



ETI INNOVATION LEARNINGS
LONGER BLADE TECHNOLOGY

BLADE DYNAMICS

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KEY CONCLUSIONS

The success of the Energy Technologies Institute's (ETI) investment in Blade Dynamics, an innovative UK SME set up to develop and manufacture wind turbine blades, has shown the value of underpinning innovation with effective collaboration and sharing of knowledge.

Delivery of this successful project involved interactions across business, science and the government. Business through deep engagement with internationally renowned wind turbine suppliers, science through using world leading open-access test facilities in the UK and government and policy makers through the ETI who also enabled business engagement by financing the highest risk elements of the project. These interactions were set up to facilitate knowledge transfer and learning and ultimately led to the purchase of the company by a global turbine OEM.

The transition to a low carbon energy system will be achieved more quickly and cost effectively with a shared understanding of the drivers for new technologies and the engagement of groups who can accept and manage the associated risks. The UK has specific cost reduction targets for the offshore wind sector and the technology that Blade Dynamics developed with the ETI now promises to challenge other suppliers, providing an important contribution to the delivery of these targets.



KEY LEARNINGS

- › SMEs like Blade Dynamics are creative, flexible and an excellent source of innovative solutions – Blade Dynamics' advanced modular blade design met a real commercial need.
- › Open, iterative processes are crucial for effective innovation – Blade Dynamics engaged across the wind industry to establish a cost effective solution to an established problem.
- › Successful commercialisation of SME capabilities requires support from a wide range of stakeholders with varied skill sets and risk appetites – Blade Dynamics benefitted from wide-ranging inputs from the ETI, OREC (the Offshore Renewable Energy Catapult) and the major turbine manufacturers.
- › Public support for innovation is more effective when co-ordinated with industry funding – although potentially close to market, neither government or industry would have made this investment in an unproven technology and the delivery team on their own. The ETI's partnership approach to sharing risk made this project possible.
- › Provision of equity support on this project showed that this can be as important as project funding in securing success for SMEs.
- › The purchase of the company by an OEM at the end of the project created a clear route to market for the technology and the resulting return on the ETI's investments allowed for the recycling of public funds.
- › Proving innovative, high risk solutions ultimately requires new industrial capabilities, such as the OREC test facilities and the ability to manage novel risk.
- › Successful innovation requires shared understanding of needs, opportunities and the options for delivering against these – Blade Dynamics' product was designed to meet the needs of turbine manufacturers, installers and operators.



OUTCOMES

In 2011 Blade Dynamics, a UK SME and wind turbine blade manufacturer with bases in the Isle of Wight and the US, had developed a new design and manufacturing concept for the production of longer blades. Through an open competition for new blade designs, the ETI identified that their innovative approach – using advanced manufacturing techniques to produce the blades as a series of sub-sections – could deliver step change improvements in quality, cost, transportability and performance.

Cost reduction targets for offshore wind are now an established part of UK Government policy and now target a levelised cost of energy of less than £85/MWh by 2026. Blade Dynamics recognised that the most effective way to respond to this challenge was to build larger machines with longer blades. Most of the major offshore wind manufacturers are now developing larger turbine concepts.

Siemens engaged with Blade Dynamics early in the ETI project, providing input that shaped the design of the new 78m long modular blade to make it suitable for Siemens' major new turbines. This made this novel, high risk technology development one of the longest blades in the world and attracted media and industry interest, not least because it had the potential to resolve a key issue for the industry – the cost effective manufacture of high quality blades at a size that would severely challenge conventional approaches.

This project was closer to market than most that the ETI funds, and anticipating broad industry interest in the technology, it was not

structured to be an exclusive supply relationship for Siemens. Blade Dynamics also engaged with other potential customers including MHI-Vestas and GE. Critically though, Siemens design engagement provided early 'real world' customer input and challenge which ensured credibility for the project across the industry.

Testing of new blades requires specialised indoor test facilities. The ETI supported Blade Dynamics in negotiating use of the new very long blade test facility (which was, at the time, still being built) at OREC in Northumberland. The ETI's board level engagement in Blade Dynamics aided this stage by ensuring the necessary skills were in place to address the various testing and cost risks associated with committing to use an as-yet unfinished test facility.

Clear commercial benefits were apparent in Blade Dynamics' rapidly developing capabilities and blade portfolio. Consequently, GE pursued an early acquisition of the company, saw the blade through the final test campaign at OREC and went on to use the capabilities within Blade Dynamics in a new in-house blade innovation and manufacturing capability.

This acquisition by one of the world's largest companies demonstrates the industry confidence that had been built through the ETI's funding of a product created by an innovative UK SME. The resources and market reach brought through an OEM should enable the technology to progress and reach a much wider global market more quickly than would have been possible for Blade Dynamics operating alone.



ABOUT THE AUTHOR



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Mike Colechin joined the ETI as Partnership Manager in 2011. He is a Chartered Mechanical Engineer with over 20 years experience in the energy sector and is responsible for ensuring that the ETI's work delivers impact with a wide range of stakeholders

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FURTHER READING



Accelerating low carbon energy innovation in the UK

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