



Case Study: Independent assessment of KPS cost of energy

Kite Power Solutions (KPS) is developing a solution to harness wind energy that could be game-changing. Using less materials and accessing a greater wind resource, kites offer the prospect of a much lower cost of energy than the next generation of conventional horizontal axis wind turbines.

KPS asked BVG Associates to provide an independent assessment of the costs and energy production of its twin-kite system.

How we helped

Aerodynamic modelling
Annual energy production assessment
CAPEX and OPEX assessment

LCOE modeling
Risk assessment & product roadmap
Business case preparation

Problem

KPS needed a robust, independent and quantitative assessment of the benefits of its technology.

It wanted assessments of capital expenditure (CAPEX) and operational expenditure (OPEX) compared to future state-of-the-art conventional offshore wind technology.

It also needed independently calculated annual energy production (AEP) estimates for use with potential investors and project developers and to derive levelised cost of energy (LCOE).

Funding was provided by KPS and The Department of Energy and Climate Change.

What we did

BVGA assessed CAPEX and OPEX for a 500kW scale system, then extrapolated to a first 3MW system and for volume production.

We produced an independent model to calculate the power curve and AEP for the KPS system.

We compared the LCOE for a 500MW wind farm using KPS kite turbines with that for a wind farm using conventional horizontal axis wind turbines, both with final investment decision in 2020.

We also assessed the LCOE for a project using KPS technology to repower a wind farm at the end of its design life and provided a sensitivity analysis considering some of the technical design options available to KPS.

Results

Our AEP modelling suggested a range of improvements that KPS could implement.

We estimated that once commercial, the LCOE from a wind farm with KPS technology would be 26%-47% lower than conventional technology, depending on wind farm location, choice of foundation and kite size.

The work has facilitated changes to KPS product development plan and significant new blue-chip investment.

It also underpinned a KPS-led consortium winning further funding of £1m from the UK government in March 2016 to develop its next scale prototype.

"I have very high expectations of BVG Associates' work and they never disappoint me with their professionalism, ability to deliver and expertise."



David Ainsworth, Business Development Director, KPS



Mike Blanch is the BVG Associates lead on airborne generation. He has more than 25 years experience in wind energy and provides consultancy to wind farm developers, financiers, governments, enablers and large energy users. He is a chartered engineer and Fellow of the Institution of Mechanical Engineers with an MPhil and an MSc from Cranfield University.

For help with cost of energy modeling, product development or airborne technology, email MJB@BVGAssociates.com