

STRATEGIC BUSINESS PLAN (SBP)

IEC/COMMITTEE:	SECRETARIAT:	DATE:
TC 88	Denmark	2025-06

Please ensure this form is annexed to the Report to the Standardization Management Board if it has been prepared during a meeting or sent to the IEC Secretariat promptly after its contents have been agreed by the committee.

A. STATE TITLE AND SCOPE OF COMMITTEE

Are there any new or emerging trends in technology that will impact the scope and work activities of the committee? Please describe briefly.

Do you need to update your scope to reflect new and emerging technologies? If yes, will these changes impact another committee's scope or work activities?

If yes, describe how these will impact another committee(s) and list the committee(s) it would impact

TC 88 Wind Energy Generation Systems

- To develop and maintain standards in the field of generation of electrical energy from wind power plants onshore and offshore, and their integration in, and interaction with systems with which energy is exchanged inside the power plant (including power-to-X *) applications).

The standards shall ensure international harmonization of technical requirements to secure that wind power plants can be operated safely with minimum impact to the environment. To this end, the scope includes standards for wind resource assessment, site-specific conditions and site suitability, functional safety and structural integrity of wind energy systems as well as requirements to engineering models, measurement techniques and test procedures. The standards cover the complete lifecycle from design through production, construction, operation, maintenance, to decommissioning, dismantlement, material recovery and recycling.

- To facilitate the integration of wind energy as a sustainable and dependable significant generation source in the global energy systems and support technology innovation.
- IEC/TC 88 develops and maintains a portfolio of technical standards for all systems and sub-systems of wind power plants and wind turbines, including mechanical and electrical systems, support structures, control and protection systems as well as information exchange and communication systems inside the power plant, as well as the implementation of grid connection requirements for wind power plants. The standard portfolio also addresses the interaction of wind turbines with other electricity generating technologies, energy storage means and technologies to generate and refine electro fuels inside the power plant**).
- IEC/TC 88 develops standards based on, and in agreement with, other appropriate IEC- and ISO-standards, and collaborates and will pursue liaisons with other Technical Committees to achieve a coherence between standards from multiple domains. Focus of TC 88's standards are on functionality, performance, reliability and safety whilst not over-constraining design, in order to allow and promote innovation and cost-efficiency in the field of wind energy generation. Their purpose is also to provide a basis for quality assurance and conformity assessment.

*)Power-to-X (from draft [ISO 24078 – Hydrogen in energy systems- Vocabulary](#)

**) inside the power plant: behind the point of connection defined as: "reference point on the electric power system where the user's electrical facility is connected [SOURCE: IEV 617-04-01]"

B. MANAGEMENT STRUCTURE OF THE COMMITTEE

Describe the management structure of the committee (use of an organizational chart is acceptable) (should be integrated by IEC Secretariat automatically) and, if relevant (for example an unusual structure is used), provide the rationale as to why this structure is used.

Note: Check if the information on the IEC website is complete.

When was the last time the committee reviewed its management structure? Describe any changes made. When does the committee intend to review its current management structure? In the future, will the committee change the current structure, for example due to new and emerging technologies, product withdrawal, change in regulations etc. Please describe.

Make sure the overview includes:

- any joint working groups with other committees,
- any special groups like advisory groups, editing groups, etc.

TC 88 management structure is very flat with leadership consisting of Chair and secretariat. Project leaders report to this leadership team. As TC 88 has been steadily growing a renewed interest has been discussed in resurrecting a Chairmans Advisory Group to discuss overall strategy and priorities, potential scope overlap, review draft work proposals etc. Currently TC 88 has 5 WG's, 11 PT's, 10 MT.

TC 88 has six Joint working groups:

- JWG 1: Wind turbine gearboxes linked to ISO/TC 60
- JWG 25: Communications for monitoring and control of wind power plants linked to TC 57
- JWG 4: Grid code compliance assessment for grid connection of wind and PV power plants Managed by SC 8A
- JWG 5: System issues regarding integration of wind and PV generation into bulk electrical grid Managed by SC 8A
- JWG 31: Subsea electrical power equipment and systems linked to IEEE PCIC WG 61886 and TC 88 Managed by TC 18
- JWG 1: Renewable energy off grid systems, including access to electricity, rural electrification and hybrid systems Managed by TC 82

TC 88 has a joint working forum on validation and verification of models with the Wind energy Sector under IECRE

Ad-hoc groups are used for specific short term needs.

C. BUSINESS ENVIRONMENT

Provide the rationale for the market relevance of the future standards being produced in the committee.

If readily available, provide an indication of global or regional sales of products or services related to the committee work and state the source of the data.

Specify if standards will be significantly effective for assessing regulatory compliance.

In many cases wind energy is one of the most cost effective power generation methods. As a result wind energy installations are still rapidly increasing worldwide with 93.6GW capacity added in 2021 (<https://gwec.net/global-wind-report-2022/>). Major markets were China, USA, Brazil, Vietnam and the United Kingdom. Offshore wind traditionally has been mainly installed in Europe but other markets (such as China) have shown rapid growth in recent years. Several other countries (e.g. Brazil, USA, Japan) have shown large deployment pipelines.

Given an increase in political instability there is also a desire for countries to more energy independent, which has stimulated the market for renewables in certain parts of the world.

https://iea-wind.org/wp-content/uploads/2022/12/IEA_Wind_TCP_Annual_Report_2021.pdf

<https://www.irena.org/Publications/2023/Jul/Renewable-energy-statistics-2023>

D. MARKET DEMAND

Provide a list of likely customers of the standards (suppliers, specifiers, testing bodies, regulators, installers, other committee's etc.). Do not specify company names, only categories of customers.

Third party certification of the technology is very common in the market and the vast majority of utility scale wind turbines hold certificates that are based on the TC 88 standards. Those standards are often supplemented with country specific building code requirements and electric codes. As such the TC 88 standards are very well accepted by the industry and its stakeholders (owner/operators, insurance companies, finance industry).

Standards are used by the OEMs (Original Equipment Manufacturers) and consultants for design, testing laboratories for testing, certification bodies for confirmatory assessment and certification, and end users to reduce risk in the performance of the wind plants.

TC88 standards are also increasingly used by, and co-developed with, OCMs (Original Component Manufacturers) who to an increasing amount take up system deliveries as wind turbines mature and industrialize.

Several countries require compliance with IEC standards (or local standards based on IEC standards) in order to obtain building permits or financial incentives.

Close co-operation with the IECRE System helps to establish the TC 88 suite of Standards as the global de facto criteria for wind energy systems – this co-operation is likely to increase and newer feedback loops are likely to get established. IECRE feedback on TC 88 standards through proposed clarification sheets has been invaluable.

E. SUSTAINABLE DEVELOPMENT GOALS

Indicate the Sustainable Development Goals (SDGs) that are addressed by work within the committee. Indicate each SDG Indicator affected (reference spreadsheet available at <https://www.iec.ch/SDG/>, and provide specific information about how the committee is addressing the SDG. Consider both direct and indirect impacts of the work of the committee.

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| ☐ GOAL 1: No Poverty | ☐ GOAL 10: Reduced Inequality |
| ☐ GOAL 2: Zero Hunger | ☒ GOAL 11: Sustainable Cities and Communities |
| ☒ GOAL 3: Good Health and Well-being | ☒ GOAL 12: Responsible Consumption & Production |
| ☐ GOAL 4: Quality Education | ☒ GOAL 13: Climate Action |
| ☒ GOAL 5: Gender Equality | ☐ GOAL 14: Life Below Water |
| ☒ GOAL 6: Clean Water and Sanitation | ☐ GOAL 15: Life on Land |
| ☒ GOAL 7: Affordable and Clean Energy | ☐ GOAL 16: Peace, Justice Strong Institutions |
| ☒ GOAL 8: Decent Work & Economic Growth | ☒ GOAL 17: Partnerships to achieve the Goals |
| ☒ GOAL 9: Industry, Innovation & Infrastructure | |

Goal 3 (indirect): adoption of Renewable Energy technologies like wind energy can contribute to good health and well-being (i.e. through improved air quality)

Goal 5 (indirect): the wind energy systems community proactively supports gender equality and for many stakeholders this is an important aspiration and is being realised

Goal 6 (indirect): Wind energy does not consume water during power production leaving valuable water resources for human consumption

Goal 7 (direct): Wind energy provides clean energy, in many cases wind energy is the lowest cost of energy generation

Goal 8 (indirect): Wind energy is often deployed in rural environments with low degree of industrialization. It creates qualified jobs, especially for maintenance over the +20 years lifecycle, which can support education, economic growth and welfare in these communities.

Goal 9 (direct): Offshore wind industry has recently prepared in advance for an incoming trend toward P to X broadening its infrastructure in the field of production of H₂, ammonia, etc. using offshore wind energy. Also, Floating offshore industry has demonstrated the technology innovation, such as wind power generation with both high-capacity factor and cost reduction by novel floaters in deep water.

Goal 11 (indirect): current utility scale wind energy systems are typically >5MW with Offshore Wind Turbines of ~15MW being demonstrated however smaller more mature systems have a role in emerging economies in terms of their sustainability where large sophisticated grid has not yet been developed

Goal 12(indirect): wind energy stakeholders are constantly striving to become more sustainable, this includes utilization of recyclable and environmentally friendly materials and maximizing product life.

Goal 13 (direct): Clean energy such as wind energy directly supports climate action by reducing greenhouse gas emissions.

GOAL 17 (DIRECT): TC 88 CLOSELY COLLABORATES WITH MANY OTHER STANDARDS COMMITTEES LIKE TC 82, TC 114, ISO, CENELEC CLC 88, ETC. MANY EXPERTS IN TC 88 ARE ALSO ACTIVE IN IECRE.

F. TRENDS IN TECHNOLOGY AND IN THE MARKET

If any, indicate the current or expected trends in the technology or in the market covered by the products of your committee.

Until today, the efficiency of wind turbines has improved by growing their size. The largest operational offshore prototypes deliver 15MW, with models up to 18MW being announced. Onshore, commercial WTG exceed 7MW, and 10MW WTG are in development. At the same time, the industry pursues other routes to increase efficiency, such as standardization or modularization. Both approaches required a high pace of technical innovation which continuously raises new design- and verification considerations that need to be reflected in the standards.

Although the majority of wind turbines and wind power plants would be readily recyclable, wind turbine blades traditionally were not. Industry is spending significant resources at also making blades fully recyclable. Additionally, the industry is moving to longer design lives, moving from 20 years to 30 or even 40 years). TC 88 has documents under development for the life extension and through life management of wind turbine to extend the useful life of wind turbines designed for a 20 year design life.

Traditionally offshore wind has been fixed bottom. New markets, such as in Asia and the west coast of the United States, and new deployment areas in existing markets will require floating offshore wind plants. This

is still somewhat new territory and there is lot of knowledge development happening which will need to be incorporated in the floating wind standards.

Wind power plants are increasingly integrated with other technologies such as PV and Storage. There is also a trend towards direct use of renewable energy to create molecules such as hydrogen, methane or ammonia as energy carriers. This integration requires standardization and coordination around interfaces and controls

G. SYSTEMS APPROACH ASPECTS (SEE DIRECTIVES PART 1 ANNEX SO)

Does your committee have a need for a systems approach?

If so:

- Will the Systems work be in a single committee or in multiple committees?
- Will a Standardization Evaluation Group (SEG), Systems Committee (SyC), or Systems Resource Group be required?
- Is your committee work of relevance to ISO?
- Is or are there fora or consortia working in parallel to IEC? Is there a chance to integrate this work in your committee?

This should not only be restricted to the customer/supplier relationships with other committees indicating types of co-operation (e.g. liaisons, joint working groups) but be of a more generic nature.

There is no additional need for a systems approach. In a sense the wind turbine can already be considered a system, and the wind plant again is a system, TC 88 is able to cover all aspects of those systems. Beyond that wind plants are a part of the electrical energy supply system. To that end TC 8/SC8A and TC 88 have established a liaison

As wind turbines contain large mechanical structures TC 88 relies on standards developed in ISO regarding structural reliability, bearings, gears, etc.. For wind turbine gearboxes a JWG with ISO TC60 was formed. Offshore wind turbine standards build on the expertise in ISO TC 67/ SC7 regarding offshore structures. Direct conversations were held with TC 67 to assure good scope differentiation and alignment.

H. CONFORMITY ASSESSMENT

With reference to Clause 33 of Part 2 of the ISO/IEC Directives, are all your publications in line with the requirements related to conformity assessment aspects?

Will the committee publications be used for IEC Conformity Assessment Systems (IECEE, IECEx, IECQ, IECRE)?

Will any of your standards include test specifications, reproducible test requirements, and test methods?

Are there likely to be special conformity assessment requirements generated by any standards projects? If yes, list which projects.

The Wind energy sector in IECRE almost exclusively relies on the IEC 61400 standards series produced in TC 88. There are liaisons in place between IECRE and TC 88 to assure coordination and alignment and a Joint Working Forum was established on validation and verification as that subject touches both groups.

IECRE and TC 88 work closely together to assure no conformity assessment content is used in the TC 88 documents.

Several TC 88 standards (e.g. 61400-11, -12, -13, -15, -21, -23,...) produce test methods that result in reproducible high quality test results that are used for conformity assessment.

I. 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES

STRATEGIC OBJECTIVES 3-5 YEARS	ACTIONS TO SUPPORT THE STRATEGIC OBJECTIVES	TARGET DATE(S) TO COMPLETE THE ACTIONS
Increase quality of documents: Continue transition to more concise easier to maintain documents with more succinct scopes. Make sure requirements are objectively verifiable. Make sure documents fit with other standards and TC 88 objectives.	As new documents are proposed assess whether all contents should be in one document nor in multiple distinct documents. As documents come up for revision challenge Maintenance teams to take close look on whether document is a candidate for restructuring. Content should be reviewed to make sure requirements are clear and verifiable. A CAG can help review how newly proposed documents fit with others and minimize overlap or duplication	2028
Continue integration and alignment of grid integration related standards	TC 88 actively to participate in ACTAD, TC 8 and SC8	2028
Look for ways to increase speed and agility in TC 88	Make recurring theme in plenary meeting and CAG meetings	2028
Improve accessibility and usability of information.	Every revision of a standard will cut down to the essential functional- and performance requirements, and wedge-out content that prescribes solutions or looks like design manuals (Directives Part 2 Clause 5.4). The hierarchical structure developed in project -101 will allow a significant reduction of redundancies and duplication of content, for instance between -1, -3-1 and -3-2 (Directives Part 2 Clause 5.7).	2026
Uncertainty estimation methods for V&V	As standards get developed or undergo maintenance, implement normative uncertainty estimations method in standard containing measurement techniques to facilitate the Verification and Validation work	2028

Note: The progress on the actions should be reported in the RSMB.