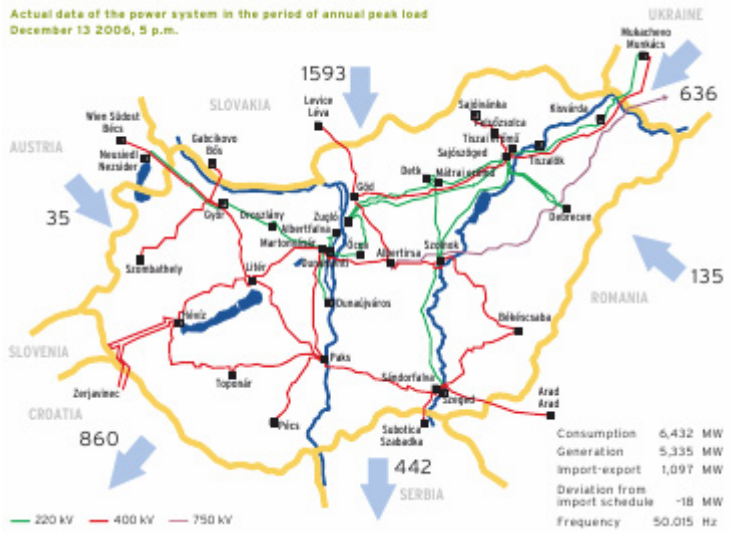
Energy & management systems in Hungary

György Morva Dr. ÓBUDA UNIVERSITY, BUDAPEST

The Hungarian Electrical Power System (HEPS) part of the European united system.It's main future – the well-looped transmission network 220-400 kV and a rare used high voltage line with 750 kV.
The distribution levels 120 kV and on MV 10 or 20 kV . The low voltage level is 0.4 kV.
The biggest power plants are nuclear (2000 MW) , hydrocarbons



(1000 & 2000 MW) and lignite ~ 850 MW.The windgeneration is low ~ 300 MW . Photovoltaics are negligible.
The transmisson system included the nuclear plant belong to state , the rest plants and distribution companies are privatisated (EdF, E.ON & RWE).The technical developing margins are determined by ownership and the Hungarian Regulator (MEH). The technical policy on distribution leevl are determinated by the common European policy of owners. EdF, E.ON & RWE have a lot filiated company in middle Europe.
If we turn to the Smart Grid & Smart Metering questions the situation like a sin Germany. Smart Metering pilots and initiatives backward if we compare with Italy, Spain and Benelux countries.
Other hand the the energy management has a long time experience in Hungary. The first ripple control (RC) system was introduced in 1971 (by PLC on 183.3 Hz). Up to 80th we had about 1.5 million households controled by ripple control signals for the tariff controls. From 2005 was introduced the radio ripple control system on 135.6 kHz. By now we have a dilemma about the ripple control systems. one hand they are working . They are reliable and their operation has high level cost benefits. The longway based ripple-control can be easy integrated to the Smart Meter's communication unit. in control way the RC can have broadcast function and his reability is high. The different 2-way communications (PLC, Zigbee) can not give 100% reliable reach.
On the system level energy management the RC has a key role. The 2-tariff domestic meters are controled by RC . It means pactically installed 2 meters - as regular classic Ferraris type- one of them controled by RC receiver. By now about 1.2 million pints controled by RC.

Electricity market & energy management

The electricity market was opened on 1 January 2003 based on the VET and it has functioned without any problems in its fourth year of operation. The market players had to learn to adapt to the new conditions.
The amendment of the VET in 2005 did not influence the access of the consumers to the network in 2006. At the same time, the Trading Code brought significant changes, namely that joint monthly cross-border capacity auctions were introduced at the Croatian intersections organized by MAVIR Zrt. on behalf of the Croatian and Hungarian system operators from the summer of 2006 and onwards, and daily auctions were introduced at the Slovakian intersections, under the management of SEPS a.s. (the Slovakian system operator). In addition to Slovakian cross-border transmissions, which were decisive during recent years from the aspect of import, the role of the Romanian cross-border transmission increased significantly. The intensity of market entrances and the rate of growth of the consumption in the competitive market reached the highest level in the first half of the year of market opening. In the summer of 2003, the proportion of consumption on the competitive market reached 15%, and stabilized at this level during the second half of the year. Following the withdrawal wave of January 2004, a further, though slower than previous, extension of the competitive market followed with a rate of 20 to 25% in the second half of 2004. In 2005, consumption on the competitive market gathered a new impetus, the extension of eligibility to all non-residential consumers in July 2004 gave an impact on the willingness to enter the market, which was perceptible even in 2005. This momentum seemed to be exhausted by 2006. The rate of market entrances slowed down, and the increase of consumption on the competitive market came to a halt by the end of the year.
The recent growth of consumption on the competitive market was based on the market entrance of big line consumers receiving electricity at high- and medium-voltage. During the four years since the opening of the market, it can be observed that the size of consumers (measured in annual electricity consumption) entering the market is decreasing gradually. The majority of consumers entering the market consisted of consumers receiving electricity at high-voltage, followed by consumers receiving electricity at a medium-voltage entering the market in a higher number. The number of consumers entering the market is increasing parallel with the decrease in the size of consumers: in 2005, the number of consumers entering the market was nearly twice that of the total number of consumers in the two first years, while the average

consumption of the service locations of the consumers entering the market was barely 2% of the value of 2003.

In the meantime, the drastic increase of import in the competitive market did not lead to the deterioration of the import balance, as well as to increased dependence of domestic consumption on import. This is partly due to the fact that import in the competitive market increased basically simultaneously with the decrease of public utility import, and in part because the export activity of traders became extremely lively from the middle of 2004. Important changes can be observed in the background of these shifts of focal points: increased role of the public utility wholesaler (and domestic power plants) in the satisfaction of domestic demand, and changes perceptible in the activities of trading companies (new market building strategies).

In electricity the supply of the electricity demands of the companies providing regional "public supply services", on the one hand comes from MVM , and making available capacities which provide system-level services to the System Operator MAVIR Zrt., on the other hand, as far as this resulted in the lowest purchase cost for MAVIR Zrt.

In 2010 was prepared a improved Final report in Assesment of Smart Metering models: The case of Hungary. By now a lot of works attended to analyses of cost & benefits of Smart metering. Our university made investigations of PLC systems and Smart meter based energy management systems.

By now has started some pilots in SM with some thousand meters. We should give results what type of communicatin will be preferred in smart meterings. What role will have the existing ripple control systems. How can be used the additional possibilities of smart meterings in SMART GRID's developing of distribution systems.

György Morva Dr.
1055 Balassi B. 9-11 • Budapest • (+36) 30 9417641
• gymorva@gmail.com

OBJECTIVE

A qualified education professional with more than 35 years of experience in College and technical University environments, and a wealth of knowledge in development and implementation of educational technology and electrical power research.

QUALIFICATION HIGHLIGHTS

Technical degree in electronics - Budapest - 1969
Polytechnical Institute Leningrad – MsC degree 1975
Automation upgrade courses – Moscow MEI – 1979
PhD degree Polytechnical Institute Leningrad -1986

TEACHING EXPERIENCE

Technical College Kandó 1976-2009
ÓBUDA TECHNICAL University, Budapest , 2009 - present
Asoc. Professor in Electrical Power Engineering

- Relay protection and automation in power systems
- Control of the electrical power systems

Lead Coordinator of Power Research Institute @ ÓBUDA UNIVERSITY

- Overhead line and cable design, installation and opereational problems
- Switching equipment arc circuit sizing and arc flash hazard estimation
- Over current limiter and circuit development
- Development of LED lighting drivers-devices
- Transformer diagnostic and monitoring systems development
- High voltage (220-750 kV) transformers on-site revision
- Electric meters - smart metering, meter influence Problems
- Ripple Control System (HKV, RKV), customers development
- Subtation secondary documentation development s
- power and reactive management problems
- Mains harmonics and voltage flickers problem
- Connection of small power plants, solar systems
- Protection resolutions - studies
- Microprocessor controls development
- SMART BOJLER controllers - energy SAVINGS
- SCADA - Load management , GIS etc

The main topics in research ativity (http://eki.kando.hu).