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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Wind energy generation systems - Numerical site calibration for power performance testing of wind turbines

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1.Structure and drafting rules for standardization documents"

Drafting.

This document is equivalent to IEC TR61400-12-4.2020 "Wind energy generation systems Part 12-4.Power characteristics of wind turbines

The document type was adjusted from IEC technical report to my country's national standardization guidance technical document.

Introduction

IEC 61400-12-1[1] is an international standard for measuring the power characteristics of wind turbines. It stipulates that field measurements should be carried out in complex terrain.

Calibration is performed to obtain the flow characteristic relationship between the measurement location and the wind turbine under test.

In addition to the reference wind tower for the unit power curve, a temporary wind tower

needs to be installed at the unit site before the wind turbine to be tested is installed.

The IEC 61400-12-1 method is often used in industrial practice, but it has the following disadvantages.

--- Analysis of the additional costs of the second wind tower and the results of the on-site calibration;

---Additional site calibration time within 3 months is required;

Before installing a wind turbine, a site calibration decision must be made.

These shortcomings have prompted the industry to look for alternative methods for field calibration. One alternative is to use numerical simulation to derive the airflow correction coefficient.

The wind speed at the wind turbine location is the relationship between the wind speed at the reference wind tower location.

In numerical field calibration, the airflow correction coefficient is calculated by numerical simulation of the flow.

Some disadvantages, but numerical field calibration also brings other challenges.

---Dependence on simulation models;

---Dependencies of model settings;

---Dependence on the professionalism of modelers;

---Quantification of model uncertainty.

Wind power generation system Wind turbine power performance

Numerical field calibration method for testing

1 Scope

This paper summarizes the current status of numerical modeling of flows, existing guidelines and past benchmarking experiences in numerical model verification and validation.

Based on the work done, this paper identifies the important techniques for flow simulation over complex terrain in wind energy applications, as well as existing

Unresolved issues, including suggestions for further validation through benchmarking.

This document is applicable to the calibration of wind turbine power characteristic test sites in wind farms.

2 Normative references

This document has no normative references.

3.1 Terms and Definitions

There are no terms or definitions that require definition in this document.

3.2 Abbreviations

The following abbreviations apply to this document.

cedures