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), GVVH (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
Dear Reader,

We proudly present the second issue in the third volume of our publication Hungarian Energy Market Report. We sincerely hope that our readers have been satisfied with the issues so far.

In the current issue, beside the analysis of electricity market trends of the past quarter, we are publishing three extensive articles. From January 2012 on the Hungarian Government plans to revise the renewable energy support system. Our first article compares advantages and disadvantages of two systems, namely the green certificate system and the differentiated feed-in obligation scheme. Even if according to the newly adopted legislation, the sector will be dominated by the differentiated feed-in obligation system, it is worthwhile to highlight the pitfalls hidden in the KÁT system as well. The Czech case of photovoltaic power generation support is presented as an illustration of the issue.

In our second study, with the use of REKK’s regional gas market model, the improvement of Hungary’s bargaining position -by the construction of new cross-border pipelines- was analysed preceding the preparation of the new 2015 gas import agreement with Russia. Our conclusions show that development of another network capacities with neighbouring countries - primarily with Austria, Croatia and Slovakia - would considerably reduce our dependence of natural gas arriving through Ukraine, and in addition, would eventually convince Russia to abandon its oil-indexed pricing.

Finally, our third article collects nuclear power plants under construction in the region, providing also an overview of the special situation of nuclear energy and related huge investments in East-Central Europe.

We are hopeful that we can provide lots of useful information to our valued readers also in the current issue.

Péter Kaderják, director
ELECTRICITY MARKET DEVELOPMENTS

In the second quarter of 2011, growth of factor markets observed in the previous quarter continued, supplemented by two strong supply shocks. Price of crude oil grew by 10 USD, while the price of ARA coal by 20 USD. Futures traded on the German market followed the path of the factor prices, baseload electricity was traded for 60 Eurocents, pek power for 70 Eurocents at the end of the period. Price of emission quotas exceeded 17 EUR. During the first quarter of 2011 the adjusted electricity consumption increased by 2% compared with the same periods of the previous years (2009 and 2010). From January 2011 on, auctioning on the Slovakian and Austrian borders was taken over by CAO, and a joint auction was introduced on the Serbian border. Changes occurred in the settlement of the balancing energy, namely the EEX limit price was replaced by HUPX. On the futures markets at the end of March the price advantage of the Hungarian market dropped to 20 eurocents, while the Czech and Slovakian base load electricity futures price for 2012 still remained 2 euros cheaper than the German markets.

International price trends

In the first quarter of 2011 international markets were determined by two strong shocks: the drop in oil production due to the Libyan crisis and the strengthened anti-nuclear measures following the Fukushima nuclear accidents. Price of the crude oil remained at December level until the middle of February reaching the value of 80-90 USD/barrel. In March, influenced by the Libyan events, price of the WTI oil passed the 100 USD/barrel price closing at 106 USD/barrel. Price surge of the ARA coal observed during the previous quarter tempered slightly in January. In the second week of March the coal price increased by about 10 EUR/ton compared to the highest prices of previous weeks: increase of oil price and news about shutting down seven German nuclear power plants resulted in a growth in demand. The price of oil on the last trading day of the quarter exceeded the period’s opening price by 15%, however, regarding the
price of coal a more moderate, 8% rise was observed.

The price of the EEX-traded 2012 electricity futures stagnated until mid-March, the baseload product price varied between EUR 50-55, the peakload product was priced EUR 10 higher. The 5 euros jump observed in mid-March could be caused by the already mentioned decommissioning of the seven German nuclear plants built before 1980, which happened just after the Fukushima nuclear incident. Prices of baseload and peak products stayed at the higher level until the end of quarter.

Similar to the earlier described situation, the price of the European Union Allowances (EUA) increased with a moderate 1-2% in January and February, then in March strengthened by EUR 2-2.5. During the three days when prices were on the increase more than 10% of total quarterly trade was realised, that is, an allowance volume of 130 000 tons was traded. Emission allowance demand probably jumped due to the observed demand increase of coal price.

Overview of the Electricity Market in Hungary

In the first quarter of 2011 the monthly temperature adjusted domestic power consumption, excluding seasonal impacts, was at average level, 2% above the 2009 and 2010 values. At the same time, the consumption within the quarter did show considerably large deviations: while the monthly quantity of January surpasses the one at the beginning of the previous year, in February and March a difference of about 1% could only be observed.
10.7% of Hungary’s electricity demand was satisfied with foreign sources, this being 4 percentage points higher than the previous year’s value, but by 2 percentage points less than the corresponding quarter’s import ratio of two years before.

The price of the monthly cross-border capacities was higher than 1 euro at the Romanian-Hungarian border only, the average price of capacities being 0.18 HUF. Similarly to the first quarter of 2011, Austrian-Hungarian and Serbian-Hungarian capacities were traded at above-average prices.

A major development on the market occurred when the Central Allocation Office, established by the cooperation of 8 system operators in July 2008, took over the allocation of yearly, monthly and daily auctions of Austrian-Hungarian and Slovakian-Hungarian capacities from January 1st. In the first quarter of 2011 the NTC based bi-lateral auctions were supposed to be replaced by flow-based allocation, but at the end of February, due to the under-development of the market, CAO suspended the introduction of the new mechanism for an indefinite period. Regarding cross-border trading, Serbian-Hungarian border the bi-lateral auctions were replaced by the joint auctioning, the yearly and monthly auctions being organized by EMS, the intra-day auction by MAVIR.

Price of spot electricity traded on the regional markets did increase compared to the preceding quarter by an average of 7%. HUPX price advantage observed during

Figure 6. Results of monthly cross-border capacity auctions in Hungary, Q1 2011

In the figure capacities mean the capacities offered for auction. Capacities were not sold fully in the period under review only if they were oversubscribed at a specific price since then the system operator regarded the next highest price as the auction price.

Figure 7. Comparison of day-ahead baseload prices on EEX, OPCOM, OTE and HUPX exchanges between April 2010 and March 2011

Source: CAO, EMS, HEP, MAVIR ZRt., Transelectrica
the preceding months disappeared, the Hungarian electricity exchange moved in tandem with the German one. The volumes traded on the Hungarian exchange almost doubled in comparison with the first quarter of preceding year: during the first three months 0.58 TWh was traded.

Year 2011 brought changes on the balancing markets as well: since January settlement price of balancing energy calculated by MAVIR will not be linked to the EEX based limit price, but rather to the limit price generated from the daily HUPX spot index. In the quarter, the average price of positive balancing energy was 30.6 HUF/kWh, that of the negative balancing energy -0.95 HUF/kWh.

Next year’s electricity prices in Hungary and in the Central-European Region

During the past three month on the Hungarian section of the Prague exchange 0.35 TWh electricity was auctioned in the value of EUR 19.1 million. The turnover was half as large as it was in the preceding quarter and in the corresponding quarter of preceding year.

To determine the 2012 baseload wholesale price, the futures baseload prices of the Czech, Slovak and Hungarian sections of the PXE were compared to those of the German exchange. In January the Hungarian baseload product was still by 90 eurocents cheaper than the German baseload product, but in February to the difference dropped to 50 eurocents, while in March to 25 eurocents. At the Czech and Slovakian markets the price of one MWh was 2 euros less compared to the German market.
HOT TOPICS

Dilemmas of renewable production support

From January 2012 the Hungarian Government plans to renew the support scheme of the renewable electricity generation. With the December 2010 expiration of the preceding regulatory period the question was raised about the type of tools to be used by the policy makers to achieve the goals of Hungary’s Renewable Energy Utilisation Action Plan (NCST). Last December it was rumored that a green certificate system would be introduced. However, the modification of the Electricity Act published on 16 March 2011 foreshadows the development of a differentiated feed-in obligation scheme, based on the German support system, which would grant different feed-in tariffs based on nameplate power plant capacity, generation technology and date of commissioning. It became clear too, that the KÁT scheme will be downsized to support renewable electricity production only, separating itself from co-generated production. It seems obvious also that time had come for large-scale biomass production, accounting for 70% of renewable electricity generation, since this technology is considered unfavorable. The new regulation is expected to be issued in July 2011.

In this article, the risks of differentiated feed-in obligation scheme are evaluated, based on the Hungarian and international examples from the past years.

Green certificate system or the KÁT?

European and Hungarian green energy support systems are usually setting quantity goals in the form of renewable share in gross consumption, or annual targets of renewable energy produces in GWhs. The most manageable method to meet quantitative goals is the introduction of a green certificate system, what forces electricity traders to purchase green certificates amounting to a predetermined proportion of their sales. The certificates are traded on a separate market and market prices independent of electric energy. Successful green certificate systems are operating in several states of the USA, and in Romania and Poland in the Central European Region. Main advantages of the system are that amount of green energy becomes exactly predictable and subsidies are allocated efficiently. In this case, efficiency means that the green certificate price provides the a necessary - but not more - support for producers, and benefits of production costs reduction generated by the fast technological development in the sector reaches the consumer in form of green certificate price reduction.

Critics of the supports provided by the green certificate system do call the attention on two main problems: first, the price volatility of green certificate and its influence of making project financing uncertain, second, the attribute of the system which encourages least cost solutions but not allowing introduction of an eventually more expensive, but, from national energy policy point of view, more advantageous technology, such as job creation or support of national suppliers. In the present Hungarian situation, risk of price increase of green certificates is rather real, considering that national green electricity objectives and scarce production capacities would probably render a permanent increase in the price of certificates. One may find however examples for limited differentiation between technologies as well: certain technologies in Romania may obtain two or three green certificates per MWs.

Pitfalls of KÁT system

Considering that on the short run the debate related to the question „green certificate system or KÁT?” is dropped, it is worthwhile to see, what kind of pitfalls should be avoided when the KÁT system is redesigned. The main pitfalls are:

- Risk of overpricing and oversupplying, introduction of quantity quotas.
- Strong political lobby group is formed against the downsizing/abolishment of KÁT support scheme, so it is difficult to exit from the scheme. Abolishment of the support scheme harms the predictability of investments.
- Benefits of technological development will appear mostly at producers.
- On the whole, the scheme might be too costly for the consumers.

Overpricing and oversupply in quantity

Case of overpricing and over-supply is illustrated by a number of international experiences.
related to KÁT systems. Considering that investor expectations related to green electricity support demand a predictability, that guarantees stable bank financing; the KÁT system tries to satisfy it through the announcement of a relatively long term (10-20 years) pricing system. If the initial KÁT tariff or its subsequent (a tariff indexed to the initial price) value promises substantial economic benefit (such as a faster than expected reduction of production costs), a „gold rush” commences and with the given KÁT price, several times higher capacities are planned to be installed. Such a situation took place in Hungary during the 2003-2009 KÁT support scheme period, when co-generation was subsidized; after announcing the first KÁT tariffs supporting utilization of wind energy, or between 2008-2011 in the Czech Republic, when the KÁT system of photovoltaic electricity production became very profitable, or in Spain, with its wind energy utilization example. Overpricing might be the consequence of the asymmetric information access existing between price-setter and producer or the faster than expected technology development. Anyhow, it is a very common situation.

Increased KÁT demand of unplanned quantity surges creates a gradually increasing pressure on raising prices of consumers. This is quickly recognized by the authorities responsible for regulation and they often make recommendations - leaving the basic characteristics of price-support system unchanged - for the introduction of quantity quotas related to production or installed capacities. In Hungary, such events occurred in 2006 in the case of wind power developments (introduction of a 330 MW quantity quota following a 1300 MW need for licenses), or when biomass-based electricity quotas were established, or during the introduction of rate-of-return based licensing system covering the length and quantity of KÁT subsidies. The regulator’s reactions might be even more stringent than the examples above, realized as a considerable KÁT feed-in price reduction or the fundamental modification of the previously issued support system. Such measures are introduced nowadays in the Czech Republic, details of which are presented in our case study below.

**Correction and political lobby**

Regulatory authority’s reaction speed and efficiency related to one of the above described problems of the KÁT system (namely the oversupply in quantity) is in a paradox way harmed by the will to stick to issued rules and thus, by the desire to maintain a stable regulatory environment. The situation is further complicated if an entrepreneurial group interested in sustaining the system is able to create an influential lobby position. In Hungary, this phenomenon is illustrated by the political dispute about the KÁT subsidies for cogeneration.

**Benefits of technological development**

One of the peculiarities of the KÁT system is that benefits resulting from production cost reduction generated by the renewable sector’s fast technological development remain with the entrepreneurs. This has an enhancing effect on investments, but from consumers’ point of view the system becomes more costly. This pitfall might be managed by an ex-ante announced degressive KÁT tariff system closely following the pace of production costs reduction. The price regulating authority however does not possess sufficient information on trends of future costs, which might lead to another regulatory setback.

Hence in the case of a differentiated KÁT system implementation an important risk emerges: namely that the renewable energy quantity targets set by the NCST can only be achieved with a higher cost than the tradable green certificate system, and introduction of ex post quantity quotas. In addition, most part of support higher than the efficient level goes to the producers, making the system even more costly for consumers. If the regulation does not take care of the quantity limits in a transparent manner in advance (for example by determining in advance that after realization of production quantities planned for certain technologies, the KÁT prices will automatically drop considerably), the regulation will probably change in a number of times, creating important regulatory uncertainties.

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1 The latter system introduces a quantity quota for the maximum subsidized quantity for each licensee, based on KÁT prices and ‘justified’ returns.
Stimulating photovoltaic (PV) electricity production in the Czech Republic

The 2002-issued Electric Energy Act introduced a differentiated and obligatory feed-in tariff and bonus system for the support of renewable electricity production in the Czech Republic. For individual technologies different feed-in tariffs were established, which were to be renewed annually by the regulator. The photovoltaic production received the most attractive tariffs, values of the feed-in tariffs and bonuses being 3-4 times higher than official prices established for other technologies. In 2008, for example, the price of 1 kWh of PV generated electricity was at least 54 eurocents.

Until 2008, PV based electricity production was negligible, but in 2009 its share was already 25% of all green electricity, and in 2010 it did already qualify for being the most attractive renewable electricity resource. Between January 2008 and January 2009 the number of licensed PV projects had a six-fold increase. By January 2010 installed capacities passed the 500 MW limit, and at the end of the year amounted to 2000 MW. Production and utilization of the capacities was significantly low. (see Figure 10.)

Investment surge had basically two reasons: attractive tariffs and quick decrease of PV investment costs, the latter amounting to even 40% (!) in 2009. This change was not followed however in time by feed-in tariffs. Thus the overpriced KÁT system in a country having lower than the European average solar exposure, was able in a short time period to generate considerable installed PV capacities.

Reactions from law makers and regulators

The regulating authority (ERÚ) did call the attention already in 2007 to problems of the feed-in obligation system. They claimed that without revision of the tariffs, this support system will exercise a price raising pressure on consumer prices. This was confirmed by the fact that the green electricity tariff component included in the electricity price quadrupled from the year 2008 to 2010. The Government started the corrections in November 2009 allowing the regulator to reduce tariffs by 5% of those renewable projects, which had already realized their returns. In the case of PV projects the tariff reduction could have reached the maximum allowed by the law. In February 2010 the Czech system operator CEPS and the distributors requested in a joint open letter to be allowed to keep the possibility of connecting new renewable projects to the network.

During the past year a number of measures were taken to slow down the expansion of investments. In June 2010 the Ministry of Industry and Commerce prepared the regulatory background of quantity quotas for green electricity capacities. The quota recommended for PV projects was 1700 MW which was surpassed by actual installed capacities at the end of the year. In September the government cancelled support for solar panel installations on agricultural land and also lifted the 5 years tax exemption of firms producing solar energy. At that time the increase of green electricity support demand for 2011 was estimated to cause a 12% increase in the public consumer price and 18% in the business sector. To avoid this, based on a government recommendation, the Lower House of the Parliament adopted the following measures:

- Those solar power producers, who built their capacities in 2009 and 2010 should pay an extra tax of 26%;
- related to the CO₂ quotas distributed in 2011 and 2012 a 32% extra tax should be paid;
- land-use fees of solar power parks located in agricultural land should be raised.

Finally, in November ERÚ announced that the 2011 feed-in tariffs will be decreased by 40% for PV producers with installed capacities below 30 kW, and by 51.5% in the case of larger capacities.

Source: ERÚ, Platts Energy in Eastern Europe reports
Analysing the pricing options of a new, long term natural gas import agreement

Hungary’s gas supply security greatly depends on the long run import agreement with Russia bound to expire in the middle of the decade. The preparatory negotiations for the next agreement will probably start within the next two years. Taking the two digit percentage difference between the oil price-indexed import prices and the prices on the European markets into consideration, it becomes vital for the Hungarian end users to see how strong negotiation position does Hungary possess by the time the new agreement is concluded. Our article attempts to analyse this issue.

Evaluation of buyer/seller bargaining positions is a rather complex task, especially if in the final decision political aspects independent from the sector might also play a side role for both parties. However, this aspect will be neglected and a possible, strictly economic logic will be presented that is suitable for an approximate analysis of contractual price effects of various infrastructure development options. Despite of its strong simplifications, this logical framework is able to demonstrate the major opportunities.

The main question is that in the second half of the decade (by the time the existing long term agreement runs out) what price levels can be reached in different markets through the various gas pipelines. By analysing the neighboring countries’ price levels using the regional natural gas market developed by REKK it was concluded that through the bidirectional Italian/Austrian and Austrian/Slovakian pipelines the present market sources are offering lower prices than the oil-indexed price that can be reached through Austria and Slovakia. Same possibilities in a somehow restricted manner will also be available through Croatia and Slovenia when reverse flow of the Croatian-Hungarian pipeline is granted.

The analysis was based on a prudent 10% and a more optimistic 20% East-West (i.e. oil-indexed and spot) price differential scenario assumption for the middle of decade. Naturally, this is independent of the fact that most probably the gas molecule arriving from Austrian or Slovakian direction will be of Russian origin. The competitive environment will not be able to fully exclude a higher priced supplier from the market, rather it will only sufficiently reduce its market share so that it is better off selling higher quantity with lower price than sticking to a higher price but at a lower market share.

In the analysis below we assume that with the conclusion of the Union’s Third Energy Package regional gas markets will considerably be integrated, thus in spite of long term agreements in force with our neighbouring countries, non oil indexed natural gas products will be available. Thanks to this, gas imported through Austrian-Hungarian and Slovakian-Hungarian pipelines may fully be of Russian origin as well with its purchase price arriving to Russian supplier similarly to the case of a direct Ukrainian-Hungarian cross border delivery. The only difference will be that the sum paid by the supplier in 2015 will amount to a mere 90% or 80% of the present oil indexed price.

In contrast, we assume the delivery through Croatia to be of a real alternative source, in line with the theory that appearance of a true competition in the Western part of Central Europe would not be possible without alternative suppliers. Hence an import through the Croatian-Hungarian pipeline – according to our assumptions – will really have a crowding out effect on Russian origin gas sales.

During our analysis an annual 11 bcm Hungarian import need was assumed, being a conservative overestimate of our expected exposure between 2010-2020. Quantifying the import possibilities – with our regional gas model – not only direct interconnecting capacities, but also demand/supply balance and other cross-border import capacities of countries located at „the other end” of pipelines were considered.

The 8 scenarios below were compared among themselves taking into consideration the infrastructure development options at hand:
1. Present infrastructure (Ukrainian and Austrian import capacities)
2. First phase of the Croatian-Hungarian reverse flow (2.1 bcm),
3. Croatian direction import capacity (2.1 bcm) plus the completion of the planned Italian-Slovenian (0.26 bcm in 2014), Austrian-Slovenian (0.15 bcm in 2014) and Slovenian-Croatian (1.1 bcm in 2011) expansions,
4. Croatian direction import possibility (2.1 bcm and related expansions) plus the first phase of HAG expansion (1.1 bcm in 2011),
5. Croatian (2.1 bcm) and Austrian (+1.1 bcm) import plus Slovakian-Hungarian interconnection (5.2 bcm in 2015),
6. Croatian (2.1 bcm) and Austrian (+1.1 bcm) import plus a second phase Croatian-Hungarian expansion (1.1 bcm in 2019),
7. Croatian (3.3 bcm) and Austrian (+1.1 bcm) import plus the first phase of the new Austrian-Hungarian pipeline (4.4 bcm in 2019),
8. Full Croatian (3.3 bcm) and Austrian (+1.1 bcm) import plus a second phase Croatian-Hungarian expansion (1.1 bcm in 2019),

The maximum direct import capacity according to the scenarios – excluding the Ukrainian-Hungarian pipeline – is represented by Figure 11. Above each scenario the expected year of construction is shown as envisaged by the existing network expansion plans.

Annual delivery volumes obtained from our regional gas market model are shown on Figure 12. The volume of gas delivered directly through Ukraine is calculated using the residual principle, since alternative directions were considered cheaper.

It may be seen that from scenario 4 on, demand for high priced deliveries arriving from Russian sources through Ukraine drops sharply. As soon as either the Slovakian-Hungarian or the second Austrian-Hungarian interconnection appears, the total Ukrainian-Hungarian pipeline (as infrastructure) is replaced with cheaper sources.

It is worthwhile to see however, that – knowing the alternatives – in what manner the pricing of gas delivered through Ukrainian pipeline varies within scenarios 1-4 and scenario 6 respectively.

First of all, costs borne by the transport company must be estimated. For this, the oil indexed pricing formula of the present agreement covering period 1996-2015 was used.

Based on oil price forecasts estimated up to the mid-1990’s, an average price of approximately 34 USD/barrel – expressed in 2009 real prices – could be calculated with. The oil indexed gas price formula based on these forecasts and the annual 10 bcm of imported volume presumably already covered the transportation costs and assured a reasonable return for the company.

In the followings – partly due to expected reduction of transported volume – it is assumed that in 2015 costs of the transporter will be covered only at an oil price of 50-70 USD/barrel, if contractual import price calculation still follows the present oil indexation.

Two types of stylized pricing strategies will be analysed. In the first one (oil-indexed pricing) the present formula valid for import delivered through the Ukrainian-Hungarian pipeline remains (with expected oil price of 95
USD/barrel), in the second (spot pricing) the Russian supplier accepts the 10% or in an optimal case even 20% cheaper spot indexing with the condition that in return – directly or indirectly – it keeps its whole 11 bcm export market.

The expected transportation profits resulting from the two pricing strategies may be compared to each other if the different scenarios and assumptions related to the various budgeting levels are taken into consideration. Results of this are shown by Figure 13.

Figure 13. illustrates annual extra profits of spot-indexed pricing belonging to each infrastructure development scenarios (with 11 bcm/year import demand assumed). The first case refers to a scenario with relatively cheap natural gas deliverable (return at a 50 USD/barrel oil price) and a 20% spot price-profit. In the second case spot prices are the same, while gas supplier costs are higher, resulting lower profits (costs cleared only at 70 USD/barrel oil price). The third and fourth cases contain a much more conservative, 10% spot price-advantage at low and high gas supply cost respectively.

If the scenarios analysed and network development plans result in negative profit surplus, (like all four cases of first scenario), then it is better for the Russian partner to sell its gas at a higher, oil-indexed price. At positive profit surplus values the reversed conclusion becomes valid.

In general it is true that a smaller spot price advantage increases also the possibility of achieving a spot-indexed pricing in the import agreement because in this case the Russian supplier’s losses become smaller as it abandons oil-indexation. Naturally a smaller spot price-profit means less savings in the case of a passage over onto market pricing.

Simultaneously, increase of gas related expenses have a quite contrary influence. More increased the Russian party’s costs are due to its natural gas transports, less it may gain from eliminating alternative sources (in our model deliveries through the Croatian border) by aggressive – i.e. spot-indexed- pricing. That is why it is less willing to abandon the oil-indexation.

Based on our calculations it may be stated that in the case of scenarios 1-3, or exclusively based on the presently available infrastructure (and the Croatian-Hungarian import capacity expansion expected before 2019), for the Russian partner it is profitable to maintain oil-indexation on any cost level and spot price advantage. With other words, without further network expansion gaining a ‘price discount’ approaching to the Western price levels is not really probable.

At a reasonable spot price advantage and/or with low natural gas supply costs scenarios 4 and 6 (reasonable HAG expansion or second phase of Croatian-Hungarian reverse flow) already contain such outcomes, which from a supplier’s point of view make justified a transition into spot-indexation.

In reality however – as shown by scenarios 5 and 7 –, either a second HAG-pipeline or a Slovakian-Hungarian interconnector would be necessary to see the Russian party reducing prices. Considering a possibly wide cost covering scale (of which unfortunately no further information is available) and various spot price advantages, a Western spot pricing or an equivalent oil-indexed price reduction for the next gas delivery agreement will not be in the interest of the Russian party without competition from at least one of these pipelines.

The strong Hungarian bargaining position resulting from scenarios 5 and 7 suggests that with the expected natural gas import demand of next decade, one of the two major investments is sufficient to make gas purchase at market prices possible.

It should not be overlooked, however, that during the post 2020 decade gas consumption...
of the power generation sector will probably increase considerably, creating an additional 3-4 bcm import demand, especially if domestic production decreases in the same time. Even if safe gas supply will be guaranteed by the infrastructure strengthened with the Slovakian-Hungarian interconnector pipeline or the HAG phase 2, to sustain market competition, realization of the other major pipeline project will probably be also needed. However, based on the available information, we can not firmly declare the necessity of both investments.
**Nuclear projects in East-Central Europe**

During the past decade the expression “nuclear renaissance” became a commonplace. The expected strong increase in global electricity consumption during the next 20 years (with about 75%) assumes a net nuclear capacity expansion above 100 GW. This will be generated mainly by the average 5-6% annual electricity consumption increase in China and the Asian region, and the ambitious nuclear plant building program planned to meet this demand. Measures targeting climate change mitigation, considerable increase of fossil fuel prices and efficiency improvements in nuclear energy production greatly improved competitiveness of carbon-free technologies, bringing eventually the nuclear energy into the forefront of investors’ interest even in the developed countries.

During the years of increased interest toward nuclear energy, the capacity expansion of the Paks Nuclear Power Plant was carried out and planning outlines of its lifetime extension and construction of new units (first named Teller, later Lévai project) was initiated. The Paks expansion was supported by all political forces (the energy policy concept for 2008-2020 adopted by the Parliament in the spring of 2008 resolutely supported the expansion necessity), legal support of building new unit(s) being resolved again by the Parliament in 2009.

Competitiveness of the new unit is influenced to a great deal by the capacity balance of neighbouring countries and investments in similar baseload generation units (primarily nuclear) planned in the region. The analysis of the experiences related to nuclear projects launched in these countries may help to avoid the most common mistakes made during investment.

In the followings some characteristics of nuclear projects planned so far in East-Central Europe (E-CE) will be presented. Our aim is to identify the driving forces behind the projects planned in the region, uncover the biggest risks endangering investments and map the factors influencing the failure or success of an investment.

Although in this article, detailed presentation of individual projects is beyond the scope of our analysis, the main parameters (capacity, reactor type, investor and strategic partner, expected date of commissioning) of the nuclear power plant investments are summarized in the table below.

In the followings our observations based on analysis of past history of the above projects will be presented, as possible, illustrated with some appropriate examples.

### 1. State resolution/decision

Nuclear power plant construction projects in the E-CE region are - without exception - state managed processes: launch date of investment, target date of commissioning, plant location, size of built-in capacity or type of reactors are all decided by the state. Realization of the projects

<table>
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<tr>
<th>Power-plant</th>
<th>Country</th>
<th>Investor, strategic partner</th>
<th>Status</th>
<th>Capacity</th>
<th>expected date of commissioning (Platts)</th>
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<tr>
<td>Temelin 3-4</td>
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<td>CEZ (100%)</td>
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<td>2024</td>
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<tr>
<td>Dukovany</td>
<td>Czech Republic</td>
<td>CEZ (100%)</td>
<td>*</td>
<td>1000</td>
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<tr>
<td>Mochovce 3-4</td>
<td>Slovakia</td>
<td>SE (Enel) (100%)</td>
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<td>JAVY5 (51%), CEZ (49%)</td>
<td>**</td>
<td>1000-1600</td>
<td>2020</td>
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<tr>
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<td>Slovenia</td>
<td>GEN Energija (?)</td>
<td>*</td>
<td>1000-1600</td>
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<tr>
<td>Belene</td>
<td>Bulgaria</td>
<td>NEK (51%), Rosatom (49%)</td>
<td>*</td>
<td>2×1000</td>
<td>2016, 2017</td>
</tr>
<tr>
<td>Visaginas</td>
<td>Lithuania</td>
<td>VAE (?) (project firm)</td>
<td>*</td>
<td>3400</td>
<td>2018</td>
</tr>
<tr>
<td>Zarnowiec</td>
<td>Poland</td>
<td>PGE (51%)</td>
<td>**</td>
<td>3000</td>
<td>2020</td>
</tr>
<tr>
<td>Klenpicz</td>
<td>Poland</td>
<td>PGE (51%)</td>
<td>**</td>
<td>3000</td>
<td>2024</td>
</tr>
<tr>
<td>Cernavoda 3-4</td>
<td>Romania</td>
<td>Nuclearelectrica (60,15%),</td>
<td>**</td>
<td>2×720</td>
<td>2016, 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enel (9%), ArcelorMittal (6%)</td>
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<td></td>
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*** In advanced stage, possible completion for planned date  
** In less advanced stage or with bigger delay, in the given case completion with less probability  
* Unprepared or stalled investment with low execution possibility with
is planned involving national electric energy companies, but their decision competence remains limited. Investment decisions are mainly made by governments and not by the stakeholder firms; in the first round, necessity of the projects is assessed mostly by government officials (usually the Minister of Economy), and almost without exception, they appear first in the country’s energy strategy document.

The dominance of state decision competence is well illustrated by the Czech case, where preparatory decisions of one of the region’s strongest and most independent energy company, CEZ, are overwitten, or modified by the Czech Government.

1.1 Czech Republic: Postponement of the EPC tender call and the state influence

The Czech electricity company, CEZ in the summer of 2009 did issue a tender call for choosing the EPC (engineering, procurement, construction) contractor for the execution of the two units (units 3 and 4) of the Temelin nuclear plant expansion. Through the 19 billion euros tender, an offer was also requested for building three additional units belonging to the Dukovany and the Slovakian Bohunice nuclear plants as well (in this latter one, JAVYS, the Slovakian state company, would have been participated as strategic partner).

One year after the tender call (when names of preselected companies were already known), following a government (primarily by the Prime Minister or the tender supervising government commissioner), notice the CEZ announced the postponement of tender call results publication together with the starting date of construction. Based on the reduced demand-forecast (in connection with the economic crisis and the post-2022 German operating time extension), the press had earlier speculated that CEZ would probably postpone the investment by a few years (according to analysts the 2016 price of 60-70 EUR/MWh is barely sufficient for starting the project). Referring to the security, economic and foreign political risks of the tender, Prime Minister Petr Necas declared that re-scheduling of the tender call and tender evaluation should remain a government competence.

The government intervention may be explained by the importance of the tender: types of planned nuclear plant units, capacities and exact date of commissioning are in general depending on EPC tender results, being an utmost important step in choosing the above parameters. For the management of the project and conveying of government positions, a government commissioner was already appointed in 2009 by the interim Government in the person of Vaclav Bartuska, who earlier acted as an “ambassador of energy security”. In a number of occasions, Bartuska called the attention to the dangers of dependence on Russian suppliers (the Czech Škoda company, which gained the right to apply for the tender in a joint venture with the Russian Atomstroyexport is owned by the Russian OMZ, while the nuclear fuel of Czech reactors is also supplied by the Russian firm Tevel). The appointment of a government commissioner beside offering the possibility to future government commitments, made also possible that Czech decision makers enforce different points of view during the course of the project. Such viewpoint might be the share of Czech suppliers (Westinghouse offered 70%), safeguarding/transfering the 55 year old Czech know-how or stronger country participation in the fuel-cycle (uranium mining, fuel rod fabrication, recycling).

Not much after the announcement of the few years delay in the project execution, the Prime Minister announced the need to inquire further questions related to the project. This inquiry, planning the preparation of six independent reports, beyond the possible common questions (such as time requirement for a necessary network planning, capacity of nuclear supervision, licensing costs of new nuclear units) should also cover such issues as: what are the weaknesses of the project preparation concept, what additional costs may appear in the financing and how the acceptance or refusal of bids might influence the relationship with the home country of the bidders.

2. Motivations for Security of supply

Primarily energy policy and security of supply motivations may support nuclear investments planned in the region. Fuel mix diversification, easing of the mostly Russian natural gas dependence, aiming for self-sufficiency (and as it may be the case, maintaining existing net exporting position), raising of emission quota prices were all very important aspects. Economic and return calculations (for instance those referring to future demand, preparation of estimates on electric energy prices, weighing the necessity of investment costs and financing needs) were less important, and in general they were carried out after project launch.
2.1 Slovakia: Substitution of nuclear units to be shut down

The Slovakian nuclear plant construction plans cover the substitution of decommissioned units at the Bohunice plant and of those units scheduled to be shut down. The first project is the expansion of the Mohovce plant with two 440 MW units each expected to enter operation in 2012 and 2013 respectively. Construction of the Mohovce units (3 and 4) was started in 1986, but due to lack of financing it was interrupted in 1992 after 70% completion of building activities and with 30% of equipment delivered. Construction restarting - with considerable government pressure - was announced in 2007 by the incumbent electric energy company, the Slovenske Elektrarne (SE), owned by the Italian Enel since 2006. The goal of the investment is the substitution of the two Bohunice units decommissioned in the recent years and recuperation of the country’s net export position.

The second project is the expansion plan of the Bohunice power plant with a new unit to substitute the presently functioning unit V2 scheduled to be shut down in 2025. The possibility of this expansion (new unit V3) was first raised in 2007 by drafting the Slovakian energy strategy by Minister of Economy Lubomir Jahnatek. At the July 2007 publication of the Slovakian energy strategy it was found that from the point of view of satisfying Slovakian electricity needs the critical period primordially appears between 2009 and 2013 (time period from closure of Bohunice unit 2 and start of operation of Mohovce units), when about 20% of domestic demand can only be satisfied with imports. To manage - at least partly - this challenge, in September 2007 the government prepared a 10-year framework agreement with Ukraine drafted to assure a 2-4 TWh import volume (according to the agreement the Slovakian party was supposed to take care of expanding interconnections and the full UCTE synchronization of the Ukrainian Burstyn plant).

However, the project was not realised and the economic crisis considerably reduced the Slovakian electricity consumption: compared to the 32 TWh envisaged by the energy strategy, the real consumption did not even approach the 29 TWh volume. This made necessary a much smaller import, amounting to a bare 5% of the consumption. From 2011 on when E.ON’s 417 MW Malzenice CCGT power plant is about to enter operation, the annual net import demand may drop to 1 TWh, which, after the commissioning of Mohovce units from 2013-2014 on may turn into an excess capacity. Following the entry of Mohovce units the Slovakian net export position will last until 2025 only, date when the decommissioning of Bohunice units 3 and 4 will take place.

2.2 Poland: “Ripening” of nuclear investment

The Polish energy strategy, the first version of which was published in 2007, already raised the possibility of nuclear power generation, but other options were kept open as well. According to the original document, satisfying the increase in future electricity demand, beside meeting the CO2 emission commitments, may be ensured with two means: either by nuclear power plant construction or by cheap (for instance Ukrainian) imports. However, the final strategy, adopted in November 2009, sides undoubtedly with the necessity of nuclear power generation. According to the strategy, by 2030 the present 95% share of coal and lignite in the fuel mix should be reduced below 56%, and the share of nuclear generation raised to an level at about 15%. As estimated by the President of the Polish Atomic Energy Office, to reach the strategy goals, by 2030 a nuclear power plant capacity of 10 GW would be needed.

Commitment to nuclear investments may be explained by the fact that in 2008, due to a number of events, security of supply considerations came in the forefront. In April 2008 a great snowfall caused the breakdown of two transmission lines leaving the Northern Polish town of Szczecin and its surroundings, 400 thousand people without electricity. In the report to the President of the Republic of Poland, the National Security Office requested the auditing of the Ministry supervising the energy sector. In spite of the fact that according to the Polish TSO and the system operator, the PSE, the Szczecin blackout was not caused by lack of capacities, the incident brought the security of supply and question of infrastructural investments into the forefront. Although the Polish system has a 10 000 MW reserve capacity, its availability is rather unsure: reserve capacities are provided by aged coal fired plants, and due to frequent servicing, outages and lack coal stocks. PSE analyses showed that in January 2008 share of reserve capacities was around 5%, meaning a considerable risk factor.

The possibility of gradual introduction of the emissions trading system, decided by a 2008 EU consultation, gave a great impetus to the Polish efforts. Furthermore, a proposal letting the poorest member states sell another 2% above
the already allocated 10% emission rights, if the resulting profits are to be spent on the diversification of energy mix, which could support a considerable source for the launch of the Polish nuclear projects.

The head of the “energy diversification” department of the Ministry of Economy claimed that the formal decision regarding the nuclear plans can be expected one year after the adoption of the Polish energy strategy in January 2010.

The last push to the Polish nuclear program was given by the 2009 Russian-Ukrainian gas conflict and the subsequent supply problems encountered. The Polish Government was finally convinced by these events that downsizing the coal fired power plant ratio without endangering the security of supply can be achieved only by having a considerable nuclear power plant capacity at hand. A few weeks after the gas conflict (not even waiting for the official adoption of the energy strategy) the Prime Minister announced the government decision on the building of two nuclear power plants of 3000 MW capacity each. The Prime Minister assigned plant construction and operation tasks to the biggest Polish electric energy company, the PGE.

3. Unexpected risks: financing difficulties and investor withdrawals

Governments forcing nuclear investments caused that the economic soundness and related possible risks had not been sufficiently assessed. The global recession compelled governments and investors to reduce expenditures. New governments were often obliged to withdraw former generous commitments and state assistance promises of their predecessors. The big, financially strong state owned firms were unable to provide their own capital, and observing this trend, strategic investors often withdrew from projects.

The ambitious concepts did not evaluate the danger presented by various competing projects and projects excluding each other. In parallel with the delays of projects, the strongly increased investment costs further complicated the situation. Risks resulting from the fluctuation of political support were stronger in the E-CE countries because the initiator of an investment is not a financially sound electricity company, but rather the state itself. Hence political cycles might considerably modify not only the implementation conditions, but the project owner itself as well.

3.1 Bulgaria: Limited commitment and financing problems

Restart of the 1991-suspended Belene nuclear power plant construction was decided by the Bulgarian Government in 2005 to compensate for the decommissioning of the two outdated 440 MW Kozloduy units being necessary as a condition for Bulgaria’s accession to the European Union. The Russian Atomstroyexport was contracted for the execution, but through international financing agreement(s) and involvement of a – Western - strategic investor the Bulgarian party intended to transform the investment into a European project. The project’s 51% shareholder, the Bulgarian national electricity company (NEK - Natsionalna Elekticheska Kompania) selected RWE as strategic investor, just a few days before the outbreak of the global economic crisis.

As shareholder, RWE planned to invest 1.275 billion euros, and as creditor another 300 million euros into the project, but in order to determine the exact value of its share, it wanted to see which sources and of what size make up the 51% part owned by NEK before signing the contract. The NEK and BNP Paribas in charge with creating financial backing for the project could not organize the financing package to be guaranteed by the Bulgarian party. In the mean time, it became also obvious for the involved parties that the originally planned project budget is way below the real one: according to industry sources the original 4 billion euros EPC agreement would suffice to finance a 1000 MW unit only (not much later the contractor Atomstroyexport itself did also modify its execution budget to 6.3 billion euros; the Bulgarian regulator estimated the total execution cost -including financing and network expansion costs- to 9 billion euros). Considering the emerging financial risks, RWE looked for another strategic partner willing to share the financial risks.

The more and more obvious financial difficulties were further complicated by the new conservative government of Boiko Borissov, which promoted a more stringent position with respect to the Belene project than its predecessor: not much after his appointment, the Minister of Finance declared that with 80% probability the project will be cancelled because for its financing neither state nor private resources are available. According to a Ministry of Economy declaration, till July 2009 (taking office date of the new government) 430 million euros were already spent for project preparation, and as said by the Minister of Finance, half of
the funds has been simply stolen. In September 2009 the Minister of Energy already stated that the Bulgarian Government intends to reduce the 51% NEK share to 20-30%. In the meantime the Russian partner claimed that it continues to be interested in the project execution and for this, he is ready to cooperate in assuring the necessary financing. The Russian nuclear state corporation Rosatom offered a 3.8 billion euros loan to the Bulgarian party, but to avoid excessive Russian influence, the offer was not accepted by the government.

Shortly after the announcement on NEK share reduction, RWE declared that due to the unresolved project financing (mainly uncertainty of funds to be provided by NEK and lack of state assistance) it withdraws from the project. In spite of the RWE withdrawal, soon after Rosatom assumed the 49% strategic investor’s role, the issue of financing at the Bulgarian part and involvement of Western professional investors still remains unresolved.

3.2 Romania: Reduction of state subsidies and investor withdrawals

Economic difficulties following the global economic crisis hindered the advance of well prepared projects as well, due to the fact that involuntary reduction of state subsidies is generally followed by investor withdrawals, as it happened in Romania.

The construction of Cernavoda nuclear power plant started in the 1980’s, originally designed for 5 generating units, presently has two functioning 700 MW Candu-6 type units (unit 1 started operation in 1996, unit 2 in 2007). Shareholder’s agreement about the construction of units 3 and 4 was signed in 2008: the Romanian state company Nuclearelectrica would possess a 20% stake, members of a six member international professional investor consortium (Enel, CEZ, RWE, GdF Suez, Iberdrola, ArcelorMittal) would have owned project shares of 10-15% each. The goal of the “scattered” shareholder system was to avoid a majority share ownership by individual investors and to keep state control in the project. Half year later the Romanian Government decided for a majority ownership of Nuclearelectrica (knowing that according to the Nuclearelectrica’s estimate, the originally planned budget of 2.2 billion euros rose to 4 billion euros within a year). To assure the majority participation, beyond Nuclearelectrica’s financial and in kind contribution, the Romanian state intended to provide a 1.02 billion euros state subsidy as well. Assurance of majority shareholding probably was connected to the intention to transfer 85% of the Romanian power plant portfolio into two major vertically integrated state companies. Accordingly, the shareholding structure of the new project firm, the EnergoNuclear established in 2009, was finalized as follows: Nuclearelectrica 51%, Enel 9.15%, CEZ 9.15%, RWE 9.15%, GdF Suez 9.15%, Iberdrola 6.2%, ArcelorMittal 6.2%.

The market participants did expect already in September 2009 that the Romanian Government, being forced by the economic crisis to enter into a credit agreement with IMF, will not be able to fund the 1.02 billion euros subsidy necessary to maintain its 51% share in the project and because of this, it will be bound to considerably reduce it (to an estimated 20-25% level). Therefore, the foreign shareholders of the project indicated their readiness to increase their contributions if the government decides to reduce Nuclearelectrica’s share.

However, when Andrian Videanu, the Minister of Economy announced that the government intends to reduce state participation in the project, it became obvious that the Romanian side is not willing to assume any financial burden related to the project. Most probably Nuclearelectrica’s participation could only participate in the project in kind (premises, infrastructure and supply of heavy water), and its exact share percentage (necessary for participation) could be established based on the evaluation of all in-kind contributions.

CEZ was the first to declare that due to the economic crisis they withdraw from a number of foreign projects, including the Cernavoda investment. A few months later GdF Suez, RWE and Iberdrola withdrew their stakes as well, justifying their decision with the insufficient state support remaining for the project. Nevertheless, the exiting investors stated that -from the point of regional electricity needs- they consider, especially seeing the difficulties at Belene, Cernavoda being viable and in case if obvious signal arrives from the Romanian Government related to a project re-start, they will be ready to participate again.

4. Financing difficulties and resolution attempts

In most countries construction of nuclear plants resulting from government decisions is assigned to state owned incumbent electric energy-industry companies. The firms in question generally (maybe CEZ being the only exception) are lacking sufficient funds (often lacking funds necessary
for maintenance and retrofitting of their existing power plant park) and their weak creditworthiness does not enable them to draw in considerable outside resources neither. To facilitate financing capabilities, some countries try to establish companies with bigger asset value and better creditworthiness by fusions. This intention often coincides with the commonly accepted aspirations in the region which aim at creating “national champions” able to compete with the huge European energy companies. However, fusions decided upon this way are not sufficiently deliberated and their long term influence on the operation of markets may become rather unfavorable.

4.1 Poland: Interventions in market structure to strengthen the "national champion" and to assure financing

Implementation of the nuclear program envisaged by the government also raised structural questions related to the electricity sector as well. One of these was the possible merger between PGE and a company before privatization. PGE, through the purchase of the to-be-privatized electricity group Energa, expects to create a market for the future nuclear plant and simultaneously to improve its creditworthiness (this latter being unavoidable for financing its planned 51% project share). Energa is the smallest of the four large, vertically integrated electricity companies (PGE, Tauron, Enea, Energa) created in 2008, with a market value of about 4-5 billion euros, serving about 2.7 million consumers living in central and Northern Poland (having a 16% market share on the retail market). As its production capacity is rather small in comparison to its share in the retail market, Energa would be a natural complementary to PGE, which has a 42% share on the electricity production market, but only a 26% cut on the retail market. An even more advantage of the merger is that, PGE's market and asset value would increase considerably, generating an additional creditworthiness just sufficient to finance the 51% PGE share in the two nuclear plant construction projects.

In September 2010, PGE, openly supported by the Prime Minister Donald Tusk, signed the agreement with the Ministry of Finance, acquiring 84% of Energa.

According to the Prime Minister, the deal will help PGE to become a “national champion” company able to compete easier with large European electric energy-industry companies. The strong government pressure on the Office of Competition and Consumer Protection aroused strong concerns among experts: well-known Polish economists, led by Leszek Balcerowicz, protested with an open letter against putting pressure on the independent Office of Competition (even the Washington Post wrote about the possible layoff of the President of the Office of Competition). Finally the merger was not approved by the Office of Competition, but PGE announced that it will appeal against the decision. PGE argued that the refusal was based on a false inquiry, since the market was determined on a national but not a regional level.

4.2 Lithuania: Joint project, disputes between partners

Export oriented projects involving more countries envisaged to reduce financing and sales risks are not really viable. Sharing of responsibilities, the different commitment level from country to country and the lack of an exclusive country stake signifies that no such player can be found, who is able and ready to shape compromises acceptable for all.

Prime Ministers of three Baltic states, Estonia, Latvia and Lithuania, signed a declaration of intention in February 2006 about constructing of a new nuclear power plant. Soon after, Lithuania announced its claim to draw Poland into the project, requiring the resolution of the long-time started Powerbridge project.

In the summer of 2007 the Lithuanian Parliament – before the participating countries could have agreed on essential project questions – adopted the act on the construction of the nuclear plant, constituting of two, 1600 MW units each. Lithuania would possess a 34% share, the Estonian, Latvian and Polish counterparts having a 22% share each.

Signature of the four-party inter-governmental agreement planned for 2007 was thwarted a number of times: in July due to internal-political tensions the Polish Prime Minister could not travel to Vilnius; later, because of the approaching elections, Jaroslav Kaczynksi could not be present at the meeting scheduled for October. Signature of the agreement and the Polish participation strongly supported by Lithuania have however obvious substantial barriers too, namely that: (i) before the signature of the agreement by the participating countries, the Lithuanian Parliament had already adopted the act on the construction of the new nuclear units, thus facing the partners with a fait accompli; (ii) in order to
export the energy produced in the new units, the polish party should facilitate the accession of the Lithuanian grid to the UCTE and the development of the polish transmission system (PowerBridge project) (iii) the Lithuanian party should guarantee that they would not reexport cheap Russian electricity through the future Polish border; (iv) the Polish claims a 1000-1200 MW capacity of the new units; at a smaller share it would not be worth for them to complete the cross-border network development requested by the Lithuanian party, estimated by Polish experts to cost about 500 million euros.

The largest –and so far unresolved- tension is caused however by the 1000 MW capacity demand of the Polish party, the satisfaction of which would mean a reduced capacity/share for the Estonian and Latvian party. Because of the obvious suspension of the project, the countries involved are getting more and more nervous. At a September 2007 meeting with his Finnish counterpart, Estonian Prime Minister Andrus Ansip raised the possible Estonian participation in the construction of a Finnish nuclear reactor and the installation of the 650 MW Estlink-2 submarine power cable. In Latvia the voice of the anti-nuclear-plant groups got stronger: the Latvian Ministry of Environment together with other 7 fellow-ministries signed a joint declaration on dangers of nuclear energy production.

Abbreviations int he Report

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>APX</td>
<td>Amsterdam Power Exchange</td>
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<td>ARA</td>
<td>Amsterdam-Rotterdam-Antwerpen</td>
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<td>ANRE</td>
<td>Autoritatea Națională de Reglementare în domeniul Energiei</td>
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<td>CEGH</td>
<td>Central European Gas Hub</td>
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<td>CER</td>
<td>Certified Emission Reduction</td>
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<td>European Carbon Exchange</td>
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<td>ERÚ</td>
<td>Energetický regulační úřad</td>
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<td>EUA</td>
<td>European Union Allowance</td>
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<td>HAG</td>
<td>Hungary-Austria Gasline</td>
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<td>HEO</td>
<td>HUNGarian Energy Office</td>
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<td>KÁT</td>
<td>Feed-in obligation system</td>
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<td>OPCOM</td>
<td>Operatorul Piete de Energie Electrica</td>
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<td>OTE</td>
<td>Operátor trhu s elektrínou</td>
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<td>PGE</td>
<td>Polska Grupa Energetyczna</td>
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<td>Polskich Sieci Elektroenergetycznych</td>
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<td>PXE</td>
<td>Power Exchange Central Europe</td>
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<td>SEPS</td>
<td>Slovenská elektrizačná prenosová sústava</td>
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<tr>
<td>UCTE</td>
<td>Union for the Coordination of Transmission of Electricity</td>
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<td>WTI</td>
<td>West Texas Intermediate</td>
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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 downloaded from the homepage http://rekk.eu/sos.
National Energy Strategy of Hungary

REKK has produced the economic impact assessment for the National Energy Strategy of Hungary, procured by the Ministry of National Development.

The impact assessment helps to unfold the economic implications of the government measures taken to ensure long term supply of secure, competitive and sustainable energy services, and highlights the possible stimulation possibilities for the sector. The three sub-markets of the national energetic are analysed in an integrated framework.

It is worthwhile to note, that the current underlying principle of the sector, that is regulated market competition financed by private capital is considered a sound concept, and no considerable change of this principle is taken into account during the time period covered by the Strategy. However, for some sections of the market, state intervention exceeding routine market monitoring exercises may be beneficial, since it can facilitate to reach such goals which would be impossible to reach due to market failures. The nearly 100% CO2 reduction set by the European climate policy may be considered as a good example, which poses a great challenge for the energy market players and governments as well.

Our analyses focuses on the following topics, in the need of strong government intervention:

- Question of nuclear power utilisation
- Question of incentives for renewable electricity and heat generation
- Ensuring the production capacities necessary for the secure operation of the power grid
- Issue of the diversification of import natural gas sources
- Enhancing household and public energy efficiency, especially for buildings.

The full study can be downloaded from our homepage.

Introduction to Energy Regulation

The Energy Regulators Regional Association (ERRA), in cooperation with the REKK staff, will organize its 9th summer university “Introduction to Energy Regulation” in Budapest between 11 and 15 July, 2011. Participants will obtain an overview of regulation issues ranging from regulation of vertically integrated industries to the regulation of competitive electricity markets. The basic know-how acquired by participants may be further developed at the subsequent course “Monitoring Activities of Energy Regulatory Commissions” to be held between 18-21 July. The topics of price and quality regulation covered, on the specialized training are supplemented by interactive market simulation and regulatory games.

More detailed information on the past and current summer universities may be found on http://www.erranet.org/Events