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BSI Standards Publication

## Wind energy generation systems

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Part 26-3: Availability for wind power stations (IEC/TS 61400-26-3:2016)

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## National foreword

This British Standard is the UK implementation of CLC/TS 61400-26-3:2017.

The UK participation in its preparation was entrusted to Technical Committee PEL/88, Wind turbines.

A list of organizations represented on this committee can be obtained on request to its secretary.

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## TECHNISCHE SPEZIFIKATION

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Wind energy generation systems -  
Part 26-3: Availability for wind power stations  
(IEC/TS 61400-26-3:2016)

Systèmes de production d'énergie éolienne -  
Partie 26-3: Disponibilité pour les centrales éoliennes  
(IEC/TS 61400-26-3:2016)

Windenergieanlagen -  
Teil 26-3: Verfügbarkeit von Windenergieanlagen  
(IEC/TS 61400-26-3:2016)

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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## European foreword

This document (CLC/TS 61400-26-3:2017) consists of the text of IEC/TS 61400-26-3:2016 prepared by IEC/TC 88 "Wind energy generation systems".

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## Endorsement notice

The text of the International Standard IEC/TS 61400-26-3:2016 was approved by CENELEC as a Technical Specification without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61400-1	NOTE	Harmonized as EN 61400-1.
IEC 61400-12-1:2005	NOTE	Harmonized as EN 61400-12-1:2006 (not modified).
IEC 61400-12-2:2013	NOTE	Harmonized as EN 61400-12-2:2013 (not modified).
IEC 61400-25-1:2006	NOTE	Harmonized as EN 61400-25-1:2007 (not modified).
IEC 61400-25-2:2015	NOTE	Harmonized as EN 61400-25-2:2015 (not modified).
IEC 61400-25-3:2015	NOTE	Harmonized as EN 61400-25-3:2015 (not modified).
IEC 61400-25-4:2008	NOTE	Harmonized as EN 61400-25-4:2008 (not modified).
IEC 61400-25-5:2006	NOTE	Harmonized as EN 61400-25-5:2007 (not modified).
IEC 61400-25-6:2010	NOTE	Harmonized as EN 61400-25-6:2011 (not modified).

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(normative)

### **Normative references to international publications with their corresponding European publications**

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050	series	International Electrotechnical Vocabulary	-	-
IEC 60050-415	-	International Electrotechnical Vocabulary - Part 415: Wind turbine generator systems	-	-
IEC/TS 61400-26-1	2011	Wind turbines - Part 26-1: Time-based availability for wind turbine generating systems	CLC/TS 61400-26-1	2017
IEC/TS 61400-26-2	2014	Wind turbines - Part 26-2: Production-based availability for wind turbines	CLC/TS 61400-26-2	2017

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### WIND ENERGY GENERATION SYSTEMS –

#### Part 26-3: Availability for wind power stations

#### FOREWORD

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 61400-26-3, which is a technical specification, has been prepared by IEC technical committee 88: Wind energy generation systems.

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The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
88/571/DTS	88/588/RVC

Full information on the voting for the approval of this technical specification 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.

A list of all parts of the IEC 61400 series, under the general title *Wind turbines* (previous title), and *Wind energy generation systems* (new title), can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

Mandatory information categories defined in this Technical Specification are written in capital letters; optional information categories defined are written in capital letters and bold letters.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

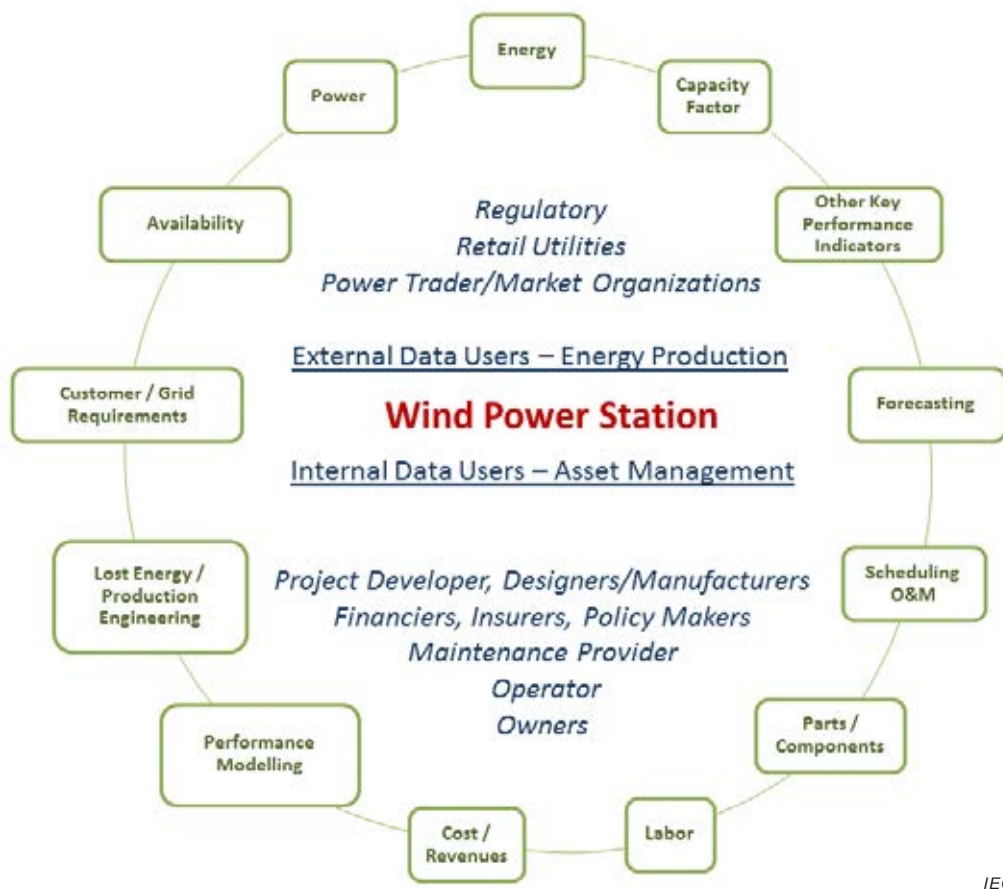
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## INTRODUCTION

The intention of this Technical Specification is to define a common basis for exchange of information on availability indicators between owners, utilities, lenders, operators, manufacturers, consultants, regulatory bodies, certification bodies, insurance companies and other stakeholders in the wind power generation business. 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. The information model forms the basis for how to allocate time for reporting availability indicators.



**Figure 1 – Data stakeholders for a wind power station**

This Technical Specification defines generic terms of wind turbine systems and environmental constraints in describing system and component availability, lifetime expectancy, repairs and criteria for determining overhaul intervals. The specification defines terminology and generic terms for reporting energy based generating unit availability measurement. A generating unit includes all equipment up to the point of interconnection<sup>1</sup>. Availability measurements are concerned with fractions of time and/or energy a unit is capable of providing service, taking environmental aspects into account. Environmental aspects will be wind and other weather conditions, as well as grid and substation conditions. The specification furthermore defines terminology and terms for reporting availability indicators based on energy production.

<sup>1</sup> Defined in IEC 60050-415:1999, 415-04-01.

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The project scope is accomplished by separating the technical specification into three parts:

- 1) IEC TS 61400-26-1, which specifies terms for time based availability of a wind turbine generating system;
- 2) IEC TS 61400-26-2, which specifies terms for production based availability of a wind turbine generating system;
- 3) IEC TS 61400-26-3, which specifies terms for time based and production based availability and services of a wind power station.

IEC TS 61400-26-3 is based on the models developed in IEC TS 61400-26-1 and IEC TS 61400-26-2.

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## WIND ENERGY GENERATION SYSTEMS –

### Part 26-3: Availability for wind power stations

#### 1 Scope

This part of IEC 61400, which is a technical specification, provides a framework from which time-based and production-based availability indicators of a wind power station can be derived. It unambiguously describes how data is categorised and provides examples of how the data can be used to derive availability indicators.

The approach is to apply the terms and definitions for the applied information models introduced in IEC TS 61400-26-1 and IEC TS 61400-26-2 to a wind power station.

The basic approach is based on the assumption that a wind power station may be modelled as one 'WTGS' representing a complete wind power station. The wind power station is made up of all WTGSs, functional services and balance of plant elements as seen from the point of common coupling.

It is not the intention of this specification to define how time-based and production-based availability shall be calculated. Nor is it the intention to form the basis for power curve performance measurements – which is the objective of IEC 61400-12. However, the annexes should be regarded as examples and guidelines for developing methods for calculation of availability indicators.

This document also includes informative annexes with:

- examples of how to expand the model to more services,
- examples of how to determine the information category for the wind power station,
- examples of how to expand the model to balance of plant elements,
- examples of determination of lost production,
- examples of availability algorithms for production based indicators,
- examples of other availability indicators,
- examples of application scenarios.

#### 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 (all parts), *International Electrotechnical Vocabulary* (available at <<http://www.electropedia.org/>>)

IEC 60050-415, *International Electrotechnical Vocabulary – Part 415 : Wind turbine generator systems* (available at <<http://www.electropedia.org/>>)

IEC TS 61400-26-1:2011, *Wind turbines – Part 26-1: Time-based availability for wind turbine generating systems*