International Standard IEC 61400-25

Information and information exchange for wind power plants

ENERGI E2 A/S

EnerNex Corporation

Garrad Hassan & Partners Ltd.

GE Energy

Hydro Tasmania

KC Associates, Inc.

natcon7

Q-Technology

Schwarz Consulting Company

Siemens Wind Power A/S

Statkraft

Vattenfall

Vestas Wind Systems A/S

W2E Wind to Energy GmbH

Introduction – Problems solved

The forthcoming international communication standard IEC 61400-25 **(Communications for monitoring and control of wind power plants) of the IEC TC 88** is developed in order to provide **uniform information exchange for monitoring and control of wind power plants.** It will eliminate the issue of proprietary communication systems utilizing a wide variety of protocols, labels, semantics, etc., thus enabling one to exchange information with different wind power plants independently of a vendor. It enables components from different vendors to easily communicate with other components, at any location and at any time. Object-oriented data structures make the engineering and handling of huge amounts of information provided by wind power plants less time-consuming and more efficient. Scalability, connectivity, and interoperability can be maximized to reduce cost and needed manpower

The IEC 61400-25 standard is a basis for simplifying the roles that the wind turbine and SCADA systems have to play. The crucial part of the wind power plant information, information exchange methods, and communication stacks are standardized. They build a basis to which procurement specifications and contracts could easily refer.

Scope

The focus of **IEC 61400-25** is on the communications between wind power plant components such as wind turbines and actors such as SCADA systems. Internal communication within wind power plant components is outside the scope of this standard.

The standard will be applied to any wind power plant operation concept, i.e., both in individual and integrated operations. The application area of IEC 61400-25 covers all components required for the operation of wind power plants, for example, not only the wind turbine, but also the meteorological system (reference wind mast), the electrical system, and the wind power plant management system.

For information associated with feeders and substations, the standard IEC 61400-25 refers to the standard series IEC 61850 (Communication networks and systems in substation). IEC 61400-25 relies on IEC 61850 – it mainly extends the information models for wind turbine applications.

IEC 61400-25 only defines how to model the information, information exchange and mapping to a specific communication protocols. The standard excludes a definition of how and where to implement the communication interface. However, the objective of the standard is that information associated with a single wind power plant component (such as the wind turbine) is accessible through standard means.

SCADA applications	This standard allows SCADA (supervisory control and data acquisition) systems to communicate with wind turbine controllers from multiple vendors. The standardized self-description can be used to configure SCADA applications. Standardization of SCADA applications are excluded in IEC 61400-25 but standardized common wind turbine information provides means for re-use of applications and operator screens for wind turbines from different vendors. From a utility perspective, unified definitions of common data minimize conversion and re-calculation of data values for evaluation and comparison of all their wind power plants.

Content

IEC 61400-25 defines all details required to connect wind power plant components in a multi-vendor environment and to exchange the information made available by a component. This is done by definitions made in the document or by reference to other commonly used standards, such as IEC 61850.

IEC 61400-25 consists of five parts:

Part 25-1 **Overall description of principles and models**: The first part offers an introductory orientation, an overview of crucial requirements and basic principles, and a modeling guide.

Part 25-2 **Information models**: The wind power plant specific name tagged information describes the crucial and common process data, meta-data (data about data, e. g. scale factor or engineering unit), and configuration data of a wind power plant. Process information is hierarchically structured and covers, for example, common process information found in the rotor, generator, converter, grid connection and the like. The data may be simple (value, time-stamp, and quality) or more comprehensive (adding more meta-data, for example engineering unit, scale, description, short hand reference, statistical and historical information of the process value).

Part 25-3 **Information exchange models**: All process and meta-data can be exchanged by corresponding services. Access to the meta-data (including configuration information with regard to the wind power plant information model and services and communication stacks) provides the so-called self-description of a device.

Part 25-4 **Mapping to communication profiles**: Mandatory mapping to web services using XML and SOAP; the services carry the exchanged values from the modeled information. Annexes include examples on mappings to other protocols, such as IEC 60870-5-101/104 and DNP3.

Part 25-5 **Conformance testing**: This part of IEC 61400-25 specifies standard techniques for testing of implementation conformance, as well as specific measurement techniques to be applied when declaring performance parameters.

Project team 25 within IEC TC 88 Wind turbines	Many of the major vendors, as well as users and integrators, are involved in the process. The list of participants includes representatives from ENERGI E2 A/S, EnerNex Corporation, GE Wind Energy, Hydro Tasmania, KC Associates, Inc., natcon7, Q-Technology, Schwarz Consulting Company, Siemens Wind Power A/S, Statkraft, Vattenfall, Vestas Wind Systems A/S, among others.
Project plan and time schedule	The committee drafts for voting (CDV) of the five parts of the standard were all approved in the CDV voting in January 2006. Comments from the national committees within IEC TC 88 are processed by the TC88 project team 25. The final standard IEC 61400-25 is expected to be available mid of 2006.
IEC TC88 Project Team 25 Contact information	- Anders Johnsson (Project leader), anders.johnsson@vattenfall.com, - Karlheinz Schwarz (Editor), schwarz@scc-online.de. - UCA (Utility Communication Architecture) International Users group: Kay Clinard, kayclinard@kcassociates.biz.

Seamless information and information exchange

Family of information and information exchange standards for electricity supply systems

IEC 61400-25	- Communications for monitoring and control of wind power plants - New project: Part 6 - Condition monitoring for wind turbines
IEC 61850	- Communication networks and systems in substations; Power Quality Monitoring (Core standard)
IEC 62344	- Hydroelectric power plants – Communication for monitoring and control
IEC 62350	- Communication Systems for Distributed Energy Resources (DER)