SOLUTIONS webinar: Electric Vehicles for cleaner cities

Cluster 6: Clean Vehicles – Electric vehicles for cleaner cities
Agenda

- Introduction
- Why electric vehicles?
- What is the status quo?
- The way forward
- International examples
The SOLUTIONS project

- SOLUTIONS – Sharing Opportunities for Low carbon Urban transportION
- 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 – April 2016
- Regional focus: Europe, Asia, Latin America, Mediterranean Partner Countries
The SOLUTIONS project

- SUMP
- Public Transport
- Infrastructure
- City Logistics
- Clean Vehicles
- Mobility Management

+ Thematic experts
+ Local take-up coaches
+ 9 Training Cities
Urban Electric Mobility Initiative (UEMI)

Initiated by UN Habitat and SOLUTIONS the Urban Electric Mobility Vehicles Initiative (UEMI) aims to:

- Decreasing urban CO₂ emissions by increasing the market share of electric vehicles in cities to 30% of annual vehicle sales (incl. LDV and motorized 2-3 wheelers)

- Integrate electric mobility into a wider concept of sustainable urban transport that achieves a 30% reduction of GHG emissions in urban areas by 2030

- The UEMI was launched at the UN Climate Summit in New York in September 2014

- Toolkit currently being developed to provide advice on the potential of e-mobility solutions to contribute to sustainable urban transport
Who is talking to you?

- Oliver Lah (Wuppertal Institute for Climate, Environment and Energy) – SOLUTIONS project coordinator

- Hanna Hüging (Wuppertal Institute for Climate, Environment and Energy) – SOLUTIONS Cluster Clean Vehicles
Why do we need clean vehicles?
Contribution of transport to GHG emissions

Figure  The Transport Sector – A major contributor to global anthropogenic CO₂ emissions Source ICCT 2014 – State of Clean Transport Policy
Air pollution and public health

- Internal combustion engines produce:
  - Nitrogen oxides (Nox)
  - Particulate matter (PM)
  - Carbon monoxide (CO)
  - Sulphur oxides and other airborne toxins
→ Acute health effects and chronic diseases (early death)

Figure: Global premature deaths from light- and heavy-duty vehicle exhaust PM2.5 (ICCT, 2014)
The challenge ahead

CO₂ emissions are likely to double by 2050 if current trends persist.

Figure 3: Transport CO₂ emissions, actual and projected
Source: Bongardt et al. 2013, based on IEA 2009
Why electric?

Key benefits from driving electric:
- Zero exhaust emissions
- Reduced noise pollution at low speeds
- Independence from fossil fuels / potential to integrate of renewable energy
- Reduction in GHG emissions

A promising option to reduce externalities from motorized transport in urban environments, if integrated in a wider sustainable mobility system.
Types of electric vehicles

- HEV – Hybrid Electric Vehicle
- PHEV – Plug-in HEV
- BEV – Battery Electric Vehicle
- Connected Electric Vehicle

Source: Electric Power Research
Charging technologies

- Conductive charging
- Inductive charging (fast/slow)
- Battery swap

(c) Volvo
Status of electric vehicles
Global development of EVs

Figure: Annual global EV sales Source: ICCT (2015) Assessment of leading electric vehicle promotion activities in United States cities.
Global development of EVs

Figure: EV registrations and market share in 2013 (Source: adapted from DLR and WI, 2014)
Challenges

Energy density (battery) → range limitations
- Vehicle efficiency improvements (short term)
- Use patterns (short term)
- Charging infrastructure (short term)
- Post-Lithium-Ion batteries (medium term)

Vehicle / battery costs
- Production improvements (economies of scale)
- Adapted battery size
- High annual millage (favourable TCO e.g. fleets)

User expectations
- New business models (e.g. sharing systems)
- Awareness raising / demonstration
E-mobility as part of a balanced sustainable urban mobility system

**Avoid:** reduce (growth in) travel activity and distances

**Shift:** change travel structure through shifts to sustainable modes of travel

**Improve:** lower vehicle energy intensity and reduce fuel carbon intensity
The world before e-mobility...
... the world after e-mobility
Carbon intensity of different fuels

Figure: Transport CO$_2$ emissions, actual and projected
Source: Bongardt et al. 2013, based on Creutzig et al. 2011)
Cities as catalysts for EVs

- Cities are seen as catalysts to increase the use of electric vehicles!

Assessing the potential for EVs
- Wider urban transport targets
- Integration with other transport measures
- Characteristics of available EVs
- Charging infrastructure
- Regulative framework
- Maximising benefits
- National support

→ Potential for EV deployment depends on the local context
Examples for EV use

Electric 3-wheelers in Manila

Electric car-sharing in Paris

Electric taxis in Barcelona

ADB 2011

Mario Roberto Durán Ortiz

Hüging, 2013
Examples for EV use

Electric bikes in Stuttgart

Electric vehicle in municipal fleets in Rotterdam (electric garbage truck)

Electric buses in Shenzhen
Example: EVs in municipal fleets

Potential instruments:
- Public procurement quota for EVs
- Sharing concepts for public EVs (employees, institutions, public)

Effects:
- Increased awareness
- Municipality acts as a role model
- Demonstrates the feasibility of EVs

Requirements
- Management structure for municipal fleet
- Infrastructure availability

Source: Kanagawa Prefecture
**Example: local incentives for EV use**

**Potential instruments:**
- Free parking
- Exemption from city tolls
- Use of HOV or bus lanes

**Effects:**
- Increased attractiveness of EVs for public and private EV users (e.g. commuters, logistic companies)
- Mainly effective for four-wheelers

**Requirements**
- Existing system in place and enforced
- Clear labelling of EVs (BEV/PHEV)

**To consider:**
- Induced traffic (e.g. shift from PT)
- Reduced effectiveness of HOV/bus lanes
- Reduced revenues
Transferability

Framework conditions

- Environmental sustainability (electricity mix)
- Regulative / legal environment
- Infrastructure and services (e.g. high voltage training for mechanics, ICT platform)
Conclusion

- Electric vehicles can make cities cleaner and more liveable
- Technologies / vehicles have to fit local context conditions
- Municipalities play a crucial role to increase the deployment of electric vehicles
- Different measures to support EV-deployment have been successfully implemented in cities around the globe
- Best a joint strategy with public and private stakeholders is developed

→ What can electric vehicles do for your city?
Thank you!

oliver.lah@wupperinst.org
hanna.hueging@wupperinst.org