Towards Extending the Operational Life of Wind Energy Assets

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Abstract

Wind energy assets are designed for a period of 20–30 years for operational use. However, at the end of their service life, a decision concerning the future use of wind turbines and associated structures is necessitated. Since a large number of wind energy assets will be reaching the end of their original design lives, asset managers have started figuring out what to do with all their turbines by the end of operational life, whether to decommission, repower, or extend the service life. Among the existing end-of-life (EOL) management strategies, life extension is regarded as a better option for wind turbines, delivering significant benefits such as low operating cost, substantial return on investment, increased electricity output and a reduction in levelized cost of electricity. Life extension is currently a crucial topic in conventional energy industries such as nuclear power plant and offshore oil and gas; however, it is relatively a new domain for the wind power industry. Therefore, in order to successfully extend the service life of wind assets at the end of their original design life, it is not only expedient to learn from the good practices and experiences of other industries, but also address the specific challenges that are likely to confront the wind power industry. The objective of this paper is to present a detailed analysis of the challenges likely to confront the wind power industry during the life extension phase of operation, share good practices and experiences from other conventional energy industries and outline the opportunities associated with life extension in the context of wind power industry.

Keywords

End-of-life (EOL); Life Extension (LE); Wind Turbine (WT).