

# Challenges And Opportunities for Wind Energy to Be More Sustainable

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## **Abstract**

Inevitably, the wind industry contributing a lot transition to green energy. Globally Denmark is playing a pioneer role in wind energy sector. However, there is an ongoing discussion how this industry will face some challenges from circular economy and sustainability point of views.

In a circular framework – there is a range of unserved issues surrounding wind energy, regarding noise, locations (visual problems), materials used (inputs) and waste generated which will be an increasingly challenging issue. As analysis shows, the problem currently regarding the waste is the lack of economically feasible ways to reuse / recycle parts of the wind turbines. Note that over time, wind turbines have increased in size and have become much more resource-efficient.

For instant, the wind turbine blades cannot be directly re-used and specific features in this type of technology development is that there exist several constraints to private investments into research and development; learning costs must be borne upfront, while the uncertainty on the benefit side is large, because of uncertainty about future product prices and technological development. Moreover, positive externalities exist from handling and reusing blades in that it reduces the pressure on the landfills. This benefit is however, not eared by the investor, but by society as a whole, which means that investments typically will be undersupplied.

In this particular case, investment (governmental and/or privately) must be encouraged, as this seems the most optimal way to handle the increasing number of discarded blades from wind turbines. It should also be kept in mind that as the amount of discarded parts from wind turbines (especially blades) increases globally, the need for solutions to recycle /reuse these parts increase dramatically, thus there are potentially large first mover advantages in this industry.

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