Transport Technology Gaps

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iea Energy Technology Network

IEA Implementing Agreements with Transport Related Activities

- End-Use
  - Advanced Fuel Cells AFC
  - Advanced Materials for Transport AMT
  - Advanced Motor Fuels AMF
  - Combustion
  - Hybrid and Electric Vehicles HEV
- Renewable Energy
  - Bioenergy
  - Hydrogen
  - Renewable Energy Technology Deployment (RETD currently has no transport related activities)

http://www.iea.org/techno/index.asp

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

Process discussing transport technology gaps

- Fall 2012 EUWP meeting Paris, September 2012
  - discussions on technology gaps start
    - industry & transport
    - a list of technology gaps in transport is developed
- EUWP Transport Contact Group (TCG) meeting Ottawa, February 2013
  - technology gaps main focus of discussions
  - recommendation to EUWP to consider a new transport system level IA
- Spring 2013 EUWP meeting Brussels, March 2013
  - action item:
  - ***"Prepare a preliminary proposal of the scope of work and strategic plan of the proposed new Energy Efficient and Intelligent Transport Systems IA, which will consider synergies with existing IA"***
- IEA EGRD workshop Espoo, May 2013
  - the idea of a new Implementing Agreement to be discussed

White paper 2011

Roadmap to a Single European Transport Area
- Towards a competitive and resource efficient transport system

The European Commission adopted a roadmap of 40 concrete initiatives for the next decade to build a competitive transport system that will increase mobility, remove major barriers in key areas and fuel growth and employment. At the same time, the proposals will dramatically reduce Europe's dependence on imported oil and cut carbon emissions in transport by 60% by 2050.

By 2050, key goals will include:

- No more conventionally-fuelled cars in cities.
- 40% use of sustainable low carbon fuels in aviation; at least 40% cut in shipping emissions.
- A 50% shift of medium distance intercity passenger and freight journeys from road to rail and waterborne transport.
- All of which will contribute to a 60% cut in transport emissions by the middle of the century.

http://ec.europa.eu/transport/strategies/2011_white_paper_en.htm

White paper 2011

- Curbing mobility is not an option
- New transport patterns must emerge, according to which larger volumes of freight and greater numbers of travellers are carried jointly to their destination by the most efficient (combination of) modes.
- Individual transport is preferably used for the final miles of the journey and performed with clean vehicles
- Information technology provides for simpler and more reliable transfers.
- Transport users pay for the full costs of transport in exchange for less congestion, more information, better service and more safety.
- Future development must rely on a number of strands:

White paper 2011

- Improving the energy efficiency performance of vehicles across all modes; developing and deploying sustainable fuels and propulsion systems; **optimising the performance of multimodal logistic chains**, including by making greater use of inherently more resource-efficient modes, where other technological innovations may be insufficient (e.g. long-distance freight)

- **Using transport and infrastructure more efficiently through use of improved traffic management and information systems**, advanced logistic and market measures such as full development of an integrated European railway market, removal of restrictions on cabotage, abolition of barriers to short sea shipping, undistorted pricing, etc.

White paper 2011

- More resource-efficient vehicles and cleaner fuels are unlikely to achieve on their own the necessary cuts in emissions and they would not solve the problem of congestion.

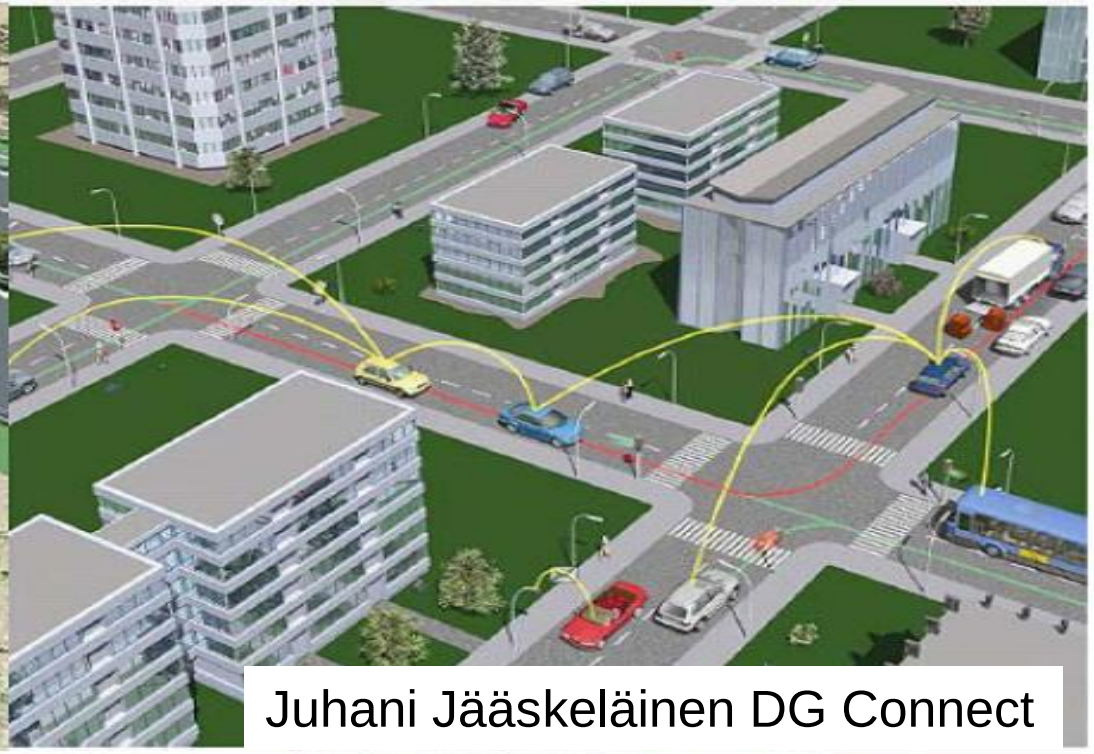
- They need to be accompanied by the consolidation of large volumes for transfers over long distances.

- This implies greater use of buses and coaches, rail and air transport for passengers and, for freight, multimodal solutions relying on waterborne and rail modes for long hauls.

Research and Development
Cooperative Mobility

Cooperative Mobility means the interconnection of vehicles and infrastructure, to create and share new kinds of information, leading to a better cooperation amongst drivers, vehicles and roadside systems.

An attractive solution contributing to the European goal of **safer, cleaner, and more efficient and sustainable traffic solutions**.



Juhani Jääskeläinen DG Connect

Clean Cars

Glotz-Richter 2010

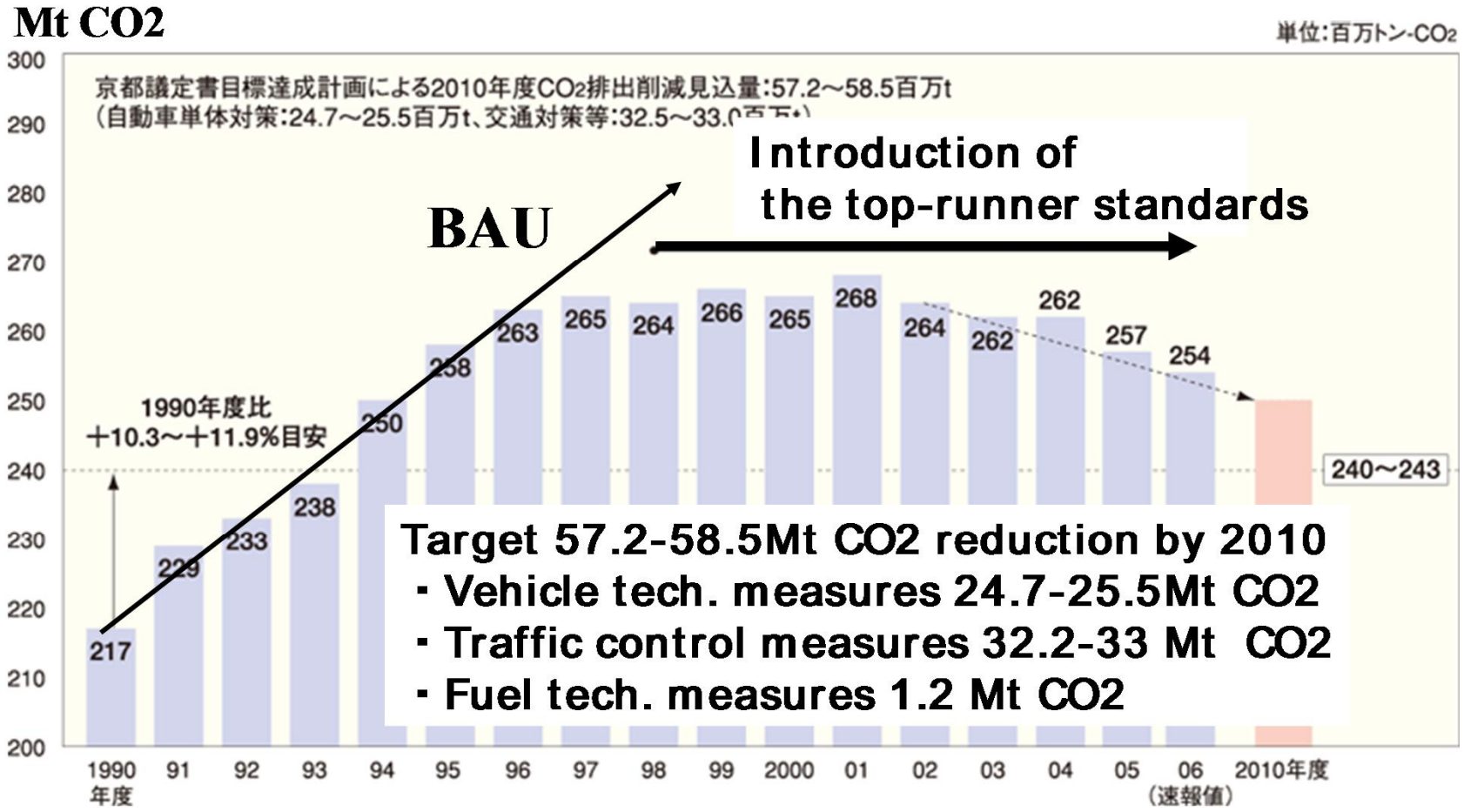
... *before* introduction of clean vehicles...

Clean Cars

Glotz-Richter 2010

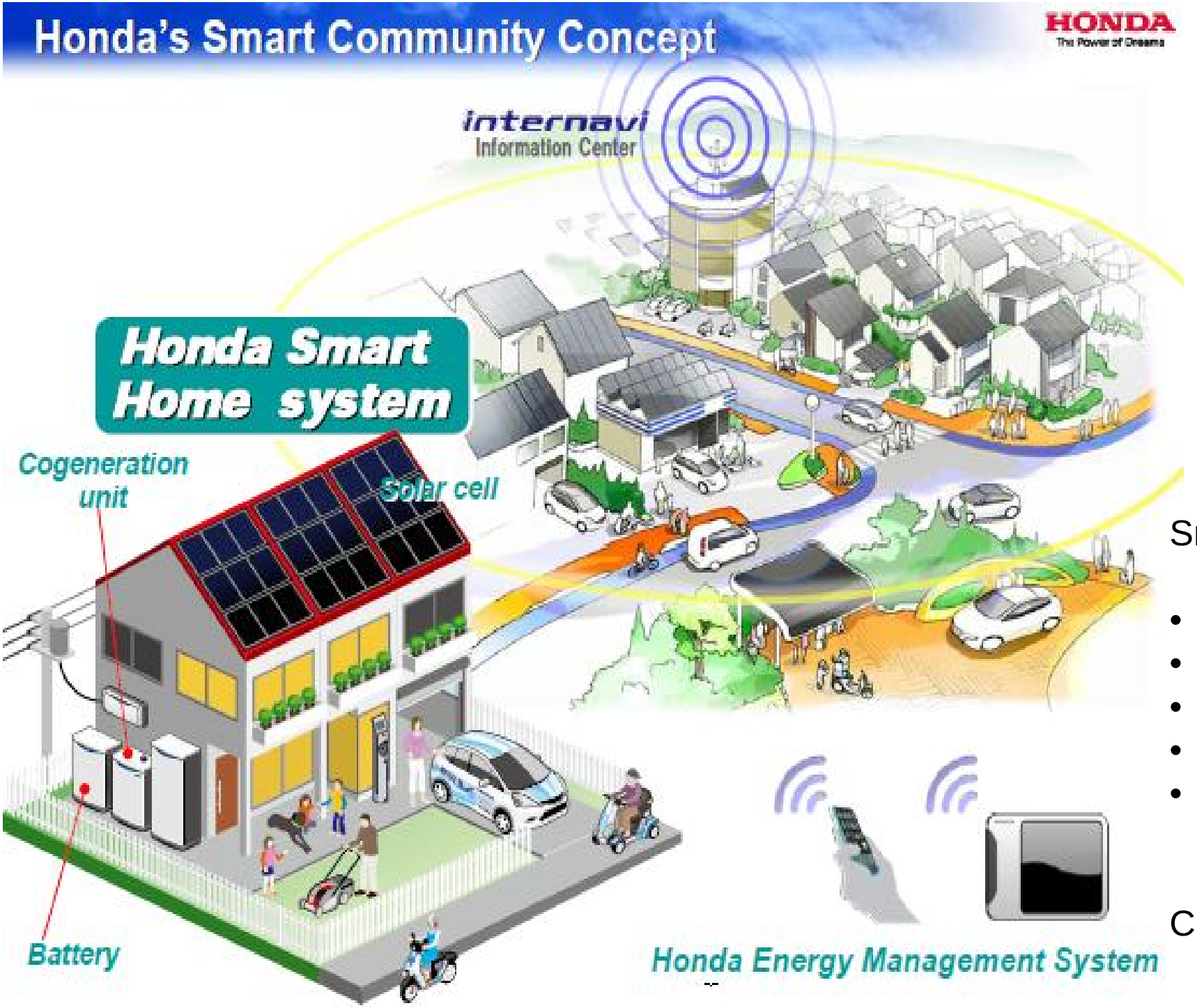
...after introduction of clean vehicles...

Japan has succeeded in cutting transport CO2 emissions



N. Iwai/NEDO 12/2008

Vehicle technology 42 %
Traffic control measures 56 %
Fuels 2 %



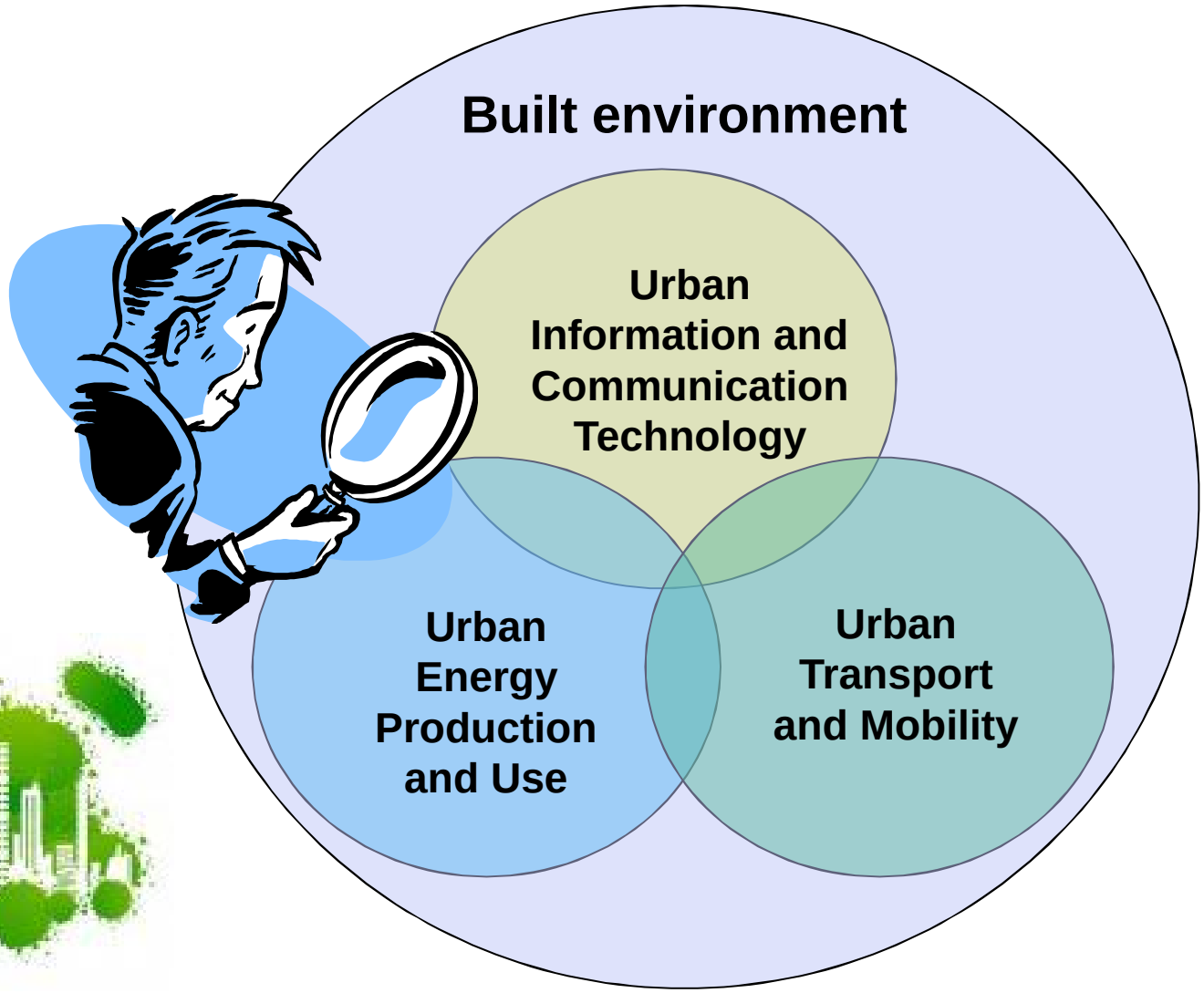
Smartness in:

- Vehicles
- Transport systems
- Electricity grid
- Buildings
- General infrastructure

Co-operative systems

Picture: Honda

EU Smart Cities and Communities EIP 2012



Elements in bus services

To
Digital Mobility
Services

Passenger

Traffic
Information
Ticketing

Design
Confort
Safety

Guidance
Security

Plug & play
On-board
architecture

Operation

Security - CCTV architecture
Traffic signal – Bus priority
Physical interfaces

IT architecture
Modularity
Energy

Speed
Accessibility

Vehicle

Infrastructure

To
Electrical
vehicle

Source: J-L Franchineau/VEOLIA Recherche & Innovation and VEOLIA Transdev

Transport Contact Group

- Technology gaps was picked as a central topic for this TCG meeting, following the discussions in the Fall 2012 EUWP meeting
- Before going into detailed discussions on the EUWP document on transport technology gaps, some general remarks were made:
  - Körner sees a need for more information on LNG trucks and alternative fuel infrastructure
  - Stork confirmed that there's a renewed interest in natural gas and especially in LNG in the US
  - Körner mentioned that University Collage of London has developed a maritime shipping model, and that the IEA Secretariat is working on rail and aviation as well
  - Kozdras noted that many universities have knowledge in transport systems
  - The mismatch between gasoline and diesel was discussed
    - marine sulphur regulations will increase the demand for middle distillates
    - Europe is exporting gasoline to and importing diesel from the US
    - Fairbridge mentioned that an airline company had bought an oil refinery
  - Körner stated that modal-shift scenarios have to be assessed and Stork emphasized the need for land-use planning

EUWP Cabinet's listing on technology gaps

- Aviation
  - none of the current IAs have knowledge in aviation technology, Bioenergy has covered biofuels for aviation
- Shipping
  - some activities within AMF, fuels, engine technology and exhaust after-treatment could be covered by AMF
- Rail
  - none of the current IAs are working on rail transport

EUWP Cabinet's listing on technology gaps

- Integrated transport system analysis towards a sustainable transport system, including logistics, infrastructure, functionality, information technology for traffic efficient management, etc.
  - these topics are not currently covered by ETN (the Energy Technology Network)
  - ICT/ITS (Information and Communication Technologies/Intelligent Transport Systems) were considered important
  - modal shifts and demand management also important
  - the use of vehicles (eco-driving, e.g. DOE Fleet Wise) was mentioned
  - Stork will check related US DOT activities

EUWP Cabinet's listing on technology gaps

- Vehicle infrastructure energy- and carbon-embedded due construction, operation and maintenance, vehicle manufacturing life cycle analysis
  - is or could be handled by the current IAs, e.g. electric vehicles by HEV, FC vehicles by HIA and conventional vehicles by AMF and AMT
  - it was noted that LCA is a tacky issue in the automotive industry
- Difference between tested and real-life fuel economy of road vehicles
  - Smallwood commented that this could be a problem especially for new vehicle technologies
  - could be tackled by the existing ETN
  - data-logging technologies found interesting, could produce new approaches, relates to ICT and ITS
  - the White House "Open Data Initiative" was mentioned

EUWP Cabinet's listing on technology gaps

- Impact of road condition/construction technique on fuel economy
  - though to be of minor importance and not a primary task for the IEA ETN
- Fuel-efficient technologies costs, saving potentials and alternative fuel costs
  - is or can be covered by the current ETN
- Vehicle trade flows globally (new and used)
  - not a primary task for the IEA ETN

TCG's recommendation to EUWP

- The outcome of the discussion was that transport system level issues are not sufficiently covered by the existing ETN
- **Therefore the TCG recommends that the EUWP should consider a new Implementing Agreement on transport systems, including ITS & ITC for enhanced efficiency in transport**
- The new agreement could cover things like overall energy efficiency, modal shift, logistics, system level assessments etc.

EUWP view

EEITS: Energy Efficient and Intelligent Transport Systems (preliminary)

- Go ahead with the planning!

Next steps

- Discussion at EGRD in Espoo/Helsinki May 2013
  - “Mobility: Technology priorities and strategic urban planning”

- Developing a preliminary document

EEITS Playing field (?)