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**ENERGY INDUSTRY STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**NB/T 31069-2015**

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**Communications for monitoring and control of wind power  
plants - Mapping to communication profile**

风力发电场监控系统通信 映射到通信规约

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### Foreword

This document was issued on 2 April 2015 by the National Energy Administration of the PRC and takes effect on 1 September 2015.

It is a NB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 27.180, Chinese classification F 11.

This standard is an identical adoption of IEC 61400-25-4:2008 Wind turbines - Part 25-4: Communications for monitoring and control of wind power plants - Mapping to communication profile.

This standard is part of the NB/T 31068 to NB/T 31069 series on communications for

monitoring and control of wind power plants.

This standard was proposed by, and is under the administration of, the wind power standardization technical committee of the energy industry.

This standard is administered by the National Energy Administration.

## 1 Scope

NB/T 31069-2015 is the Chinese adoption of IEC 61400-25-4, the standard that maps the wind power plant information model onto real communication protocols. It exists because of a problem every wind farm operator meets on the first day of commissioning: the turbines come from one vendor, the substation from another, the SCADA system from a third, and none of them speak the same language. The IEC 61400-25 series solves that in two halves. One half, adopted in China as NB/T 31068, defines what the information is - an abstract model of the turbine, its rotor, converter, yaw system, alarms, logs and statistics, described in a way that is independent of any protocol. This part is the other half: it defines how that abstract model is carried over the wire. It specifies five alternative mappings, and the choice among them is the choice of what kind of system the wind farm is being connected to: SOAP web services for an IT-oriented integration, OPC XML-DA for a plant historian, IEC 61850-8-1 MMS for a substation automation system, IEC 60870-5-104 for a utility control centre, and DNP3 for the North American convention. All five are optional, but a system claiming compliance must implement at least one. The document covers data access and retrieval, device control, event reporting and logging, publisher and subscriber, device self-description through the data dictionary, and the classification of data types, and it defines the vocabulary the model uses - actor, alarm, command, communication function, control, data retrieval, diagnostics, event, function, intelligent electronic device, information, information exchange, information model and log. The bulk of the 257 pages is in the normative annexes, one per mapping, which give the service-by-service correspondence tables: Annex A alone runs from page 10 to page 145 for the web services mapping, and Annex D includes the detailed control sequence cases for direct control and select-before-operate under both normal and enhanced security. A further normative annex covers time synchronisation, and an informative one the practical interface implementation considerations. It was issued on 2 April 2015 by the National Energy Administration and took effect on 1 September 2015.

This standard specifies the mapping to specific protocol stacks, so providing the information encoding required for the exchange of information between a client and a remote server, including:

- data access and retrieval;
- device control;
- event reporting and logging;

- publisher and subscriber;
- device self-description, that is the device data dictionary;
- classification and mining of data types.

The mappings specified in this standard are:

- mapping to SOAP web services;
- mapping to OPC XML-DA;
- mapping to IEC 61850-8-1 MMS;
- mapping to IEC 60870-5-104;
- mapping to DNP3.

All the mappings are optional mappings, but in order to comply with the provisions of this standard at least one optional mapping shall be selected.

## 2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies to this document. For undated references, the latest edition, including all amendments, applies to this document.

DL/T 634.5104-2009 Telecontrol equipment and systems - Part 5-104: Transmission protocols - Network access for IEC 60870-5-101 using standard transport profiles (IEC 60870-5-104:2006, IDT)

DL/T 860.72-2004 Communication networks and systems in substations - Part 7-2: Basic communication structure for substation and feeder equipment - Abstract communication service interface (ACSI) (IEC 61850-7-2:2003, IDT)

DL/T 860.73-2004 Communication networks and systems in substations - Part 7-3: Basic communication structure for substation and feeder equipment - Common data classes (IEC 61850-7-3:2003, IDT)

DL/T 860.81-2006 Communication networks and systems in substations - Part 8-1: Specific communication service mapping (SCSM) - Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3 (IEC 61850-8-1:2004, IDT)

IEC 61400-25 (all parts) Wind turbines - Part 25: Communications for monitoring and control of wind power plants

DNP 3 Specification, Volume 2 to Volume 8: 2007

## 3 Terms and definitions

The following terms and definitions apply to this standard.

### 3.1 actor

A system that monitors and controls the wind power plant without taking part directly in generation, such as a data acquisition and supervisory control system. Note: other names are also used, such as central management system, supervisory control system and remote control system.

### 3.2 alarm

Wind power plant status information, being a safety declaration in which the wind turbine control system intervenes, such as on or off.

### 3.3 command

Control data for the behaviour of the system, such as permit or prohibit, valid or invalid.

### 3.4 communication function

The functions used by an actor to configure, execute and monitor the exchange of information with the wind power plant, for example operation and management functions.

### 3.5 control

Wind power plant operating functions used for replacing, modifying, inserting, switching, controlling, parameterising and optimising.

### 3.6 data retrieval

The operating function used to collect wind power plant data.

### 3.7 diagnostics

The management function used to set up and provide self-monitoring of the communication system.

### 3.8 electrical system

The equipment used in the wind power plant to collect and transmit the electrical energy produced by the wind turbine generator units.

### 3.9 event

A change of state, such as a condition, an alarm or a command.

### 3.10 function

A task performed by the control centre or by the wind power plant. Note: in general a function is made up of several sub-functions that exchange data with one another; under the influence of the definition of the function, the functions also exchange data with one another.