International Standards that Promote Technological and Social Innovations
– The Case of the IEC –

Hiromichi Fujisawa, Dr.
Visiting Professor, Waseda University
Research & Development Group, Hitachi, Ltd.
Former Vice President of the IEC and Chairman of Conformity Assessment

Summary
• **Global concerns** such as more efficient energy use, rapid urban population growth, etc. urge technological and social innovations for sustainable development.
• **Innovation at the society level** needs various stakeholders’ involvement, not only scientists and engineers. No single company nor country can solve the problems alone.
• **Technological innovation** needs new or retrofitted **systems and solutions** based on multiple technologies.
• **International standardization organizations** (SDOs) can play the role of catalyst by providing **international platforms for broad stakeholders** to join to seek solutions and consensus for international standards.

IEC, its Role and Organizational Structure
• 83 National Committees + 84 Affiliate Countries
• Two pillars: **Standards** and **conformity assessment**
• Executive Committee: President, VPs, Treasurer, GS
• Council: Member NCs
• Council Board: 15 members
• Three management boards: SMB, CAB and MSB

CAB: Conformity Assessment Board
International framework for testing and certification
• > 180 certification bodies in 54 countries
• Mutual recognition of CA results
• “One test, one standard, accepted everywhere”

IECQ: Quality of parts (since 1981)
IECEE: Safety of products (since 1985)
IECEx: Safety of explosion protected equipment (since 1996)

IECRE: New CA System for Renewable Energy Systems
• Wind, marine and solar PV energies
• Risk-based certification – Investors and insurers

History of electrotechnology and the IEC

Electricity – The Second Industrial Revolution
• 1831: Faraday’s discovery of induction
• 1860’s: Electric generators and motors
• 1870’s: Electric lighting
• 1881: 1st meeting of International Electrical Congress for dialogue on nomenclature and standardization
• 1906: **International Electrotechnical Commission (IEC)** for standardizing units, ratings, measurement, etc.

IEC est. 1906
Lord Kelvin 1st IEC President

SMB: Standardization Management Board
• 97 Technical Committees and 77 Subcommittees
• Joint TC with ISO for information technologies
• 20 000 experts
• Publications: 574 (2014/7-2015/6)
• Standards in library: 9 000 (2015)

Systems approach: System Evaluation Group (SEG) & Systems Committees (SyC)
• **AAL** (Active Assisted Living)
• **Smart Energies** (incl. Smart Grid)
• **Smart Cities** (to be est. soon)

MSB: Market Strategy Board
• Direct “window” to industry
• 15 members of CTO class
• Top-down/market pull approach, evaluating the trend of the future demand and technologies

Published IEC Whitepapers:

a) Coping with the energy challenge: Smart electrification – The key to energy efficiency [FR]
b) Electrical energy storage [JP]
c) Grid integration of large-capacity renewable energy sources and use of large-capacity electrical energy storage [CN]
d) Microgrids for disaster preparedness and recovery – With electricity continuity plans and systems [JP]
e) Orchestrating infrastructure for sustainable smart cities [FR]
f) Internet of Things: Wireless sensor networks [CN]
g) Factory of the future [US]
h) Strategic asset management of power networks [JP]

*[XX]* represents a country which proposed and led the work.