



Smart TSO-DSO interaction schemes, market architectures and ICT  
Solutions for the integration of ancillary services from demand side  
management and distributed generation

EUW16 Barcelona – Interoperability session | 16.11.2016

## TSO-DSO interaction to increase flexibility and improve interoperability in real time reserve management: the view of the SmartNet project

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# Agenda

- The context: some “driving forces
- Interoperability for an “intelligent grid”
- About the project SmartNet: goals, layout, consortium

# The context: some “driving forces”



Need to balance G and L in real time (bulk storage is still insufficient)



An adequate level of reserve must stay available



Possibility to provide advanced services for the system if dispatchability is guaranteed



Evolution of distribution systems:

- Smart Grids
- VPP (storage + generation)
- DSM

Need to provide economic “signals” to allocate reserve in an efficient way

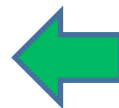


Drive to extend market coupling towards real time markets

Increased needs for system flexibility and reserve



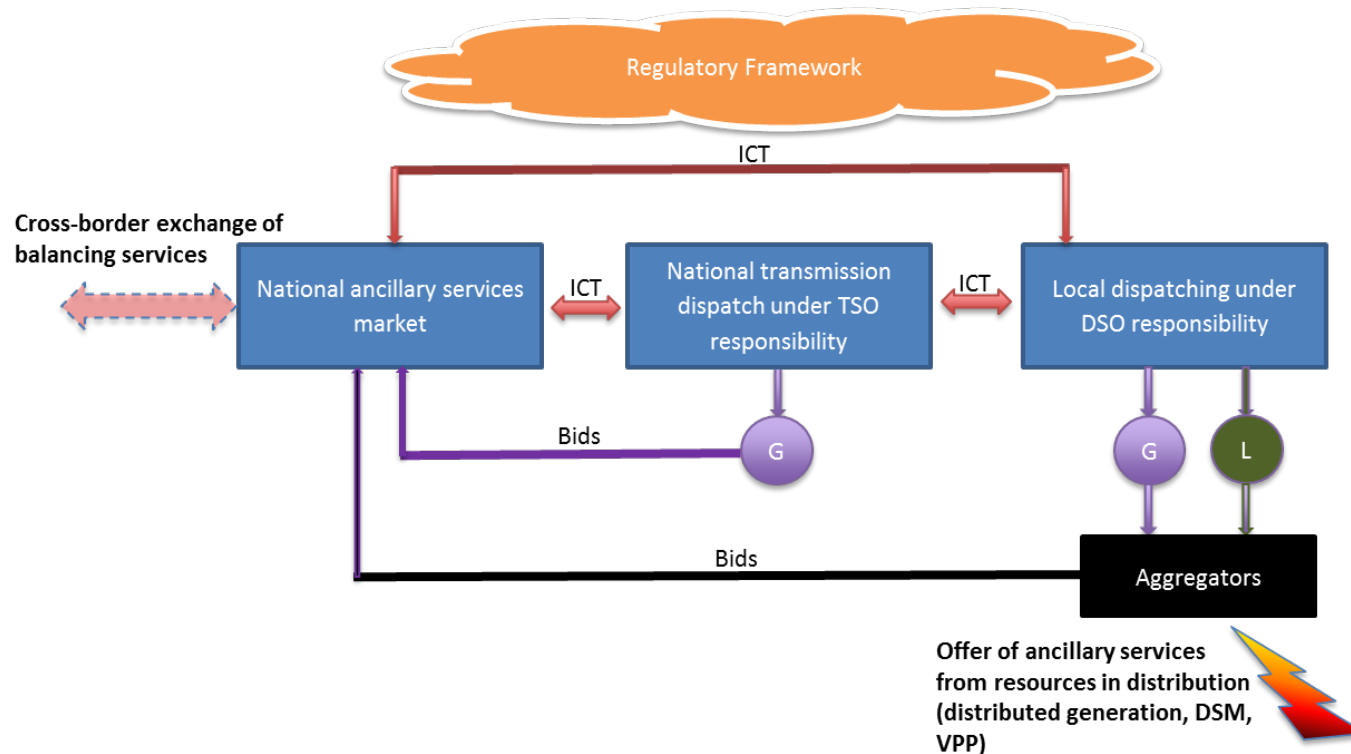
Explosion of RES deployment in T&D system: network under stress



System unbundling: creation of electricity markets:

# Interoperability for an “intelligent grid”

*“Interoperability is a characteristic of a product or system, whose interfaces are completely understood, to work with other products or systems, present or future, in either implementation or access, without any restrictions” (Wikipedia)*



**Network interoperability allows information exchange and enables services to be provided by consumers / utilities.**

SmartNet analyses **architectures for optimized interaction between TSOs and DSOs** in managing the exchange of information for the acquisition of ancillary services (reserve and balancing, voltage regulation, congestion management) from subjects located in the distribution segment.

Different architectures are compared **on three simulated national cases** (Italy, Denmark, Spain).

The simulation platform is then implemented in a **full replica lab**, where the performance of real controller devices will be tested.

**Physical network layer**

**Market layer**

**ICT layer**



**Three physical pilots** developed to show:

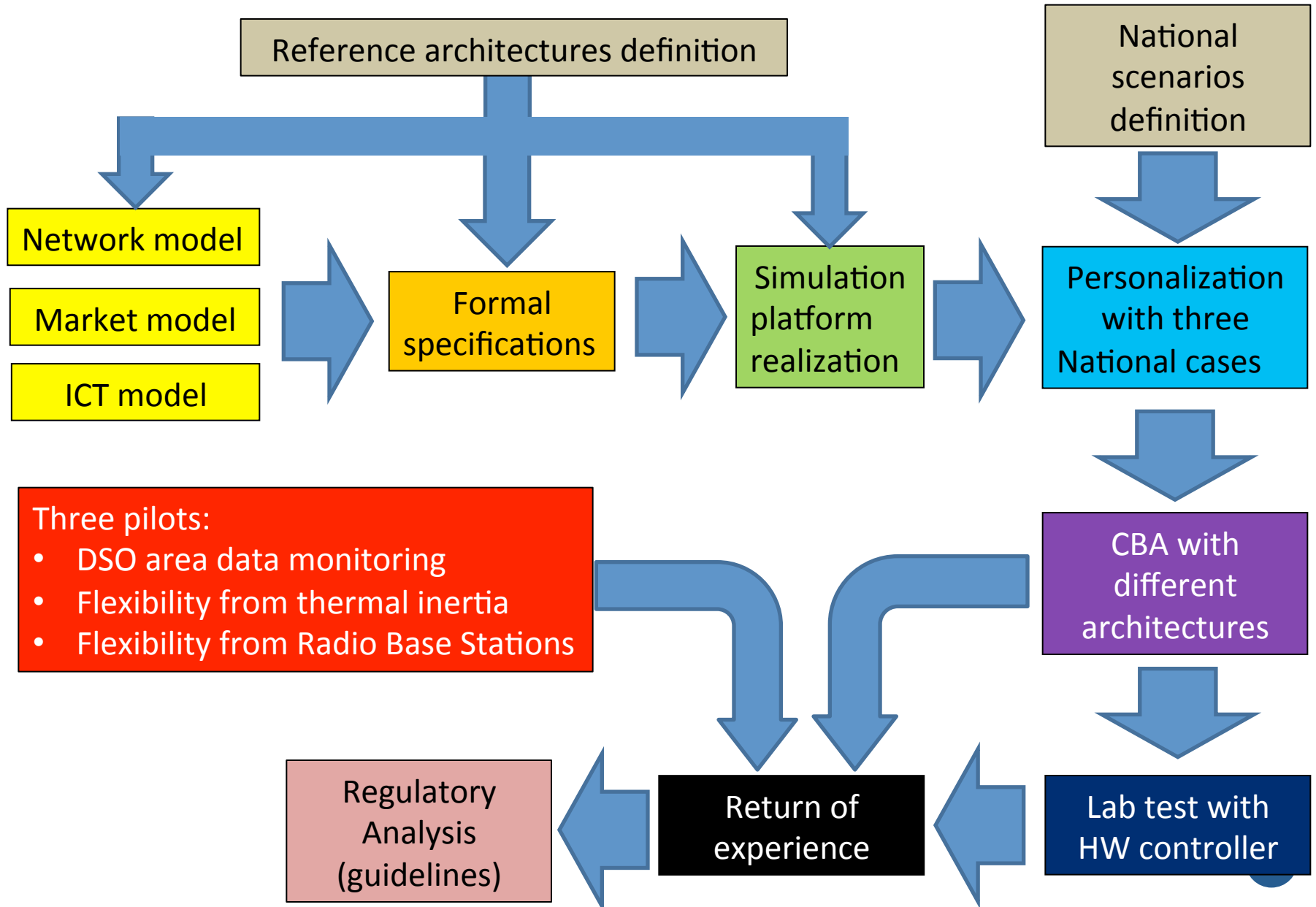
- modalities to exchange monitoring signals between transmission and distribution networks
- study cases on services that can be offered by entities connected to distribution
  - thermal inertia of indoor swimming pools,
  - storage of radio-base stations for telecommunication).

The ambition of SmartNet is to tackle such questions as:

- **which ancillary services** could efficiently be provided from distribution to the whole system (via transmission)
- **which optimized modalities (“architectures”)** could be adopted for managing the network at the TSO-DSO interface and what monitoring and control signals could be exchanged to carry out a coordinated action
  - **what information has to be exchanged** and how (ICT) for the coordination on the distribution-transmission border, starting from monitoring aspects, to guarantee observability and control of distributed generation, flexible demand and storage systems
  - **which regulatory implications** could the above issues have on the European system and on the on-going market coupling process.



# Overall project layout



# The SmartNet consortium



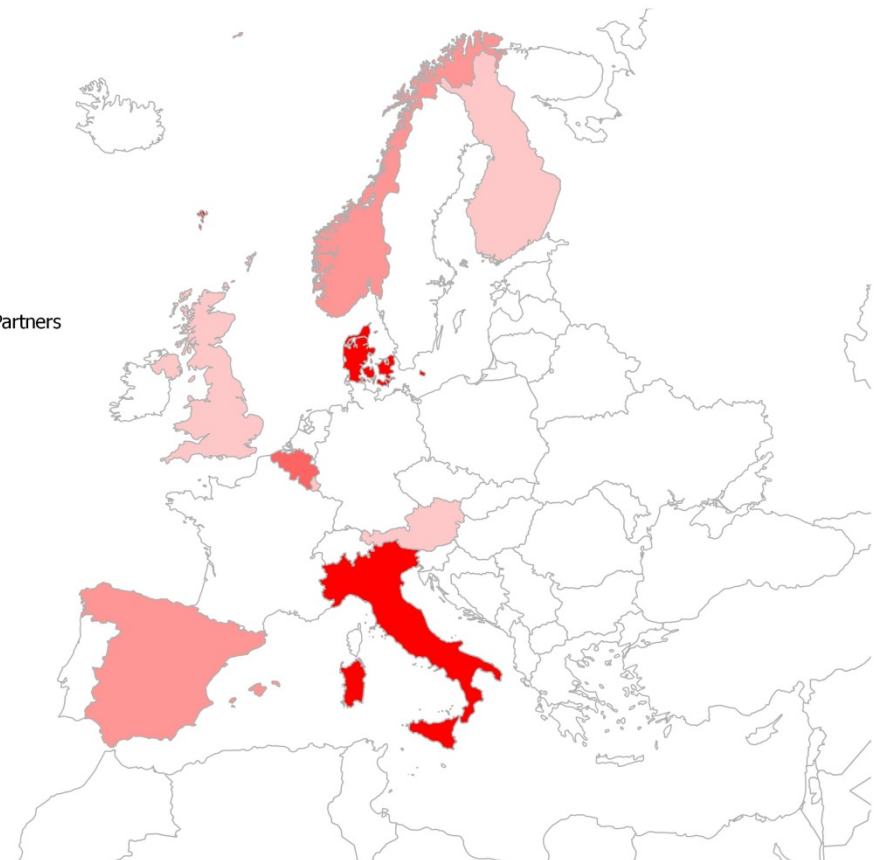
- **R&D partners**

- Research Organizations: RSE, AIT, SINTEF, Tecnalia, VITO, VTT
- Universities: DTU, Uni-Strathclyde, KU Leuven
- Other: EUI/FSR

- **Industrial partners**

- TSO: Energinet.dk, TERNA
- DSO: ENDESA, NYFORS, SELNET
- Manufacturers: SELTA, SIEMENS Italia
- Software developers: Eurisco, N-SIDE
- Telecom: VODAFONE
- Trader: Danske Commodities
- Vacation rental: NOVASOL

Number of Partners





Hub Programme DAY : 16 <sup>th</sup> November 2016	
Title of Track:"Intelligent Grid"	
Title of session: Interoperability: the view of the SmartNet project	
Chairperson: Gianluigi Migliavacca, RSE	
14.00-14.15	<b>Introduction to the session and to the SmartNet project</b> <i>Speaker: Gianluigi Migliavacca (RSE)</i>
14.15-14.30	<b>TSO-DSO coordination schemes for accommodating ancillary services from distribution networks</b> <i>Speaker: Daan Six (VITO)</i>
14.30-14.45	<b>Market architectures integrating ancillary services from distributed energy resources</b> <i>Speaker: Olivier Devolder (N-SIDE)</i>
14.45-15.00	<b>Communication and ICT requirements</b> <i>Speaker: Seppo Horsmanheimo (VTT)</i>
15.00-15.15	<b>Comparison of the national cases in a simulation environment and lab testing</b> <i>Speaker: Marco Rossi (RSE)</i>
13.15-15.30	<b>Danisk Pilot: flexibility resources from indoor swimming pools</b> <i>Loui Algren, Hanne Storm Edlefsen (ENERGINET.DK)</i>
15.30-16.00	<b>Afternoon Coffee Break</b>
16.00-16.20	<b>Italian Pilot: monitoring and control of distribution resouces from the transmission</b> <i>Gianluca Bruno (TERNA)</i>
17.20-17.40	<b>Spanish Pilot: Flexibility resouces from radio base stations for telecommunication</b> <i>Speaker: Miguel Pardo (ENDESA)</i>
16.40-17.30	<b>Panel Discussion: Ancillary services from distribution: a reasonable business case for the near future?</b> Moderator: Gianluigi Migliavacca (RSE) Panelists: same people as the speakers

# SmartNet



[SmartNet-Project.eu](http://SmartNet-Project.eu)

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Thank You

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