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What is the role of oil and gas in future energy supplies?

**Presented by
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Future forecasts of world energy demands show a growth of 30% by 2035, driven by population growth of 1.5bn people. This growth in demand is driven by economic growth in China, India and in other developing countries. One of the biggest growth areas is car travel, predicted to double to 1.8bn cars. Forecasts from different sources suggest fossil fuels may still provide up to 80% of world energy supply in 2040. Others challenge those figures, suggesting the growth of renewables is continually under-estimated. Keeping pace with demand is less of an issue than that of the CO₂ associated with it. To stay on course for the Paris Agreement of 'well below 2 degrees C' requires a major reduction in fossil fuel use.

In the UK, progress on emission reduction from 1990 to 2015 has been good. Replacement of coal power generation, initially by gas and latterly increased renewables has enabled the UK to lead the G7 nations performance. Unabated coal will be phased out entirely by 2025. Future alternatives include continued growth in wind and solar power, where costs have fallen considerably. Potentially tidal or small modular nuclear reactors are alternatives, though further research is required to prove these are cost competitive. Later targets in 2028-32 are more challenged and it should be remembered that these '80% below 1990 emissions' targets were aimed at a 2 degrees C, not the more ambitious Paris target.

There has been less progress in transportation, which accounts for 24% of emissions (cars, aviation and shipping). Significant increases in electric vehicles (EVs) are expected, but forecasts vary. The UK government has said diesel and petrol cars will be phased out by 2040. Various car manufacturers plan to offer only hybrids much earlier than this and ING predicts Europe's 290 million car fleet could be 'all-electric by 2035'. The National Grid has scenarios which vary from 30% EVs to 100% in 2050, with potentially 18GW of additional power needed. This is 30% additional power, on top of today's peak demand - how will this be generated? BP's Energy Outlook however, suggests a more modest rise from ~2.5 million EVs worldwide in 2016 to 100 million by 2035, still less than 10% of a much larger car fleet. It's clear that the introduction of EVs will be slower in markets with less infrastructure and increased efficiency of conventional engines will be key there.

Does this affect UK offshore oil and gas production? In 2015 only 45% of the UK's gas came from offshore and its natural decline through the 2030s probably fits well with the expected move from fossil fuels. The ideal scenario of using existing infrastructure for carbon capture and storage (CCS) however, seems challenged. The government plans to meet the 2050 targets do include however, some greenhouse gas removal technologies or 'negative emissions', which are yet to be developed.

As geologists we are well accustomed to thinking about ranges, we are used to dealing with uncertainty. The talk, from a 'non-expert' in much of this subject will consider – from this array of predictions, what do we need to believe to accept either high or low scenarios and what are the indicators we may see along the way?

Tuesday 20th February 2018 Networking from 17:30hrs, Start at 18:00hrs

**Durham University, School of Engineering and Computing Sciences
Room CLC406, Derman Christopherson room, Calman Learning Centre, Stockton Road,
Durham, DH1 3LE**

Visitors should park in the Durham University Science Campus Engineering Car Park. Access is from Stockton Road. The lecture will be held in the Calman Learning Centre.

Registration is not required. However, we would appreciate confirmation if you plan to attend to ensure adequate refreshments and seating are provided.

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