# The future Role of VPPs in Europe

## Pan European Balancing Market: EU-FP7-Project **eBadge**

Workshop on DSM Potentials, Implementations and Experiences

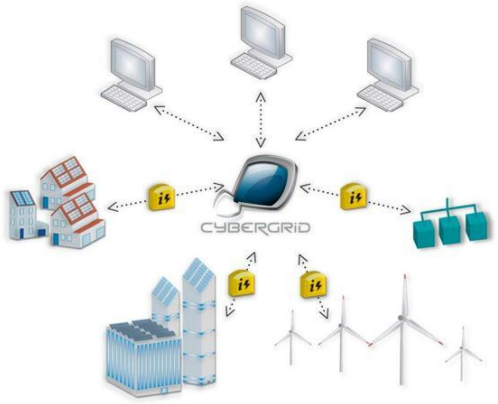
20th of May 2014
Graz, Austria

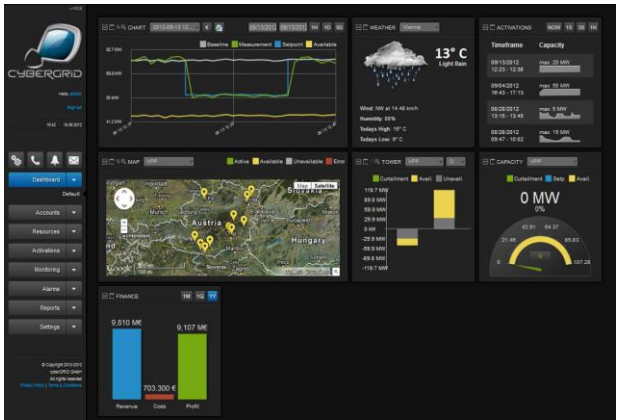
# cyberGRID –
# A TOSHIBA Group Company

- Founded in 2010; Headquarter in Klosterneuburg (Vienna)
- 76% stake acquired by Toshiba corp. In 2013
- Supplier of Solutions for **Demand Response und virtual power plants** for utilities, power traders, balance responsible parties, large industries …
- We are NOT the Aggregator - not competing with Electricity retailers/utilities
  ⇒ we enable them to provide new products for their clients
- Consulting and support in the implementation of VPP and business models

- Commercial projects in **Germany, France, Belgium, Slovenia**
- Research projects: EDRC, cyberPRICE (national), eBadge (EU-FP7), evolvDSO (EU-FP7
- A founding member of Smart Energy Demand Coalition

SEDC
Smart Energy Demand Coalition

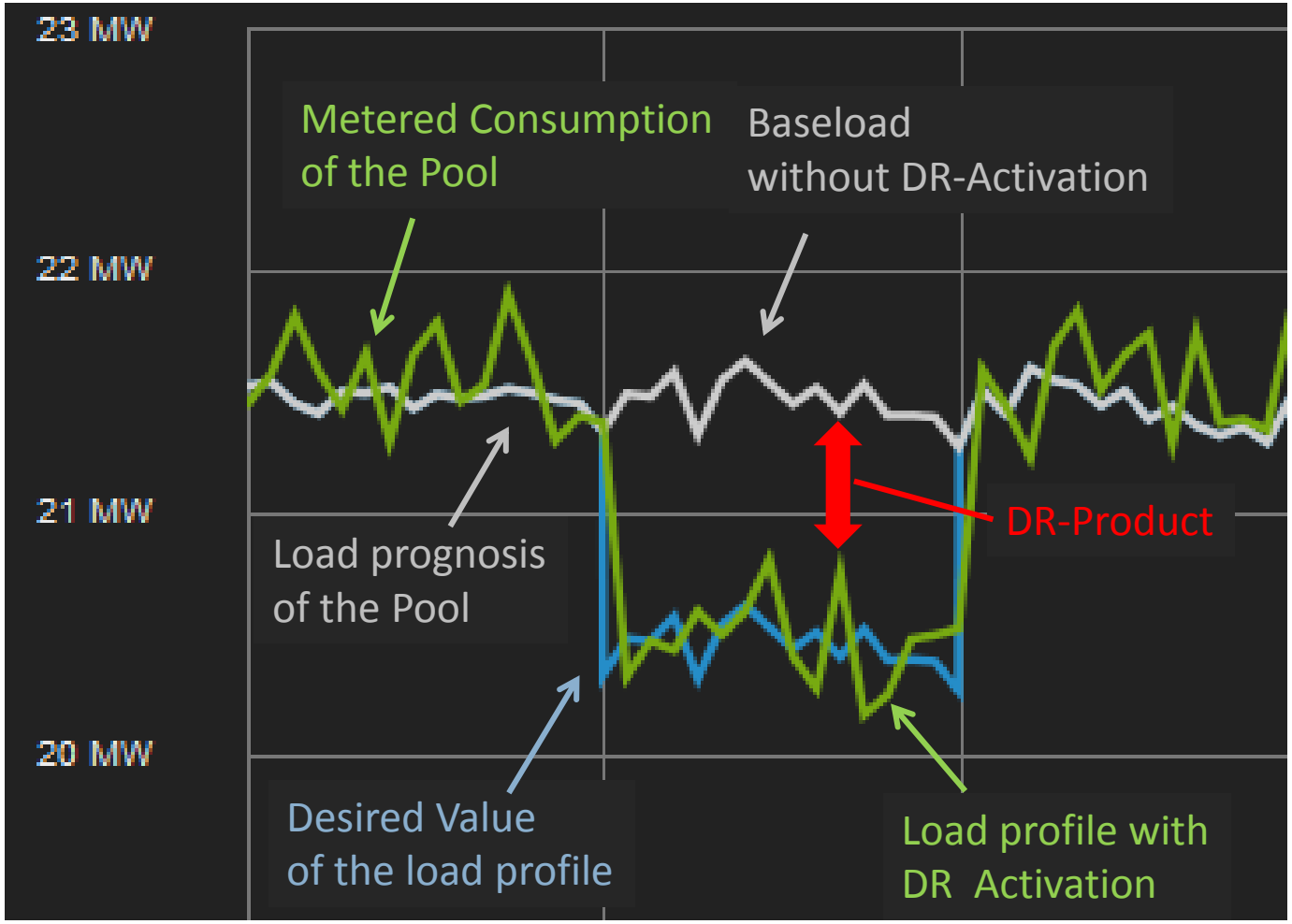


# Applications of VPP and Demand Response

- Internal **portfolio optimization** for utilities
- **Energy markets**
  - Day-night shift (spot market optimization)
  - (Internal) Adjustment of balance groups to minimize imbalance costs
  - Intraday markets
- **Capacity/Reserves markets**
  - Load/frequency control
    - Tertiary control reserve
    - Secondary control reserve
    - Primary control reserve
  - Capacity securing mechanisms for annual peak load (winter in Europe)
- **Grid services**
  - Congestion management for TSO, DSO
  - (Re)Active voltage control for DSO
  - Emergency reserve
- **Customer Relations**

# VPP Activation Example



# eBADGE: background and motivation

- On 11 September 2012, the European Parliament adopted the Energy Efficiency Directive (EED):
  - (29a) **Demand response** is an important instrument to **improve energy efficiency**, since it significantly increases the opportunities for consumers or third parties nominated by them to take action on consumption and billing information and thus provides a mechanism to reduce or shift consumption resulting **in energy savings in both final consumption and, through the more optimal use of networks and generation assets**, in energy generation, transmission and distribution.
- The eBADGE project baseline are ACER‘s **Framework Guidelines on Electricity Balancing** published on 18 September 2012:
  - One of the five **objectives** the specifications for national balancing reserve and balancing energy procurement and cross-border balancing exchanges shall pursue is:
    - **facilitating wider participation of demand response and renewable sources of energy**;

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# eBADGE: objectives

- The overall objective of the eBADGE project is to propose an optimal **pan-European Intelligent Balancing mechanism**, piloted on the borders of Austria, Italy and Slovenia, that is also able to **integrate Virtual Power Plant Systems** that can assist in the management of the electricity Transmission and Distribution grids in an optimized, controlled and secure manner.
- Project objectives are:
  1. To develop the components: simulation and modeling tool; message bus; VPP data analysis, optimisation and control strategies; home energy cloud; and business models between Energy, ICT and Residential Consumers sector;
  2. To integrate the above components into a single system;
  3. To validate these in lab and field trials;
  4. To evaluate its impact.

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# eBADGE: Partners

AIT Austrian Institute of Technology

APG Austrian Power Grid — We keep it going

Borzen

CYBERGRID

ELEKTRO LJUBLJANA

ELES

RSE Ricerca Sistema Energetico

SAP

SAUPER Umwelt. Daten. Technik.

TelekomSlovenije

TU Wien

vaasaETT Global Energy Think Tank

XLAB Not Idle

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Seventh Framework Programme

# eBADGE Tasks

- **Simulation and modeling tool** for studying an Integrated Balancing/Reserve Market allowing the participation of VPPs on the distribution side;
- Uniform **high performance message bus** between Balancing/Reserve entities;
- **Business models** between Energy, ICT and Residential Consumers sectors;
- Virtual Power Plant as a Reliable Balancing Asset;
- Pilot eBADGE Cloud based on a “Home Energy Cloud”

- Project end: 09/2015

# Added Values for TSOs

- **Wider Range of Balancing Options – Renewable Power Sources + Smaller Loads**

- **More Control over Demand Side, Resulting in Better Planning and Consequently Higher Security of Transmission System**

- **Reduced Cost of System Services – Lower Cost of Power Reserve**

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# Pan European Balancing Market: Simulation Scenarios


- Austria and Slovenia are represented with only one zone, while Italy is split into six zones (corresponding to the Italian day ahead market zones)
- Scenario 1: Base Case scenario (BC) simulates situation in which each nation has to solve its own imbalances with only local resources
- Scenario 2: Common Balancing Market scenario (CBM) simulates situation in which there is the possibility to exchange resources.

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# Pan European Balancing Market: Simulation Results

| M€ | Austria | Slovenia | Italy | Total |
|---|---|---|---|---|
| Secnario 1: BC | 3.47 | 37.3 | 137 | **177.77** |
| Scenario 2: CBM | 5.22 | 20.18 | 76.7 | **102.10** |

- Total savings of more then **40%** in the common balancing market scenario
  - Cost are lower for Slovenia and Italy
  - Cost go slightly up for Austria
  - Increase of costs in Austria small compared to overall savings
- Estimation of the best possible solution, in which internal network constraints are not violated.
- In order to make possible real integration of the European balancing markets, big steps toward market harmonization have still to be made: the three analyzed markets are, at the moment, highly non-harmonized

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# Outlook

- Fragmented EU market
- No demand side participation
- Non standardized products
- National balancing markets

- Cross-border balancing market model
- Removing barriers for demand response
- Integration of VPP‘s

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# THANK YOU FOR YOUR ATTENTION !

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