**THE ALL PARTY PARLIAMENTARY ENGINEERING GROUP**

ENERGY UPDATE - a progress report on wind, nuclear and fracturing

Report of the lunch meeting held on Monday 9th December at the Cholmondeley Room, House of Lords

**Chairman**

Professor the Lord Broers

**Speaker**

Professor Robert Mair. Professor of Geotechnical Engineering at Cambridge University

William Heller, Chief Executive of Falck Renewables Ltd.

Adrian Bull, Director of External Relations at the National Nuclear Laboratory

Introduction

Lord Broers introduced and thanked the speakers .He then thanked and welcomed all of the guests to the event.

Professor Robert Mair

Professor Mair began by explaining that there are lots of myths about fracking, which mainly originate from the media. He then stated that he had chaired a committee into fracking last year. He explained how fracking works and why directional drilling is required to *"encourage"* the gas to flow from the rocks.

Professor Mair then said that, despite fears, earthquakes are very unlikely and that earth tremors are more likely. These would measure 3 on the Richter scale, which is the same level as a heavy lorry on a road. Coal mining, he said, had caused far more significant earthquakes than fracking. He then said that fracking will also not affect groundwater because the fractures only go a few hundred metres so don't reach that high.

He then explained that fracking is a very current and emotional issue and that the key is to ensure there is robust regulation and monitoring as in the US some wells were built poorly. He also stated that in the future fracking technology will improve, and there is a possibility of using saline water instead of fresh water in the future.

William Heller

Mr Heller began by stating that *"wind is a viable, long-term option for electricity"*

He then said that the UK has *"some of the best wind"* and that better blade technology means that wind turbines are capturing more energy. He also said that new technology

means that turbine blades have been extended and that doubling the length means 4 times more power generation.

Mr Heller then discussed how engineers needed to *"engineer out"* some challenges in the industry, such as the costs of off-shore wind turbines, which cost over twice as much as on-shore. He said that recent technological advances have led to a 56% increase in efficiency in turbines in the last 4 years alone.

He then said that there will be a 400% growth in wind power up to 2020, 20% of which could come from the UK, and that the UK should innovate and export. He finished by saying that wind cannot be expected to cover all of our needs but can be a major contributor in the future.

Adrian Bull

Mr Bull began by stating that the key benefits of nuclear power are a low carbon footprint, reliability on a large scale and affordable and stable pricing. He also said that in the past 40 years nuclear technologies have advanced.

He then cited the day's energy mix figures, highlighting that gas was 34%, coal was 37% and nuclear 17%, before emphasising the need for a balanced mix of energy supplies and that the main aim is to cut carbon drastically, which requires a move away from coal.

Mr Bull then explained that in the UK we now have the capacity to handle the full nuclear cycle; research and development, power creation, and handling nuclear waste. He said that the Hinkley Point C power station is hopefully the first of many and that he was expecting positive announcements from the Government on nuclear research and development soon.

He closed by saying that the UK needs to start thinking about power needs at the end of this century and to look at new, advanced nuclear stations., before reflecting that as the rest of the world is waking up to the importance of nuclear power, the UK can play a *"massive role in the world market"*.

Questions and Answers

**Lord Jenkin of Roding** asked whether wind could be competitive and require no public subsidies by 2020.

**William Heller** replied that two thirds of the costs of offshore wind power are related to civil engineering. Once these engineering problems have been solved, he said, there is no reason why it can't be competitive.

**Jerry Tsikata (Vodafone)** asked what an ideal energy mix would look like for the UK.

**Adrian Bull** said that there is no clear answer and that in the future the electricity sector may include other needs, such as new transport systems. He said that different energy supplies

have different characteristics, with some more flexible than others, so it is important not to *"put all our eggs in one basket"*.

**Dr Helene Meese (IMechE)** asked how we can deal with a lack of engineers in the energy sector.

**Professor Robert Mair** said that we need more engineers across the board, not just in energy. He said that young people's interest I science is being *"untapped"* and that it is important to change the perceptions of parents, teachers and students that *"engineering is a job for boys"*.

**Alistair Evans (Nuclear Industry Association)** asked what can be done about increasing the power capacity threshold

**Adrian Bull** said that it is just being *"managed"* at the moment and that hopefully new investment announcements from the government will change this. He said that in a really cold winter we could well see some users going without power for periods of time - but these would most likely be large industrial consumers rather than domestic users

**Tom Bennett (Vodafone)** asked whether fracking can pollute fresh water supplies

**Professor Robert Mair** said that at the moment fracking requires large quantities of water, although other industrial processes are worse. He said that this is a potential limitation as it requires fresh water, but that there are pending technological advancements in using salt water.

**Chi Onwurah MP** questioned whether if coal mining was starting now, would it be as controversial as fracking?

**Professor Robert Mair** agreed that it would, although he said mining would now be much safer than before.

**Rob Sharpley (Nestlé)** asked whether we need to develop better storage technology to close the energy gap.

**William Heller** said that at the moment this is not economically viable in relation to wind energy, but that responsive gas plants are a more viable option.

**Lord O'Neill of Clackmannan** made a comment, saying that there is soon to be an increasing demand for nuclear engineers because of the work involved in decommissioning old nuclear stations, so it is the best path for young engineers.

**Lord Rooker** asked why we don't have more small and medium nuclear power stations, instead of large ones.

**Adrian Bull** explained that economies of scale and the need to compete with low wholesale gas prices led to the development of large stations. He said that *"small modular reactors"* are now a viable option, which could allow less developed countries access to nuclear power. He said engineers are now working on how you can *"ship"* power plants, rather than creating reactors on site.

**Lord Davies of Oldham** asked why Germany has turned away from nuclear power.

**Adrian Bull** said that the Fukushima disaster, combined with political pressure at home has led to the German decision, which has caused both carbon and prices to go up. He said that Germany also has different energy needs to the UK as, being an island nation; we cannot readily buy energy from our neighbours, so we require greater energy security.

**Salma Begum (IMechE)** asked what measures have been introduced to reduce energy use in the construction and running of power stations.

**William Heller** replied that the eco-payback of a single wind turbine is between 90 and 160 days.

**Adrian Bull** said that as well as reprocessing fuel, they monitor energy use at all sites and have implemented energy reduction programmes.

**Professor David Cope (Cambridge University)** suggested that *"no country is an energy island"* and asked what opportunities there were for the UK to export our engineering skills.

**William Heller** said explained that wind is an international market and the UK should seek to dominate the design and logistics of the industry.

**Katherine Faulkner (Young Engineers)** asked how sustainable current energy generation methods are.

**Professor Robert Mair** said that carbon capture technology provides interesting opportunities for the future in this area.

**William Heller** said that we are still in the early stages of wind technology as well as wave and tidal.

**Lord Broers** said that this is a good question because at the moment we will use up all of the world's fossil fuels in a very short spell of human existence.

**Jake Tudge (IMechE)** asked whether enough is done to involve the public sufficiently in energy debates and energy saving.

**Professor Robert Mair** said that with shale gas exploration, this has only just started. He said that engaging the public is both crucial and a huger challenge.

**Leah White (Cleeve School)** asked what future there is for coal mining in the UK.

**Professor Robert Mair** said that the "*short answer is not very much",* adding that America uses none, because they now use shale gas.

**William Heller** said that there is no future for coal unless there are significant advances in carbon capture technology.

Vote of thanks

Lord Broers thanked all of the speakers for the discussion and the ensuing question and answer session.

He then thanked all of the guests and commented on the satisfaction he felt seeing so many enthusiastic young engineers.