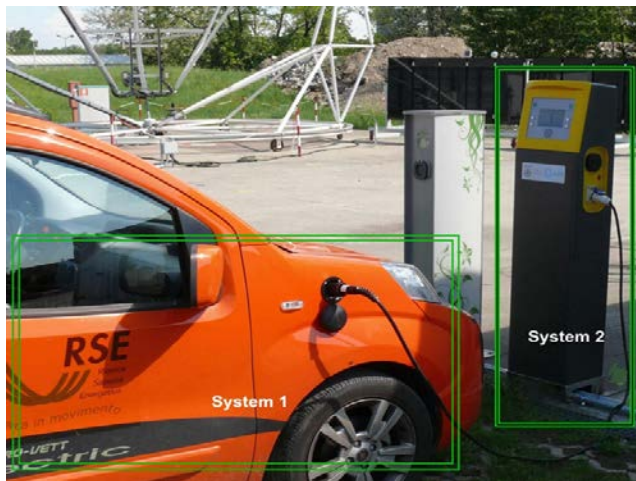
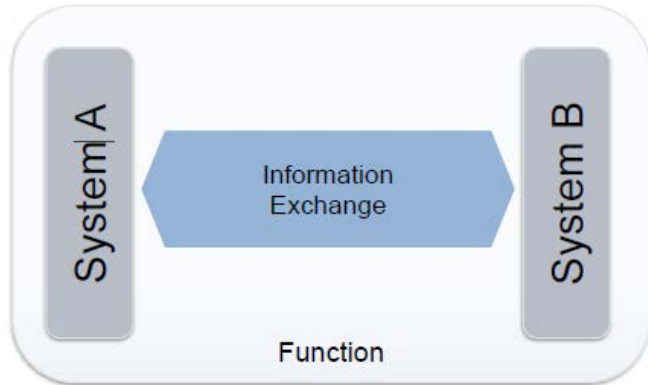


STARGRID Workshop
“Interoperability Recommendations”
Giorgio Franchioni (RSE)
Brussels, January, 23rd 2015

- Interoperability: pre-requisite of SG and complex issue
- Critical aspects of SG interoperability from STARGRID Survey
- The profiling methodology proposed by SGCG WGI
- Recommendations from STARGRID
- Expected impact
- Conclusions

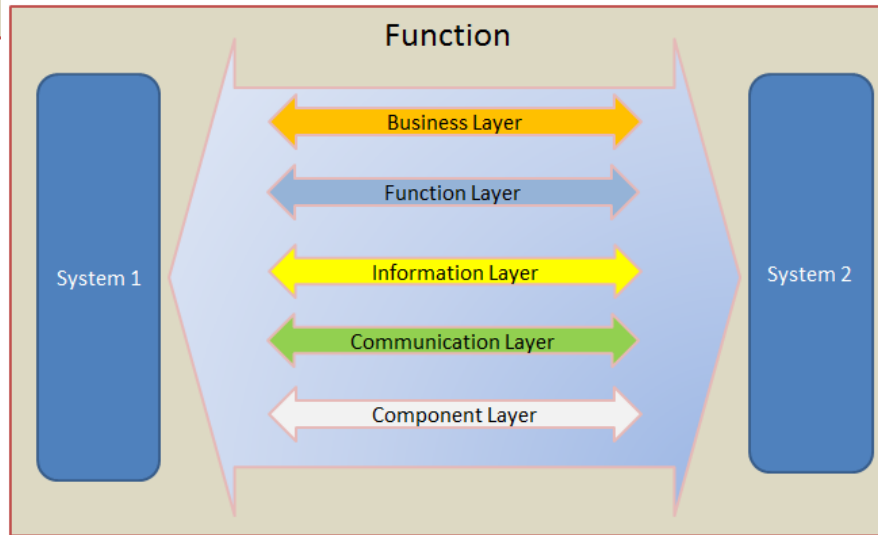
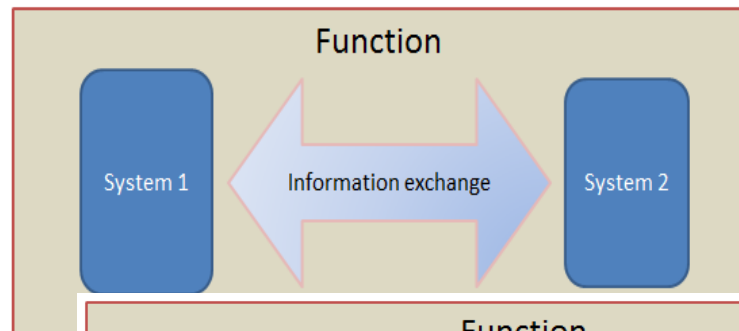
Interoperability: a prerequisite of the integration in Smart Grids

It is the ability that systems have to exchange informations and use them in order to perform required functions

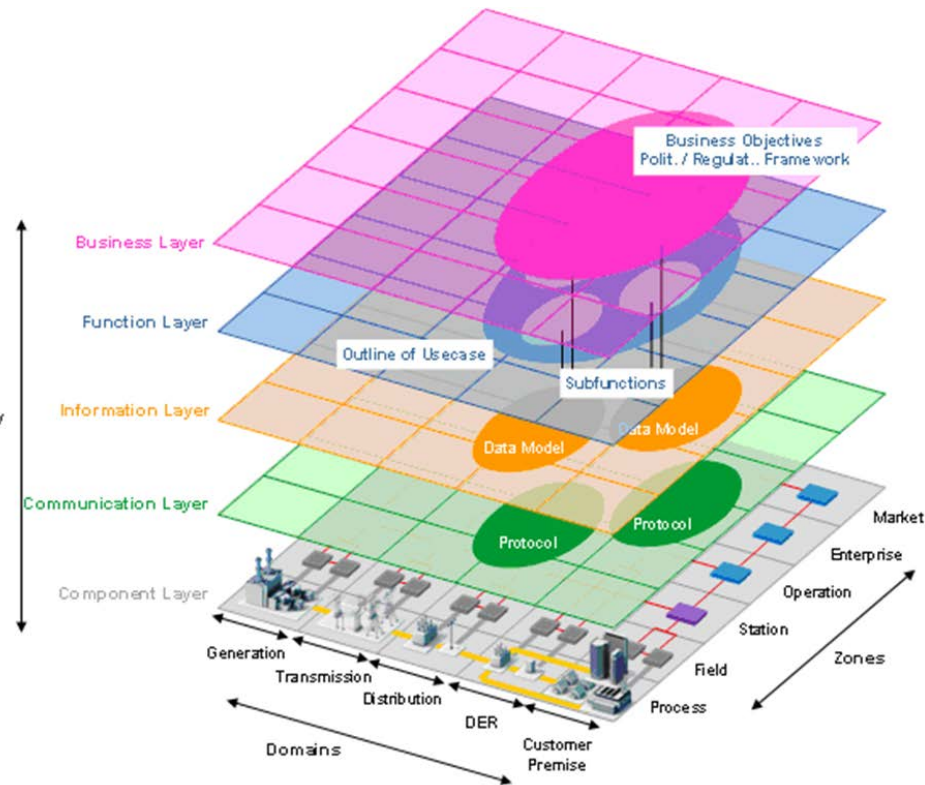


A complex issue

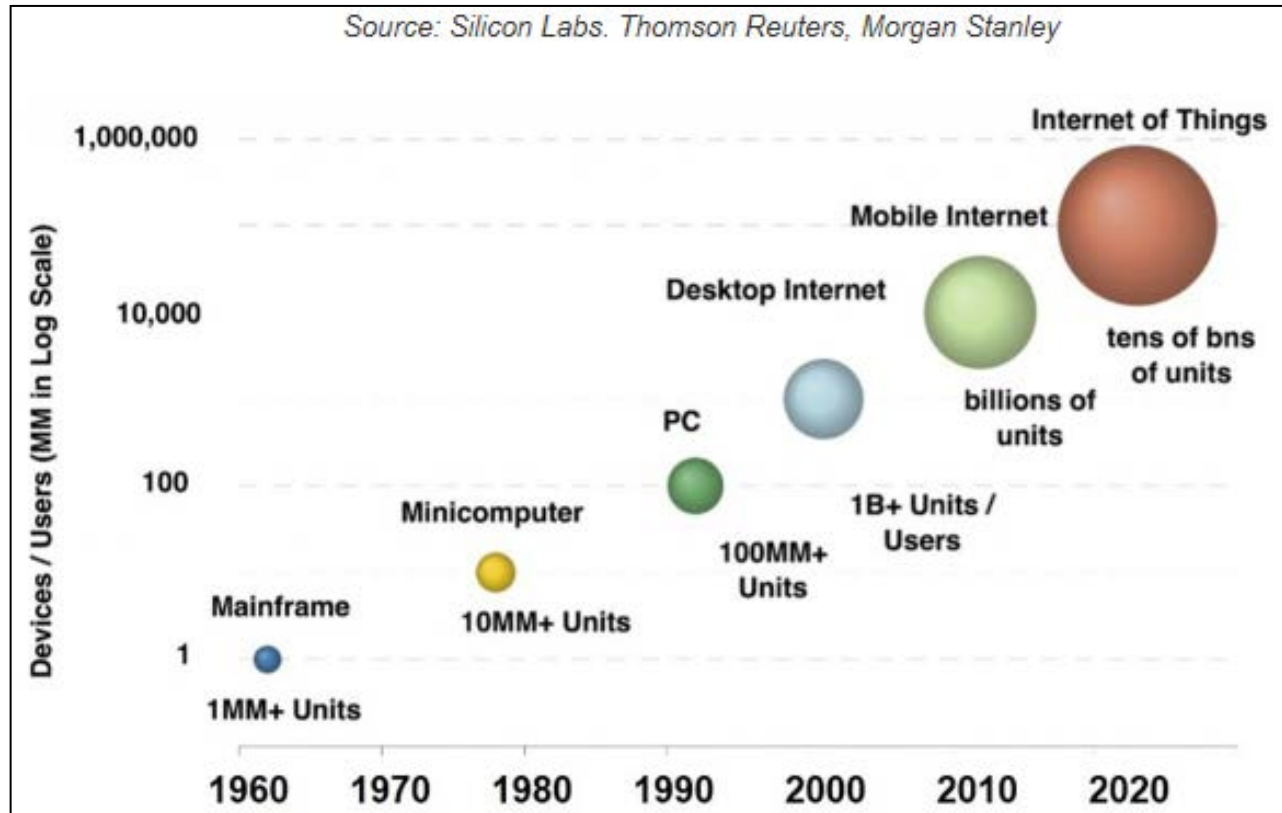
Interoperability layers in the SGCG SGAM



Interoperability Dimension



A more&more complex issue



LAN
Applications

Computer networks

- 1980 - email
- 1990 - web
- 2000 - social network

People networks

2005 – alarm,
thermostat, white
goods, navigator

Internet of things

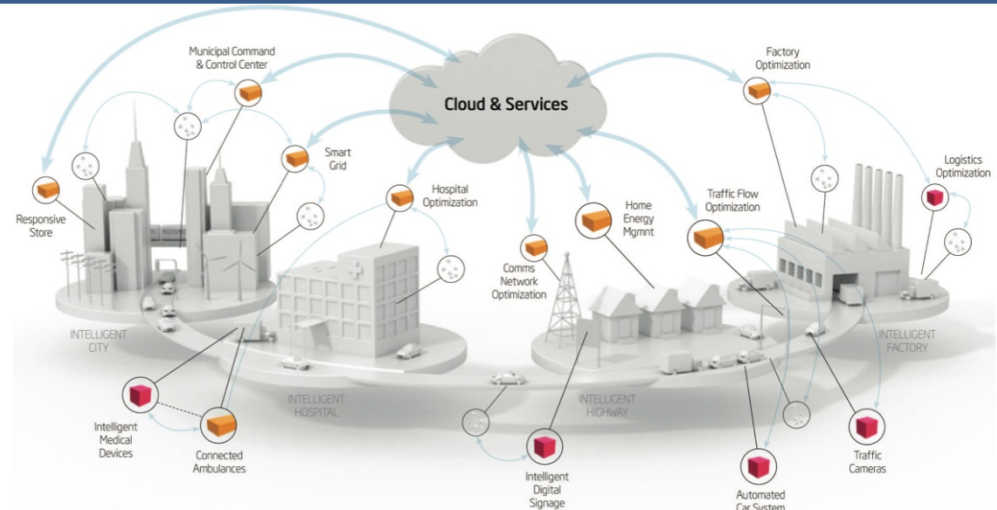
Es: Internet of things

Today “Internet of things” is often conceived as a remote control/monitoring of "things."
(e.g., turn on the home heating)



Tomorrow “Internet of things” will use heterogeneous informations, with the purpose of providing services.

(e.g. management of home comfort , considering weather forecast , costs, habits, ...)

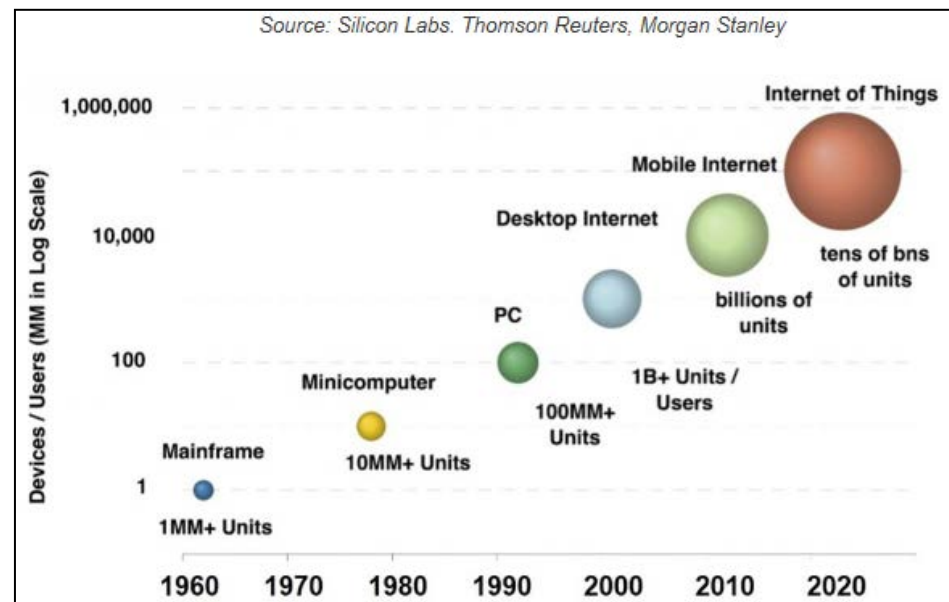


Interoperability as a key success factor

The challenge of Standardization to achieve interoperability

The information approach

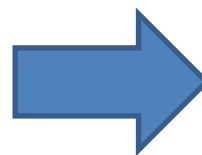
- In front of complex contexts, managing big data and/or specifying new communication protocols is not enough
- A global approach is needed, by increasing the value of “data” through a description of their meaning
- In this way simple data become “information” that means «knowledge» of a context/domain



TCP/IP
Standard

Standard
(es. http,
html)

Will a new ICT
standard be
enough?



Sharing common semantic
through
Standard Data Model

Mainly from Network operators

- Network systems should be **open** to any new demands and **fully automated**. Interoperability of systems and devices is the pre-requisite on any **investments**
- Interoperability **should be proved**. To demonstrate the interoperability of any device to be integrated in the Smart Grid, specific interoperability tests are necessary
- Interoperability is a «**systemic issue**» and has to be demonstrated in a systemic environment. Conformance do not fulfil requirements.
- Interoperability tests methods and conditions need to be developed **based on specifications** of SG functionalities
- A **coherent standardization** framework is necessary

Mainly from device/equipment producers

- Interoperability requirements conformance should not limit the potential for **innovation and differentiation** of products
- Interoperability requirements may impact the **costs** of equipment and the **market penetration** capacity

A methodology for the profiling process to achieve interoperability (in the design and validation phases)

- A) Select the **applicable Use Cases** and define the interoperability requirements among the components in the different interoperability layers, including physical interfaces and communication channels
- B) Select the **related Standards and Specifications** covering the identified requirements
- C) Build up interoperability **profiles** (BAP and BAIOP concepts)

Selection and profiling IOP tool

Standardization organization	Standards	SGAM layers				Crosscutting issues (WGS)				SGAM Domain specific systems					Function specific and other systems						SGAM Zones		Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Component	Communication	Information	Function	Business	EMC	Functional safety	General	Power qauality	N/A	General Generation	General Substation	EMS Scada system	WAMPACS	FACTS	General Substation	Feeder Automation System	FACTS	DMS SCADA	DER management	General Metering-related	AMI system	Aggregated prosumers	e-mobility	General Trading system	Market place system	General Assets and maintenance	Communication network	Clock reference system	AAA system	Weather forecast and	General System approach	Data modelling	Telecommunication	Security	Connecting DER	EMC	Power Quality	Functional safety	N/A	Process	Field	Station	Operation	Enterprise	Market	N/A	Electrical	Mechanical	System	Conformance	Interoperability	Acceptance	N/A	Type / Routine Test																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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To Standardization Organizations and SG actors

R3-1: Prioritize the development and adoption of interoperability test specifications to validate interoperability of components and systems for Smart Grid applications.

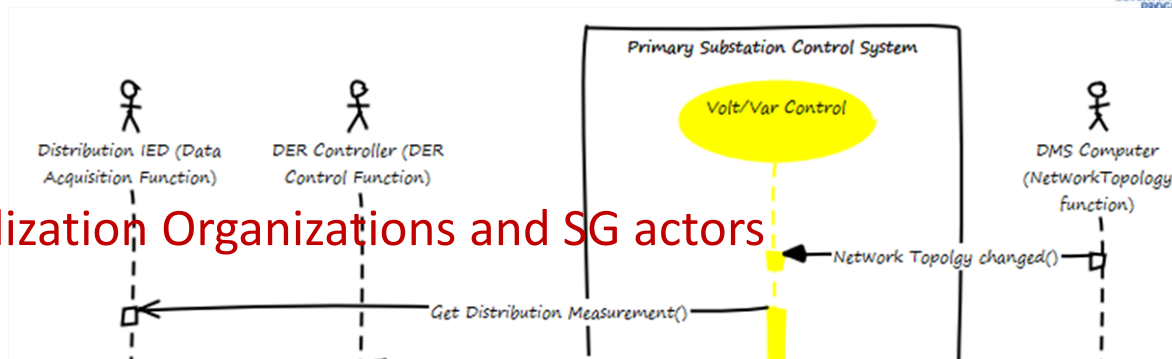
Implementation

Include in the standardization process, when relevant, interoperability test specifications (according with the SGCG WGI approach and IEC 62559):

- **Define the reference Use Case(s)** or develop them whenever necessary: identify actors, interactions and interfaces ([SGCG/SP](#) and [Methodology](#)). Identify the **most critical steps** for the interoperability
- **Map standards** and specifications on the Use Case
- Profile standards and specifications according with the specific Use Case and the identified critical steps
- State **conditions/specifications/requirements** for testing

Define the reference Use Case(s)

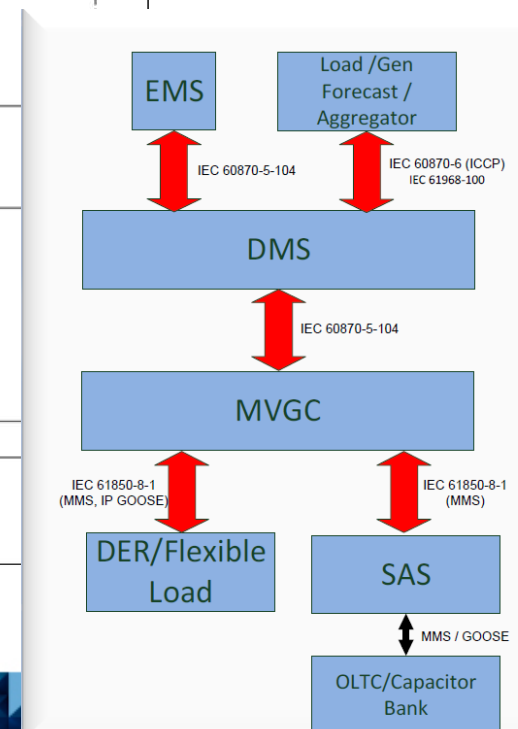
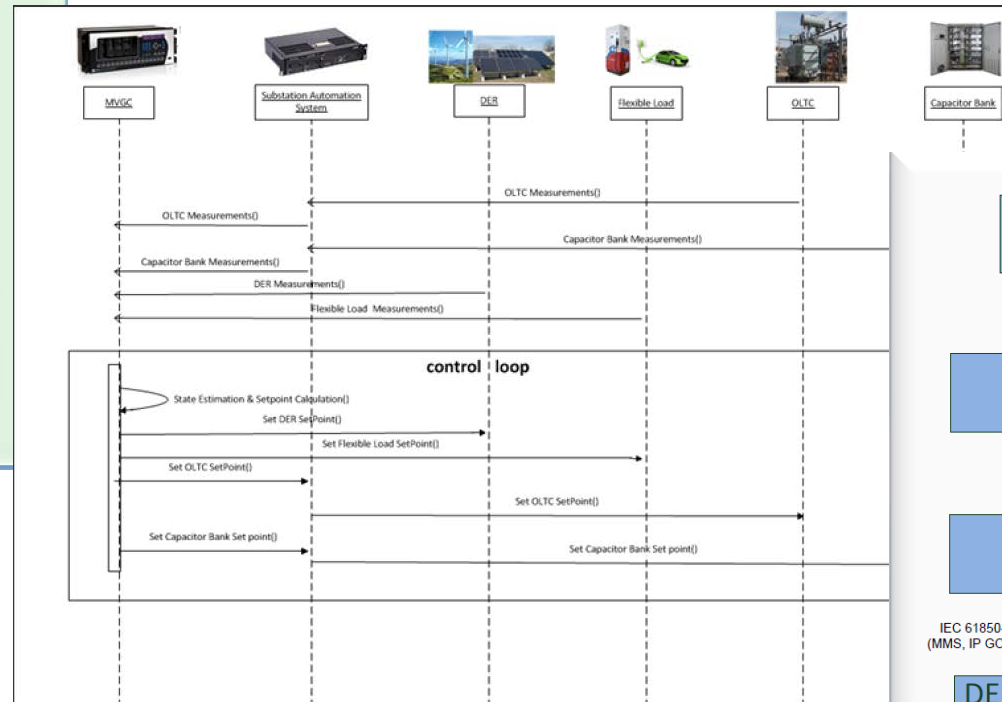
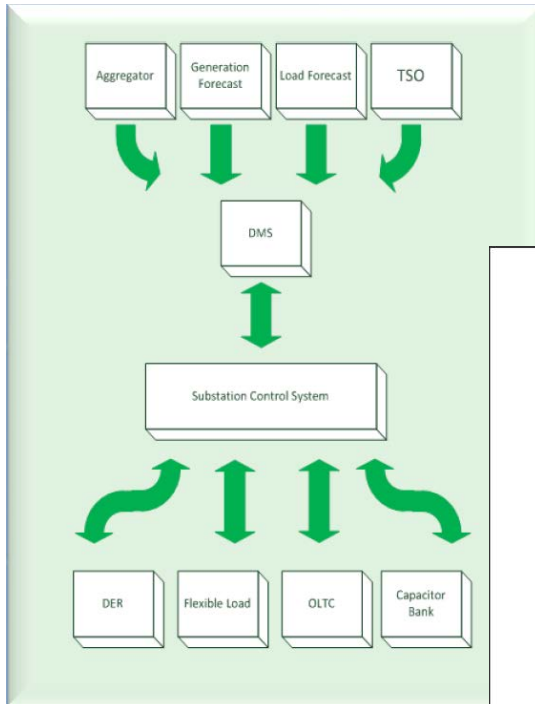
To Standardization Organizations and SG actors



- **Identify and define critical Use Cases**, where interoperability tests are most urgent. Whenever necessary for these critical situations, develop missing use cases.
- Where regulatory provisions are concerned, the task of defining the use cases is in the regulator's responsibility. If necessary, **delegate the task to a User Group** or Industry Association, by issuing a formal mandate.
- **A coordinating entity**, possibly operated by the ESOs, would be of great benefit, to define the basic criteria for the selection of Use Cases, refine the methodology, maintain an overview of available testing specifications, and develop a roadmap for the development work, in close interaction with the affected stakeholders

EU funded projects in support to validation of interoperability achievement

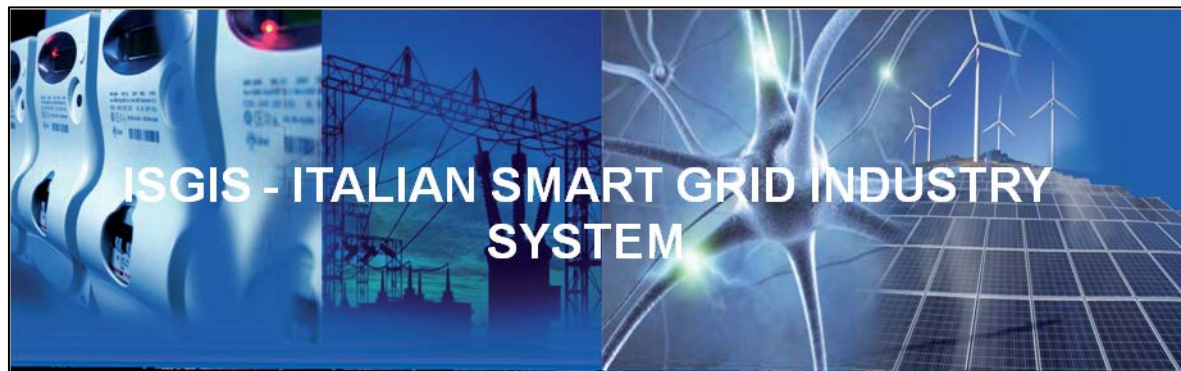
- Take advantage of **EU funded projects** to develop interoperability tests specifications.
- Specific Networking actions should be addressed by **targeted Calls** (e.g. within H2020).



Use Case: Security in Voltage Control

<http://www.soes-project.eu/>

- Foster cooperation between actors of the Smart Grid value chain (especially Energy and Communication operators) to develop smart grid solutions based on standardized approaches to enhance the interoperability of components and systems (e.g. user groups for specific standards).



IL COMITATO DI INDIRIZZO

Il Comitato di Indirizzo del Sistema Italiano per le Smart Grids (ISGIS) è in fase di costituzione ed è attualmente composto da rappresentanti di:

- RSE - Ricerca sul Sistema Energetico
- GSE - Gestore Servizi Energetici
- ENEL Distribuzione
- FEDERUTILITY
- ANIE Energia
- ANIE Automazione
- CEI - Comitato Elettrotecnico Italiano
- Telecom Italia
- The Innovation Cloud

Con il patrocinio di:

- Ministero dello Sviluppo Economico

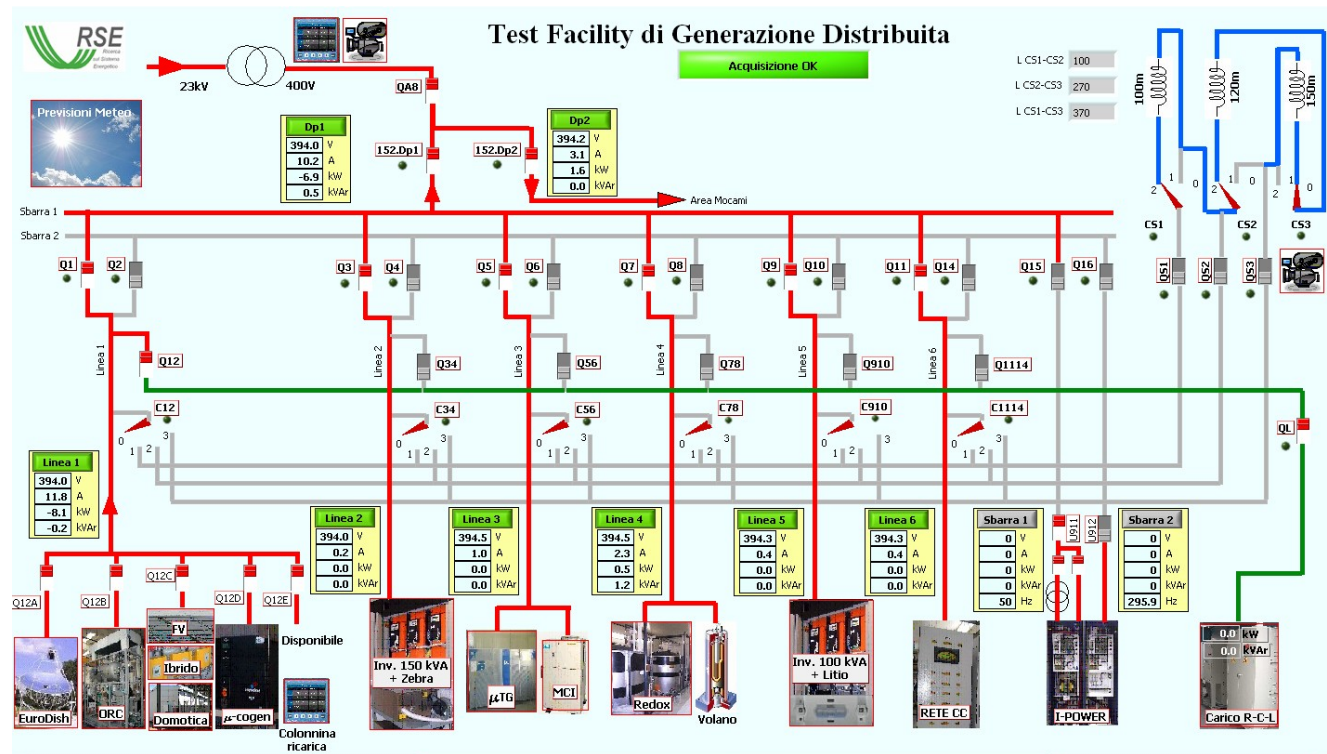
Con il supporto di:

- Autorità per l'Energia, il Gas e il Sistema Idrico

More info on [ISGIS](#)

State conditions/specifications/requirements for testing

Interoperability tests requires the availability of qualified testing infrastructures, able to create the system validation framework, test bed architecture and agreed test procedures.



RSE Test Facility

Recommendation: A Certification System needed

To Policy Makers, Standardization Organizations and Testing Infrastructures owners

R3-2: A coordinating entity should be installed to establish and maintain a “Certification system” for the Interoperability of Smart Grid devices and systems and to help identifying what Use Cases should be covered by such a certification system.

Aim:

- **certifying the interoperability performances** of devices and systems against the developed specifications, possibly leading to the appointment of a sort of “interoperability label”
- **accrediting certification laboratories** conforming to agreed interoperability certification procedures.
- establishing a **mutual acknowledgment** regime impacting the market

Expected impact

- General benefit to electric system in terms of **security of supply** and to industry in terms of **higher quality of products**, **stronger competitiveness** and **wider access to market**
- **More closed collaboration** of actors (policy makers, regulators, Std orgs, research and Industry) to identify/select/describe use cases, especially those impacting the system security
- Agreements among industry actors to **harmonize protocols/data models** in SG applications (e.g. ISGIS, Energy@home...)
- More targeted approach by Standardization Organizations aimed at including interoperability **requirements and specifications in standards**
- Greater attention by the EC in **Standardization issues to be included** in Research/Innovation projects
- Impulse to development/improvement of **testing infrastructures** targeted to SG interoperability
- **Considering the timing of the evolution of the Smart Grid system, interoperability testing standardization is deemed a medium-term objective (2020)**

Conclusions

- Interoperability is paramount and pre-requisite to the SG evolution and to the stability and security of the energy system
- STARGRID Survey confirmed Interoperability as a priority to the energy industry
- Security, investments, costs and market penetration are the greatest concerns
- Interoperability demonstration through tests is deemed necessary for applications affecting security

Main Recommendations from STARGRID:



Develop and include in standards test specifications to validate interoperability of components and systems for Smart Grid applications. Harmonize standardization framework accordingly



Establish and maintain a “Certification system” and a “Mutual acknowledgement system” for the Interoperability of Smart Grid devices and systems.

Thank you
of your attention



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