

Global standards development



June 2014

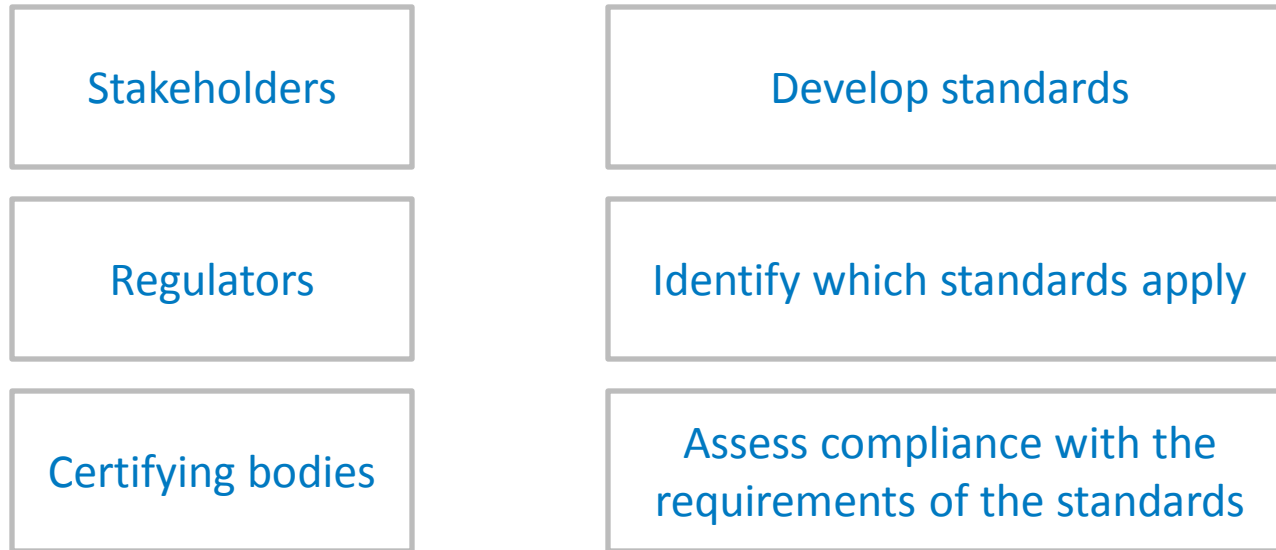
Standard

- A standard is a document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Consensus

- “**consensus:** General agreement, characterized by the absence of sustained opposition to substantial issues by any important part of the concerned interests and by a process that involves seeking to take into account the views of all parties concerned and to reconcile any conflicting arguments.
- NOTE Consensus need not imply unanimity.”

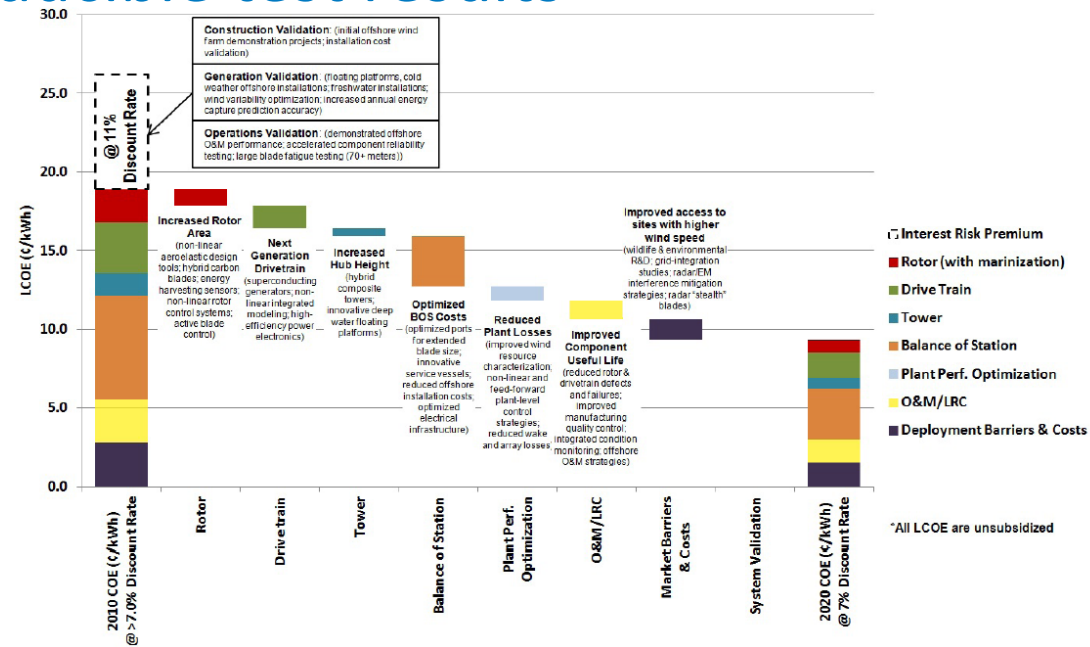
Roles and responsibilities



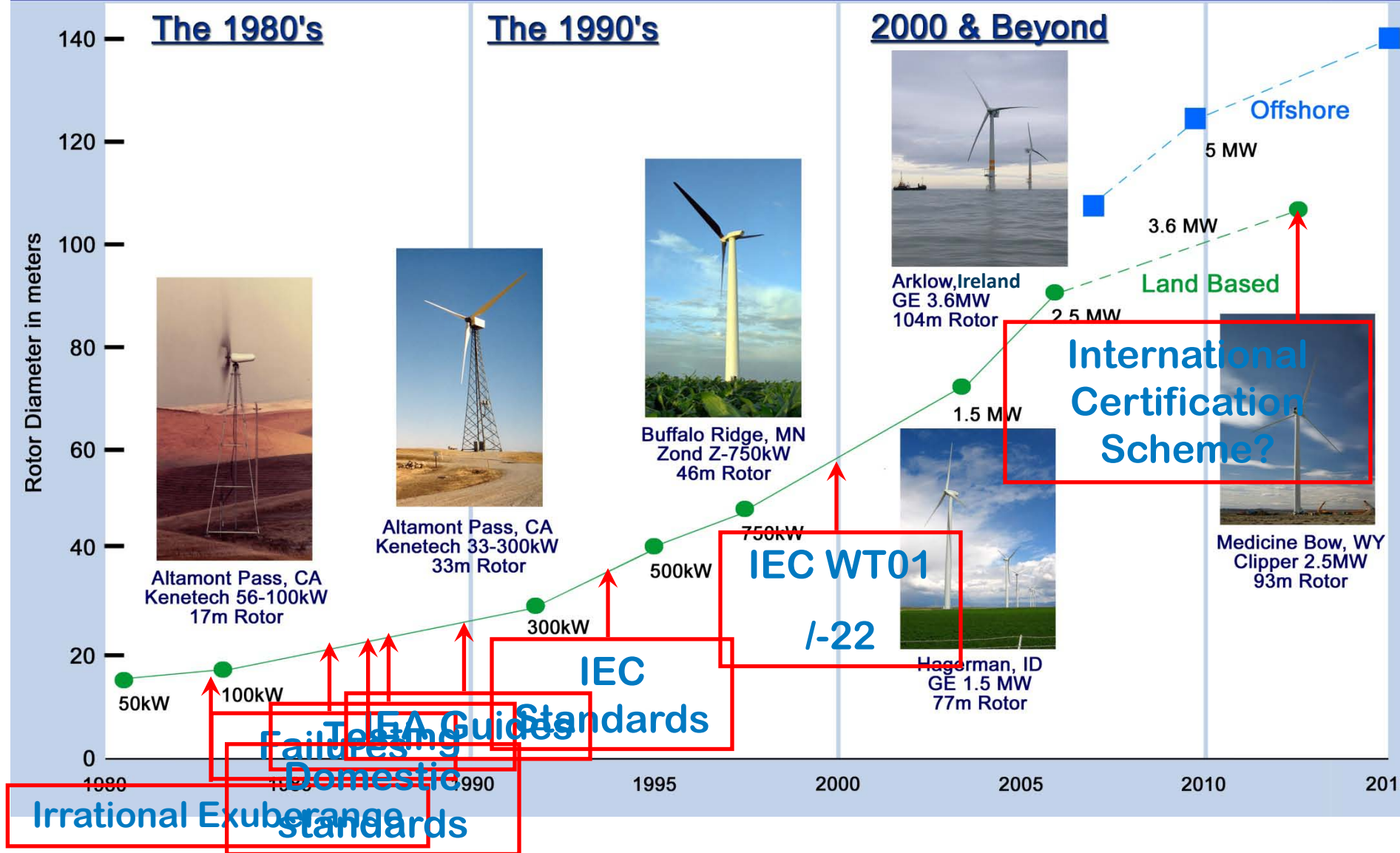
Note: if regulators do not set requirements the market may do so themselves.

Benefits of standards

- Clarity\order
- Removal of market barriers
- Reduce risk (and thus LCOE) through:
 - appropriate level of safety
 - high quality reproducible test results



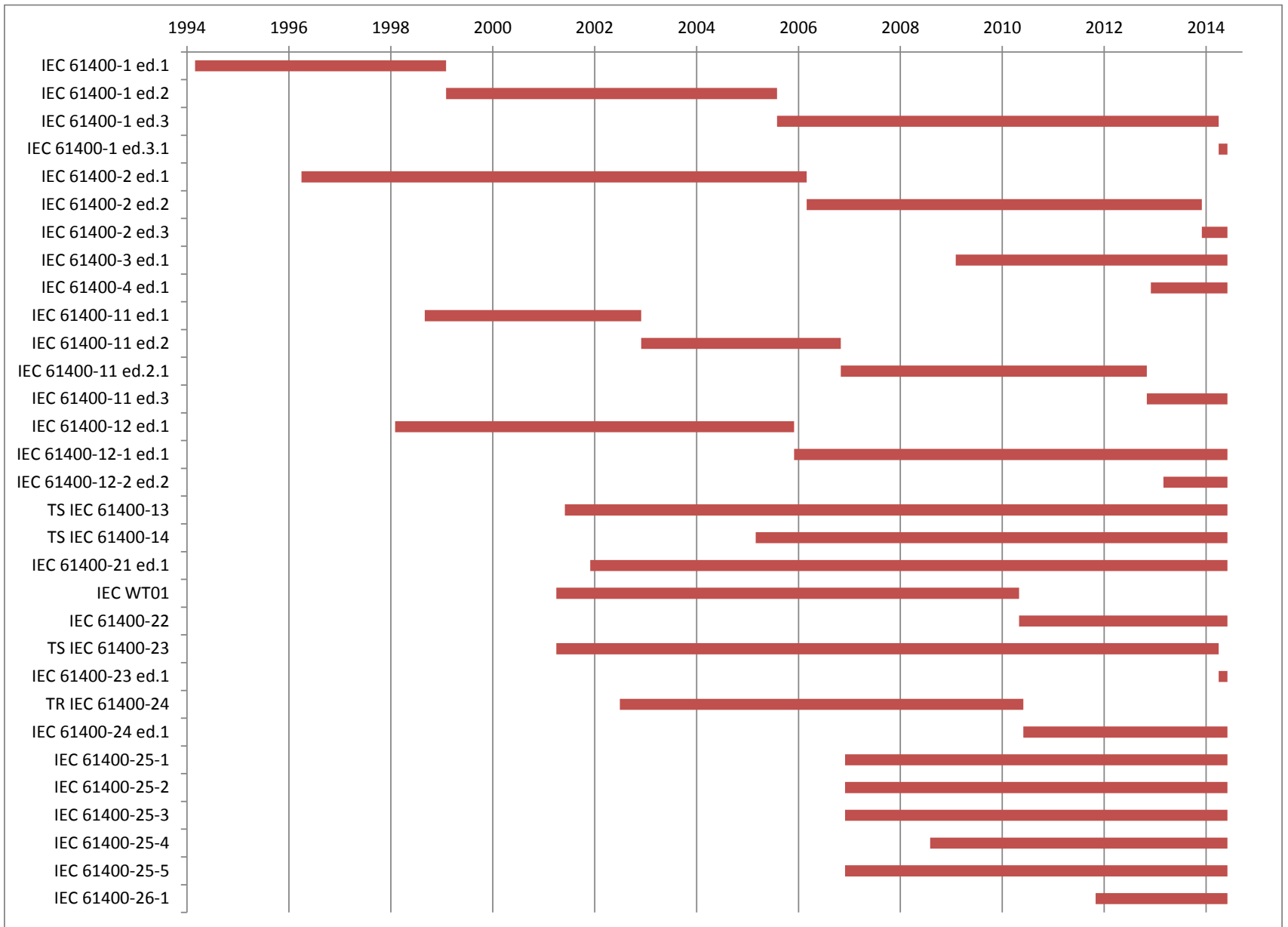
Evolution of U.S. Commercial Wind Technology



Historic time line

- **1986 GL**
- **1988 NEN 6096**
- **1992 DS 472**
- **TC88 works started in 1988**
- **First IEC wind turbine standard published in 1994**
- **1995 work started on IEC certification document**

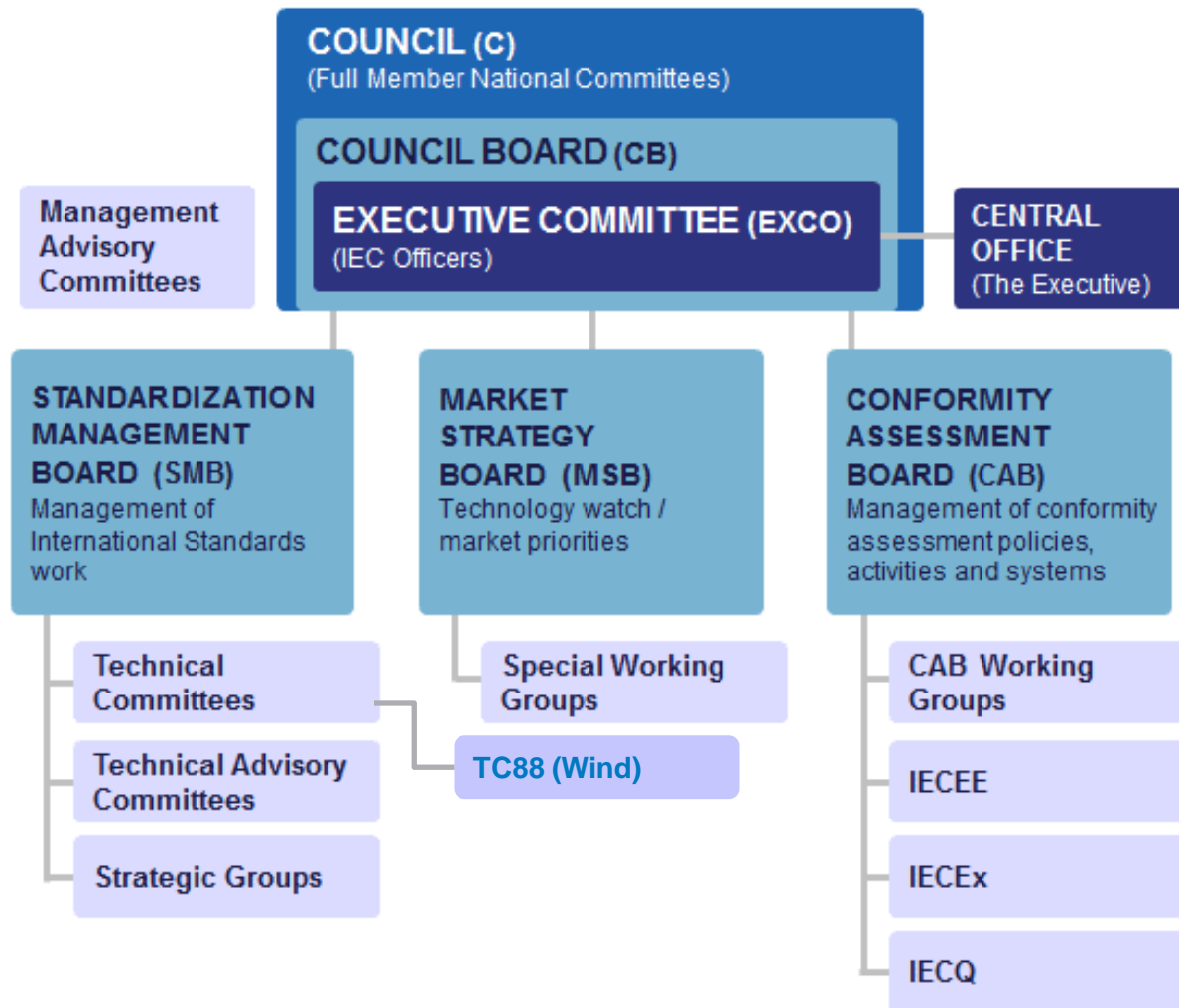
TC88 Timeline



Accomplishments

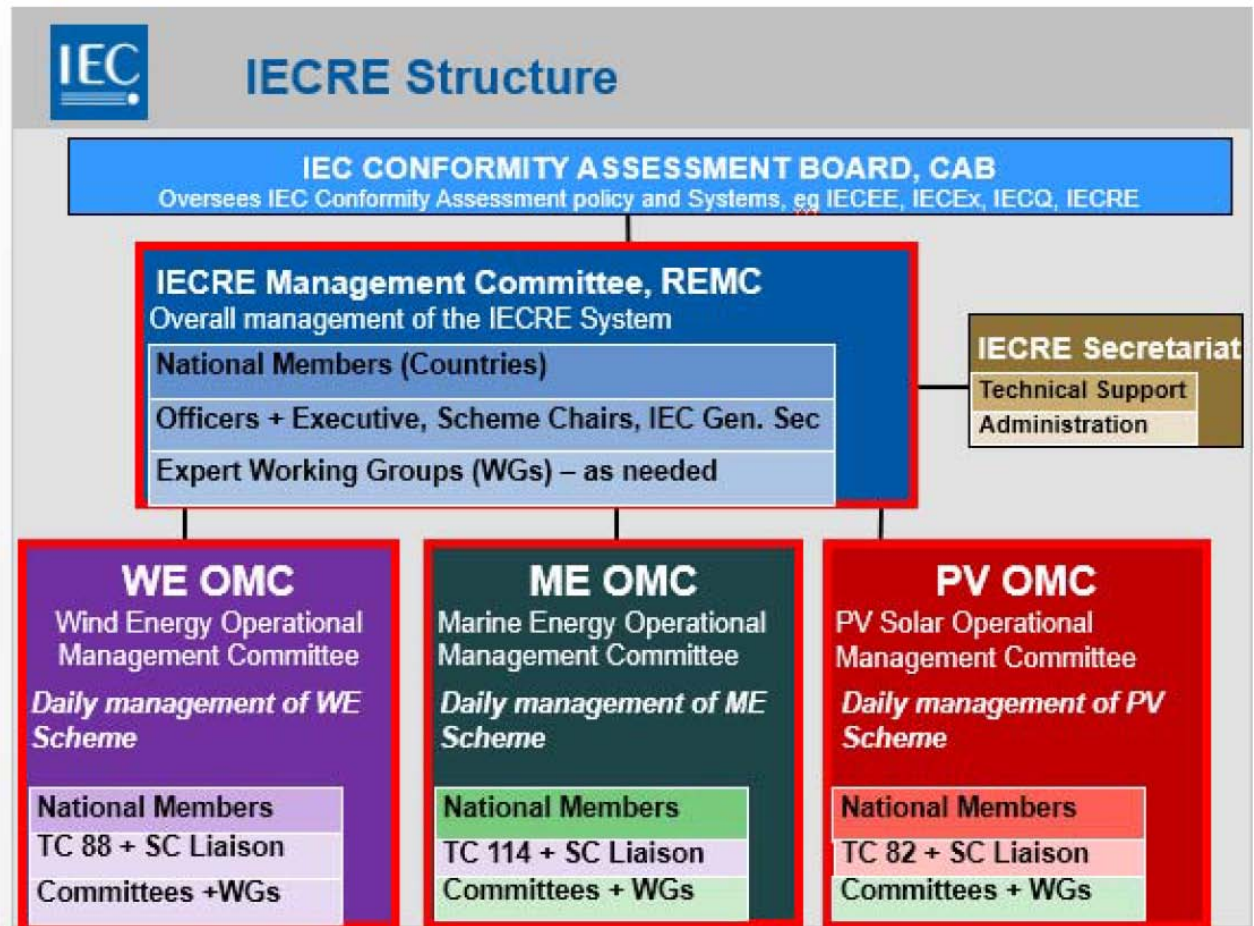
- **Common terminology\vocabulary**
- **Design process (DLC's, limit states)**
- **Definition of external conditions**
- **Minimal safety requirements (safety systems, design life)**
- **Credible\consistent test results**

IEC structure



IEC RE System

- IEC RE to be approved in June by CAB
- Three year transition from IEC 61400-22 to IEC RE



Current challenges TC88

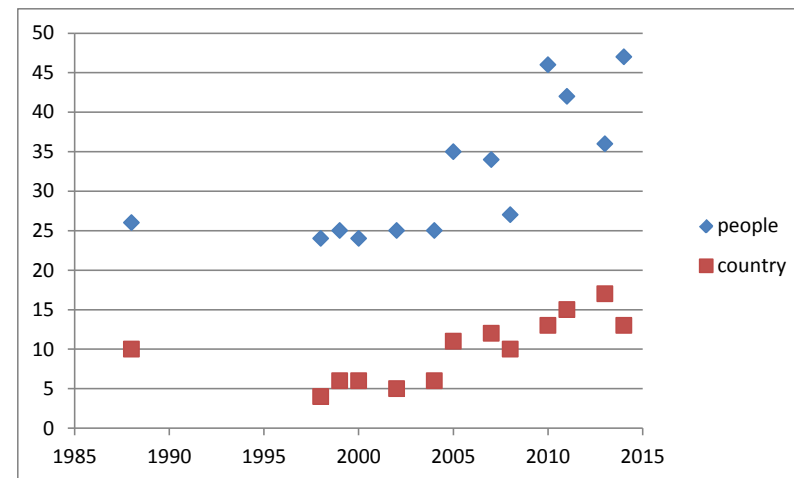
- Increasing complexity/size in both document and group size (currently 558 experts active under TC88)
- Create manageable groups/documents without losing the system level overview

IEC 61400-1 document size:

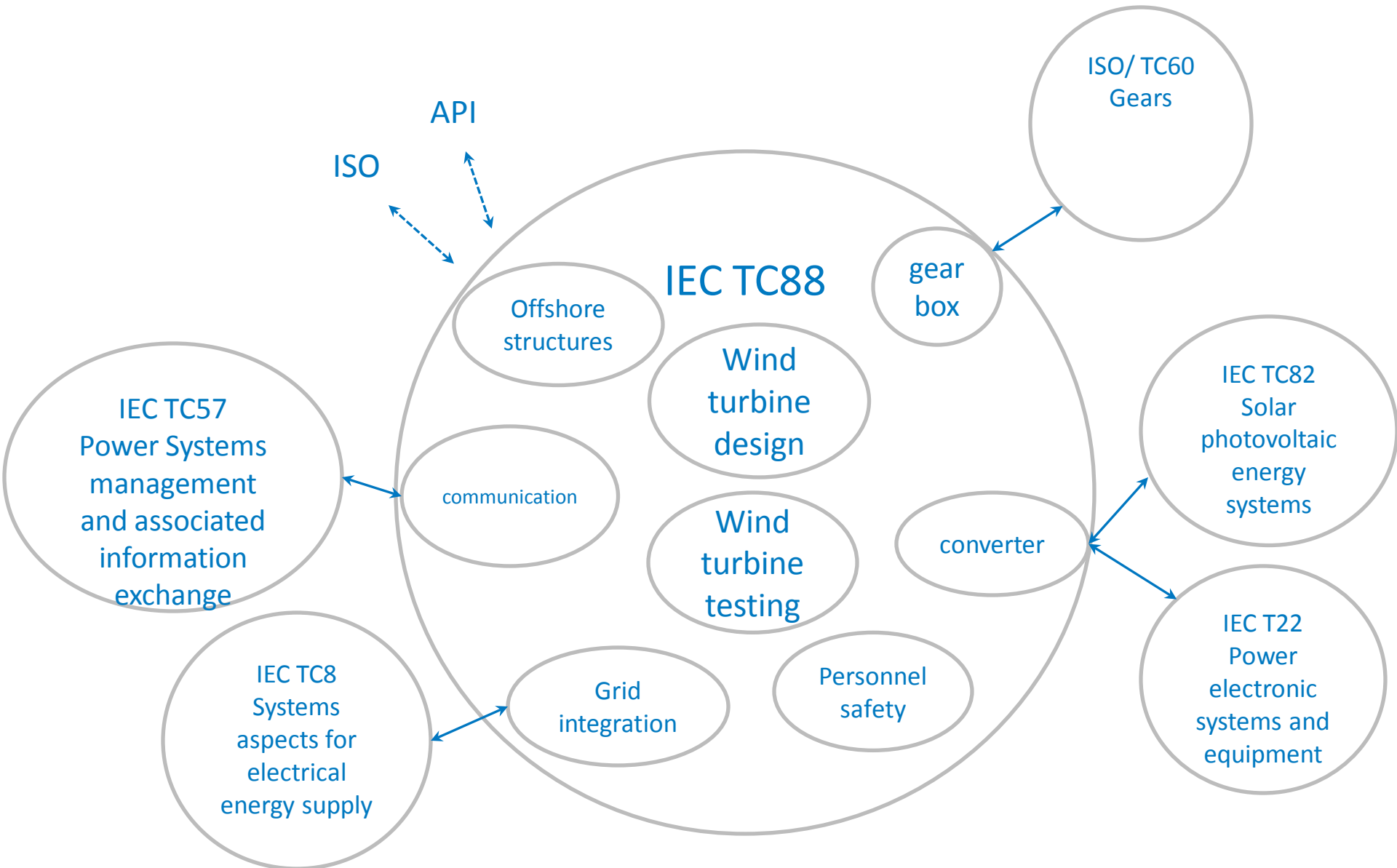
Ed1	Ed2	Ed3	Ed4
54 pages	58	92	~150



TC88 meeting size:

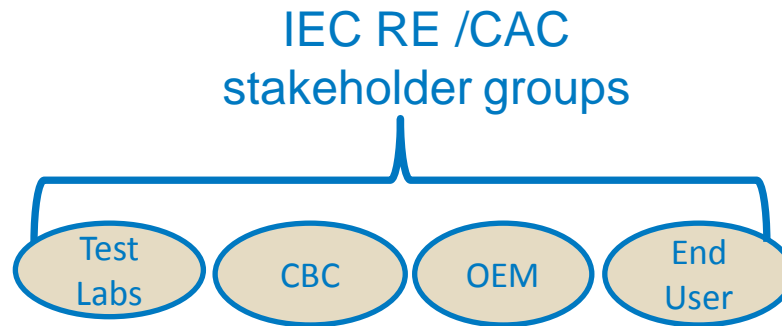


Increasing overlap with other groups



Challenges cont'd

- Organically grown structure
- Need to make sure all stakeholders well represented
- Other organizations writing standards/document where gaps are present or perceived



Sys	61400-1
	61400-2
	61400-3
Components	61400-4
	61400-5
	61400-6 Generator? Lift?
Elec	61400-24
	61400-25 Converter? Electrical?
Testing	61400-11
	61400-12
	61400-13
	61400-21
	61400-23 Safety & Fnc
Commercial	61400-15
	61400-26
	61400-27 Interconnect? Safety?

US activities

AWEA is recognized by the American National Standards Institute (ANSI) as an Accredited Standards Developer

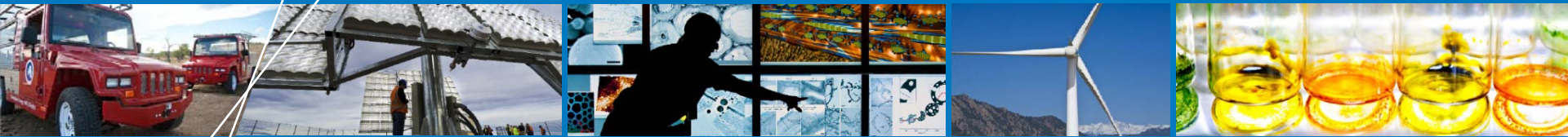
AWEA Standards Development Board (SDB):

- 1. AWEA SDB actively participates in the development of all Wind Energy related Standards.**
- 2. Promote the use of existing consensus standards by the US Wind Industry and authorities having jurisdiction**
- 3. Identify industry needs for National US standards**
- 4. Develop ANSI standards to fill gaps where neither international or national standards currently fill.**
- 5. Develop publications to identify US National deviations where there are gaps in existing standards**
- 6. Prioritize in developing standards harmonized at the highest possible level**

Adopt the current IEC standards as US standards through ANSI.

Applicable lessons learned

- **Get all stakeholders involved**
- **Find consensus on the right level of structural safety we can accept as an industry**
- **Collaboration/cooperation**
- **Harmonize at the high level (ideally global) use domestic standards where needed**
- **Marketing/education**
- **Think of structure**
- **Identify R&D needs to fill gaps in knowledge**



Questions?