

Overview of European Smart Grids Initiatives

11th of September 2013
Santiago 2013 Symposium on Microgrids

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What is a SmartGrid?

Definition by SG ETP in 2009

What is a SmartGrid?



A SmartGrid is an electricity network that can intelligently integrate the actions of all users connected to it - generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies.

A SmartGrid employs innovative products and services together with intelligent monitoring, control, communication, and self-healing technologies to:

- better facilitate the connection and operation of generators of all sizes and technologies;
- allow consumers to play a part in optimizing the operation of the system;
- provide consumers with greater information and choice of supply;
- significantly reduce the environmental impact of the whole electricity supply system;
- deliver enhanced levels of reliability and security of supply.

SmartGrids deployment must include not only technology, market and commercial considerations, environmental impact, regulatory framework, standardization usage, ICT (Information & Communication Technology) and migration strategy but also societal requirements and governmental edicts.



What is an ETP?

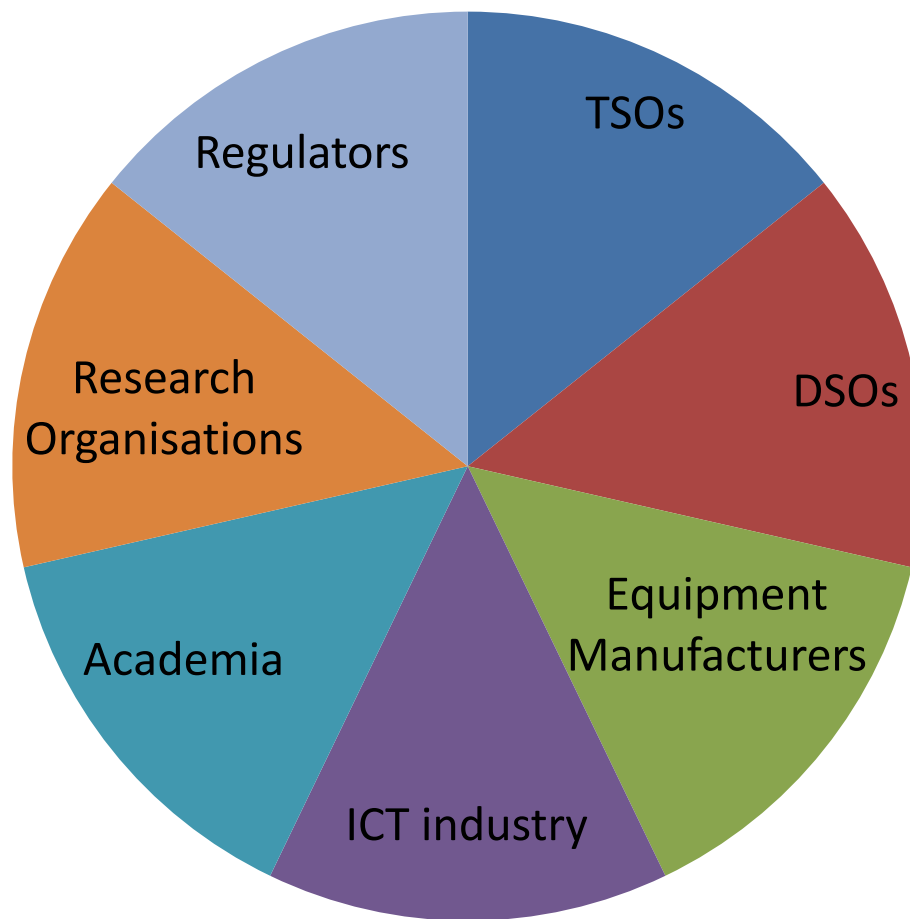
- ❑ An Industry-led stakeholder forum charged with defining research priorities in a broad range of technological areas
 - provides an independent framework
 - to define agendas, priorities, and action plans
 - for research and technological developments
 - in areas where Europe requires major advances
 - in the medium to long term.
- ❑ An ETP is also to:
 - provide input to European and National research funding schemes.
 - foster effective public-private partnerships,
 - contribute to development of a European Research Area



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New ETP SG Steering Committee

Stakeholders represented





2006/2007: EU SmartGrids Activities

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- ❑ **2006: EU SmartGrids TP, SmartGrids Vision**
 - ❑ **2007: 1st SRA (Strategic Research Agenda)**
SRA 2035 is an update of this SRA 2007
 - ❑ **Nov 2007: SET (Strategic Energy Technology) Plan**
 - Initiatives: Wind, Solar, EEGI, Bio-energy, CO2 capture, transport and storage, JTI on fuel cells and hydrogen, Smart Cities
 - EERA (European Alliance of SmartGrids laboratories)
 - **JRC**: Joint Research Center
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The SmartGrids TP Vision



<http://www.smartgrids.eu>



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SET- PLAN

The SET-Plan establishes an energy technology policy for Europe. It comprises measures relating to planning, implementation, resources and international cooperation in the field of energy technology.

The SET-Plan has two major timelines:

For **2020**, the SET-Plan provides a framework to accelerate the development and deployment of cost-effective low carbon technologies. With such comprehensive strategies, the EU is on track to reach its 20-20-20 goals of a 20% reduction of CO₂ emissions, a 20% share of energy from low-carbon energy sources and 20% reduction in the use of primary energy by improving energy efficiency by 2020.

For **2050**, the SET-Plan is targeted at limiting climate change to a global temperature rise of no more than 2° C, in particular by matching the vision to reduce EU greenhouse gas emissions by 80 - 95%. The SET-Plan objective in this regard is to further lower the cost of low-carbon energy and put the EU's energy industry at the forefront of the rapidly growing low-carbon energy technology sector.



2008/2009: EU SmartGrids Activities

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□ **2008: SmartGrids ERA-Net (Cooperation and Coordination of Research Activities carried out at National or Regional Level)**

➤ **20 National SmartGrids Program managers cooperate for better SmartGrids research**

□ **2009: SDD (Strategic Deployment Document) by SG ETP**

- 1st SmartGrids Strategic Deployment Document
 - Follow-Up was **EEGI** (European Electricity Grid Initiative) as part of SET Plan
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2009/2010: EU SmartGrids Activities

- ❑ **2009: New SmartGrids European Technology Platform (ETP)**
 - ❑ **June 2010: ETP SmartGrids and IEEE organised the “SmartGrid World Forum”**
 - ❑ **2010: EC sets up the Task Force on SmartGrids**
 - ✓ Reference Group for SG Standards,
 - ✓ Expert Group for Regulatory Recommendations for Privacy,
 - ✓ Data Protection and cyber-security in the SG Environment,
 - ✓ Expert Group for Regulatory Recommendations for SG Deployment,
 - ✓ Expert Group for SG Infrastructure Deployment,
 - ✓ Industrial Policy for Smart Grids
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2010/2011: EU SmartGrids Activities

□ 2010: EEGI (European Electricity Grid Initiative)

- Roadmap for SmartGrids Demonstration for 2020
- ETP SG - Stakeholder based review process

□ 2010: CEN, CENELEC and ETSI

- Smart Meters Coordination Group (M/441)
- Joint Working Group on standards for the SG (M/490)

□ 2011&2012 Update of SmartGrids SRA 2035

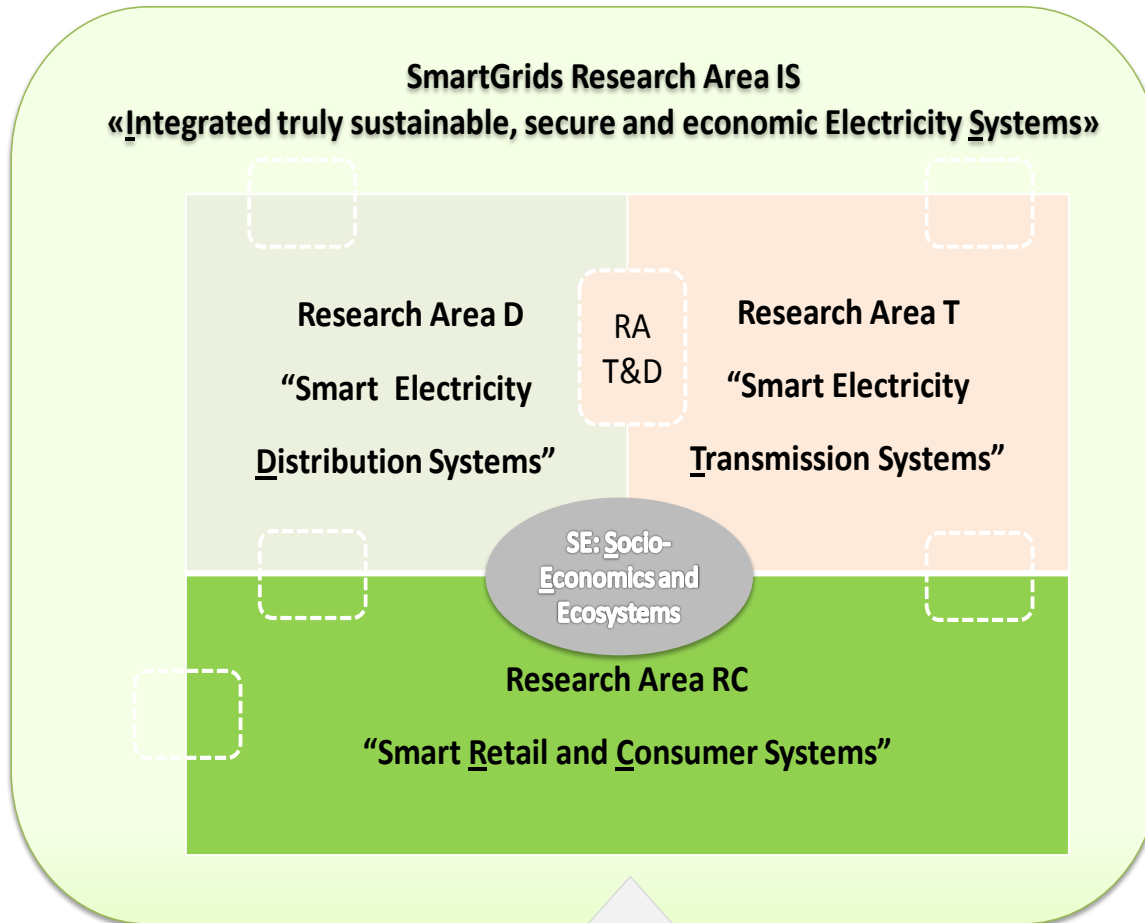
starting point: SG Technology Push and SG Market Pull

□ 2013 New ETP on SmartGrids



S M A R T G R I D S

SmartGrids SRA 2035



Other research areas contributing to the SmartGrids SRA 2035:
European Energy Platforms for Wind, PV, CSP, CCS, Bio-Energy,
Fuel Cells, Hydrogen, SmartCities, Nuclear Fission



March 2012 – Adoption of SRA 2035 in Rome

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□ 2011-2020

2011

SRA 2007 was input to EEGI: European Electricity Grid Initiative (initiated by Grid Operators)

Goal EEGI: Demonstration SmartGrids 2020

□ 2020-2035

SRA 2035 is input to the future European Research Program Definition

2020

– The definition of research areas, tasks, topics to be solved starting today ...

... for the needs of the energy/electricity system and its stakeholders by 2035

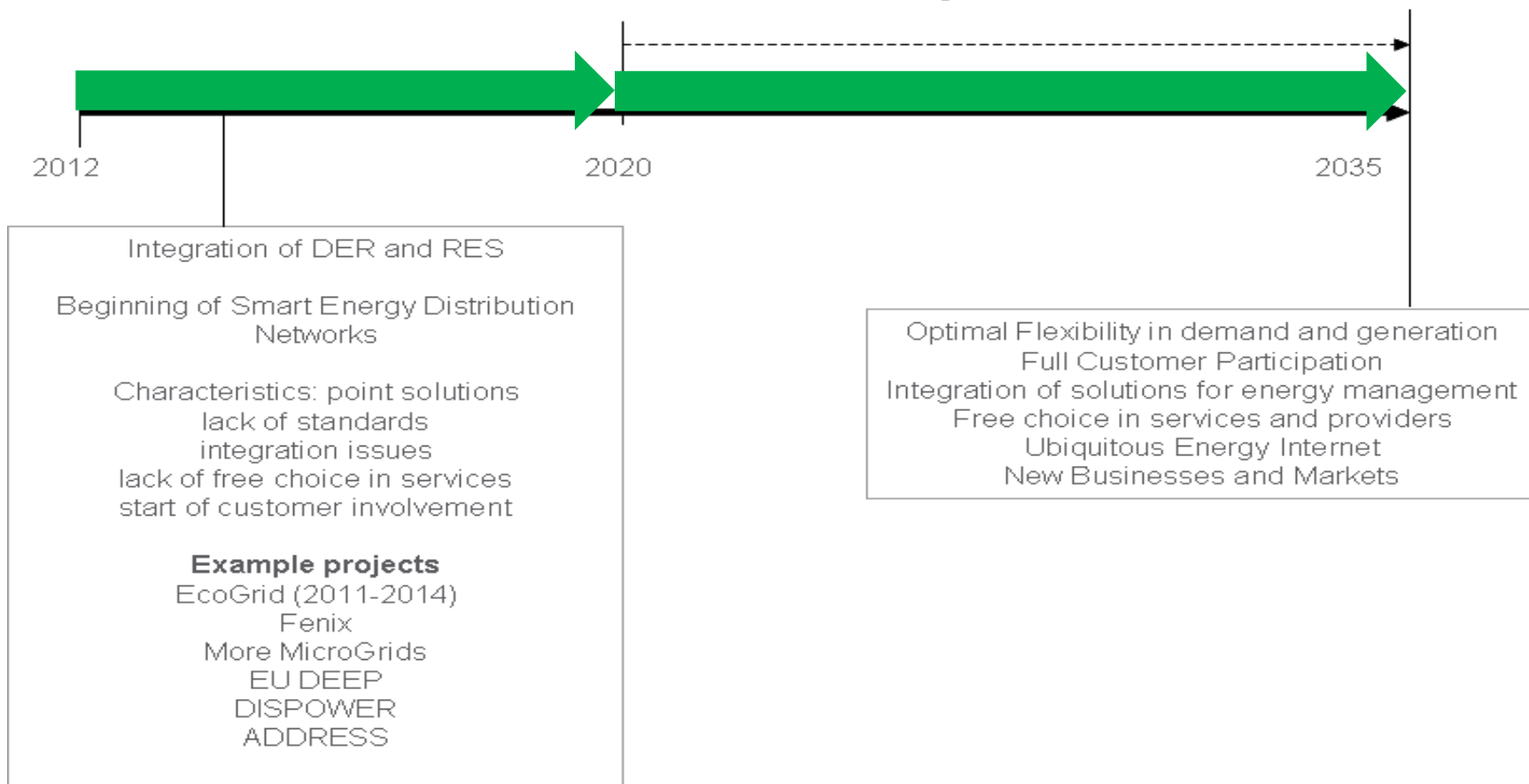
2035



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What are the expected fundamental changes between 2020 and 2035 for SmartGrids?

Transition to optimal Smart Energy System
with optimal flexibility in demand and
generation





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Expected Externalities 2035+

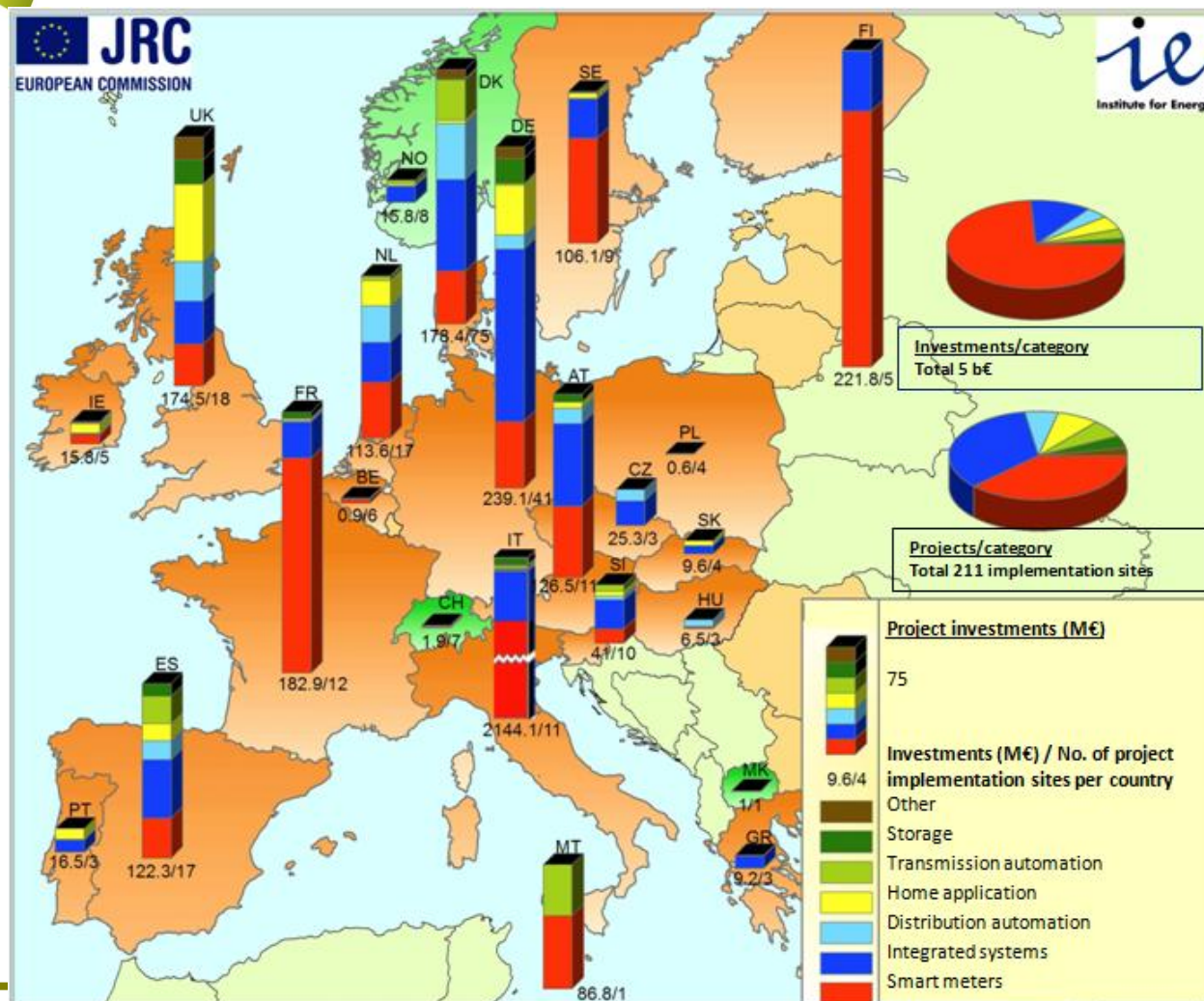
- ❑ Reduced greenhouse gas emissions by the energy sector 2050 by over 80%
 - ❑ Decreased energy demand by 41% by 2050 as compared to 2006
 - ❑ RES shares achieve at least 55% in gross final energy consumption by 2050
 - ❑ RES shares in electricity consumption reach between 64% to 97%.
 - ❑ Electricity could provide around 65% of energy demand by passenger cars and light duty vehicles
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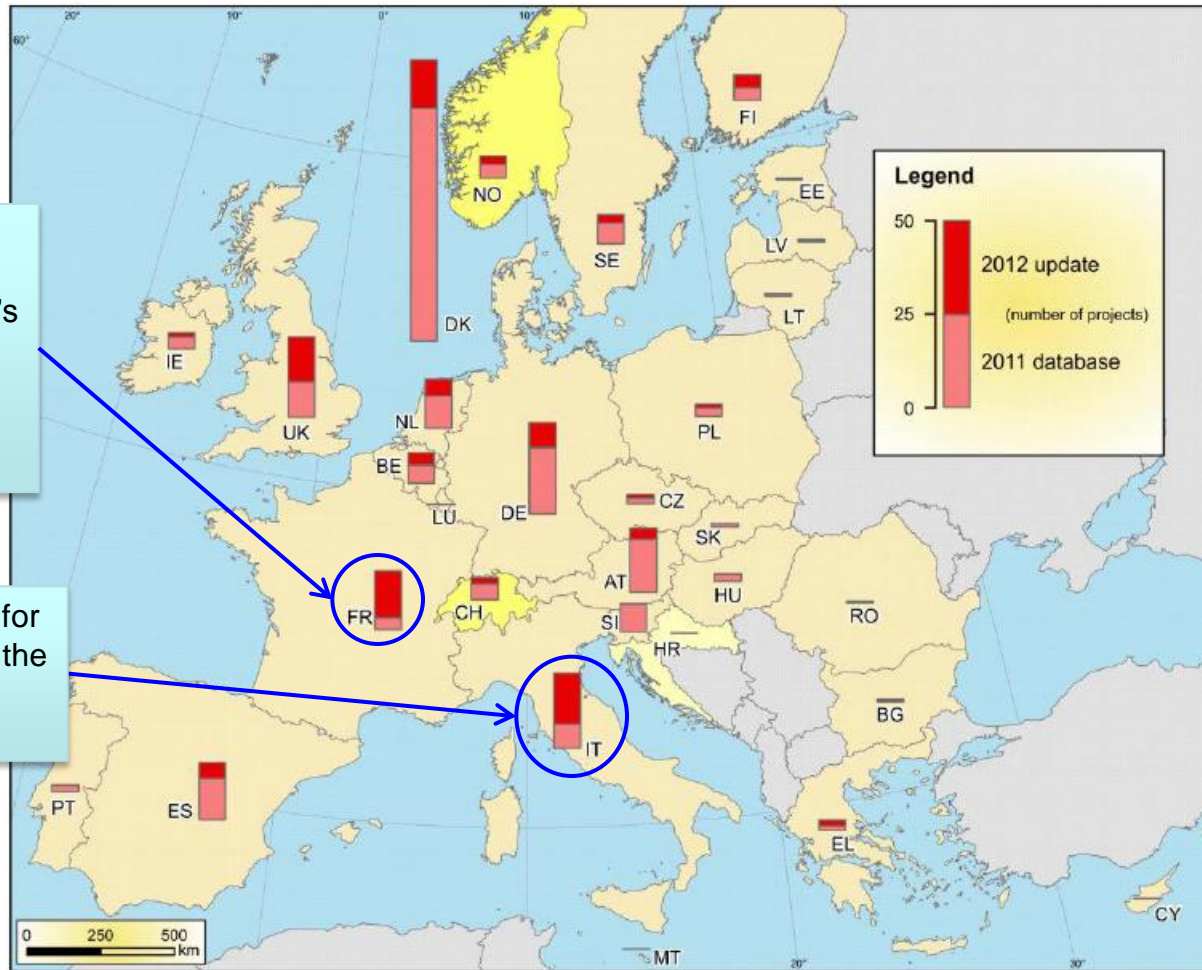
SmartGrids projects in Europe by July 2011

at total investment of 0,5 b€ (source JRC)



- July 2011: 219 projects (195 SmartGrids, 24 Smartmeter projects) in EU 27, Switzerland and Norway
- 2012: 281 SmartGrids RD&D projects and 90 Smartmeter projects. Total investment: 1,8 b€. (average budget/project 6.5 m€, average duration 35 months).

Geographical distribution of SG projects (source JRC)



Public sector support through the smart grid programme of France's Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME)

Regulatory incentives for smart grid projects by the Italian regulatory authority AEEG

70 % of all projects are in seven countries: Denmark, Germany, Italy, Austria, the UK, France and Spain

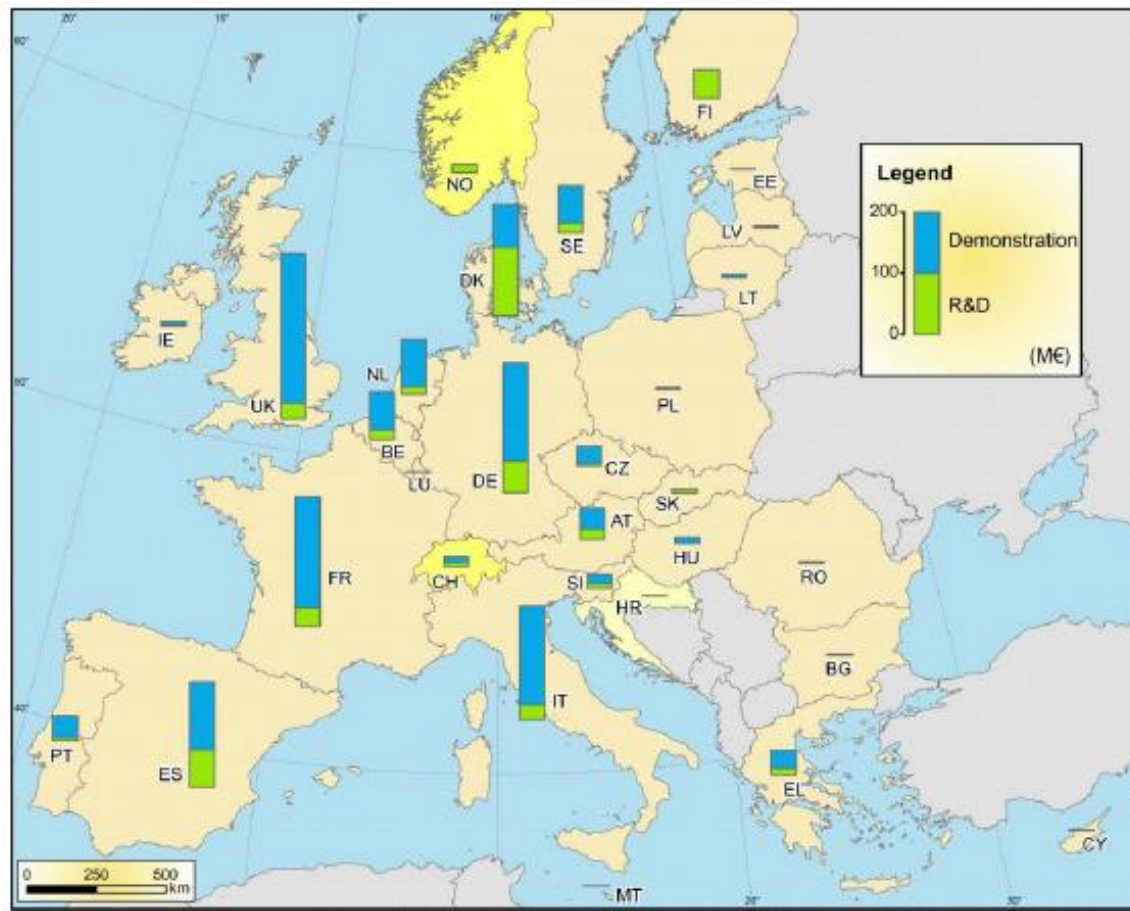
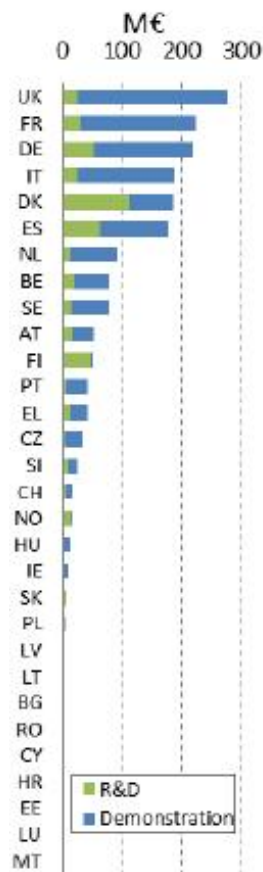
Italy and France each have 14 new smart grid projects (which started in 2010-12) in addition to four and six respectively last year.



Investments in RD&D SG projects (1/2)

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(source JRC)



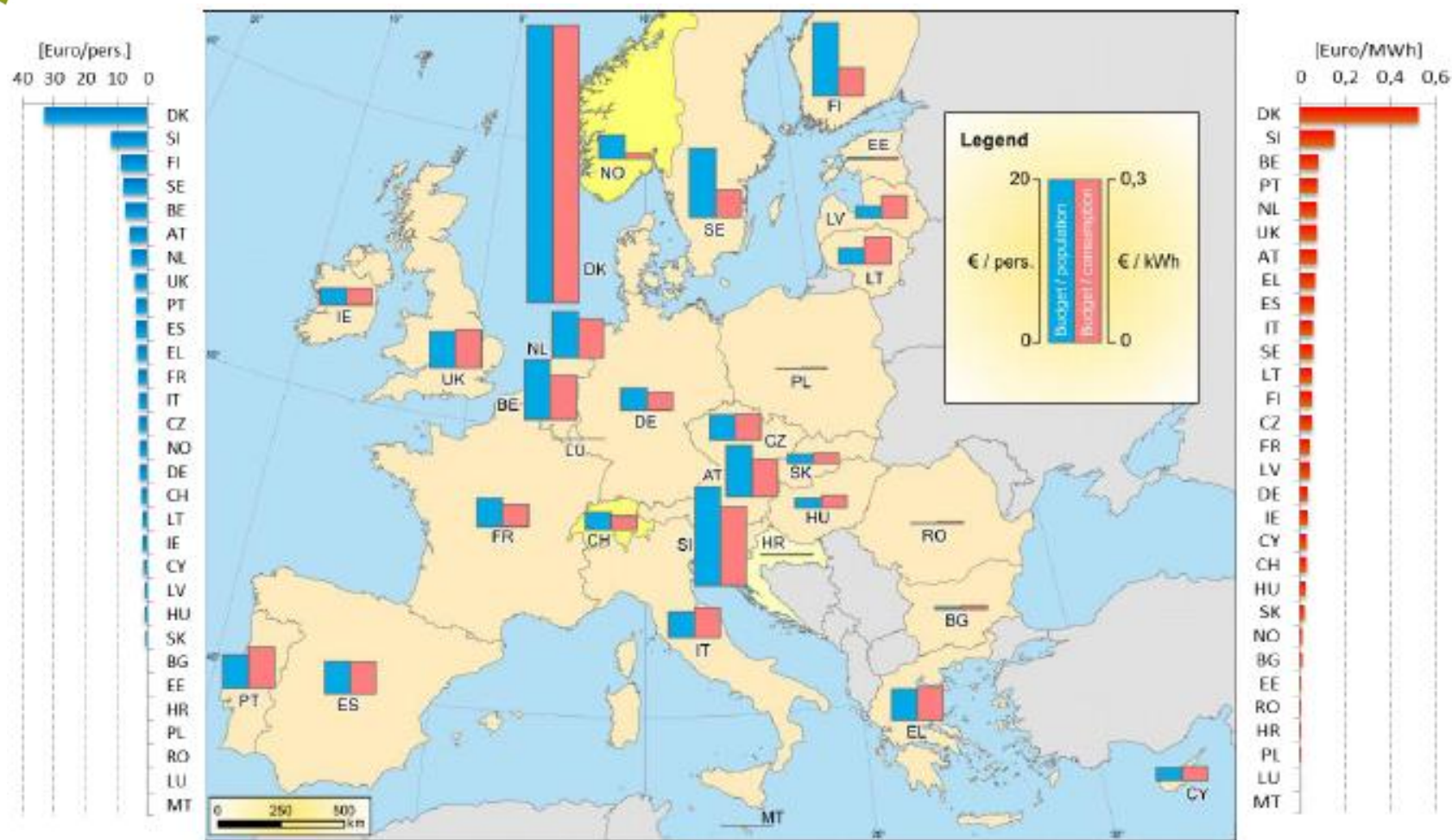
UK~15%
Germany~12%
France~12%
Italy~10%
Denmark~10%
Spain~10%



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Investments in RD&D SG projects (2/2)

(source JRC)

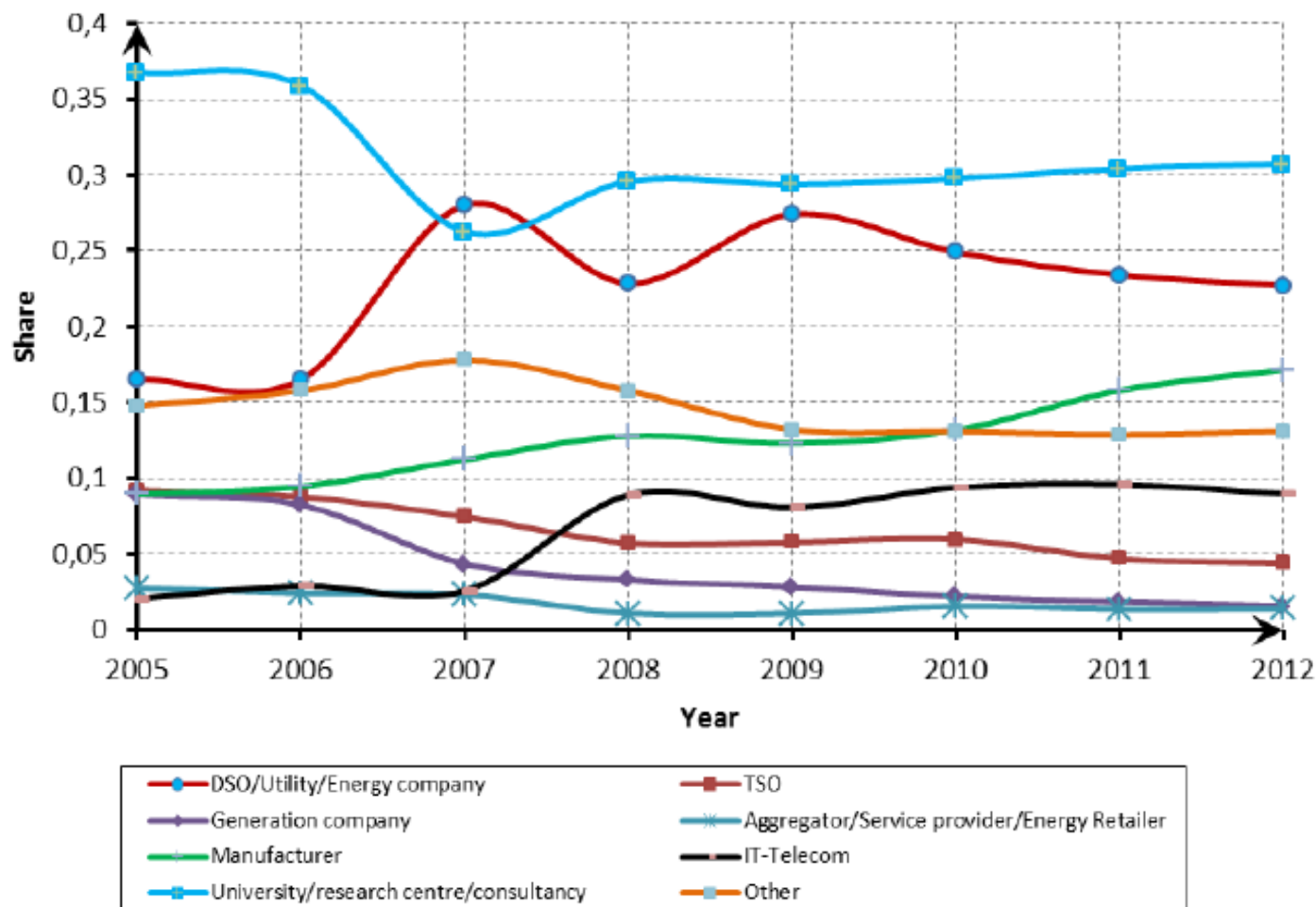


Denmark is the country that invests most both per capita (over € 30 per person) and per KWh of consumed electricity (€0.5 per MWh)



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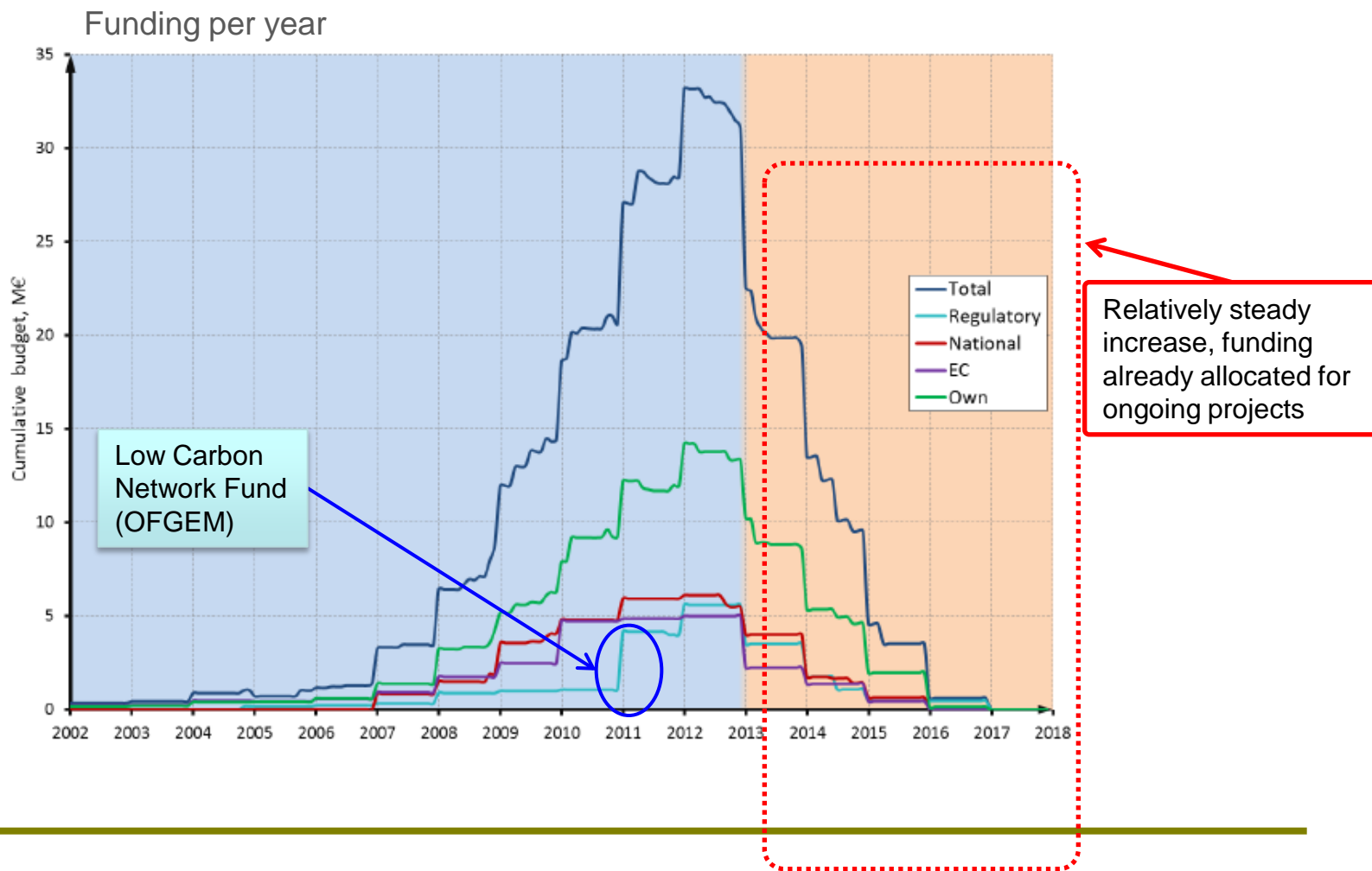
Share of participation by organisation type (weighted with the budget) *(source JRC)*





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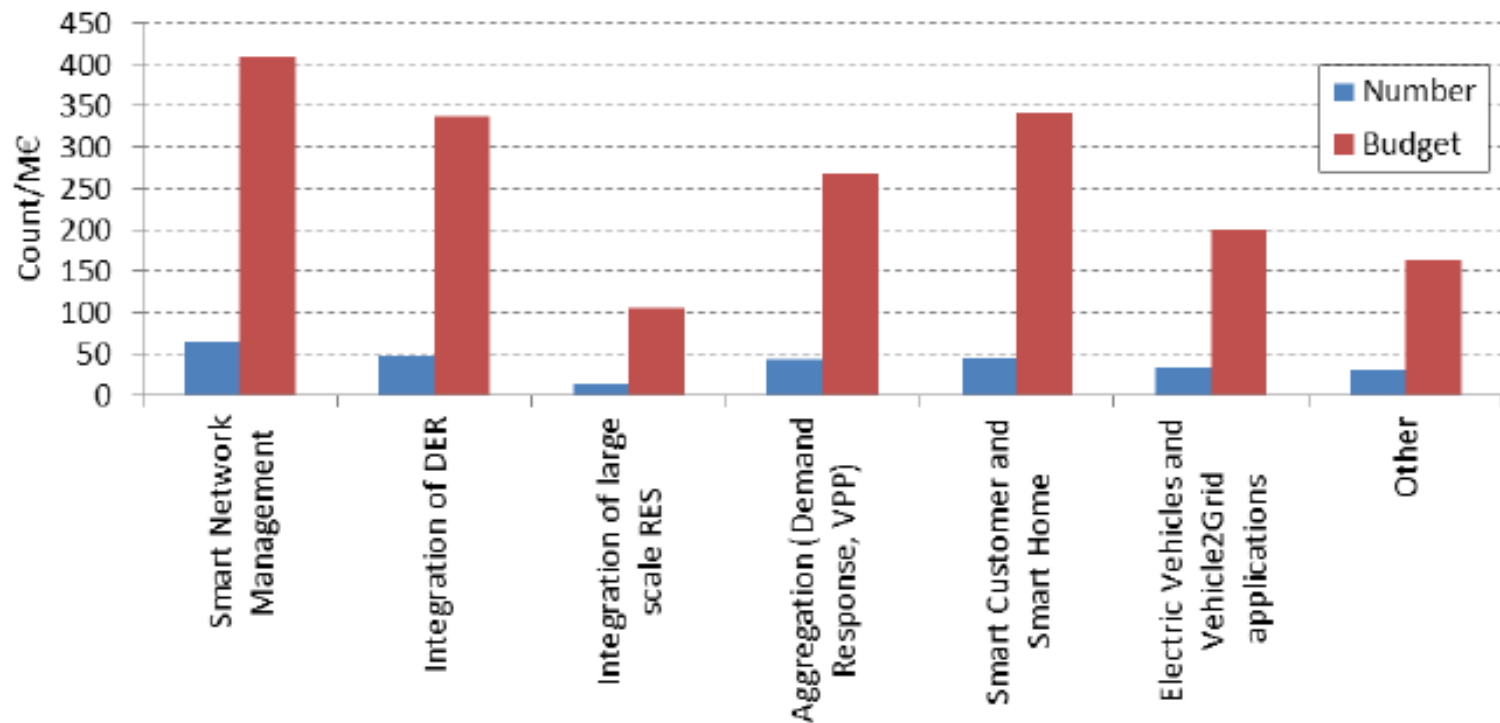
Allocated funding over lifespan of SG projects *(source JRC)*





S M A R T G R I D S

Smartgrid applications targeted (source JRC)



**Microgrids, the building blocks of Smartgrids,
encompass all SG applications!**