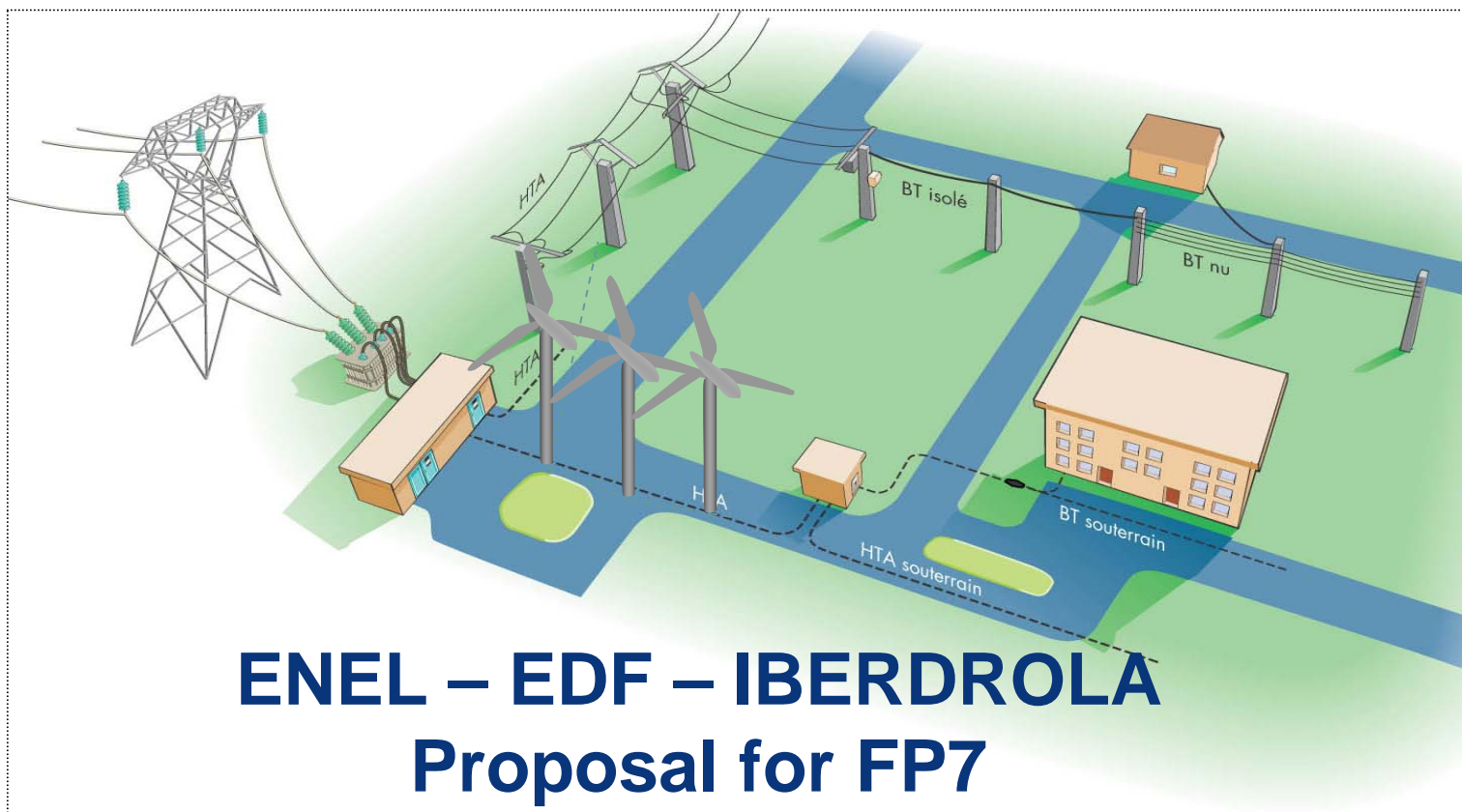


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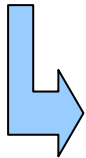


Wien, February 28th, 2007

Topic of interest within ENERGY theme: 7.1.1

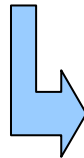
Activity **7**

SMART ENERGY NETWORKS



Research area **1**

DEVELOPMENT OF INTER-ACTIVE DISTRIBUTION ENERGY NETWORKS



Topic **1**

Develop and validate innovative control strategies and network architectures for **active networks** with large-scale penetration of renewable sources and distributed generation

Topic analysis

Content/scope:

Research on new concepts for future **active customer-integrated distribution networks** and validation of most promising ones. These new concepts should enable the **market based optimal exploitation** of the multiple benefits of large numbers of **renewables and distributed generation coupled with intelligent metering and real-time demand and response techniques**, and at the same time **fulfill customer expectations**. In addition, research should also cover **pre-regulatory issues** related to the development of **decentralised energy** and **ancillary services markets**, the efficient allocation of **network costs, new business models and flexible contract management**.

Expected impact:

In line with the objectives of the EU in the areas of **renewable energies, energy efficiency and functioning markets**, the results of this project should demonstrate that **active distribution networks** have the potential to **accelerate the large scale deployment of distributed generation and renewables** and to **significantly increase the network load factor**.

Active distribution networks : drivers

- Concerns on
 - Energy efficiency and sustainability of energy systems: limited “traditional” energy resources, increasing energy prices, ...
 - Climate change: reduction of GHG, ...
 - Power generation capabilities: peak load, investment, ...
- Development of DG and RES
 - New problems and constraints but also ...new opportunities
 - ⇒ exploitation of the services/benefits that DG (& RES) can provide
 - ⇒ Evolution of regulation & grid connection requirements (TSO & DSO)
- Development of DR/DSM techniques (and programs)
 - Possible service provision to grids, suppliers ... other players
 - ⇒ active integration of demand side flexibilities
- Development of energy (thermal, electric) storage technologies
 - Controllable load/generation
 - ⇒ source of flexibility for the networks and its users

Active distribution networks: needs for evolution

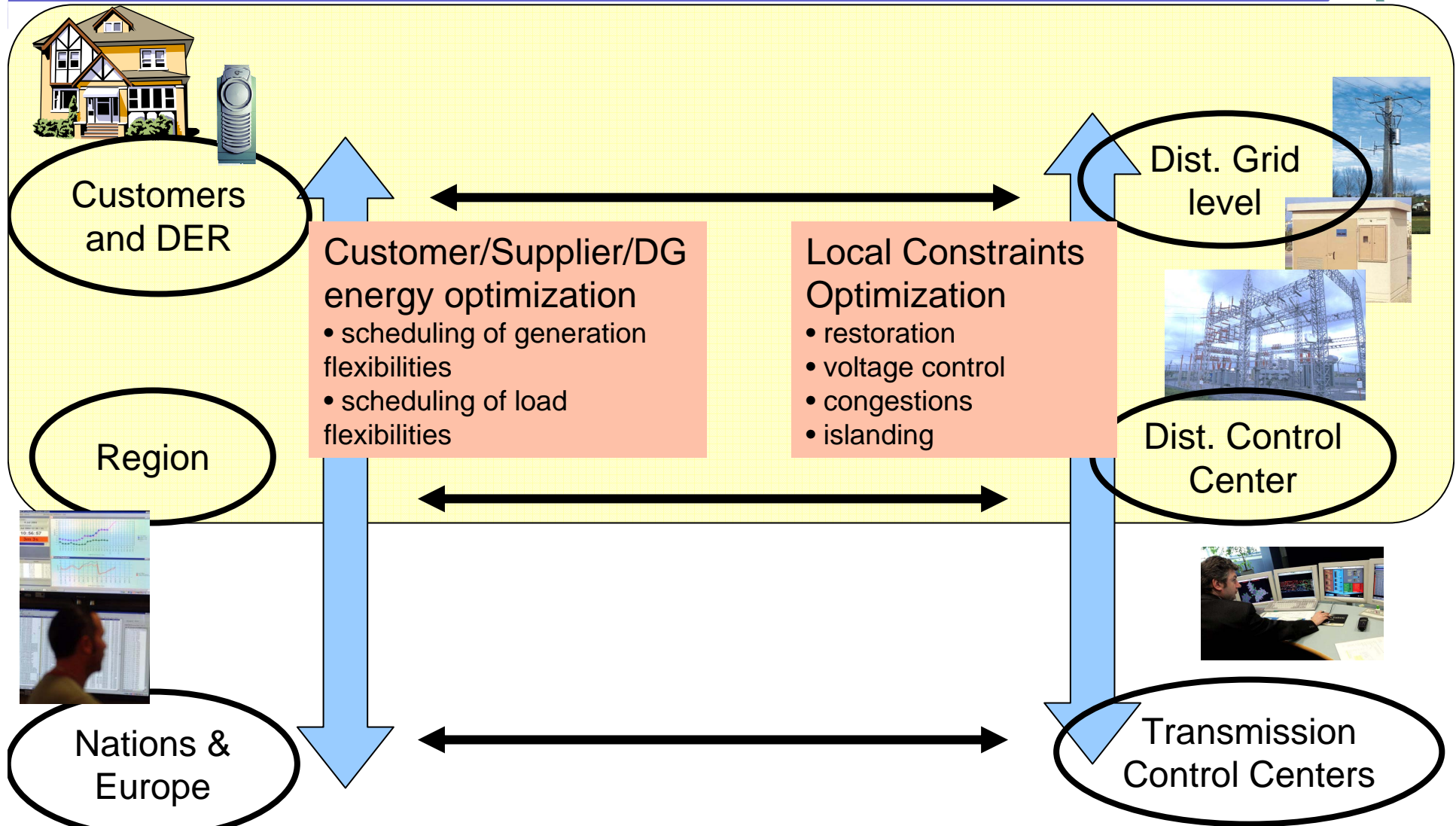
- Evolution to enable the flexibilities and new services provided by Demand side and DER (DG&RES, storage) on distribution networks
 - ⇒ impact on distribution network operation (and planning)
 - New constraints and ... solutions
 - ⇒ new opportunities for DNOs to solve networks constraints
 - Use the benefits of DER and demand side participation
- Evolution of the players' roles and constraints:
 - New expectations from TSO => new constraints
 - New business models for DNOs
 - New players and services providers ...

⇒ Necessary evolution towards “active distribution networks”

Active distribution networks : enablers

- Development of new automation & control concepts and technologies
 - Decentralized control, distributed intelligence, advanced automation technologies, ...
 - ⇒ “Enabler” for the evolution of distribution grids operation
- Development of ICT
 - Intelligent metering techniques, EMS, telecommunication technologies, M2M communications, ...
 - ⇒ New opportunities for network automation and DSM
 - ⇒ “Enabler” for the development of the new concepts
- Development of market “approach”
 - Necessary remuneration of flexibility/services provision
 - Participation of DER and demand to market mechanism
 - ⇒ Towards market structures at the local (distribution) level

Two Optimisation Processes to Develop & Coordinate



Two Optimisation Processes to Develop & Coordinate

- Players (DNO, energy suppliers, DER owners, aggregators, services providers, etc.) develop their own tools to perform their optimization
 - ⇒ Need of a coherent and coordinated approach
 - to avoid too much redundancy
 - to ensure efficient and reliable interaction
 - to fulfill the players' expectations and in particular the end users, in a most economical way
- Taking into account the contextual factors (regulations, economic and socio-political aspects, grid technical characteristic, etc.) in the EU countries
- ⇒ Need of distributed intelligence

the solution: project **ADDRESS**

Active **D**istribution networks

with full integration of

Demand and distributed energy **RES**ources**S**



Project summary

- Develop new concepts, strategies and architectures for a full integration and a market-based exploitation of the **flexibilities and services provided by Demand and Distributed Energy Resources** (DG&RES and storage) on distribution grids
 - ⇒ **Demand and DER become true active players on distribution grids**
- Investigate the impacts on distribution grids and develop new control and automation solutions at the grid level
 - **to enable these flexibilities and services**
 - **to use them to solve network constraints**
 - ⇒ **Evolution towards active distribution networks**
- Validate the solutions developed in the project through prototypes testing and pilot experimentations in different EU Countries

Expected project impacts

- Facilitate the development of DG&RES
- Create value for domestic and commercial customers
- Contribute to the safe and reliable operation of power systems
- Increase the network usage factor

core Work Packages

1. Concepts, requirements and selection of scenarios
2. Metering, DSM and DER flexibility solutions
3. Integration in the active grid
4. Interoperability & communication issues

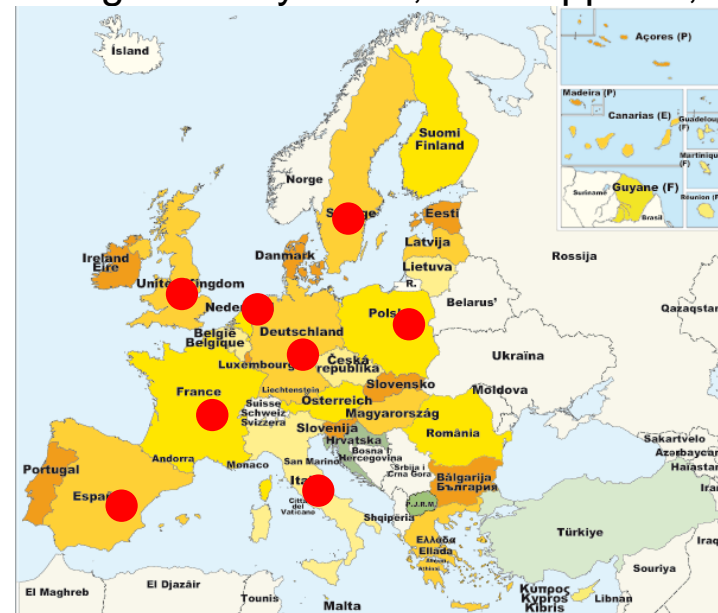
Partners & Stakeholders

Partners:

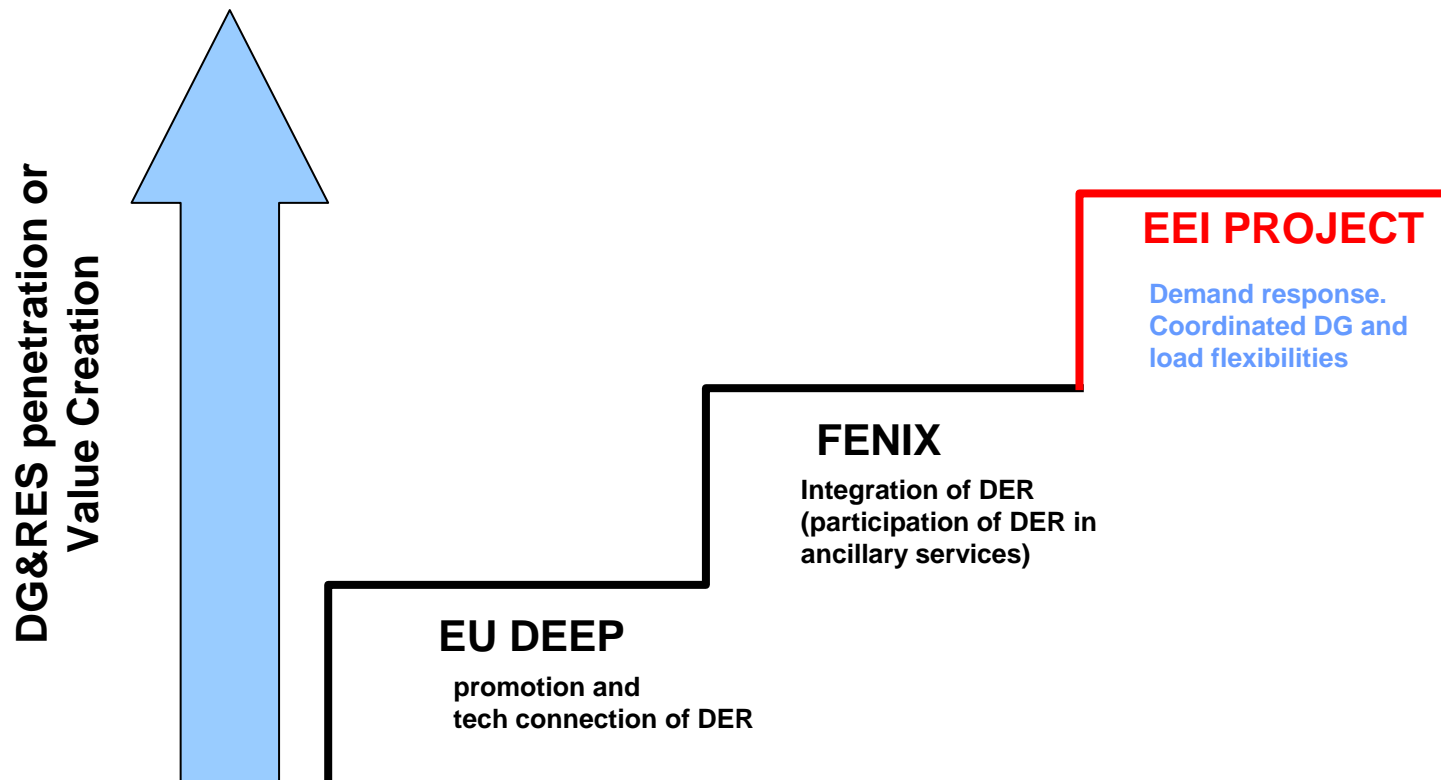
- DNO's
- Energy suppliers
- Market operators
- Manufacturers (meters, power system management systems, ICT suppliers, electrical appliances, generators)
- R&D centers
- Universities

Stakeholders:

- TSO's
- Commercial & domestic customers
- Regulators



ADDRESS project: one step further!



THE END

Thanks for your attention!