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## IEA Wind TCP Task 45

Deliverable 3.1

### Traceability and Value Chains



iea wind

# Guideline on the establishment of Traceability and Value Chains for the recycling of wind turbine blades



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# 1. Introduction

A connected value chain is needed to support the recycling of wind turbine blades. Our experiences suggest that the development of technical processing solutions alone will not be sufficient to enable blade recycling. Specifically, the level of volatility and uncertainty in the supply of decommissioned blades is a barrier to investment in the upscaling of recycling and repurposing technology. Indication of the quality, magnitude and timing of the supply of decommissioned blades is needed. However, this information can be hard to obtain in many regions. Many countries lack detailed centralised inventories of installed wind turbines, and even where good data exists on current installations prediction of decommissioned blade volumes is still challenging as many diverse factors underlie the decision of whether, and when, to decommission specific turbines (Delaney et al., 2023). In addition, many wind turbines continue in operation far beyond the original design life (Bech Abrahamsen et al., 2024).

Successful end-of-life solutions for wind turbine blades may be measured on technical, economic, environmental or social performance, or some combination of these. However, most end-of-life solutions are dependent on logistics and on one or more pre-processing stages such as blade sectioning, shredding or grinding (Lund & Madsen, 2024). If the value associated with a particular pre-processing stage cannot be realised, a link in the processing chain of decommissioned blades may remain underdeveloped, thereby jeopardising the overall flow of blades from the point of decommissioning to an end-of-life solution. With the wind energy industry's call for a landfill ban in Europe (WindEurope, 2021) and a general move towards circular economy principles in decommissioning practices (Velenturf, 2021), addressing deficits in current value chains and traceability for recycling or repurposing decommissioned wind turbine blades is important in order to facilitate repowering projects and deliver on decarbonisation targets.

This study is an open exploration with the aim to create common ground with regard to priority actions for the diverse stakeholders that are involved in enabling a circular economy for wind turbine blades. The study's objectives are to identify key steps, partners and actions in the value chain, especially with regard to improving traceability in the supply chain in terms of location and the quality and quantity of materials. The study will gather insights from along the supply chain – from pre-manufacture through to end-of-life and the second life – to enable action and support for investment into circular chains for wind turbine blades.

The aim of this study is hence to bring stakeholders together, for the objective of developing a shared position on the status quo and priority actions for traceability in wind energy supply chains to enable more circular economy practices to be developed in the near term (by 2025) and the longer term (by 2035).

Through a series of stakeholder engagements, including a pre-workshop survey, in-person workshop and post-workshop survey, this study will co-produce:

- The changes that are preferred and necessary
- Analysis of the current state of traceability in the supply chain
- Co-production of short-term and long-term future visions
- Barriers and drivers for realising the visions
- Actions required by stakeholders

This study will result into shared messages about traceability in the wind turbine blade supply chain, suggested targets to reach, with core contents for presentations for all to use at e.g. events and a short summary document for public use.