

A novel method based on Nacelle Mounted Lidar to reduce the uncertainty of Power Performance Testing

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Introduction

In the past, the Meteorological Mast (Met Mast) is the traditional solution for Power Performance Testing (PPT). However, Nacelle-mounted lidar (NML) is increasingly used and widely accepted for PPT, thanks to its high accuracy on the wind measurement and the easy deployment.

Methods

1. A pilot project, fully complied with IEC 61400-50-3, is conducted at a flat terrain in one US's wind farm.
2. The results of Met Mast and NML are compared and investigated.

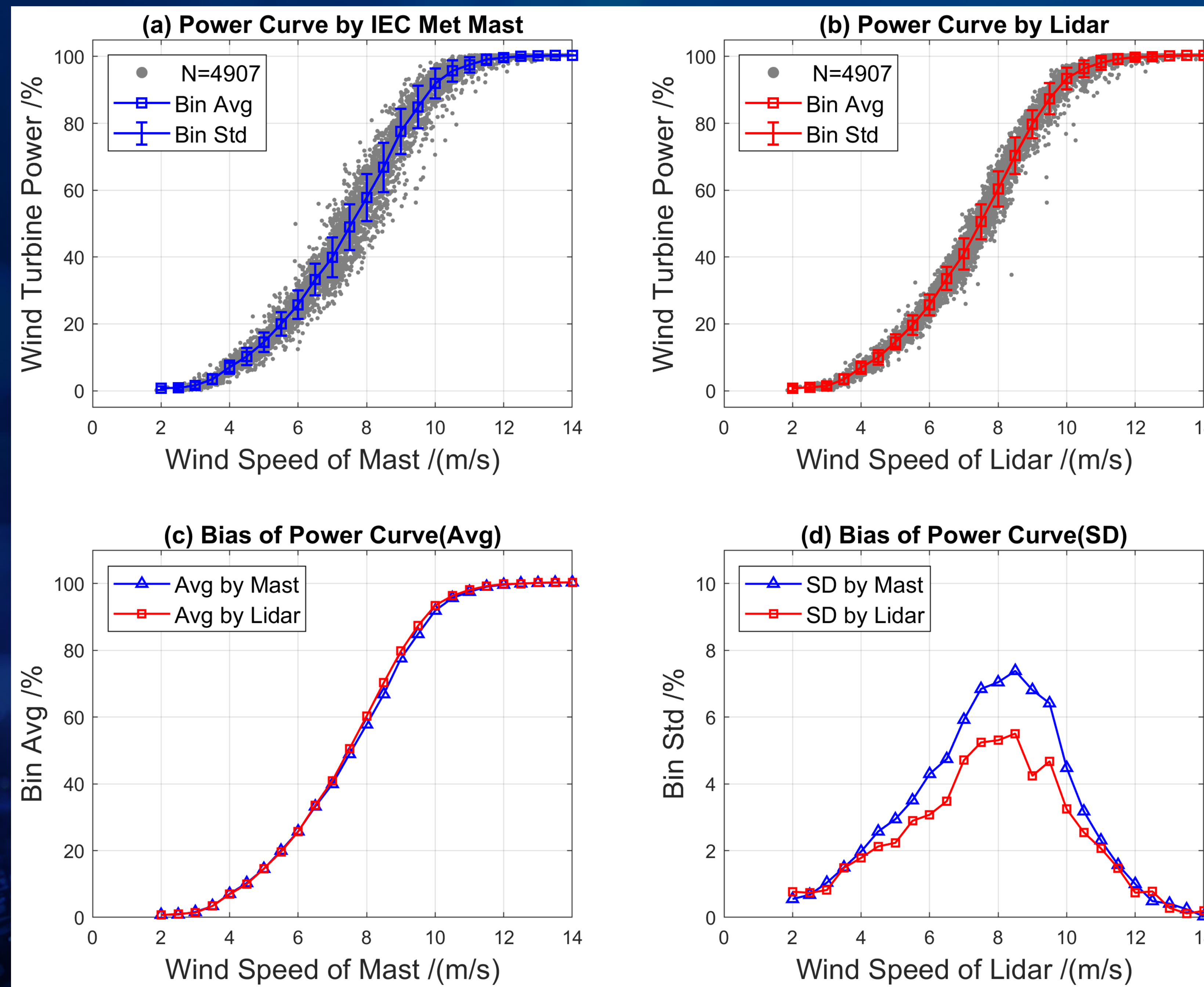
Results

1. The scatter points of PPT by MNL in fig(b) are more concentrated than those of PPT by Met Mast in fig(a).
2. In fig(d), Standard Deviation(SD) by NML is lower than SD by Met Mast.

Discussion

The comparison shows the result of PPT by NML has a lower uncertainty than Met Mast.

Nacelle Mounted Lidar reduces the uncertainty of Power Performance Testing by Met Mast!



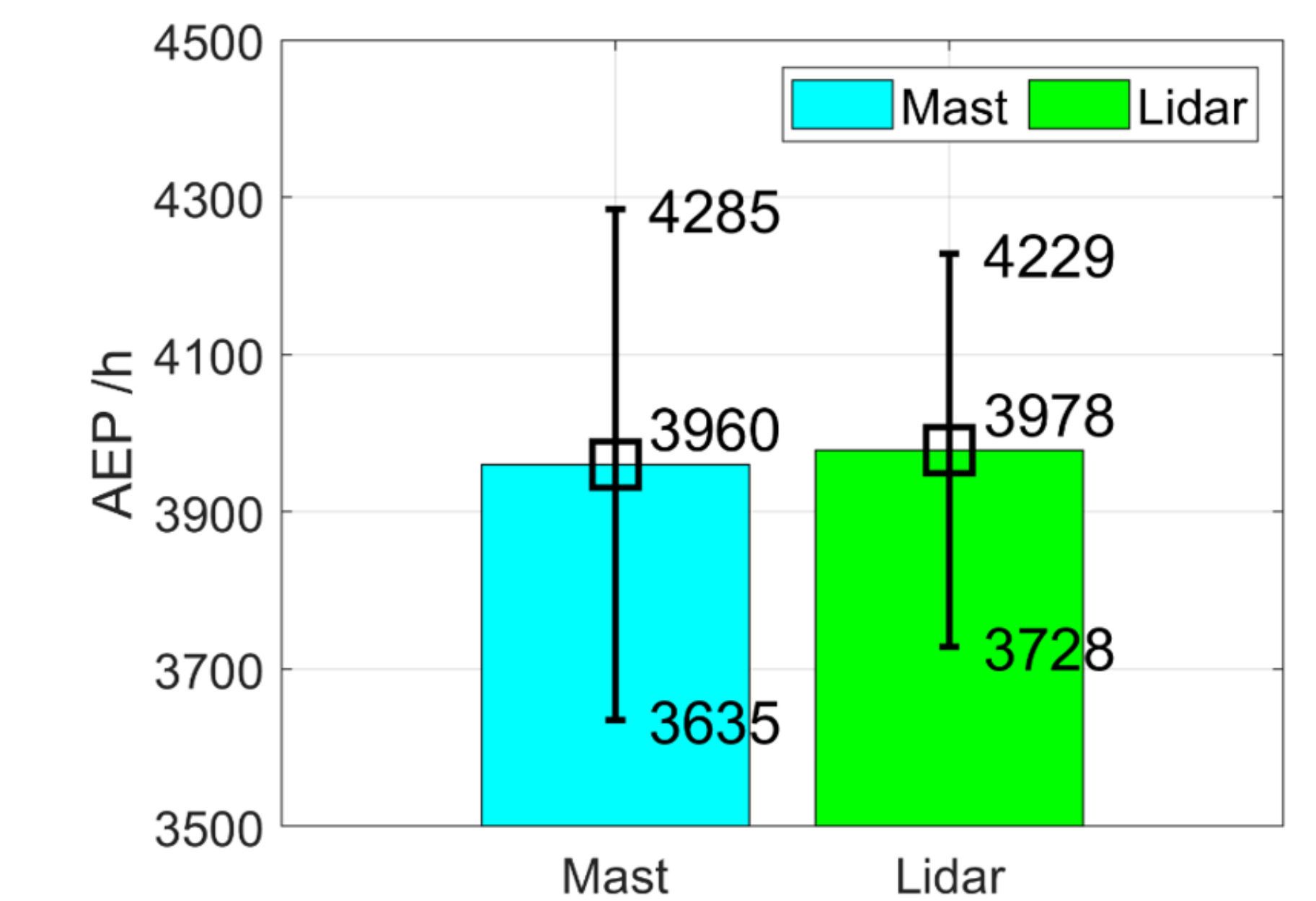
Two testing methods:



(1) Met Mast (2) NML: on nacelle

Comparison on AEP Uncertainty

The AEP ranges, evaluated by Met Mast and NML, are [3635h, 4285h] and [3728h, 4229h]. The AEP range of NML is within the range of Met Mast, therefore the overall uncertainty of NML is smaller than that of Met Mast. NML has a lower uncertainty for the measurement of PPT, which means the higher accuracy.



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