ASTM International Committee E44

Solar, Geothermal and Other Alternative Energy Sources

International Electrotechnical Commission

TC 82 on Solar Photovoltaic Energy Systems

Conformity Assessment:

Introducing IEC RE

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E44.44 Chairman and TC 82 Secretary

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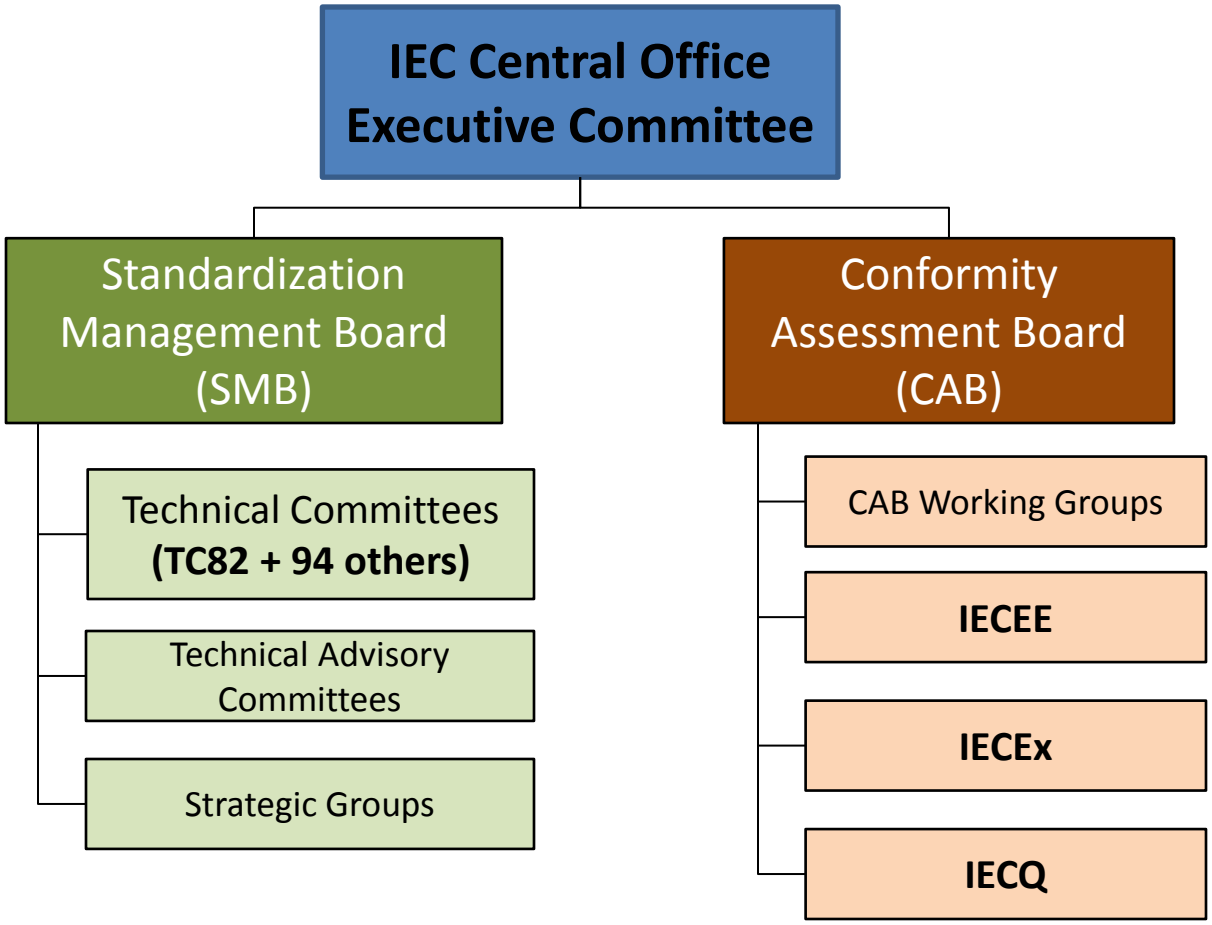
Background

- Industry Growth
  - Demand increasing 20%+ per year
  - Significant increase in large commercial plants
- Concern for Quality / Bankability
  - Doubts about adequacy of existing standards
  - Need for improved understanding of reliability
  - Validation of product lifetime for investors
- Need for Conformity Assessment
  - Assurance of security of investments in PV

IEC Organization



Roles & Responsibilities

- Standards Management Board (**SMB**)
  - Technical Committees => Write the standards
  - Manage nomination of experts and voting by National Committees

- Conformity Assessment Board (**CAB**)
  - Assessment Schemes => Evaluate implementation of standards in specific situations
  - Manage accreditation of Certifying Bodies

Existing CA Schemes

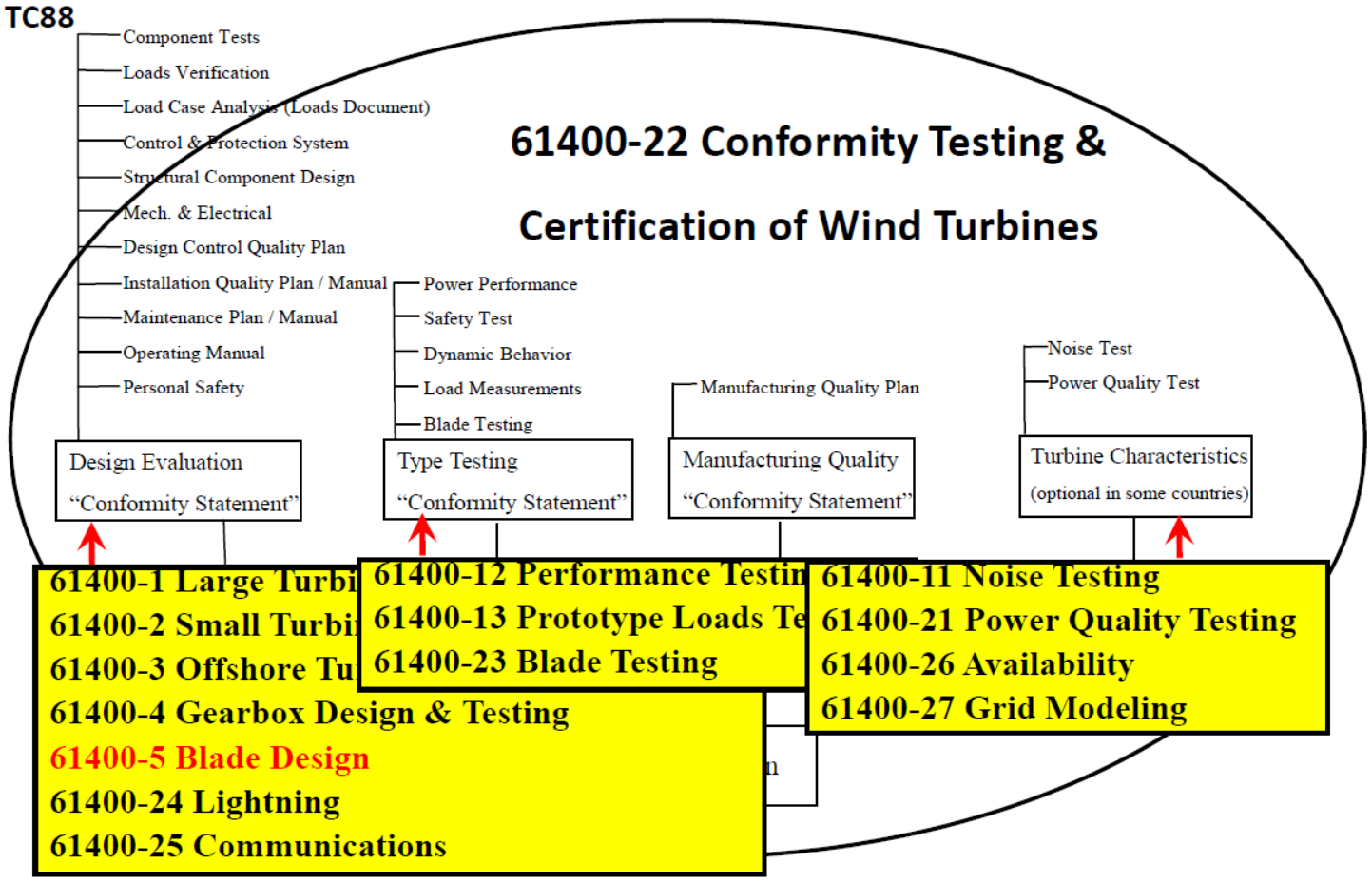
- **IECEE**
  - System for conformity testing and certification of electrotechnical equipment (specific categories including PV modules)
  - Oversees the Certification Body (CB) Scheme and recognizes CB Testing Laboratories (CBTL)
- **IECEx**
  - Conformity assessment for equipment operating in explosive atmospheres
- **IECQ**
  - Quality assessment system for electronic components and associated materials

TC 88 - Wind Turbines

- Wind industry identified need to standardize "system aspect" of large complex projects
  - Not addressed by any existing CA scheme

- Requirements written into IEC 61400-22
  - Type Certification
  - Project Certification
  - Management of certification system
  - Acceptance of operating bodies

Wind Certification and IEC Standards

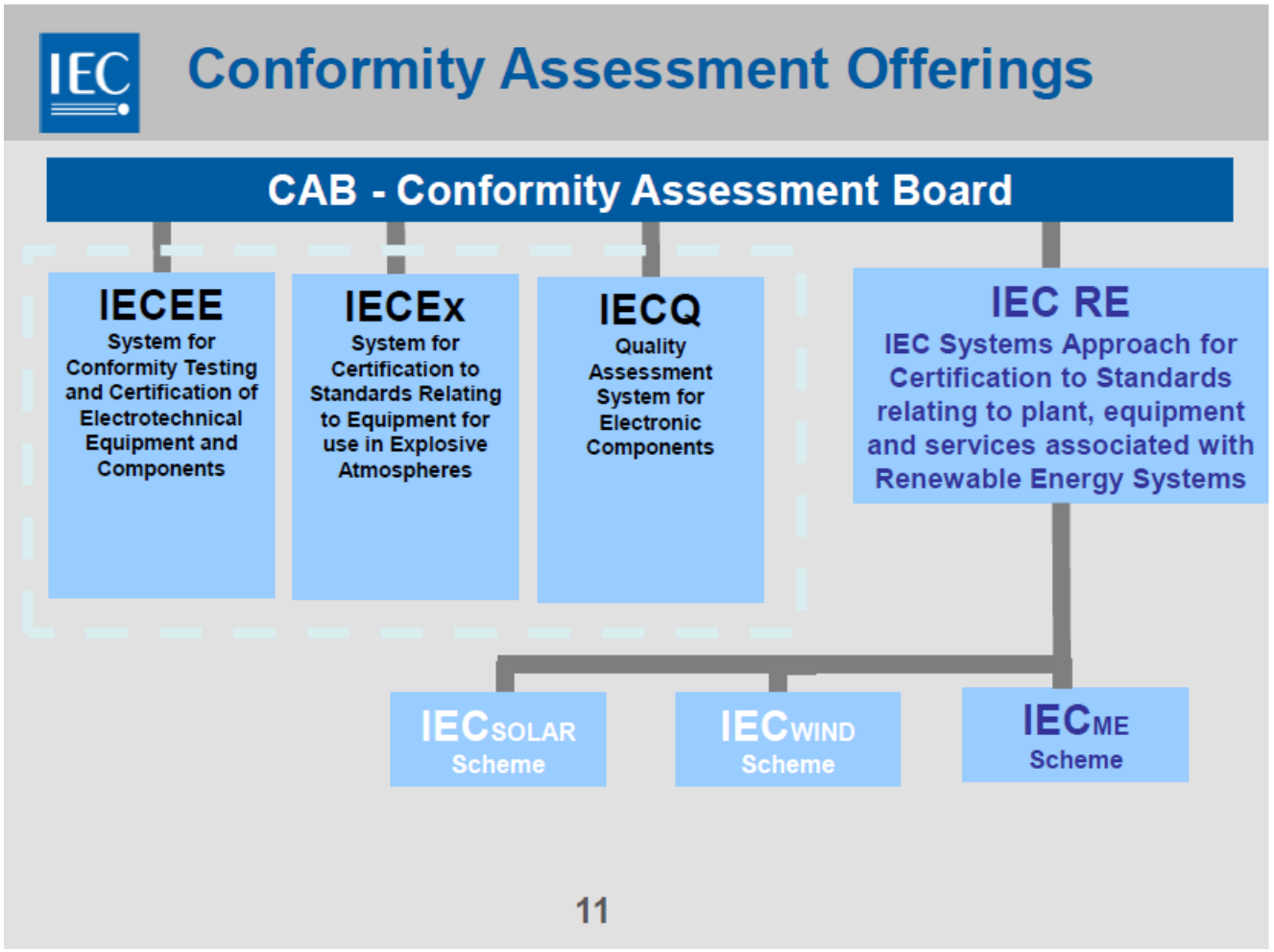


CA activities => Wind Turbine CAC

Problem with WT-CAC

- IEC structure / policy requires separation of standardization and CA activities
  - TC88 crossed the line, but with strong industry support
  - WT-CAC allowed to exist temporarily as industry matures
  - Parallel infrastructure with CAB is not sustainable
- Concept developed for new CA scheme (IEC RE)
  - Similar requirements exist for Marine Energy projects as well as large PV plants
  - Specific differences in details apply for each industry

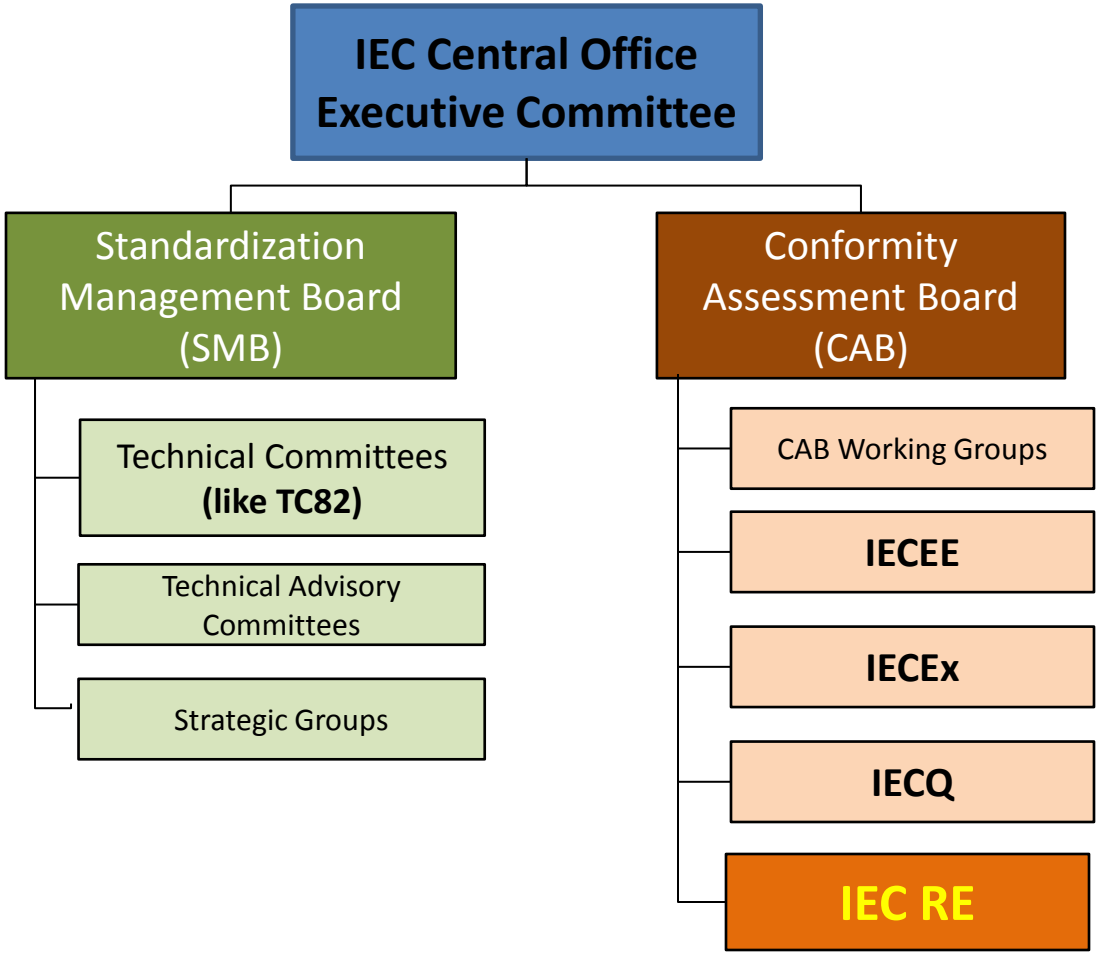
IEC RE Concept



CAB Decisions (June 2013)

- Proposal for a new RE System was endorsed along with the recommended next steps
- Decision 33/20
  - CAB approves the creation of a Renewable Energy Conformity Assessment System once the Basic Rules have been developed
- Decision 33/21
  - Establishes a working group to prepare a draft set of Basic Rules and report back at the next CAB meeting in New Delhi

New IEC Organization

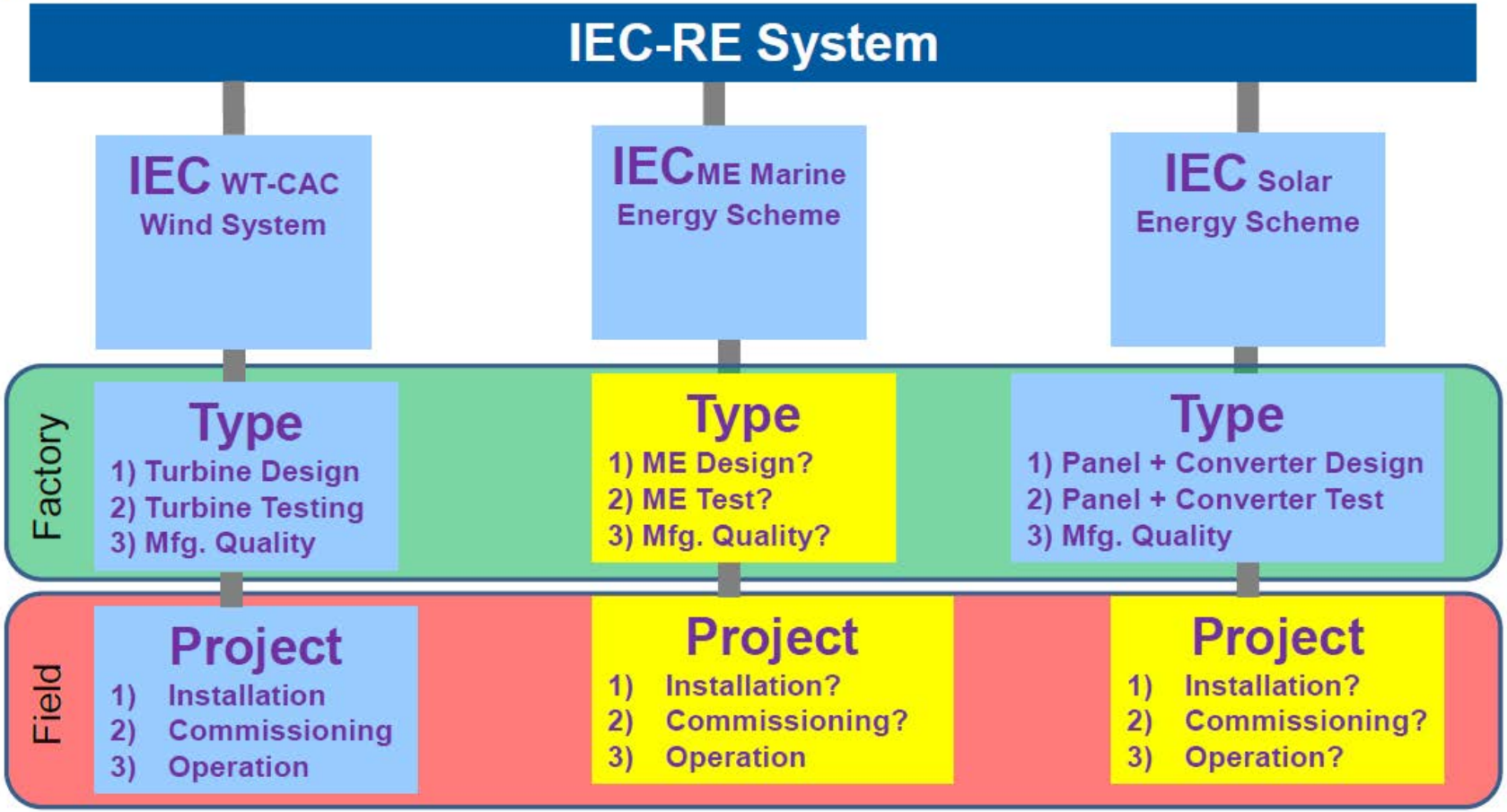


IEC RE kickoff meeting

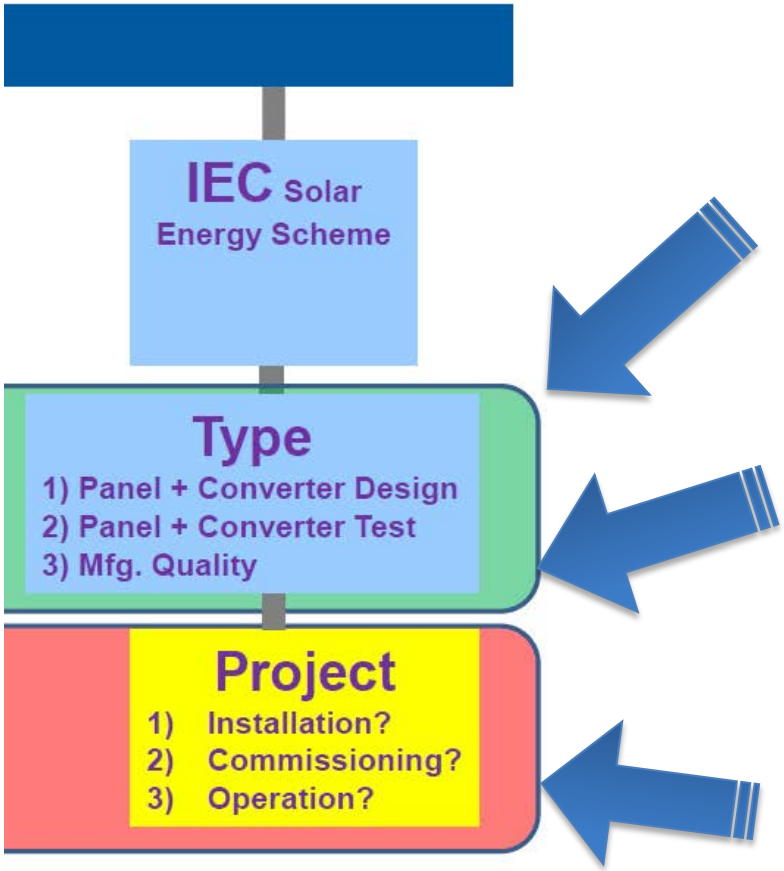
- 18-Oct-2013 in Aarhus, Denmark
  - Participation by TC82, TC88 (Wind Turbines) and TC114 (Marine Energy)
    - Seeking to include TC117 (Solar Thermal)
  - Working groups assigned to draft Basic Rules and Rules of Procedure for IEC RE
    - Basic Rules are common to all
    - Rules of Procedure are industry-specific

WTCAC

RE System Common Elements



PV Standards for Assessment



Module - 61215 / 61730
Inverter - 62109 / 62891
BOS - 62509 / 62093 + TBD

Manufacturing Quality –
PVQA **Task Group 1** NWIP

System Design - 62738 / 62548
Commissioning - 62446 / 61829
Operation – 61724 + TBD

PVQA Task Group 1 - NWIP

- Guideline for Manufacturing Consistency
  - Drafted by collaboration of 4 regional teams; collection of best practices
  - Approach for NWIP discussed and agreed between TC82 and IEC Central Office
  - Focused on PV-specific manufacturing processes and procedures to ensure quality and consistency
  - PV modules produced this way will be more likely to perform according to warranty (25+ years)

Systems / BOS

- WG 3&6 address systems aspects of PV projects, similar to requirements for other Renewable Energy industries
- Safety standards for specific components
  - Inverters (62109-2)
  - Combiner boxes (62109-4)
- System commissioning and O&M
  - “Coordination” with work in TC64
  - 62548 to be replaced by 60364-9-1

ICOMP

- Possible to have ASTM standard used?
  - Quick development (IEC average 33 months)
  - Technical excellence (existing IEC standards are relatively weak)
- Expect resistance, but willing to try
  - **Need to gain support** of PVQA Task Force, ANSI and Chinese/Japanese National Committees

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Thank you for your attention

Questions?

Contact solarexpert13@gmail.com

TC 82 Scope

- To prepare international standards for systems of photovoltaic conversion of solar energy into electrical energy and for all the elements in the entire photovoltaic energy system.

- In this context, the "photovoltaic energy system" includes the entire field from light input to a photovoltaic cell to and including the interface with the electrical system(s) to which energy is supplied.

TC 64 Scope

(TC 64 = Electrical installations and protection against electric shock)

- To prepare International standards concerning protection against electric shock arising from equipment, from installations and from systems without limit of voltage
- The standards shall lay down requirements for :
  - installation and co-ordination of electrical equipment
  - basic safety for protection against electric shock
  - protection against other hazards arising from the use of electricity