



AIRBORNE WIND ENERGY FOR ISLANDS

Airborne wind energy (AWE) systems consist of tethered kites or drones that generate power by capturing high-altitude winds with very low material input. AWE devices tackle the unique challenges faced by islands such as complex logistics, high energy costs and limited space. The AWE sector is now at the brink of commercialization with the first systems being deployed and fully competitive with diesel generation.

Benefits of Airborne Wind Energy (AWE) for island communities

Ease of deployment: Due to their compact and lightweight design, AWE systems are easily transportable and deployable. This makes them an ideal solution for islands with limited infrastructure, allowing for quick setup and scalability to meet diverse energy needs.

Low environmental impact: AWE has a minimal visual and ecological footprint, making them suitable for deployment in environmentally sensitive areas. Its operation takes a low impact on birds due to the altitudes at which the kites fly, and their movement patterns.

Improved exploitation local wind potential: AWE systems allow accessing high-altitude winds of up to 800m that are typically not captured by established wind turbines. This capability complements other renewable sources and enhances energy integration when combined with solar PV, batteries or biodiesel in hybrid energy systems.

Cost-effectiveness: AWE systems require up to 90% less material compared to other technologies which offers a large potential for low capital costs (CAPEX) in the next years. Their high-capacity factor leads to more hours per day where electricity is generated, reducing the need for extensive energy storage. Currently, AWE systems achieve a Levelized Cost of Energy (LCOE) below 20 cents per kWh, making them competitive with diesel generation commonly used on islands and remote areas.

Disaster relief: The ability to be quickly deployed makes AWE systems ideal for providing emergency power during extreme weather conditions. Their flexibility and rapid setup can offer crucial support in disaster-stricken areas, ensuring a reliable energy supply when it is most needed.

Airborne Wind Energy in action: Island applications

SkySails Power successfully runs a 150kW system in Mauritius, replacing diesel power in partnership with IBL Group for over three years. This project was a significant milestone, showcasing the practical benefits of AWE systems and their capacity to seamlessly integrate into existing energy infrastructures. By providing a cleaner and more sustainable energy source, this deployment not only reduced the reliance on fossil fuels but also demonstrated the potential for AWE systems to contribute to a greener energy future for island nations.



SkySails operating over bagasse fields in Mauritius

Kitepower is operating a 30-100kW system in Ireland. Their system is offering a renewable energy solution to remote communities as it can be delivered as a combined Kite-Battery Energy Storage System (K-BESS). In an earlier short-term deployment to **Aruba**, Kitepower demonstrated the ease with which AWE systems can be deployed and installed, even in challenging grounds where traditional wind may be less viable.



Kitepower operating over a bog in County Mayo, Ireland

Key applications and requirements

AWE systems require open areas within a 400-850m radius around the ground station to operate effectively, with optimal performance achieved at wind speeds of 4-5 m/s or higher. This requirement makes them well-suited for islands where space is often a premium, but high-altitude winds are more accessible.

AWE can be deployed in various applications, including direct grid connection, off-grid systems, self-consumption, disaster relief energy supply, and hybrid integration with other renewable technologies. In direct grid connection, AWE systems feed electricity directly into the local power grid, providing a consistent and reliable energy source. In off-grid settings, AWE can provide power to remote communities, complementing solar PV and other renewable sources. For self-consumption, they can power local industries or communities, reducing dependency on imported fuels. After disasters, their rapid deployment capability ensures a swift restoration of power, which is critical for recovery efforts

Further deployments

Taiwan is going to install SkySails' systems which have just shipped in December 2024.

La Gomera (Canary Islands) will serve as a test hub for AWE solutions, supported by local and European partners, showcasing AWE's potential in island environments with strong and consistent winds.

The Philippines, with its reliance on imported energy for the many islands, plan to boost energy security and cut electricity costs through AWE systems.

Cape Verde, with excellent wind resources, aims to leverage AWE technology to meet growing energy demands sustainably, aligning with its renewable energy and carbon reduction goals.

About Airborne Wind Europe

Airborne Wind Europe is the association of the European airborne wind energy industry, founded in 2018. It aims to help creating the political and regulatory framework for airborne wind energy in Europe and the member states. The association represents all European airborne wind energy system manufacturers as well as various research institutes and suppliers. In addition, more than 50 organisations along the supply chain are active world-wide.

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