Interreg North-West Europe
MegaAWE
European Regional Development Fund

Airborne wind energy: Wind made AWEsome

Photo: KitePower

This brief explains the advantages of the Airborne wind energy (AWE) technology and outlines the investment requirements for scaling and bringing this novel solution to market. The brief is based on the White Paper "Getting airborne – the need to realise the benefits of airborne wind energy for net zero" by BVG Associates on behalf of Airborne Wind Europe.

KEY INSIGHTS:

- **Airborne wind energy (AWE) systems use autonomous tethered flying devices to harness energy from the wind at heights up to 500m, above those accessed by established wind technology.** 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. The first commercial 150 kW AWE single-kite system supplied by SkySails was installed in Mauritius in 2021.

- **AWE systems enable higher energy generation at lower carbon intensity, and eventually at lower cost.** Other advantages include reduced environmental impact and material use, potentially higher social acceptance due to lower visual impact, reduced up-front costs and logistical requirements, as well as effective use of space and possibilities to reuse foundations from decommissioned wind farms.

- **A model scenario shows that cumulative global deployment of AWE could be 5 GW by 2035 and at least 177 GW by 2050,** based on an understanding of realistic early sales forecasts of leading AWE technology developers and on the assumption that the AWE market follows the same trend as the established wind turbine market but 40 years later.

- **As with all new energy technology, public support is necessary to:** a) ensure sufficient R&D happens b) provide developers with stability for product development c) establish regulatory regimes d) roll-out first commercial projects e) prepare the environment needed for AWE technology to be deployed at volume in existing markets f) make AWE competitive with established wind technology.

- **Moreover, test sites need to be established to allow for continuous operational hours to develop reliable products and industry standards, providing evidence to customers and authorities.** These require agreement with numerous authorities, including in aerospace, defense and public health and safety. In July 2022, as part of the MegaAWE project, RWE completed construction of an AWE test site in Ireland.

- **To enable the scenario as described, over the next 15 years, €5 billion of public support is needed realise the net benefits of AWE.** This support will be split as €4 billion for project electricity price support and €1 billion for industry development support. Extra price support will break even the cost of AWE with the established wind technology by the mid-2030s. For context, €4 billion is the price of a single 1.2 GW offshore wind farm.

- **The wind market needs AWE.** Delivering all wind demand needed from established wind turbines alone will be challenging. Many countries are already struggling to find enough viable sites for onshore wind, hence the move to developing offshore wind at scale.

This info brief is based on the White Paper "Getting airborne – the need to realise the benefits of airborne wind energy for net zero" produced by BVG Associates and commissioned by Airborne Wind Europe as part of the MegaAWE project supported by the Interreg North-West Europe Programme.

[MegaAWE website]

[Download the White Paper]

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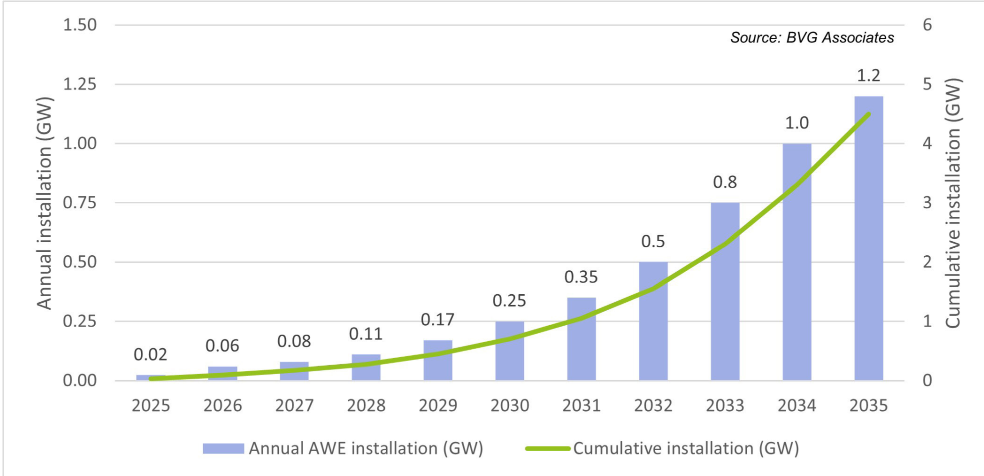

Figure 1: Global AWE initial installation from 2025 to end 2035.

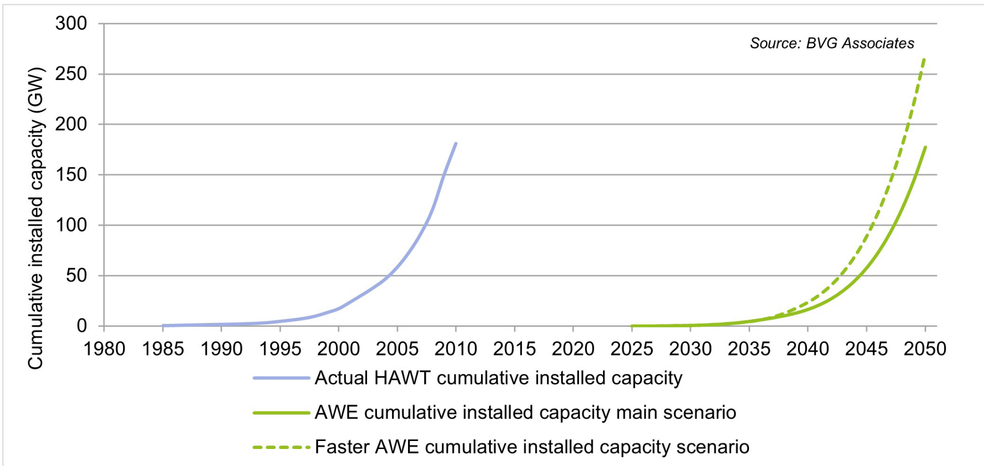

Figure 2: Global cumulative AWE installed capacity scenario with the established wind turbine market it mirrors from 1985 to 2010. HAWT stands for Horizontal Axis Wind Turbine.

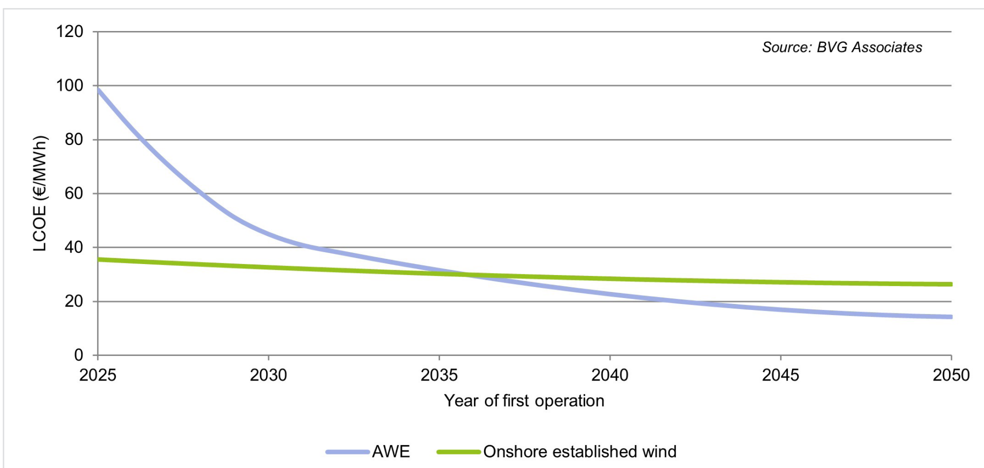

Figure 3: Trend in average Levelized Cost of Energy (LCOE) of AWE and onshore wind turbine technology.