



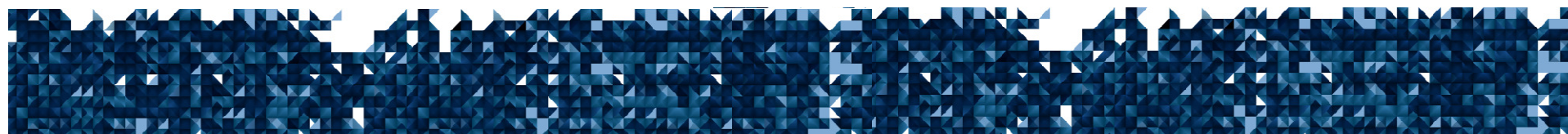
Workshop Smart Grid  
Standardisation  
May 16th 2013



## Session 1

# DER Integration and Grid control

Giorgio Franchioni – RSE Italy



# The EU strategy and the proliferation of DERs

## EU 2020 Strategy

### Energy-Climate Targets – 20/20/20

- + 20% from renewables
- + 20% energy efficiency
- 20% greenhouse gas

### EU Market Objectives

#### Third Energy Package:

secure operation of EU power systems;  
integration of large volumes of low carbon generation;  
creation of a Single Europe-wide Electricity Market

FIGURE 2.1 INSTALLED POWER GENERATING CAPACITY PER YEAR IN MW AND RES SHARE (%)

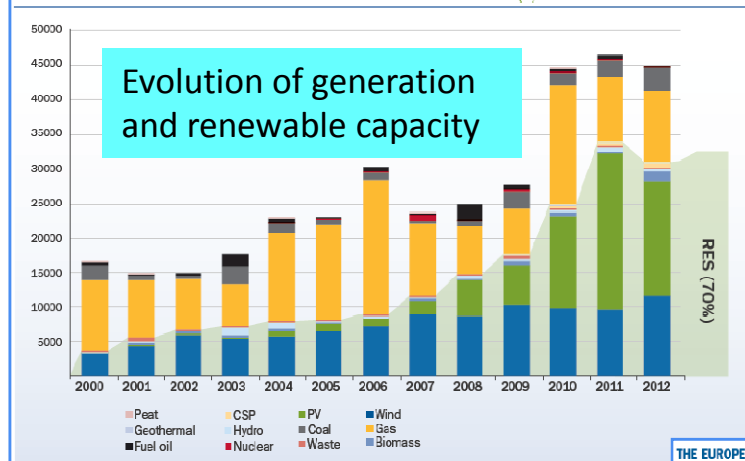


FIGURE 2.4 EU POWER MIX 2012

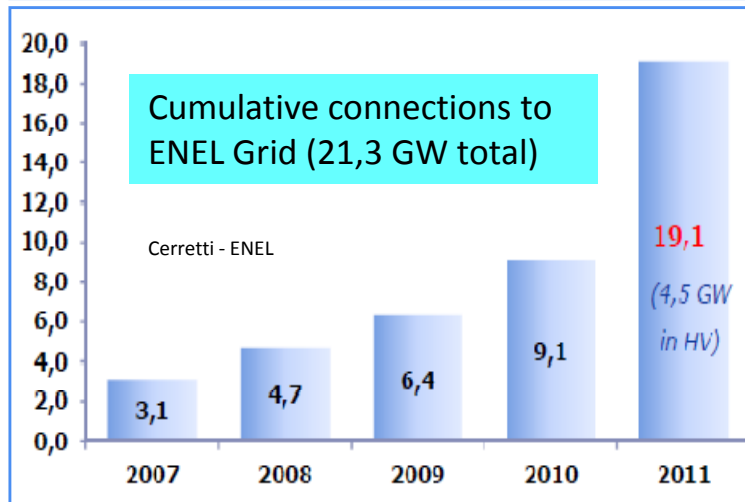
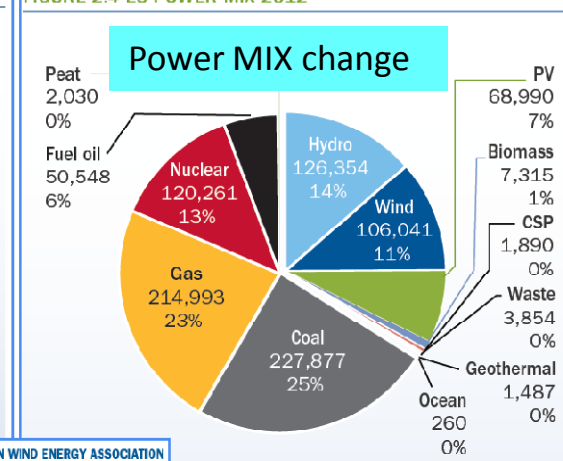
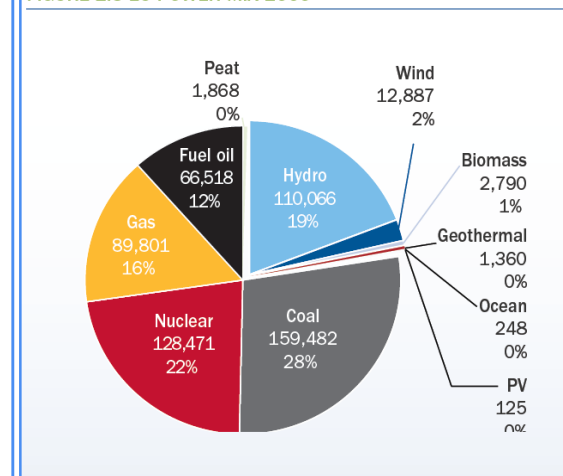


FIGURE 2.3 EU POWER MIX 2000



# DER integration and Grid stability

## Energy Revolution Hiccups: Grid Instability Has Industry Scrambling for Solutions

By Catalina Schröder

Sudden fluctuations in Germany's power grid are causing major damage to a number of industrial companies. While many of them have responded by getting their own power generators and regulators to help minimize the risks, they warn that companies might be forced to leave if the government doesn't deal with the issues fast.

August 16, 2012 - 06:00 PM

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FROM DER SPIEGEL



Even a millisecond in voltage fluctuation can cause major damage at large industrial firms.

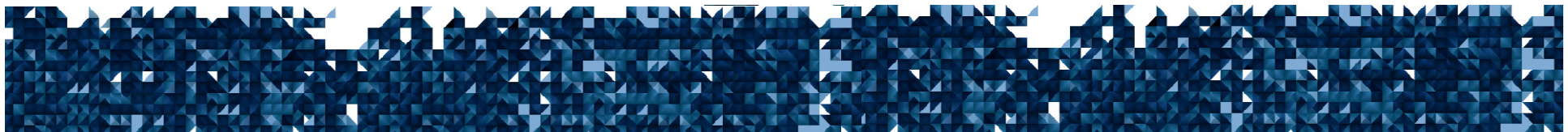
### Dramatic increase of:

- Short interruptions of supply
- Service failures
- Production stoppages
- Economic losses

Two main problems with operation of distribution grid:

- Voltage variations (fluctuations, harmonics, flickers) -> poor quality, overcoming of limits
- Congestions and Exceeding hosting capacity -> Losses increase, interruptions, curtailments

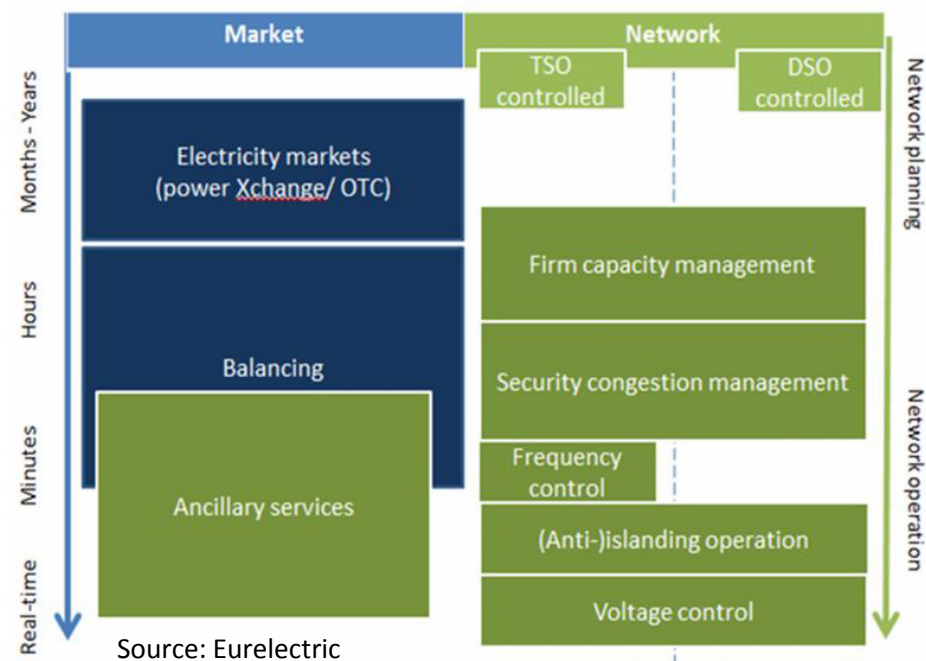
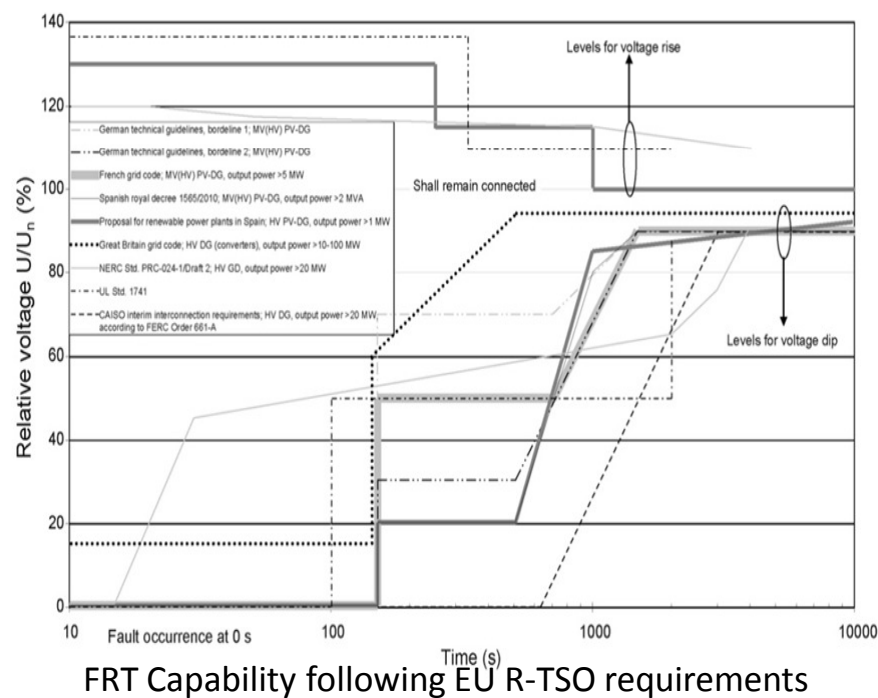
Repercussion on transmission grid -> Frequency/Voltage instability



# "DER integration and Grid Control" - NC

## Two main implications:

- Ruling connection and disconnection conditions of DERs***



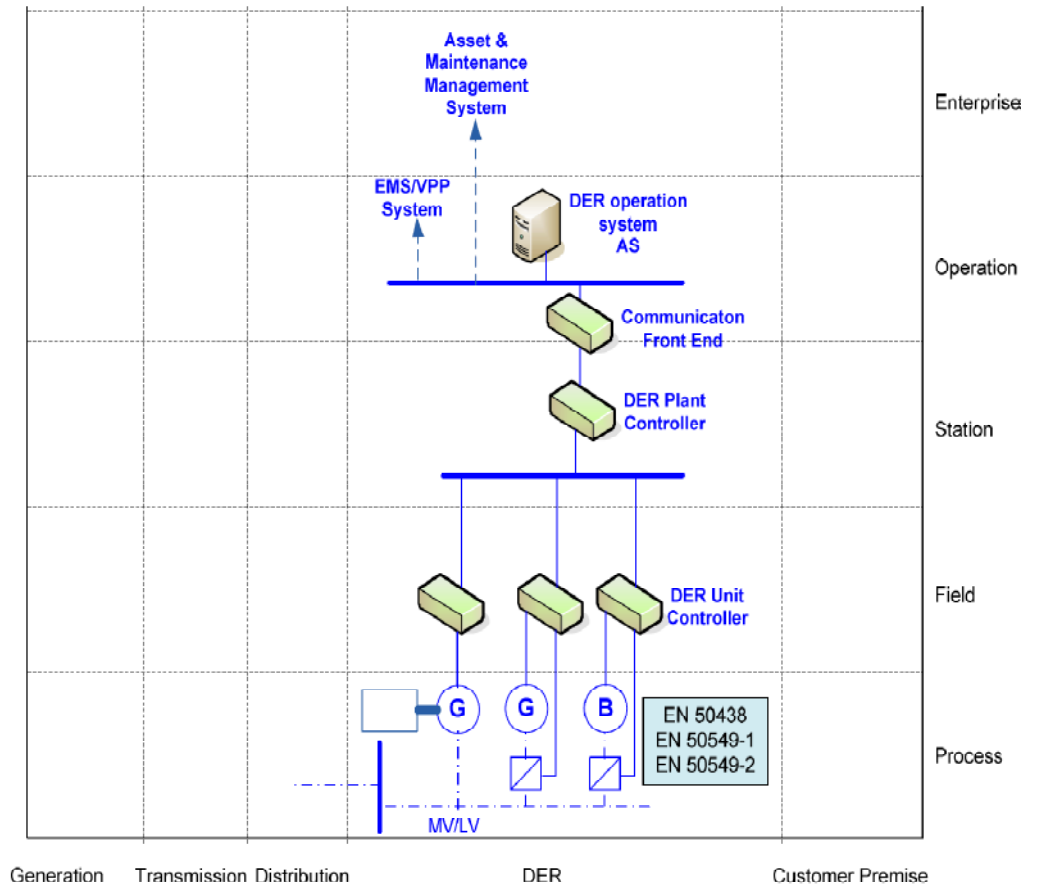
- Contribution of DERs in the management and control operations***

**Impacting stakeholders?**



# "DER integration and Grid Control" – M490

Use case related operations	High level use cases
(AMI) Collect events and status information	Manage supply quality
Connect an active actor to the grid	Managing generation connection to the grid Managing microgrid transitions
Demand and production (generation) flexibility	Generation forecast Load forecast Load forecast of a bunch of prosumers in a DR program (from remote)
Generation Operation Scheduling	Ancillary services and reserve products control
Grid stability	Monitoring and reduce harmonic mitigation Monitoring and reduce power oscillation damping Monitoring and reduce voltage flicker
Managing power quality	Frequency support Voltage regulation VAR regulation
Monitoring the grid flows	Archive operation information Capture, expose and analyse disturbance events Monitoring electrical flows Monitoring power quality for operation (locally) Producing, exposing and logging time-stamped events Supporting time-stamped alarms management at all levels
Operate DER(s)	Aggregate DER as commercial VPP Aggregate DER as technical VPP DER performance management DER process management DER process management with reduced power output DER remote control (dispatch) Registration/deregistration of DER in VPP Store energy from the grid
System and security management	User management Role management Rights/privileges management
Weather condition forecasting & observation	Wind forecasting Solar forecasting Temperature forecasting Providing weather observations Situational alerting



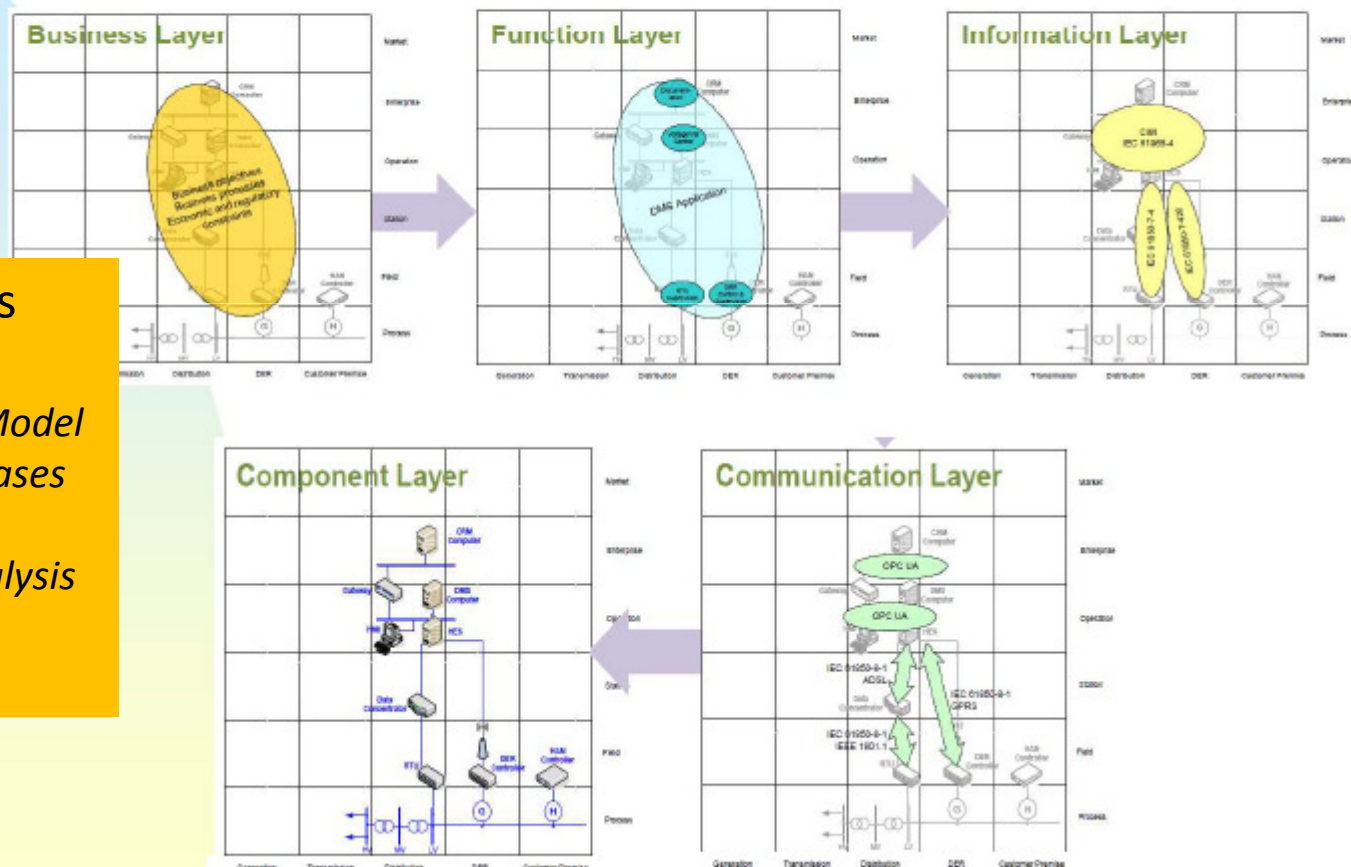
DER Management System according to SGCG  
SGAM representation

# Standardisation Initiatives: M490

## An Example of Use Case Mapping "Control Reactive Power of DER Unit" Use Case

### SGCG actions under M490

- Architecture Model
- Process-Use Cases definition
- STD Sel. & Analysis
- Gaps
- Priorities

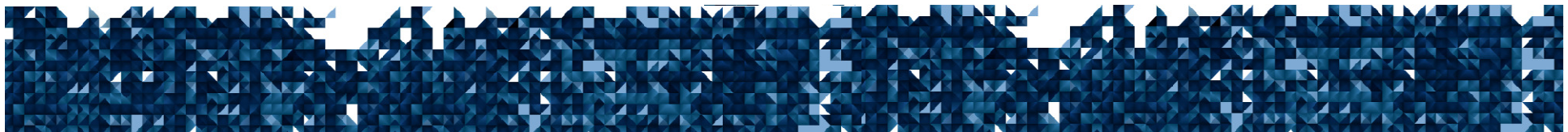


# Intl and national Std initiatives

- The [National Institute of Standards and Technology \(NIST\)](#) has founded the Smart Grid Interoperability Panel (SGIP), which has already produced a Catalog of Standards and Roadmap documents as well.
- The [Electrical Power Research Institute \(EPRI\)](#) is strongly engaged since the last 5 years in the research on Interoperability issues, and has recently produced, under the Smart Inverter Communication Initiative, standardisation inputs on common communication protocols and specific functionalities of inverter-based systems, figuring DERs high-penetration Cases.
- The [IEEE](#) has approved, among the others, a new standards development projects, the P1885 relevant to Volt-Var Control Optimization on Distribution Systems, and the P1547.8 on the flexible interconnection in case of large penetration
- The [IEC](#), through the Project TR 62357–1, is working on the core applications of smart grid, namely EMS, DMS, Distribution Automation, Substation Automation, etc. Within the TC/8X the PT62786 on the interconnection of Energy Sources with the grid

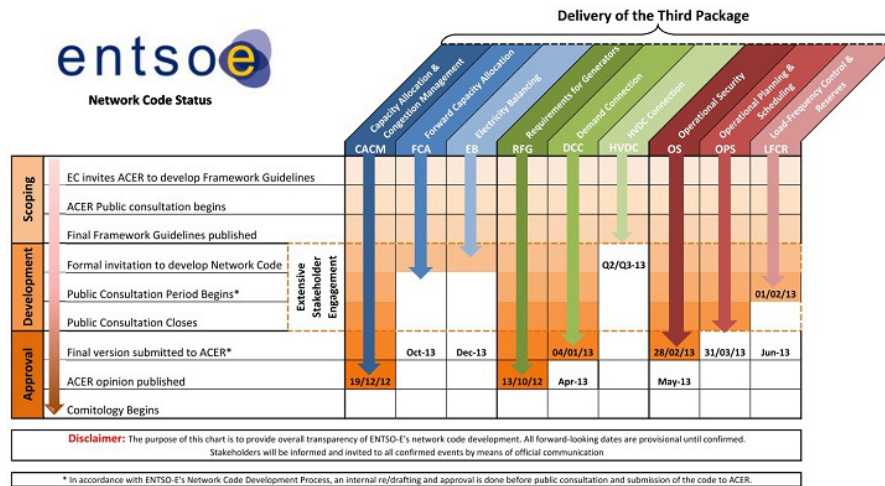
E.g.

- [Italian Stds CEI 0-16 and CEI 0-21](#), concerning the technical rules for the connection of active and passive consumers to the HV, MV and LV electrical networks.





# Industry Initiatives



**entsoe**  
Reliable Sustainable Connected

**EDSO**  
for smart grids

## The European Electricity Grid Initiative (EEGI)

*Roadmap 2010-18  
and  
Detailed Implementation Plan 2010-12*

**eurelectric**  
ELECTRICITY FOR EUROPE

**EDSO**  
for smart grids

## DSO PRIORITIES FOR SMART GRID STANDARDISATION

A EURELECTRIC / EDSO for Smart Grid joint position paper

**Priority conflict with STD initiatives?**

EUROPEAN TECHNOLOGY PLATFORM SMARTGRIDS

## SmartGrids SRA 2035 Strategic Research Agenda Update of the SmartGrids SRA 2007 for the needs by the year 2035

**Terna**

**Guida Tecnica**

Codifica	Allegato A. 70	
Revisione	N° 02	Pagina 1 di 13

**REGOLAZIONE TECNICA DEI REQUISITI DI SISTEMA DELLA  
GENERAZIONE DISTRIBUITA**



## Standardisation: What about SMEs?

EU Com2010\_2020 A strategy for smart, sustainable and inclusive growth

Meeting the EU's objective of 20% of renewable sources of energy alone has the potential to create more than 600 000 jobs in the EU. Adding the 20% target on energy efficiency, it is well over 1 million new jobs that are at stake.

[http://ec.europa.eu/enterprise/policies/sme/index\\_en.htm](http://ec.europa.eu/enterprise/policies/sme/index_en.htm)

The more than 20 million SMEs in the EU represent 99% of businesses  
Every year more than 1000 European standards are adopted.

Although standardisation processes formally allow for participation and input from all interested stakeholders, SME's and craft enterprises often do not take part in the process. Ultimately, the specific interests of SME's may not be properly reflected in the standards, as SME's only learn about the new standards after their adoption and publication (in their own language).

Jobs by the renewable energy industry in the EU <sup>[37]</sup>		
year	Employees	
2005	230.000	
2006	300.000	
2007	360.000	
2008	400.000	
2009	550.000	

- What's the impact on SME products/services and on the SME competitiveness?
- What's the level of representativeness of SMEs in the Smart Grids std process?
- What about SMEs requirements acceptance/consideration?

## Presentations

- European Standardisation Landscape – *Giuseppe Dell'Olio (GSE - Italy)*
- Impact of the Network Codes – *Gérald Sanchis (RTE - France)*
- Learning from EEGI Demonstration projects – *Jerome Frémont (ERDF - France)*

