Transport and Energy Integration

ERP Transport Post-Plenary Event
21st April 2016
Liam Lidstone – Strategy Manager
The ETI undertakes analysis of the overall energy system.

<table>
<thead>
<tr>
<th>Supply</th>
<th>Infrastructure</th>
<th>Industry</th>
<th>Buildings</th>
<th>Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>37% mainly coal-fired power stations</td>
<td>&lt;1%</td>
<td>13%</td>
<td>19%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Greenhouse Gas Emissions from the UK energy system
Transport Sector Modality Shift

Modal Shift (<10%)

Increasingly Efficient Use of Liquid Fuels

Alternative Energy Options

Figures are share of UK Transport CO₂ Emissions

Transport

Aviation
- Domestic 2%
- International 19%

Heavy Duty
- Marine 6%
- HGV 15%
- Off-Road 7%
- Rail 1%
- Bus/Coach 2%

Light Duty
- Commercial Vehicles 9%
- Passenger Cars 39%
The ETI is seeking to demonstrate 30% improvement in fuel efficiency before aerodynamic and light-weighting advances. Natural gas and bio-fuels could supplement liquid fuel given compatible vehicles and subject to lifecycle emissions analysis. On board storage requirements are challenging as is the ability to support off-highway duty cycles. Hydrogen storage density coupled with fuel cell robustness are major challenges for HDVs.

UK Heavy Duty CO$_2$ Emissions (kT) by source (2008)

- On-highway: 47%
- Off-highway: 22%
- Marine: 27%
- Rail: 4%
- Articulated HGV: 23%
- Rigid HGV: 18%
- Bus & Coach: 6%
- Agricultural Machinery: 14%
- Industrial Machinery: 6%
- Material Handling: 2%
Meeting light vehicle charging requirements

Journey arrival times (2007-2010) and Electricity demand profile (7th December 2010)

Compiled using NTS and UKERC data
Where to support charging

Parking availability at homes

- On-street parking only - 'inadequate'
- Off-street parking only - 'adequate'
- Off-street parking - owner / occupier
- Off-street parking - rented, but not a flat / apartment
- On-street parking - a flat / apartment

Arrivals of a Given Vehicle at a Given Location Each Week

- Home
- Workplace
- Food Shopping Location
- Other Shopping Location
- Eat / Drink Location

Proportion of Parc

Based on DCLG data

Compiled using NTS data

© 2016 Energy Technologies Institute LLP - Subject to notes on page 1
A transition away from liquid fuels for passenger cars

Source: ETI analysis (input data from various sources, including ETI projects)
Consumers Vehicles and Energy Integration (CVEI) project

- Sustainability
- Security
- Affordability

- Users
- Vehicles
- Energy supply
Consumers
Fleet buyers are seen by many as the route to market for new vehicle technologies, but....... 

....although they buy around half the new cars, they sell them quickly and only own ~8% of vehicle in the UK.....

....so an attractive proposition must be created for private car buyers, to avoid prohibitive depreciation.....

....hence, the system design needs to be optimised for the whole lifecycle.....

....and this needs to take account of the ratio of GHG emissions in use vs manufacture.
Transport emissions in a whole system context

Net CO₂ Emissions

- 2010 (Historic)
- 2020
- 2030
- 2040
- 2050

ESME v4.1 Database 100sim

© 2016 Energy Technologies Institute LLP - Subject to notes on page 1