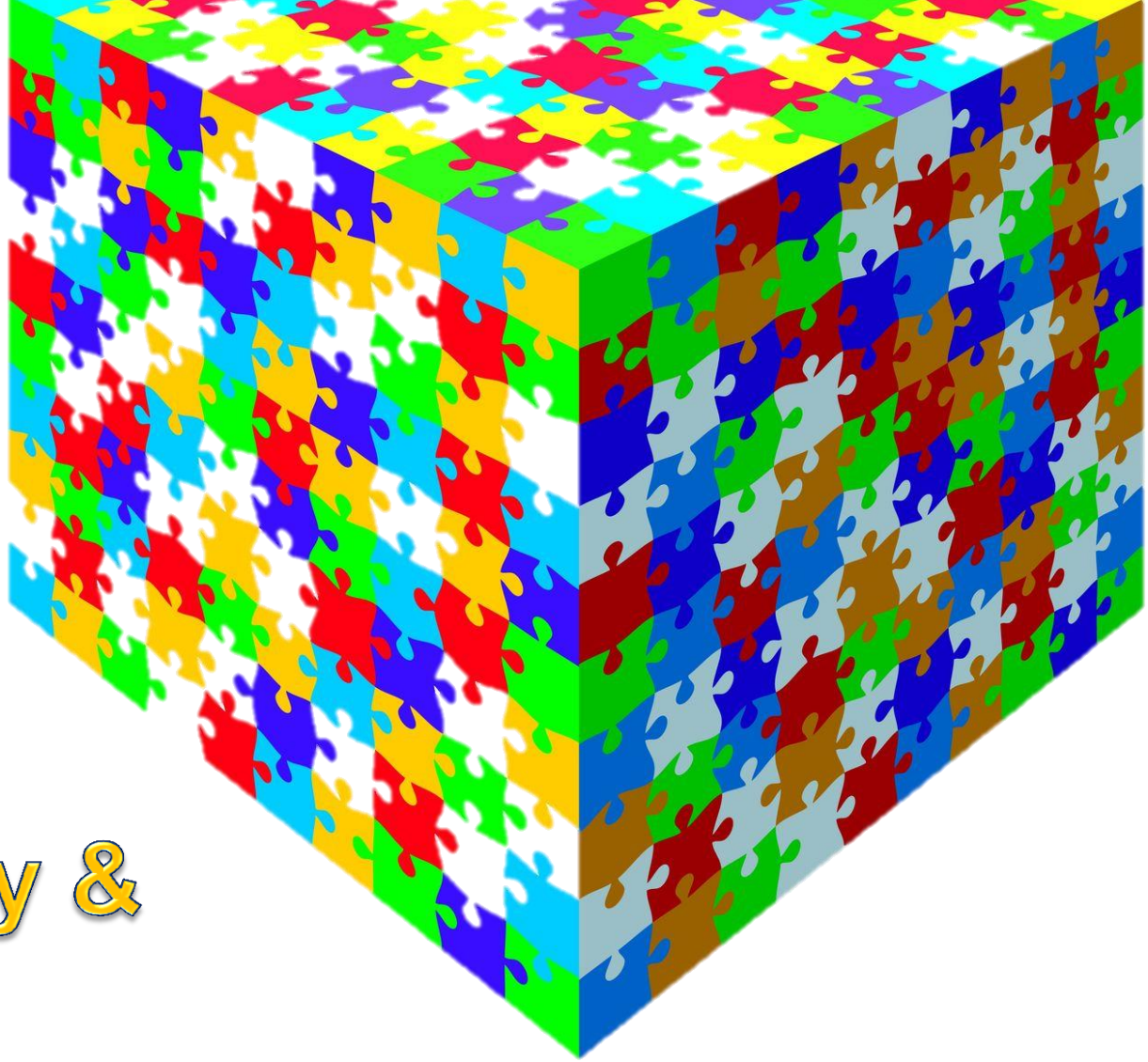

IEC Systems Approach: Smart Energy & Smart Cities

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Smart Energy

ABINEE TEC 2015
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International Electrotechnical Commission


global reach:
166 countries
98% of world population
96% of energy generation

Systems aspects in industry

The customer expects one system, even though this is composed of several components!

Integration: The horizontal functions of the system are intended to be perceived as an integrated feature;
Interoperability: The components of different suppliers are to be interchangeable in order to be independent of individual suppliers;
Compatibility: The properties of new components are intended work in the system even though the system was originally not designed for this purpose;
Best-of-breed functionality: The overall system is intended to integrate the ”best“ components

Systems Approach

- **Systems Engineering Methodologies for Complex Systems**
- **Response to IEC Masterplan**

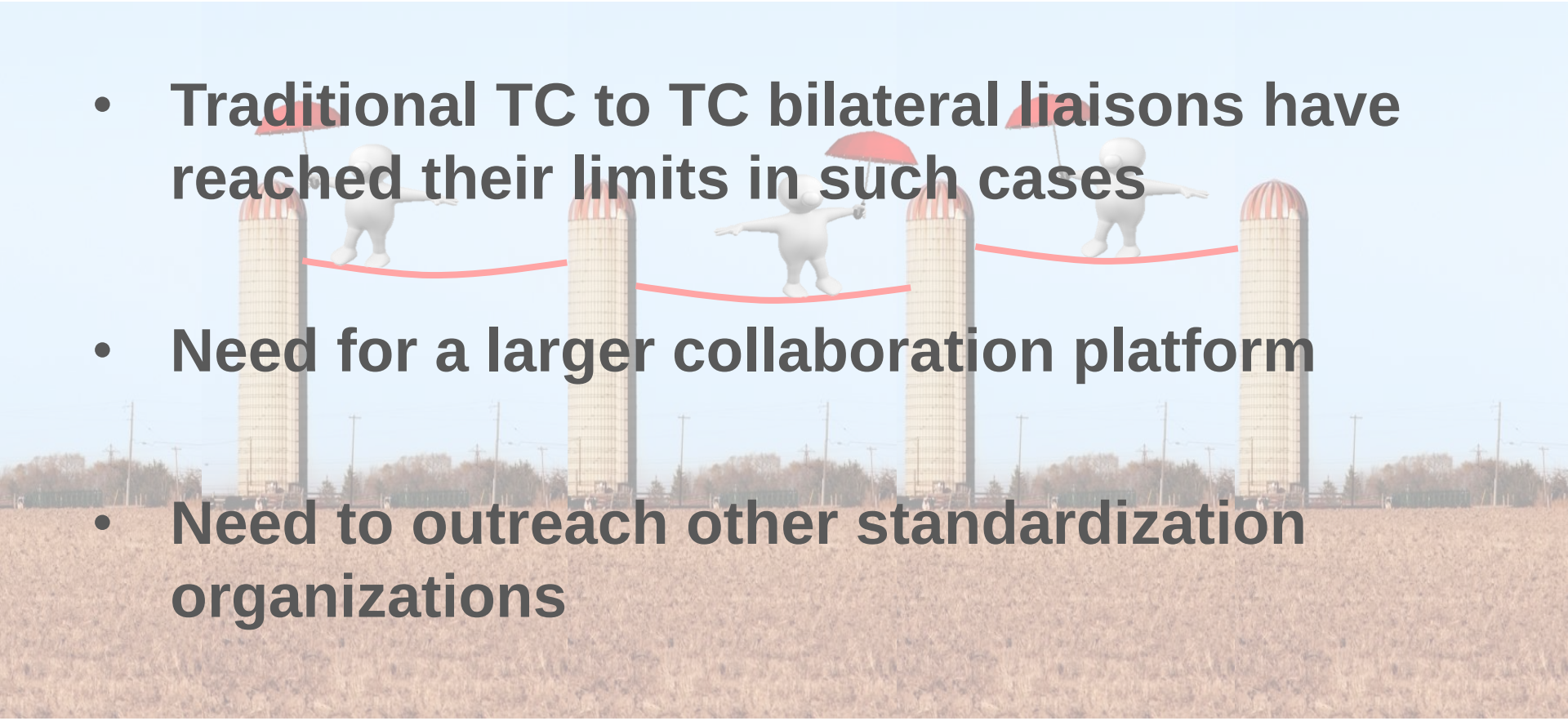
IEC will lead the way in substantially extending the use of systems and sector approaches in appropriate areas of its standardization and conformity assessment activities.

Why a Systems Approach?
➡ Complexity of Technologies

- Multiplicity and convergence of technologies
- Large-scale infrastructures
- Need for inter-operability
- Many new and emerging markets

An ever increasing number of technologies and standards are involved

Why a Systems Approach?
➡ A new level of collaboration



- Traditional TC to TC bilateral liaisons have reached their limits in such cases
- Need for a larger collaboration platform
- Need to outreach other standardization organizations

The Systems Approach:
➡ A collaboration platform

- Top-down approach starting at the system rather than at the product level
- To address the complexity
- To ensure the inter-operability

The Systems Approach:
➡ A collaboration platform

- **Engaging TCs, and not directing**
- **Complementary to existing TCs, and not competing**

Steps to enable Systems Standards

Systems Evaluation Groups (SEG)

First stage of systems development whose role is to engage the community of experts identify the relevant stakeholders and define the general architecture and boundaries of the problem to be addressed.

Systems Committees (SyC)

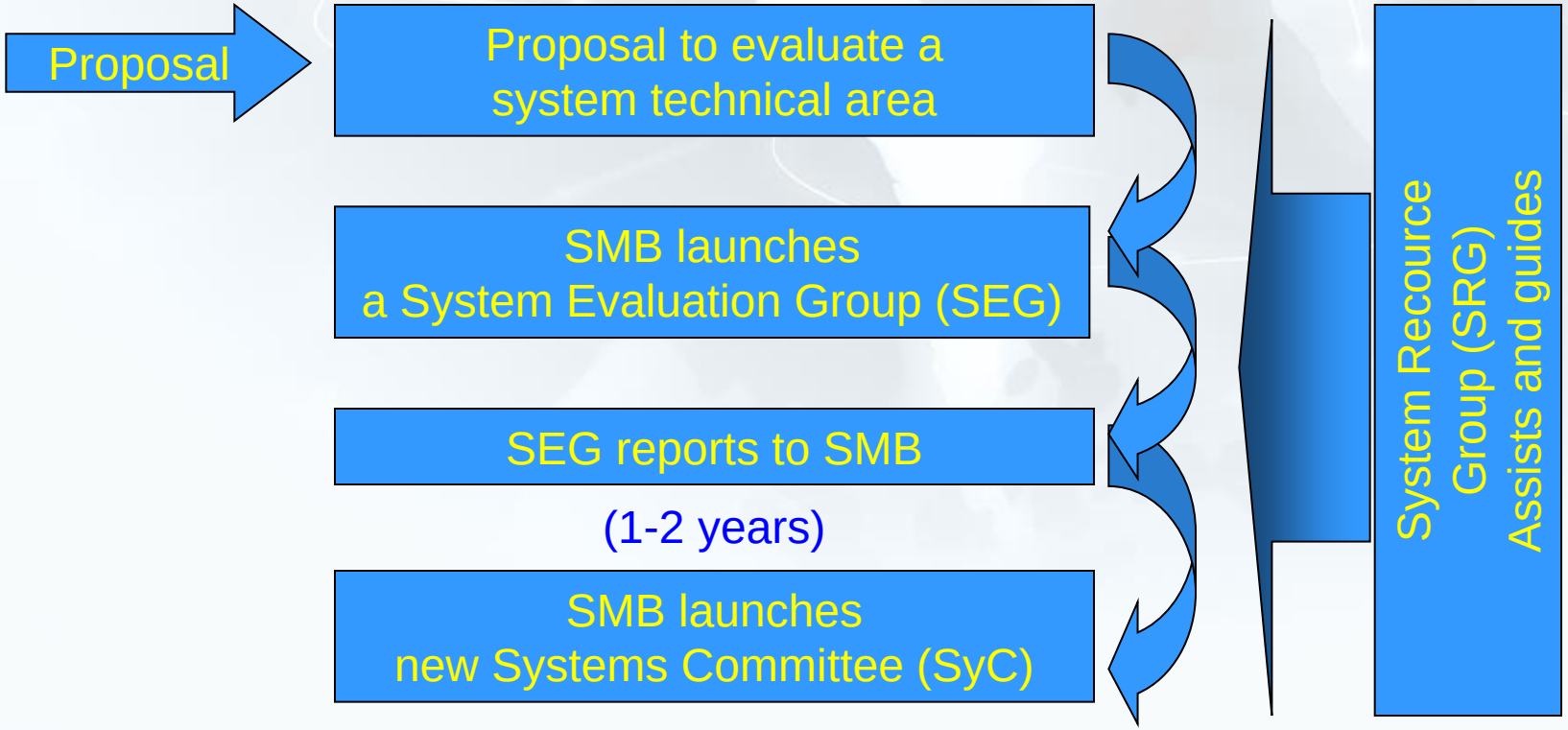
Working at the systems instead of the product level to define reference architectures, use cases and appropriate standards.

Systems Resource Group (SRG)

Group populated by systems experts whose purpose is to guide the development and use of specialized tools and software applications for Systems.

IEC approach to systems

- **IEC will address the needs of large systems in the following way**



First Step: Systems Evaluation Group (SEG)

- Evaluates if the “Systems” approach is relevant for the problem to be addressed
- A larger, open group used in the first stage of systems development
- Engages the community of experts and identifies the relevant stakeholders
- Defines the general architecture and boundaries of the problem to be addressed
- 2 years approx. lifetime

Existing SEGs

SEG 1: Systems Evaluation Group - Smart Cities

SEG 4: Systems Evaluation Group - Low Voltage DC Applications, Distribution and Safety for use in Developed and Developing Economies

SEG 5: Systems Evaluation Group - Electrotechnology for mobility

SEG 6: Systems Evaluation Group - Non-traditional Distribution Networks / Microgrids

SEG 1 – Smart Cities

The Energy challenge and the cities

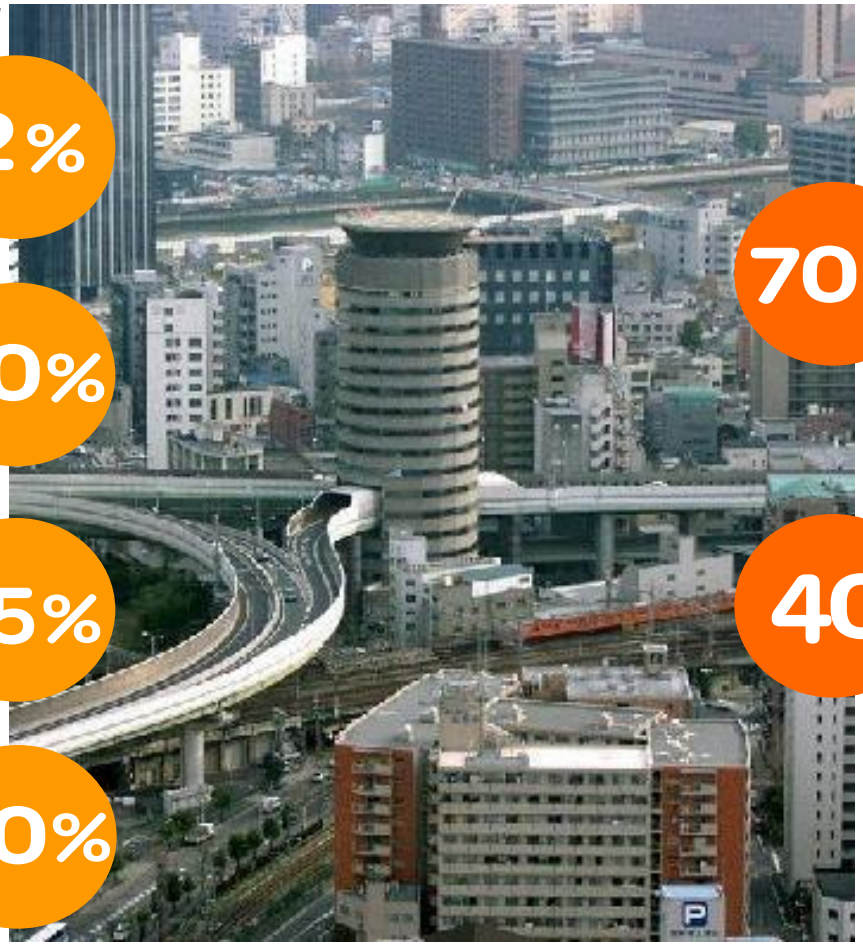
Cities today…

Earth's surface **2%**

World population **50%**

Global energy consumption **75%**

Global CO_2 emissions **80%**



…and by 2050

70% **World population**

40 **Years to double the urban capacity developed over the past 4000 years**

the battle will be won, or lost, in the cities

Cities need to become smarter

Urban efficiency delivers liveability and sustainability

Stakeholder collaboration

Governments
Includes National, regional as well as local city officials

Private Investors
Includes international development banks and private organizations

Planners & Developers
Includes real estate developers, urban planners, & property managers

People & Communities

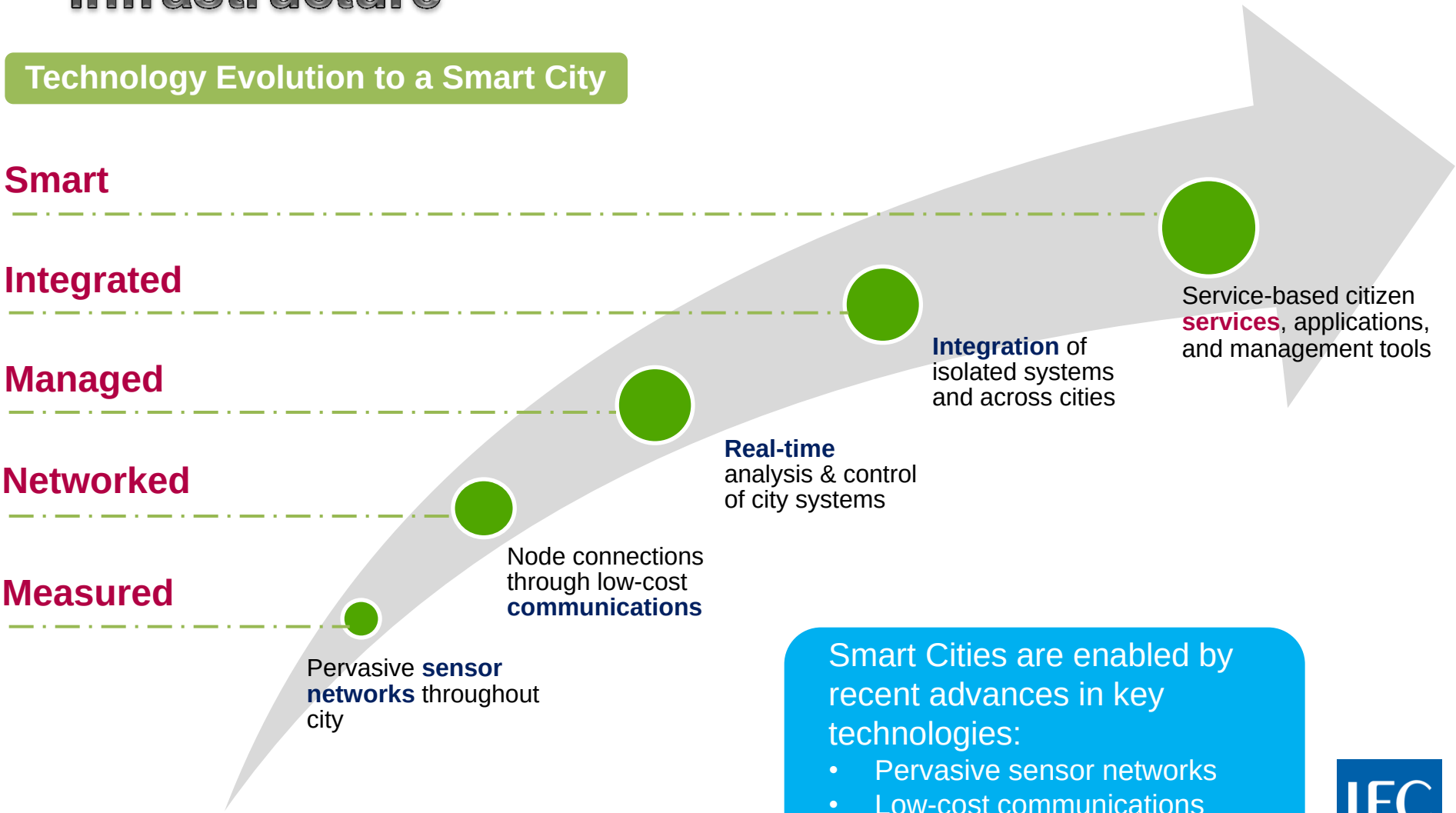
Industry suppliers
Includes ICT, energy, transportation & infrastructure vendors & service providers

Utilities
Includes city and private electric, water, & gas utilities

NGO's & associations
Includes all local organizations - citizens, businesses & NGOs

Becoming smarter is a long-term process , a step-by-step approach, built on existing infrastructure

Technology Evolution to a Smart City



Smart Cities are enabled by recent advances in key technologies:

- Pervasive sensor networks
- Low-cost communications
- Software-as-a-Service

SEG 1 Smart Cities

1. Recognizes the unique challenges for SDOs involved in the complex issues associated with smart cities;
2. Work based on identifying the sectors/bricks of applications (energy, transport, water....)
3. Integrated into a flexible architecture, aggregating existing and new systems, open and interchangeable.
4. Ensuring progressive deployment and easy operations thanks to development of professional services, including Data Management, protection, & cyber security

SEG 1 Smart Cities Statistics

- Formed in 2013
- 60+ members;
- IEC, ISO, ITU, IEEE, Academia, Cities;
- Varied interests and expertise;
- Focusing their work on high-level needs in this area;
- 4 Meetings since 2013;
- A thorough plan / outline to support the proposed SyC Smart Cities - and a clear understanding of the IEC role in this area being designed.

White Paper

Orchestrating infrastructure for sustainable Smart Cities

This White Paper explains what is needed to move cities to greater smartness.

- **Calls for a wide collaboration between many stakeholders, including other international standardization bodies to ultimately lead to integrated, cost-efficient, and sustainable solutions.**

- **IEC has a specific role to play in the development of Smart City Standards.**

Next Step: Systems Committees (SyC)

Systems Evaluation Groups (SEG)

First stage of systems development whose role is to engage the community of experts identify the relevant stakeholders and define the general architecture and boundaries of the problem to be addressed.

Systems Committees (SyC)

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Next Step: Systems Committee (SyC)

- Working at the systems instead of the product level to define reference architectures, use cases and appropriate standards
- to support applications and services relevant to IEC stakeholders
- An SyC can publish international standards, as well as other IEC deliverables
- It functions generally in the same manner as a conventional TC (except extended liaisons to reach out to other SDOs)
- It operates at the “same level as a TC”

SyC's : Smart Energy & AAL

1. SyC Smart Energy

- Standardization in the field of Smart Energy
- Coordination and guidance in the areas of Smart Grid
- Including interaction in the areas of Heat and Gas

2. SyC-AAL - Active Assisted Living

- Enable accessibility of AAL Systems and user interfaces & cross-vendor interoperability of AAL systems, products and components

- IEC work is central to global efforts to help the elderly and people with disabilities live a healthier, more active and independent life

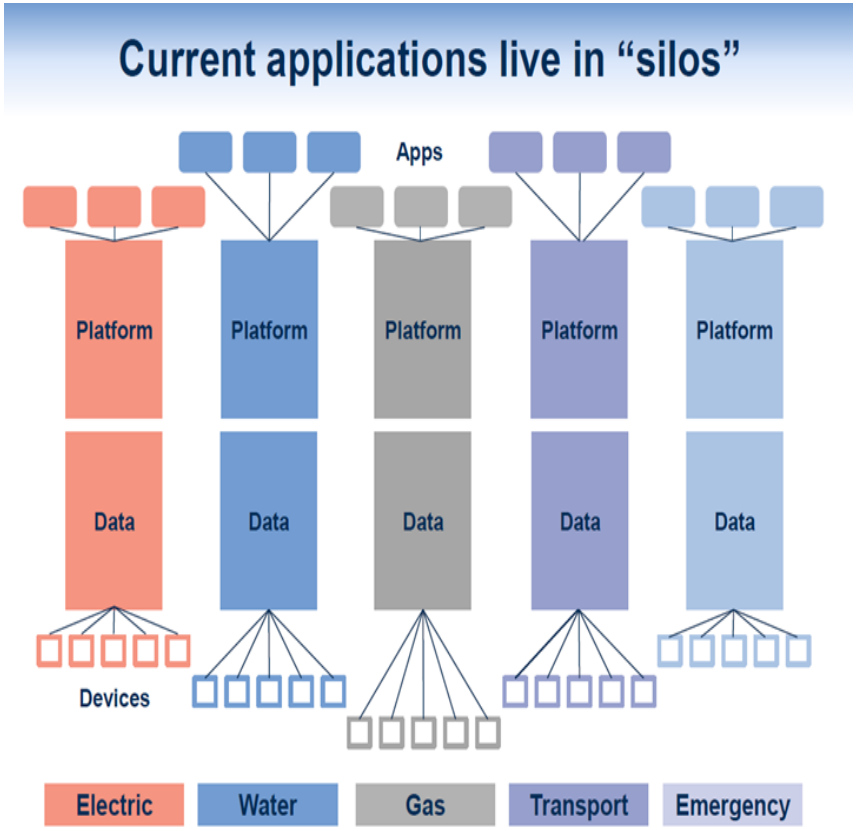

SyC Smart Energy

SyC Smart Energy

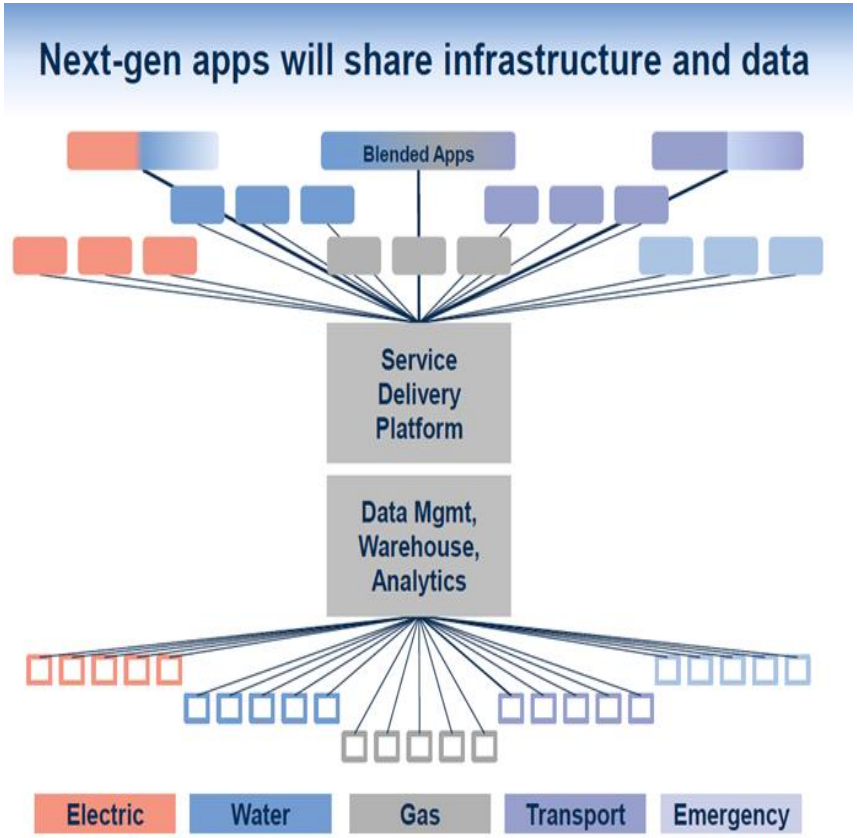
- Former SG3/SEG2
- Published IEC Smart Grid Roadmap
  - Ed. 2.0 to be published in Q4 2015
- Use Case repository (TC8)
- Smart Grid Mapping Tool
  - www.smartgridstandardsmap.com

A different approach

Individual Silos

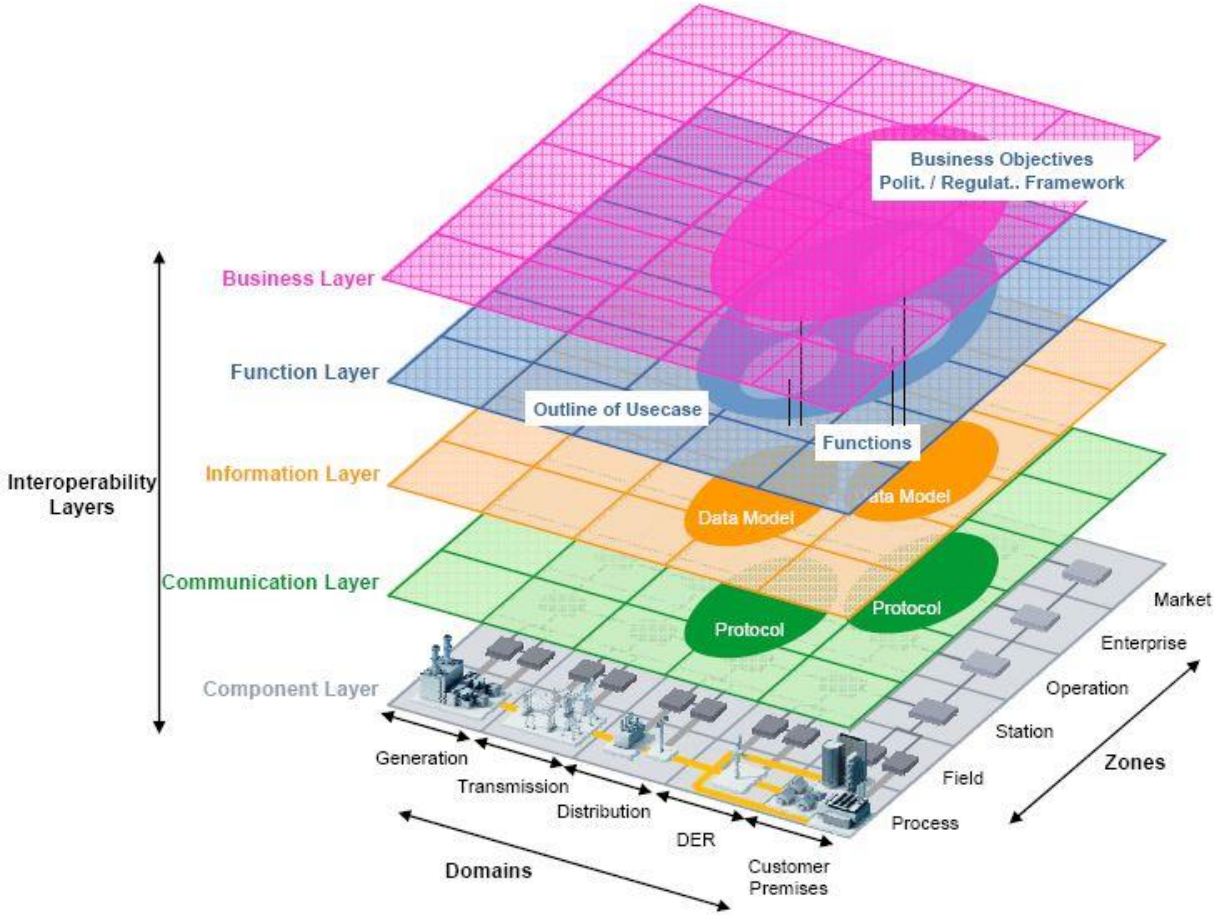


Systems Approach

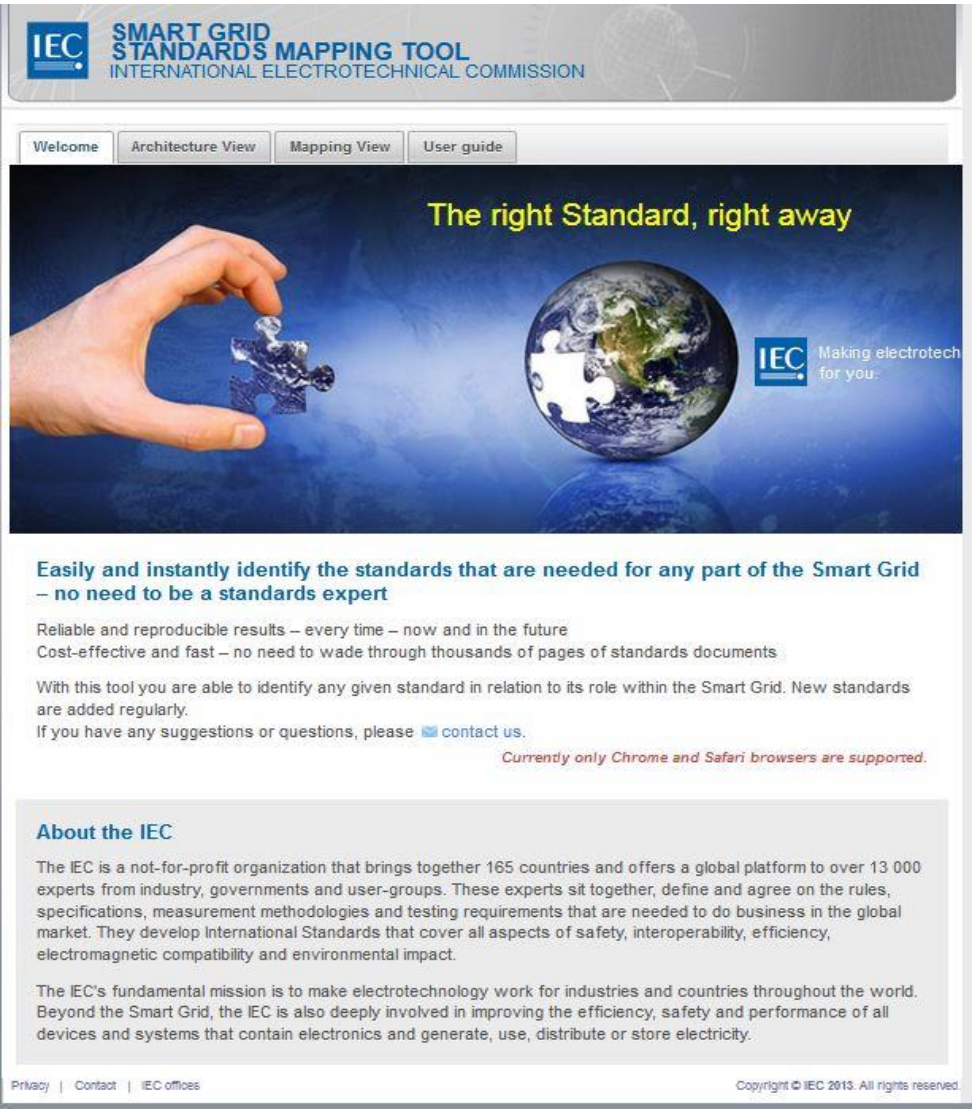


SyC Smart Energy - SGAM

- X: Domain
- Y: Interoperability (Layer)
- Z: Zone



smartgridstandardsmap.com

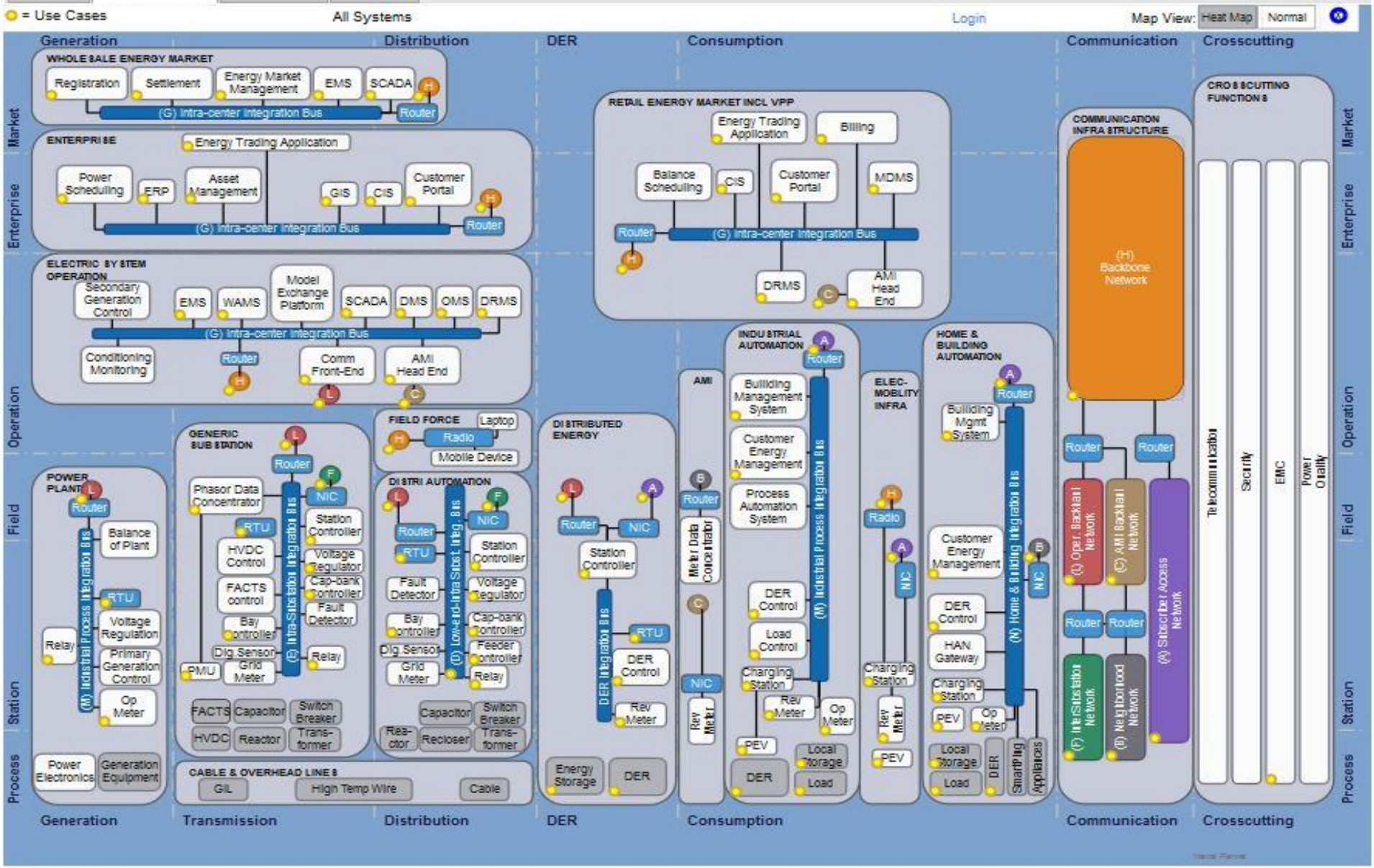


- SG3 – Smart Grid
- Standards Database
- Search by standard
- Search by cluster
- Other SDOs mapped
- No need to be standards expert

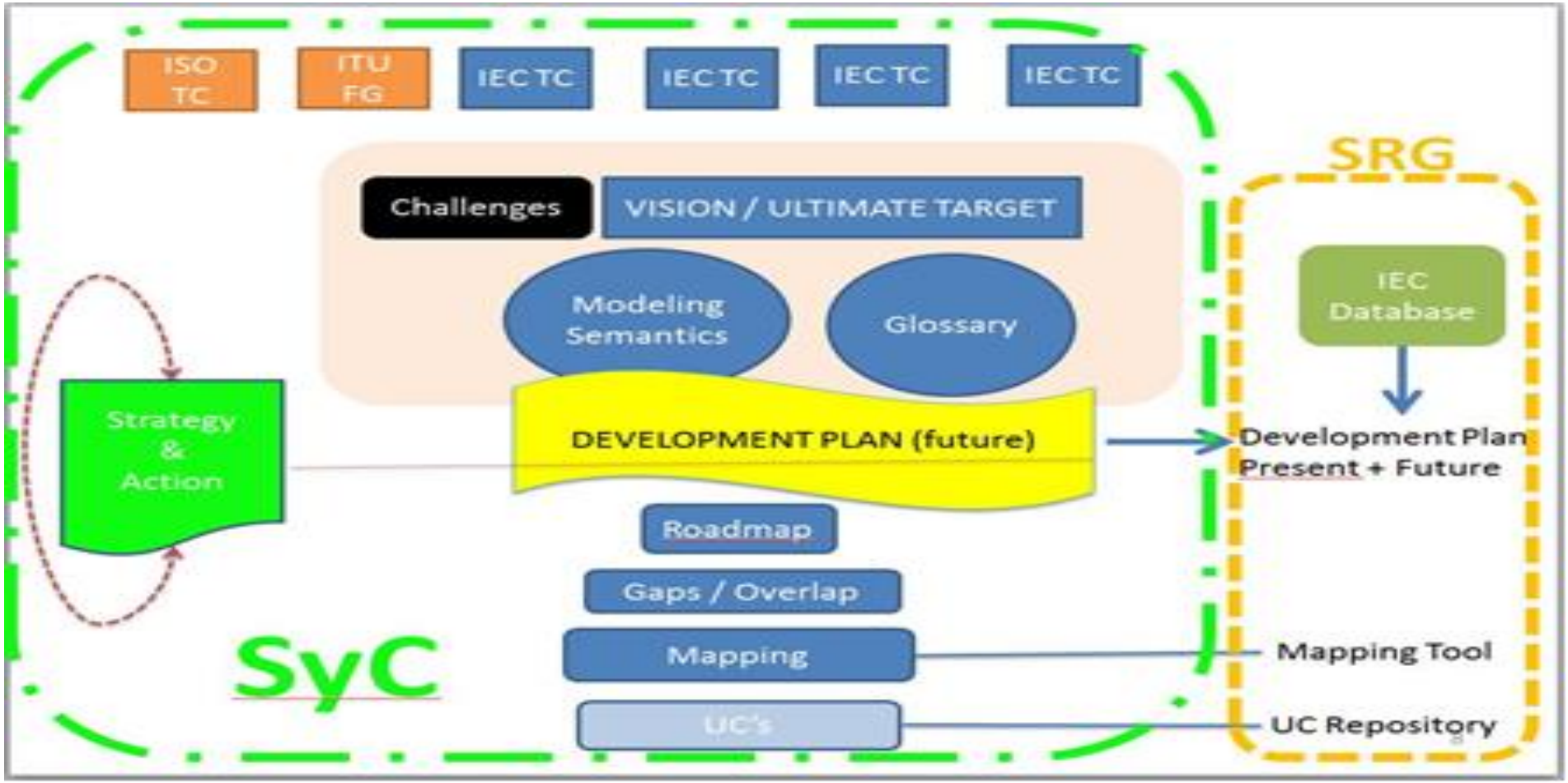
SMART GRID STANDARDS MAP
INTERNATIONAL ELECTROTECHNICAL COMMISSION

Welcome | Architecture View | Mapping View | User guide

= Use Cases | All Systems | Login | Map View: Heat Map | Normal



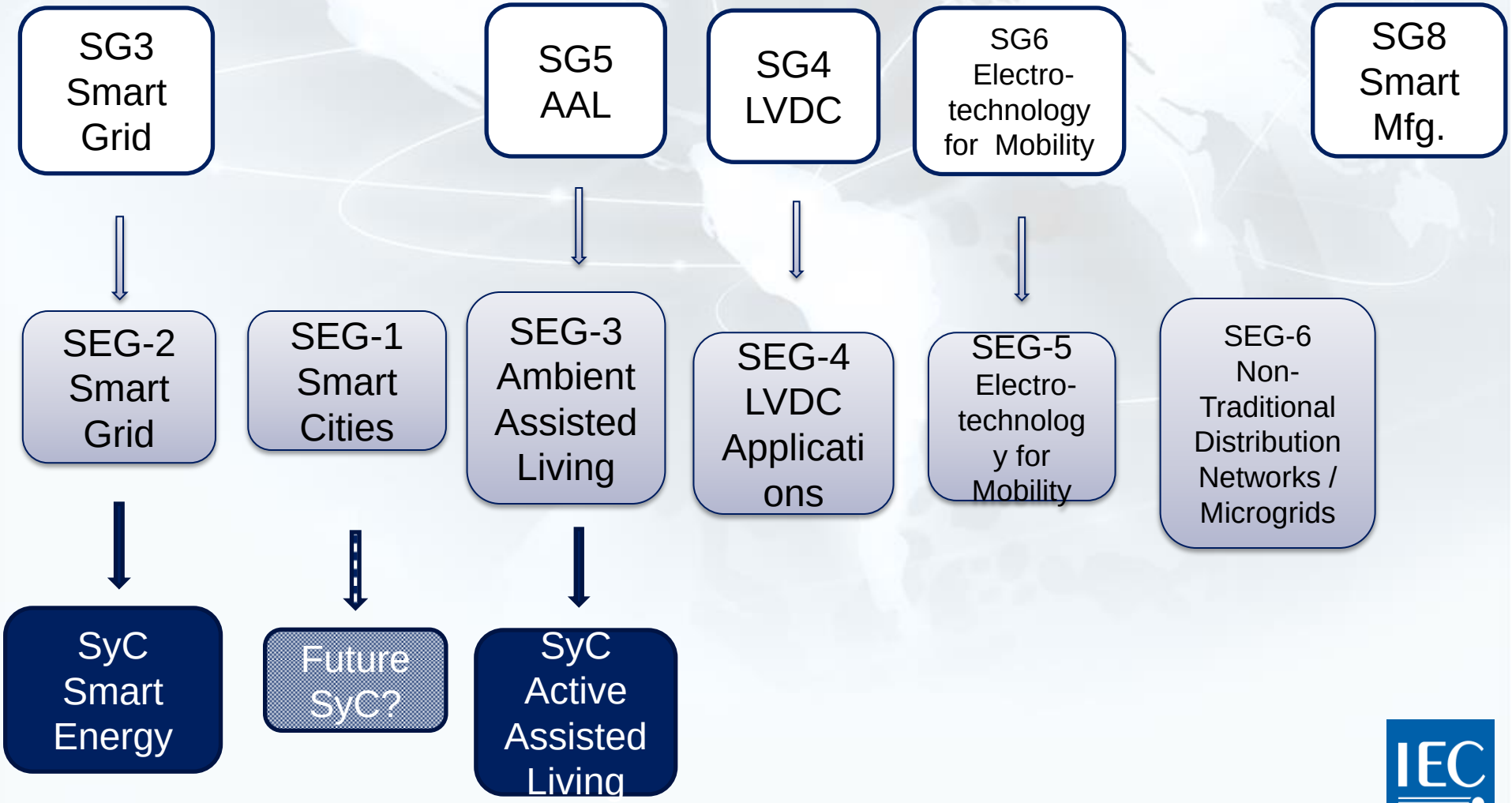
Structure of SyC Smart Energy



SyC Smart Energy - Next Steps

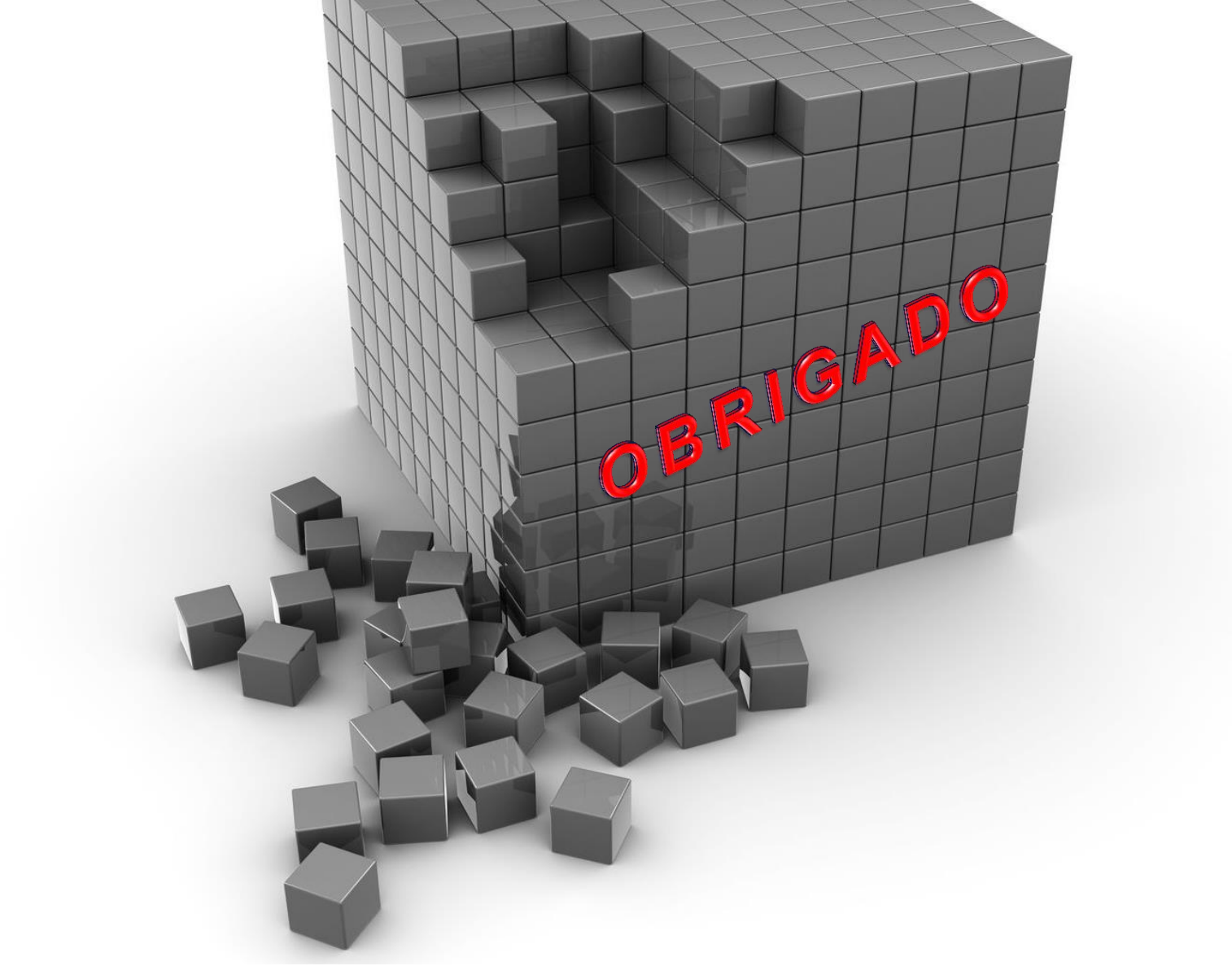
- Coordinate with existing IEC, ISO and ITU-T committees and smart energy activities.
- Identify technology themes in the smart grid system and categorization of standardization projects and relevant activities.
- Identify and categorizing stakeholders and market drivers.
- To have first meeting in Beijing, China on 18/19 June 2015

IEC Expanding The Universe Of Systems Standardization



IEC Systems Committees Conclusions and Guiding Principles

- Systems Standards are enablers
- Guiding principles and strategic orientation for industry and the IEC
- Guiding principles for technology and systems integration
- Guiding principles for collaboration between actors



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Commission