MOBILITY: TECHNOLOGY PRIORITIES AND STRATEGIC URBAN PLANNING

Summary - discussion

http://www.iea.org/aboutus/standinggroupsandcommittees/egrd/

or google: IEA-egrd

» Focus on energy and climate change
Day 1

- What is the current status of vehicle efficiencies, and what more can realistically be achieved before 2020?

- What are the actions needed to achieve further efficiency gains and who is responsible (e.g. automobile manufacturers, policy makers)?

- Comparing new transport options, which have the greatest potential and the least number of barriers to implementation (e.g. financial, policy, R&D or other)?

- What are electricity network issues urban planners and policy makers need to address to implement light rail or hybrid and electric vehicle programmes?
Day 2

- Which policies or frameworks have proven to be effective in reducing transport demand?

- Urban transport infrastructure has grown organically since the first automobiles. How can we integrate the newer fuels and technologies into urban landscapes?

- Are there country- or region-specific advantages to adopting particular transport technologies?

- Which financing mechanisms have proven to be successful for new transport programmes?
Historic trends

World transport energy use has doubled in past 30 years

Light-duty vehicles continue to drive growth, while road freight and air travel also increased rapidly in last decade.
Coverage of transport modes

2-3 wheelers
Light duty vehicles
  • internal combustion
  • hybrids / plug-in hybrids
  • fuel cell vehicles
  • electric vehicles

Heavy duty vehicles
  • passenger (minibuses, buses, BRT and intercity buses)
  • freight (medium and heavy trucks)

Rail
  • passenger and freight
  • HSR (added in 2012)

Air / Water transport
ETP 2012 transport outlook to 2050

Transport energy use by mode in the ETP scenarios

Energy use could increase as much as 70% by 2050 if no further policies are adopted in support of efficiency, alternative vehicles/fuels and modal shifting.
ETP 2012 transport outlook to 2050
Efficient vehicles and alternative fuels key to achieve 2DS

An ‘avoid, shift and improve’ approach is the most cost effective to reach 2DS objectives
There are ambitions

Because:
- There is too much air pollution
- We want to avoid congestion
- It’s getting to expensive
- Safety...
- Etc.....
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And it’s good for business.
Elements determining the environmental impacts of traffic

- Community structure
- Traffic volumes & choice of transport mode
- Energy for transport
- Vehicles and user behaviour

Policy orientation

Technology orientation
The transport system is developed by implementing a diverse range of measures set out at different development levels through cooperation between the parties.

1. Sustainable urban structure and land use
2. Public transport, walking and cycling connections and services
3. Mobility management, pricing and regulations
4. Operation and maintenance of the transport system
5. Transport infrastructure

Longterm effect
Alternative fuels – Well to Wheel

Well to tank

Tank to wheel
Technological Achievements *(that have to be improved)*

Fuel cell:
- Power density
- Reliability
- Lifetime
- Low-temperature performance
- Environmental adaptation

Battery:
- Nickel-metal battery
- Lithium ion battery
- Super capacitor battery
Battery Models for Busses

For electric buses, several options are available to ensure maximum operational time.
Technological Achievements

- Hybrid
- Plug-in Hybrid
- Electric Powered
- Fuel cell
More small cars needed?

smorsche

smerrari

smamborgin

smorvette
"Unlimited" new options

Role of ICT in transportation services

- ICT is a key enabler of energy efficient smart transport services:
  - Fast, mobile internet connections
  - Smartphone as the universal terminal
  - Common platforms enabling combining different services
  - The major challenge is interoperability of systems

- Services supporting efficient mobility
  - Flexible public transport (changing modes, real-time route information) & multi-modality

- Services for smart vehicles (e.g. CO₂, fuel optimization)
  - Intelligent transport management (e.g. optimisation)
There are a lot of demonstration projects: Development Strategy of Industrialization of electric vehicle

- Pilot demonstration
- 8.8 billion RMB investment
- 27,432 electric vehicles in 25 cities
  - 9,834 electric cars,
  - 2,513 electric buses,
  - 3,305 hybrid electric cars,
  - 10,495 hybrid electric buses,
  - 52 fuel cell vehicles
  - 174 charging stations
  - 8,107 charging piles.
Are there country- or region-specific advantages to adopting particular transport technologies?

WintEVE – EV’s in Winter Conditions

Need
- Testing and demonstration solutions for arctic conditions

Solution
- Testing ecosystem based on collaboration between Arctic Research Center and testing service providers in Lapland

Benefits
- Combination of world class testing environment and experience
- Technology tested in arctic conditions works elsewhere

Users
- EV manufacturers, OEM’s
- Suppliers of charging technology and end user services, utilities etc

www.centria.fi
www.winteve.fi
Financial incentives

- Congestion tax
- Reduced cost for e-charging / for free
- Tax reductions
- Purchase subsidy
- Free parking / designated parking spaces (?)

Not clear what has the optimal benefits.
Financial Models
- “google”- “apple” approach
- ----
Logistic solutions

- Logistic solution (Stockholm)
- Start with municipal fleet to go sustainable
- Taxi priority
Model shift
- Don’t tell you customer what to do
- Inform the public (good websites’ best apps.)

But first find the right things to do &

Learn from
- Customer needs & appetite
- Effect on sustainability awareness
- Small scale impact on CO2 reduction
- Coalitions & Cooperation
- Multiple technical solutions
- Innovative funding

Determine
- Customer needs and wishes
- Optimized Customer approach
- Ideal cooperation’s
- Scalability characteristics
- Best CO2 cases
Policies

Green procurement – allow only companies with a green fleet. Give room for demonstration projects.
Policy Frameworks / roadmaps
The U.S. planning context

**National (Federal)**
- Vehicle and fuel standards and fuel pricing
- Transport planning – procedural requirements, funding, and technical assistance

**State**
- Transport investment priorities (non-metropolitan)
- Roadway design standards
- Freeway/arterial systems management
- Roadway and fuel pricing

**Regional (MPO)**
- Transport investment priorities (metropolitan)
- Transit investment
- Freeway/arterial systems management
- Voluntary cooperation on land use, etc.

**Local (City, County, Town)**
- Land use planning
- Local transport investment priorities & design standards
- Bicycle and pedestrian infrastructure
Roadmap to a Single European Transport Area
Towards a competitive and resource efficient transport system

- To meet the challenges, transport has to:
  - Use less energy
  - Use cleaner energy
  - Exploit efficiently a multimodal, integrated and ‘intelligent’ network
- Curbing mobility is not an option
- By 2050 reduce emissions by 60%, and 20% by 2020 (2008 level)
- By 2050 move close to zero fatalities in road transport, halving road casualties by 2020
3. Suggestions to International Cooperation (China)

- Increase the investment in R&D
- support cross-industry technology development.
- Offer purchase allowance and tax reduction
- finance supports to developments of charging facilities and battery recycling systems
Suggestions

Researches on charging mode, commercial mode and standardization of PEV

Policies to stimulate the use of PEV

- No license control
- No plate number limitation
- Permission to use bus lane, and
- Parking priority
There are 11 standards which have been revised and to be ratified, 14 standards being made or revised, and no standards to be remade. But 45 items of standards are needed in the industry, and the standard system for electric vehicle is the largest in both aspects of coverage and quantity around the world.
Some barriers to further EV charging deployment

Various regional standards for connectors, especially for DC fast charging.

More important than connector type is achieving as much commonization as possible in major portion of the communications protocols.

<table>
<thead>
<tr>
<th>Connector</th>
<th>CHAdeMO (Japan)</th>
<th>GB/T (China)</th>
<th>COMBO1 (US)</th>
<th>COMBO2 (Germany)</th>
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<tbody>
<tr>
<td>Vehicle Inlet</td>
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**CAN**

**PLC**
The Questions

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Additions – remarks?