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Exploring the Wind Beneath the Waves: A Visit to Rampion Offshore Wind Farm
Brighton Marina, 11 July 2025

On a hot, cloudless summer day, twelve of us gathered at Brighton Marina, buzzing with anticipation for a trip that promised sea air, engineering insight, and a deep dive into one of the UK's major renewable energy landmarks — the Rampion Offshore Wind Farm. The marina was still waking up, the scent of salt and diesel mingling in the air as our boat nudged away from the dock, heading straight into the English Channel.

As the boat picked up speed, Brighton's shoreline shrank behind us, replaced by nothing but rolling sea and sky. The water sparkled under the sun, the breeze fresh on our faces. Before long, tiny specks on the horizon grew into towering white figures — 116 wind turbines, each over 140 metres tall, standing like futuristic giants rooted in the seabed.

Up close, the scale of the turbines was staggering. Their lower sections were painted yellow for visibility, while the upper towers shimmered a pale grey. We were surprised by the touch of colour — and by the red warning lights that adorned the blades. We learned these lights flash in Morse code, spelling out the letter "W" (for "wind"). It's something I'll be looking for the next time I spot a wind farm at night!

From the shore, the turbines appear to sit in neat rows, but our guide explained this is an illusion. They're actually laid out in a wide arc, carefully calculated so that the maximum number are always facing the prevailing south-westerly wind. The spacing is also optimised to avoid turbulence between them — too close, and their efficiency drops; too far, and you waste valuable seabed.

The commentary continued as we cruised through the site. The turbines are all fixed to the seabed using monopile foundations, driven deep into the marine geology. We learned the seabed here is relatively shallow, which made construction possible — but not without challenges. Beneath the waves, the geology changes dramatically across the site. The western section of the wind farm is underlain by Quaternary gravels, Upper Cretaceous Chalk, and layers of weathered chalk. In contrast, the eastern section features Holocene palaeochannels — ancient, buried riverbeds made of soft, silty sediments.

These palaeochannels are one of several geological hazards, along with seabed scour, hard flint layers, and even large boulders left behind by ancient glacial activity. Geoscientists carried out detailed seabed surveys before construction to map these hazards and guide safe turbine placement. It was fascinating to see the cross-over of geoscience skills from planning hydrocarbon production platforms to wind farm design and location.

We passed the offshore substation, located in 20 m of water, which plays a vital role in the wind farm's operation. Electricity generated by the turbines flows here first, where transformers increase the voltage so that it can be transmitted efficiently to shore via thick seabed cables.

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These cables aren't buried with machines; instead, huge granite blocks are dropped from above to pin them safely to the seabed. We saw where they eventually make landfall at Brooklands Pleasure Park in Lancing — a location chosen to minimise environmental and public disruption.

As we cruised between the towers, we noticed a protection vessel gently patrolling the area, ensuring safety and monitoring activity. Recreational boats are allowed to pass through the site — you can even fish or dive — but trawling is banned to protect infrastructure. Overhead, the quiet whoosh of turbine blades contrasted with the soft growl of our boat's engine. Despite the technology around us, there was a strange peace out there — just sky, sea, and slow, sweeping motion.

We even caught sight of a technician at work, suspended by a harness near the blades — a tiny human figure against the backdrop of a massive turbine. Each turbine is serviced once a year, with three technicians working for three days, checking everything from blades and gearboxes down to the foundation structure. Crews are dropped off in the morning and collected in the evening. The boats have rubber bumpers to hold position against the turbine base while workers clip in and climb aboard. Inside the towers, there are supplies in case someone gets stuck — but no toilets!

After a couple of hours at sea, we returned to Brighton for a well-earned lunch and some free time. Some of us wandered through the city's buzzing streets and markets, while a few headed straight for the beach to cool off with a swim. The contrast between the high-tech marine structures and the relaxed vibe of Brighton's seaside was striking — two worlds only a few miles apart.

The final part of our day was an exclusive visit to the Rampion Visitor Centre, located on the seafront beside the i360 tower. It's a brilliantly curated space, full of interactive exhibits, models, and displays that explain everything from wind turbine engineering to energy production and climate change. We even got to hold a section of copper-cored cable, used to carry electricity from turbine to shore. It looked ordinary but was surprisingly heavy — a real reminder of the power being transferred beneath the waves.

We learned that Rampion generates up to 1,400 GWh (1.4 terawatt-hours) of electricity per year — enough to power around 350,000 homes. To put that in perspective, East Sussex has approximately 250,000 to 270,000 households, so the wind farm can meet the electricity needs of all the homes in the county. Even more impressively, it helps to offset around 600,000 tonnes of CO_2 emissions annually — the equivalent of taking 250,000 cars off the road.

The Visitor Centre also gave us insight into the careful planning that went into the site. Rampion had to avoid major shipping lanes (the Channel is the busiest in Europe), as well as areas used by the aggregates industry, and regions of archaeological importance, including old shipwrecks. There's even an underwater cliff face 12 miles offshore — a remnant from when sea levels were much lower and the coast extended further out.

READ THE FULL ARTICLE IN THE UPCOMING GESGB JULY MAGAZINE!