



## The EU-DEEP project

Gilles Bourgain, GDF SUEZ  
Coordinator of the EU-DEEP project



A European Project supported within the sixth Framework Programme for Research and Technological Development

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Technical Director : J. Deuse, Tractebel Engineering



22/06/2009

## Distributed Energy Resources will play a key role

The European 20-20-20 objectives (first milestone)

- ~ **35%** of electricity consumption will be RES
- A significant part of the electricity generation will be distributed
  - Renewable
  - Combined Heat and Power

### Distributed Energy Resources (DER)

- Distributed Generation + Demand Response + Storage
- Close to the final customer
- Lower than 10 MW

## DER raise different challenges for the stakeholders



ISO

How to manage the network  
with DER?

## DER raise different challenges for the stakeholders



ISO



DSO

What are current DER integration  
limits? How to go further?

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## DER raise different challenges for the stakeholders

The diagram features a central speech bubble containing the text "How will DER change my business?". Surrounding this bubble are four stakeholder icons: a brown figure labeled "ISO" with a power grid icon, a green figure labeled "DSO" with a house and power line icon, a light blue figure labeled "Producers & Retailers" with a bar chart and lightbulb icon, and a dark green figure labeled "Investors" with a Euro symbol icon.

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## DER raise different challenges for the stakeholders

The diagram features a central speech bubble containing the text "What are the promising business models for DER?". Surrounding this bubble are four stakeholder icons: a brown figure labeled "ISO" with a power grid icon, a green figure labeled "DSO" with a house and power line icon, a light blue figure labeled "Producers & Retailers" with a bar chart and lightbulb icon, and a dark green figure labeled "Investors" with a Euro symbol icon.

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## DER raise different challenges for the stakeholders

The diagram features a central speech bubble containing the text "How to design a suitable DER project?". Surrounding this bubble are five stakeholder icons, each with a specific icon representing their role:
 

- ISO**: Represented by a brown person icon and a power line icon.
- DSO**: Represented by a green person icon and a house with a meter icon.
- Energy Managers**: Represented by a brown person icon and a shopping cart icon.
- Investors**: Represented by a green person icon and a Euro symbol icon.
- Producers & Retailers**: Represented by a light blue person icon and a factory with a lightbulb icon.

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## DER raise different challenges for the stakeholders

The diagram features a central speech bubble containing the text "What are the needs of the market for new technologies innovation?". Surrounding this bubble are five stakeholder icons, each with a specific icon representing their role:
 

- Manufacturers**: Represented by a yellow person icon and a factory with a gear icon.
- ISO**: Represented by a brown person icon and a power line icon.
- DSO**: Represented by a green person icon and a house with a meter icon.
- Energy Managers**: Represented by a brown person icon and a shopping cart icon.
- Investors**: Represented by a green person icon and a Euro symbol icon.
- Producers & Retailers**: Represented by a light blue person icon and a factory with a lightbulb icon.

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## DER raise different challenges for the stakeholders

Manufacturers

TSO

Policy Makers

DSO

Producers & Retailers

Energy Managers

Investors

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What are the impacts of the 20-20-20 objectives?

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## DER raise different challenges for the stakeholders

Regulators

Manufacturers

TSO

Policy Makers

DSO

Producers & Retailers

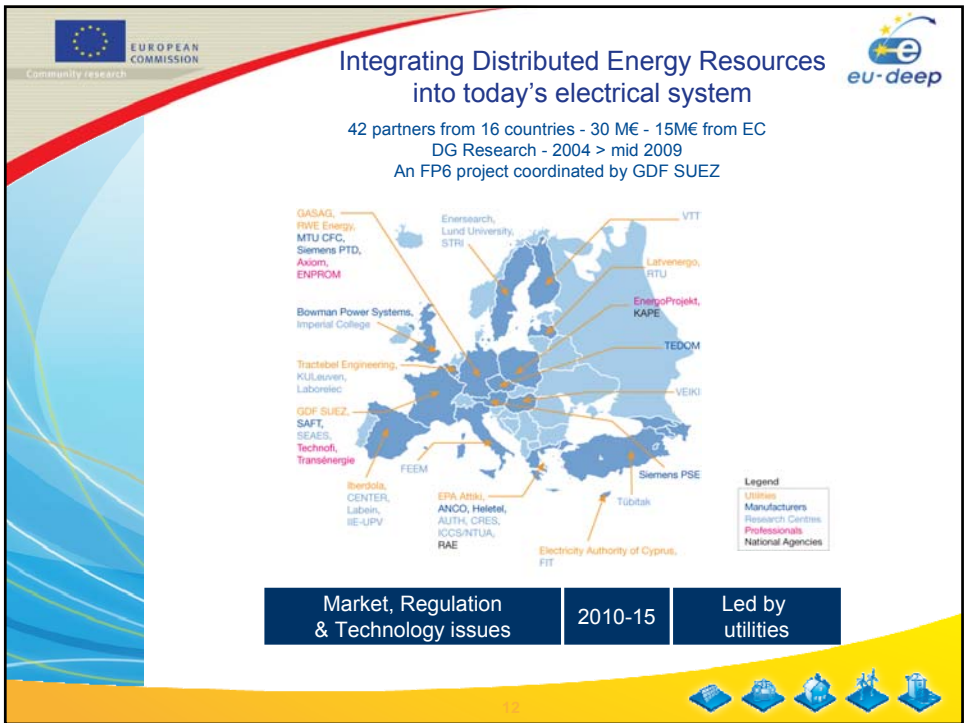
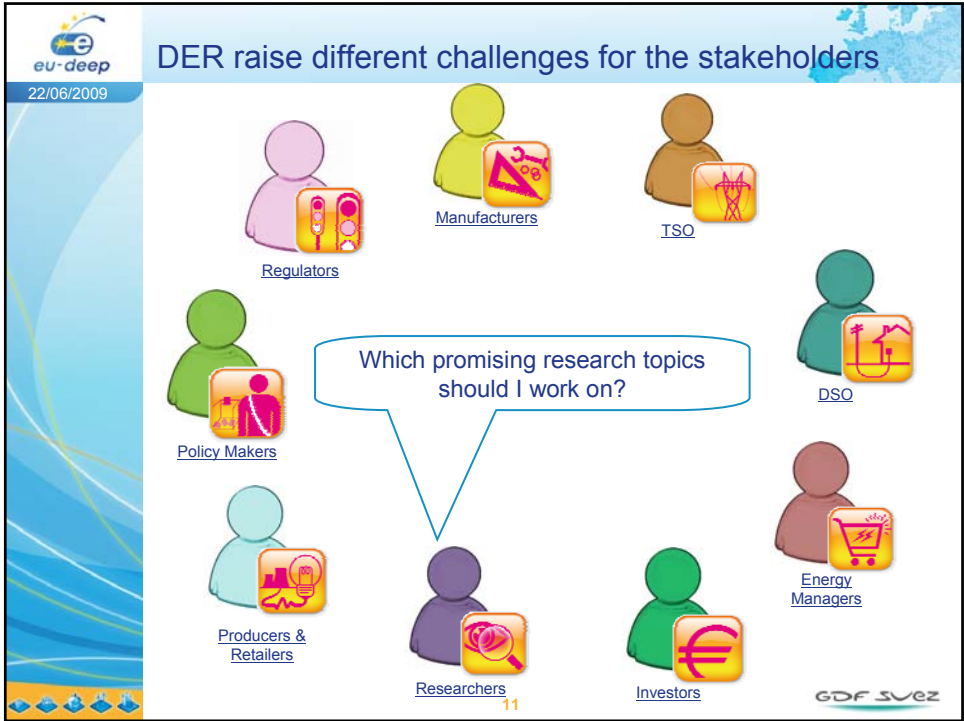
Energy Managers

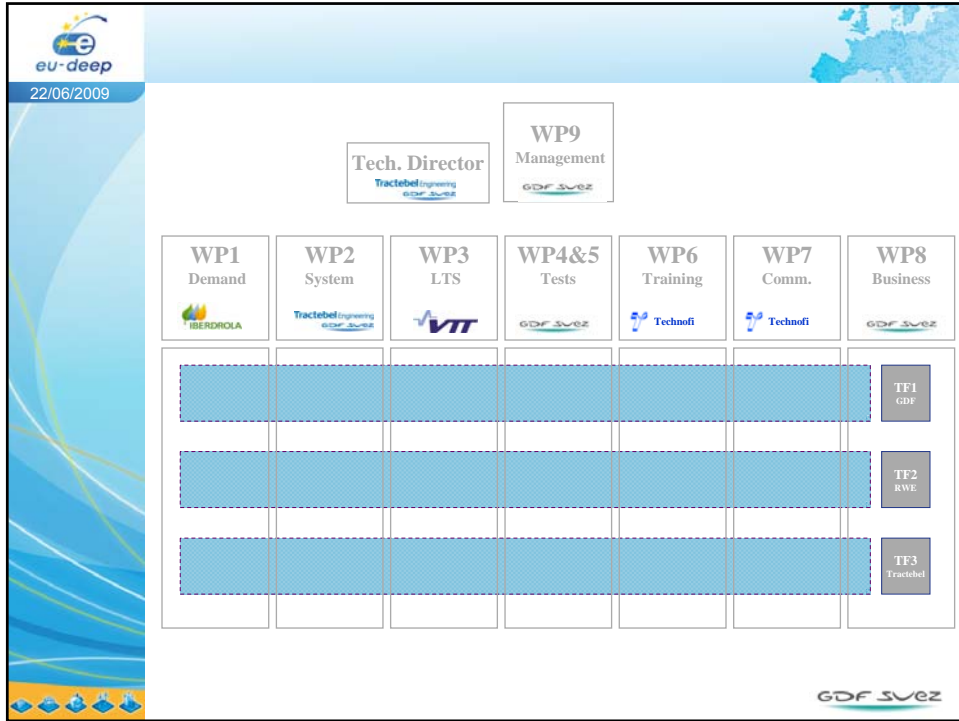
Investors

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What rules need to be changed to take into account the DER development?





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**Technical issues**


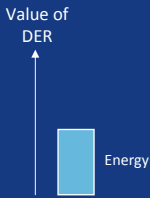
- ① Large amount of DER can be hosted in the today system, if certain specifications are respected.
- ② New ways to operate the today system to increase the hosting capacity have been defined.
- ③ EU-DEEP suggested upgraded designs to achieve an **even larger DER penetration**.
- ④ A strong **coordination process between TSO and DSO** is required.
- ⑤ EU-DEEP proposed concrete steps towards the **Smartgrid vision**.

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### Energy value

- ① In-depth analysis of energy end-uses is crucial to **design appropriate DG project** and to reveal the **Demand Response** potential.
- ② A validated toolbox has been developed to **assess the demand of the customers**.

Value of DER

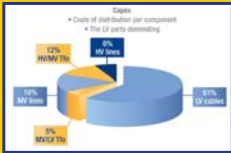
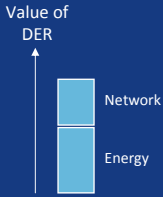
Energy

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### Network value

- ① The actual **"Use of System"** charges tariffs are not cost reflective.
- ② **Use of System Charges and incentives** should be clearly distinct.
- ③ EU-DEEP proposed **reflective Use-of System charges tariffs** able to unveil the footprint of DER or load on the Distribution Network.



Value of DER

Network

Energy

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Value of services

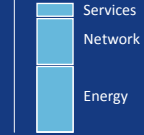
① In the current status of the electricity market, DER are able to **deliver services to the transmission system**.



② In the future **additional services could be delivered by DER** because distribution networks (MV & LV) will no longer be designed following the "fit & forget" principle.





Value of DER







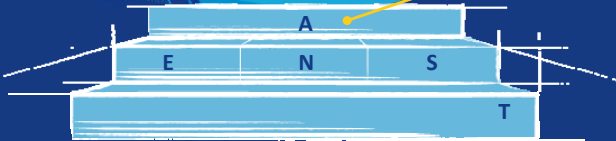
Aggregation


① EU-DEEP developed some **aggregation** concrete business models and confirmed that aggregation will play a **key role for the success of DER**.

② DER development is leading the way to a **new kind of customer: active and aware** of its impact on the system.

③ A validated toolbox has been developed to **assess profitability** and to **operate an aggregation business**


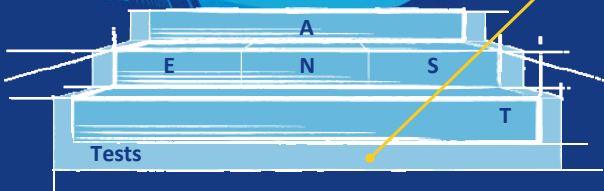








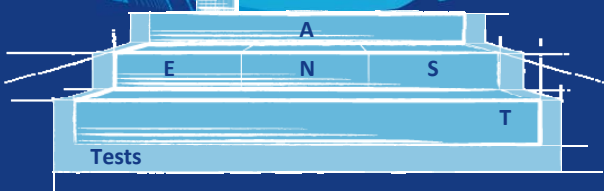
**Tests**

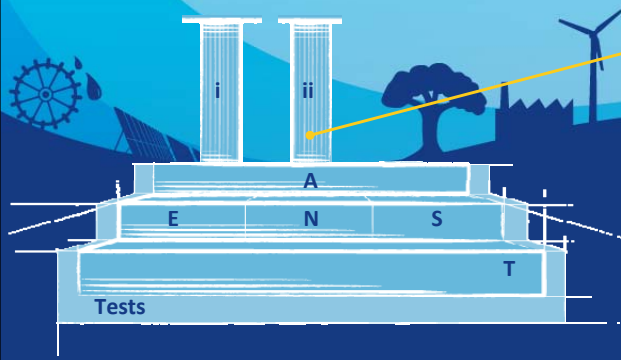
- ① Validation of innovative DER control technologies (single and aggregation).
- ② Collection of aggregation costs in a single database.
- ③ Analysis of the customer acceptance.
- ④ Validation of the tools developed in the project.
- ⑤ Electrical data to feed system simulations.

**Business model I**

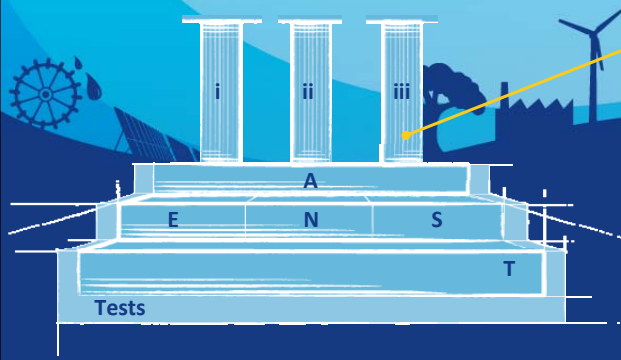
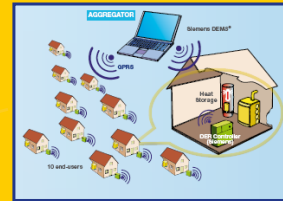
With industrial and commercial customers, **aggregating demand response** can be profitable in the UK under current regulation.



### Business model II

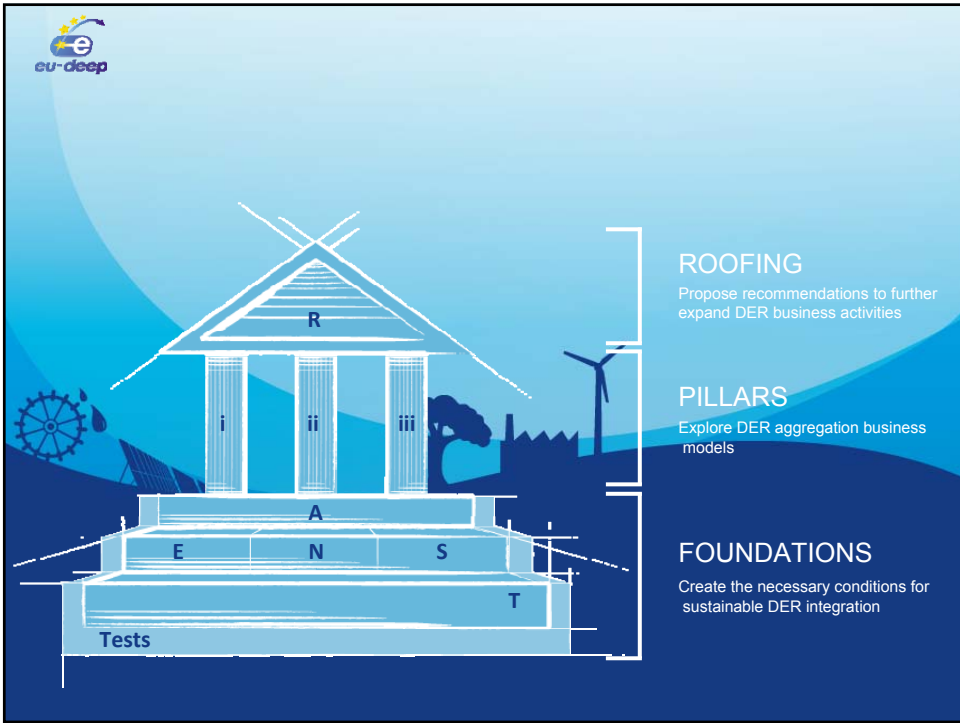
In Germany, **aggregation business based on micro-CHP** for residential customers is **difficult to implement** under the current regulatory regime.



### Business model III

An aggregation business driven by an **Energy Service Company** with **cogeneration units** and **Demand Response contracts** can be **profitable** in Belgium today.







14h00	Intro - EU-DEEP conclusions	G. Bourgain – GDF SUEZ	20 mn	FOUNDATIONS
14h20	Technical Challenges	M. Bollen - STRI	10 mn	
14h30	Energy Value	D. Alfonso - UPV	5 mn	
14h35	Network Value	J. Deuse - Tractebel	5 mn	
14h40	System Value	O. Samuelsson – IEA LTH	5 mn	
14h45	Aggregation	A. Vafeas – GDF SUEZ	5 mn	
14h50	Tests	M. Berger – GDF SUEZ	5 mn	
14h55	Questions		15 mn	PILLARS
15h10	Task Force 1	G. Brecq – GDF SUEZ	10 mn	
15h20	Task Force 2	M. Laskowski - RWE	10 mn	
15h30	Task Force 3	K. Purchala - Tractebel	10 mn	
15h40	Questions		15 mn	ROOFING
15h55	Break		20 mn	
16h15	Large scale demonstration	R. Rodriguez - Labein	5 mn	
16h20	DER Standards	E. Fuchs - Siemens	5 mn	
16h25	Regulation	Per Agrell - FEEM	10 mn	
16h35	Panel Session		45 mn	
17h20	Using the knowledge produced	S. Galant - Technofi	5 mn	
17h25	Next steps	Several	10 mn	
17h40	Conclusion	M. Florette – GDF SUEZ	5 mn	
17h50				