

# Sandia Wind Turbine Reliability Workshop August 2-3, 2011 Albuquerque, NM

## Work in the IEC on Wind Turbine Availability

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# PT-26 – Availability Standard

## 61400-26 – Availability Standard for Wind Turbines and Windfarms

- **Convener** – Robert W. Sherwin, EAPC Wind, Norwich, Vermont, USA
- **Secretary** – Niels Raben, Dong Energy, Copenhagen, Denmark
- **Meetings:**
  - **Last Meeting:** 12<sup>th</sup> meeting held 7-10 June 2011 at Visby, Sweden
  - **Next Meeting:** 13<sup>th</sup> meeting to be Norwich, Vermont in September.

# PT-26 – Committee is Diverse...

## **34 members from 11 countries**

(SE, DE, ES, NO, GB, US, DK, AT, JP, ZA, RU)

## **Representing 10 WTG manufacturers**

(MHI, GAMESA, ENERCON, REPOWER, GE, VESTAS, ALSTOM, NORDEX, SIEMENS and ACCIONA)

And 1 controller manufacturer (Bachmann)

## **Representing 8 major owner operators**

(EON, IBERDROLA, STATKRAFT, ENBW, RWE, ESKOM, DONG ENERGY and NEXT ERA)

## **And 6 IE firms and institutions**

(SMTEKNIK, EAPCWIND, GLGH, WINDCONSULT, and SANDIA and JEMA)

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

**Committee Work Status:**

- **TS 61400-26-1 specify terms for time based availability of a wind turbine generation system**

- Part 1 is complete and expected publication is 3<sup>rd</sup> Q 2011

- **TS61400-26-1 specify terms for production based availability of a wind generating system**

- Part 2 is currently being drafted by the committee. Work to be complete 2012

- **TS61400-26-3 (Planned new work) specify terms for time and production based availability of a windfarm**

- Part 3 is future work not yet formally approved by the IEC. Work to begin in 2012-13

# Part 26-1: Time-based availability for wind turbines

## Scope

The scope of this technical specification is to define generic information categories to which fractions of time can be assigned for a wind turbine generating system (WTGS) considering internal and external conditions based on fraction of time and specifying the following:

- Generic information categories of a WTGS considering availability and other performance indicators
- Information category priority in order to discriminate between concurrent categories
- Entry and exit point for each information category in order to allocate designation of time
- Informative annexes including:
  - examples of optional information categories
  - examples of algorithms for reporting availability and performance indicators
  - examples of application scenarios

## The specification provides..

- Common standard definitions for communication among the industry stakeholders
- An information model comprised of different information categories requiring all calendar time to be distributed into one of the categories with priorities – Some mandatory, some optional.
- Information categories that are counters for accumulation of time periods with specified attributes.
- Informative annexes providing examples and verification scenarios.

# Information Category Overview

| Information categories        |                                 |                           |   |                                   |  |
|-------------------------------|---------------------------------|---------------------------|---|-----------------------------------|--|
| Mandatory Level 1             | Mandatory Level 2               | Mandatory Level 3         | Mandatory Level 4   | Optional Level 5                  |  |
| INFORMATION AVAILABLE<br>(IA) | OPERATIVE<br>(IAO)              | GENERATING<br>(IAOG)      | FULL PERFORMANCE<br>(IAOGFP)  |                                   |  |
|                               |                                 |                           | PARTIAL PERFORMANCE<br>(IAOGPP)                                     | Derated<br>Degraded               |  |
|                               |                                 | NON-GENERATING<br>(IAONG) | TECHNICAL STANDBY<br>(IAONGTS)                                      |                                   |  |
|                               |                                 |                           | OUT OF ENVIRONMENTAL SPECIFICATION<br>(IAONGEN)                     | Calm winds<br>Other environmental |  |
|                               |                                 |                           | REQUESTED SHUTDOWN<br>(IAONGRS)                                     |                                   |  |
|                               |                                 |                           | OUT OF ELECTRICAL SPECIFICATION<br>(IAONGEL)                        |                                   |  |
|                               |                                 | NON-OPERATIVE<br>(IANO)   | SCHEDULED MAINTENANCE<br>(IANOSM)                                   |                                   |  |
|                               |                                 |                           | PLANNED CORRECTIVE ACTION<br>(IANOPCA)                              |                                   | Retrofit<br>Upgrade<br>Other corrective action |
|                               | FORCED OUTAGE<br>(IANOFO)       |                           | Response<br>Diagnostic<br>Logistic<br>Failure repair                |                                   |  |
|                               | SUSPENDED<br>(IANOS)            |                           | Scheduled maintenance<br>Planned corrective action<br>Forced outage |                                   |  |
|                               | FORCE MAJEURE<br>(IAFM)         |                           |   |                                   |  |
|                               | INFORMATION UNAVAILABLE<br>(IU) |                           |   |                                   |  |



## The specification does not provide...

- Technical specifications to determine the method of information acquisition.
- Prescriptive requirements for criteria to establish levels of performance for availability.

## Definitions and methodology expected to be used...

- For common basis of reference in turbine supply and warranty contracts.
- For “legal” basis for insurance benefits and claims resolution.
- For interested parties to have a common basis to compare
- WTG and project performance and compatibility attributes.

## Definitions and methodology expected to be used...

- For operations and O&M forecasting, management and improvement of outcomes.
- For clarity of definitions for 3<sup>rd</sup> party engineers and financial institutions for lending and equity placement.
- Improved WTG Designs