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, ELMÜ,
- Főgáz, Alcoa, DRV

**International organisations**
- DG TREN, USAID, ERRA, CEER, NARUC
Dear Reader,

The gas crisis in January and the market model changes to Hungary's gas market in July are two important events that require us to focus our report on analyzing the domestic Hungarian gas market. The two events provide an important reason to raise the question again whether the policy determining the future of the Hungarian gas supply should give priority to the security of supply or establish conditions for a competitive gas market. Do these two important priorities contradict each other? In this report, there is also the regular review of developments in the electricity sector for this year’s first quarter.

While preparing for the gas market model changes, including price liberalization in July, the unprecedented gas crisis in January warned us all of the seriousness of supply security risks of one-sided gas import dependency. However, it could also be regarded as a 'test', which revealed how successful the most affected countries of the region could manage the impacts of the cut-off of gas supply and what were key elements of successful crisis management. Liquid and effective market, contracted import diversification, strong physical interconnections and market integration with the liquid German/Austrian markets as well as powerful domestic gas industry with appropriate gas storage capacities: these are a few of the key success factors revealed by our regional gas analysis. The analysis suggests the establishment of institutional and infrastructural conditions of the gas market is a precondition also for enhancing security of supply.

Several sections of our report focus on elements of the demand and supply side of gas markets in terms of the preparation for price liberalisation. The features of the gas market make it more favourably to competition than electricity, therefore the relation between price and demand are more vivid. Our analysis shows that customers in the residential sector have started to adjust their consumption to price increases of 50% (real value) in the last two and a half years. Gas demand both in total, and in particular the retail sector, fell in comparison to the record 2005 consumption level. In this report, we also highlight factors on the supply side and give an overview of the competitiveness and the opportunities of the gas storage segment, which is important for competition and security of supply. Furthermore, we seek to answer the question, how gas auctions contribute to the improvement of competition and liquidity in Hungary. Finally, we offer a summary on the schedule of legislation determined by the governmental decree enforcing the Gas Supply Act.

We hope you will find our report useful and we welcome any feedback.

Péter Kaderják, Director
DEVELOPMENTS OF ELECTRICITY MARKET

Energy market trends have been determined by the economic recession. The price of Brent oil was down to its near 5-year low in February, and has since been hovering between 45 to 50 USD/barrel. Coal is traded at 80 to 85 USD/tonne as it was two years ago. Future prices on EEX experienced an overall drop in January, then plummeted in February, after which they rose slightly. The data of cross-border capacity auctions suggest that differences between the prices for monthly/daily wholesale products have diminished further on the power exchanges of Hungary and the neighboring countries, and (with the exception of Romania) have generally adjusted to German market prices.

International price trends

Energy market trends were determined by the economic recession in the first quarter of 2009. Brent oil price began to decline in the middle of 2008 then stopped at the end of the year. Since then it has stagnated around 50 USD/barrel, excluding March, which witnessed a slight shift in prices. There was a similar tendency also in the price of coal. At the beginning of 2008, a tonne of coal cost USD100, which later started increasing significantly. The trend is similar for the price of oil. Coal prices showed a decreasing trend in the second half of the year. By the end of the first quarter of 2009, the coal was traded at USD85. Compared to the same period of the previous year, the decrease in coal prices was half that of crude oil. There has been a slight rise for both products since the beginning of March 2009.

The 2010 baseload and peak electricity futures traded on the German power exchange, EEX. Here there is a similar price trend for both fuels. It can be seen that the world economic crisis accelerated the decline in November 2008, and prices hit the lowest level in the last year and a half at the end of February 2009. The market price of baseload products was 43 €/MWh with peak products at 62 €/MWh. This decreasing trend appears to have stopped after reaching bottom in February, when the prices of the two products started rising. Currently, it is too soon to decide whether it should be considered an emerging trend or only a small market correction.

In addition to EEX prices, it is essential to examine the relationship of these prices with the prices on the power exchanges in the region. In the following, we compare the day-ahead power prices on the exchanges operated by
the Romanian OPCOM, the EEX and the Czech TSO, the OTE; here we analyse short-term tendencies. The last quarter of 2008 saw decreasing day-ahead prices which also occurred in the first quarter of 2009. Parallel to decreasing prices, there was a significant fall in the international price differential. This is noticeable on weekends which have lower demand. The highest prices are on the EEX, followed by the OTE. In January, the difference between the prices on these two exchanges was 3.1 €/MWh on average, this was down to 2.2 €/MWh by March. In January 2009, the price of power traded on the Romanian exchange was 25 €/MWh lower than the price on the German power exchange. This price premium narrowed to 7.2 €/MWh by March.

The tendency is similar for the price of carbon-dioxide allowances in relation to power prices. The price of EUA plummeted in the middle of February (at 8.2 €/t), since then the price has risen moderately. However, similarly to the electricity price, we cannot claim that it is the start of a new trend. Traded quantities tend to rise significantly. In the first quarter of the year, the average traded quantity was 15 million tonnes per day, which approximates 1% of the total allocated quantity.

General survey on Hungary

In the first quarter of 2009, the monthly temperature adjusted power consumption excluding seasonal impacts1 was 3.5% to 4% lower than in the same period of the previous year. Following a significant drop of more than 8% between the consumption data of December 2007 and December 2008, figures in January fell by nearly 3.5% relative to the figures of the same period for the previous year. In other words, the big fallback of the previous quarter did not repeat in the first quarter of 2009. The decline in consumption may derive from the drop in economic activity since the industrial produc-

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[1]Seasonal adjustment has a special importance in this period because last February had 29 days for 2009 being a leap year.
Spot prices cannot be tracked on the Hungarian electricity market due to the lack of an exchange. Nevertheless, the results of the Austrian-Hungarian hourly cross-border capacity auctions may give a reference on the Hungarian prices. Auction prices reflect the difference between the prices of the two markets, therefore if the capacity charges for import oriented transmissions are positive, the prices on the Hungarian market is higher by the difference, and on the contrary, if the charges for export oriented transmissions are positive, the prices on the Hungarian market are lower by the difference relative to the Austrian market. Based on the results of the hourly auctions of the first quarter of 2009, it can be observed that in January Hungarian prices were equal to the German exchange prices in the daytime hours; however, these were slightly lower in the dawn hours and slightly higher in the early evening hours. In February, Hungarian prices were generally lower in each hour (in off-peak dawn hours in particular) compared to the German ones. In March, Hungarian hourly prices lifted to the German price level and significantly exceeded that in the late evening hours.

MAVIR Zrt. held its usual monthly cross-border capacity auctions also in the first quarter of 2009. In February 2009, there was an important development with MAVIR selling a portion of the Ukrainian interconnector capacity at auction, from April this was expanded with the total capacity. Contrary to other interconnector capacities, where system operators sell the access right jointly or share the sales of the
DEVELOPMENTS OF ELECTRICITY MARKET

available capacities 50%-50%, MAVIR Zrt. allocates the access right of the international line on the Ukrainian interconnector only to the Hungarian side. Those who want to transport electricity from the Ukrainian side, have to acquire the rights for network use also on the Ukrainian side. As a result, we cannot give an estimate on the transport costs of Ukrainian imports on the basis of the auction fees from the rights of network usage on the Hungarian side.

The other interconnectors saw a trend similar to the previous quarter that is capacity charges near 0 HUF/kWh. Consequently, we might assume that the national electricity markets, in the short run, constitute one regional pricing zone. In March, Romania joined this price zone as well.

Results of quarterly and monthly capacity auctions

MVM Trade auctioned 1 TWH electricity on its interim capacity auction on 18 March 2009. The product range included 2Q 2009 and monthly (April, May and June) futures contracts. The range that consisted of 21 products in total included standard base load and peak demand, however, the majority of the products, similarly to the offer on the last year’s annual auction, were non-standard Block Trade Facilities. Consistent with international trends, the offered products were sold at a relatively depressed price. Baseload electricity was sold at 9 to 10 HUF/kWh and peak electricity at 11 to 12 HUF/kWh. The auction for baseload for the second quarter of 2009 (80 MW) had an auction price of 9.762 HUF/kWh, which is fundamentally the same as the price for the same German exchange product at the end of March (See Figure 9). This confirms that for short-term wholesale products the Hungarian electricity market is strongly linked to the German market.

Figure 8 Results of monthly cross border capacity auctions, 1st quarter of 2009
In the figure, capacities mean the announced capacities.

Figure 9 Prices of baseload futures, 2nd quarter of 2009 on the German and Hungarian markets (based on EEX prices and the results of the MVM’s capacity auction)
Hungarian gas demand

The gas crisis in January 2009 caught the attention of the public. The domestic use of gas can be broken down to three parts from demand side: residential and communal consumption, industrial consumption and consumption for electricity and heat production.

When examining the development of the Hungarian gas demand, it has to be taken into account that it is strongly dependent on temperature. However, the relationship between gas consumption and temperature is not linear because it has a breaking point, a so-called threshold temperature. If temperatures are lower than the threshold temperature, then the lower the temperature, the higher gas consumption. However, any change in temperature above the threshold value does not have any effect on gas consumption. The figure below depicts the relationship between the daily mean temperatures and the size of gas consumption between 2004 and 2008.

Figure 10 shows the threshold value is about 16 degree Celsius, over which the size of gas consumption stops, depending on temperature. The so-called degree-days are defined on the basis of this threshold temperature. A degree-day is the difference of 16 degree Celsius and the daily mean temperature, if it is lower than 16 degree Celsius, and otherwise zero. The regression analysis on the relationship of degree-days and the daily domestic gas consumption shows that a one-degree decline in temperature results in a 1.25-million-cubic-meter increase in consumption.

The relationship between temperature and gas consumption is certainly similar on an annual time horizon. In other words, the annual gas consumption is largely determined by the weather of the winter months of a given year. Therefore, if we wish to analyse the long-term trend of gas consumption, the effect of temperature should be excluded from the data. Temperature adjusted data show what the size of gas consumption would be in a given year at an ‘average’ temperature. The adjustment is calculated by subtracting the rise (decrease) in consumption that took place because of the temperature exceeding (below) the average, from the effective consumption. The relationship between degree-days and gas consumption as described above is used in the calculation.

The raw data indicate that gas consumption was stagnating between 1997 and 2000, and then peaking in 2005 after a strong increase, which was followed by a significant decline. After controlling for the effect of temperature we obtain a more realistic picture. In fact, there was not any sudden shift in gas consumption but it was growing nearly evenly since 1992 until 2003. In 2003, parallel to the liberalisation of the energy sector (electricity and gas), the various consumer groups tended to face the real costs of their energy consumption (prices grew), giving them an incentive to improve efficiency and decrease consumption. This was accompanied by natural growth tied to economic performance; this then implies that the size of gas consumption was actually stagnating in Hungary from 2003 till 2005. After which it was followed by a slight decline due to a decrease in residential consumption.

Household consumption, representing the majority of gas consumption, is characterised by a significant drop after 2005. Household consumption is fundamentally influenced by two factors from a demographic viewpoint. First, there is the number of households connected to the gas supply, which increases only to a limited extent, and second the decreasing population, which has a negative effect
on gas consumption. As a result, gas consumption may decline even on the long term. The fallback in residential gas consumption in 2005 is partly the result of the newly introduced gas support scheme, since a significant proportion of consumers faced a large price increase. The impact of the sudden increase in price was larger for the decrease in demand for gas than the effect of the saturated household market where there was a natural limited growth in demand.

In the second segment, the gas use for electricity generation stagnated between 2003 and 2006, and then soared in 2007. The powerful rising gas use for electricity generation between 2000 and 2003 was due to newly commissioned gas fuelled power plants. This tendency was slightly offset by the import balance changed by the electricity market liberalisation in 2003 since domestic customers imported more electricity, thus requiring lower domestic production. In 2007, the power shortage in the South East European countries significantly increased the production of domestic power plants, which resulted in higher gas consumption relative to previous years. However, several questions are raised by the currently available plans for new generation investment, which project a considerable increase in the number of gas fuelled power plants. These will have an important impact on the domestic gas demand and also on prices. At the same time, the gas use for other purposes (the large majority of which comes from the chemical industry, coke production, and non-metallurgical mineral production) was descending due to the high price elasticity and the substitutability of gas.

Prospects of the Hungarian gas storage market

Western Europe including Germany, Spain and the Netherlands in particular, witnessed a considerable wave in gas storage construction in the recent years. Investment decisions were backed by the assumption of an increasing gas demand and the growing role of gas storage in a liberalised market environment. Today, investments aim not only to balance the traditional seasonal fluctuations of demand but also to manage peak periods in a flexible way.

The domestic gas storage market, having lacked any significant investment until recently, is dominated by E.ON. This situation, however, will change in the near future due to the new gas storage capacities under construction and planned. Below, using basic market analysis tools, we analyse the chance for effective competition on the domestic gas storage market.

All five underground gas storage sites in Hungary are owned by E.ON Natural Gas Storage Zrt. Total mobile gas capacity of the Hungarian...
storages (the total quantity that can be taken out from the storage) is 3720 million m³. Based on the geological conditions of Hungary existing storage and those sites under construction along with planned investments, are or will be established, on depleted gas fields. This type of storage is used for storing large quantities of gas and primarily to balance seasonal fluctuations. Its specific cost is far lower than that of other storage types (salt caverns, aquifers and LNG storage).

A disadvantage is however, that the direction of withdrawal and injection in order to adjust to market prices cannot be changed too often. This type of storage usually has two seasons in a year: injection in summer and withdrawal in winter. The current nominal peak withdrawal capacity of the Hungarian gas storage system (the total quantity of gas that can be taken out from the storage in a day) is 50.5 million m³.

The current mobile gas capacity in Hungarian storage accounts for a quarter² of the annual consumption, while the withdrawal capacity is more than 60% of the annual daily peak of consumption.³ Based on these conditions, Hungary is one of the countries in Europe, which has sufficient storage capacity. In addition to the European storage mobile gas and withdrawal capacities, Table 1 in the third column includes also the consumption swing. This indicator is often used in the gas industry to indicate the ratio of the consumption and the months of the highest and the lowest consumption. The swing gives a good picture on the flexibility needs of a given market. In each EU country where the annual swing exceeds three, storage is used mainly for meeting the required flexibility, while in the countries where the swing is lower, storages play a lesser role.

A crucial condition for the evolution of competition on the gas storage market is market concentration. We have conducted a market concentration analysis based on the regulatory practice of the American regulator, FERC. First, we define the relevant market, then calculate for this segment the Herfindahl-Hirschmann Index (HHI), which indicates the concentration of the market. The value of HHI is the sum of the squares of the market share of each participant. Market shares are calculated on the basis of the maximum daily flexibility capacity in winter. In the FERC’s scheme, a market is concentrated if the HHI exceeds 1800.

The total of storage capacities is owned by one player also in Poland, Portugal, the Czech Republic and Bulgaria from amongst the Member States of the European Union, the HHI is 10 000 in these countries. In neighbouring Austria, where gas storage is in the hands of three independent players, the HHI amounts to 4000. There is a

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²Last year’s annual gas consumption was 13.5 billion m³ (source: MEH).
³The daily peak consumption in 2008 was 79.052 million m³.
multiple-player storage market in Germany, Spain and Great-Britain with a concentration index of 1300, 3100 and 5950 in turn.

For Hungary, currently all the storage capacities are operated by E.ON Földgáz Storage Zrt. consequently, the HHI is 10 000 at present. However, gas storage supply will significantly grow in the following years due to the strategic storage currently under construction and the planned investments. New storage can only be practically established by MOL and those who are allowed by MOL to enter the market, since it possesses almost all the depleted oil and gas fields. The only thing that E.ON can do is to extend its current storage sites. The strategic gas storage under construction may offer flexibility service since the operator MMBF ZRt. is 62% owned by MOL; it will be allowed to sell the withdrawal capacities belonging to the strategic reserves as interruptible capacities. (The Hungarian Hydrocarbon Stockpiling Association [MSZKSZ] has exclusive rights to access the strategic storage to be built in Szőreg ordered by law and serving primarily for security stockpiling.)

What changes are expected in the market structure as a result of these investments? When defining the market, we differentiated two key cases: on the one hand, the relevant market in a narrow sense includes only the underground storage; on the other hand, the definition of market can be extended by other flexibility tools (domestic production and import as well as interruptible consumption). Table 3 shows the maximum capacities we took into account for the calculation of concentration in the five introduced cases. We assumed that all the investments listed in Table 1 are realised.

In the first two cases, we examine narrowly the storage market. The first case describes the conditions in 2010, while the second describes the expected situation in 2015, when the above mentioned investments will likely be realised. The third case extends the definition of the relevant market with import and the daily flexibility of the domestic production assuming that the new pipeline Beregdaróc and the storage in Szőreg will have been built. The fourth case describes the expected situation of the extended market in 2015, while the fifth one includes consumption flexibility, as well. Accordingly, we made calculations for the given cases on the HHI and share of the two major players, E.ON and MOL, which are shown in Table 4.

When analysing the storage market in itself, the HHI is above 4000 in both cases, which shows a very concentrated market, however the joint storage project of MOL and Gazprom will moderate this concentration by the year 2015. The value
of the HHI is significantly lower if other flexibility tools are taken into account, thus the value of concentration would be below 3000, which may sink below 2500 by the year 2015 due to new investments. The HHI further decreases if flexible consumption is taken into account.

As a summary, we can state that the new gas storage projects to be realised in the following years will imply a considerable decrease in the concentration of the Hungarian natural gas daily flexibility market, which may open the way for an effective competitive market. However, it should be noted that the HHI value will be still expected to exceed 1800, which is the threshold for a concentrated market according to the FERC categories, even based on the definition of market in the widest sense.

The complete analysis including a detailed description on methodology and a regional outlook on storage can be found on the REKK homepage. This article is based on updated data and on currently available investment plans.

Regional effects of the gas crisis in January

Between January 7th and 19th of this year the transit of Russian gas to Europe through the Ukraine was halted. This was the most serious European gas crisis to have happened since the start of Russian gas transmission decades earlier. The effect of the crisis was more severe in our region (and in Hungary in particular) than in the majority of the old Member States of the EU. This is due to Hungary’s dependency on Russian gas imports, which is by far higher than the European average, in addition, the lack or regional storage and interconnection capacity in the affected countries. The effect of the cut-off of gas delivery on consumers was ‘fortunately’ mitigated by a significant drop in the non-household gas demand implied by the economic recession. Last December’s weather, which was milder than the average resulted in an oversupply of storage capacities in the European market during the crisis. Under less favourable conditions, or if the crisis had lasted longer, a similar crisis would have affected consumers much more drastically than in January.

Since the implementation of the 10 years long Russian–Ukrainian agreement, closing the January crisis, is doubtful, the affected countries have to prepare for the management of similar crises in the future. Therefore we have looked for the answer to the question, what are the key factors for successfully managing a gas crisis. For the answer we have studied the experience of ten countries of our region in the January 2009 gas crisis.

Table 5 compares the share of Russian imports in gas supply by country and the seriousness of restrictions on consumers during the crisis.

Table 5 Share of Russian import and consequences of the gas crisis

<table>
<thead>
<tr>
<th>Country</th>
<th>SUPPLY EFFECT</th>
<th>CONSUMER EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Russian import / domestic production + total import), year total</td>
<td>(seriousness of restrictions on end consumers)</td>
</tr>
<tr>
<td>Austria</td>
<td>low</td>
<td>No obligatory restriction on end consumers</td>
</tr>
<tr>
<td>Bosnia-Herzegovina</td>
<td>low</td>
<td>No obligatory restriction on end consumers</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>medium</td>
<td>Obligatory restrictions for consumers other than household/protected consumers</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>high</td>
<td>Obligatory restrictions in each customer circle</td>
</tr>
<tr>
<td>Croatia</td>
<td>low</td>
<td>No obligatory restriction on end consumers</td>
</tr>
<tr>
<td>Hungary</td>
<td>medium</td>
<td>Obligatory restrictions for consumers other than household/protected consumers</td>
</tr>
<tr>
<td>Romania</td>
<td>high</td>
<td>Obligatory restrictions in each customer circle</td>
</tr>
<tr>
<td>Serbia</td>
<td>low</td>
<td>No obligatory restriction on end consumers</td>
</tr>
<tr>
<td>Slovakia</td>
<td>medium</td>
<td>Obligatory restrictions for consumers other than household/protected consumers</td>
</tr>
<tr>
<td>Slovenia</td>
<td>low</td>
<td>No obligatory restriction on end consumers</td>
</tr>
</tbody>
</table>

Legend:
- SUPPLY EFFECT
  - Share of Russian import is below 50% low
  - Share of Russian import is between 50 and 75% medium
  - Share of Russian import exceeds 75% high
- CONSUMER EFFECT
  - No obligatory restriction on end consumers
  - Obligatory restrictions for consumers other than household/protected consumers
  - Obligatory restrictions in each customer circle

Table 6 Supply side opportunities of import replacement

<table>
<thead>
<tr>
<th>Country</th>
<th>IMPORT DIVERSIFICATION (Non-Russian import /total import, year in total)</th>
<th>DOMESTIC PRODUCTION (production/consumption, winter peak period)</th>
<th>STORAGE (withdrawal capacity/consumption, winter peak period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>36%</td>
<td>16%</td>
<td>104%</td>
</tr>
<tr>
<td>Bosnia-Herzegovina</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>0%</td>
<td>8%</td>
<td>35%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>25%</td>
<td>0%</td>
<td>96%</td>
</tr>
<tr>
<td>Croatia</td>
<td>0%</td>
<td>38%</td>
<td>45%</td>
</tr>
<tr>
<td>Hungary</td>
<td>25%</td>
<td>13%</td>
<td>69%</td>
</tr>
<tr>
<td>Romania</td>
<td>0%</td>
<td>54%</td>
<td>43%</td>
</tr>
<tr>
<td>Serbia</td>
<td>0%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0%</td>
<td>0%</td>
<td>73%</td>
</tr>
<tr>
<td>Slovenia</td>
<td>48%</td>
<td>0%</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
to Russian imports. Our analysis exposes the following reasons for successfully weathering the supply disruption:

Import diversification. The share of gas imported from non-Russian sources is 48% in Slovenia, 36% in Austria and 25% in the Czech Republic. Although a majority of these are traditionally regarded as ‘contracted’ diversification (in other words, contracts concluded with a party other than Russia are generally also fulfilled mainly from gas from a Russian source), the crisis revealed that the contracted parties were able to fulfil and in several cases temporarily even increase their deliveries. The three countries have appropriate interconnections in the Austrian-German direction.

Successful reorientation of the typical flow directions and the establishment of technical conditions for West/East flows. German and other regional gas transmission companies’ performance in establishing West/East gas deliveries proved to be a crucial component to successfully replacing supply. The management in these companies proved to be outstanding. The increased imports from the West played an important mitigating role in the January crisis because of this re-orientation of gas supplies.

Successful market mechanisms. There was a sufficient amount of bids during the crisis on the Austrian balancing market to replace the shortage of gas supply; there was also not any significant increase in market price. This prevented any regulatory interventions and helped to manage the situations in Slovenia and the Czech Republic. In addition, significant industrial consumers in Austria voluntarily switched fuels.

High domestic storage capacity and production. The ratio of domestic production and consumption in the winter peak period, from amongst the studied countries, is the highest in Romania. This production and the availability of significant storage capacity prevented Romania from implementing restrictions on consumers. Austria has a significantly high storage capacity, which allows it to cover its winter peak consumption by itself. Storage capacity played a key role also in managing the crisis in the Czech Republic.

Countries managing the crisis with medium consumer impact. This category includes Croatia, Hungary and Slovakia. These countries needed to impose restrictions on consumers during the crisis, but restrictions were not extended to residential and other protected consumers (hospitals, schools). Lacking a liquid gas market, the multinational companies of the region (E.ON, GdF, RWE) provided for the replacement of considerable portions of the missing gas through intra-corporate transactions. The enforcement of restrictions on consumers, in all three countries encountered difficulties.

Countries managing the crisis with high consumer impact. The gas industry of the countries suffering the highest consumer impact and damages (Bulgaria, Serbia, Bosnia and Herzegovina) can be characterised by opposite conditions as experienced by those who weathered the crisis well. Most importantly, countries most effected are far from the relatively liquid German/Austrian markets, lack domestic gas production and if they have any at all, their gas storage capacity is limited, they import exclusively Russian gas and the total consumption is supplied through a one-directional transit pipeline. These countries were prepared for a crisis only at a minimum level: they lacked alternative fuel stocks or if they had any, these were difficult to mobilise. Affected consumers often replaced the missing gas used for heating or district heating with electric heating.

The gas crisis resulted in fierce political reactions in the affected countries in the region. This prompted intensive debate on the short and long term strategies for improving gas security of supply.

The revision of the Hungarian legislation on the management of a gas crisis is currently underway. Its key elements are the following: elaboration of a scheme of incentives facilitating the rapid fuel switch of consumers; obligatory provisions on the booking of commercial storage by market players; clarification of the rules on financial arrangements of transactions in a crisis; clarification of the nomination right of the system operator on the strategic stockpile, revision of the consumer restriction categories and its scheme. Another important lesson of the January crisis for Hungary is that a liquid and effective balancing market, closer integration with the West and an enhanced contracted diversification will improve the efficiency of a crisis management.

### Table 7 Options enhancing security of gas supply, which are currently under discussions

<table>
<thead>
<tr>
<th>Country</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>Reinforcement of the interconnections and development of bidirectional interconnections between Romania and Greece; establishing projects for LNG import.</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Extension of storage capacity; extension of the Western interconnection pipeline.</td>
</tr>
<tr>
<td>Croatia</td>
<td>Acceleration of the KKH LNG project; Establishment of a second storage, Establishment of a Croatian-Hungarian gas pipeline connection.</td>
</tr>
<tr>
<td>Poland</td>
<td>Decreasing the share of Russian gas import from 70% to 40%, acceleration of an LNG project, increasing domestic production, extension of gas storage capacities, extension of German, Austrian and Scandinavian interconnections.</td>
</tr>
<tr>
<td>Serbia</td>
<td>Development of natural gas storage capacity jointly with Gazprom.</td>
</tr>
<tr>
<td>Slovakia</td>
<td>Establishing a wholesale and storage undertaking partly owned by the state, regional storage cooperation, nuclear power production, option of a strategic storage.</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Establishing a domestic gas storage, demand for further coal-based and nuclear power production.</td>
</tr>
</tbody>
</table>

Source: own research based on Platts reports; Hungarian Energy Office.

The gas crisis resulted in fierce political reactions in the affected countries in the region. This prompted intensive debate on the short and long term strategies for improving gas security of supply.

The revision of the Hungarian legislation on the management of a gas crisis is currently underway. Its key elements are the following: elaboration of a scheme of incentives facilitating the rapid fuel switch of consumers; obligatory provisions on the booking of commercial storage by market players; clarification of the rules on financial arrangements of transactions in a crisis; clarification of the nomination right of the system operator on the strategic stockpile, revision of the consumer restriction categories and its scheme. Another important lesson of the January crisis for Hungary is that a liquid and effective balancing market, closer integration with the West and an enhanced contracted diversification will improve the efficiency of a crisis management.

### Table 7 Options enhancing security of gas supply, which are currently under discussions

<table>
<thead>
<tr>
<th>Country</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>Reinforcement of the interconnections and development of bidirectional interconnections between Romania and Greece; establishing projects for LNG import.</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Extension of storage capacity; extension of the Western interconnection pipeline.</td>
</tr>
<tr>
<td>Croatia</td>
<td>Acceleration of the KKH LNG project; Establishment of a second storage, Establishment of a Croatian-Hungarian gas pipeline connection.</td>
</tr>
<tr>
<td>Poland</td>
<td>Decreasing the share of Russian gas import from 70% to 40%, acceleration of an LNG project, increasing domestic production, extension of gas storage capacities, extension of German, Austrian and Scandinavian interconnections.</td>
</tr>
<tr>
<td>Serbia</td>
<td>Development of natural gas storage capacity jointly with Gazprom.</td>
</tr>
<tr>
<td>Slovakia</td>
<td>Establishing a wholesale and storage undertaking partly owned by the state, regional storage cooperation, nuclear power production, option of a strategic storage.</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Establishing a domestic gas storage, demand for further coal-based and nuclear power production.</td>
</tr>
</tbody>
</table>

Source: own research based on Platts reports; Hungarian Energy Office.

Countries managing the crisis with high consumer impact. The gas industry of the countries suffering the highest consumer impact and damages (Bulgaria, Serbia, Bosnia and Herzegovina) can be characterised by opposite conditions as experienced by those who weathered the crisis well. Most importantly, countries most effected are far from the relatively liquid German/Austrian markets, lack domestic gas production and if they have any at all, their gas storage capacity is limited, they import exclusively Russian gas and the total consumption is supplied through a one-directional transit pipeline. These countries were prepared for a crisis only at a minimum level: they lacked alternative fuel stocks or if they had any, these were difficult to mobilise. Affected consumers often replaced the missing gas used for heating or district heating with electric heating.

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HOT TOPICS

Hungarian gas release

E.ON Földgáz Trade Zrt. hold its fourth yearly natural gas auction on 6 March 2009. The event is important because the natural gas sold transparently on the auction accounts for a significant proportion of the gas sold on the Hungarian free market. In our estimation, this proportion was nearly 30% in 2008, which equals 8.5% of the last year’s total Hungarian natural gas consumption.

DG Competition of the EU obliged E.ON to release gas as a remedy of the approval on 21 December 2005 of E.ON Ruhrgas International AG’s acquisition of MOL Földgázellátó Rt. (MOL Supply) and MOL Földgázttároló Rt. (MOL Storage) following an in-depth investigation.5 Because of the fact that E.ON was a significant market player both in the Hungarian gas wholesale and storage markets and a significant actor on the electricity market, the Commission approved the merger but subject to several conditions. A key element of the conditions is the obligation of ownership unbundling of gas transmission (FGSZ owned by MOL) and the wholesale gas business units (E.ON Földgáz Trade). Our analysis focuses on recommendations to enhance liquidity.

Two important sources for enhancing liquidity on the competitive market are the gas deriving from the contract release and gas release programmes to be implemented. The contract release has resulted in the transfer of half of the domestic production (near 1.2 billion m³ per annum) to Tigáz and Főgáz until 2015. This source is fundamental to increase free market sales, however public gas utilities obtain a part of this amount. In the gas release programme, a part of imported gas has to be sold on auction, which as a whole contributes to free market sales.

In the framework of gas release, E.ON Földgáz Trade Zrt. needs to offer for trade 1 billion m³ every year for eight years (from 2006 to 2013) for natural gas traders and eligible consumers. None of its affiliated companies can participate in the yearly auctions either directly or indirectly. It is an ascending-price auction, i.e participants indicate the quantities they want to buy (in packages of 25, 50 and 100 million m³) at the bidding price. In case of oversubscription, new bids are required at higher prices as long as the demand decreases to the level of the offered quantity. The price mechanism of the auctions allows the participants to buy natural gas at competitive prices; this is because the starting price is 95% of the WACOG, representing the average purchase costs. The financial losses of the sales for E.ON have been limited by the Commission’s Regulation to EUR 26 million. Accordingly, the starting price in 2008 based on the losses of 2006 and 2007 was 97.4% of the WACOG, and 99.3% of WACOG in 2009.

Although the settlement price is unfortunately not public, it is still indicated in the Table because the starting price became the settlement price in the first two years. It can be explained by the facts that in 2006 market players were still cautious, had little time to prepare for the auctions and there was high uncertainty about other factors (regulated prices). The bids covered less than half of the quantities offered for sale (in accordance with the rules, the quantities not sold on the auction would be offered in equal proportions in the following three years). Afterwards, the gas release price turned out to be very favourable for the successful bidders compared to the reference price, which was a regulated public utility price. In 2007, the quantity offered for sale was just equal with the bids, therefore there was not any price competition evolving among buyers, and the quantities offered for sale were bought at the starting price again. In 2008, the auction already had three rounds, and the settlement price was higher than 97.4% of the WACOG but failed to reach the WACOG, and the packages of different size closed at different prices (higher than the starting price).

The fact that competition has been enhanced is indicated by the auction being completed in seven rounds this year, although with less participants and with less successful bidders compared to the previous year. Each product package closed in seven rounds at the same price. The settlement price exceeded the WACOG by the end of the auction, which also indicates a significant market competition at wholesale level. This auction did not result in any further losses for E.ON.

<table>
<thead>
<tr>
<th>Year</th>
<th>Starting price in % of WACOG</th>
<th>Settlement price (% of WACOG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>95%</td>
<td>8,023 USD/GJ (=95%)</td>
</tr>
<tr>
<td>2007</td>
<td>95%</td>
<td>8,2667 USD/GJ (=95%)</td>
</tr>
<tr>
<td>2008</td>
<td>97,4%</td>
<td>(n. a.&lt;100%)</td>
</tr>
<tr>
<td>2009</td>
<td>99,3%</td>
<td>(100%&lt;n. a.)</td>
</tr>
</tbody>
</table>

Table 8 Starting and settlement price of the Hungarian gas release (USD/GJ, and in percentage of WACOG)

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5Case No COMP/M.3696-E.ON/MOL
Regarding the technical parameters of the product to be auctioned, it is the same as the Panrusgas contracts product: a continuously deliverable gas with low flexibility and at a constant quality, which in itself is not capable to satisfy the full needs of consumers but can be used as one element in a gas portfolio. The contracted quantity is delivered over two years, in equal portions on the delivery points - 80% on the Beregdaróc (Ukrainian-Hungarian) intersection and 20% on the Baumgarten (Austrian) metering station. E.ON Földgáz Trade Zrt. transports natural gas from Baumgarten to the Austrian-Hungarian intersection through the HAG pipeline, for which it charges an extra charge. The possibility to sell the purchased gas abroad (e.g. in Baumgarten) is purely theoretical because of the Hungarian rules on contracting transmission capacity and the exclusion of swap methods.

Gas release programmes are implemented by regulators and competition authorities. They believe that additional sources on the market offered in a transparent way at sufficiently low price will enable new participants to enter the market and boost their market presence, particularly on markets that are characterised by high concentration and long-term agreements. There were and have been several gas release programmes running in Europe. However, a properly functioning competitive market requires not only sufficient sources but also opportunities for market players to access storage and transmission infrastructure and customers. In the case of almost every completed European gas release programme, gas release programmes failed to have the required catalytic effect in enhancing market competition due to the lack of some prerequisites. The Hungarian gas release programme, however, was regarded by the appointed EU observer as sufficient with regard to its administration and with an irrefutable and significant contribution to the country’s free market segment in natural gas.

**Status report on the regulatory background of gas market**

The Act 40 of 2008 on the Supply of Natural Gas (hereinafter: the New Gas Act) was passed by Parliament on 8 June 2008. The New Gas Act introduced several - well-known - changes relative to the previous operational model, however, various details remain unelaborated upon. There are nearly a hundred sections in the Act referring to a separate legislation or governmental decree to set the detailed rules on the enforcement of the Act. The most important of these legislations is the Governmental Decree on the enforcement of the certain provisions of the New Gas Act, which was published on 3 January 2009 (Govt. Decree 19/2009 [hereinafter: the enforcement decree]), and includes the majority of the detailed rules.

Most of the provisions of the New Gas Act will come into force on 1 July 2009, however, its entrance into force is gradual. Certain provisions have already come into force on the day subsequent to its promulgation, certain ones on 1 and 15 September 2008, on 1 January and 1 April 2009.

The implementation of the enforcement decree is gradual, as well. Most of its provisions will come into force on 1 July 2009, but the provisions that serve for ensuring transition came into force on the day of its promulgation and on the 15th day of its promulgation, respectively.

- Legislations provide for several measures in the interest of ensuring transition, which have to be implemented by 1 July. These measures include among others the following:
  - Issue of new licenses and modification of existing ones,
  - Preparation of a new or revised Network and Commercial Code,
  - Establishment of a daily natural gas and capacity market and the selection of a clearing house,
  - Shaping of a balancing mechanism setting the regional natural gas distribution charge,
  - Setting of tariffs associated with universal service and the conditions of their application,
  - Charges for system use to be paid for the interoperable natural gas system, which will be determined by a ministerial decree based on the proposal of the MEH also in the future.

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of those submitting bids</td>
<td>10</td>
<td>7</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Number of successful bidders</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

**Table 9 Number of participants in the Hungarian gas release programme, in yearly breakdown**

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>End consumers</td>
<td>350</td>
<td>400</td>
<td>500</td>
<td>200</td>
</tr>
<tr>
<td>Traders</td>
<td>125</td>
<td>775</td>
<td>600</td>
<td>900</td>
</tr>
<tr>
<td>Total</td>
<td>475</td>
<td>1175</td>
<td>1100</td>
<td>1100</td>
</tr>
</tbody>
</table>

**Table 10 Quantities won in the Hungarian gas release programme in million m³ and the number of successful bidders in brackets**
Impact of the 2004 Enlargement on the EU Energy Sector

The Regional Centre for Energy Policy Research has just published the book *Impact of the 2004 Enlargement on the EU Energy Sector*. This book provides an assessment of the impact on the European Union’s energy security of supply as a result of the 2004 enlargement. This broad based topic is broken down into six categories that provide an in-depth examination of the policies, investments and infrastructure developments leading up to enlargement and in the initial post-enlargement years.

The common theme that is revealed in the book is the long unification process has been ongoing in policies and infrastructure investments since the start of the post-communist era. The ‘rejoining’ of Eastern Europe to Western Europe on May 1, 2004 emerges as an event marking a steady realignment of policies and renewal of Eastern Europe’s energy and industrial infrastructure.

The chapters within this book take this historical perspective to determine how the security of supply has been impacted by the full integration of 10 new Member States into the EU.

The key issues addressed in the book are:

- Electricity and gas supply disruptions
- Geopolitics of gas in Central Eastern Europe
- Long-term energy security of supply
- Market opening in the electricity and gas sector
- Mergers and acquisition of energy companies in New Member States
- Renewable energy investment and directive implementation
- Energy efficiency targets in Member States
- Regulatory Framework and Implementation Capacity of Member States.

You can order a copy of the book on our website [www.rekk.eu](http://www.rekk.eu)