



STRATEGIC BUSINESS PLAN (SBP)

IEC/TC OR SC:	SECRETARIAT:	DATE:
TC 114	United Kingdom	2025-09

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 TC

TC 114: Marine Energy Conversion Systems

TC 114 was established by the IEC in 2007, and the original scope of TC 114 was established at the 2008 Plenary Meeting and modified in 2015. TC 114 needs to update the scope and title to reflect technologies not explicitly referenced previously (e.g. OTEC), and the proposed changes will not impact another TC. This necessary update to the scope, in 2025, followed a review of the progress and the variety of technologies within the marine energy sector. An updated TC 114 scope is provided below:

To prepare international standards for marine energy conversion systems and interaction with connected systems, consistent with the IEC systems approach.

The primary focus will be on Marine Energy Converters (MECs), to include the wide range of use cases and sizes of MECs using wave, tidal, ocean current, river current, and the wide range of outputs such as electrical or mechanical energy. Other conversion methods, systems and products are included such as Ocean Thermal Energy Conversion (OTEC).

Hydraulic turbines for use in tidal barrage and dam installations, as covered by TC 4, are excluded.

The standards produced by TC 114 and in liaison with other TCs and SCs will address:

- terminology
- management plans for technology and project development
- performance measurements of marine energy converters
- resource assessments
- design and safety including reliability and survivability
- deployment, commissioning, operation, maintenance, retrieval and decommissioning
- electrical interfaces, including array integration and/or grid integration
- laboratory testing, manufacturing and factory acceptance
- additional measurement methodologies and processes as required

B. MANAGEMENT STRUCTURE OF THE TC

TC 114 is comprised of Project Teams ("PT"), Maintenance Teams ("MT") and ad-Hoc Groups ("ahG"). In 2020, the TC 114 Chair established two Advisory Groups ("AG") to better coordinate the work of the PTs, MTs and ahGs ("AG 1") and to align content of TC 114 publications ("AG 2") with IEC publication standards.

TC 114 was an early adopter of the Online Standards Development (OSD) platform and, as of March 1, 2025, 100% of standards development is conducted utilizing the OSD platform. The effort to migrate all standards development was led by AG 2 and helped identify the need for a TC 114 Good Working Practice (GWP). The first edition of the TC 114 GWP was published in 2023 and a second edition is scheduled for publication in 2025. AG 2 is responsible for the annual review of the TC 114 GWP, and as necessary, to revise the document for TC 114 approval and publication.

As of March 1, 2025, the following countries were either participating (P) countries or observing (O) countries:

Participating ("P") Countries: Australia, Belgium, Canada, China, Denmark, France, Germany, India, Iran, Ireland, Italy, Japan, Republic of Korea, Netherlands, Singapore, Spain, United Kingdom, United States of America

Observing ("O") Countries: Brazil, Czech Republic, Finland, Israel, Norway, Poland, Portugal, Romania, Russian Federation, Saudi Arabia, Sweden, Ukraine

Publications:

As of March 1, 2025, the following TC 114 publications have been issued:

IEV Part 417 (Vocabulary)

IEC/TS 62600-2:2019 Edition 2.0 (2019-10-18)

Marine energy – Wave, tidal and other water current converters – Part 2: Design requirements for marine energy converters

IEC/TS 62600-3:2020 Edition 1.0 (2020-05-14)

Marine energy – Wave, tidal and other water current converters – Part 3: Measurement of mechanical loads

IEC/TS 62600-4:2020 Edition 1.0 (2020-09-22)

Marine energy – Wave, tidal and other water current converters – Part 4: Specification for establishing qualification of new technology.

IEC/TS 62600-10:2021 Edition 2.0 (2021-07-22)

Marine energy – Wave, tidal and other water current converters – Part 10: Assessment of mooring system for marine energy converters (MECs)

IEC/TS 62600-20:2019 Edition 1.0 (2019-06-18)

Marine energy – Wave, tidal and other water current converters – Part 20: Design and analysis of an Ocean Thermal Energy Conversion (OTEC) plant - General guidance

IEC TS 62600-30:2018 Edition 1.0 (2018-08-29)

Marine energy – Wave, tidal and other water current converters – Part 30: Electrical power quality requirements

IEC/TS 62600-40:2019 Edition 1.0 (2019-06-18)

Marine energy – Wave, tidal and other water current converters – Part 40: Acoustic characterization of marine energy converters

IEC/TS 62600-100:2024 Edition 2.0 (2024-11-18)

Marine energy - Wave, tidal and other water current converters - Part 100: Electricity producing wave energy converters - Power performance assessment.

IEC/TS 62600-101:2024 Edition 2.0 (2024-12-17)

Marine energy - Wave, tidal and other water current converters - Part 101: Wave energy resource assessment and characterization

IEC/TS 62600-103:2024 Edition 2.0 (2024-07-03)

Marine energy - Wave, tidal and other water current converters – Part 103: Guidelines for the early-stage development of wave energy converters - best practices and recommended procedures for the testing of pre-prototype devices

IEC/TS 62600-200:2013 Edition 1.0 (2013-05-07)

Marine energy - Wave, tidal and other water current converters - Part 200: Electricity producing tidal energy converters - Power performance assessment.

IEC/TS 62600-201:2015 Edition 1.0 (2015-04-09)

Marine energy - Wave, tidal and other water current converters - Part 201: Tidal energy resource assessment and characterization

IEC/TS 62600-202:2022 Edition 1.0 (2022-04-07)

Marine energy - Wave, tidal and other water current converters - Part 202: Early stage development of tidal energy converters - Best practices and recommended procedures for the testing of pre-prototype scale devices

IEC/TS 62600-300:2019 Edition 1.0 (2019-09-12)

Marine energy - Wave, tidal and other water current converters - Part 300: Electricity producing river energy converters - Power performance assessment.

IEC/TS 62600-301:2015 Edition 1.0 (2019-09-12)

Marine energy - Wave, tidal and other water current converters - Part 301: River energy resource assessment

Terms and Definitions:

Terms and definitions for TC 114 have now been moved to the [Electropedia](#) and can be found in section [IEV Part 417 \(Vocabulary\)](#).

Liaisons:

As of March 1, 2025, TC 114 has established official liaisons with the following organizations:

IEC: TC4 (Hydraulic Turbines); TC8 (Systems aspects of electrical energy supply); TC8/SC8A (Grid Integration of Renewable Energy Generation); TC8/SC8B (Decentralized Electrical Energy Systems); TC 56 (Dependability); TC82 (Solar photovoltaic energy systems); TC88 (Wind energy generation systems); IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications (IECRE); SyC Smart Energy

ISO/IEC: JTC1/SC 41 (Internet of Things and Digital Twin)

ISO: TC43/SC 3 (Underwater Acoustics); TC 67/SC 7 (Oil and gas industries including lower carbon energy - Offshore structures); TC 108/SC 5 (Condition monitoring and diagnostics of machines)

International Energy Agency (IEA) – Ocean Energy Systems (OES)

International Network on Offshore Renewable Energy (INORE)

International Towing Tank Conference (ITTC)

C. BUSINESS ENVIRONMENT

Marine energy technologies of various types have been developed across the world for decades, with different countries or regions paying particular attention to the natural marine resources they have locally. In some cases, this leads to the need for a range of technology types rather than a focus on a single technology design. As the technology requirements are reliant on the natural resources local to that region, international collaboration and even local support for development has typically been inconsistent. Support for development of new technologies can be expensive, so it is intrinsically linked to the economic performance of a country. Regulations, government policies and competition against other cheaper energy sources also impact support for marine energy. In many cases it should be seen to be complementary to other renewable energies, possibly generating energy when others are not available (wave energy is greater during the winter months), or in a more predictable way (tidal stream). Marine energy can also support countries progressing towards energy security, to decarbonising their national grid with the aim of achieving net zero or provide energy to remote or island communities.

However, in recent years, international collaborations, in particular through the International Energy Agency – Ocean Energy Systems Technology Collaboration Platform (IEA-OES), opportunities for progress have increased. Local and international targets are being set for marine energy technology deployments across the world, feeding towards a possible 300 GW wave and tidal stream installed capacity by 2050 [ref: Ocean Energy and Net Zero – Roadmap to develop 300 GW of ocean energy by 2050]. Market support mechanisms, such as Contracts for Difference (CfD) in the UK and feed-in-tariffs, are also giving confidence to project developers and investors that technology will reach commercialisation in the near future, unlocking the financial backing that is required.

While the prospects of large-scale deployment, and commercial viability of marine energy technology is increasing, it is worth noting that there is a relatively small number of commercial products across the world. Design convergence that has been seen in other sectors is slower or not feasible for some of the technology types covered under the marine energy topic and TC 114.

Tidal, current and river energy converter technologies have continued to mature and converge towards a smaller set of technological configurations and several pilot-scale and full-scale commercial deployments have taken place. Wave energy research and development is continuing to address a range of engineering and technology challenges with efforts focused on refining system and component designs and testing initiatives that yield cost reductions and increased operational reliability. There have been few commercial

wave energy converter (“WEC”) deployments and convergence towards a dominant WEC type has not occurred. Ocean Thermal Energy Conversion (“OTEC”) technologies have progressed, but significant engineering and cost-related challenges remain.

The growing contribution of marine energy to the global energy mix continues to be a significant opportunity. Many nations are seeking alternatives to fossil fuel and nuclear power and climate change concerns have stimulated closer investigation of marine energy. However, while there may be exceptions to the rule, the overall cost of energy, often referred to as the Levelized Cost of Energy (“LCOE”), is a key driver of investment decisions and therefore reductions in capital costs and life-cycle operational costs will continue to be the primary focus of industry research and development efforts.

An increase in the number of deployments has helped build operational experience and further inform design requirements. The marine energy industry is conducting tests of an increasing number of reduced-scale prototypes in tanks and sheltered sea areas as well as full-scale devices in open sea and in-stream river sites. With such additional experience and sharing of lessons learned, marine energy is steadily evolving and is approaching cost competitiveness in several commercial applications. In addition to LCOE as a metric, the value of resilience and the UN’s disaster reduction efforts are areas of analysis that consider the increasing frequency and severity of foreseeable high consequence extreme events that threaten the availability of energy systems. Disaster risk reduction and the value of resilience are factors that can justify investments in marine energy for energy security and community resilience.

Therefore, the work of TC 114 focusses on elements of marine energy that are common across technologies and give the greatest benefit to a wide range of project or installation types. It covers guidance to early-stage developers determining the resource available at a site, to those looking to build and test their first prototypes through to large scale and long-term deployments.

TC 114 has published a number of Technical Specifications (TSs) to date and actively encourages feedback from developers at all stages of their work to ensure the documents are as widely applicable as possible and capture the broadest range of lessons from the developments.

D. MARKET DEMAND

Potential customers for TC 114 Technical Specifications and standards are as follows: industry (technology developers and project developers), manufacturers, utilities, investors, insurers, national and local government bodies, test laboratories, certification bodies and regulators, research organisations and academics.

The development of the IECRE Conformity Assessment System for renewable energies (wind, solar PV and marine) entitled “IEC System for Certification to Standards Relating to Equipment for use in Renewable Energy Applications” is proceeding and giving rise to growing demand for published Technical Specifications and, eventually, standards.

Feedback from standards users, National Committees and the IECRE Marine Energy Sector Working Group (“ME-SWG”) will generate additional demand for standards, operational documents, and clarification sheets.

E. SUSTAINABILITY DEVELOPMENT GOALS

INDICATE THE SUSTAINABLE DEVELOPMENT GOALS (SDGs) THAT ARE ADDRESSED BY WORK WITHIN THE TC/SC. INDICATE EACH SDG INDICATOR AFFECTED (REFERENCE SPREADSHEET AVAILABLE AT <https://www.iec.ch/SDG/>, AND PROVIDE SPECIFIC INFORMATION ABOUT HOW THE TC/SC IS ADDRESSING THE SDG. CONSIDER BOTH DIRECT AND INDIRECT IMPACTS OF THE WORK OF THE TC/SC.

- | | |
|--|--|
| ☒ 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 1: INDIRECT – marine energy can provide electricity (one of the basic public services) in coastal and island communities, supporting job opportunities, enabling economic development, and improving living standards.

Goal 3: INDIRECT – increased access to renewable energy from marine sources help reduce air pollution, contributing to better public health outcomes.

Goal 6: INDIRECT – while the work of TC 114 focuses on electricity generation, marine energy can supply electricity to desalination plants, providing clean drinking water to communities facing water scarcity.

Goal 7: DIRECT – the work of TC 114 directly contributes to SDG 7 by providing a sustainable and clean energy generation globally.

Goal 8: INDIRECT – the development and deployment of marine energy technologies can create new job opportunities in the areas of research, innovation, manufacturing, and maintenance, driving economic growth

Goal 9: DIRECT – the work of TC 114 directly supports driving innovation in clean energy generation, creating jobs and fostering sustainable industrial practices in the marine sector.

Goal 10: INDIRECT – marine energy helps bridge the energy supply gap in SIDS (Small Island Developing States), reducing energy inequalities and improving access to essential services.

Goal 11: INDIRECT – the work of TC 114 compliments the work of IEC SyC Smart Cities; Marine energy can contribute to sustainable cities and communities, particularly in remote communities.

Goal 12: INDIRECT – marine energy can promote more sustainable patterns of energy use, encouraging responsible consumption of resources associated with energy production, reducing environmental impacts associated with traditional energy production. TC 114 has a representative on the IEC ACEA.

Goal 13: DIRECT – by harnessing energy from marine sources, it can help mitigate climate change by decreasing greenhouse gas emissions, thereby supporting global efforts to combat climate change and its impacts.

Goal 14: DIRECT – The work of TC 114, including IEC/TS 62600-40 on acoustics, directly supports consideration for life below water, reducing impacts on marine ecosystems.

Goal 17: DIRECT – TC 114 has liaisons with the IEA-OES, ITTC, IECRE and ISO among others; TC 114 members are involved with the IEC ACEA, UNECE GERE among others.

F. TRENDS IN TECHNOLOGY AND IN THE MARKET

Testing of individual devices at both full and reduced scales remains the primary focus of industry activity. Improvements in modelling tools, instrumentation, and data analysis techniques (among others) has yielded improved research, development, and deployment outcomes. Significant advances have been made in controls, materials, environmental effects measurement and analysis and stakeholder outreach/education. New methods for evaluating risk and measuring costs have helped the marine energy industry gain credibility with the investment community and continued efforts to assess global marine energy resources has spurred renewed awareness and interest in its potential.

A significant number of demonstration projects involving single MEC devices has occurred and deployment and testing of arrays is the next major step. Issues specific to the deployment and testing of arrays may stimulate the need for new standards.

Various numerical models are used to estimate marine energy resources and power generation performance of MEC device, and to design the device structure. In recent years, 3D fluid analysis models, such as CFD models that can account for fluid nonlinearity and viscosity, are becoming more widely used. These numerical models are indispensable tools for the optimal and safe design of complex structure they can take into account metocean conditions, the topography of the sea area, and the device because of the device. Since various numerical models have been proposed, it is important to use the model that is most appropriate for the purpose. In the future, it is desirable to improve the accuracy of these numerical models and develop additional models that can solve new problems, such as the design of new types of devices, array deployment, and coupled analysis of fluid and structure.

Test facilities are being established in more locations around the world which will increase the need to coordinate the ways in which testing is conducted and reported. In response, the IECRE Marine Energy Sector Working Group has several initiatives underway to incentivize test laboratories and certification bodies to adopt and use IEC standards. Lloyd's Register Marine Limited has become the first Renewable Energy Certification Body (RECB), and the European Marine Energy Centre is the first Renewable Energy Testing Lab (RETL). Several nations are developing, or have developed, centers of excellence and research consortia to complement their test facilities. Additional applications and market opportunities for marine renewable energy are being explored as wind and solar PV technologies continue to be more competitive on a cost per kWh basis. Applications where marine renewable energy may find profitable commercial opportunities include, a) supplying power for islands and remote communities, b) producing hydrogen for energy storage or as an alternative transportation fuel, c) recharging autonomous underwater vehicles, ocean sensing and communications systems; d) providing power to offshore aquaculture farms, and e)

supplying power to desalination systems that convert seawater into fresh water. New standards may be needed to ensure that marine energy technologies can be integrated into smart grids and thereby address many of the United Nations' 17 Sustainable Development Goals and contribute meaningfully to the development of the circular economy.

The rapidly growing floating offshore wind and PV sectors will create multiple opportunities for productive collaborations with the marine energy sector and the ME-SWG's efforts to establish stakeholder groups will provide incentives for various end-user groups, e.g., manufacturers, insurers and financiers, to actively participate in the advancement of the marine energy industry. Many of the components used for MECs may be similar to those used in other offshore energy sectors and the supply chain will develop to serve all these opportunities. For example, some equipment originally designed for subsea oil and gas sector may be adapted for use in MEC projects.

The lack of infrastructure necessary to connect ME systems to electrical grids may be a limiting factor to ME growth but may, at the same time, represent a commercial opportunity to serve remote and off-grid communities and enterprises. A growing trend towards locating energy generation assets much closer to sources of energy demand may spur growth of the ME industry because a great percentage of the world's population – over 50% by some estimates - lives within 50 km of a coastline.

Questions around the effects of marine energy devices on the environment are beginning to be definitively answered and research results are becoming more widely available. The skills, techniques and equipment needed for accurate environmental monitoring are steadily improving and the evidence to date is that there are negligible environment effects associated with the deployment and operation of single devices, or a small number of separate single devices deployed in certain areas. Additional studies are on-going at sites where arrays are deployed, and TC 114 may consider developing standardized measurement methodologies for relevant physical and operational parameters of marine energy devices to support these studies.

Adoption of best practices and available tools aimed at maximizing sustainability must remain at the heart of marine energy projects and standardisation of approaches to environmental monitoring is needed to ensure consistency on an international basis. However, it is accepted that any detailed international guide to environmental impact assessment is problematic due to the varying legal and regulatory regimes that different countries may have. Significant dialogue among member countries must continue to harmonise approaches to sustainable development to the greatest degree possible.

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

The Technical Specifications which are under development and those which are being maintained may be found on the home webpage for TC 114: [www.iec.ch/TC 114/](http://www.iec.ch/TC_114/). The table below provides the TC 114 activities in the context of Technical Areas and includes additional international activities that are, or may be, relevant

Technical Area	Foreground TC 114 Activity	Background Knowledge & External Liaison Opportunities
Development	MT-4: Technology Qualification 62600-4:2020 Edition 1.0	
Terminology	AG2: Publication alignment support IEV Part 417	-IEC/TC 1: Terminology [IEC 60050 (all parts)]
Electrical Interface	ahG-10: Power quality 62600-30:2018 Edition 1.0	-IEC/TC 8/SC 8A: Grid integration of renewable energy generation -IEC/TC 8/SC 8B: Decentralized electrical energy systems -IEC/TC 8/SC 8C: Network Management in Interconnected Electric Power Systems -IEC/TC 18: Electrical installations of ships and of mobile and fixed offshore units -IEC/TC 18/SC 18A: Electric cables for ships and mobile and fixed offshore units -IEC/TC 20: Electric cables [IEC 63026] -IEC/TC 22: Power electronic systems and equipment -IEC/TC 82: Solar photovoltaic energy systems [IEC 61727] -IEC/TC 88: Wind energy generation systems [IEC 61400-21-1, IEC 61400-21-3, IEC 61400-24, IEC 61400-27-1]

Marine Structures, Mooring and Foundations	MT-2: Design 62600-2:2019 Edition 2.0 MT-10: Mooring 62600-10:2015 Edition 1.0 ahG-15: Measurement of mechanical loads 62600-3:2020 Edition 1.0 ahG-14: OTEC 62600-20:2019 Edition 1.0	-IEC/TC 37/SC 37A: Low-voltage surge protection [IEC 61643-11] -IEC/TC 56: Dependability [IEC 60812] -IEC/TC 81: Lightning protection [IEC 62305-3] -IEC/TC 88: Wind energy generation systems [IEC 61400-1, IEC61400-3-1, IEC61400-3-2, IEC 61400-6] -ISO/TC 8: Ships and marine technology [ISO 29400] -ISO/TC 61/SC 2: Mechanical behavior [ISO 527-1] -ISO/TC 61/SC 13: Composites and reinforcement fibers [ISO 13003, ISO 14125, ISO 14126, ISO 14129, ISO 14130, ISO 15024] -ISO/TC 67/SC 6: Processing equipment and systems [ISO 17776] -ISO/TC 67/SC 7: Offshore structures [ISO19900, ISO 19901 (all parts), ISO 19902, ISO 19903, ISO19904] -ISO/TC 98/SC 2: Reliability of structures [ISO 2394] -ISO/TC 156: Corrosion of metals and alloys [ISO 12473]
Renewable Energy Production	MT-100: WEC power performance assessment 62600-100:2024 Edition 2.0 MT-200: TEC power performance assessment 62600-200:2013 Edition 1.0 ahG-12: REC power performance assessment 62600-300:2019 Edition 1.0 PT-21: OTEC power performance assessment	-IEC/TC 8/SC 8A: Grid integration of renewable energy generation -IEC/TC 8/SC 8B: Decentralized electrical energy systems -IEC/TC 38: Instrument transformers [IEC 61869-2, 61869-3] -IEC/TC 77/SC 77A: EMC - Low frequency phenomena [IEC 61000-3 (all parts)] -IEC/TC 82: Solar photovoltaic energy systems [IEC 61724-1, IEC 61724-2, IEC 61724-3, IEC 61853-1, IEC 62253, IEC 62670-1, IEC 62670-2, IEC 62670-3] -IEC/TC 85: Measuring equipment for electrical and electromagnetic quantities [IEC 60688] -IEC TC 88: Wind energy generation systems [IEC 61400-12-1, IEC 61400-12-2, IEC 61400-12-4] -IHO
Environmental	MT-101: Wave resource assessment 62600-101:2024 Edition 2.0 MT-201: Tidal resource assessment 62600-201:2015 Edition 1.0 ahG-13: River resource assessment 62600-301:2015 Edition 1.0 MT-40: Acoustic characterization of marine energy converters 62600-40:2019 Edition 1.0 PT-41: Measurement and characterization of biofouling accumulation PT-50: Measurement and characterization of turbulence	-IEC/TC 4: Hydraulic turbines -IEC/TC 88: Wind energy generation systems [IEC 61400-11, IEC 61400-14] -ISO/TC 8: Ships and marine technology -ISO/TC 43/SC 3: Underwater acoustics -ISO/TC 67: Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries -ICES -IHO

Marine Testing	ahG-15: Measurement of mechanical loads 62600-3:2020 Edition 1.0 MT-103: Scale testing of wave energy converters 62600-103:2018 Edition 1.0 ahG 18: Scale testing of tidal energy converters 62600-202:2022 Edition 1.0	-IEC/TC 88: Wind energy generation systems [IEC 61400-13, IEC 61400-23] -ISO/TC 8: Ships and marine technology -ISO/TC 67: Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries -ITTC
Electro-Mechanical Power Conversion Systems	MT-2: Design 62600-2:2019 Edition 2.0 ahG-10: Power quality 62600-30:2018 Edition 1.0 ahG-15: Measurement of mechanical loads 62600-3:2020 Edition 1.0	-IEC/TC 4: Hydraulic turbines -IEC/TC 18: Electrical installations of ships and of mobile and fixed offshore units -IEC/TC 18/SC 18A: Electric cables for ships and mobile and fixed offshore units -IEC/TC 88: Wind energy generation systems [IEC 61400-4, IEC 61400-5] -ISO/TC 60: Gears -ISO/TC 108/SC 5: Condition monitoring & diagnostics of machines -ISO/TC 131: Fluid power systems -CIGRE

H. CONFORMITY ASSESSMENT

The Technical Specifications and standards developed by TC 114 are used to support the work of the Marine Energy Sector Working Group (ME-SWG) of the IECRE System. Given that conformity assessment protocols are the primary determinant of the pace at which marine energy technologies and projects become commercially viable, e.g., insurable and bankable, it is critical that TC 114 and the ME-SWG build and maintain communication channels through which information can be exchanged. Accordingly, priority is given to the development and dissemination of standards and Technical Specifications that are most urgently needed for certification purposes. The ME-SWG and TC 114 are actively collaborating to ensure these priorities are identified and considered for new TS initiation.

In developing its roadmap for the creation of new standards, TC 114 will actively monitor approaches undertaken by related sectors such as the wind industry and will adapt them for application to the marine energy sector. As practically possible, TC 114 will establish formal liaisons to facilitate this exchange.

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
TS Ed 1 transition to TS Ed 2 and IS Ed 1	TC 114 intends to transition existing 1 st Edition Technical Specifications (TS) into 2 nd Edition Technical Specifications and 1 st Edition International Standards (IS) over the next 3-5 years. The resourcing of these tasks is considerable due to the immaturity of the industry so there may be a need to sequence work in a prioritized manner. In some cases, additional TS editions may be appropriate.	3 – 5 years
Publish PT and MT documents	TC 114 will make a concerted effort to publish all existing and in process Project Team and Maintenance Team documents within 1-3 years. During this time there will be a need to balance the	1 – 3 years

	needs of the industry and the need to support developing certification requirements.	
Incorporate ME-SWG input	TC 114 will request input from the IECRE ME-SWG on standards' priorities in addition to those listed in Section H. This input combined with the needs of the industry will inform the priority list of new standards for development.	1 – 3 years
Review New Work Item Proposal ("NWIP") recommendations	The SBP committee will carefully review recommendations for new work items in the next 12 months to assess the priorities in Section H and reflect input from the IECRE ME-SWG and industry. a. Assess how many new work items can be supported as the existing work is completed. b. Coordinate with National Committees to submit NWIPs based on a revised priority list of standards for development. c. Submit 1-3 NWIPs	12 – 18 months
Receive information on TSs	Establish ad hoc groups to receive information from users of published Technical Specifications to quickly turn around next editions or transition to an IS.	0 – 5 years
Note: The progress on the actions should be reported in the RSMB.		

The over-arching objective of TC 114 is to support the development and implementation of marine energy technologies and facilitate progress towards the realization of commercial-scale projects and applications. During the next 3 to 5 years, TC 114 will: (1) complete the TSs currently under development, (2) initiate Project Teams to draft new TSs, (3) support Maintenance Teams and ad-Hoc Groups for several recently developed Technical Specifications, and (4) collaborate with conformity assessment initiatives underway at the ME-SWG. All four of the above are geared toward the ultimate completion of first edition International Standards.

TC-114 must address issues related to climate change and diversity as they may apply to the development and maintenance of standards and certification protocols. Specifically, IEC Council Board has established a Task Force on Diversity and has created a Joint ISO/IEC Strategic Advisory Group on gender responsive standards. Additionally, ISO Guide 84 developed by its Climate Change Coordinating Committee ("CCCC") shall, to the greatest extent possible, inform TC-114 PTs, MTs and ahGs with respect to climate change. Key ISO notes about the CCCC include:

- 1) that the purpose of the CCCC is to support ISO groups in their coordination activities with the IEC and ITU-T on the topic of Climate Change; and
- 2) (to promote) information sharing among ISO/IEC committees involved in standardization related to climate change.

The engagement of all stakeholder groups in standards-making activity, particularly technology developers, is encouraged. Possible approaches to achieve this include assigning formal liaisons to funded projects that provide feedback and inform present and future Technical Specifications and spur their transition to International Standards. It is likely, however, that public funding mechanisms will be needed to formalize and incentivise such collaborations. Member country delegations have been largely successful in collaborating with their national government agencies to ensure that funded R&D efforts are conducted in concert with TC 114 standards and Technical Specifications and, in turn, inform the further development of requirements therein.

The Technical Specifications under development and those being maintained may be found on the home webpage of TC 114 (<http://www.iec.ch/tc114>) and are identified in Section F above. These TSs have been highlighted as being fundamental to the early-stage development of marine energy converters and future TSs will be undertaken as the needs of the marine energy sector evolve. To facilitate this strategy, TC 114 has

established a prioritised list of new TSs to be developed. This list may be rearranged and expanded as new information and understanding of the sector becomes available; however, it currently provides a baseline for the committee to use when deciding upon convening new Project Teams.

In establishing the priority of standards, both those underway and those being planned, TC 114 has considered both the stage of development of marine energy converters and the impact that particular standards will have on the progress of the sector. The IECRE will provide input to TC 114 regarding Technical Specifications necessary to support certification of marine energy converters.

International Standards under development address the full range of engineering stages, including:

- Modelling and analysis
- Full- or sub-scale component/device testing
- Prototype device deployment and testing
- Operational devices and arrays

To determine the next round of standards development initiatives TC 114 should undertake, the Strategic Business Plan Task Force solicited input via a survey from the National Committees of all eighteen TC 114 P-Member countries. The survey requested each National Committee assign a priority level (high, medium, low) to the list of possible topics seen in the previous SBP as well as a justification for the priority level assigned. Further, the National Committees were encouraged to include additional topics not listed. The Strategic Business Plan Task Force analysed and compiled the results into the three categories shown in Table 1 below. Several of the initiatives shown in the “High Priority” category may be presented to the P-Member National Committees in the form of New Work Item Proposals (NWIP). If a majority of P-Member National Committees approve a NWIP and if enough subject matter experts are nominated to support a new Project Team, the NWIP will be approved, and a new Project Team will be established.

When considering new specifications, the committee seeks to avoid creating new work item proposals which do not address the most urgently needed specifications. Members may propose new specifications to be added to the list in Table 1 below, and the committee will decide on the prioritization of the proposed new specification based on a consensus as to the urgency of need. Of particular importance is to time the establishment of new Project Teams so as not to over-extend the availability of members to support new work.

Table 1. IEC TC 114 Prioritized List of Potential New Standards for Development, Recommendations for TC 114 Consideration, and Items Out Scope.

ABBREVIATED TITLES	PRIORITY	POSSIBLE TS SUB-CLAUSES OR NEW TS TITLES [2025 POLL TITLES WITH {PRIORITY LEVEL}]	KEY ORGANIZATIONS TO CONSIDER
Installation, Operation, and Maintenance (IO&M)	HIGH	Guidelines - I,O&M procedures {Higher Priority} O&M principles {Higher Priority} Commissioning/decommissioning procedures {Higher Priority} Health & Safety {Higher Priority} Life Cycle Assessment {Medium Priority} Technical Safety {Medium Priority} Autonomous Operations {New Priority}	ISO TC 207; IEC ACEA, ACOS; MT 62600-2, -10
Electrical Interconnection	HIGH	Design guidelines - connections to mini grids {Higher Priority} Technical requirements for marine energy system grid-connection to power system {Higher Priority} Mini-Grid {Higher Priority} Hybrid systems {Higher Priority} HVDC Systems {New Priority} Charging, connection, and use of batteries {New Priority}	IEC SC 8A, 8B, 8C, TC 88, TC 82, SC 22F, TC 21
Cables	HIGH	Design guidelines - subsea cables {Higher Priority} Cable Lay Guidelines {Medium Priority}	IEC TC 88, TC 20, SC 18A
Design/Testing	MED	Evaluation of Hybrid Systems e.g. wind/wave, wave/solar {Medium Priority} Biofouling mitigation {Medium Priority} Design guidelines for offgrid small devices for wave and tidal/hydrokinetic energy {New Priority} Supporting structure {New Priority} Guidelines for PTO testing {New Priority} Corrosion potential and corrosion prevention {New Priority} Performance assessment of small devices for wave and tidal/hydrokinetic energy {New Priority}	ISO TC 67/SC 7; IEC TC 88, TC 82; PT 62600-50; MT 62600-2, -4, -10, -100, -200; ahG 12, 14
Arrays	MED	Array performance {Medium Priority} Array yield modelling {New Priority} Array wake modelling {New Priority}	
Extreme Conditions	MED	Heavy weather and climatic impacts (storms, ice, etc.) {Medium Priority}	ISO TC 67/SC 7; MT 62600-101, -201; ahG 13
Manufacturing	LOW	Manufacturing {Lower Priority}	
Cyber Security	LOW	Cyber security {Lower Priority}	IEC TC 65
Measurements	LOW	Measurement methodologies including physical parameters {Lower Priority}	ISO ICS 17
Cost	LOW	Cost analysis {Lower Priority}	IEA-OES
SCADA	LOW	Data acquisition and communications {Lower Priority} Prognostics and Health Management (PHM) {New Priority} Design guidelines for implementation of SCADA system for ocean energy plant automation {New Priority}	
Recommendations for TC 114 Consideration	N/A	Harmonization amongst the TC-114 standards suite Recommended Practice for Harmonization of IEC Standards Standards implementation guidelines Separate design standards for Wave, Tidal and River Strategic Study on TQ Classification of devices/resources	AG 2; NCs
Out of Scope	N/A	Fish safety (tidal stream turbines) Ecological impacts Environmental monitoring Consent principles for coastal and ocean area utilization by marine energy Guidelines for marine environmental impact assessment	IEC TC 120, ACEA

NOTE: Initiatives shown in the “Medium Priority” and “Low Priority” categories will be re-considered when the next Strategic Business Plan Task Force is convened.