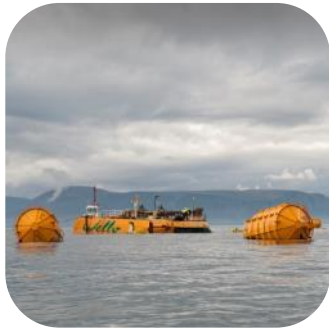


A GLOBAL CENTRE OF EXCELLENCE IN
MARINE ENERGY TESTING AND RESEARCH

EMEC 
ORKNEY
THE EUROPEAN MARINE ENERGY CENTRE LTD



Why International Standards?

John Griffiths
Technical & Compliance Director
(Chairman of UK National Committee on
Ocean Energy Standards PEL/114)

Why are standards needed?

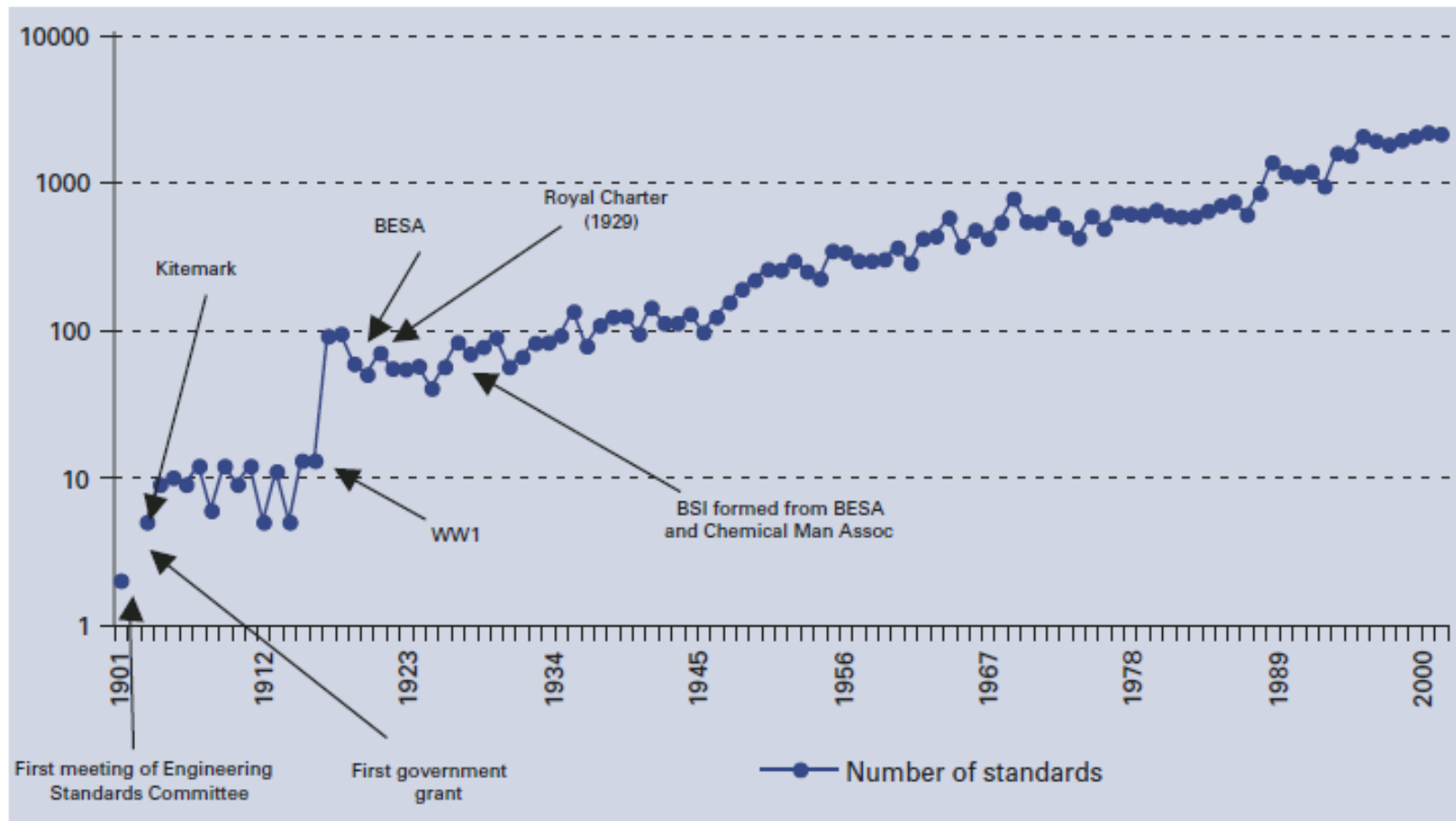
- The need for standards
- The international process for development of standards



Standards grow with technology

BSI publications by year (1901-2003), log scale

(Source: BSIPERINORM)



Exponential Growth in Technology = Exponential Growth in standards

Successful industries...

... ARE HIGHLY STANDARDISED!

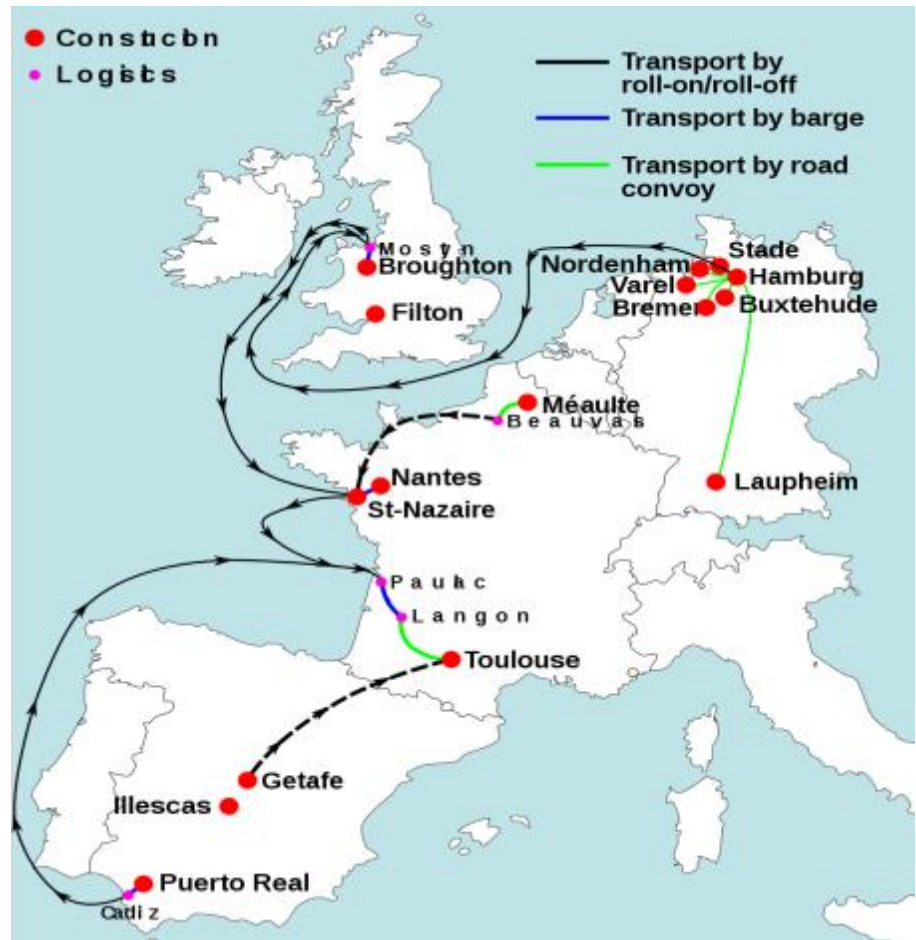
27,000 active standards:

- Automotive
 - 400 standards
- Aerospace
 - 800 standards



Complexity creates need for standards

- AIRBUS aircraft are assembled in Toulouse and Hamburg
- Wings in Filton & Broughton
- Fuselage/Cabin in Hamburg, Bremen & St Nazaire
- Tail assemblies at Hamburg, Stade, Getafe, Illescas & Puerto Real
- This could never be achieved without detailed standardisation



Making of standards – structure

- International Body
- Technical Committee
- Project Teams
(draft standards)
- National Committee
(nominates experts)
- Mirror Committees
(provide comment)



International Electrotechnical
Commission (IEC)



TC/114 – Ocean Energy



e.g. PT 62600-200 The assessment of
performance of tidal energy
converters



PEL/114 – Ocean Energy (UK)



Support National Experts

International Committee TC-114



- **Three Technical Specs published:**
 - Terminology
 - WEC Test
 - TEC Test
- **8 international project teams running:**
 - Design Requirements
 - Wave Energy Resource Assessment
 - Tidal Energy Resource Assessment
 - Assessment of Moorings Design
 - WEC Power Performance at Second Location
 - Power Quality
 - Tank Testing – Wave
 - Ocean Energy Thermal Conversion
- **Working Group – Certification & Compliance**

IEC documents – how?

- Drafted by Project Teams (TC114)
- Gather Industry comments on drafts
- Technical Specifications (TS)
- Use for 3 year life
- Record and comment on experience
- Revise to full standard status



Member nations of TC/114

- All these nations are potential markets!
- All want to get involved

(P) Denotes Participating Members
(O) Denotes Observer Members

Country	Country Code	P/O Status
<u>Brazil</u>	BR	O-Member
<u>Canada</u>	CA	P-Member
<u>China</u>	CN	P-Member
<u>Czech Republic</u>	CZ	O-Member
<u>Denmark</u>	DK	P-Member
<u>France</u>	FR	P-Member
<u>Germany</u>	DE	P-Member
<u>Ireland</u>	IE	P-Member
<u>Italy</u>	IT	O-Member
<u>Japan</u>	JP	P-Member
<u>Korea, Republic of</u>	KR	P-Member
<u>Netherlands</u>	NL	P-Member
<u>Norway</u>	NO	P-Member
<u>Poland</u>	PL	O-Member
<u>Portugal</u>	PT	O-Member
<u>Romania</u>	RO	O-Member
<u>Russian Federation</u>	RU	O-Member
<u>Spain</u>	ES	P-Member
<u>Sweden</u>	SE	P-Member
<u>Ukraine</u>	UA	O-Member
<u>United Kingdom</u>	GB	P-Member
<u>United States of America</u>	US	P-Member

A bit of history

- 2003: First draft standard - Wave Device Performance
- 2004: UK Government Wave & Tidal Protocols for Performance Measurement
- 2005: DNV Guidelines on Design and Operation of WECs
- 2007-9: EMEC draft standards and guidelines**
- 2008-11: EquiMar Protocols and deliverables, EU project
- 2008 on-going: IEC International standards (Secretariat through BSI)
- 2012/13: First International Technical Specifications published
- 2014: ?????????



Where are we now?

- The standards and guides need review
- There is a recognised need for some additional documents
- We need an industry view on this – which you represent!



Index of typical test standard (Tidal)

- 1. SCOPE
 - 2. NORMATIVE REFERENCES
 - 3. TERMS AND DEFINITIONS
 - 4. SYMBOLS, UNITS AND ABBREVIATIONS
 - 5. SITE AND TEST CONDITIONS
 - 6. TIDAL ENERGY CONVERTER DESCRIPTION
 - 7. TEST EQUIPMENT
 - 8. MEASUREMENT PROCEDURES
 - 9. DERIVED RESULTS
 - 10. REPORTING FORMAT
 - Annex A (Informative) Description of Availability
 - Annex B (Normative) Categories of Error
 - Annex C (Informative) Uncertainty Case Study
- }

Fixed Items

}

Variable items

}

Annexes as back-up

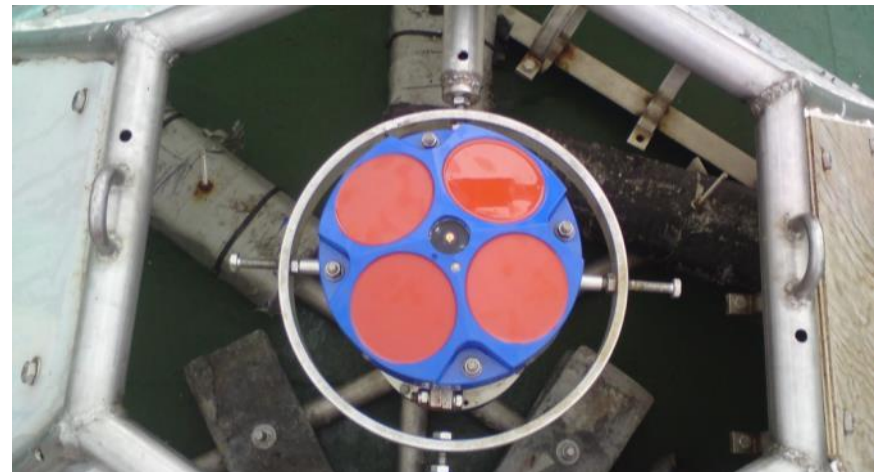
Why are we here?

- Find out how useful are the guides we have at present
- Understand what we should develop as new guides
- Establish some interest groups for new guides
- Grow and maintain momentum of interest and comment into international documents.



What do we want to do today?

- Look at the existing standards/guides
- Using experience gained in the last few years
- Are these standards/guides used?
 - by whom?
 - do they do the job?
- Are additional standards/guides needed?



EMEC standards and guidelines (2008 & 9)

Wave Device Performance Assessment*

Wave Resource Assessment*

Tidal Device Performance Assessment*

Tidal Resource Assessment*

Certification System Guide*

Design Basis Guide*

Project Development Guide

Health & Safety Guide (Renewable UK)

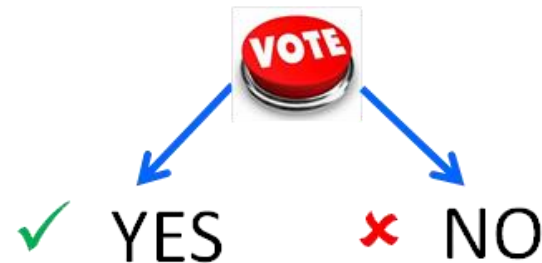
Grid Interface

Reliability, Survivability Guide

Guide to Manufacture of Devices

Tank Testing Guide (wave)*

1. Are you aware of the Standard/guide?
2. Have you seriously considered using it?
3. Is it satisfactory?



4. Are other standards/guides needed?

* These were fed into TC114 as first drafts

Potential new standards & guidelines

- To be discussed today:
 1. Guide to Installation Planning & Methods
 2. Guide to O&M
 3. Life Cycle of Subsea Cables
 4. Environmental Guide (UK)
- Any others...?



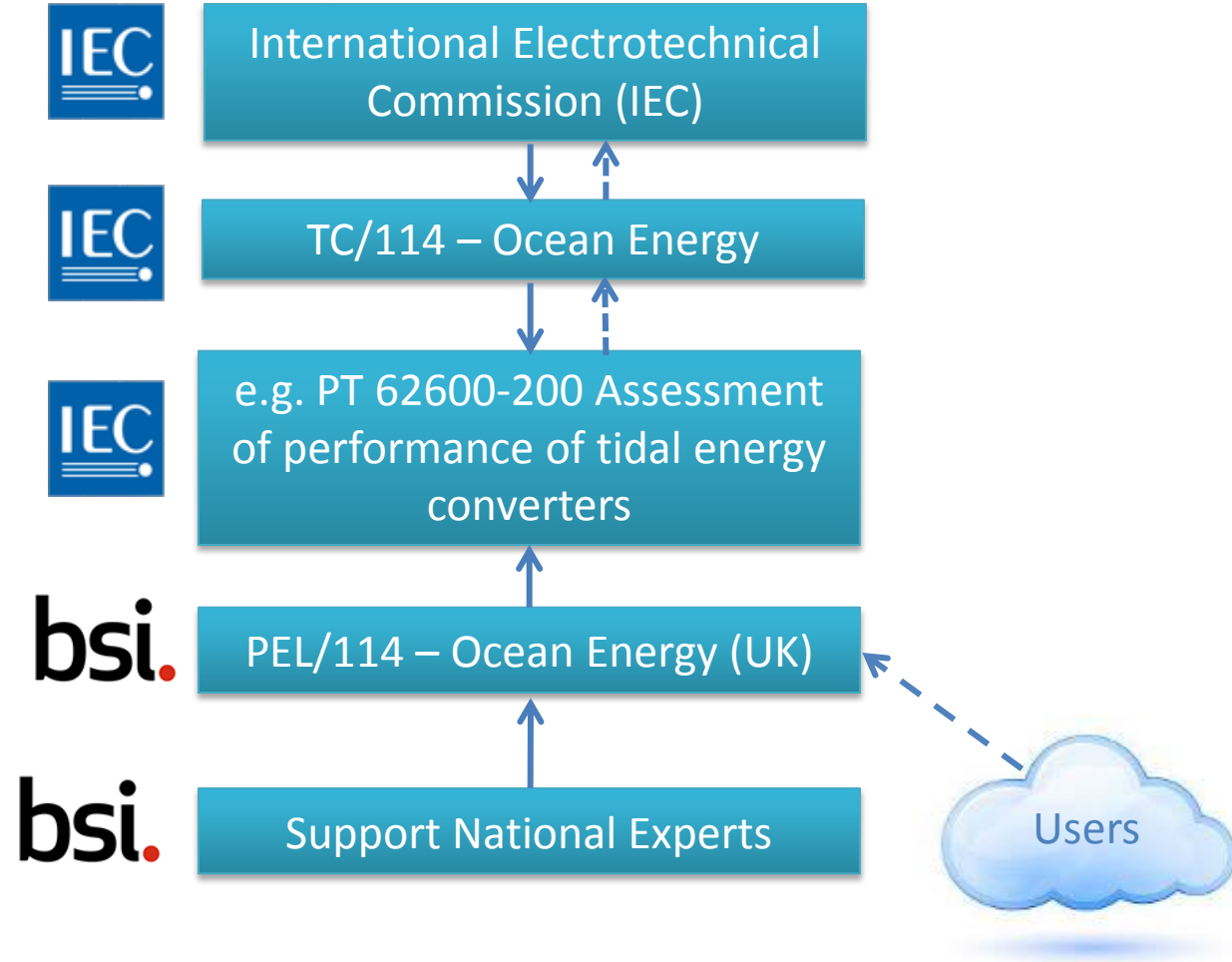
Method to develop documents

- Justify & obtain funds
- Run as a programme
- Appoint authors (competitive)
- Identify working groups
- Hold workshops
- BSI to do final edit to BS-0
- Publish via EMEC and ORE Catapult websites
- *Feedback?*



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John Griffiths

Standards Review

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