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
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

- Metered Consumption of the Pool
- Baselload without DR-Activation
- Load prognosis of the Pool
- Desired Value of the load profile
- Load profile with DR Activation

DR-Product

- (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;**
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.
eBADGE: Partners
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
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.
Pan European Balancing Market: Simulation Results

- Total savings of more than 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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<th>Austria</th>
<th>Slovenia</th>
<th>Italy</th>
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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
THANK YOU FOR YOUR ATTENTION!

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