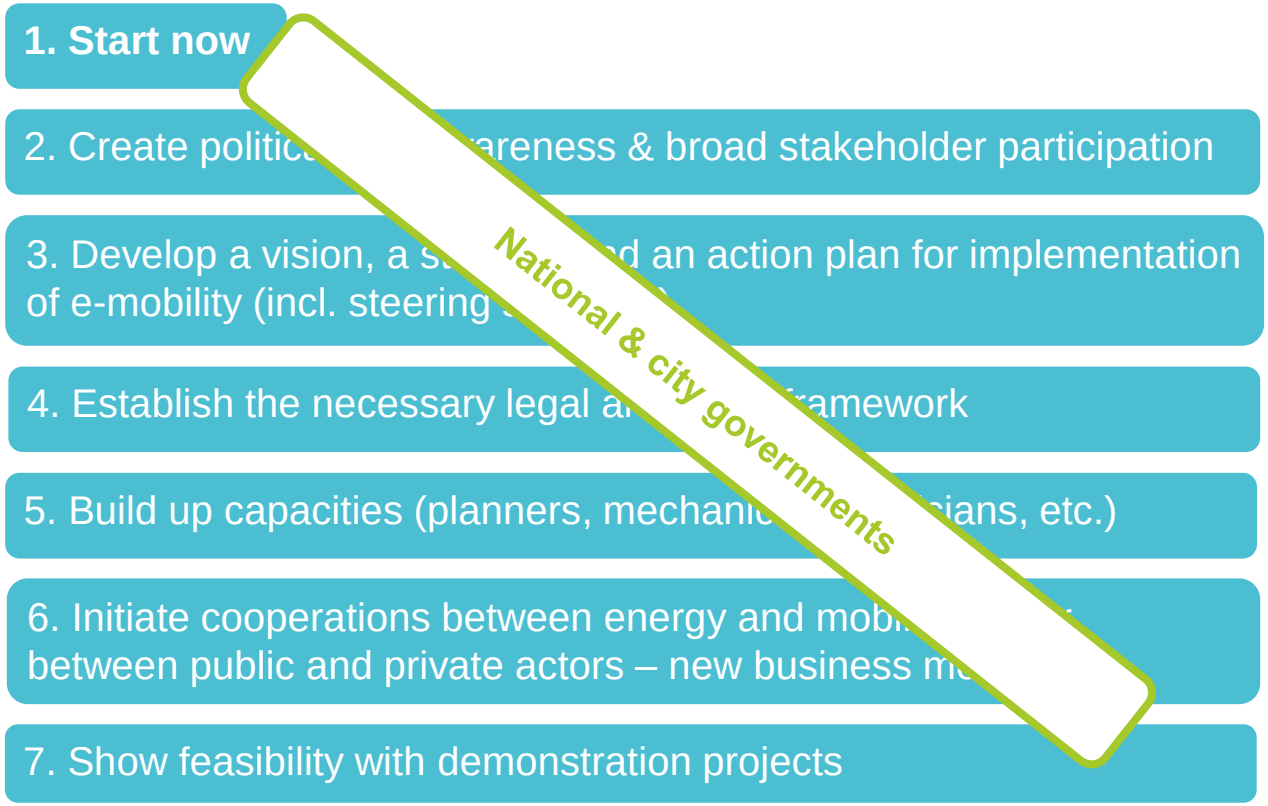
Challenges and Solutions for the introduction of electric buses in Berlin (since 2015)

- Frist **trials with electric buses since 2015**
- **Regular operation since 2019 (137 buses)**

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 Double-deckers remain challenging	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-sei

Key recommendations



NDC Transport Initiative for Asia

Outcome

Countries in Asia work on comprehensive strategies to decarbonize transport

→ **Project financed by the International Climate Initiative**

Partners:

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WORLD RESOURCES INSTITUTE

International Transport Forum

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Agora Verkehrswende

SLOCAT Partnership

REN21

On behalf of:
Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
of the Federal Republic of Germany

Project components – NDC Transport Initiative for Asia

	China	India	Vietnam
Identifying pathways	I.1 Enhanced national climate & pollutant emissions strategies	II.1 National stakeholder platform for decarbonizing transport	III.1 Enhanced NDC and systems for monitoring and reporting
Fostering key actions	I.2 Peaking roadmap & stakeholder platform in a province	II.2 Improved deployment framework for e-mobility	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 Viet Nam'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.

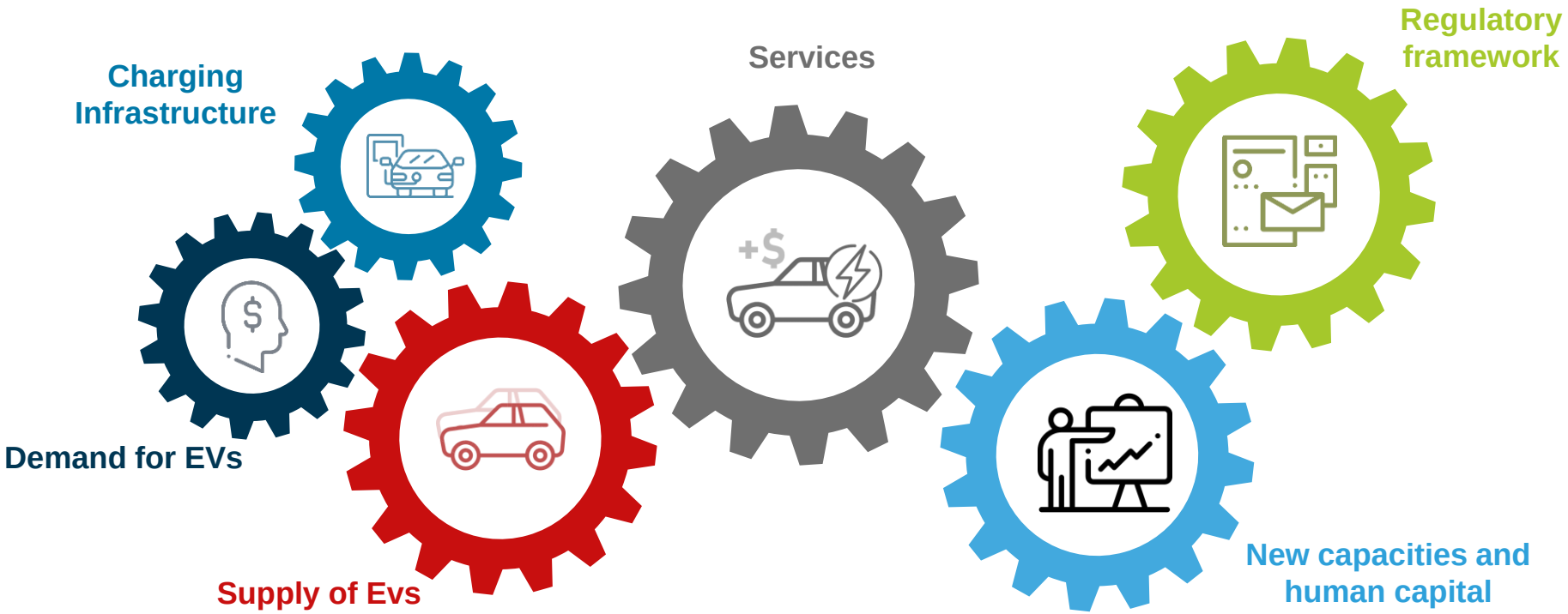
Advancing E-mobility development

*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



Source: Soler (2020), Ministry of Energy, Chile

THANK YOU FOR YOUR ATTENTION!

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