Powering the future

If net zero targets are to be met and sustained over the long-term, offshore wind in the UK and Europe must continue to expand. Hitachi Energy is one company that is contributing to this expansion, focusing on technological innovations, infrastructure improvements, and strategic collaborations that are driving the renewable energy transition. PES wanted to hear from Laura Fleming, Country Managing Director for the UK & Ireland, and Alfredo Parres, Head of Renewables, about how the business is leveraging its expertize to support a sustainable energy future.

PES: Thanks for your time today, Laura and Alfredo. Perhaps a good place to begin would be to ask how Hitachi Energy is contributing to the development and expansion of offshore wind projects in the UK?

Laura Fleming: Hitachi Energy's purpose is 'advancing a sustainable future for all'. Together with customers and partners, we are committed to scaling up the European energy system to meet net zero targets. We continuously enable the integration of wind into more sustainable, flexible, and secure power systems.

In the UK, we employ over 600 people working across critical infrastructure

projects. With a key role in the UK's energy transition, we are collaborating with our customers, partners and government to deliver key infrastructure to connect renewables projects into the UK's electricity grid. Hitachi Energy's technology will be critical to the UK achieving a fully decarbonized electricity system by 2035.

As an example, our industry leading high-voltage direct current (HVDC) technology enables Dogger Bank Wind Farm to power six million homes, supporting the UK's renewable electricity demand. We supply onshore HVDC converter stations in Scotland, including six HVDC 'power corridors' that, in the future, will enable large amounts of renewable energy to be transmitted from northern Scotland to areas in the south.[1]

We are also part of several key HVDC projects in the UK, such as the Caithness Moray and Shetland, and Hornsea links that will enable the transmission of renewable power to the mainland grid, increasing reliability. Hitachi Energy's HVDC technology also supports Scottish and Southern Electricity Networks Transmission (SSEN) to connect the Shetlands Islands to the Scottish mainland. The Shetland link was the first multiterminal HVDC system in Europe using voltage-source converter technology, pioneered by Hitachi Energy.[2]

PES: What about your work in the wind industry in Europe?

Alfredo Parres: In addition to our UK operations, we have a global footprint which enables us to deliver our customers' needs, employing over 45,000 people, with over half of this talent based in Europe. Since 2020, we have invested over $3 billion in manufacturing, engineering and R&D and have hired more than 8,000 people to meet the growing demand for electrification. Globally, we have enabled over 150 GW in HVDC links to be integrated into the power system, enough to meet the power demand for the whole of Japan.

From frame agreements with Orsted and Equinor, working on the link between Norway and Germany, the interconnection between France and Spain, and combined grid solutions between Denmark and Germany, Hitachi Energy is providing critical equipment for Europe's wind industry. Similarly, our recent framework agreement with TenneT is worth around 13 billion Euros and means we will supply several HVDC converter stations and critical infrastructure to accelerate and integrate renewables into European power grids, and we recently agreed a landmark deal with RTE to provide offshore wind connections in France.

Hitachi Energy is also enabling offshore wind in Poland and supporting early developments in Sweden and Norway, while developing the new technologies that will enable floating offshore wind. Similarly, onshore wind as a market leader delivering power transformers in Spain to connect onshore wind farms to the grid, as well as connecting the largest onshore wind farms in Sweden and Finland.

In Sweden, we plan to hire thousands of additional workers over the next few years and expand our operations in various locations throughout the country.[3]

Similarly, we recently announced investments that will provide critical energy infrastructure and technology globally including an investment of 30 million Euros in the expansion and modernization of the power transformer factory in Bad Honnef. We are also making a $1.5 billion investment in scaling up global transformer production that includes a $170 million investment in a new factory in Finland to produce transformers.

PES: Robust grid infrastructure is crucial for the successful growth of offshore wind energy, isn't it?

LF: Yes. The UK is a global leader in offshore wind, but the growth of offshore wind must happen in tandem with the expansion and improvement of the electric grid. Each clean GW that we add to the energy system needs to be balanced with an increase in grid capacity and flexibility to meet security, reliability, and resilience. We need a grid twice the size of the current UK grid, one which is digitalized and flexible to cope with a more complex energy system.

Hitachi Energy is a critical part of the energy supply chain, providing technology, equipment and software for the transmission and distribution grids. The technology exists for a grid fit-for-the-future. The focus must now shift to delivery.

In the UK market, a major priority for us is to support our customers in their objectives to deliver over 50 major grid projects that have now been defined in two holistic network design plans and to deliver them quickly to minimize delays in enabling renewable electricity to flow into the grid.

PES: Talk us through some of the technological innovations Hitachi Energy is implementing to enhance grid connectivity for offshore wind farms?

AP: Together with customers and partners, we are working to scale up the European energy system to meet net zero targets.

Alfredo Parres

Laura Fleming

We are smartening the grid through digital technologies that increase the capacity of the current grid and make it more reliable with technology that supports balancing the grid with more variable renewable power integration.

LF: Digitalisation is a key enabler to integrate renewables into the energy system at speed. We have a range of digital solutions in our portfolio that will help manage the increasing complexity of the energy system.

We are championing the urgency and the pace of change needed to achieve net zero. We are deploying solutions and technologies that are needed to help make the world's energy system more sustainable flexible and secure.

EconiQ™ high-voltage portfolio replaces SF6 gas with eco-efficient gas mixtures, taking much needed steps to carbon neutral. This is used in Scotland where Scottish Energy Networks is set to upgrade its gas-insulated switchgear substation with our innovative EconiQ technology helping them to reach Net-Zero targets.

AP: HVDC Light® is a voltage source converter technology developed by Hitachi Energy, which was launched over 25 years ago. It is the preferred technology for many grid applications, including interconnecting countries, integrating renewables and 'power-from-shore' connections to offshore production facilities.

This technology is used for the Nordlink interconnector, which links the power grids in Norway and Germany, enabling the integration and exchange of renewable wind, solar, and hydro power between the two countries. Surplus wind and solar power produced in Germany can now be transmitted to Norway, increasing energy security for both countries.

OceaniQ, our innovative portfolio of transformers and services designed for the offshore industry and floating offshore wind. This enables larger volumes of energy to be efficiently harvested and integrated into the energy system.

Lumada, asset performance management software solution, which empowers engineers to take strategic approaches to assets by providing insights and recommendations for maintenance of critical infrastructure.

LF: Static compensators (STATCOM) support the stability of the grid by providing variable reactive power in response to variations in voltage. Installing a STATCOM at one or more points in the grid will increase power transfer capability by enhancing the voltage stability and maintaining a smooth voltage profile under different network conditions.

PES: Are there any technology challenges that need to be addressed?

LF: The wind industry is still relatively new. The technological advances have been fast, but the technologies needed to bring us to 2030 already exist. As wind farm developers move further offshore and use bigger turbines, the challenges in ensuring a reliable, secure, and sustainable energy system are well documented. We now need a continuous effort to plan infrastructure in lockstep with new power generation, to meet soaring global electricity demand that will double in some sectors by 2026.[4]

AP: There is the need for flexibility in the future energy system, technologies to enable a more flexible grid such as static compensators (STATCOM) and battery energy storage systems (BESS) need to be more widely adopted to provide reliable power.

Long term storage options and technology need further development to plug the gap in those extreme cases when the system is unbalanced. Some solutions are proven but others, like hydrogen to power, are still in early stages.

Along with the need for further digitalization and automation to provide better knowledge of the distribution network's live capacity and ability to flex its demand, allowing for better interaction between transmission and distribution. Accelerating permitting and introducing new business models are also essential to accelerate the energy transition to allow each actor along the supply chain to focus on what they do best.

PES: Are there any other issues that need to be tackled?

LF: Achieving net zero as well as transforming the energy system and transport targets along the way will require a holistic government approach to ensure targets and policy are turned into reality in the quickest possible timeframe. Governments from across the world play a critical role in setting clear pathways so businesses can invest in a country's net zero futures with maximum confidence.

The energy transition and its components transcend politics and should be treated as such. The COP28 agreement clearly shows the direction of travel toward renewables and it's now important that leaders look at enabling this shift, upgrading the electricity grid is a critical component.

PES: So good supply chains are essential, wouldn't you agree?

AP: We are in a global race for equipment and skills along the supply chain. In Europe and the UK there is a need to prioritize unblocking supply chain bottlenecks. Earlier this year, we signed up to the 'Wind Energy Initiative' with Engie, Siemens Gamesa, Statkraft, Wind Europe, and EcoVadis which aims to accelerate the adoption of sustainable practices by fostering strong collaboration with trading partners.

As part of the commitment, we agreed to enhance supply chain transparency and elevate performance standards of the wind industry when it comes to Environment, Social, and Governance (ESG) topics.

LF: In the UK specifically, it is vital that we work hard to attract project investors and supply chain companies to attract the support needed to meet climate targets. The supply chain needs to scale much faster. At Hitachi Energy our global footprint gives us an advantage to provide for our partners. We decided to invest 1.4 BUSD in expanding the production of transformers globally which includes a new factory in Finland.

We also need to think more long term with regard to the supply chain, and in using

our learnings from projects strategically; moving away from a transactional to a programmatic approach. This way we can use knowledge transfer and learning to bring about innovation.

AP: Two notable initiatives are the European Wind Power Package and the EU Grid Action Plan.

The European Wind Power Package is certainly promising. But to deliver 420 GW of wind energy by 2030, Europe needs to strengthen both its supply chain and electricity grid.

The EU Grid Action Plan is a step in the right direction and looks to consider anticipatory investments and planning of European grids in coordination with new energy generation. This integrated approach is important. The Grid Action Plan also covers some aspects of the supply chain bottlenecks. This topic requires primary attention from policy makers.

LF: In the UK, the Transmission Action Plan includes actions to support the supply chain, including standardization. Similarly, the Holistic Network Design and its Follow up Exercise set out needed strategic investment. More standardized solutions across European operators will reduce design and manufacturing times, allowing projects to be delivered faster.

PES: The skills gap needs bridging in order to reach those net zero targets though, doesn't it?

AP: There is a huge rising demand for skilled workers to contribute to the energy transition. We need to train, recruit, and upskill a diverse range of employees all along the supply, delivery and execution chain. From digital skills to manufacturing and installation, we need to grasp the enormous job opportunities to deliver lasting prosperity for Europe and create the next generation of workers.

At Hitachi Energy, since 2020, we have hired over 8,000 new people globally and will continue to grow. This new talent needs to come from a diverse background, from different sectors with transferable skills like oil and gas, as well a diverse range of thinking in order to continue to accelerate the energy transition through collaboration.

PES: Of course, there's a need to look even further down the road to ensure long-term certainty. What part are you playing in this?

LF: The UK has ambitious grid targets and a long-term network plan which gives an indication on the size of the project pipeline. We now need to increase confidence that the targets will be met and turn the pipeline of projects into commitments.

This can be done through new business models and long-term framework agreements such as the one with TenneT with whom we have signed long-term agreements to secure resources to build grid connections for North Sea wind farms. The UK could emulate this approach.

PES: Is there a case for streamlining planning and permit applications to speed up the process?

AP: Streamlining the process is essential to bringing these projects online faster. That means better grid planning, streamlining the procurement process while also reinforcing the incentive regime that will increase community support for new energy infrastructure. Digitalising the process would also help move things faster.

Permitting remains a bottleneck to the expansion of wind energy in Europe, but things are improving. Last year, Europe approved considerably more permits for new onshore wind farms than in previous years in part thanks to new rules on renewables permitting.

Germany permitted 7.5 GW of wind energy, an increase of 70% from the previous year, while Spain granted permits for over 3 GW in 2023, which is another 70% increase compared to the year before.

In France, there was an increase of over 10% in permits granted and, in the UK, there was a 10% rise in onshore projects. Greece and Belgium also increased their number of permits.[5]

PES: It all certainly looks to be headed in the right direction. Thanks very much to you both for sharing your insights with us today.

www.hitachienergy.com/uk-ie/en

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