Hungarian Energy Market

REPORT

4th Issue 2011
The aim of the Regional Centre for Energy Policy Research (REKK) is to provide professional analysis and advice on networked energy markets that are both commercially and environmentally sustainable. We have performed comprehensive research, consulting and teaching activities on the fields of electricity, gas and carbon-dioxide markets since 2004. Our analyses range from the impact assessments of regulatory measures to the preparation of individual companies’ investment decisions.

### Key activities of REKK:

#### Research
Geographically, our key research area is the Central Eastern European and South East European region:
- regional electricity and gas price modelling
- CO₂ allowance allocation and trade
- supports for and markets of renewable energy sources
- security of supply
- market entry and trade barriers
- supplier switching

#### Consultancy services
- price forecasts and country studies for the preparation of investment decisions
- consultancy service for large customers on shaping their energy strategy on the liberalised market
- consultancy service for regulatory authorities and energy supply companies on price regulation
- consultancy service for system operators on how to manage the new challenges

#### Trainings
- Our training programmes:
  - summer schools
  - courses for regulators
  - trainings and e-learning courses in the following topics:
    - price regulation
    - electricity markets
    - market monitoring
    - gas markets
  - occasional trainings for companies based on individual claims

Nowadays, due to market opening, energy markets cannot be analysed without taking into account regional environment. We monitor the market situation and developments of the countries of the Central Eastern and South East European region. We have built a regional electricity market model including 15 countries to forecast regional electricity prices.

The experts of REKK with their energy regulatory experience and academic background can supply scientific solutions taking also into account the specialities of the given markets.

### Our reference partners:

#### Regulatory authorities and ministries
- MEH (Hungarian Energy Office),
- GVH (Hungarian Competition Authority),
- KVVM (Ministry of Environment and Water),
- GKM (Ministry of Economy and Transport),
- FVM (Ministry of Agriculture and Rural Development)

#### Energy companies and large customers
- Mavir, E.ON, MOL, MVM, ELMŰ, Főgáz, Alcoa, DRV

#### International organisations
- DG TREN, USAID, ERRA, CEER, NARUC

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Dear Reader,

We proudly present the fourth issue in the third volume of our Hungarian Energy Market Report. We sincerely hope that you have found earlier issues of the Report informative.

In the current issue we continue the analyses of electricity and gas markets. In this quarter, two studies and two hot topics are published.

The first study discusses the capacity drop at the Slovakian-Hungarian cross-border auction in October, its effects on electricity wholesale markets and attempts to reveal its causes.

Power plants may acquire CO₂ quotas via auction only pursuant to the new ETS Directive that comes into force in 2013. Certain new Member States may be exempted from this requirement, providing free allocation to their power plants. Our second study presents the details of derogation as implemented in Hungary, considering its possible impacts on the markets.

To promote the establishment of a uniform internal electricity market, the Commission and other European professional organisations forged the target model for the integration of the electricity markets and laid down detailed roadmaps to couple regional markets. This process is discussed in detail in our third article.

The fourth article takes a close look at the water utility sector awaiting framework legislation, and reviews the best practices and pitfalls of new regulations by examining existing European regulation and the institutional background.

We hope that you find a wealth of useful information in this issue as well.

Péter Kaderják, Director
ENERGY MARKET DEVELOPMENTS

Q3 brought minor fluctuations only in the crude oil, natural gas and coal markets. Coal price remained at USD 126, crude oil was traded for USD 110-115. Natural gas futures were some EUR 0.5 higher than in the previous quarter. Base-load and peak power prices in the futures market dropped slightly, resulting in a 1 EUR/MWh decrease on average. The price of CO₂ quota continued its decline to a 12 EUR/ton price level. Quarterly adjusted electricity consumption was on a par with the same period of last year, and nearly 25% of consumption was covered by imports in late summer. The bottleneck at the Slovakian border led to a perceptible upswing in import capacity prices on the western and northern borders of Hungary. The price gap between the Hungarian and the German exchanges continued to increase in the wholesale markets, resulting in a 1 EUR/MWh higher electricity price in the HUPX.

Imports dwindled and domestic production increased on the sources side during Q3. Mild weather in September promoted lower gas consumption. Storage facility utilisation was 500 million m³ less by the end of the injection period than last year. Oil-indexed and mixed import gas prices were 30 HUF/m³ above futures gas prices. We expect this difference to escalate as high as HUF 37.

International price trends

The trends of the factor markets experienced only minor change in Q3 2011. Brent and ARA coal futures for 2012 were traded essentially on level with the previous quarter. A steep decline of Brent oil price occurred in the first week of August, bouncing back to 115 USD/barrel by mid-September, followed by another downswing at the end of the month. ARA coal price underwent a slowly decline, falling to 126 USD/ton on average in September from 128 USD/ton in the beginning of the period in the futures market.

The 2012 futures baseload and peak power price reduced by EUR 1 in the quarter under review. Baseload prices were in the 56-59 EUR/MWh range, closing at EUR 56.6 at the end of September. Peak power was traded for 71.3 EUR/MWh on
average, available at approximately 70 EUR/MWh in the German futures market at the end of the period. Despite the moderate decrease, wholesale electricity prices were still EUR 5 higher compared to the prices in March. Natural gas futures increased moderately, fluctuating around 27.5 EUR/MWh on average in Q3, closing at 27 EUR/MWh at the end of September.

The fall in the price of emission rights with December 2011 delivery to be permanent, the enduring decline resulted in an average price of 12 EUR/ton in CO₂ quota trades. Trading, on the other hand, surged: compared to the previous quarter 18 percentage points more quotas were traded at this price.

**Overview of the electricity market in Hungary**

In Q3 2011, the temperature adjusted domestic power consumption, excluding seasonal impacts, was virtually identical with Q3 of the previous year, showing a minor rise of 0.64% only. Consumption levels in July and September were equivalent to the same period of 2010, only August showing a slight increase of 2.7 percentage points. Although consumption in the quarter was 2.8 percentage points higher on average than in 2009, it was still 3% less than in 2008.

Net imports covered nearly 24% of the consumption, which is in line with the trends since 2009 as the net import rate in the past two years usually exceeded 20% in the summer months.

Monthly cross-border capacity rates remained under
ELECTRICITY MARKET DEVELOPMENTS

Figure 6 Results of monthly cross-border auctions in Hungary, Q3 2011

Capacities above mean capacities offered for auction. Capacities were not sold fully in the period under review in the event of oversubscription at a specific price, because in such cases the system operator considers the next highest price as the auction price.

1 HUF/kWh on each border. Slovakian-Hungarian capacities diminished significantly from the average transmission of 600-800 MW to only 200-350 MW capacity available monthly. This curtailment drove the prices from the usual 0 HUF/kWh in the season to an average of 0.5 HUF/kWh.

The monthly average electricity price in the regional markets fell in every regional exchange to a different extent since the previous quarter. This means 13 percentage points in the German and Czech markets, and 3-6 percentage points in Romanian prices averaged for three months. The price of Hungarian day-ahead power broke with German prices and surpassing last year’s EUR 1-2 spread, making Hungarian baseload power cost 3 EUR/MWh more than German electricity in August and 6-7 EUR/MWh more in September. The price increase may have been caused by the diminished cross-border capacities, boosting demand for domestic electricity. Consequently, 20% more day-ahead power was traded in the Hungarian power exchange in terms of both baseload and peak power.

The wholesale price of electricity is influenced by the costs of deviations from the schedule and the balancing energy prices. The system operator sets the settlement prices of upward and downward regulation on the basis of the procurement costs of energy from the balancing market. The financial costs of balancing for the balance circles are determined by the balancing energy prices and the spot price of electricity in the settlement period. The higher the difference is between the price of upward and downward regulation and the spot wholesale price, the more it costs to

Figure 7 Comparison of day-ahead baseload power prices on EEX, OPCOM, OTE and HUPX between October 2010 and September 2011
acquire the required amount from the balancing market. Positive balancing energy in Q3 was 21.64 HUF/kWh on average, while negative balancing energy cost 0.93 HUF/kWh. The spread between the positive balancing energy price and the wholesale price sank markedly due to the drop in balancing energy prices and the increase of the HUPX price level in the period.

The price of baseload power for 2012 dropped about EUR 1. Czech and Slovakian power had the lowest price in the futures market in the region, selling 2 EUR/MWh less on average than German wholesale electricity. The spread between Hungarian and German electricity prices widened, German electricity was more than EUR 1 cheaper than Hungarian baseload power.

**Overview of the gas market in Hungary**

Although gas consumption is only slightly affected by summer months, some interesting events occurred in the storage and wholesale markets in Q3.

Consumption in summer months is less subject to actual temperature, heating degree days (HDDs) are negligible, although weather may have an impact in September. This September was warmer than the same month last year and the average monthly temperature metered in the previous years. Therefore, consumption was also 11 percentage points lower compared to last year.

Imports on the supply side have not changed considerably in comparison with last year’s source structure, the Baumgarten and Beregdaróc entry points each covering 50% of imports corresponding...
The source structure of the gas market of Hungary by month

Figure 11

The mobile gas storage capacity of commercial storage facilities and their stocks by month

Note: Data is for the storage facilities of E.ON Natural Gas Storage Zrt. and MMBF.

Figure 12

Transmission at the Baumgarten entry point in the 2010/2011 gas year in addition to the booked interruptible and non-interruptible capacities

Figure 13

to last year’s division. At the same time, import volume sank 6 percentage points in the quarter compared to the value last year. Domestic withdrawal slightly surpassed the previous year’s corresponding data growing from 690 million m³ to 740 million m³ in the quarter.

The injection period approaching, we can observe a huge drop in the utilisation of commercial storage capacities this year. The gas reserve level in storage facilities at the end of September indicate 1 billion m³ less capacity committed for 2011/12 than 2010/11. Storage reserves were 500 million m³ lower at the beginning of the injection period than last year, and approximately the same amount of gas less has been injected to the gas storage facilities than in 2010. The booked capacities carried over from last year and the decrease in booked capacities this year were equally instrumental in reducing gas storage utilisation.

Natural gas transmission at the Baumgarten entry point on the western border fell in July, then virtually returned to the standard volume in mid-August. Interruptible capacities grew, however, size of the gas flow remained under non-interruptible capacity all through the period - in July, gas flows made up 70% of non-interruptible capacities on average, the same figure was 80% in August and 90% in September respectively. Total western imports reached 900 million m³ gas in Q3, which accounts for the 80% of the total 1100 m³ non-interruptible volumes.

48% of available capacities were booked on the Ukrainian border, but only 38% of that was utilised. Quarterly delivery did not probably exceed the contractual and technical minimum. Imports from the Ukraine totalled...
950 million m³, 51% of the quarterly import volume.

The price difference of western import, Russian oil indexed and mixed products returned to the same level as in December 2010: the spread doubled in Q3, natural gas cost 30 HUF/m³ less on the Baumgarten hub compared to the oil indexed price. Our forecast based on the futures products traded in the Dutch power exchange shows this price advantage to continue its upswing to 37 HUF/m³.

** Figure 14 Turnover at the entry point in Beregdaróc in the gas year 2010/2011 in addition to the total available capacity and the booked non-interruptible capacity

** Figure 15 Past changes and forecast for international and domestic wholesale gas prices

* 60:40 weighted average of the oil indexed and ENDEX TTF gas price in the power exchange.

** The price difference between oil indexed and CEGH for past prices, and oil indexed and corresponding quarterly forward ENDEX TTF prices for future gas prices. The spread between spot prices at Dutch and Austrian exchanges has become very small recently. This is why futures ENDEX gas prices were considered relevant for the Austrian market as well.
Shrinking capacity on the Slovakian-Hungarian border: causes and consequences

An interesting phenomenon struck the eye at the cross-border markets this September. The capacities announced in September for the Slovakian-Hungarian border for October suddenly dropped from the usual 600-800 MW monthly rate to 0 MW. Even capacities announced in June for July and those announced in August for September had already fell considerably: the available cross-border transmission capacity was 350 MW in July, 250 MW in the first half of September, then 0 MW between 12-25 September. Due to the lack of any justification from the transmission system operator, rumours have emerged speculating the reasons of foreign trade constraints. Some pictured MVM’s forthcoming auction in the next quarter to be the main reason, while others opted for the scheduled maintenance of the power plants in MVM’s sphere of interest.

The problem with unannounced capacity reduction is that it generated uncertainty in the market, since market participants had previously reckoned with available capacity: the Slovakian-Hungarian interconnection had typically been a reliable source of import with substantial contracted capacities. The unanticipated cut of this source – also without any prior communication by MAVIR – forced traders to satisfy the demand from other, supposedly more expensive sources, which in turn may trigger a wholesale price increase. Market participants could have saved some costs to manage the problem if the transmission system operator had communicated this rather significant change. The practice of other transmission system operators, like that of ELES Slovenia that discloses the foreseen monthly ATC values a year in advance, should be exemplary. Even if the capacity cut was caused by vis maior, it would have been more appropriate to inform the market participants.

The unusual drop in Slovakian-Hungarian cross-border trade did not only impact monthly, but daily trade as well: the otherwise high daily import capacity from Slovakia fell considerably in August and September.

The reduction in supply caused by the decrease in Slovakian import capacity with an unchanged demand boosted prices: baseload power price for October traded on HUPX the day after the announcement rose from 62 EUR/MWh
to above 64 EUR/MWh. At the same time the German baseload price for October plummeted.

The price of peak power also reflects this trend: more expensive German peak power became EUR 2-4 cheaper than Hungarian peak power as of 6 September.

Lower supply had its effect on the spot markets: Hungarian prices were more than EUR 13 higher on average than the German spot index. Czech and Slovakian markets did not experience a similar price surge, but closely followed the German price development.¹ Hungarian prices broke away from German prices in July and August, possibly due to the decrease in daily capacity in the given months.

We can state that the drop in Hungarian-Slovakian capacity led to a price increase in the baseload and peak power market, something the development of prices in the region did not call for.

Although the consequences of the drastic downturn of cross-border transmission capacity are quite clear, in default of an official reason, we still do not know what drove the transmission system operator to make the decision. One reason could be network maintenance, at least this is what Platts gathers from MAVIR citing network maintenance to justify the ATC drop in September.

Another possible cause may be the increase of loop flows, which is difficult to verify based on publicly available data. One thing is sure: there was a massive - approx. 500 MW - upsurge of physical flows in July. What we do not know, however, is the extent the increase in commercial flow and loop flows may be responsible for it. That being the case, we investigated if there were any developments in the Central European region electricity markets that may have contributed to the increase of loop flows on the Slovakian-Hungarian border.

Many experts in the sector believe that German wind-power generation has a considerable impact on the flow characteristics on the Hungarian borders. Those who hold this view argue that German wind-power is stored in Austrian pumped storage power stations, consequently the increased flow on Austrian interconnectors “displace” available NTC values on the neighbouring borders. German and Austrian TSOs do not have annual, monthly or daily capacity auctions, APG reports no bottleneck on the border. The flow on such border sections does appear as loop flows on the borders of neighbouring countries as a consequence of

¹ This figure features the Slovakian section of OTE only. The prices of the Czech OTE section differed from Slovakian prices only on 7 days of the observed period, therefore, they are considered essentially identical.
maintaining system balance, and reduces cross-border capacity available for allocation for commercial purposes on the affected borders.

To verify the above assumption, we examined the actual German wind-power generation data of recent years. Daily wind generation figures may in fact confirm higher cross-border volumes – as production was 2 TWh higher in comparison with the previous year –, even so, wind generation in September and October showed no striking difference from the same period last year. That being the case, wind-power generation volume only does not account for the increase of physical flows.

We also looked for any changes in flow patterns at other borders in the period under review. We found that no systematic change to explain or be in line with the incident at the Slovakian-Hungarian border occurred on the (German-Austrian, German-Czech, Austrian-Slovakian) borders relevant from the point of this issue in the region.

We presented the possible causes and consequences of the drop in monthly Slovakian-Hungarian cross-border transmission capacity. While the consequences – significant increase in the domestic wholesale product prices as a result of diminished import potentials – are clear, the causes of the available capacity drop remain unclear.

**Free Hungarian CO₂ allocation schemes – tuned to pumped-storage plants (SZET)**

Directive 2009/29/EC of the European Commission on the reduction of greenhouse gases (GHG) determines the new regulations for the electricity industry and for other sectors under the scope of the so-called Emission Trading Scheme (ETS) to reduce GHG in the period following 2013. The main element of the allocation system in force from 2013 is that, as a principal rule, power plants will obtain emission rights exclusively via auction, that is for a charge, as opposed to the earlier practice of free-of-charge allocation mechanism. The revenues generated at the auctions will be accounted in the national budgets. The utilisation of 50% of such income will be discretionary, while the other half is to be appropriated to energy efficiency, GHG reduction and areas related to the management of fuel poverty.

The Directive stipulates two criteria, and Member States must meet the requirements of at least one in order to request free allocation from the European Commission:

- The EU Member State was not a member of the common UCTE system in 2007, or it is connected to the UCTE with an interconnector not exceeding 400 MW capacity.
- More than 30% of electricity generation was based on one type of fossil fuel in 2006 and the GDP per capita did not exceed 50% of the EU average in that year.

The share of free emission still cannot reach 100% even if the derogation was applied: up to 70% of 2005-2007 year average emissions may be allocated in 2013, which will be cut to 0% by 2010.

This set of criteria created an opportunity for the new Member States essentially – only Slovakia and Slovenia failing to meet either of the criteria – to maintain the limited system of free allocation until 2020. The three Baltic countries and the two islands may request derogation due to the lack of their connection to the UCTE system, while other countries may cite their dependency on fossil fuels (being gas for Hungary and coal for the others). One of the main drives to provide an opportunity for derogation is to give time to the electricity industry of the Member States concerned to develop their low carbon intensity capacities.

Every “club member” with the exception of Malta has requested derogation, nevertheless, neither Member State, nor EU sources have any public information available on the details of national schemes.

One way to explain the point of the new regulation is to compare it to the system of the uniform European carbon taxation. In this system, the governments of the above listed countries could decide to grant exemption from the generally introduced tax to its power producing companies in the system that is to be launched in 2013, and thereby abandoning significant budget revenues.

The EU ETS Directive stipulates that it is not the countries, but the power plants that are eligible to the limited free allocation. Therefore, the derogation regulations include a crucial element determining the method, by which governments may distribute the free CO₂ quotas among the individual power plants. The basis of distribution may be the national or European benchmark GHG emission level, or the average emission of the involved power plants between 2005-2007. Since the Commission recommendation allows for several options, the impact on competitiveness of power plants is also diverse. If quotas are allocated on the basis of historical data instead of just applying a general benchmark, power plants with higher CO₂ emissions (e.g. coal or lignite fuelled power plants) will certainly receive more free quotas.

Since the institution of derogation is a deviation from the general allocation rule – therefore,
unquestionably distorts competition - the Commission has set numerous requirements for the countries willing to take advantage of it. The most important stipulation is that power plants may only earmark the resources generated this way for the modernisation of the electricity sector, more specifically the following developments:

- Retrofitting and upgrade of the existing power plants and infrastructure (e.g. cross-border transmission capacity);
- Construction of renewable technologies;
- Diversification of the energy source and generation portfolios.

In addition to upgrades and developments, they have to ensure the reduction of GHG emissions in the given Member State through the developments and to eliminate the situation calling for derogation.

In order to minimise the distortion of competition, governments of the Member States must ensure the realisation of investments on a par with the auction revenues remitted. The purpose of this mechanism is to prevent the competitive advantage of power plants utilising derogation over the other power plants required to auction.

Governments have to submit a so-called National Plan to the Commission including the details of the infrastructural and power plant upgrades to be implemented, the method of allocation and the enforcement mechanisms as well. The nine Member States listed submitted such National Plans this September, and the Commission will publish the assessment thereof in six months, wherein the Commission may accept the plans totally or partially, or even reject them.

According to the National Plan the Hungarian government submitted to the Commission 47.8% of the 2005-2007 emissions will be granted to power plants in 2013, which will reach 0% by 2020 decreasing 6.8 percentage points per annum.

Power plants are not allowed to utilise the received quotas freely, but are required to sell them at a predetermined price to a CO₂ trader selected through public procurement. The set CO₂ price is EUR 14.5 per ton in the first two years, and EUR 20 per ton from 2015 until the end of the term. Power plants must immediately transfer the amounts received to MVM, which will utilise such proceeds to carry out the investment projects set out in the National Plan. The CO₂ Trader – to be selected through public procurement by the Hungarian State – will therefore purchase the CO₂ quotas from the power plants at a fixed price, and will have to sell them in a transparent manner. The Trader may keep the profits if the quotas are sold at a higher price. Should the sales revenues exceed a previously set profit limit, the Hungarian State will drain the fraction above the profit limit. Any loss incurred must be borne by the Trader.

The rationale for this type of allocation is to keep the capital required for the planned investments stable and independent of the prevailing CO₂ rates. Nonetheless, the question is what would happen if the price of the CO₂ quota in the European markets remains permanently lower than the price level determined on the basis of the EU Commission’s price model. Now, this is not extremely unlikely, because the current rate is around 10 EUR/ton, which is some 5 EUR/ton lower than the Commission expects in 2013. The following figure illustrates the process of quota allocation.

As depicted above, MVM implements the investments set in the National Plan, scheduling three major investments from the amount available: pumped storage, partial implementation of a...
smart grid and the construction of the Slovakian-Hungarian gas interconnector. The following table summarises the main characteristics of the three investments and explores the extent they meet the requirements laid down in the ETS Directive.

Above, we have shown that the ETS Directive specifies three major criteria for the investments implemented fully or partly from the free allocation. These are:

- Investments must facilitate the reduction of natural gas consumption
- Investments must achieve GHG reduction
- Allocation must be competition neutral

It is highly doubtful whether the Slovakian-Hungarian interconnector will meet the relevant criterion. The National Plan argues for compliance stating that the Slovakian-Hungarian interconnector will be instrumental in that Hungarian power plants may obtain natural gas at a lower price. Cheap fuel will enable the construction of new, modern gas power stations that replace old and outdated gas based generating units, which ultimately will require less fuel to generate the same amount of electricity output, that gas consumption will decrease. This very statement may be challenged, but then the National Plan also fails to consider that lower fuel prices may increase gas consumption outside the electricity industry. Another disputable point is whether the SZET and the gas interconnector projects would actually reduce GHG and whether SZET is a competitive neutral investment, especially in the light of that the owner/operator of SZET would be MVM, which owns the Paks nuclear power plant and has a high share anyway. The National Plan recommends the construction of SZET “to solve the serious balancing problems of the Hungarian electricity system”. At the same time, the National Plan gives the following explanation on why SZET is considered an investment neutral to competition in respect of the reserve and balancing market. “The balancing control market is expected to become regional by the time SZET will enter the market, nevertheless, considering its capacity, SZET would only have a negligible market share in comparison with the (pumped storage) power plant capacity providing secondary control with corresponding efficiency in the German-Austrian or the Community market (under 10% compared to the current capacity of the German-Austrian market only), while further considerable pumped storage power plant capacity is anticipated to emerge in the regional market by 2020.” Consequently, there will be a standard European secondary market by the time SZET is completed, according to the National Plan, in other words the SZET investment will essentially become pointless.

All in all, it is surprising that almost all the eligible Members States make use of derogation, for they can turn firm – and partly discretionary – budget revenues into “fixed” investments for private enterprises in the energy industry involving significant administrative burdens. Furthermore, since the investments in the National Plan are effected by a state company in Hungary, they could be implemented even without any administrative commitments.

Although power plants get free CO2 quotas, they are obliged to sell them at a specified price and forward their revenues to MVM. This way, power plants equally have to purchase the CO2 quota corresponding to their emissions. In other words, Hungarian power plants gain no advantage from free allocation, on the contrary, they may be handicapped compared with Western European power plants. On the one hand, their administrative burdens increase, on the other hand, an investment project is implemented that may drive

<table>
<thead>
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<th>Investment attribute</th>
<th>Pumped storage (SZET)</th>
<th>Smart grid</th>
<th>Natural gas interconnector</th>
</tr>
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<tbody>
<tr>
<td>Scheduled implementation date</td>
<td>+/- 600 MW capacity</td>
<td>250,000 controlled points of consumption</td>
<td>Slovakian-Hungarian line</td>
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<tr>
<td>Scheduled implementation date</td>
<td>2019</td>
<td>2013</td>
<td>2014</td>
</tr>
<tr>
<td>Rate of subsidy from the free quotas</td>
<td>EUR 365 M = - HUF 100 bn</td>
<td>EUR 38 M = - HUF 10 bn</td>
<td>EUR 18.52 M = - HUF 5 bn</td>
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<tr>
<td>Will gas use drop?</td>
<td>Yes</td>
<td>Yes</td>
<td>Strongly arguable</td>
</tr>
<tr>
<td>Will the investment reduce GHG?</td>
<td>Doubtful</td>
<td>Yes</td>
<td>Doubtful</td>
</tr>
<tr>
<td>Is the investment competition neutral?</td>
<td>Doubtful</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The total investment amount for the SZET and the gas interconnector is yet unknown, while the intelligent grid would be constructed from subsidy alone.

Source: National Plan, REKK
them out from certain electricity industry submarkets (e.g. gas power plants in the reserve market). In conclusion, since the CO₂ quota also appears as revenue (and expenditure at the same time) at the power plants, the increase of revenue-based taxes are expected for these facilities.

NEWLY PUBLISHED!

Security of Energy Supply in Central and South-East Europe

REKK has published the research findings of its Security of Supply project, launched in 2009, enclosed in the volume titled Security of Energy Supply in Central and South-East Europe.

The English-language publication analyses the question of supply security thoroughly, focusing on the following subjects:
- Regional electricity- and natural gas demand forecast to 2020
- Regulatory preconditions to encourage multi-country new gas infrastructures
- Lessons from the 2009 January gas crisis
- Modelling a regional gas market
- Measures and indicators of regional electricity and gas supply security
- Generation investments under liberalized conditions
- Mid-term gas supply security scenarios for the CSEE region
- The economic value of increased supply security

The book can be ordered from the homepage www.rekk.eu.
HOT TOPICS

Roadmap for the European electricity market integration

Several news portals reported this summer the launch of a project to couple the Czech-Slovakian-Hungarian day-ahead electricity markets. Pursuant to the joint letter of intent signed on 30 May 2011, the Czech, Slovakian and Hungarian Transmission System Operators (EPS, SEPS, MAVIR), Power Exchanges (OTE, OKTE, HUPX) and National Regulatory Authorities (ERU, URSO, HEO) set out to establish the interconnected day-ahead market by the second quarter of 2012, and, as far as possible, integrate the coupled markets in the Central Western European (CWE) region in the same year.

The following paper endeavours to put this project into perspective in the European integration processes by presenting the institutional framework, the means and planned roadmap for interconnecting the European markets.

Driving market integration: a system of regional initiatives

Regional Initiatives (RI) were launched by ERGEG (European Regulators Group for Electricity and Gas) in order to promote the creation of single European energy markets by establishing regional markets in a bottom-up approach based on the voluntary cooperation of stakeholders within individual European regions (regulators, TSOs, traders, professional organisations). Table 2 presents the regions defined by ERGEG to provide a framework for the individual integration projects.

The capacity calculation, allocation and market coupling projects launched in the various regions proved extremely useful in mapping out the means for market integration. Nevertheless, it soon became clear that the solutions applied in the different regions with more or less success were too diverse to serve as a basis for a uniform European electricity market. The Commission concluded that regions should receive more top-down guidelines to channel regional initiatives and reduce unnecessary costs and efforts. ERGEG formed the Project Coordination Group (PCG), a body comprised of stakeholders (ENTSO-E, EuroPEX, EFET, Eurelectric), to develop such top-down guidelines, created the so-called reference (or target) model that may be a draft (or a kind of a convergence point) for regional market integration projects.

Target model elements

The electricity market model developed by PCG includes capacity calculation, the operation of day-ahead markets, futures markets, intraday markets and balancing markets, as well as governance matters. In the following sections we present a brief overview of the recommendations of the electricity market model for the markets mentioned before. These recommendations also determine the regulatory framework domestic market players will have to comply with in the near future.

Capacity calculation

TSOs share the opinion that the currently used NTC/ATC based capacity allocation – especially in densely interconnected networks – does not ensure optimum capacity allocation from the point of commerce or system security. The allocation of capacities available for commercial use on

<table>
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<th>Members</th>
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<td>Estonia, Latvia, Lithuania</td>
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<td>Central-East (CEE)</td>
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<td>Central-South (CSE)</td>
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<td>Central-West (CWE)</td>
<td>Belgium, France, Germany, Luxemburg, Netherlands</td>
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<td>France, UK, Ireland (FUI)</td>
<td>France, UK, Ireland</td>
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<td>North (NE)</td>
<td>Denmark, Finland, Germany, Norway, Poland, Sweden</td>
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<td>South-West (SWE)</td>
<td>France, Portugal, Spain</td>
</tr>
</tbody>
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*In addition to the above regions, NWE (North West Europe), comprised of the CWE and NE regions and the United Kingdom, is also used frequently.
each border is artificial in the sense that it ignores the physical flows, which affect the quantities to a great extent.

A partial solution to the problem caused by ignoring physical flows is combined capacity allocation, already used in the CWE region. In this case, TSOs combine conventional NTC based bilateral capacity calculation and a safety check applying the Common Grid Model (CGM).

The target model of PCG recommends two capacity allocation methods as permanent solutions. The first being coordinated capacity calculation (applying complex technical profiles): in this case, it is still the TSOs who determine capacities that can be allocated on the individual borders, but in a coordinated manner, considering the results of the common grid model. Another method, which is preferred on the long-term, is the concept of pure flow-based capacity allocation (FBA), where TSOs do not determine available capacities to be auctioned on the individual borders: it is rather the traders’ bids during cross-border capacity auctions that determine the capacity to be allocated on the different borders within the framework set out by the common grid model.

It is a particularly complex task to develop the technical details of flow-based capacity calculation and allocation, and it is just as difficult to have market players accept the approach. Therefore, the failure of initial FBA attempts in the generally more advanced CWE region or in the CEE region was no wonder. Nevertheless, none of the regions question the necessity of introducing flow-based allocation, the initial difficulties notwithstanding. The practical utilisation of flow-based allocation, however, can only begin after the coupling (accompanied by NTC based capacity determination at the beginning) of day-ahead markets - that enjoy explicit priority - will have been finished.

Day-ahead markets

When considering short-term (day-ahead) capacity allocation, the target model views implicit allocation, used in an increasingly wide range in the markets, as the appropriate solution. This is essentially how the market coupling models within the CWE region as well as between the CWE and NWE regions work. In the course of market coupling, two neighbouring day-ahead power markets (exchanges) are cleared jointly, automatically enabling both supply and demand bids to be available from the other zone as well, as long as cross-border transmission capacities required for calling the bids are available. All the cross-border capacity between the two markets are automatically allocated to the deliveries with the highest arbitrage potential, and by definition, the capacity price (congestion rent) is equal to the difference between the equilibrium prices of the two price zones. When two markets are coupled, there is no separate (explicit) capacity auction, but the transmission right is allocated implicitly, together with the energy product.

A conventional method, i.e. NTC based capacity calculation, has been used to determine the capacity to be allocated through the mechanisms to couple markets in the western regions. The concurrent introduction of coordinated and flow-based capacity calculation together with the market coupling mechanisms – which alone involve a lot of technical difficulties – in a single phase would have been an unreasonably big leap for the markets. A clear order seems to take shape in the ongoing market integration projects in the CWE and NWE regions: the implementation of intra- and interregional market coupling has top priority followed by the application of flow-based capacity calculation.

Futures markets

The concepts concerning the futures markets are almost as polished and accepted as the schemes for day-ahead markets, however, specific projects are not as far ahead as, for example, in the case of market coupling. The establishment of joint allocations offices – CASC (Capacity Allocation Service Company) in the CWE region and CAO (Central Allocation Office) in the CEE region – has created the institutional background of integrated capacity allocation. Still, there is no substantial progress with respect to the structure of capacity products, the determination of allocated capacity amounts, the operation of secondary capacity markets or the application of compensation in the case of the curtailment of allocated capacities by TSOs.

According to the target model, TSOs have to sell 100% of their expectedly available capacity in the form of physical or financial transmission rights. Physical Transmission Rights (PTRs) entitle the holder to cross-border electricity delivery at specific borders. If the holder of transmission right fails to nominate its capacity, then it must be made available in the markets as day-ahead capacity applying the “use-it-or-sell-it” (UIOSI) principle. Financial Transmission Rights (FTRs) entitle the right holder to be compensated for the price differential between two pricing zones. Payment is effected by the transmission system operators entitled in the first place to receive the
congestion rent (i.e. the proceeds from the sale of cross-border capacity rights) between the two pricing zones. FTR, therefore, is purely a financial right, that is the holder may not dispose over physical energy transmissions, while it is suitable to provide futures coverage for transmission costs (that is to reduce the risk of day-ahead capacity allocations).

An essential element of the future allocations in the forward capacities in the target model is the firmness of transmission rights. In other words, except in force majeure cases, TSOs – in the case of curtailment – should compensate the capacity right holders with an amount equal to the price difference between the two price zones, instead of just repaying the initial (forward) price of the capacity. The target model thereby transfers the entire financial curtailment risk from the market participants to the TSOs.

The above approach to ensure the non-interruptibility of transmission rights generates a significant financial risk for TSOs. In order to reduce exposure, TSOs would optimally repurchase the required capacities in the secondary market, or – in a worse case – attempts to eliminate the problem by limiting the transmission rights to be allocated. The regulatory dilemma to comply with the requirements of the target model concerning futures transmission rights must be resolved by regulators.

**Intraday and balancing markets**

Intraday markets provide an opportunity for market participants after the gate closure in the day-ahead markets to utilise market-based remedies to adapt fast to the changed conditions without resorting to system reserves (and rebalance their positions immediately before physical performance).

Traders in the intraday market require fast and flexible trading of a relatively low amount of non-standard products (required for the fast closing of trading positions), which is not possible in the framework of auctions. The target model, therefore, recommends continuous trading on the intraday markets, and allocation in line with the first-come-first-served (FCFS) principle for capacity allocations.

TSOs (using the common grid model) upload the available capacities for intraday trading to the so-called Pan-European Capacity Management Module (CMM). The output of CMM is basically a matrix showing the amount of transmission capacity available from each zone to all other zones. Power exchanges (PXs) in the meantime forward all the supply and demand offers received to a Shared Order Book Function (SOBF), where a unique matching algorithm pairs the offers that create value for the market participants (i.e. the purchase price exceeds the sales price). As long as there is available transmission capacity from zone to another (as signalled by the CMM), orders can be matched across zones just as they can be matched within zones.

The target model for the cross-border integration of balancing markets is still in its infancy and only concerns the manually activated tertiary capacities at the moment. The long-term vision of the target model has a multilateral TSO-TSO mechanism for sharing balancing energy. Offers would be called in from a common merit order to the extent that transmission constraints allow.

Harmonisation with day-ahead and futures market operations is required as early as for the first steps in the process towards balancing market integration. It is a crucial requirement for contracting reserves from outside the control zones and the integration of the balancing markets that forward cross-border transmission rights should be exempt from the UIOSI principle and also be protected from intraday markets, since whether the capacity will be needed or not is only learned in the last hour before real time.

**Market integration roadmap**

The European Council at its meeting in February 2011 concluded that the internal electricity market should be completed by 2014 which “requires in particular that in cooperation with ACER national regulators and transmission operators step up their work on market coupling”. The highly ambitious target date and the above wording makes it clear that the Council would give definite priority to the integration of day-ahead markets, which may suffer no delay caused by the work on the other partial markets or the finalisation of the flow-based capacity mechanism.

The day-ahead market coupling (also referred to as “European Price Coupling – EPC”) is currently the “flagship” market integration and target model project in Europe. The core of the project is the price coupling of the CWE and NWE regions, scheduled to be completed by the summer or end of 2012, then extended gradually to the other regions by 2014. The trilateral Czech-Slovakian-Hungarian market coupling is also planned to be operational by mid-2012, and fully compatible with the current market coupling approach in Western Europe. It is a definite “PR success” of the
Hungarian regulator, TSO and PX that the CZ-SK-HU market coupling has been seriously recognised on a European level, indicated by the willingness to accept the three countries’ readiness to join the NWE coupled markets early (at the end of 2012).

Of course, the above rough market integration roadmap may upset by numerous unresolved details. The agreement of the stakeholder authorities, institutions and market participants on essential issues, however, forecasts the realisation of the day-ahead market coupling within years, and the European Union will be a significant step closer to the establishment of an integrated electricity market.

**Thirsty for regulations: major changes to come in Hungarian water utility services**

**Introduction**

The Hungarian water utility services experience major changes nowadays. A water utility act, to make up for decades without dedicated regulations, is being drafted. The sector is fragmented, with intricate ownership and property relations and a missing regulation to set the rules and constraints for competition, market and pricing. This article presents the factors that characterise and influence the sector, and outlines the specifics of water utility services, as one of the network industries in Hungary. We also take a brief outlook on solutions for market regulation in Europe, then discuss the conclusions that should practically be considered in the course of developing regulations and requirements for the sector.

**Assessment of the current situation**

Even though Hungarian water and sewage utilities fulfil the health and quality requirements, provide service without major outages, and consumers are predominantly satisfied with the performance of the utilities, the scope of the problems that affect and engage the sector is quite wide. The answers to the problems may be easier to find if we list and review the issues related to the regulations (or rather the lack of regulations) in the sector, lingering for almost twenty years. The fundamental problem that generates a vast number of additional issues is definitely the lack of market and competition regulation (water utility act).

The water and sewage utility sector has a strongly decentralised structure (with almost 400 service providers) and a high number of waterworks are supplying only one settlement. The sector is lacking a country-level water management concept for the towns and villages, or a policy to rate new and existing utilities. Water utilities are short of an elaborate price regulation and subsidy system encompassing various aspects and complying with the principles of the Water Framework Directive. The lack of appropriate regulations accounts for cross-financing, which is indicated by that many utilities apply the same fees to residential and non-residential consumers for water and sewage services.
Furthermore, the sector also is without a clear, long-term demand for service providers concerning efficiency and environmental sustainability requirements. Property and ownership relations are frequently chaotic in water utilities, and the integrated institutions with control and regulation responsibilities have not been established, yet. Inadequately regulated contractual relations – like the lease agreement between municipalities and service providers – may account for the current withdrawal of capital from this sector.

**Specifics of the water utility sector**

The structure of water and sewage service systems is illustrated in Figure 21.

Water and sewage service also bears the properties of network industries. This way, service providers’ activity is a typical example of natural monopoly: the service has no substitute product, and several companies would perform the same task with less efficiency, i.e. at a higher price or in inferior quality. At the same time, water utility service is also characterised by high transmission costs, which is especially striking when compared to other network industries. The transmission costs of water are the highest in relation to the own costs of the service: while the transmission cost of electricity is 5% of the total costs, that of natural gas is 2.5%, the same may be as high as 50% in the case of water.

The high capital demand of investments and the above outlined costs have an adverse effect on market relations and sound competition in the field of water withdrawal and transmission, in other words, newcomers to the market have to face high barriers to entry. A sign of capital intensity in the sector is the significant differences in return on investment figures in comparison with other network industries: telecommunication service providers realise a revenue of 40-100% from the invested capital, while water utilities perform at 7-20%.

Similarly to other network industries, economies of scale and economic density also play an important role in improving the efficiency of water utilities. The latter term means that water utilities are more efficient when located in an urban environment with more consumers and a higher specific consumer density (i.e. more consumers on the same area).

The sector experiences both positive and negative externalities. Environmental pollution (i.e. the deterioration of water bases) may induce additional costs for other consumers as well. The restriction of pollution and the obligation to bear the additional costs is included in the regulation under the EU Water Framework Directive – known as the “polluter pays principle” – and it was also the original goal of introducing the water load fee.

The process of introducing regulations for various areas of network industries (e.g. telecommunications, electricity, gas, etc.) takes place in different points in time. Steps in this respect have been taken regarding the telecommunications sector, where the development of competition and market regulations were much faster to follow the technical developments of the sector than in other industries without similar extensive progress in technical solutions (e.g. water utility services). Regulatory issues to be tackled in network industries are similar, so the experience gathered in other areas may be adopted, which bring about a kind of integration of regulations of network industries.

**Regulatory opportunities and models in water utility services: European examples**

There is no standard practice for the operation and regulation of service providers in the Member States of the European Union.
Union. There are also historical reasons to that all forms of ownership from fully private to public are present in the EU. The number, management and the tasks of service providers show a similarly heterogeneous picture (Figure 22).

**England and Wales**

An independent regulatory authority (Office of Water Services – OFWAT) with strict licences has been in charge of supervising the sector in England since market opening in 1989. This office determines the method of price regulation and exerts considerable pressure on service providers to increase efficiency. It resorts to specific operating costs, key cost components and water loss indicators to regularly review the improvement of service providers’ efficiency. OFWAT is also responsible to encourage market competition as well as for the development of ownership and merger policies. There are two additional national authorities to regulate quality issues in the sector: the Environment Agency and the Drinking Water Inspectorate. The supervision of the industry is complemented with consumer representatives.

**France**

The French system is characterised by market competition and contract-based regulations, where local governments have the responsibility of supply and pricing. Consequently, the water sector is highly segmented. Water supply and sewage services are provided either directly by the local governments or through diverse management contracts. The French government has direct control over water quality, contracting for public services and general competitive relationships. France also provides detailed regulations on the conditions private businesses must satisfy to enter water utility services.

**Germany**

The German water utility sector is characterised by public-private partnerships, which resulted in the establishment of large, multi-sector service providers (Stadtwerke). There is a broad spectrum of service solutions ranging from local governments with no financial autonomy performing water services (under 10,000 inhabitants) to the joint venture model with a PPP-type ownership and operation. The responsibility of supply and pricing the services are assigned to local authorities, while water quality is overviewed on the government level. The state is also responsible for establishing the general regulatory framework regarding prices (e.g. ensuring full cost recovery). Privately owned service providers are obliged to prove that their fees are not higher than fees of the other service providers (benchmarking).

**Portugal**

Local governments have the responsibility of supply, and it is at their discretion to provide water services alone or in cooperation with other local governments, or enter into a contract (even by involving a private service provider) for water withdrawal and sewage services. The regulatory authority in Portugal is called IRAR (Instituto Regulador de Águas e Resíduos). IRAR stipulates requirements concerning the organisation and conduct of service providers, and uses consistent indicators to assess the business activities, the technical standards and health quality of service providers. The authority also publishes the data on service providers to ensure transparency.

Although the above examples do not cover the practices of all EU countries, they do present a comprehensive picture of regulatory practices.

**Conclusions – concerns for Hungary**

European experience shows that water utility services may have diverse structures of industry as well
as a large number of working regulatory models with major differences. The historical traditions and concepts of a country concerning the water sector determine the prevailing model in that country.

Relying on European models, Hungary, as the first step, has to develop a general strategy and water policy of the sector and elaborate the following aspects: the structure of the sector, involvement of private equity (ownership and operation), and the definition of supply and other responsibilities (e.g. price regulation) on the level of government or local governments. Experience from other network industries must be considered when developing regulations, and the institutions responsible for stipulating the fundamental principles for pricing and controlling the practical execution thereof, as well as the enforcement of long-term comprehensive efficiency requirements with respect to service providers have to be identified. The range of data to be supplied and the methodology to assess such data – e.g. by way of regular market analysis – must be established in order to evaluate service providers’ activities. Only an institutional and regulatory system in conformity with the outlined principles may ensure the economically efficient operation of one of the key public service in a sustainable manner in the long run.
Kick-off Workshop of the ‘Roadmap to a Low Carbon Energy Sector in Hungary’ Research project

The Regional Centre for Energy Policy Research (REKK) organises a research project kick-off workshop on the future of low carbon energy production. The one-day workshop is aimed to present the regulatory challenges to the establishment of a low carbon energy sector in the EU and in Member States, review current technologies, discuss the role of renewable resources and the implications of recent German nuclear phase-out.

Invited speakers:

- Laurens de Vries, TU Delft: Market design and investment into low carbon technologies
- Karsten Neuhofer, CPI, Berlin: German nuclear phase-out and its implications for European decarbonisation roadmaps
- Jean-Arnold Vinois, DG Energy: Transmission upgrade needs and financing in Europe: the Commission's view
- Christian Hirschausen, DIW Berlin: The utilization of North and Baltic Sea off-shore wind resources and their impact on the CEE electricity markets

Attendance to the workshop requires preliminary registration.
Please, register with andrea.keszthelyi@uni-corvinus.hu and also visit our website for further details (www.rekk.eu).

Abbreviations in the report:

APX Amsterdam Power Exchange
ARA Amsterdam-Rotterdam-Antwerpen
CEGH Central European Gas Hub
ECX European Carbon Exchange
EEX European Energy Exchange
EUA European Union Allowance
GHG Greenhouse gas
HAG Hungary-Austria Gasline
HEO Hungarian Energy Office
OPCOM Operatorul Piete de Energie Electrica
OTE Operátor trhu s elektrinnou
PXE Power Exchange Central Europe
SEPS Slovenská elektrizačná prenosová sústava
UCTE Union for the Coordination of Transmission of Electricity