Smart Design for the Smart Grid - Experiences from Europe

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Mobile telephone... or more?
Smart Meter

Meter + Communication?

NO, instead

Gateway for Smart Grid!
Smart Grid: Why?
Grid Investments: Why?

- Upgrade the Grid

Demand  Supply  Grid
Reducing Investments through DR

- Users supply flexibility to the grid

Dynamic Pricing

2-way Communication with Home Appliances
Gasunie VPP Field Test

- Gasunie Virtual Power Plant Field Test using PowerMatcher
- 10 households with micro-CHP (1kW)
- Peak load -22%
- Normal user comfort
- Load duration curve (2007 summer day)

www.powermatcher.net
EU Technology Platform SmartGrids

- utilities
- manufacturers
- researchers
- EU & national support

www.smartgrids.eu
Fenix: Virtual Power Plant

CVPP System

e-terraTrade

SCADA

e-terraControl

PowerMatcher Multi Agent System

Matcher Agent

VPP Agent

Freezer Agent

CHP Agent

GasGen Agent

PV Agent

FENIX City Simulation

IEC 61850-104

www.fenix-project.org
(More) Microgrids

- experimental validation Microgrids

- islanded + storage

- interconnected transition

- alternative topologies

- islanded

www.microgrids.eu
Smart Substation

- Supply
- Demand
- Power Quality

2-way communication
CRISP: Imbalance reduction

- Windfarm
- Flexible demand
- Flexible supply
- PowerMatcher

43% imbalance reduction

www.ecn.nl/crisp
ADDRESS: Active demand

- active participation of small consumers
- comprehensive framework
  - commercial
  - technical

www.addressfp7.org
E-Energy: ‘Internet of Energy’

- Germany
- 6 projects
- 140 M€

www.e-energy.info
SmartHouse-SmartGrid

- Interaction
  - Smart Houses
  - Smart Grids

- Integration
  - Smart Metering
  - Enterprise Systems

www.smarthouse-smartgrid.eu
Proposed Super-Grid

- Trans-mediterranean Grid:
  - Balance supply variations RES
- Local flexibility still needed

www.desertec.org
Smart Meter: Smart Grid Gateway

- Smart Grid Services
  - Dynamic pricing
  - 2-way communication with home appliances
ESMA Alliance

- European Smart Metering Alliance (Esma)
  - European Smart Metering Guide 2009: Energy Efficiency and the Customer
  - Review of experiences from Europe (and beyond)
  - For members of Esma Alliance (100+, Europe, N-America, Australia)

- Free copy for all people that are still awake...

www.esma-home.eu