

# **IEC SC 8A: Grid Integration of Renewable Energy Generation -- Perspective, Activities and Plans**

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Making electrotechnology work  
for you.

**Dr. Bernhard Ernst  
Chairman of IEC SC 8A**

**Dr. Yongning CHI  
Secretary of IEC SC 8A**

**September 2017**

# Content



**Scope and Perspective**



**Latest Activities**



**Future Work Plans**

# 1. IEC SC 8A Scope and Perspective

2015-03-03/04, 1<sup>st</sup> scope harmonization meeting, Colorado, USA.

## □ Key outcomes

- Agreement on the modification of scope and title of SC 8A and TC 88, SC 8A changed the title with “**Grid Integration of renewable energy generation**” . (8A\_17\_Q)
- Agreement on the proposal for two AHGs to be organized under SC 8A. AHG1: Grid Code Compliance for grid connection of Renewable, and AHG 2: Renewable Energy Power Prediction. (8A\_18\_AC, 8A\_19\_AC)

# 1. IEC SC 8A Scope and Perspective

## IEC SC 8A perspective and focus on grid integration

- ❑ **Output variability of RE generation**
  - More power system flexibility are needed to balance the power variation and meet the system balancing requirement.
- ❑ **Power-electronization of RE generation**
  - The use of converter based RE generation brings big challenges to system operation, because of vulnerability and weak grid support capability.
- ❑ **“Today’s methods and responses to the challenges, they will not suffice as the proportion of renewables grows to 15 %, 25 % or even 35 % of the energy in some grids. ” (IEC grid integration of renewable white paper, 2012)**

# 1. IEC SC 8A Scope and Perspective



## Scope of SC 8A – Grid integration of renewable energy generation

- ❑ To prepare ... the development of **international standards and other deliverables** for grid integration of variable power generation from renewables such as PV and wind energy with emphasis on overall system aspects of electricity supply systems (grids) as defined in TC 8 scope.
- ❑ SC 8A **focuses on the impact of a high percentage of renewables** connected to the grid, considering that their **variability and predictability** impact the functioning of the whole electricity grid.
- ❑ It covers grid integration standards for renewable energy..... includes **requirements** for interconnection and related **grid compliance tests**, as well as standards or best practice documents for planning, modeling, forecasting, assessment, control and protection, scheduling and dispatching of renewables with a grid-level perspective.

# Content



-  **Scope and Perspective**
-  **Latest Activities**
-  **Future Work Plans**

## 2. Latest activities of IEC SC 8A



□ Title :

**Grid Integration of Renewable Energy Generation**

□ Secretariat :

**China**



| Role         | Name  | Nationality |
|--------------|---|-------------|
| Chairman     | Mr. Bernhard Ernst  | DE          |
| Secretary    | Mr. Yongning CHI  | CN          |
| P-Member: 17 | Australia, China, Germany, Denmark, Spain, Finland, France, United Kingdom, Italy, Japan, Malaysia, Netherlands, United States of America, Russian Federation, Switzerland, Sweden, South Africa. |             |
| O-Member: 11 | Austria, Belgium, Canada, Czech Republic, Israel, Mexico, New Zealand, Poland, Portugal, Thailand, Korea, Republic of   |             |

## 2. Latest activities of IEC SC 8A

### □ Existing Working Groups in IEC SC 8A

| WG No. | Title   | Convener                               | Num of experts |
|--------|---|--|----------------|
| WG 1   | Terms and definitions of grid integration of renewable energy generation        | Mr. Lingzhi ZHU                        | 26             |
| WG 2   | Renewable energy power prediction   | Mr. Shuanglei Feng                     | 27             |
| AHG 3  | Roadmap of grid integration of renewable energy generation                      | Mr. Bernhard Ernst<br>Mr. Yongning Chi | 25             |
| JWG 4  | Grid code compliance assessment for grid connection of wind and PV power plants | Mr. Qing LI                            | 29             |



## 2. Latest activities of IEC SC 8A



**2016-10-12, The third plenary meeting of IEC SC 8A, Frankfurt, Germany.**

### □ Key decisions

- DECISION 2: The request for WG 1 - Grid integration of renewable energy generation - Terms, definitions and symbols to extend the CD stage to June 2017 was approved.
- DECISION 3: Mr. Li Qing was appointed by SC 8A meeting as the convenor of new JWG - Grid code compliance assessment for grid connection of wind and PV power plants.
- DECISION 5: [Korea, Republic of](#) was moved to O-Membership for the reason of inactive participation.
- DECISION 6 : **SC 8A next plenary meeting** will be in conjunction with next TC 8 meeting, and **take place in Vladivostok, Russia.**

## 2. Latest activities of IEC SC 8A



### WG 1 perspective and activities

- **WG 1: Terms and definitions of grid integration of renewable energy generation (2016-01-22 , 8A/25/RVN)**
  - Work out the standard with regard to terms, definitions and symbols which will be used by all the publications and deliverables of RE grid integration in IEC.
  - Covering the following part: Renewable energy generation, Grid requirements, Modelling, analysis and planning, Control and Protection, Power prediction, Grid compliance test and assessment, Scheduling, dispatching and market
  - The kick-off meeting, 2016-07-06, Beijing. The second meeting, 2016-10-10, Frankfurt.
  - **The committee draft (CD) should be completed for comment before Sep 2017.** About 2 meetings before the WD is submitted to SC8A (face to face or by web conference).

## 2. Latest activities of IEC SC 8A



### WG 2 perspective and activities

#### □ **WG 2: Renewable energy power prediction**

**(2016-02-05 , 8A/26/AC)**

- **DECISION** of AHG 2 Meeting in 2015 October. All members of AHG2 agree that the next step is to setup a working group and develop a Technical Report addressing best practices around power prediction and forecasting, which is approved on 2016-02-05.
- **Scope of WG 2:** The scope of this TR is to describe common practices and state of the art for RE power prediction. It includes general data demands, method of renewable energy power prediction and prediction error evaluation. The report outlines the basic aspects of RE power prediction.
- The kick-off meeting, 2016-07-07, Beijing. **The second meeting, 2016-10-11, Frankfurt.**
- **A new outline of the report will be drafted. The WG experts should read and comment. According to the discussion, the convener will ask all the experts to make a decision about which sections of the report they will work on.**

## 2. Latest activities of IEC SC 8A



### AHG 3 perspective and activities

#### □ AHG 3: Roadmap of grid integration of renewable energy generation (2016-09-02 , 8A/29/AC)

- Task of AHG 3: To collect information from regulatory contents including network codes, policies, relevant issues in different countries, and work out a roadmap for SC 8A, which will mainly address the technology development tendency, nowadays best practices of RE grid integration, and the future standardization activities of SC 8A, in cooperation with the other relevant TCs and liaison organizations.
- The kick-off meeting, 2017-02-14, Miami.
- The second meeting, 2017-05-23, Kassel, Germany.
- The version 2.0 report has been completed.

#### □ 8A/33/DC

- ✓ Activity 1 - Project team establishment; kick-off meeting of AHG 3 (scheduled in Dec, 2016 or Jan, 2017)
- ✓ Activity 2 - Survey the technology development, practices; 2<sup>nd</sup> meeting of AHG 3 (scheduled in Apr, 2017)
- ✓ Activity 3 - Survey the existing standards and gaps analysis 3<sup>rd</sup> meeting of AHG 3 (scheduled in Aug 2017)
- ✓ Activity 4 – First draft roadmap report preparation; Circulate the first draft report and call for comments by Dec, 2017.
- ✓ Activity 5 - Second draft roadmap report preparation; 4<sup>th</sup> meeting of AHG 3 (scheduled in Dec, 2017)
- ✓ Activity 6 - Strategic study and the future standardization; 5<sup>th</sup> meeting of AHG 3 (scheduled in April, 2018)
- ✓ Activity 7 - Final report preparation and dissemination; 6<sup>th</sup> meeting of AHG 3 (scheduled in Aug 2018)  
Finalize the Roadmap report of AHG 3 and report dissemination.

## 2. Latest activities of IEC SC 8A

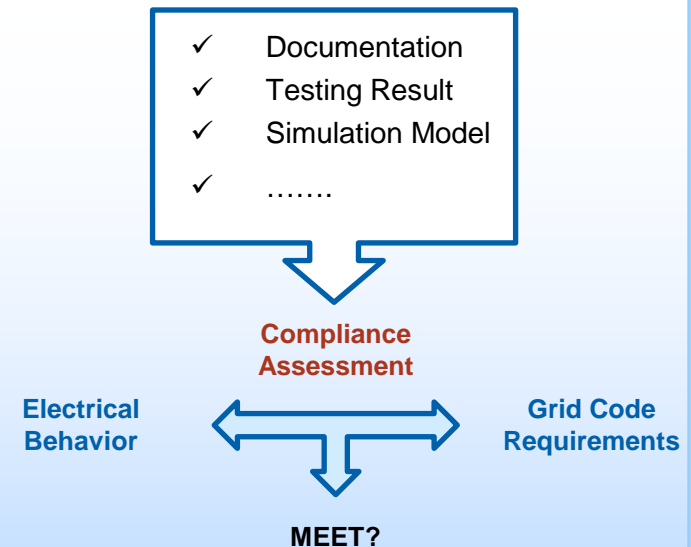


### JWG 4 perspective and activities

#### □ JWG 4: Grid code compliance assessment for grid connection of wind and PV power plants

(2016-12-09 , 8A/34/RVN)

- Joint working group with TC82 and TC88
- Task: To develop a TS on grid code compliance assessment for grid connection of wind and PV power plants.
- **Compliance assessment** is the process of determining whether the electrical behavior of wind and PV power plants meet technical requirements in grid codes.
- The kick-off meeting, 2017-04-19, Beijing. Miguel Lavin was nominated as the co-convenor.
- The first draft will be sent to all expert before August 15 and all experts will have 6 weeks to review prior to next meeting.
- Date and place of next meeting is Oct 3rd in Vladivostok.



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-  **Scope and Perspective**
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-  **Future Work Plans**

## 3. Future Work plans

**SC 8A roadmap will further investigate the related issues**

- **Grid requirements (Network code, or Essential Reliability Services)**
  - In Europe, North America and China, renewable energy grid connection requirements are mostly developed by some electricity association or power grid companies.
  - Standards should be developed and kept continuously updated to meet the grid needs and reflect advances in RE technology. For example, the capability to provide **HVRT, Inertia Response, Primary Frequency Control** might be required in the near future.

# 3. Future Work plans

SC 8A roadmap will further investigate the related issues

## □ Integration planning and evaluation

- Planning and evaluation are hot-topics since the operation and stability of the existing power system will be greatly affected with the large scale renewable power integration. A lot of research and analysis works have been done by the research institutes and international organizations.
- **Modelling, methodologies and evaluation indices** related to integration planning and evaluation are the most important parts should be considered in future activities.



## 3. Future Work plans

SC 8A roadmap will further investigate the related issues

### □ System operation, control and protection

- Many new requirements to system operation and control are emerging, and technique application related to V and f control (**AVC & AGC**), RE plant cluster control, **Virtual Power Plant (VPP)**, System Security Control, Grid Protection, **System Reserve** and **technical aspect of Power Market** need to be considered in roadmap project.

# 3. Future Work plans

## SC 8A focusing topics and observations

- **Preparation of the new proposals of relevant international standards**
  - Grid requirements to RE voltage and frequency control, dynamic performances.
  - Technical requirements and functional specifications of **renewable energy generation cluster control.**
  - **Renewable energy generation connecting into weak AC power system; offshore wind power.**
- **More contribution and expert participation are needed from each SC 8A NC, relevant TC/SCs, and cooperation with other International academic and standardization bodies is also needed.**

# Thank you!

In case of any questions, please contact:

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