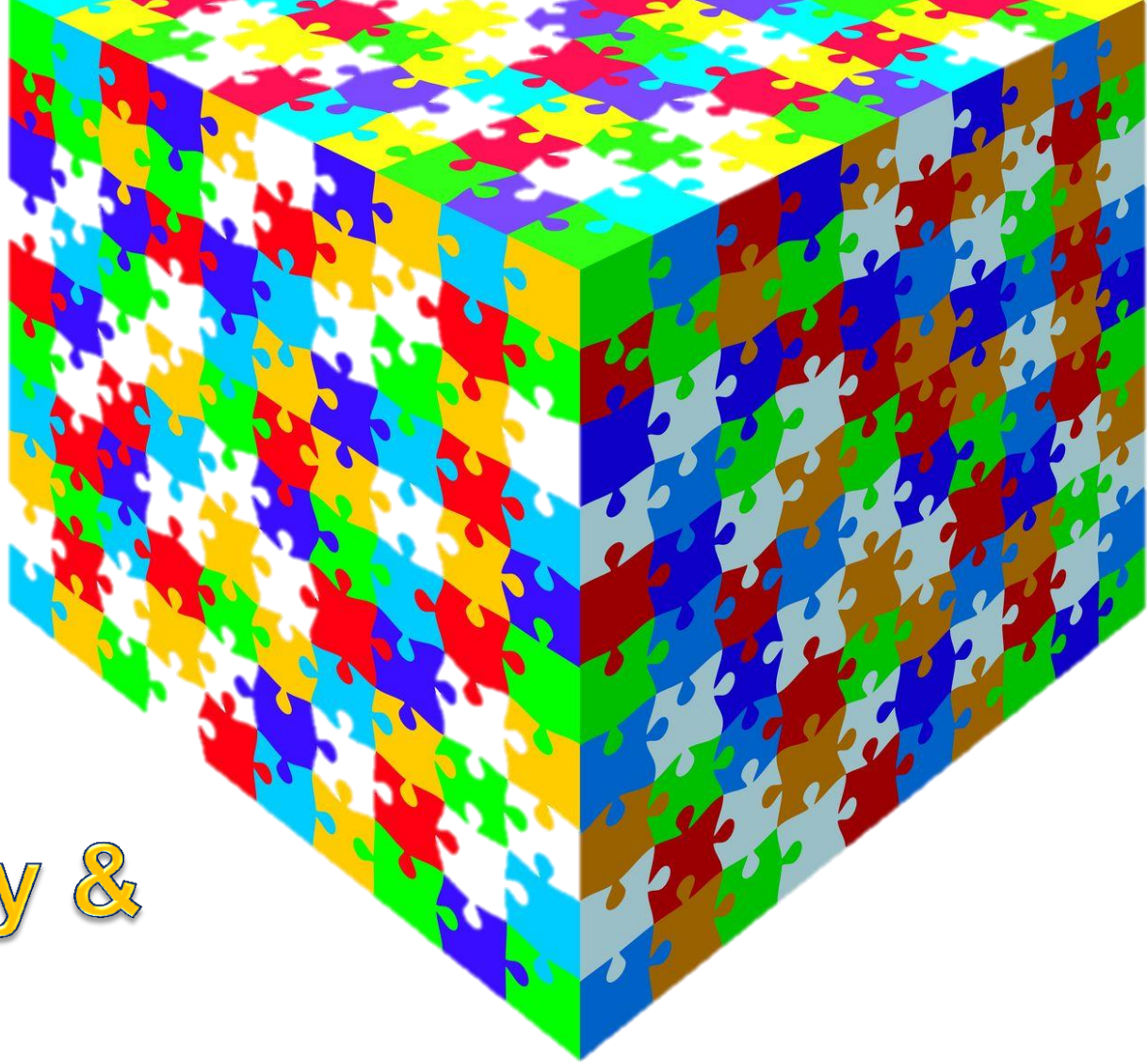


IEC Systems Approach: Smart Energy & Smart Cities



Peter Lanctot
Secretary MSB
Smart Energy

ABINEE TEC 2015
Sao Paulo, BR
2015-03-26



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 interoperability



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)

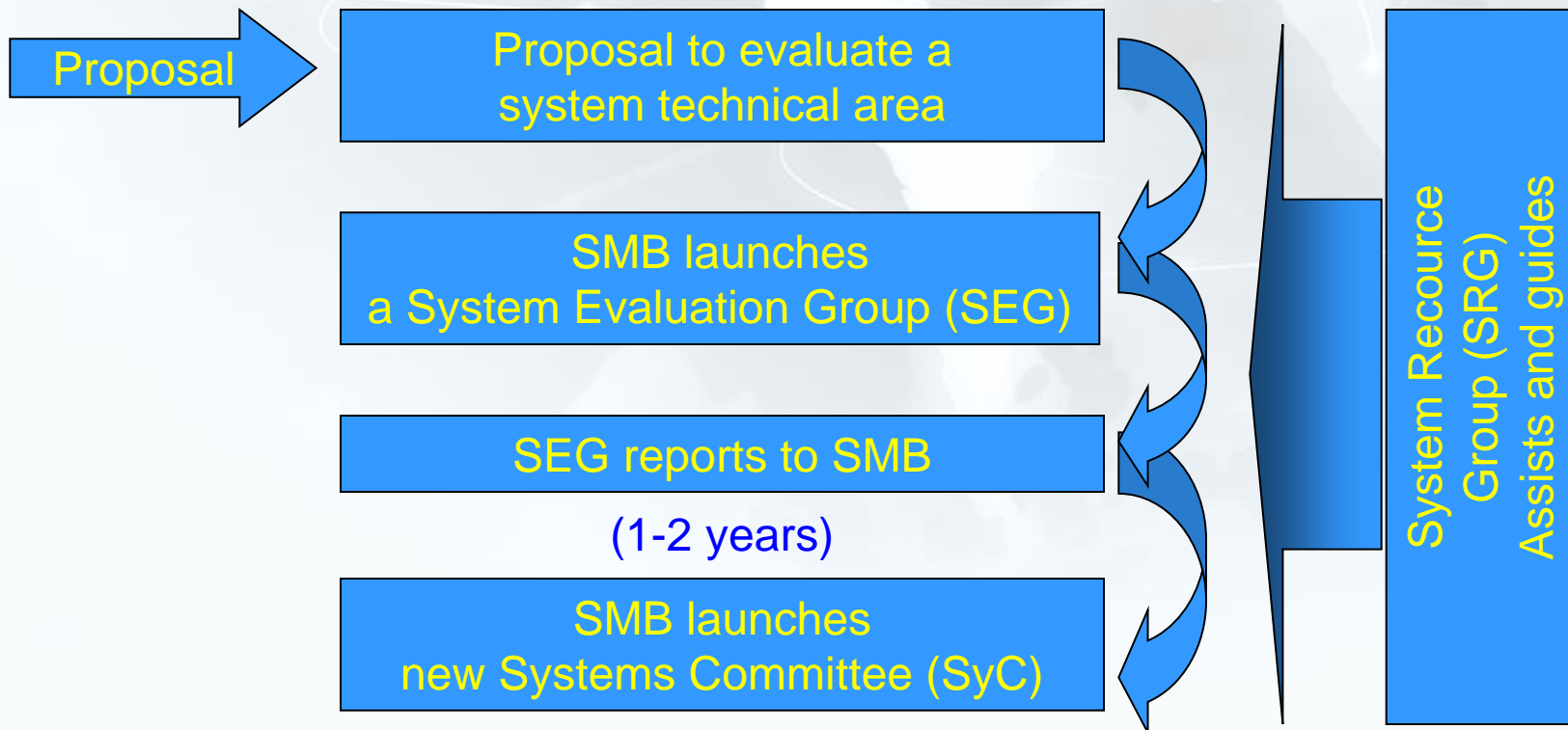
Working at the systems instead of the product level to define reference architectures, use cases and appropriate standards.

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...

...and by 2050

Earth's surface

2%

World population

50%

Global energy
consumption

75%

Global CO₂
emissions

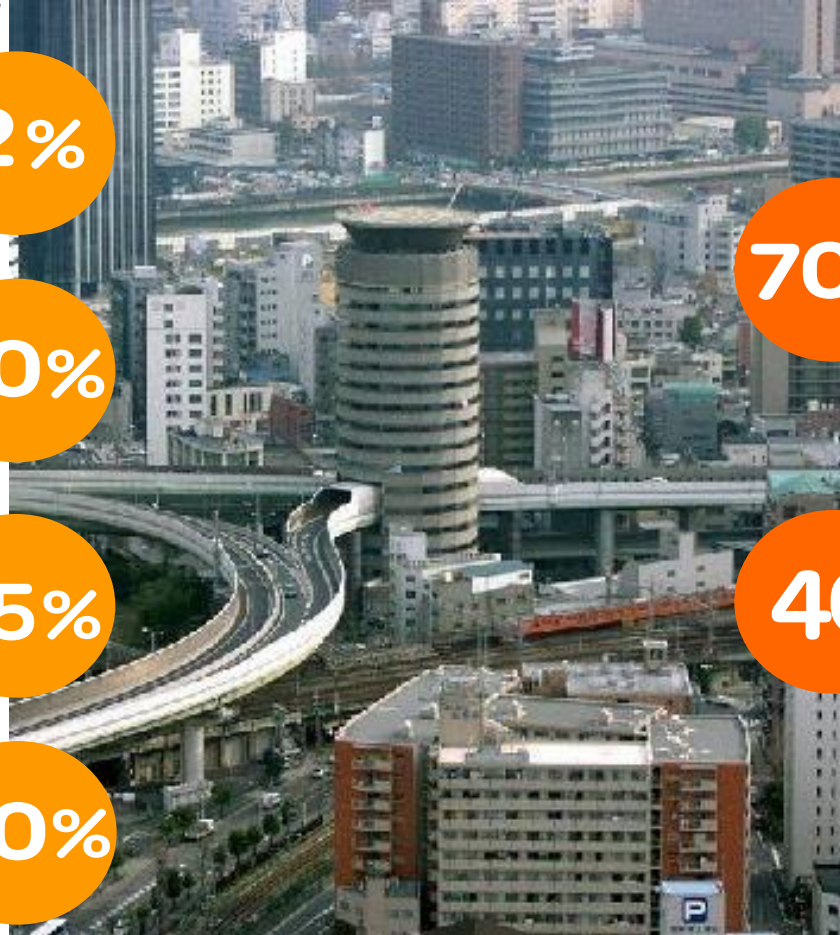
80%

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



Increasing competitiveness

Creating jobs

An efficient, liveable, sustainable city

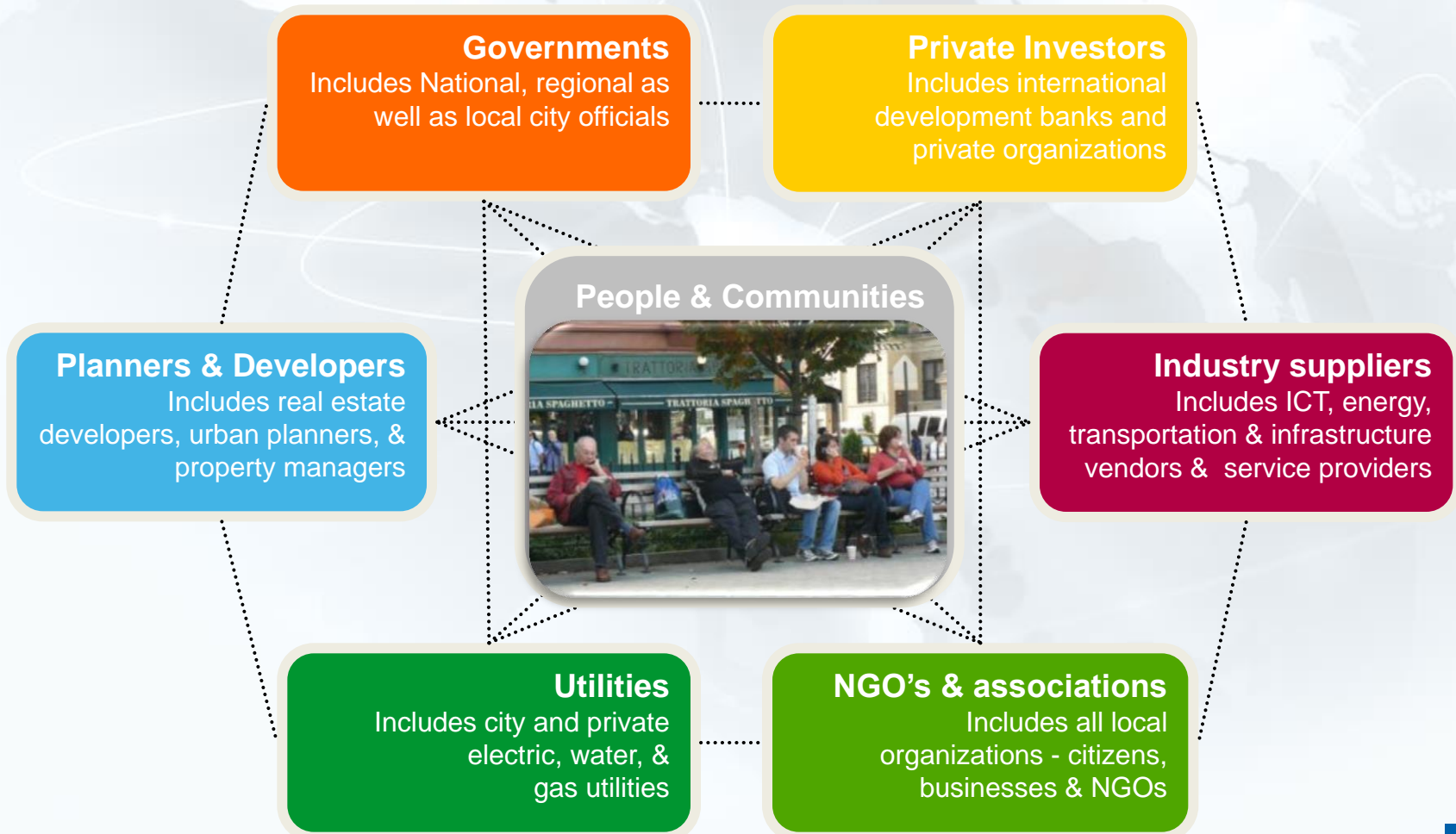
Improving attractiveness for residents, citizens and visitors

Improving the efficiency of the city's underlying urban infrastructures

Becoming a better place to live, work and play

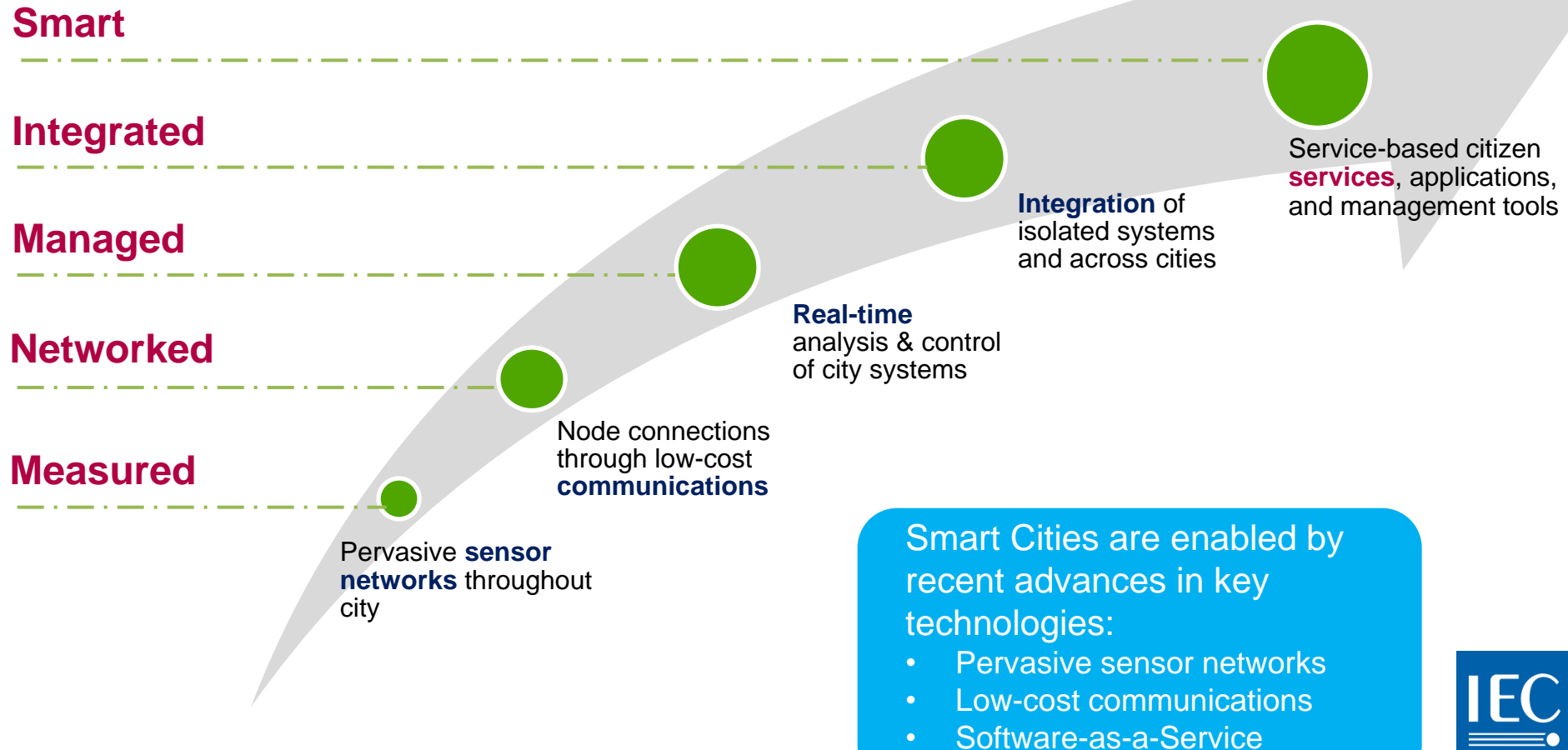
Improving public services: schools, safety, transportation...

Stakeholder collaboration



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

Technology Evolution to a Smart City



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)

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.

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)

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

A large, realistic human hand is shown from the wrist down, reaching towards a futuristic landscape. The landscape is a lush green valley with a winding path. In the upper left, there's a large industrial building. To the left, a cluster of white wind turbines stands on a grassy hill. In the upper right, a large satellite dish is mounted on a structure. Below it, several blue solar panels are arranged in a row. In the center, a small house is visible. In the lower left, a modern multi-story building is shown. In the lower right, a large dam or hydroelectric structure is partially visible. Glowing blue lines of light connect the hand's fingers to various points in the landscape: the index finger points towards the house, the middle finger towards the solar panels, and the ring and pinky fingers towards the dam. The text "SyC Smart Energy" is overlaid in the center in a bold, yellow, sans-serif font.

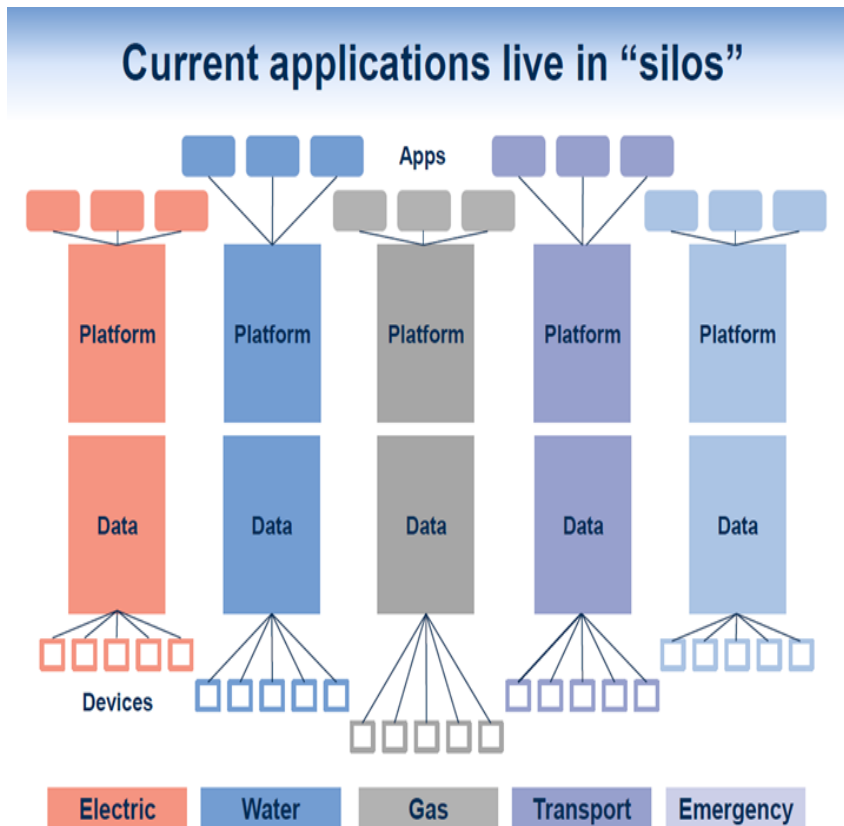
SyC Smart Energy

SyC Smart Energy

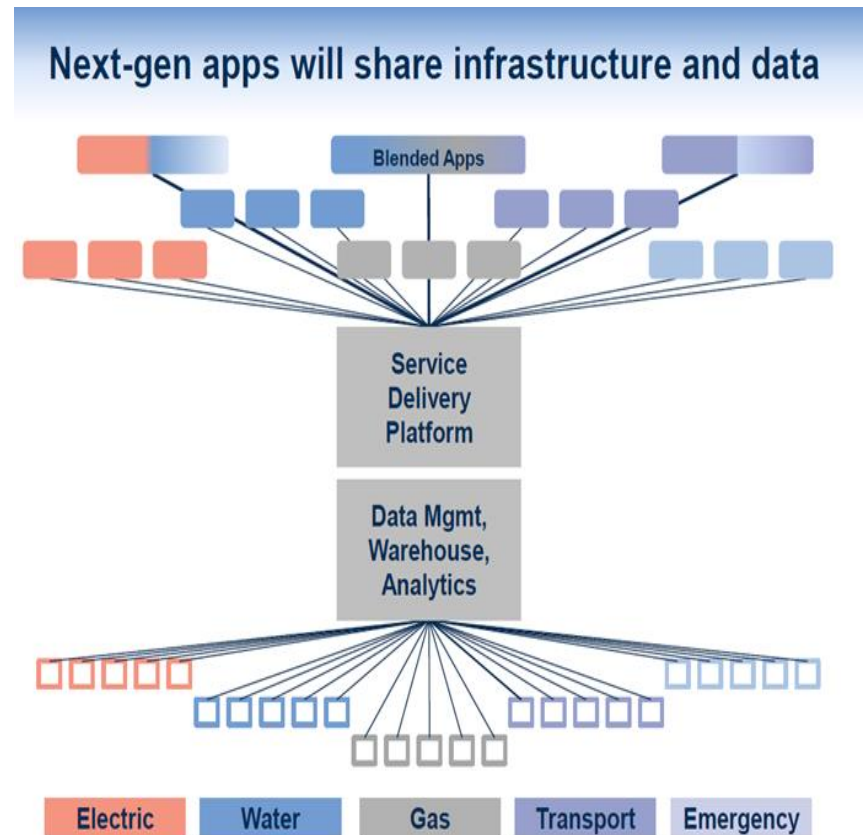
- **Former SG3/SEG2**
- **Published IEC Smart Grid Roadmap**
 - **Ed. 2.0 to be published in Q4 2015**
- **Use Case repository (TC8)**
- **Smart Grid Mapping Tool**
 - **www.smartgridstandardsmap.com**

A different approach

Individual Silos



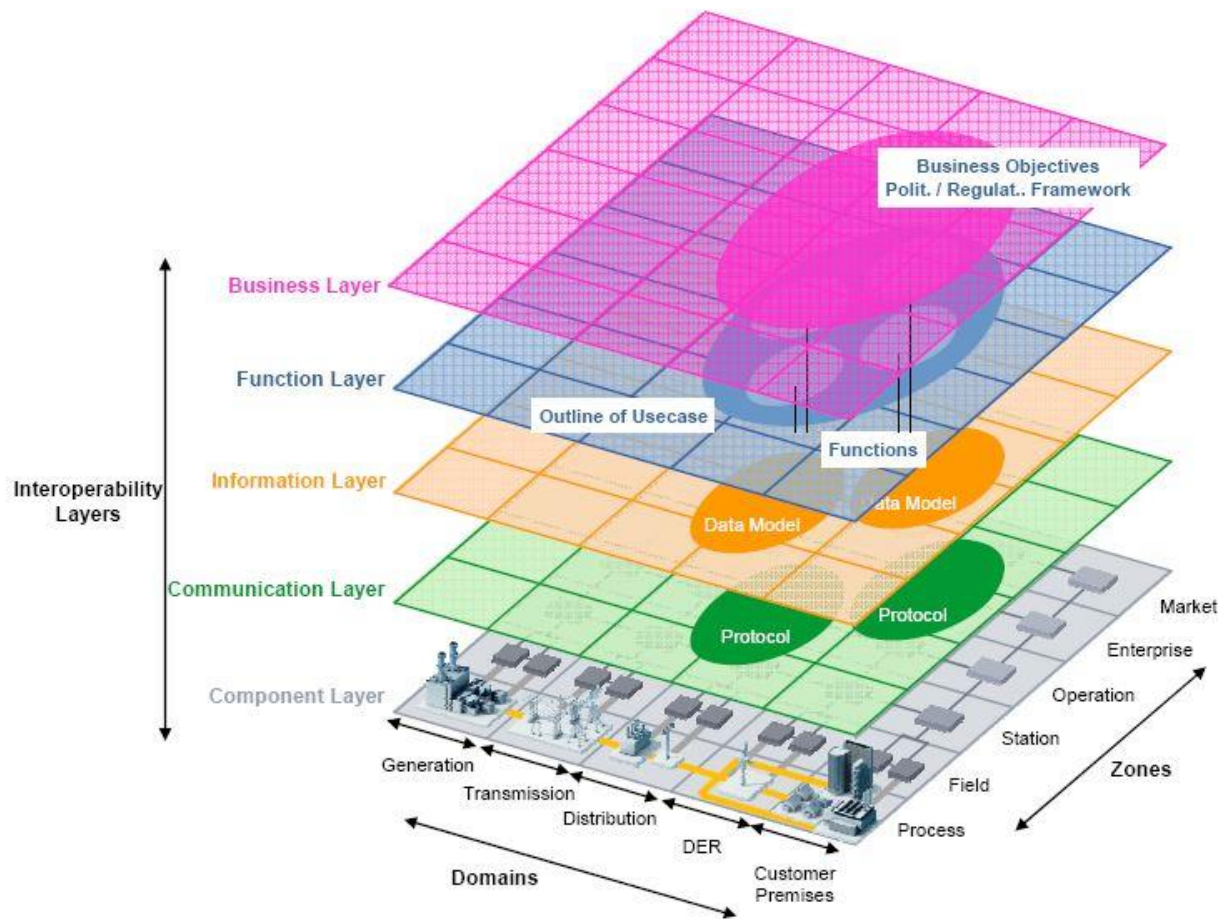
Systems Approach



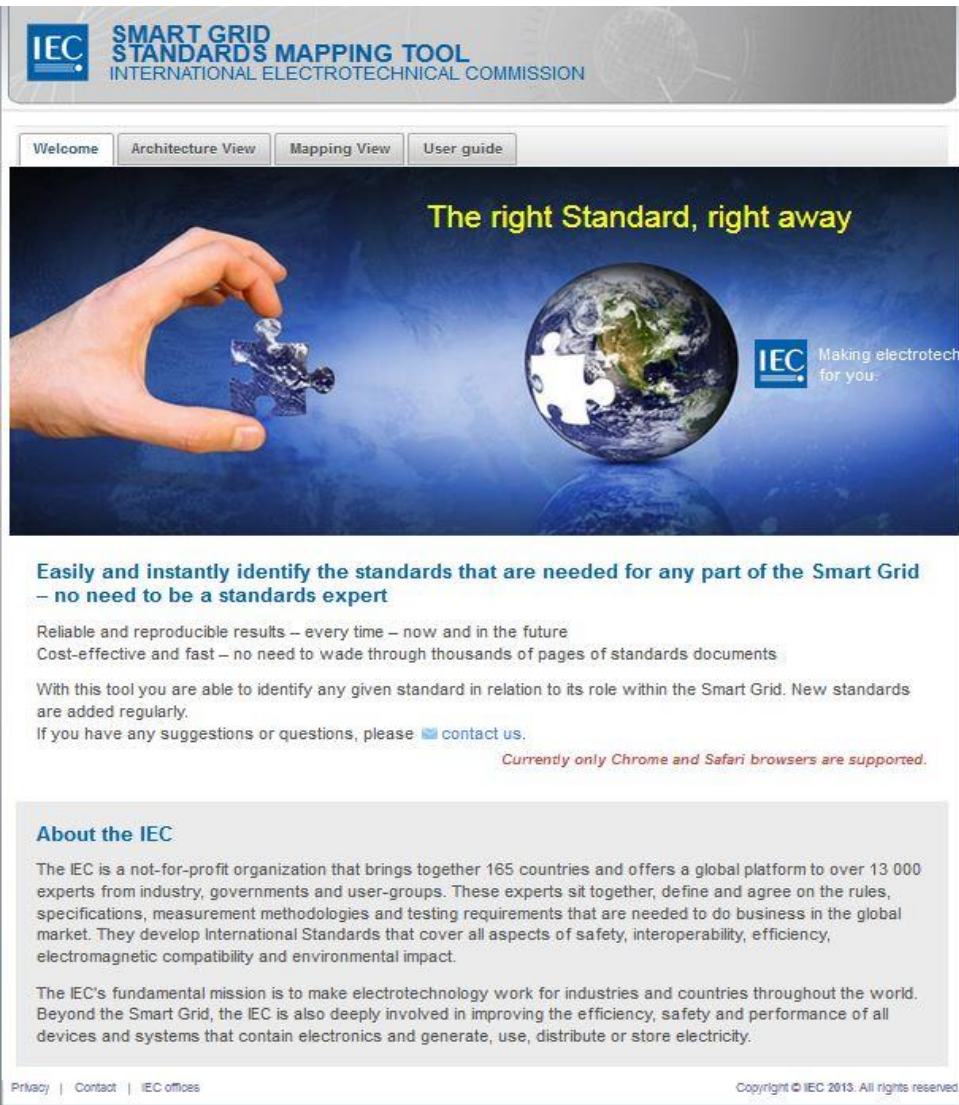
SyC Smart Energy - SGAM

500014002_Smart_Eng_Report_1: list of standards (part), 1.10, 501 and 501A

- 592 ■ X: Domain
- 593 ■ Y: Interoperability (Layer)
- 594 ■ Z: Zone
- 595



smartgridstandardsmap.com



The screenshot shows the homepage of the smartgridstandardsmap.com website. At the top, there is a header with the IEC logo and the text "SMART GRID STANDARDS MAPPING TOOL" and "INTERNATIONAL ELECTROTECHNICAL COMMISSION". Below the header, there are four navigation tabs: "Welcome", "Architecture View", "Mapping View", and "User guide". The main content area features a large image of a hand placing a puzzle piece into a globe, with the text "The right Standard, right away" and "IEC Making electrotech for you." Below this, there is a section titled "Easily and instantly identify the standards that are needed for any part of the Smart Grid – no need to be a standards expert". This section lists benefits: "Reliable and reproducible results – every time – now and in the future" and "Cost-effective and fast – no need to wade through thousands of pages of standards documents". It also states: "With this tool you are able to identify any given standard in relation to its role within the Smart Grid. New standards are added regularly." and "If you have any suggestions or questions, please [contact us](#)." A note at the bottom of this section says "Currently only Chrome and Safari browsers are supported." Below this is a section titled "About the IEC" which describes the IEC as a not-for-profit organization that brings together 165 countries and offers a global platform to over 13 000 experts from industry, governments and user-groups. It also states the IEC's fundamental mission is to make electrotechnology work for industries and countries throughout the world. At the bottom of the page, there is a footer with links for "Privacy", "Contact", and "IEC offices", and a copyright notice: "Copyright © IEC 2013. All rights reserved."

SMART GRID STANDARDS MAPPING TOOL
INTERNATIONAL ELECTROTECHNICAL COMMISSION

Welcome Architecture View Mapping View User guide

The right Standard, right away

IEC Making electrotech for you.

Easily and instantly identify the standards that are needed for any part of the Smart Grid – no need to be a standards expert

Reliable and reproducible results – every time – now and in the future
Cost-effective and fast – no need to wade through thousands of pages of standards documents

With this tool you are able to identify any given standard in relation to its role within the Smart Grid. New standards are added regularly.
If you have any suggestions or questions, please [contact us](#).

Currently only Chrome and Safari browsers are supported.

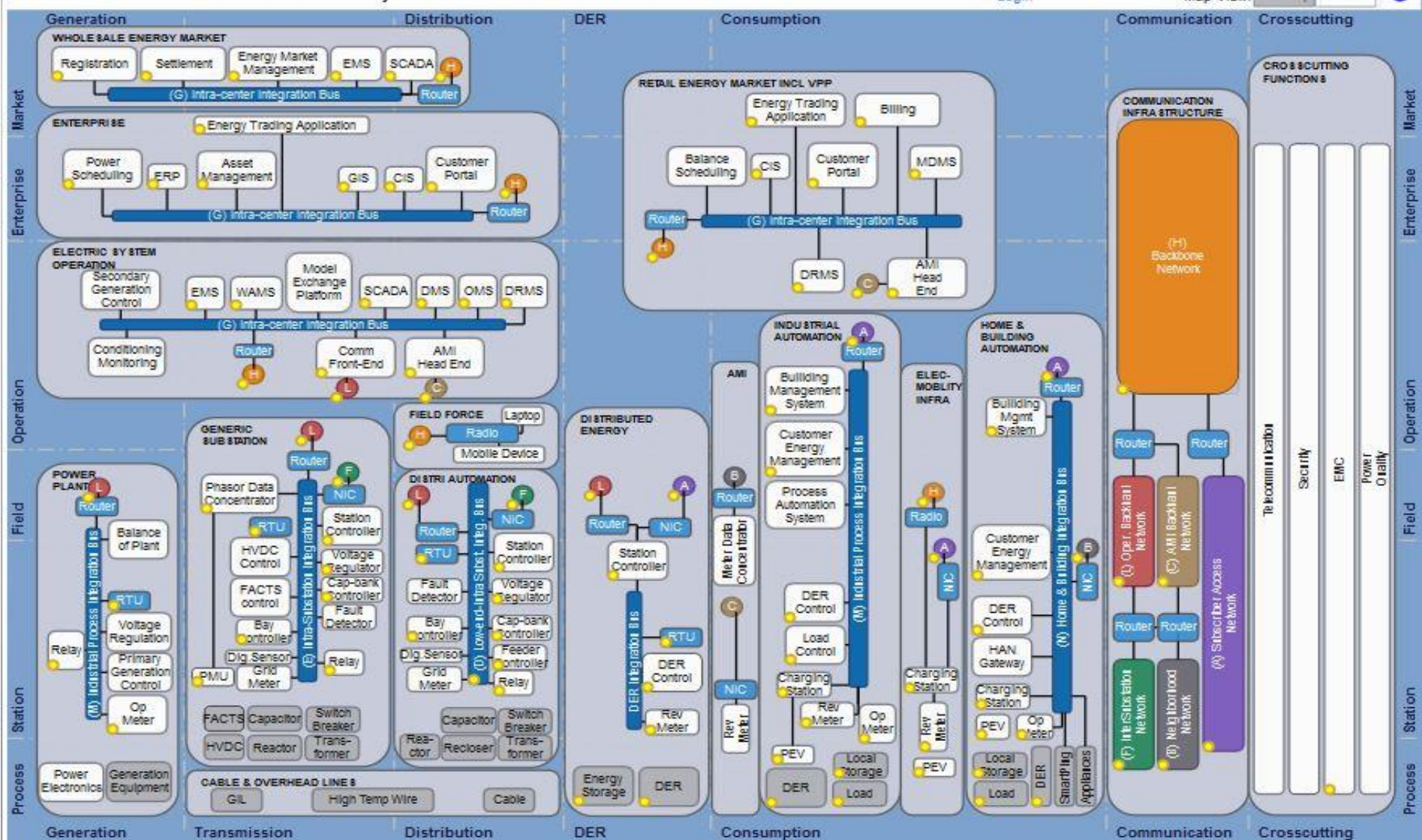
About the IEC

The IEC is a not-for-profit organization that brings together 165 countries and offers a global platform to over 13 000 experts from industry, governments and user-groups. These experts sit together, define and agree on the rules, specifications, measurement methodologies and testing requirements that are needed to do business in the global market. They develop International Standards that cover all aspects of safety, interoperability, efficiency, electromagnetic compatibility and environmental impact.

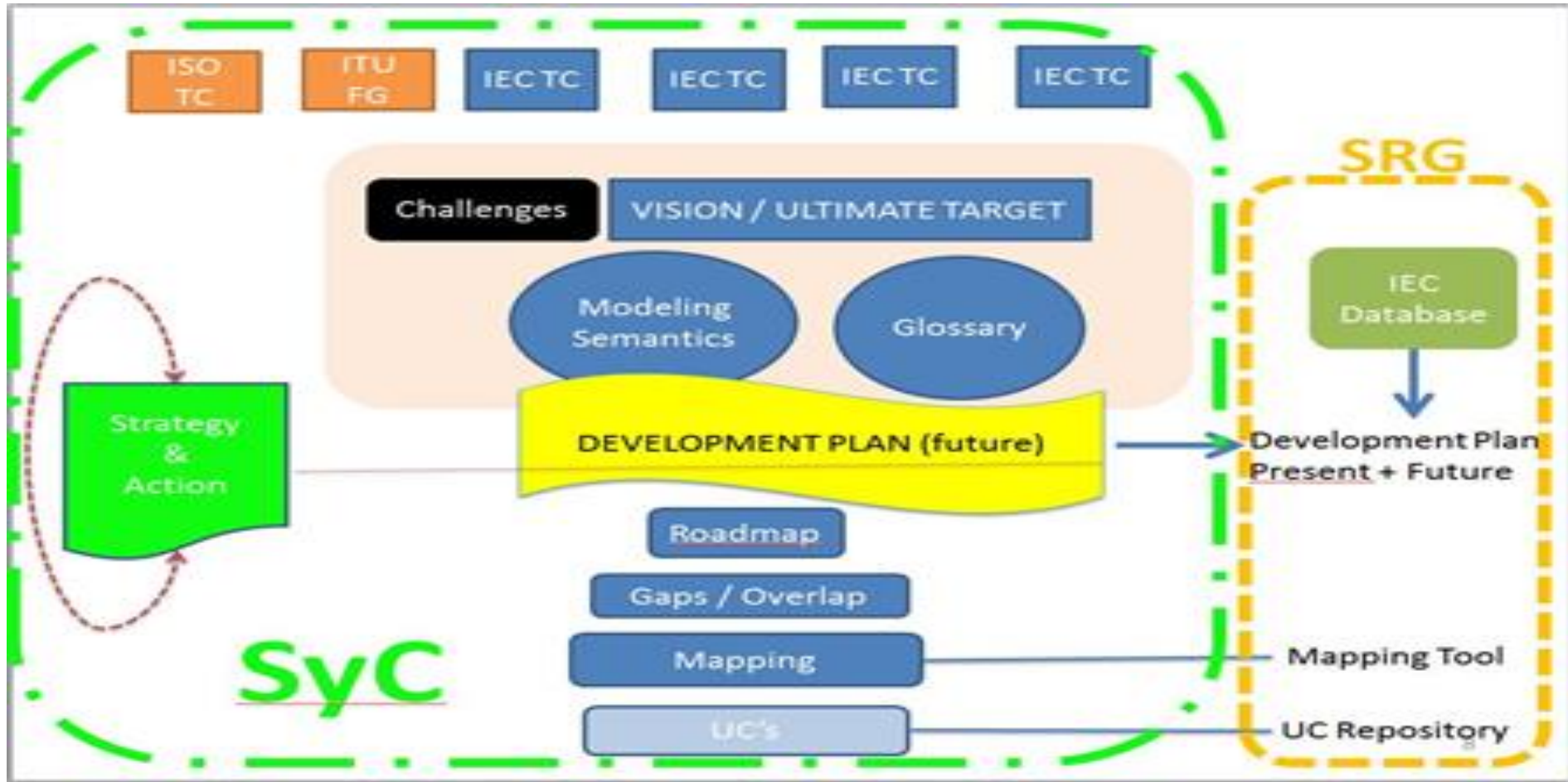
The IEC's fundamental mission is to make electrotechnology work for industries and countries throughout the world. Beyond the Smart Grid, the IEC is also deeply involved in improving the efficiency, safety and performance of all devices and systems that contain electronics and generate, use, distribute or store electricity.

Privacy | Contact | IEC offices Copyright © IEC 2013. All rights reserved.

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



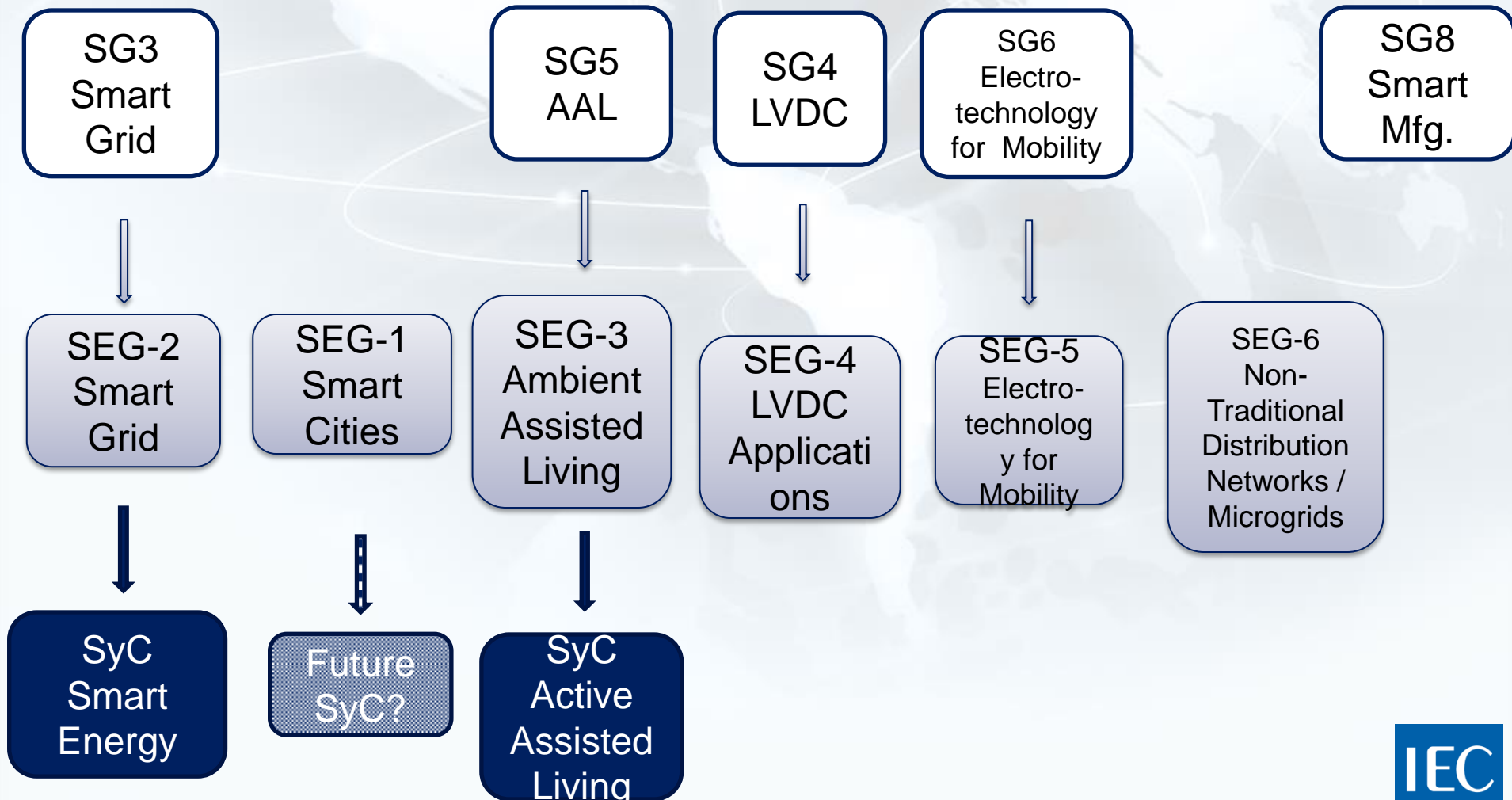
Structure of SyC Smart Energy



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

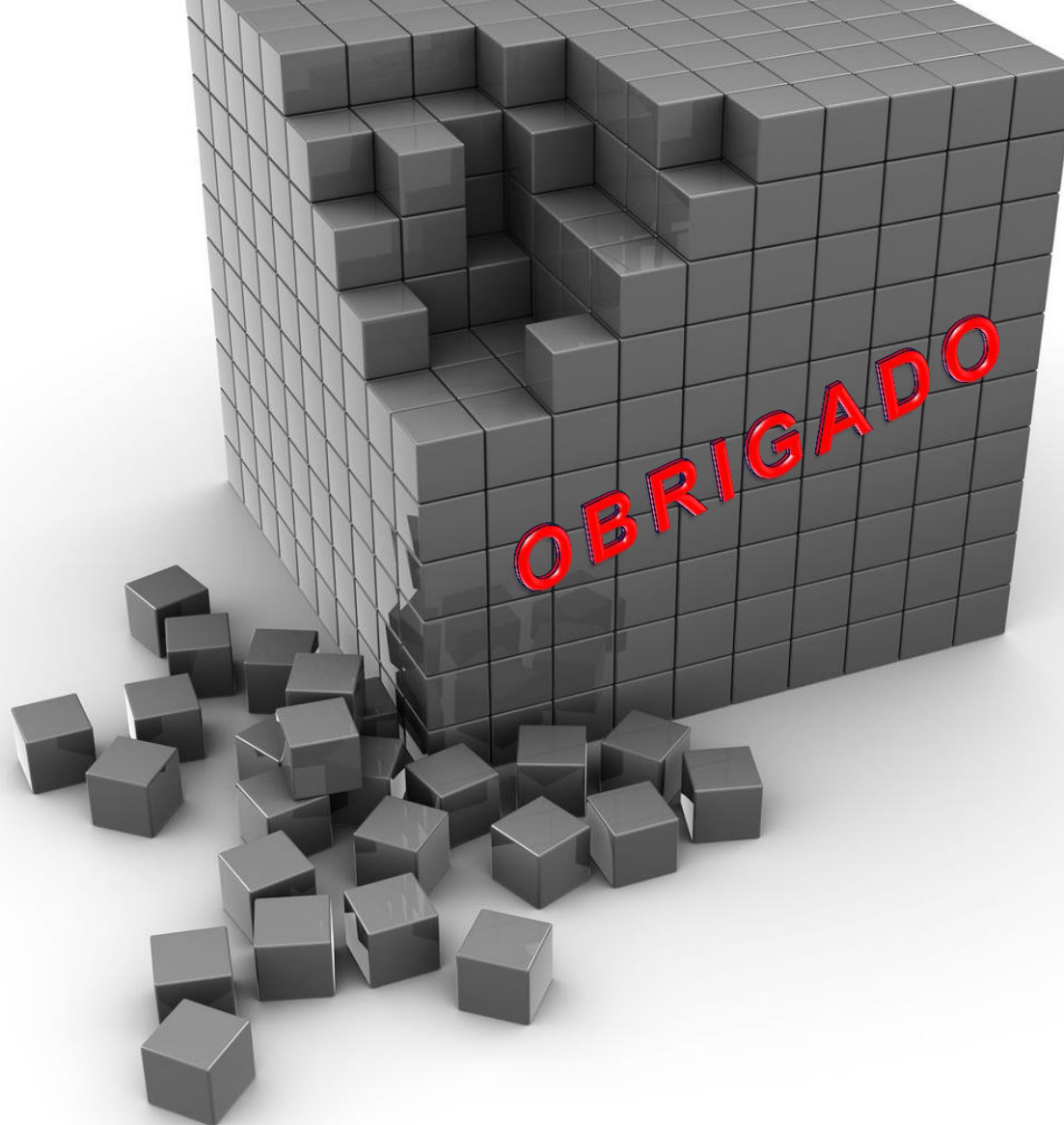
IEC Expanding The Universe Of Systems Standardization



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**



Peter Lancotot
pjl@iec.ch



International
Electrotechnical
Commission