

# ETP SmartGrids and European SmartGrid Initiatives

Workshop for Preparation of Croatian Technology  
Platform for Cooperative Renewable Energy  
Systems and Smart Grids

1<sup>st</sup> of July 2013

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[www.smartgrids.eu](http://www.smartgrids.eu)

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# Power System - figures

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**Europe's electric power system is one of the largest technical systems in the world**

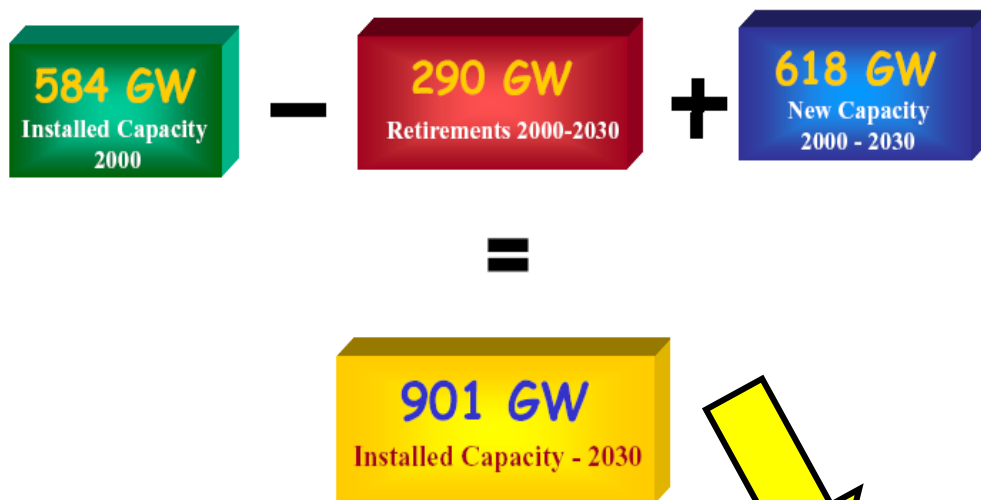
- ☐ **430 million people served**
  - ☐ **2500 TWh used**
  - ☐ **560 GW installed capacity**  
**@ 500€/kW = 280G€**
  - ☐ **230.000 km HV network**  
**@ 0.4M€/km = 90G€**
  - ☐ **Approx. 5.000.000 km MV+LV network**
  - ☐ **1500€ investment per EU citizen**
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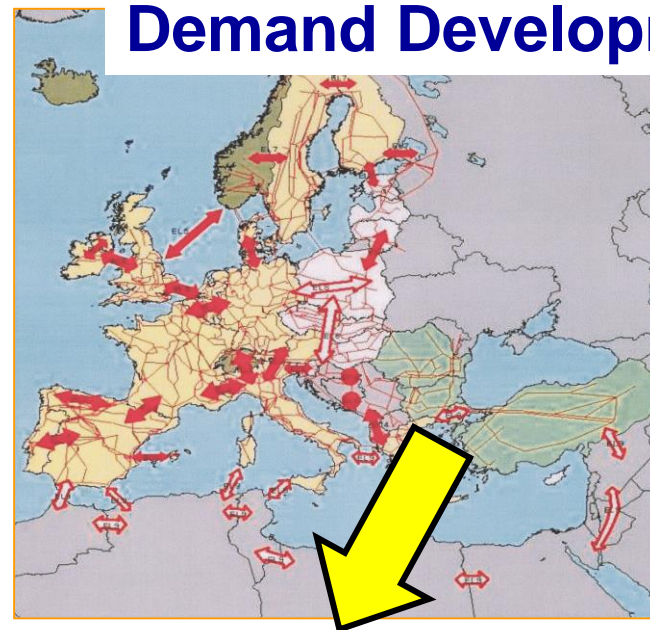
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# Inter-operability challenges

## Ageing assets



## Demand Development



**Comprehensive strategy is required  
for energy supply + power system**

# Challenge

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The IEA World Energy Investment Outlook 2003 states that the electricity sector in the EU has an annual turnover of about €112 billion and contributes about 1.5% to EU GDP.

Investment in the sector is about €22 billion per year in the EU.

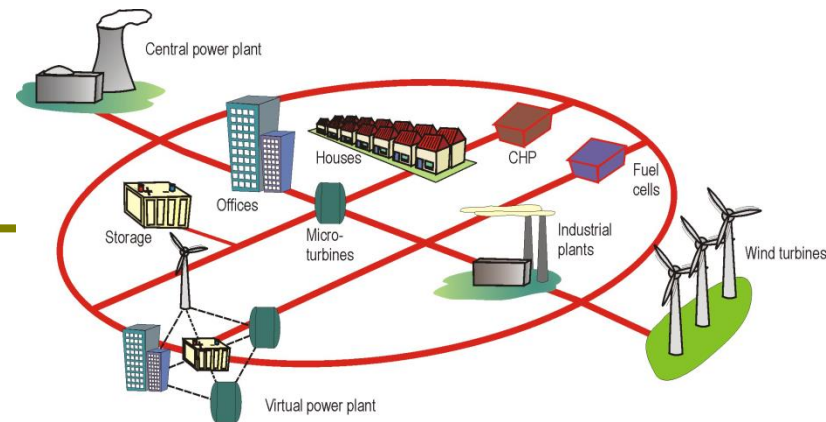
Looking ahead, EU Member States will need to invest in excess of 750 billion euros in power infrastructure over the next three decades, divided equally between generation and networks (some €90 billion will be invested in transmission and €300 billion in distribution networks).

Now days these aims are even greater. Over the next 25 years, around €900 billion will be needed to invest in new coal- and gas-fired power plants, along with wind turbines. Even if we increase our energy efficiency to limit growth in demand, **major investment in infrastructure** is vital.

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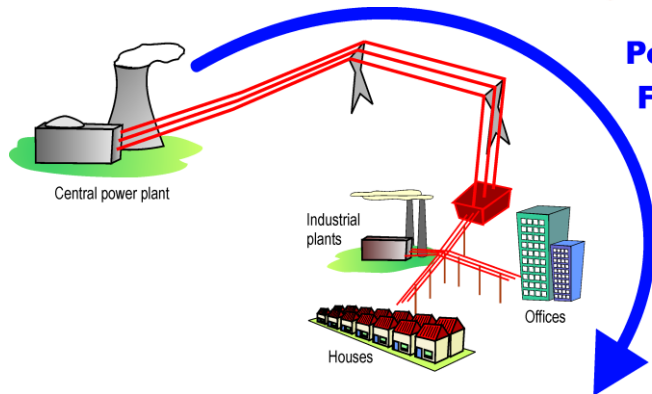
# In transition

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**Tomorrow:**  
Integrated secure  
network combining  
central and DG

**Today:**  
Highly  
centralised power  
and little DG



**Power  
Flow**

Emphasis on Energy Value

Emphasis on  
Information Value

Final stage

Intermediate stage

Initial stage



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# Transition: driving factors

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- ☐ European and national policies encourage lower carbon generation, RES and efficient energy use
  - ☐ Need for investment in end-of-life grid renewal (ageing assets)
  - ☐ Handle grid congestion (with market based methods)
  - ☐ Reduce uncertainty for investment
  - ☐ Integration of RES and DG into the grids
  - ☐ Increased customer participation
  - ☐ Progress in technology
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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.



# SmartGrids: Some figures

- ❑ Europe needs 56 billion € investment in SmartGrids between 2010 and 2020 (conservative). At least €30 billion of investments by 2020 are possible to achieve with current pace of investments.
- ❑ Energy Efficiency: By exploiting simple functionalities of smartmeters the European Commission estimates 7% energy savings for households and 10% for businesses.
- ❑ The European Network of Transmission System Operators for Electricity estimates that Europe will need to add 42100 km to its existing 300 000 km of trans-European high-voltage power lines in the next ten years, an effort that will cost up to €28 billion between 2010 and 2015.





# 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

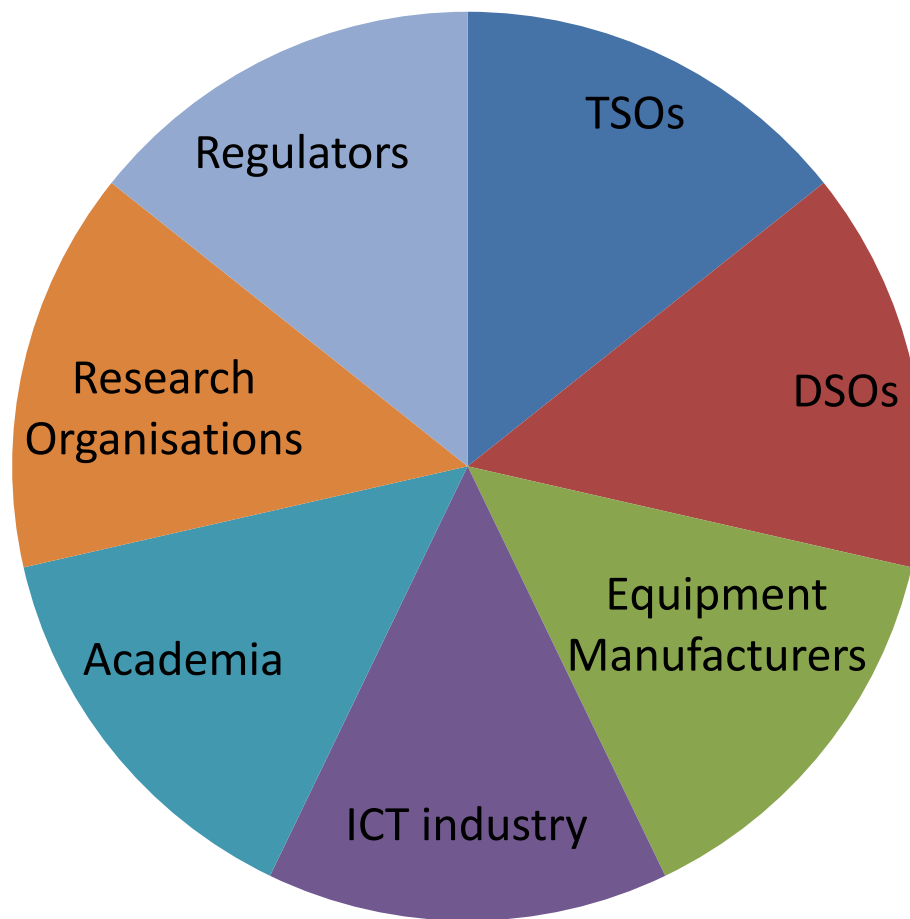


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# New ETP SG Steering Committee

## Stakeholders represented

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# 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, CO<sub>2</sub> 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





# 2006/2007: EU SmartGrids Activities

S M A R T G R I D S

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□ 2006: EU SmartGrids TP, SmartGrids Vision

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□ **Nov 2007: Commission proposal for SET (Strategic Energy Technology) Plan**

- Initiatives: Wind, Solar, EEGI, Bio-energy, CO<sub>2</sub> capture, transport and storage, JTI on fuel cells and hydrogen, Smart Cities
  - EERA (European Alliance of SmartGrids laboratories)
  - SETIS (JRC: Joint Research Center)
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# 2008/2009: European 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 coordination of SmartGrids R&D programmes
  - ❑ **2009: SDD (Strategic Deployment Doc) by SG ETP**
    - 1st SmartGrids Strategic Deployment Document
    - Follow-Up was EEGI (European Electricity Grid Initiative) as part of SET Plan
  - ❑ **2009: KIC (Knowledge and Innovation Community) “InnoEnergy”**
    - Interfaces between industry, education and research
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# 2009/2010: European SmartGrids Activities

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- ❑ **2009: New SmartGrids European Technology Platform (ETP)**
  - ❑ **June 2010: ETP SmartGrids and IEEE organised the “SmartGrid World Forum”**
  - ❑ **2010: EC sets up the SmartGrids Task Force (SGTF)**
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# EU SmartGrids TF

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The mission of the SGTF is to advise the Commission on policy and regulatory frameworks at European level to co-ordinate the first steps towards the implementation of Smart Grids under the provision of the Third Energy Package and to assist the Commission in identifying projects of common interest in the field of Smart Grids under the context of regulations on guidelines for Trans-European Infrastructure (COM (2011)658 and 657).

Five working groups are functioning under the framework of the SGTF covering the following areas:

- ☐ Reference Group for Smart Grid Standards
  - ☐ Expert Group for Regulatory Recommendations for Privacy, Data Protection and cyber-security in the Smart Grid Environment
  - ☐ Expert Group for Regulatory Recommendations for Smart Grids Deployment
  - ☐ Expert Group for Smart Grid Infrastructure Deployment
  - ☐ Industrial Policy for Smart Grids
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# 2010/2011: European SmartGrids Activities

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## □ 2010: EEGI (European Electricity Grid Initiative)

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

## □ 2010: CEN, CENELEC and ETSI

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

## □ 2011&2012: Update of SmartGrids SRA 2035

## □ 2013 New ETP on SmartGrids

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# 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

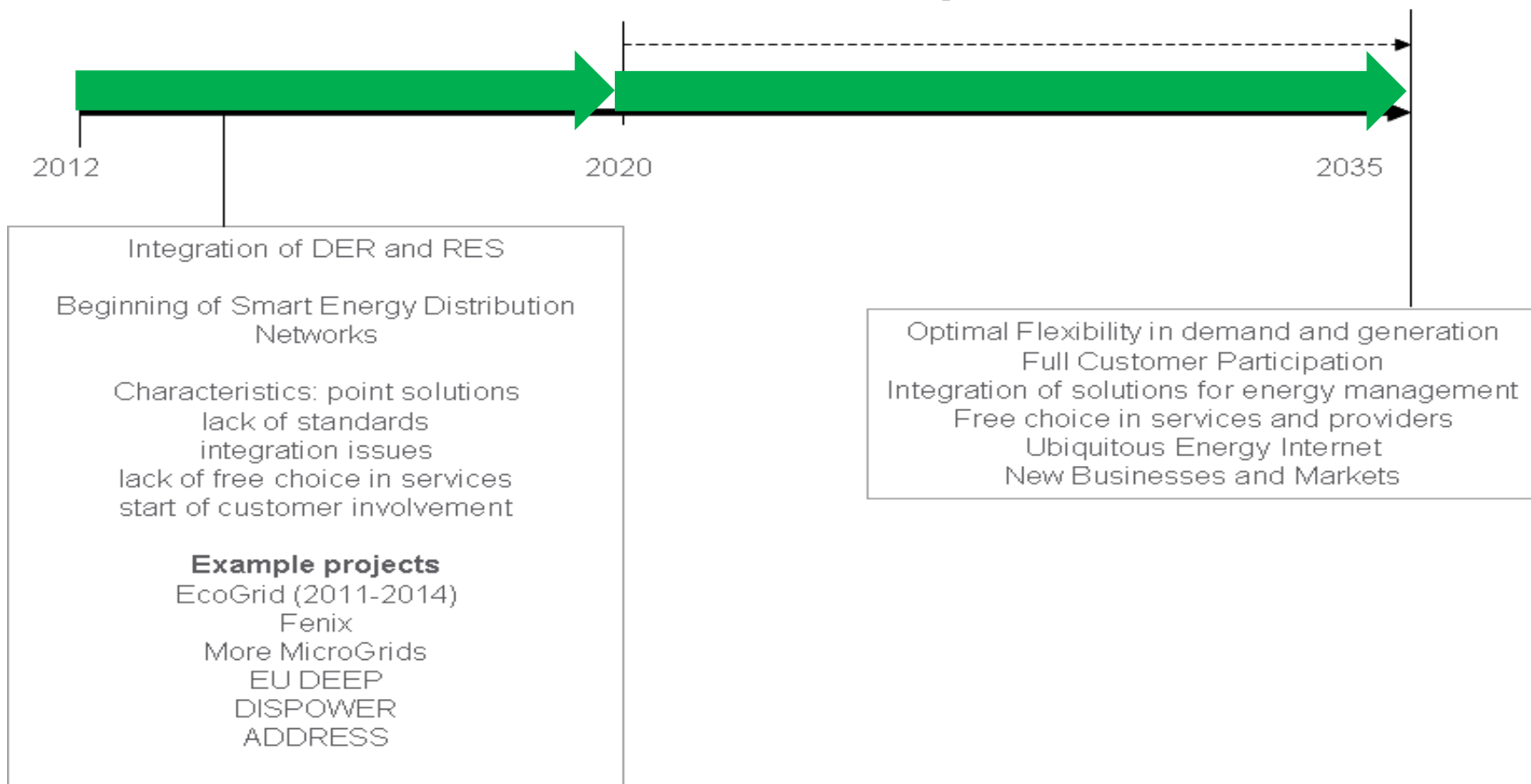
2035



S M A R T E R G R I D S

# What are the expected fundamental changes between 2020 and 2035?

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





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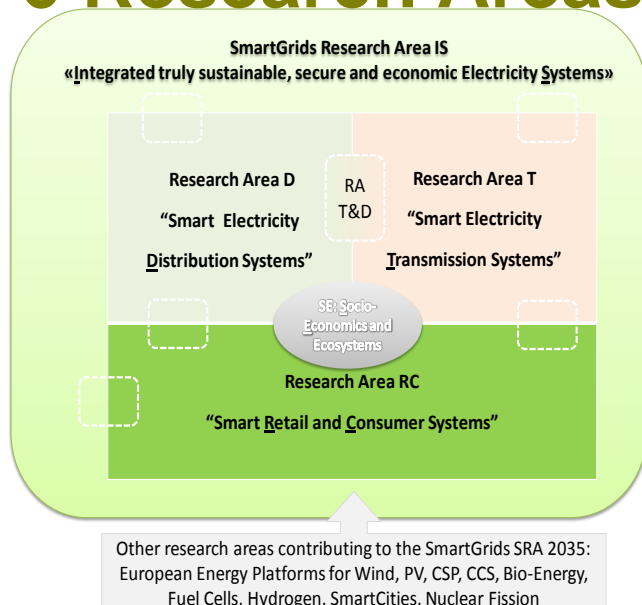
# Expected Externalities 2035+ (Source: EC)

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- ❑ 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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## 6 Research Areas

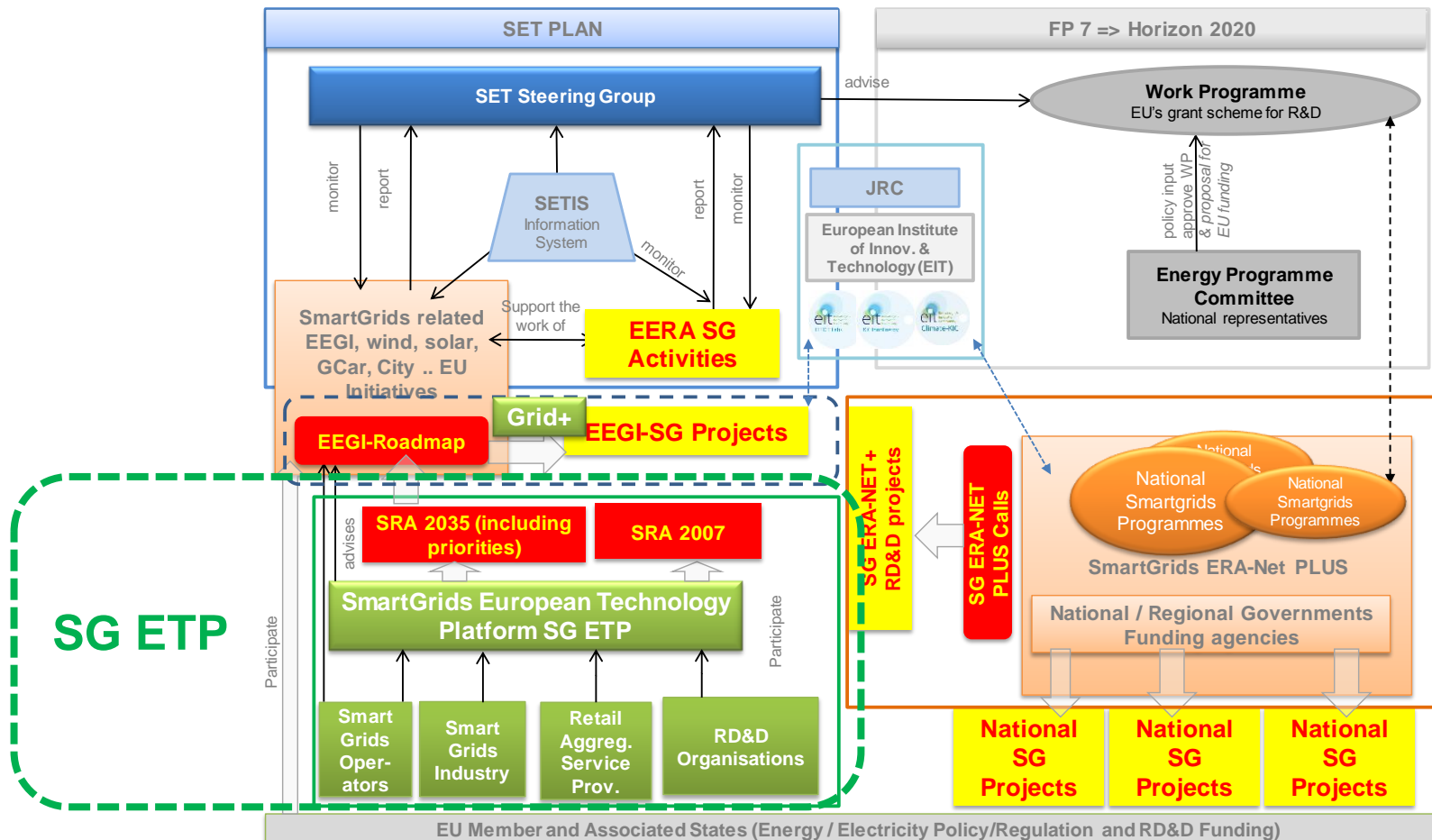




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# The ETP SmartGrids: A key institution to move SmartGrids forward

## SmartGrids Programmes, Topics, Priorities, Projects and Funding Landscape Europe



ERA is about transnational cooperation and competition on common research agendas and research infrastructure, creating more effective and coordinated national research systems



# NTP and RTP mapping exercise

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## ETP SG mapping NTPs and RTPs in EU

- Starting point workshop summer 2012
- Know NTPs / RTPs and their activities
- Develop a map of NTPs / RTPs SmartGrids in all EU Member States
- 11 NTPs already identified
- NTPs / RTPs are requested to fill in a profile form (accessible at [www.smartgrids.eu](http://www.smartgrids.eu))

# Thank you for your attention!

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