

LCV technologies as a part of sustainable transport policies

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Structure of presentation

- 1. Intro to low carbon vehicles (LCV)
- 2. Policy framework: climate, energy, transport
- 3. Some questions for discussion

Intro to LCVs

- Why are we interested in low carbon vehicles (LCV)?
 - The Transform Scotland approach: Demand management (economic instruments /pricing), infrastructure, behavior change and information
 - LCVs a new area to cover
- Here LCVs defined as having potential to reduce CO2 emissions
 - Powered by alternative fuels or technologies: biofuels, electric vehicles (EVs), plug in hybrids, hybrids, stop-start/micro hybrids, hydrogen vehicles or equivalent

Intro to LCVs

- Electric vehicles

- EV energy efficiency $\approx 72\%$, overall energy efficiency electricity from coal 26% , hydropower 65% .

- Fuel cells

- Energy efficiency $\approx 64\%$
- Commercialised fuel cell vehicles from 2015 onwards

- Biofuels

- Ethanol
- Biodiesel
- Second generation biofuels 2014
- Internal combustion engine efficiency $\approx 20\%$

2. Policy framework

1. Climate Change (Scotland) Act
2. Climate Change Delivery Plan
3. Renewable Energy Framework
4. Energy Efficiency Action Plan
5. LCVs strategy

Climate Change (Scotland) Act 2009

– Targets to 2020:

- GHG emissions at least 42% lower than the baseline (1990)

– Targets to 2050:

- General target for GHG emission reduction of 80 % from year 1990 levels.

Climate Change Delivery Plan

- “Almost complete decarbonisation of road transport by 2050 with significant progress by 2030 through wholesale adoption of electric cars and vans, and significant decarbonisation of rail by 2050.”
- Planning and development needs for transport sector:
 - Demand management measures: reduce the need to travel and the carbon intensity of travel, prioritising integrated public transport and maximise active travel (walking, cycling),
 - Vehicle technology improvements, EVs and hydrogen, charging and infrastructure
 - Measures in infrastructure and local speed limits, road space reallocation, “Smarter measures” e.g. “eco driving”
 - Influencing the location of new development through the planning system

SG Renewable Energy Framework

- Making Scotland a leader in green energy: Draft framework for the development and deployment of renewables in Scotland, 2008
 - Significant potential in RE for sustainable economic growth
 - Harnessing RE resources
 - Research and Technology expertise
 - Businesses and jobs
 - Creating wealth

SG Renewable Energy Framework

– 2 main RE points for transport :

1. Electric or hydrogen vehicles contribution in meeting renewable targets
1. Need to follow the emerging evidence on biofuels and securing the sustainability of biofuel use

Energy Efficiency Action Plan

2. Energy Efficiency Action Plan to be published spring 2010



Energy Efficiency Action Plan

- Three energy efficiency improvement areas for transport sector:
 1. Improving the energy efficiency of transport system
 - Introduction of new technologies
 - Improving the fuel efficiency of fossil fuelled vehicles
 - Reducing the absolute levels of consumed fuel
 2. Managing better the demand for travel
 - Encourage change in attitudes to travel so that the efficiency savings are not lost through additional journeys or the purchase of additional vehicles
 3. Encouraging people to use more public transport and active traveling (walk, cycle)

Low Carbon Vehicles strategy

- Scottish consultation on LCVs 2009
 - Alternative fuels or technologies: biofuels, (EVs), plug in hybrids, hybrids, stop-start/micro hybrids, hydrogen vehicles or equivalent
 - Renewable Transport Fuels Obligation (RTFO) (SI 2009/843)
 - 10 % of transport fuels by 2020
 - Postponed targets: 5 % by the 2013/2014
 - Improved efficiency of internal combustion engines
 - Emission performance standards for new passenger cars, Regulation (EC) No 443/2009
 - Ultralow CO2 emission cars 50 g/Km
 - Average emission from 130 to 95 g/Km by 2020

Low Carbon Vehicles strategy

- Scottish consultation on LCVs 2009
 - Introduces targets for public sector fleet in short term and 2020 e.g.
 - Purchase of best in class vehicles from 2010
 - Lead in trialing new LCVs pre general production
 - 95% of purchased new vehicles LCV by 2020

3. Some questions for discussion

- How to combine the economic development and emission reduction goals as suggested in RE framework?
- What should be our focus: achieving higher emission standards for ICE vehicles, or more LCVs?

Question re. energy demand for EVs

- Effects on electricity generating capacity and grid
- Example 1.
 - Estimation used in Scottish LCV consultation: 100% electric cars in Scotland would mean additional 5 TWh per annum in electricity consumption, which equals 15 % of projected Scottish electricity demand in 2020.
 - To reduce emissions electricity generated needs to be from renewables
 - If vehicles are charged off peak hours, no need to build additional electricity generating capacity, but local grids may need some enforcements

Question re. energy demand for EVs

- Example 2.
 - In France 23 % (7.3 million) of cars could be EVs without need for additional electric infrastructure. (European Association for Battery Electric Vehicles, 2008)
- Example 3.
 - According to WWF Germany study (2009) 2% (1 million electric) of cars could be EVs without need to changes in the transmission structure. (The number of cars 53 million)

Question re. energy demand for EVs

- The estimations for EVs effect on electricity demand and grids vary.