Energy Technology Perspectives 2014

Mitigation potential in transport

Cédric Philibert on behalf of Jean-François Gagne Energy Technology Policy Division Head International Energy Agency

Mitigation Potential of Urban Sustainable Low-Carbon Transport COP 20 side-event, 4th December, Lima, Peru



A transformation is needed...



Achieving the 2DS will require contributions from all sectors and application of a portfolio of technologies.

Energy Agency

iea

Energy consumption in transport



Transport is the end-use with the least diversification

iea

ETP

2014



Sources: IEA energy balances and IEA Mobility Model

* Aviation (only allocated to passenger transport activity) includes international bunkers www.iea.org

Passenger transport: development to date Activity (left) and energy use (right)



- Most energy consumption (and growing) is for cars
- When looking at activity, collective transport modes (higher average loads) gain importance



Sources: IEA Mobility Model, UNCTAD Review of Maritime Transport, UIC rail transport database, IEA energy balances

* Includes international bunkers

www.iea.org

Freight transport: development to date Activity (left) and energy use (right)



- Road takes the lion's share of energy use also for freight
 - Trucking experiences the fastest growth
 - LCVs (energy intensive) have larger growth potential in non-OECD
- When looking at activity
 - shipping outweighs all other modes
 - rail becomes comparable to road, but only highly used in a few countries: United States (26%), China (26%), Russia (20%), India (6%)

Perspectives for 2050 CO₂ emissions in transport



'Avoid' and 'shift' contribute, but 'improve' remains decisive to reach 2DS objectives



Improve: Technology still has a big potential



All modes can significantly decrease their carbon intensity

© OECD/IEA 2014

International

Energy Agency

FTP

Improving fuel economy is cost effective ETP 2014



Potential cumulative savings over the life time of vehicles: USD 35 trillion (2010 – 2050)

Transition to advanced biofuels for transport threatened by policy uncertainty



Conventional biofuel production continues to grow, and will provide 4% of road transport fuel demand in 2020

First commercial-scale advanced biofuel plants coming on line

 Without adoption of long-term policy framework, advanced biofuels sector faces grim future

Potential and maturity of electrification



Notes: it is not only the vehicle itself that determines the potential/maturity, but also the application in which it is used. Bicycles, for example, have different results if considered individually or within the context of bike sharing. Abbreviations: Li-ion = lithium ion battery. PHEV = Plug-in hybrid electric vehicle. LCV = Light commercial vehicle. MFT = Medium freight truck. HFT = Heavy freight truck. n.a. = not available.



Fuels switching can support energy policy goals

Global portfolio of technologies for passenger LDVs



Electric, PHEV and FCEVs together could account for nearly three-quarters of new vehicle sales in 2050.

© OECD/IEA 2014

iea



More than USD 60 trillion saved over the next 4 decades by saving fuel, and also reducing vehicle and infrastructure spending

A low carbon future could save money

Driving change through infrastructure



Avoid/Shift policies can reduce net infrastructure needs, resulting in potential cumulative savings of International USD 20 trillion (2010 – 2050) iea

Energy Agency

Future challenges: addressing urban mobility and energy needs

Common city contexts representation



www.iea.org/tale-of-renewed-cities

ETP 2016 : Identify synergies between global and municipal challenges and opportunities to make cities more efficient, secure and healthier places to live Energy Agency 162

Systems thinking and integration

Co-generation Renewable energy resources Centralised fuel production, power and storage Distributed energy resources Smart energy system control H₂ vehicle Surplus heat F٧

A sustainable energy system is smarter than today's, multidirectional and integrated - requiring long-term planning for <u>services</u> delivery

© OECD/IEA 2014

International