

# Status and Plan of SC8A WG2

## Renewable Energy Power Prediction



Mr. Zheng Wang  
Secretary of WG2  
China Electric Power Research Institute

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# The information of WG2




2016-2-5:

Set up Working Group (WG2): Renewable Energy Power Prediction(47 experts from 13 countries)

## Task of WG2:

To develop a Technical Report addressing best practices and state of the art around RE power prediction.

- Technical Report 63043 was published in November 2020.
- 138 pages, 60000 words, 10 chapters

<p>This is a preview - click here to buy the full publication</p>  <p><b>IEC TR 63043</b> Edition 1.0 2020-11</p> <p><b>TECHNICAL REPORT</b></p> <p>Renewable energy power forecasting technology</p> <p>INTERNATIONAL ELECTROTECHNICAL COMMISSION</p> <p>ICS 29.020 ISBN 979-2-8322-9079-9</p> <p>Warning! Make sure that you obtained this publication from an authorized distributor.</p> <p>© Registered trademark of the International Electrotechnical Commission</p>	<p>This is a preview - click here to buy the full publication</p> <p>– 2 – IEC TR 63043:2020 © IEC 2020</p> <p>CONTENTS</p> <p>FOREWORD ..... 7</p> <p>INTRODUCTION ..... 8</p> <p>1 Scope ..... 10</p> <p>2 Normative references ..... 10</p> <p>3 Terms, definitions and abbreviated terms ..... 10</p> <p>3.1 Terms and definitions ..... 11</p> <p>3.2 Abbreviated terms ..... 13</p> <p>4 General introduction to renewable energy power forecasting ..... 15</p> <p>4.1 History of RPF ..... 15</p> <p>4.1.1 General ..... 15</p> <p>4.1.2 Development of wind power forecasting ..... 16</p> <p>4.1.3 Development of PV power forecasting ..... 17</p> <p>4.2 Use of RPF ..... 17</p> <p>4.2.1 General ..... 17</p> <p>4.2.2 RPF for system operations ..... 18</p> <p>4.2.3 RPF for power trading ..... 18</p> <p>4.2.4 RPF for operations and maintenance ..... 18</p> <p>4.3 Methods for forecasting renewable power ..... 19</p> <p>4.3.1 General ..... 19</p> <p>4.3.2 Classification of forecasting methods ..... 19</p> <p>4.3.3 Classification based on time scale ..... 21</p> <p>4.3.4 Classification based on spatial range ..... 22</p> <p>4.3.5 Classification based on the forecasting model ..... 22</p> <p>4.3.6 Classification based on the forecasting form ..... 24</p> <p>4.4 Summary ..... 26</p> <p>5 NWP technology ..... 26</p> <p>5.1 General ..... 26</p> <p>5.2 Concept and characteristics of NWP ..... 26</p> <p>5.3 Influence on RPF accuracy ..... 27</p> <p>5.3.1 Sensitivity analysis ..... 27</p> <p>5.3.2 Error source analysis ..... 28</p> <p>5.4 Technology progress for improving NWP ..... 29</p> <p>5.4.1 General ..... 29</p> <p>5.4.2 Global model ..... 29</p> <p>5.4.3 Regional model ..... 31</p> <p>5.5 Key techniques for improving the forecast accuracy of regional models ..... 31</p> <p>5.5.1 Improve the accuracy of the initial conditions ..... 31</p> <p>5.5.2 Ensemble prediction systems ..... 32</p> <p>5.5.3 Establish regional customized forecasting model ..... 36</p> <p>5.5.4 NWP post-processing ..... 36</p> <p>5.6 Summary ..... 39</p> <p>6 Statistical methods ..... 39</p> <p>6.1 General ..... 39</p> <p>6.2 Methods ..... 42</p> <p>6.3 Applications ..... 42</p> <p>6.3.1 General ..... 42</p>	<p>This is a preview - 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● Proposed: 2014-11-13

● Approved: 2020-09-11

# The information of WG2

- **TS-Specification** for evaluation of renewable energy power forecasting results.(Approved-IEC TS 63531 ED1)
- Project leaders: Dr. Shuanglei Feng(CEPRI) and Dr. Corinna Möhrlein(WEPROG)

2	<b>Specification for evaluation of renewable energy generation forecasting results (OUTLINE)</b>
3	
4	<b>1 Scope</b>
5	<b>2 Normative references</b>
6	<b>3 Terms and definitions</b>
7	probabilistic forecasting, ramping and ramp forecasts, mixed renewable stations, target groups and applications, metric calculations and choice of metrics etc.
8	
9	<b>4 Data preparation</b>
10	4.1 Processing method for forecasting results data (time resolution, time scale, data length etc.)
11	4.2 Processing method for measurement data (time resolution, data length, quality control, curtailment etc.)
12	
13	<b>5 Evaluation framework</b>
14	The overall process and steps of evaluation. Firstly, collecting data sets. Secondly, data processing, and so on.
15	
16	<b>6 Evaluation method</b>
17	Targeting different applications, present evaluation methods separately.
18	<b>7 Normative requirements for evaluation result documents</b>
19	Including the method based on which the evaluation results are provided and the quality control method of data sets.
20	
21	<b>Annex A. Mathematics function</b>
22	<b>Annex B. Document example</b>

**SC 8A** Grid Integration of Renewable Energy Generation

Scope Structure **Projects / Publications** Documents Votes Meetings Collaboration Platform

Work programme > [Project: PNW TS 8A-127 ED1](#)

**Detail**

Committee	Working Groups	Project Leader	Current Status	Frcst Pub Date	Stability Date
SC 8A	<a href="#">WG 2</a>	Mr Shuanglei Feng	PNW	2026-12	

**History**

Stage	Document	Downloads	Voting Result	Decision Date	Target Date
prePNW				2023-07-13	
PNW	<a href="#">8A/127/NP</a>	113 KB		2023-07-14	
PRVN					2023-10



# Main works from last meeting



- Kick-off meeting(Chinese team): 2023-10-13, Changchun;
- Kick-off meeting(Working Groups): 2024-01-25,26, Singapore;
- IEA Workshop: April 10/11, 2024 | Risø, DK;
- TS WD Workshop(Chinese team): 2024-8-1,2, Guangdong.

**IEC SC/8A WG2**  
International Electrotechnical Commission Technical Committee No. SC/8A: Renewable Energy Integration Working Groups 2: Renewable Energy Generation Power Forecasting

**Meeting Minutes**

**Location:** IEC Asia-Pacific Regional Centre (No.2 Bukit Merah Central, Singapore)  
**Date:** Jan 25-26, 2024 from 9:00-17:00.  
**Convener:** Mr. Shuanglei Feng  
**Co-convener:** Ms. Corinna Möhrlein  
**Secretary:** Mr. Zheng Wang

**Meeting participants:**

- Bo Wang (CEPRI, Beijing, CN, Vice director of Forecasting and Prediction Division, Professor of Engineering)
- Corinna Möhrlein (WEPROG, Denmark, industry forecast provider, IEA Wind Task 51 Management Workpackage leader, first author of IIA Wind Recommended Practice for the Implementation of Renewable Energy Forecasting Solutions (IEAWind RP))
- Fei Wang (North China Electric Power University, Beijing, CN, Professor)
- Gregor Giesel (Technical University of Denmark, DTU, Wind, Head of Section Renewable Plants in Weather Driven Energy Systems (RES))
- Haohuai Wang (China South Power Grid (Guangzhou, serves 5 provinces), Vice Manager of dispatch and control center department)
- Jie Yan (North China Electric Power University, Beijing, CN, Professor)
- Li Li (North China Electric Power University, Beijing, CN, Professor)
- Lijie Wang (Beijing Information Science and Technology University, CN, dissertation on wind power prediction, Professor)
- Mao Yang (Northeast Electric Power University, Vice president of School of Electronic Engineering, Professor)
- Ming Yang (Shandong University, Vice president of School of Electronic Engineering, Professor)
- Shuanglei Feng (CEPRI, Convener)
- Tohiya Nanahara (Aichi Institute of technology, JP, Professor)
- Weisi Dang (China South Power Grid, dispatch and control center department)
- Xiaosheng Peng (Huazhong University of Science and Technology, Wuhan, TR co-author)
- Zheng Wang (CEPRI, CN, secretary)

**Main Agreements**

1. Focus on the distinguish with TR. IEC requires TS to be blinding, if the new item doesn't present the blinding characteristics, in the periods of voting for approving our new item, there will be a very high probability to cancel our item or publish as a TR. If we just give a series of evaluation methods in new item, it's not necessary to build this new item, since there are some comments about evaluation methods in IEC TR 63043/Renewable energy generation forecasting technology). There must be contain of evaluation methods and performance requirements for the RP forecasting results, not just evaluation methods. Although different time scale, updating times and so on in different countries, however we must solve various problems and achieve the target.

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# Draft--outline



1. Scope
2. Normative reference
3. Terms and definitions
4. General framework
5. Data prepare
6. Matrix statistic
7. Results evaluate(data sets)
8. Evaluation report

# Draft--scope



This document / This part of IEC TS 63531 gives guidelines on evaluation of renewable energy power forecasting, including data preparation, matrix statistics, results evaluation and evaluation report.

This standard only includes the evaluation of the prediction results of renewable energy power generation, and does not cover how to predict renewable energy power generation and the technical specifications that should be met in the prediction of renewable energy power generation.

This document is applicable to renewable energy power forecasting service providers, renewable energy power forecasting results application institutions, and renewable energy power forecasting technology research institutions. Support forecasting service providers and research institutions to discover the problems existing in renewable energy power generation power forecasting technology, so as to improve forecasting technology and improve forecasting accuracy; Support forecasting application institutions to have an in-depth understanding of the deviation characteristics of the prediction results of renewable energy power generation, and ensure the safe, economical and stable operation of the power system with the best procurement forecasting services and appropriate use of the forecasting results.

The renewable energy in this document mainly refer to wind power, photovoltaic power generation, and a mixture of the two.

# Draft--Normative references



- ◆ IEC 61400-25 (all parts), *Communications for monitoring and control of wind power plants*
- ◆ IEC 61724-1:2021, *Photovoltaic system performance - Part 1: Monitoring*
- ◆ IEC 61400-26-1 :2019, *Wind energy generation systems - Part 26-1: Availability for wind energy generation systems*
- ◆ IEC TS 61724-3:2016, *Photovoltaic system performance - Part 3: Energy evaluation method*

# Draft—general framework



Data Prep.

- Data quality checking
- Exception data handling
- Sample size confirmation
- Data timescale alignment

Matrix Stat.

- Statistical matrix construction
- Statistical matrix calculations

Results Eva.

- Evaluation rule development
- Result performance judgment

Report

- Report format confirmation
- Preparation of an outline of the report
- Preparation of the content



# Plan



Extending the deadline of TS CD to June 2025.

1. Nov. 2024: TS WD-V1
2. Dec. 2024 and Jan. 2025: Comments for WD-V1
3. Feb. 2025 Revising to WD V2
4. March. 2025: Workshop for WD V2

# Future Meeting and Standards



- Meeting:
  - Virtual meeting for TS CD, Nov. 2024.
  - Workshop for TS CD, March. 2025, Pending.
- PWI:
  - Multi-time scale generation capacity prediction technology and application of new energy participating in the electricity market(TR)

***Thank you for your attention!***

