Smart metering case study

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Technical Exchange Programme: Sustainable energy regulation
March 3-4, 2011, Warsaw, Poland
Agenda

- The Polish specific drivers for implementation of smart solutions
- The Polish „smart thinking” developing story
- Current Polish pilot projects
- The Polish Regulatory position
The Polish specific drivers for implementation of smart solutions

Structure of system power plants (geographical location and coal dominance)

Average age of system power plants

Decrease of available power reserves in the power system

Unstable generation diffusion inside the network (on the medium and low voltage levels) – huge investment as a condition of connection, increase of dispatching problems

Increasing of imbalance between geographical location of load and geographical location of generation

Insufficient transmission and distribution capability
The Polish specific drivers for implementation of smart solutions

Geographical location of system power plants
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Coal dominance

Percentage structure of the capacity available in the Polish Power System as of December 31, 2007
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Average age of system power plants

+ blok Pątnów II
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Decrease of available power reserves in the power system in 2007

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Unstable generation diffusion inside the network
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Geographical imbalance between load and generation

- Increase of load area
- Decrease of load area

- Increase of load area
- Decrease of load area
- Decrease of load area
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Average month system load curve

Source: J. Lewandowski, Praca systemu elektroenergetycznego, materiały.itc.edu.pl
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Insufficient transmission and distribution capability

Difference between real situation and “copper plate” is significant
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Real risk of permanent power imbalance
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Current situation and the nearest future of the Polish energy sector from legal point of view

- The III Liberalisation Package of EC:
  - necessity to switch off a significant part of generation (fit jet) in 2016 (up to 15 GW), due to emission limits (deep decreasing of power system balance)
  - necessity of development of renewable generation, specially wind farms, on-shore and off-shore
- Bureaucratic (legal) obstacles against new infrastructure investment (many-year processes of all permission procedures)
- Social (political on the local scale) obstacles against new network and generation localisations (NIMBY syndrome)
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Risks related to possible solutions in the traditional manner (1)

Coal:
- economical risk of continuity of current technologies and locations for generation (new kind of stranded costs)
- social risk regarding the reduction of coal extraction
- according to the EU legislation – necessity to CCT development (CCS for example)

- huge founds for investment and time for application of new technologies
- increasing of coal using
- simple continuity „new – old” plants in new market environment (low efficiency, high emission costs, etc.)
- reduction of coal extraction
- regional structural unemployment and social unrest
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Risks related to possible solutions in the traditional manner (con 2)

Natural gas:
- political risk regarding increased dependency of power production from gas due to one-direction pipelines supplies

  LNG can be solution .... except one only available source, located in Sakhalin, for example. Does shale gas create a prospects?

Nuclear:
- social risk because of the Czernobyl trauma,
- extremely high cost of investment,
- long perspective for real commissioning
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Risks related to possible solutions in the traditional manner (con 3)

Biomass:
- a) neglected effect of sparse, small scale power plants
- b) special risk related to large power plants
  - risk of competition against the food market
  - risk of environment degradation (overload of forest biomass exploitation and total ineffectiveness of reduction of CO2 emission according to current legal rules, focused on co-burning in large power plants)

Wind:
- risk of system disturbances because of instability of wind power
- risk of overinvestment on the network, regarding to power flow

Other renewable sources:
- limited possibility to solve system problems because of small scale of applications
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Risks related to possible solutions in the traditional manner (con 4):

It is not only Polish problem, it is common situation of many European countries, UK for example:

„…With gas too risky, coal too dirty, nuclear too slow and renewables too unreliable, Britain is in a bind. …”

„…All this leaves Britain in a hole. The lights are dimming, but green targets are an argument against new coal plants, security-of-supply concerns make gas dicey, lack of time rules out nuclear, and worries about practicality dog renewables….”

[both above: The Economist, Aug 6th, 2009]
The Polish specific drivers for implementation of smart solutions

General assumptions for the grid of the future (goals - 1)

Smart grid can be one of the tools for the creation of the „emergency exit” from current situation
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General assumptions for the grid of the future (goals - con 2)

We need the grid as an efficient tool for delivery:

- Energy (as a commodity)
- System services (to achieve sufficient quality of supply)
- Market information (as a basis for market oriented customer decisions)
- Technical information (as a basis for system defence oriented operator decisions)
- Technical information (as a basis for better system planning and maintenance)

We need the grid as an efficient tool for harmonised dispatching of distributed (disseminated) generation and load → „flexible users”

We should use the network as an additional channel for transmission and exchange of many other pieces of information between the system users
The Polish „smart thinking” developing story

- The first approach - Transition Facility 2005 Project
  - Quality measurement system for Regulatory Body
  - Assumption for Smart Metering implementation
- Smart Metering – Smart Grid relationship: the maturation of meaning in the Polish case
- Drivers and barriers from power sector side
- Public discussion
- Regulatory role
Current Polish pilot projects

- **Theoretical studies**
  - ERO – DGA/Sobieski Institute
  - PTPiREE – IEn/E&Y
  - PSE-O – CATA, HP
  - ENERGA-O – ATKEARNEY
  - ERO – WB (negotiated)

- **Field projects**
  - ENERGA-O
  - VDP
  - PGE – Łódź
  - RWE Stoen
The Polish Regulatory position

- The main assumptions and targets
- Regulatory tools
- Time schedule
- Legal framework
- Political support
The Polish Regulatory position

The main assumptions and targets:
- opening of the elasticity of demand, broad application of DSM tools and distributed generation are crucial (not only remote controlled billing)
- system open on the other energy and non-energy sectors and services
- one only metering data hub, common for all market players
- global positive result of CBA is clear, the problem is how to rebalance benefits and costs related to certain participants
The Polish Regulatory position

- Regulatory tools:
  - Developing Plans approval procedures
  - Schedule of expected functionalities control
  - Differentiated Regulated ROA for dedicated (but effective only) investments
The Polish Regulatory position

Time schedule:

- Public discussion of Regulatory position – up to end of March, closing Workshop planned
- Additional related documents (full landscape of SG System Regulatory requirements) – up to July 2011
- Beginning of the massive roll’out – from 2012
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 Legal framework:

- **Primary legislation:**
  - Energy Act necessary amendment
  - Special Smart Grid Act (planned)

- **Secondary legislation:**
  - Necessary amendment of Power System Regulation
  - Necessary amendment of Tariff Regulation

- **Market rules**
  - New approach to the energy and power trade
  - Necessary amendment of Grid Codes
The Polish Regulatory position

- Political support:
  - governmental support of activity
  - parliamentary support of activity
Conclusions

- The current goal is: „Smart Metering Smart Grid Ready”
- Common meaning about the above mentioned goal is much closer than one year ago
- 2012 should be the first year of massive roll’out process
Thank You for Your Attention!

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