Offshore wind operations and maintenance logistics: Practical implementation and government LCoE studies

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Abstract

This research reveals that logistics makes up at least 17% of annual operational expenditure costs for offshore wind farms. This research furthermore contains an analysis of 11 largely government sponsored studies of levelized cost of energy as well as an industry-wide case study on how to practically take cost out of logistics operations and maintenance operations. The analysis of the 11 cost studies reveals that annual operational expenditure is found to vary by a factor of 9.5, making the operational expenditure share of levelized cost of energy for offshore wind range from 13% to 57%. The industry wide case study yields an opportunity to reduce levelized cost of energy by approx. 1% by expanding operating hours from daytime to also working at night.

Objectives

This research [1] set out to understand the relative importance of logistics as a part of the overall operational expenditure of offshore wind. In addition, a part of the research [1] was the active participation in an action-research type case study effort that worked on 5 specific potential cost-out areas for offshore wind operations and maintenance related logistics operations.

Methods

The findings of this research [1] are based on a 20-month industry-wide case study targeting cost reduction initiatives for the offshore wind industry. The case study setting was Denmark where a wide cross-section of Danish as well as European/global offshore wind constituencies participated. To understand the relative importance of logistics as a share of operational expenditure of offshore wind farms, eleven largely government sponsored studies of levelized cost of energy for offshore wind published over a 10-year lifespan were examined in detail (see Figure 1). The analysis of the 11 cost studies focused on individual cost line-items for logistics which were compared and contrasted in detail using a broad definition of logistics for offshore wind [2].

Results

The analysis of the 11 cost studies included in this research [1] reveals that logistics makes up at least 17% of operational expenditure for offshore wind. In addition, operational expenditure in general can vary by a factor of 9.5 making operational expenditure range from 13% to 57% when measured as a share of levelized cost of energy using the Megavind calculator [1; 2] for levelized cost of energy (see Figure 2). A detailed business case is included in this research [1] for offshore wind operational expenditure related logistics operations which generates a savings of approx. 1% of levelized cost of energy.

These savings were computed as part of the industry-wide case study and the sample project used in this research was how to expand operations and maintenance working hours from daytime to also work at night.

Conclusions

The findings of this research [1] reveal that actual cost-out measures are difficult to implement in offshore wind in practice due to cultural differences between land and sea based personnel. Cost reduction implementation efforts are rendered by personnel located offshore in a harsh sea environment which is in stark contrast to the shore-based office personnel who develop studies and policies [1; 2] directing cost reduction efforts as well as firm strategies and implementation plans.

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References


Acknowledgement

Funding from the Danish Maritime Foundation (Grant 2012-097) is acknowledged.

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