The All-Party Parliamentary Group for

Engineering

09 May 2023

**Offshore Wind**

*Discussion over lunch in the House of Lords*

**Chair** – Professor the Lord Mair CBE

**Speakers**:

* Bridgit Hartland-Johnson, Chief Specialist, Project Development System Integration, Ørsted
* Ulas Cilingir, Lead Geotechnical Engineer, Ørsted
* Simone Schmieder, Lead Engineer, Wood Thilsted

Lord Mair began the meeting by thanking everyone for attending and introduced the first of the distinguished speakers, Bridgit Hartland-Johnson, Systems Integration Innovation Manager at Ørsted.

**Bridgit Hartland-Johnson**

Bridgit Hartland-Johnson is a Project Development System Integration Chief Specialist at Ørsted. She is responsible for investigating technology solutions that can create business case value as well as support interactions with the National Grid. She is an electrical engineer by background and has worked for Schneider Electric, Alstom and Siemens. Bridgit has also worked in France, Germany and India, where she ran her own consultancy to deliver smart grid solutions to governments and regulators.

Bridgit began by noting that she works in a team that delivers offshore wind farms. She then explained the British Government’s Net Zero Strategy and Ten Point Plan for a Green Industrial Revolution,. adding that one of these ten points includes producing 40 gigawatts of offshore wind by 2030 and mentioned that the UK is currently producing around 10. Bridgit continued that this ambition was stretched in 2022 with the British Energy Security Strategy, which set a new target of 50 gigawatts of offshore wind by 2030.

She continued by pointing out that offshore wind is now the cheapest new build power generation in the UK and mentioned that one rotation of a typical wind turbine can power a house for two days. This ensures that offshore wind is key to achieving net zero. However, Bridgit stated that workers are needed to ensure offshore wind can expand. Around 70,000 workers are needed to meet these ambitions and the current workforce is around 26,000. She added that it was her job to try and motivate attendees to think about working in offshore wind.

Bridgit explained that she had recently been promoted and is now a Chief Specialist and told students that she loves her job. She did however point out that she was from a very normal background having been state educated whilst not attending university. She always wanted to be an engineer and noted that many members of her immediate family had been engineers of some form. She added that her lack of a degree has not held her back and she wishes in hindsight that she hadn’t worried about it so much.

She continued by stating that her job involves managing mini-projects which includes investigating technical and commercial feasibility, whether the regulatory frameworks are right whilst looking at technologies like energy storage and the creation of offshore energy hubs. Bridgit concluded by encouraging students to dream big and to believe that they can do anything they wish and noted that the offshore wind industry can offer something to everybody.

**Ulas Cilingir**

Ulas Clingir is a Lead Geotechnical Engineer at Ørsted. He leads a team that uses advanced numerical simulations to predict the behaviour of wind turbine foundations under different loading conditions. His work helps to mitigate site related risks during the design phases of renewable energy projects. He has a PhD in engineering from Cambridge and has extensive experience in seismic and offshore geotechnics. Ulas also worked on some big infrastructure projects before he got into offshore wind, including on the world’s longest single span suspension bridge in Turkey.

Ulas explained that he wanted to focus on his own background and how he got into offshore wind in the first place. As a child, he was always interested the sciences and maths but was inspired to become an engineer following a catastrophic 1999 earthquake in Turkey. He wanted to make a difference so became an earthquake engineer. Ulas completed his Master’s in earthquake geotechnical engineering before being accepted for a research position at Cambridge. He subsequently did his PhD on the seismic response of tunnels.

He explained that, after completing his education, he worked as design engineer in Turkey before joining a multinational company in London as a seismic expert where he was exposed to a variety of interesting projects. Ulas added that, more recently, he has been applying his skills to offshore wind projects which has led him to Orsted. Here, Ulas works on advanced numerical simulations and models for large wind turbines. He added that he really enjoys working in the offshore wind industry as it’s very diverse

**Simone Schmieder**

Simone Schmieder is a Lead Engineer at Wood Thilsted, a consulting firm that specialises in offshore wind. She is a geotechnical engineer with a lot of experience in offshore wind foundation design. She has been leading the delivery of key geotechnical scopes for several offshore wind farms across the globe. Her strengths lie in connecting the dots between site investigation, data interpretation and the geotechnical design and installation, providing advice about the whole life cycle of the foundation of wind farms. Simone has a Master’s in civil engineering from ETH in Zurich.

Simone thanked attendees for coming. She explained that at school she had no idea what she wanted to do., continuing that her parents were not engineers. Simone explained that she found out about civil engineering through a university open day which appealed to her desire to build things.

Simone then explained the importance of offshore wind, noting how it makes sense for the UK. She noted how there is more space offshore for turbines, as they can be built in the hundreds and on a much bigger scale than those on-land. Simone continued that offshore wind appealed to her because of how new it was, with much of the innovation surrounding the industry still being explored.

She added that she is a geotechnical engineer and helps energy companies to build offshore wind farms. This entails checking geological surveys and maps to see what the seabed conditions are and whether they are suitable for an offshore wind farm.

Simone concluded by telling students that engineering is an amazing industry and is perfect for people who are curious about how things work. She noted that communication and teamwork are vital to the success of big engineering projects and people with these skills are needed in the industry just as much as stereotypical engineers that are experts in maths and physics. Another important skill is creativity as out-of-the-box thinkers are always required, as are fresh ideas.

**Q1 – Jerry Brown (Tewkesbury School)**

Question: Is it true that renewables will never exceed 40% of our actual energy needs in the UK, or can this figure be exceeded?

Answer: Bridgit Hartland-Johnson: Yes,100%. Renewables often do exceed this figure for periods during the winter. The problem is that renewables produce energy at inconsistent rates, so we need to invest in new technologies like energy storage in order to better manage and utilise this energy

**Q2 – Dr David Boyce (Uppingham School)**

Question: Most offshore wind farms are in shallow water. What is the feasibility of placing wind farms in deeper water and will this ever be required?

Answer: Simone Schmieder: There is lots of space left in shallow water. However, there will be moments in the future when there will be a need to explore deeper water due to just how much fossil fuels need to be replaced. This requires a floating offshore wind farm, where the foundation is chained to the seabed. This is similar to the technology used for deep sea oil rigs. This does, however, cost more money than shallower water wind farms.

Ulas Cilingir: The chains that Simone mentioned are massive and the world does not currently have the capacity to produce these. Similarly there just aren’t enough ports and vessels. Consequently there are a lot of challenges involved.

**Q3 – Ian Gilbert (Worshipful Company of Scientific Instrument Makers)**

Question: How much of the manufacturing of wind turbines is done in the UK?

Answer: Bridgit Hartland-Johnson: Near to 100% of the blades at least are built in the UK. This is because they are so difficult to transport and have to be built locally.

**Q4 – Gregor Woolgrove (Uppingham School)**

Question: Should offshore wind turbines replace onshore turbines, or should there be a combined system?

Answer: Bridgit Hartland-Johnson: We need a bit of everything as they each provide different production profiles. They are complementary and we need both alongside different energy sources such as solar.

**Q5 – Louis Nuttall (Sheffield Park Academy)**

Question: How damaging is the construction of turbines to offshore natural environments?

Answer: Bridgit Hartland-Johnson: Offshore wind projects require approval from the Government. Subsequently there is a very intense process that needs to be completed in order to get this approval. For example, projects must prove they aren’t in the way of bird migration paths. A lot of work is done in this regard.

Simone Schmieder: Offshore wind farms are very noisy to install for underwater mammals. Subsequently, engineers create bubble tunnels around construction work to absorb sound waves. These projects mustn’t damage the environment.

**Q6 – Dominic Cox (Marlborough College)**

Question: What are the economics of offshore wind compared to other sources of energy?

Answer: Bridgit Hartland-Johnson: New build offshore wind farms are cheaper to build per unit of electricity created than any other source of power generation. The difficulty is raising the money to build the farms in the first place as solar farms for example are much cheaper to build initially.

**Q7 – Mina Tomacelli Filomarino (Marlborough College)**

Question: What has been your biggest setback so far?

Answer: Ulas Cilingir: Finding the right people and human resourcing. The industry desperately needs engineers.

Bridgit Hartland-Johnson: One of the biggest challenges is integrating power generation that relies on the weather. Connecting this to the grid is very difficult as the National Grid was made for a different type of power.

Simone Schmieder: There are many countries where it is difficult to prove the effectiveness of offshore wind. We rely on politicians to push forward the argument and this brings difficulties when there is a change of Government for example.

**Q8 - Iskandar Ergashev (Uppingham School)**

Question: Simone, what can be improved in the installation of wind turbines?

Answer: Simone Schmieder: One problem is that we often know very little about the geology that we are building in. This requires a lot of testing and exploration.

Ulas Cilingir : Geotechnical work is inherently risky and is full of uncertainties. We do our best and use the best available tools but, even so, there are still a lot of risks and challenges.

**Q9 – Matt Gow (Marlborough College)**

Question: Wind turbines are very ugly. Are there any plans to improve the optics of them?

Answer: Bridgit Hartland-Johnson: I actually think they are quite pretty.

Ulas Cilingir : I don’t know of any such initiatives.

Simone Schmieder: The majority of new projects are being built so far offshore that you don’t really see them.

**Q10 – Professor Barbara Shollock (King’s College London Engineering)**

Question: Are wind farms designed to have a second life?

Answer: Ulas Cilingir: At every stage of the development process we have to think about ‘what happens next’.

Simone Schmieder: We have to think about what materials we are using and can these be reused and recycled. We also have to factor in how the life cycles of materials and parts can be extended to their absolute limit. This is something that is ever present in the design process.

**Q11 - Rachel Hayden (ICE)**

Question: What have you seen in global markets that should be imported to the British offshore wind industry?

Answer: Ulas Cilingir: Orsted is a Danish company that works in a global function. I personally work on projects in the US and Taiwan and we use the same practices worldwide.

Simone Schmieder: The beauty of engineering is that it doesn’t see borders. New ideas can travel around the world. For example my company has been inspired by the work life balance ethos of Scandinavian companies.

**Q12 – Rui Du (King’s College London Engineering)**

Question: What is the biggest challenge in combining wind and tidal power?

Answer: Bridgit Hartland-Johnson: We don’t have any tidal projects on the go currently, but it is under discussion. It is something we are thinking about but it would have to be very location-specific due to the sheer amount of stakeholders it would impact, such as fishermen.

**Q13 – Humphrey Braxton (Marlborough College)**

Question: Bridgit, how did not attending university affect the beginning of your career?

Answer: Bridgit Hartland-Johnson: I used to have a lot of angst about this when I was younger. However, this allowed me to have a form of apprenticeship that supported me to work whilst also going to college. I think this created some value over time as I ended up getting experience whilst also learning.

**Q14 - Edwin Prapaisal (Uppingham School)**

Question: Can wind turbines be minimised and used on a household scale?

Answer: Simone Schmieder: This would be quite impractical as they would be so close to your home. In theory this could work, however this is not where the solution lies long term. Wind farms wouldn’t be as efficient in an urban environment.

**Q15 – Dave Doogan MP**

Question: I am an aircraft engineer. How much of the efficiency gain in modern turbines is down to aeronautics on the blades of these turbines?

Answer: Bridgit Hartland-Johnson: The Crown Estate do a report every year about the efficiency of offshore wind farms. These show that primitive turbines had load factors of around 20-30%. Now we are expecting projects to have load factors of around 60%. The blades contribute a lot to this efficiency gain.

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Professor the Lord Mair closed discussions by thanking our distinguished speakers, our guests for their excellent questions, and the event organisers.