Hydrogen and Fuel Cells in the UK

Real transformation and innovation occurring across transport, power and heat that could deliver commercial benefit for all

Amanda Lyne, Managing Director, ULEMCo Ltd

UKHFCA

ULEMCo
About ULEMCo & Me

• Founded in 2014, focussed on hydrogen for commercial vehicle applications
  • Over 40 vehicles on the road today in real world duties saving tonnes of CO2
  • Delivering air quality improvement in urban environments
  • Supporting the build up of hydrogen refuelling infrastructure globally

• Previously founder of ACAL Energy (fuel cell technology company), and career in industrial chemicals, innovation and clean tech

• Chair of the UKHFCA
The UK Hydrogen and Fuel Cell Association covers:

- All fuel cell types and applications
- The full fuel cell supply chain (from research into material science through to systems integration and distribution)
- Hydrogen production and storage
- Hydrogen infrastructure
- Other issues around the delivery, storage and use of associated fuels

The Association acts on behalf of its members to accelerate the commercialisation of fuel cell and hydrogen energy solutions.
The UK has recognised the pressure to mitigate Climate Change by enshrining in law the target for Net Zero carbon emissions by 2050.
We’ve got 10-15 years maximum to transform!
Latest analysis of the UK’s current emissions (NB: Transport is now the biggest emitter)
UK has a strategic approach to Hydrogen Economy

- Aimed at improving understanding of it’s potential to meet Clean Growth goals, the timescales needed to deliver and ways that hydrogen can provide opportunity to facilitate cost-effective energy system decarbonisation
- Taking a whole system perspective, with detailed understanding of potential in each sector
- Building relationships – hydrogen industry, lead projects, key regions/clusters, international partners
- Identifying near term opportunities to unlock deployment of low carbon hydrogen in UK context, including priorities for innovation support
Three KEY strategic roles for hydrogen in the UK energy system decarbonisation

<table>
<thead>
<tr>
<th>Improved productivity of renewables</th>
<th>Seasonal energy storage &amp; Industrial Heat</th>
<th>Long range &amp; Heavy Duty Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improves the investment return for renewable electricity generation</td>
<td>• Large infrastructure with CCSU</td>
<td>• R&amp;D &amp; Innovation</td>
</tr>
<tr>
<td>• Enables energy storage, cross energy sector balancing and deeper decarbonisation</td>
<td>• Large engineering feasibility studies</td>
<td>• Deployment trials</td>
</tr>
<tr>
<td>• Supported by RTFO &amp; grid network funding</td>
<td>• Safety assessments</td>
<td>• Specific hydrogen vehicle support</td>
</tr>
<tr>
<td></td>
<td>• Blended or 100%</td>
<td>• Clean Bus Fund</td>
</tr>
<tr>
<td></td>
<td>• Supported by industry and gov’t R&amp;D and innovation</td>
<td>• Hydrogen Transport Programme</td>
</tr>
</tbody>
</table>
City wide bus deployments by London, Aberdeen and Liverpool
Innovative refuelling solutions by Fuel Cell Systems
Onsite generation and forecourt fuelling by ITM Power & Shell
Renewable energy productivity by Orkney
Emission reducing power generation in London from fuel cell CHP installations
Industrial heat through blending hydrogen with gas in the North West of England
Fuel cell application innovation by Intelligent Energy
Planes, trains, vans, refuse trucks, sweepers, ships and automobiles across the UK!
Novel approaches to Ultra low & Zero for commercial vehicles by ULEMCo
Particularly for emission urban truck applications
Soon to be at scale in Glasgow City Council

As well as R&D projects in the pipeline with fuel cell integration to provide range extension for vans

Project Rooftop - eNV200 FC Rx™ Conversion

Project ZERRO – Zero Emission Rapid Response Operational ambulance
Conclusion

• Hydrogen infrastructure in the UK is happening now
  • Localised energy system projects to improve productivity of renewables
  • By 2025-2030 in pipelines for other energy system uses
• Innovation is extensive in all applications and parts of the supply chain
• Collaboration is essential, as is strategic support from government for funding and focus