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**Wind energy generation systems –
Part 26-1: Availability for wind energy generation systems**

**Systèmes de génération d'énergie éolienne –
Partie 26-1: Disponibilité des systèmes de génération d'énergie éolienne**



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IEC 61400-26-1

Edition 1.0 2019-05

INTERNATIONAL STANDARD

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Systèmes de génération d'énergie éolienne –
Partie 26-1: Disponibilité des systèmes de génération d'énergie éolienne

INTERNATIONAL
ELECTROTECHNICAL
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INTERNATIONALE

ICS 27.180

ISBN 978-2-8322-6797-4

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WIND ENERGY GENERATION SYSTEMS –

Part 26-1: Availability for wind energy generation systems

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CDV	Report on voting
88/665/CDV	88/705/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

The intention of this International Standard is to define a common basis for exchange of information on availability metrics between stakeholders in the wind power generation business such as owners, utilities, lenders, operators, manufacturers, maintenance providers, consultants, regulatory bodies, certification bodies and insurance companies. From this diverse group of stakeholders, a number of external and internal interfaces arise in the operation and delivery of power. Some of these are energy related and many are informational. Since the intention is for a common basis of informational exchange, many of these interfaces are illustrated in Figure 1, which identifies external and internal elements related to energy production and asset management and which also benefit from a defined set of terms. This is achieved by providing an information model specifying how time designations shall be split into information categories.

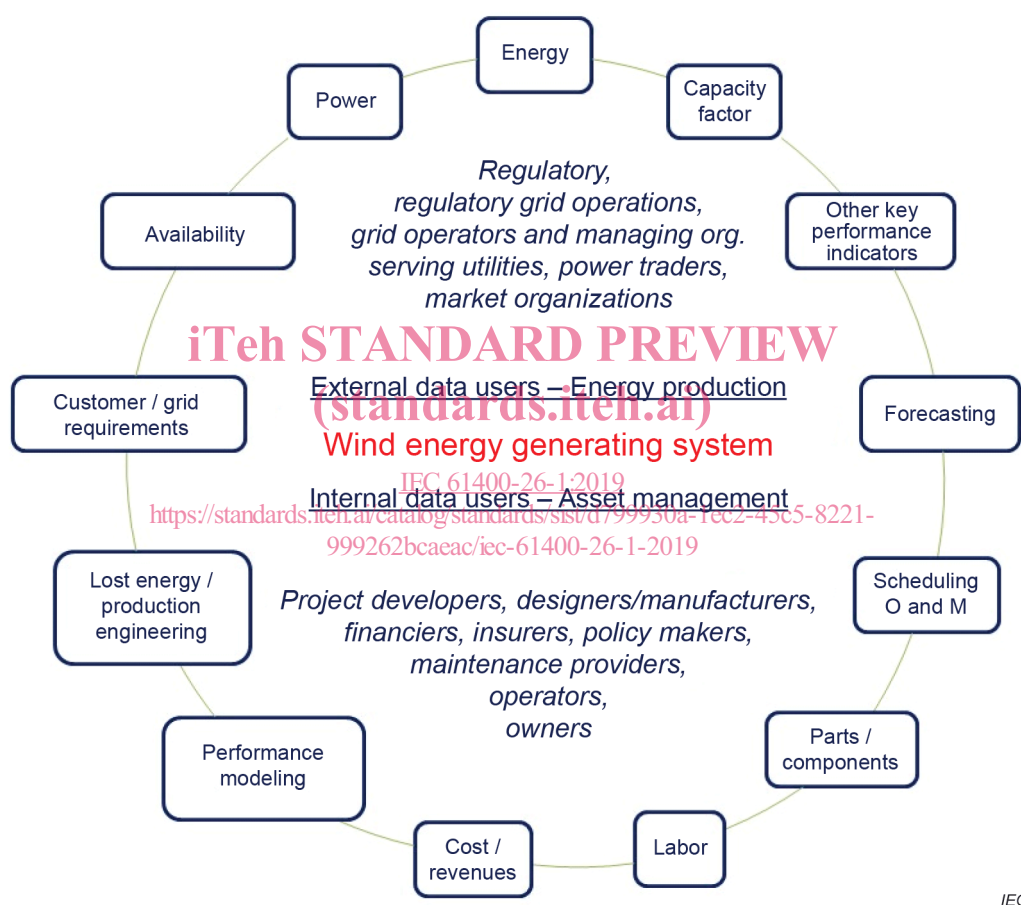


Figure 1 – Data stakeholders for a wind energy generation system

Throughout the document, reference is made to wind energy generation systems (WEGS); however, the document may be used for a single wind turbine (WTGS), as well as for any number of WTGSs combined with additional components to represent a complete wind power station (WPS). The designation WEGS used throughout the document thus shall be understood as the specifications being applicable to individual wind turbines as well as for wind power stations.

The information model specifies the terminology for reporting availability indicators. Availability indicators include time-based and production-based availability. A WECS includes all equipment up to the point of interconnection¹, or in case of a single WTGS in a WPS, the interconnection point defined by the user. Availability indicators are based upon fractions of time and the amount a service is providing or capable of providing within the time fractions, taking internal and external aspects into account. Internal aspects will include the WECS' components and their condition. External aspects are wind and other weather conditions, as well as grid and substation conditions.

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¹ Defined in IEC 60050-415:1999, Definition 415-04-01.

WIND ENERGY GENERATION SYSTEMS –

Part 26-1: Availability for wind energy generation systems

1 Scope

This part of IEC 61400 defines an information model from which time-based, and production-based availability indicators for services can be derived and reported.

The purpose is to provide standardised metrics that can be used to create and organise methods for availability calculation and reporting according to the user's needs.

The document provides information categories, which unambiguously describe how data is used to characterise and categorise the operation. The information model specifies category priority for discrimination between possible concurrent categories. Further, the model defines entry and exit criteria to allocate fractions of time and production values to the proper information category. A full overview of all information categories, exit and entry criteria is given in Annex A, see Figure A.1.

The document can be applied to any number of WTGSs, whether represented by an individual turbine, a fleet of wind turbines, a wind power station or a portfolio of wind power stations. A wind power station is typically made up of all WTGSs, functional services and balance of plant elements as seen from the point of common coupling.

Examples are provided in informative annexes which provide guidelines for calculation of availability indicators.

- examples of optional information categories, Annex B;
- examples of application of the information categories for determination of availability, Annex C;
- examples of application scenarios, Annex D;
- examples on methods for determination of potential production, Annex E;
- examples of how to expand the model to balance of plant elements, Annex F.

This document does not prescribe how availability indicators shall be calculated. The standard does not specify the method of information acquisition, how to estimate the production terms or to form the basis for power curve performance measurements – which is the objective of IEC 61400-12.

A degree of uncertainty is inherent in both the measurement of a power curve and the calculation of potential energy production. The stakeholders should agree upon acceptable uncertainty parameters.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-415, *International Electrotechnical Vocabulary – Part 415: Wind turbine generator systems*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-415 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

actual service delivery

quantified level of a service provided by the WEGS as measured

Note 1 to entry: Actual service delivery can only be assigned to measurable services.

3.1.2

balance of plant

BOP

infrastructural components of the WPS except for the WTGS(s) and its internal components and subsystems

Note 1 to entry: The infrastructure normally consists of site electrical facilities, monitoring and control (often called SCADA) as well as civil plant (such as foundations and roads) supporting the operation and maintenance of the WTGS(s).

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3.1.3

constrained potential service delivery

calculated level of a service that could have been provided by the WEGS based on operating specifications such as external set-points or contractually imposed constraints combined with design criteria, technical specifications and site conditions

3.1.4

design specifications

the collection of precise and explicit information about requirements for a product design

Note 1 to entry: It provides in-depth details about the functional and non-functional design requirements including assumptions, constraints, performance, dimensions, weights, reliability and standards. For example, specifications and design considerations given in the IEC 61400-1 standard define the process for producing design specifications for WEGS.

3.1.5

external conditions

conditions outside of the WEGS that affect the operation, such as (i) operating specifications, (ii) environmental conditions and (iii) grid conditions

3.1.6

grid

electrical network to which the WEGS is electrically connected

Note 1 to entry: The WEGS delivers its services into the grid. The interface between the grid and the WEGS internal electrical system is the network connection point often referred to as the point of common coupling (PCC).