4. Urban Transport – improving efficiency

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Bangkok, 2 April 2019

IEA #energyefficientworld
4. Urban Transport – improving efficiency

**Trainer(s):** John Dulac

**Scenario:** Demand for mobility in your city/municipality is increasing

**Question:** What are the ways to improve the efficiency of transport in your city?
4. Urban Transport – improving efficiency

1. Improving efficiency
   - Potential of improving efficiency (fuel economy, electric vehicles)

2. ‘Improve’ Policies
   - Policy case studies on ‘improve’
   - Technology support policies: EV support; charging infrastructure rollout; mobility as a service

3. Activity
   - Avoid-Shift-Improve vs Regulatory-Economic-Information Grid
   - Map out stakeholders
1. Improving efficiency
Transport activity is rising and behaviours are shifting to less efficient practices. Energy efficiency improvements have prevented energy use equivalent to 120 million cars.
**1. Improving efficiency. Potential to improve**

<table>
<thead>
<tr>
<th>Opportunity in IEA’s Efficient World Scenario (EWS)</th>
<th>Key policy actions</th>
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</thead>
<tbody>
<tr>
<td>• Energy demand could stay flat, despite doubling activity levels.</td>
<td>NATIONAL</td>
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<tr>
<td>• Passenger cars and trucks offer two-thirds of potential savings.</td>
<td>• Improve coverage and strength of transport policies for cars and trucks and non-road modes.</td>
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<td>• Provide incentives to support uptake and sustainable use of efficient vehicles.</td>
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<td>• Information to support efficient vehicle uptake and mode shift.</td>
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Source: Energy Efficiency 2018
1. Improving efficiency. More efficient vehicles

Where to start?  Tools  What are the steps?

More efficient vehicles...

Consume Less Fuel

Use more efficient powertrains

Transport more people
1. Improving efficiency. More efficient vehicles

Where to start? Tools What are the steps?

• Increasing the fuel economy of engines and vehicles directly “improve” the efficiency. This is done on a national level.

ICE potential, through hybridization and light-weighting

![Image of fuel efficiency chart]

FIGURE 2.1 Historical and projected light-duty vehicle fuel economy. NOTE: All data is new fleet only using unadjusted test values, not in-use fuel consumption.

Source: https://www.nap.edu/catalog/18264/transitions-to-alternative-vehicles-and-fuels
1. Improving efficiency. More efficient powertrains

Where to start?

Tools

What are the steps?

- **Well-to-wheel efficiency** of battery electric vehicles outweigh conventional internal combustion engines by **5-6 times** especially if coming from renewable resources.

![Torque - Electric vs. ICE](image)

An electric motor can produce torque at 0 RPM and it’s torque output remains nearly constant – up to about 5000 rpm.

Because it produces constant torque at nearly all RPMs, electric cars do not require multiple speed transmissions.

Use more efficient powertrains

![Cars: Battery electric most efficient by far](image)

Source: https://www.transportenvironment.org
1. Improving efficiency. More efficient powertrains

- Electric mobility not limited to cars. More efficient powertrain also exist for other types of vehicles

**Electric 2-wheelers**
China: 250 million stocks, 30 million sales/yr

**Low Speed EVs**
China: ~4 million stocks, >1 million sales/yr

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China: ~4 million stocks, >1 million sales/yr

*An electric motor can produce torque at 0 RPM and its torque output remains nearly constant – up to about 5000 rpm. Because it produces constant torque at nearly all RPMs electric cars do not require multiple speed transmissions.*
1. Improving efficiency. Higher occupancy

Transport more people

Where to start?

Tools

What are the steps?

• Car sharing brings modest but important benefits in transport efficiency by increasing occupancy rates

- Between 2% and 5% of the service’s members sold a car due to their use of carsharing.
- 7% to 10% of the respondents did not buy a vehicle thanks to carsharing.
- Each vehicle of the service removed 7 to 11 vehicles from city roads. In total, it could represent as much as 28,000 vehicles off the road.
- Users report a 13% increase in cycling and 19% increase in walking.
- A 4% to 18% (average 10%) reduction in greenhouse gas (GHG) emission across the study population.
- A 6% to 16% (in average 11%) reduction in vehicle miles traveled (VMT).

2. ‘Improve’ Policies

What are the policies to encourage the uptake of more efficient vehicles?
2. ‘Improve’ Policies

Make more efficient vehicles...

**Regulatory / Institutional**
- Mandatory-to-buy/sell
- Mandatory-to-use

**Economic**
- Cheaper / easier-to-buy/sell
- Cheaper / easier-to-use

**Information / Capacity**
- Known
- Popular
- Easy to understand
2. ‘Improve’ Policies. Regulatory/Institutional

Where to start?

Tools

What are the steps?

**Regulatory / Institutional**

- Mandatory-to-buy/sell
- Mandatory-to-use

- Fuel economy standards (National Level)
- Phase-out of older and polluting vehicles (Local/National Level)
- Sales quota for dealerships (Local/National Level)
2. ‘Improve’ Policies. Regulatory/Institutional

Where to start?

Tools

What are the steps?

- Mandatory-to-buy/sell
- Mandatory-to-use

• Differentiated access for vehicles in the city
  - Low Emissions Zone (LEZ)
    - ICE of high emissions standard, alternative fuel vehicles, hybrid vehicles, electric vehicles
  - Zero Emissions Zone (ZEZ)
    - Strictly all-electric vehicles
2. ‘Improve’ Policies. Regulatory/Institutional

Where to start?

Tools

What are the steps?

Regulatory / Institutional

• Mandatory-to-buy/sell
• Mandatory-to-use

• Case Study: Differentiated access for electric vehicles, Paris
  • Visible stickers related to emissions are placed on the windshield

Source: https://www.toi.no/getfile.php?mmfileid=49204
2. ‘Improve’ Policies. Regulatory/Institutional

Where to start?

Tools

What are the steps?

Regulatory / Institutional

• Mandatory-to-buy/sell
• Mandatory-to-use

• Case Study: Differentiated access for electric vehicles, Paris
  • Reduced NOx, and more modern fleet composition

Source: https://www.toi.no/getfile.php?mmfileid=49204
2. ‘Improve’ Policies. Regulatory/Institutional

Where to start?

Tools

What are the steps?

Regulatory / Institutional

• Mandatory-to-buy/sell
• Mandatory-to-use

• Case Study: Differentiated access for vehicles in Metro Manila
  • Freight trucks banned between 6AM-10AM and 5PM-10PM everyday except Sunday and holidays

• Reduced congestion and improved overall throughput

Source: http://www.cartrextrucking.com/metro-manila-truck-ban/
2. ‘Improve’ Policies. Economic

Where to start?  Tools  What are the steps?

- Purchase incentives (often National Level)
  - Differentiated taxation or subsidies
  - Fee-bates
  - VAT exemptions

Economic

- Cheaper / easier-to-buy/sell
- Cheaper / easier-to-use
2. ‘Improve’ Policies. Economic

Where to start?

- Fuel taxes (often National Level)
- Circulation incentives
  - Emissions-based road pricing
  - Free / dedicated parking
  - Access to special lanes (e.g. bus lanes)
- Roll-out of support infrastructure (e.g. charging for EV and/or hydrogen vehicles)

Tools

- Cheaper / easier-to-buy/sell
- Cheaper / easier-to-use

What are the steps?
2. ‘Improve’ Policies. Economic

Economic

• Cheaper / easier-to-buy/sell
• Cheaper / easier-to-use

• Circulation incentives
  • **Free / dedicated parking**: Sweden found net positive impacts on EV use and circulation caused by free parking for EV only, delivered along other EV incentives

2. ‘Improve’ Policies. Economic

Where to start?  Tools  What are the steps?

Economic

- Cheaper / easier-to-buy/sell
- Cheaper / easier-to-use

- Roll-out of support infrastructure (e.g. charging for EV and/or hydrogen vehicles)

Charging Infrastructure Rollout

Parking Spots for EV Charging

Successful Grid Integration
2. ‘Improve’ Policies. Economic

Where to start?

Tools

What are the steps?

Economic

- Cheaper / easier-to-buy/sell
- Cheaper / easier-to-use

• Roll-out of support infrastructure (e.g. charging for EV and/or hydrogen vehicles)

Early efforts on standardisation reduces system costs for everyone involved

2. ‘Improve’ Policies. Economic

Where to start?

- Utrecht and Amsterdam (The Netherlands): 1 000 euro subsidy for semi-publicly accessible charging points.
- Oslo (Norway): Grants for up to 60% of installation cost of a charging point.
- Oslo (Norway): Building two large parking garages for electric vehicles.
- Copenhagen (Denmark): 500-1 000 publicly available charging stations and 5 000 semi-public charging stations by 2025.

Tools

- Vancouver (Canada): 20% of the parking stalls in multifamily buildings must be equipped with wire conduits.
- San Francisco (US): 10% of parking spaces in new construction must have Level 2 chargers.
- San Jose (US): Simplify local charging permitting process.
- Los Angeles (US): Deploying charging stations on streetlights.
- New Orleans (US): Residents can apply for permits to install electric vehicle charging stations on the road in front of their homes.

What are the steps?

- Beijing (China): 100% of new residential buildings and 15-25% of new commercial buildings required to be fitted with wire conduits.
- Tokyo (Japan): Subsidy of approx. JPY 1.5 million for charge points in condominiums.
- Shanghai (China): Plan to build 28 000 publicly available charging points by 2020; 210 000 publicly available + private charging points by 2020.
- Shanghai (China): 30% capital subsidy for businesses for charging infrastructure.

- Target number of charging points to be built
- Financial Incentives
- Building codes
- Direct EVSE deployment
2. ‘Improve’ Policies. Information / Capacity

**Where to start?**

**Tools**

**What are the steps?**

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**Information / Capacity**

• Known
• Popular
• Easy to understand

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• Fuel economy labeling (National Level)

• Open data and apps to show public transport (shift policy) and car-sharing options (improve policy) for point-to-point travel
2. ‘Improve’ Policies. Information / Capacity

Where to start?  Tools  What are the steps?

- Open data and apps >> mobility as a service (MaaS)

Information / Capacity

- Known
- Popular
- Easy to understand

Greater integration with more sustainable transport

Economies of scale allow faster tech replacement

Optimised infrastructure and movement saves energy further

Source: https://transportknowledgehub.org.uk/case-studies/mobility-service-west-midlands-elsewhere/
2. ‘Improve’ Policies. Information / Capacity

Where to start?
Tools
What are the steps?

Information / Capacity

• Known
• Popular
• Easy to understand

• Case study: Accessibility to jobs in Lisbon before (left) and after (right) the introduction of shared mobility solutions

Source: https://www.itf-oecd.org/shared-mobility-innovation-liveable-cities
2. Activity
2. Activity. Part 1

- **(15 mins)** What urban transport policies can you think of? Classify the post-its by colour (regulatory, economic, information) and label with A, S, and I (avoid, shift, improve)

<table>
<thead>
<tr>
<th></th>
<th>Regulatory</th>
<th>Economic</th>
<th>Information</th>
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<tbody>
<tr>
<td>AVOID (A)</td>
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<td>SHIFT (S)</td>
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<td>IMPROVE (I)</td>
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2. Activity. Part 2

• **(20 mins)** Considering your power and influence (Session 1), and what we learned for the urban transport session (Session 2, 3, and 4), prioritise the policies based on ease and importance.
Key Resources
Electric Vehicle Initiative

- Government-to-government forum comprising 13 countries
  - Canada
  - China
  - France
  - Germany
  - India
  - Japan
  - Mexico
  - Norway
  - Poland
  - Spain
  - Sweden
  - UK
  - US
- Currently co-chaired by Canada, China and the United States*, and coordinated by the IEA
- Released several analytical publications (Global EV Outlook, City casebook)
- Engaged stakeholders in high-level roundtables (CEM8 and Pilot City Forum in Beijing, June 2017)
- Instrumental to mobilize action and commitments (Paris Declaration on Electro-Mobility and Climate Change at COP21, Government Fleet Declaration at COP22)

- Just launched the EV30@30 Campaign, aiming to achieve a 30% market share for EVs by 2030
The Global Fuel Economy Initiative (GFEI) works to secure real improvements in fuel economy, and the maximum deployment of vehicle efficiency technologies across the world.
Key Resources

Data-Driven Transport Policy

[Link](https://www.itf-oecd.org/sites/default/files/docs/data-driven-transport-policy.pdf)

Big Data and Transport
Understanding and assessing options

[Link](https://www.itf-oecd.org/sites/default/files/docs/15cpb_bigdata_0.pdf)