



Offshore renewable energy standardization review

Innovate UK – the new name for the Technology Strategy Board – is the UK’s innovation agency. Our aim is simple – to accelerate economic growth by stimulating and supporting business-led innovation. For more information about Innovate UK please see: www.innovateuk.gov.uk or contact: support@innovateuk.gov.uk.

Timely, consensus-based use of standards plays a vital role in ensuring that the knowledge created in the UK’s research base is commercialized and brought to market as well as playing an important role in driving innovation. Innovate UK is working with BSI, Research Councils and Catapults to establish new standards earlier in the development of new technologies and services.

We are collaborating in four emerging areas to define standards that will accelerate the development of those technologies and services; and provide UK businesses with a competitive “first mover advantage”:

Synthetic biology

Cell therapies

Assisted living

Offshore renewable energy

The four technologies are at different stages of development and face different challenges in their commercialization. All four technologies are internationally competitive areas, and it is important that the UK creates successful capabilities quickly.

BSI is the UK National Standards Body, and is responsible for developing British Standards and related publications that serve the interest of a wide range of stakeholders, including Government, business and society. BSI represents the UK view on standards in Europe, and internationally (ISO and IEC), and has a globally recognized reputation for independence, integrity and innovation, ensuring standards are useful, relevant and authoritative.

Innovate UK
Technology Strategy Board

Introduction

Driven by issues of climate change, security of energy supply and economic development potential, the UK Government has established ambitious plans for the growth of offshore wind by 2020. In addition, the UK Government has provided targeted support to realize the potential of wave and tidal power generation.

The development and delivery of standards is important for driving the industrialization of offshore renewable energy. Appropriate standards create a foundation for growth based upon recognized benchmarks of quality and promote UK competitiveness by reducing barriers to international trade. For these reasons, BSI has been at the forefront of developing offshore renewable energy standards via its membership on IEC's renewable energy committees. However, further work can be done. Thanks to the partnership between Innovate UK and BSI, BSI undertook a strategic review that will inform its direction and actions as it relates to the future needs of offshore renewable energy. The overarching aims of this phase of the work were to:

- research the needs of the offshore renewable sector via a programme of engagement with the supply chain,
- identify the opportunities to transfer or to adapt pre-existing standards that have been developed by other branches of the maritime and power generation sectors,
- build consensus within the supply chain and key stakeholders as to the strategic direction of BSI as it seeks to develop new standards that serve the needs of the offshore renewables sector.

Study of relevant standards to the industry

Offshore renewable energy is a generic term to group and describe wind, wave and tidal stream-derived forms of marine renewable energy. However, each of these marine environment-harnessed energy sources, particularly wind as distinct from wave and tidal, are at different stages of commercial maturity and exploitation. From the very outset of this work it has been appropriate to conduct the study in a manner that allowed the differing offshore renewable energy concerns of wind, wave and tidal to be captured accordingly.

In order to satisfy the strategic objectives of the project, it was clear that a structured mechanism capturing the views of a broad range of offshore renewable energy practitioners was required. A questionnaire was developed in order to obtain four main types of information from telephone interviews. The respondents identified 185 standards, guidelines and other similar documents that they used in their offshore renewable energy-related activities.

Independent of the interviews, BSI conducted a literature search of standards and similar documents that are or could be of relevance to the offshore renewable energy industry. This search produced a list of 200 standards and similar documents. Combining the industry information and the BSI review information indicates that there are at least 335 standards and similar documents that are of relevance to, and could be used by, the offshore renewable energy industry. A comparison of these two sources of information on standards used in offshore renewable energy revealed that there are 50 key standards documents that are both used by industry and referenced by the BSI review.

Resulting from the views provided by the offshore renewable energy supply chain it was possible to identify a number of both general and specific themes for the development of new standards. Key generalized points were that from several quarters the desire was expressed for new standards that place greater emphasis on defining 'safety exceedance thresholds', based upon function and operational environment, rather than prescriptive requirements. Another line of opinion was that 'route maps', 'indexing' or 'search' tools would be of great help in accessing and choosing from the large number of standards and similar documents that already exist.

The possibility of developing new standards for the offshore renewable energy industry should be tempered with the view expressed by a few people that no new standards are needed – only increased harmonization of existing standards, with improvements and revisions where necessary. However, the view of 'no new standards' needs to be balanced with the responses from the wave and tidal communities in particular; these communities were interested in developing standards specific to their industries, reflecting the different requirements of wave and tidal devices to existing offshore industries. In addition, the view of 'safety exceedance thresholds' needs careful consideration when applied to wave and tidal technologies as the relative absence of operational running hours means that the knowledge needed to determine such safety thresholds is not readily available.

Having identified the range of topics that the contributors believed were eligible for consideration as areas where new standards would assist their business activities, the relative prioritization associated with developing each theme was scored against both ease of implementation and potential impact against a 2020 time scale. This is summarized in the figure below.

Potential Implementation Difficulty	HIGH	Load cases for WECs	Load cases for TECs	
	MED	Tidal stream material selection	TEC installation TEC seabed stability TEC turbulence and measurement	OWT control systems for turbines and farms
	LOW	OWT sea fastening OWT data exchange	H&S qualifications and practises harmonization	OWT lightning strike EIA guidance Route map and indexing existing standards
		LOW	MED	HIGH
Potential ORE 2020 Impact				

Recommendations

The following standardization areas were recommended as high priority topics for UK effort:

- As the UK is the world's leading offshore wind marketplace, it is recommended that, because of the maturity of the sector and the long-standing establishment of IEC Technical Committee (TC) 88, the UK considers a New Work Item Proposal with regards to standardization in the areas of control for offshore wind turbines and farms, and improved standardization in the area of offshore wind lightning protection.
- It is recommended that, in conjunction with the cooperation of EIA statutory bodies, an exercise should be undertaken to determine the requirements for the International Energy Agency study and reporting methodologies. It is felt that this may reduce the cost of the Environmental Impact Assessment (EIA) for offshore renewable energy and potentially compress consenting timescales.
- The development of a standards indexing exercise to provide a route map to guide the development of Wave Energy Converters (WECs) and Tidal Energy Converters (TECs) was felt to be of high impact and easy to implement.

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