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Federal Ministry
for Transport,
Innovation and Technology

Invitation

SMART GRIDS WEEK SALZBURG 2010

Austrian Smart Grid Pioneers in Dialogue
Guest Countries: Germany and Switzerland

D-A-CH Workshop June 22, 2010
Conference June 23 to 25, 2010

Land Salzburg

Salzburg AG

e 2050

EUROPEAN INDUSTRIAL INITIATIVE ON ELECTRICITY GRIDS

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Outline

- Electricity networks towards 2020
- The EEGI Roadmap and Implementation plan
- Financing the program
- KPIs and Knowledge sharing
- Cooperation with other initiatives
- Conclusions

Electricity Networks in the 21-st century: towards 2020

External

- **20-20-20** EU Goals
- Electricity **consumption growth**
- Large increase of unpredictable **renewable energy** sources
- **Security** of supply
- The **Third Energy Package**

Internal

- Reduce the **total costs** of the power system
- Replacement of **ageing infrastructures**
- Integrate **low-carbon generation** sources
- Support **energy efficient demand side technologies**
- Enable the **active participation** of customers to the energy market
- Enable the **electrification** of the **transport sector**
- Increase the network **flexibility** to face 2050 scenarios

The European Electricity Grid Initiative (EEGI)

Networks are the enabling factor of a sustainable development

Vision

by 2020 the electricity networks in Europe will:

1. Actively integrate efficient new generation and consumption models:

- Integrate new intermittent renewable resources at the different voltage levels
- Support and enable energy efficiency by end users
- Enable and integrate active demand from end users
- Enable and integrate new electricity uses, in particular recharging infrastructure for electric vehicles and increasing electric heating (heat pumps)

2. Coordinated planning and operation of the whole Electricity Network

- Coordinate planning and operation for the pan European transmission network through ENTSO-E with dedicated solutions developed in the EEGI program
- Coordinate planning and operation between transmission and distribution networks with dedicated solutions developed in the EEGI program

3. Study and propose new market rules to maximize European welfare

- Study and recommend new market rules both at national and European level.
- Enable new business opportunities and innovations for market players

Objectives

- The EEGI has been created to accelerate the development of the electricity networks of the future in Europe, the **Smart Grids**
- The EEGI will conduct the **extra RD&D efforts needed** to develop new solutions to overcome the following barriers:
  - **Technology barriers** including standards, interoperability, cyber security and data privacy
  - **RD&D organization barriers** including the fragmentation of efforts
  - **Market failures and distortions**: present incentives are not sufficient for network operators to invest
  - **Public barriers** including customer engagement and public acceptance

The characteristics of the EEGI

- The program is focusing on the **electricity system innovation**
- The Grid Initiative is an **enabler for other energy technology initiatives**, in particular Solar and Wind
- The validity of the developed innovations needs the implementation on **real networks under real operating conditions**
- The network operators will ensure that new developments **provide a level playing field for the competitive activities of market players**.
- The network operators, through the interaction with the regulators, aim **at optimizing the overall electricity system efficiency.**

Smart Grids Model

SMART GRIDS
Functional level

Level 5: Smart Customers

Customers aware and actively participating

Level 4: Smart Energy Management

Management of end-use energy efficiency, aggregation, retail

Level 3: Smart Integration

Renewable energy, DG, electric vehicles, electricity storage and aggregation

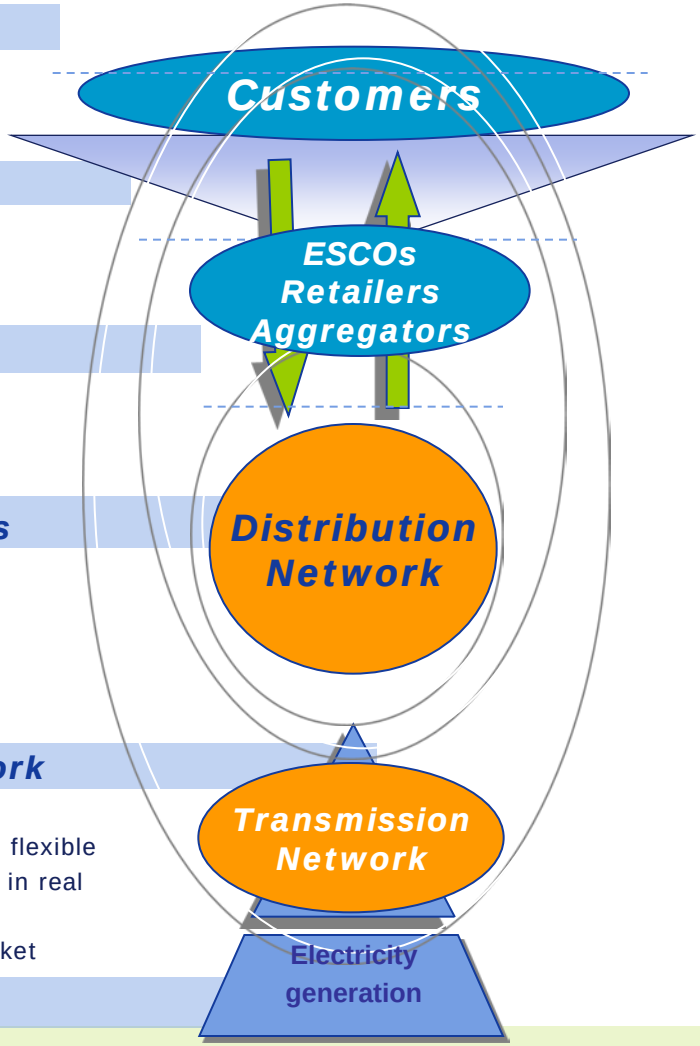
Level 2: Smart distribution network and processes

More automated MV distribution networks with self healing capabilities.
Monitored and controlled LV networks
IT supported monitoring process

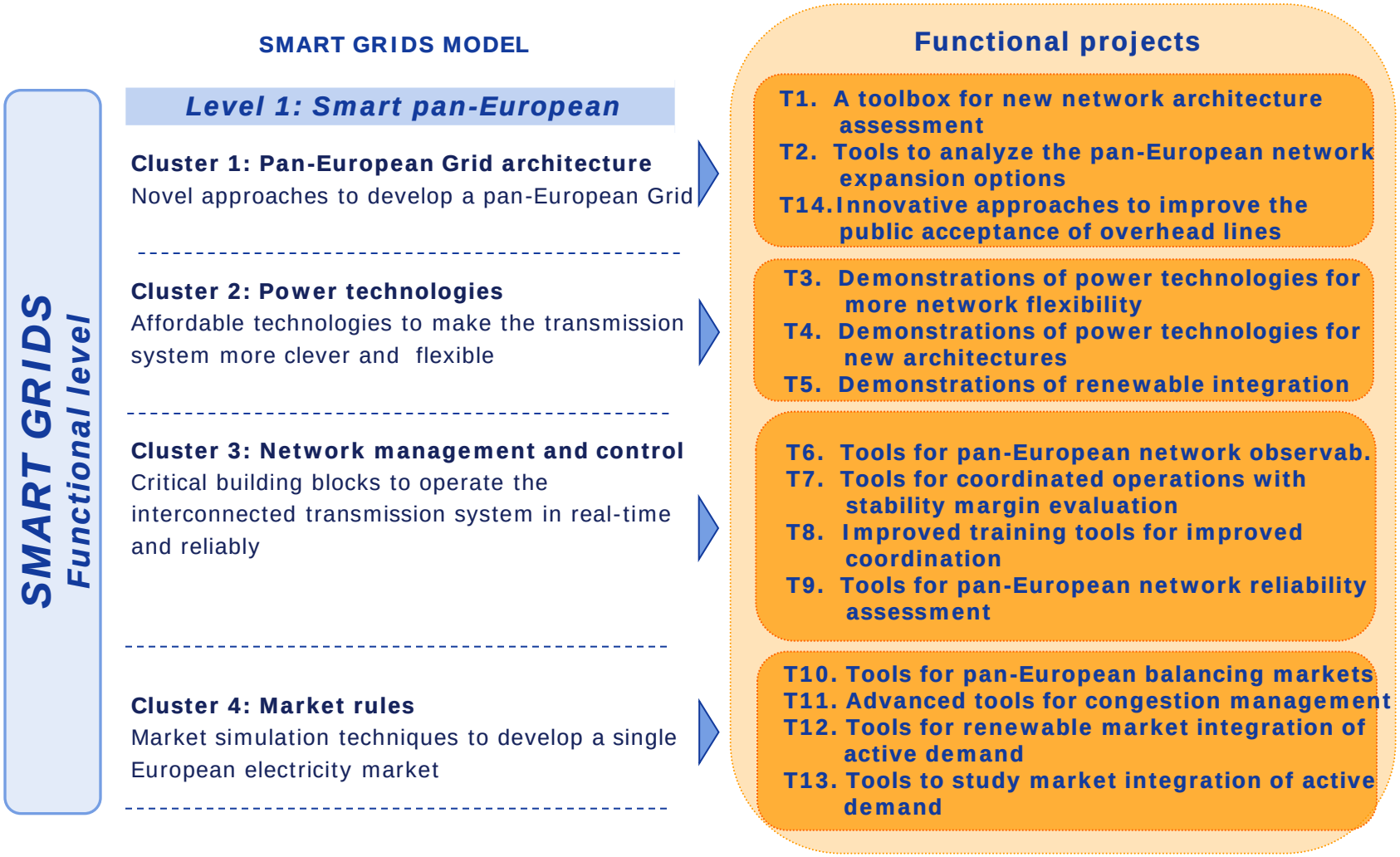
Level 1: Smart Pan-European Transmission network

Novel approaches to develop a pan-European grid
Affordable technologies to make the transmission system more clever and flexible
Critical building blocks to operate the interconnected transmission system in real time and reliably
Market simulation techniques to develop a single European electricity market

Level 0: New generation technologies



The 14 Functional Projects on transmission networks



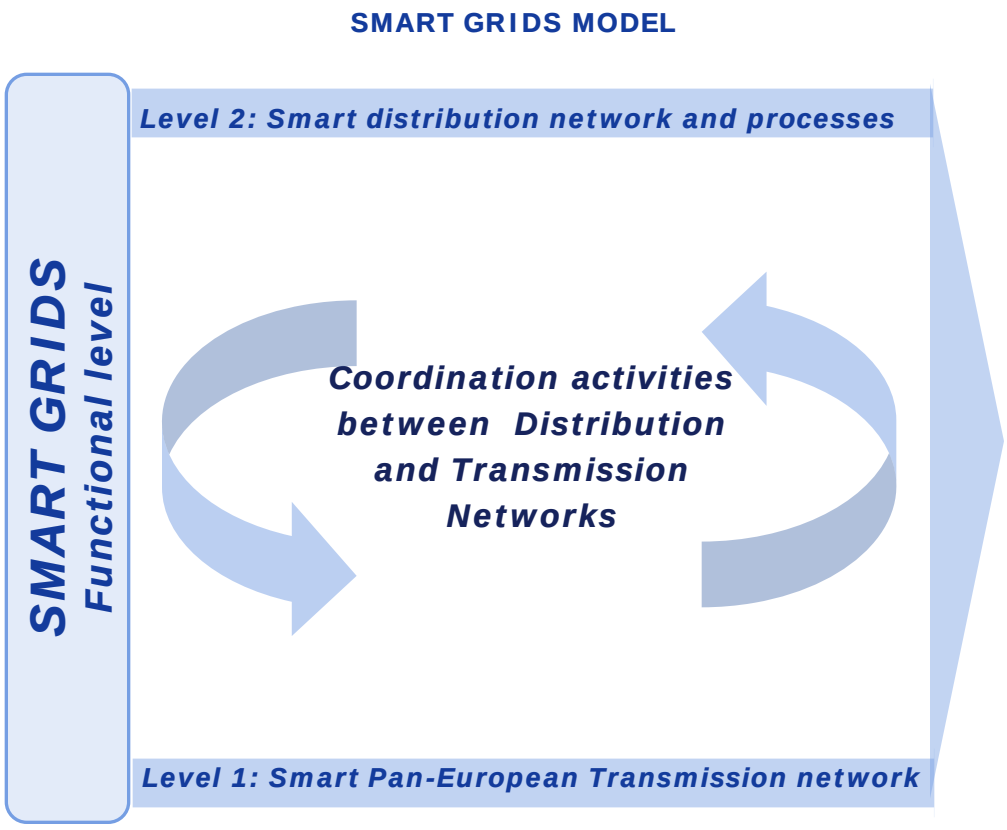
Transmission activities

RD&D Roadmap

Mill EUR

Smart Grids Functionalities	Project	YEAR										Total Costs	2010-2012
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019		
Pan-European Grid Architectures(R&D)	T1		A tool box for new network architecture assessment									19	19
	T2	REALISEGRID		Tools to analyze the pan European network expansion options								21	21
Power Technologies (Demonstration)	T3				Demonstr.of Power technologies for more network flexibility							80	--
	T4				Demonstrations of Power technologies for new archtectures							120	--
	T5	SAFEWIND, WINGRID, IS-POWER, TWENTIES			Demonstration of renewable integration (ct'd)							130	--
Network management and control (R&D)	T6	PEGASE			Tools for a Pan European network observability							12	--
	T7		Tools for coordinated operations with stability margin evaluation									24	24
	T8				Improved training tools for improved coordination							25	--
	T9		Tools for Pan European network reliability assessment									14	14
New market design options (R&D)	T10				Tools for Pan European balancing markets							18	--
	T11				Advanced tools for congestion management							21	--
	T12	OPTIMATE			Tools for renewable market integration							14	--
	T13				Tools to study market integration of active demand							12	--
Pan-European Grid Architectures(R&D)	T14		Innovative approaches to improve the public acceptance of overhead lines									50	30
											Total	560	108

The 5 Functional Projects on transmission / distribution networks coordination



Functional projects

- **TD1. Increased observability of the electric system for network management and control**
- **TD2. The integration of demand side management in TSO operations**
- **TD3. Ancillary services provided by DSOs**
- **TD4. Improved defence and restoration plans**
- **TD5. Joint task force on IT system protocols and standards**

Transmission / distribution networks coordination

RD&D Roadmap

Mill EUR

Project	YEAR										Total Costs	2010-2012
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019		
TD1		Increased observability of the electric system for network management and control									45	18
TD2			The integration of demand side management in TSO operations								70	7
TD3		Ancillary services provided by DSOs									50	10
TD4		Improved defense and restoration plans									45	14
TD5		Joint Task force on IT system protocols and standards									20	19
										Total	230	68

The 12 Functional Projects on distribution networks

SMART GRIDS *Functional level*

SMART GRIDS MODEL

Level 5: Smart Customers
Customers aware and actively participating

Level 4: Smart Energy Management
Management of end-use energy efficiency, aggregation, retail

Level 3: Smart Integration
Renewable energy, DG, electric vehicles, electricity storage and aggregation

Level 2: Smart Distribution network
More automated MV distribution networks with self healing capabilities.
Monitored and controlled LV networks
ICT supported processes

Functional projects

Cluster 1: Integration of smart customers
- **D1. Active Demand Response**
- **D2. Energy Efficiency from integration with Smart Homes**

Cluster 2: Integration of smart metering
- **D3. Metering infrastructure**
- **D4. Smart metering data processing**

Cluster 3: Integration of DER and new uses
- **D5. DSO integration of small DER**
- **D6. System integration of medium DER**
- **D7. Integration of storage in network mgt**
- **D8. Infrastructure to host EV/PHEV**

Cluster 4: Smart Distribution Network
- **D9. Monitoring and control of LV network**
- **D10. Automation and control of MV network**
- **D11. Methods and system support**
- **D12. Integrated communication solutions**

Distribution activities

RD&D Roadmap

Mill EUR

Smart Grids Functionalities	Project	YEAR 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total Costs	2010-2012
Active Demand Response and integration with Smart Homes	D1	ADDRESS			Active Demand Response							190	--
	D2	BEWARE Smart Homes/Smart Grids			Integration with Smart Homes							120	--
Smart Metering Infrastructure & Data Processing	D3	OPEN METER Existing Deployment			Smart Metering Infrastructure							150	150
	D4	Existing Deployment	Smart Metering Data Processing									20	20
Integration of RES, storage and EV	D5	Active Distribution Network			Integration of small DER							90	90
	D6	Active Distribution Network	Integration of medium DER									150	150
	D7	STORAGE TECHNOLOGY			Integration of storage technologies							60	--
	D8	ELECTRIC VEHICLES			Integration of Electric Vehicles							100	100
Planning, monitoring and control	D9	Active Distribution Network			Monitoring and control of LV networks							100	100
	D10	Active Distribution Network	Automation and Control of MV networks									90	90
	D11		New methods and systems support									80	80
Integrated communication Infrastructure	D12	Active Distribution Network			Integrated Communications Solution							50	50
											Total	1,200	830

EEGI Program budget - summary

- Total program cost estimation is around **€ 2 bn in 9 years (2010 – 2018)**
- The cost estimation of the **priority actions** that need to **start in 2010-2012** is around **€ 1 bn**

Roadmap	Priority projects costs (€M) Start 2010-12	Other projects costs (€M) Start 2013-	Total costs (€M)
Transm./distrib. coordination	68	162	230
Transmission networks	108	452	560
Distribution networks	830	370	1,200
Total	**1,006**	**984**	**1,990**

- The results are beneficial for the whole European energy value chain, requiring a comprehensive funding **that must involve EC, the Member States, the regulators and industry**.

Financing the program

- According to the **Third Internal Energy Market package**, **tariffs** should ensure that **network operators are granted appropriate incentives**, including support to related **research activities.**

- New appropriate **tariff schemes are not expected** to be active in a majority of Member States **in the period 2010-2012**.

- A **significant share of public funding would be needed** from
  - **European sources** to
    - encourage the European-level planning and cooperation
    - to avoid unnecessary duplication of efforts
    - supporting European standardization and interoperability
  - **National support** to
    - encourage substantial benefits at national level
    - cover costs of the market players to encourage knowledge sharing related to new activities and opportunities

Key Performance Indicators (KPIs)

The key performance indicators will encompass three levels of performance measurements of the EEGI roadmap:

- **Level 1 - Program KPIs** indicate the ability to reach the 2020 European Energy Policy targets with acceptable costs.

- **Level 2 - Program KPIs** are defined to measure:
  - **the economic effectiveness** of the roll-out of innovations validated by the EEGI program
  - **the technical and implementation effectiveness** of the EEGI program

- **Level 3 - Project KPIs:** These KPIs are defined on a case by case basis to monitor the performance of the single project and its contribution to the program goals.

The KPIs are being finalized by the Network Operators in collaboration with SETIS

Knowledge sharing

The **sharing of knowledge**, in compliance with the necessary protection of the related intellectual property rights, depends on the source of funding and is based on the following principles:

- The **technical functionalities** of the solutions and the **general results** of the experiments are made available to all interested stakeholders upon request.
- The sharing of **intellectual property** related to the detailed technical solutions to implement the projects will depend on the source of financing and on the stakeholders involved
- Network operators will grant access to new software developments for members of the network associations (ENTSO-E and EDSO-SG) at a **reasonable cost**

Cooperation with other Initiatives

The **coordination and cooperation** between the EEGI and the other European Industry Initiatives is important to ensure that:

- **all necessary new requirements** concerning grid integration of low-carbon energy sources are addressed
- RD&D activity **overlaps between the initiatives are minimized**

Coordination with:

- **Solar:** the allocation of responsibilities was defined in June 2009
- **Wind:** a first allocation of responsibilities has been agreed in May 2010

Cooperation launched with:

- **EERA**
- **EU ERA NET Smart Grids** - www.eranet-smartgrids.eu
- **Other Initiatives (Storage, Electric Car, Smart Buildings)**

Conclusions

- The implementation of EEGI program is a **key element to reach the 20/20/20 goals and beyond**

- **Grid operators are fully committed** to lead the EEGI based on a strong cooperation between Transmission and Distribution.
  Suitable involvement of relevant stakeholders is a must for the EEGI success.

- Guidelines for financing the program have been developed and **budgets must be dedicated now** to start the first projects at the beginning of 2011.

- **The coordination process** with other initiatives and stakeholders will continue in order to guarantee coherence and avoid RD&D activity overlaps.

THANKS FOR YOUR ATTENTION