

# **Progress in commercialising** airborne wind energy (AWE) and its potential for Ireland

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Co-funded by the European Union

**North-West Europe** 

**DEM-AWE** 

#### **ABOUT US**







#### **OUR SERVICES**







#### **KITES HAVE ALWAYS BEEN IN OUR LIVES**





#### FROM FISHING GEAR TO AWE-INSPIRING GREEN TECHNOLOGY



## **ABOUT AIRBORNE WIND ENERGY (AWE)**

15.0



- We need a broad variety of renewable energy technologies to acheive net-zero
- Airborne wind captures wind energy at 300m heights and higher
- Wind is more powerful and steady at higher altitudes
- The difference between 100m and 500m is 25% higher wind speed, translating into higher capacity factor
- AWE taps into a previously unexplored energy resource that can be combined with other renewable energy technologies



Source: Bechtle et. al., wind data: ERA5

### **ABOUT AWE**



- Airborne wind energy systems use kites, drones and gliders to harvest energy from powerful steady winds.
- There are many different forms
  under development. The most
  common option is a ground-based
  powertrain where a generator is
  run by a tether being pulled out
  by a kite or a glider.
- For reference, one <u>Kitepower's</u>
   <u>Falcon</u> device, with an annual capacity of 450 MWh, produces enough power for 150 households.



#### **ABOUT AWE**

- Can operate offshore and off-grid suitable to remote areas (it can also be grid connected)
- Can operate around the clock and uses an untapped resource – integration with other renewables
- Flexible and fast installation suitable for emergencies
- Low material use, translating into lower upfront project investment as technology matures - reducing the costs for renewables overall







- With support from SEAI, followed by NWE Interreg Programme, Ireland hosts the first technology agnostic AWE test site in Europe.
- The test site was built as part of the MegaAWE project with support from RWE and Mayo County Council.
- The site in Bangor Erris, Co. Mayo was chosen after an extensive global search for a suitable location to develop this technology. The site received planning permission in 2023 to allow the Kitepower device to fly.
- BlueWise Marine developed a GIS-based site identification tool as part of the MegaAWE project.



Photo: Kitepower

- Currently we are collaborating on the DEM-AWE project, also with support from the NWE Interreg Programme.
- Running a 12-month pre-commercial demonstration of the K-BESS prototype.
- K-BESS is a battery storage system powered by a kite, capability to charge a 400kWh battery in 10 hours – enough to charge a typical electric car x 10 times.
- Using the BlueWise Marine site identification tool to determine the best locations for AWE installations in Ireland, Netherlands, Spain and France.







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) 25 50 km

Test Case	N Sites	Min Capacity 200kw/ device (MW)	Max Capacity 1.5MW/device (MW)
Base case	<mark>6,000</mark>	<mark>4,300 - 4,900</mark>	<mark>32,200 - 36,700</mark>

\* Base case: Tether length: 425 m Safety Risk buffer: 100 m

\* Our site identification tool shows suitable location, but installation of each of the AWE devices must be evaluated on a case-by-case basis.

The potential is vast: 5 GW - 36 GW

BlueWise Marine site identification tool provides highly granular results, enabling precision in terms of site identification and key influential parameters, such as tether length.



- BlueWise Marine site identification tool provides highly granular results, enabling precision in terms of site identification and key influential parameters, such as tether length.
- Other parameters included in the model ensure the locations exclude high rise structures, residential buildings, air traffic, military areas and protected areas.
- The base case criteria includes colocation with agricultural land and partial overlap with forests and water bodies.







#### SITE IDENTIFICATION ALLOWS TO

50 km

- Assess of the feasibility and economic viability of deploying AWE technologies
- Focus efforts on locations that offer the greatest potential for energy generation
- Determine the energy generation capability, provide comparison with other energy sources and begin energy system integration.

BlueWise Marine site identification tool provides highly granular results, enabling precision in terms of site identification and key influential parameters, such as tether length.



#### AWE CAN PROVIDE LONG-TERM CATALYST FOR THE ECONOMY AND MAKE IRELAND A PIONEER FOR INNOVATIVE RENEWABLE TECHNOLOGIES

- High-tech made
- **High value creation** involving existing industry
- **Creation of jobs** in manufacturing, O&M, R&D
- **Export potential** thanks to scalable systems
- **Expansion of existing R&D landscape** in energy & aerospace sectors







#### **Opportunities for:**

- Energy
- Aviation / aeronautics
- Textile industry (soft kites)
- Composites (fixed-wing)
- Automotive (gear boxes, etc.)
- Computer Chips
- IT/AI
- Tether / ropes
- Mechanical engineering



## OPPORTUNITIES TO SUPPORT AWE TECHNOLOGY DEVELOPMENT IN IRELAND



- AWE has now been included in the German Renewable Energy Act
- SEAI included AWE in its Offshore Renewable Energy Technology Roadmap.
- Other steps could include including targets for AWE in: Powering Prosperity Strategy, the Climate Action Plan, the Irish NECP, and consider including AWE in Local Development Plans







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