PYROPLAN

Pyrolysis of Wind Turbine Blades

A feasibility study

- CONFIDENTIAL -

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Management summary

The annual volume of composite waste is growing substantially, driven by growing sectors like the Wind power, Automotive and Aviation industries.

Pyrolysis of composite materials has shown to be a technically proven process at small scale, and several companies around the world have been developing the process on a larger scale recently. Nevertheless the processes are hard to get profitable. For that reason processes regenerating *carbon* fibers rather than glass fibers only have gained most attention up to now.

The process of composite pyrolysis shows strong parallels with BIO-oil production, that is currently being further developed and expanded by multiple parties in the world. Compared to these processes, the pyrolysis of turbine blade composites shows several interesting advantages:

- Less water content of feedstock, resulting in more efficient processing
- More homogeneous feedstock, resulting in better controllable output properties
- Potentially no feedstock costs but revenues instead
- Potentially higher added value of specific components/pieces when reused

Nevertheless, specifically for wind turbine blades, additional practical issues arise like the absence of carbon fibers in most blades and efficiently partitioning the blade. These aspects make the process potentially less economically viable. To develop a sustainable pyrolysis recycling process for wind turbine blades, at least some of the following points are to be addressed:

- The processing costs should be partially subsidized by the supplier, paying a disposal fee of approximately 50% of the landfill costs
- The reuse of components/pieces should provide satisfactory revenues
- The regeneration and reuse of glass fibers should provide satisfactory revenues
- Strong industrial or governmental parties should provide substantial financial support during the start-up years in order to attain a economically viable process

Apart from financial points of attention for exploitation, the following aspects are critical:

- Technical challenges
- Environmental licenses
- Logistics
- Supplying and consuming parties
- Health and safety

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