Recycling Composite Wind Turbine Blade for High-Performance Composite Manufacturing

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With exponential growth in UK annual end-of-life WTB over the coming decade, solutions to properly handling this waste stream must be pre-emptively addressed. There is no commercial solution to the problem of large-scale blade recycling in the UK, leading to public criticism of the sectors waste management. “Recycling Composite Wind Turbine Blade for High-Performance Composite Manufacturing” built upon the Advanced Composites Groups thermal recycling technology to discover the environmental and economic outlook of adopting blade recycling. Process modelling found that energy demand for recycling glass fibres from end of life composite blades would be significantly lower than is required to produce new glass fibres. It was concluded that manufactures selecting to use recycled glass fibres would have a net negative energy attributed to these materials, which is commercially attractive given the social pressure to adopt green products. Techno-economic analysis of blade recycling was carried out, concluding that recycled glass fibres could be cost competitive against virgin materials with plant capacities in line with projected UK end of life wind turbine blade volumes. Several routes to market for recycled glass fibres as reinforcement mediums in new composites have been identified with trials underway in commercial and academic facilities. With a strong environmental and economic justification, as well as the potential for integration of recycled fibres into the composite supply chain, this work has worked toward advancing the commercialisation of composite blade recycling.