Agenda

1. Introduction to Ecuity
2. Policy landscape
3. The potential role of fuel cells
4. Discussion
Introduction to Ecuity

Focus
A dedicated team of sustainable energy market development specialists

Reputation
Our analysis is respected across Whitehall, Westminster, Brussels, devolved nations and regions as well as industry

Expertise
Experts in bringing business and government together in a way that makes energy policy and markets work

Diverse skill base
Diverse skill base including economics, research, analysis, strategy, communications and engineering
Our approach to lowcarbon technology business development

- Engage systematically key policy and industry stakeholders and capitalise on commercial opportunities
- Monitor policy and funding developments through direct insight
- Shape the policy agenda to create market drivers and touchpoints
- Explain the strategic value for UK plc. based on technoeconomic evidence
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‘The UK was one of the first countries to recognise and act on the economic and security threats of climate change. The Climate Change Act, passed in 2008, committed the UK to reducing greenhouse gas emissions by at least 80 per cent by 2050 when compared to 1990 levels.’
Decoupling carbon reduction and growth

Carbon emissions from buildings

- Residential direct CO₂
- Residential non-CO₂
- Public direct CO₂
- Public non-CO₂
- Commercial direct CO₂
- Commercial non-CO₂
- Residential share of CO₂ from grid electricity
- Commercial share of CO₂ from grid electricity
- Public share of CO₂ from grid electricity
- Other sectors

Total UK emissions were 456 MCO₂e in 2017 (with buildings 19% of total emissions).

Decarbonising different sectors of the economy

Excellent progress in reducing emissions from electricity generation masks failure in other sectors. The UK’s greenhouse gas emissions have reduced by 43% compared to 1990 levels, on the way to a target of at least an 80% reduction by 2050.

75% of emissions reductions since 2012 have come from the power sector.

Clear goals, ambitious strategy and well-designed policies have been effective. These lessons must now be applied to other sectors.
Current challenges

- Direct emissions from buildings fell in 2017 to 85MtCO2e, a 4% reduction relative to 2016. This was entirely due to higher winter temperatures.
- Home insulation rates fell further in 2017, with only 123,000 lofts or walls being insulated. Home insulation rates are at just 5% of peak market delivery in 2012.
- Around 4.5% of heating buildings is from low-carbon sources - mostly from biomass.
- There has been good progress in deployment of district heat networks, though they continue to be supplied mainly by gas. Combined Heat and Power (CHP) rather than low-carbon alternatives such as waste heat or large-scale heat pumps.
- The domestic heat pump market remains stagnant at under 1% of annual heating system sales.
The need for policy intervention to shape markets

Committee on Climate Change, Annual Communication to Parliament (2018)
Figure 3.3: CCC Indicators for buildings

- **Buildings emissions:**) To all key sectors by 2050 with options developed to allow near-zero emissions by 2050

- **Energy demand for heating and ventilation:**
  - Supply of low-carbon heat: A quarter of heat demand from low-carbon sources by 2030
  - Biomass: Around 40 TWh by 2030
  - Heat pumps: From 2020 to 2025, all new buildings, and all buildings by 2050
  - Energy efficiency: Existing buildings
    - Improved heating system efficiency and building fabric efficiency
    - Standards for new-build energy efficiency

- **Low-carbon heat networks:**
  - Framework to support low-carbon heat post-2030
  - Policies to improve heating system efficiency
  - Standards for new-build energy efficiency
  - Stable framework and direction of travel linking energy efficiency and low-carbon heating standards that tightens over time: well-funded offer to households and SMEs suited to ‘trigger point’; simple, visible information and certification; and insurable savings

Strategy for future of grid and low-carbon heat on gas and property not on heat network.
Air quality as a salient issue

Source(s): BBC News, April 2015
DEFRA analysis using interim recommendation from COMEAP working group on NOx. (Draft Plans to improve air quality in the UK Sep 2015)
The focus on road transport emissions is set to yield significant results over the next decade – through policies such as the Ultra Low Emissions Zone and investments in the bus fleet. At the same time gas combustion could increase as a proportion of future NOx emissions. Modelling shows that, based on current policies, gas combustion could overtake road transport as the largest source of NOx emissions in Central London between now and 2026, and could be responsible for just under half (48%) of total NOx emissions in Central London by 2025.‘

Policy Exchange, 2016
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Policy interplay of fuel cells

**Widespread deployment of fuel cells in the UK:**

- Is an essential component of a pathway to decarbonisation that includes hydrogen as a fuel.
- Supports the transition to a lower carbon more intermittent system through better alignment of supply and demand especially in urban centres as transport electrifies.
- Nearly eliminates emissions from pollutants such as NOx, SOx and particulates which is key in urban centres.
- Achieves higher primary energy savings than from a conventional CHP plant.
- Presents significant interplay with green gas and heat pump applications offering exceptional on site efficiencies.
The economic case for governments

Levelised cost of electricity

<table>
<thead>
<tr>
<th>Technology</th>
<th>Levelised Cost (£/MWh)</th>
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<tbody>
<tr>
<td>Biomass CHP</td>
<td>£1291</td>
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<tr>
<td>Biomass CHP (with RHI)</td>
<td>£1331</td>
</tr>
<tr>
<td>Gas CHP (159 mg/Nm³ emissions)</td>
<td>£150</td>
</tr>
<tr>
<td>Gas CHP (72 mg/Nm³ emissions)</td>
<td>£98</td>
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<tr>
<td>Year 0 - fuel cells (0 units)</td>
<td>£83</td>
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<tr>
<td>Year 4 - fuel cells (900 units)</td>
<td>£39</td>
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</tbody>
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Source(s): “Averting an Emerging Air Quality Risk – see appendix for detailed source info and assumptions
Note: Corrected to 15% oxygen level