Breakthrough Abstract EWEA 2015

Title: **Floating Lidar, An owner's perspective and calculations**

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1. Introduction

Historically all wind measurements for offshore windfarms have been performed using cup anemometers and stand-alone met masts, usually on monopiles. While these provide excellent datasets, they do so at a high cost and are fixed in location. The development and steady acceptance of lidar technology has opened up the opportunity for potentially cheaper technology particularly offshore. This paper explores the advantages and also performs a quantitive analysis of the errors associated with both sets of measurements only recently produced.

2. Approach

The approach of RWE has been to facilitate the experimental deployment of trial floating lidar at its offshore windfarm sites. Blind experimental data has been collected and independently analysed. These have been used to provide data for the accuracy and reliability of the technology. RWE is thus presenting the owner's view rather than the suppliers, or consultants providing a realistic view of the data uncertainty and the perceived cost benefit of deploying such technology.

3. Abstract

RWE has managed the deployment of the first floating lidar trials. With the financial assistance of the Carbon Trust through the Offshore Accelerator Program, two floating lidar systems have been successfully trialled , for periods of over 6 months in the last two years.

The paper details a summary of the results, pulled together from the various trials (and separately reported previously) along with the deployment lessons, learnt from an operators/owner's perspective, not individually reported.

Recent final reports, additional data analysis of results and the production of uncertainty analysis leading to a cost benefit analysis from the owner/developers perspective has been newly produced.

This demonstrates that while the floating lidars can produce accurate results, there is still a useful primary place for the fixed met mast with cup anemometers for producing data with the lowest uncertainty. This becomes significant when the high capital costs of developing and building an offshore wind farms are taken into account and is often neglected by the equipment suppliers.

The recent learnings from these trials and subsequent uncertainty analysis are presented in this paper

4. Conclusion

The early part of the paper has detailed the practical aspects that have been learnt from the trial deployments. These have been feed back into subsequent deployments and also the IEA best practice guidelines.

The uncertainty analysis and cost benefit analysis seem to demonstrate that while the uncertainties of floating lidar systems are low, the cost benefit analysis still favours the deployment of a fixed met mast with cup anemometers.

5. Learning Objectives

The learning objectives have been to gain critical operational, verification and safety and design data on the deployment of floating lidar systems.

The second learning area has been to apply detailed uncertainty analysis to provide a real operators view of the future of floating lidar systems. An uncertainty methodology and cost benefit analysis is presented to justify these conclusions and for future use.