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# **Liberalisation of Natural Gas Market – EU Vision vs. Reality**

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**IES Occasional Paper: 2/2009**



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# Liberalisation of Natural Gas Market – EU Vision vs. Reality

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**Abstrakt:**

In the article, I focus on the goal of creating a single competitive European natural gas market. After a brief discourse on the debate between theoretical and practical economists on the best mode to liberalise the energy sector, I lay out the vision of the European Union for gas market liberalisation and its outcome. With the help of a case study from the Czech Republic, I explain that the competencies of the European Union to reach its goals in a sufficient way are limited and, moreover, that EU reforms may even create unintended, negative side effects, which in some cases deliver less benefits than costs. The cause is the basic features – or the “nature” - of the gas market and the different institutional settings of each member state within which liberalisation has been implemented. The third package of legislation introduced by the European Commission in September 2007 should boost the single competitive market. Proposed provisions influence legal and regulatory rules and have an impact on market structure; however, none of these provisions have the power to change the key characteristics of the gas market, which remain the real source of the problem, namely the lack of self-sufficiency of the EU with regard to sources of natural gas and the oligopoly nature of important gas producers out of reach of EU legislation. The impossibility to change these key characteristics of the gas market indicates that a more important challenge than the third package will be active foreign policy of the EU, aimed either at opening markets beyond the EU border or at protecting fragile competition.

**Keywords:** gas sector, liberalisation, unbundling, market structure, market performance, European Union, Czech Republic

**JEL Classification:** G34, L1, L43, L95



## ***Theoretical Discussion***

The gas sector exhibits some features of market failure: scope and scale economies (Glachant and Finon, 2000, Williamson, 2000, 2002), and the attributes of natural gas as a public good inspire the application of the theory of natural monopoly. Yet in the '80s the European natural gas sector was characterised by divided national markets with a limited number of vertically or horizontally integrated firms of significant market power (Newbery 2000, 2002 a, b). Network operators acted simultaneously as suppliers. Vertical integration of gas companies in the value chain (gas extraction, import, transmission, distribution, storage, wholesale<sup>1</sup> and retail supply) was considered to be the optimal gas market structure to enable the realisation of scope economies. In line with most economic textbooks<sup>2</sup>, gas companies were considered to be a key part of the public (state-owned) sector with specific regulations. However, under the influence of the stagnant competitiveness of public network utilities, some doubts about the abovementioned formation and its theoretical explanation arose, and academic views that this state of affairs needed to be overhauled gradually won recognition (Mejstřík, 2004).

In the '90s, a discussion took place between theoretical and practical economists about increasing the effectiveness of utilities. Suggestions for privatization and liberalisation were made (Midttun, 1997 and 2001, Vickers and Yarrow, 1988, Newbery, 2001a and 2002c, Glachant and Finon, 2003). Moreover, liberalisation of the gas sector became a means of reaching the single European market (free movement of persons, goods, services and capital within the EU).

How to accomplish the sector transformation was a primary topic. Common consensus ruled that industry

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<sup>1</sup> For the purposes of this paper, by 'wholesale supply' I mean the sale of gas to retail suppliers by means of a transmission network. By 'retail supply', I mean serving and selling gas to end-customers by means of a distribution network.

<sup>2</sup> (e.g. Nordhaus and Samuelson, 1989)

performance is influenced by basic conditions (technical infrastructure, laws, regulation, etc.) and market structure. So in order to make the mechanism of competition begin to function, it was not enough to declare the market open (Glachant 2003, Holburn a Spiller 2002, Joskow 2002), as there was also a need to change the legal aspects and market structure and the form of corporate ownership. Among the suggestions were laws to break the monopoly in the commercial activities of supply and import, to break the barriers in the gas trade between national markets, and to enforce the free access of the third parties to gas networks (Glachant 1998, Glachant and Finon, 2004). Working towards liberalisation, emphasis was placed on the institution of regulation, namely regulatory bodies and rules (Armstrong, Cowan, Vickers, 1994b, Newbery, 2004).

One obstacle to the straightforward accomplishment of liberalisation (Newbery, 2002c) was the original model of vertically integrated utilities (VIU), which contained naturally monopolistic activities related to the gas infrastructure, as well as activities potentially exposable to competition (import, wholesale and retail supply) - let us call them “commercial activities”. Disagreement among economists emerged as to whether or not the division of integrated companies, so-called unbundling, should forego the liberalisation of gas utilities. During the course of the discussion on unbundling, economists conferred on the positive effects of competition and the deficiencies of regulation; both concepts indicate the consistent unbundling of commercial activities from monopolistic ones and the replacement of regulation with competition (Mejstřík, 2004). On the other hand, disintegration would mean a loss of synergies of VIU. The argument depends on whether, after unbundling, the benefits of introducing competition offset the disadvantages that would emerge from the loss of synergies (Iimi, 2003, Bjoerkroth, Groenblom and Willner 2006).

According to Glachant and Finon (2004), two concurrent market theories influence the difference of opinions of economists on unbundling:

- § The standard market theory considers that the number of players and competition at different levels of the natural gas value chain determine the players’ conduct and the efficiency of the markets (Armstrong, Cowan, Vickers, 1994b, Newbery 2001b). This suggests that commercial activities must be horizontally disintegrated among significant market players. Organisation of the interface between different parts of the value chain limits the exercise of market power by incumbents. This suggests a clear separation of commercial activities from the transmission system operation. Secondly, vertical integration between import/wholesale supply and retail supply under a hierarchical structure must be limited in order to limit entry barriers.
- § A model of virtual competition proposed by the theory of contestable markets (Baumol Panzar, Willig, 1982) considers that, rather than structural conditions, the technical and jurisdictional conditions allow a credible competitive threat and virtual competition. The main objective of competition could be better reached by suppressing legal and technical barriers to entry. A credible threat of entry exerted by foreign competitors that are incumbents in their adjacent national markets would lead to effective allocation. In other words, industrial structures –

horizontal concentration and vertical integration of import/wholesale supply and retail supply – might be preserved if non-discriminatory access to grids is guaranteed to the incumbents' potential competitors with a complete unbundling of the networks.

Willner (2003) and later Bjoerkroth, Groenblom and Willner (2006) also came to the conclusion that liberalisation would have no need to bring more contribution than a welfare-maximizing public monopoly, if the gas industry remained imperfectly competitive. Liberalisation could come about either by market consolidation or deepening horizontal integration, which ultimately could bring higher prices and a transfer of strategic decision-making into the hands of a limited number of large companies. The intended opening of the market to new suppliers would become more difficult, and further regulation would be needed. Newbery (2001c) pointed to proactive antitrust policies with the goal of resisting the power of vertically and horizontally integrated firms.

## ***EU Vision***

In pursuit of increasing the welfare of gas consumers, and along with the discussions regarding the efficiency of energy firms and the anticipated growth of the European dependence on importation, the European Union (EU) decided to open up the national gas markets to competition and to integrate them into **a single liberalised European market** in natural gas by utilising the integrated pan-European network and the cooperation of the network operators.

The EU defined **unbundling** as the primary means of vertically integrated market liberalisation. First, accounting unbundling was enforced, then functional and legal unbundling. Recently, ownership unbundling was suggested by the European Commission. Legal unbundling led to the separation of the transmission system operator (TSO) or distribution system operator (DSO) providing services with characteristics of a natural monopoly (transmission and distribution through gas networks) from the rest of the vertically integrated gas undertakings (VIU), above all from gas extraction and activities which could be exposed to competition (import, wholesale and retail supplies). The goal of unbundling was to prevent showing partiality towards the vertically integrated supplier/trader and to ensure the fair non-discriminatory access of third parties (TPA) to the existing gas infrastructure.

**The area of the “commercial activities” gas import and supply was decided to be liberalised.** From liberalisation, the EU expects that new shippers/traders/suppliers (including international players) will enter the wholesale/retail market, and customers will be eligible to choose one where the products, services and prices suit them. Competition between shippers/traders/suppliers should bring innovation, push prices down and increase the quality and diversity of the products and services on offer, including types and lengths of contracts between market players. Market liberalisation and integration should increase the security of supply through the diversification of sources and transport routes. Natural gas prices should be de-coupled from oil prices and should be determined by matching demand and supply on

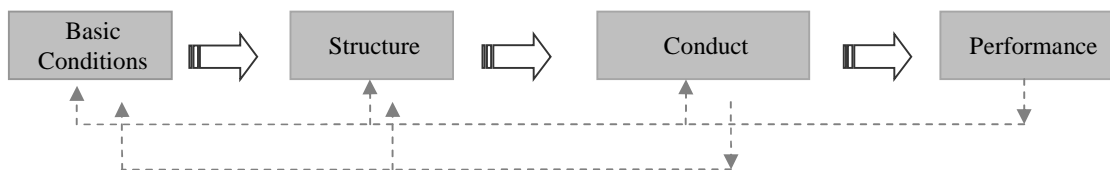


newly established stock exchanges and secondary markets.

**The area of naturally monopolistic network activities was designated to be regulated and harmonized.** The EU has formed independent national and supranational regulatory bodies, which set down the rules of fair access and transparent price-setting with regard to transmission/distribution, and which supervise the observation of the same by the gas network operators. The EU anticipates that unbundled operators will secure fair access for competing shippers/traders/suppliers to the infrastructure, and that they will compete in attracting them (pipe-to-pipe competition of different transport routes should arise additionally to gas-to-gas competition in the commercial area). Network operators should aim to maximize the usage of network capacity, which should lead to the removal of bottlenecks; they should be motivated to invest in new interconnections, which will contribute to pan-European network integration.

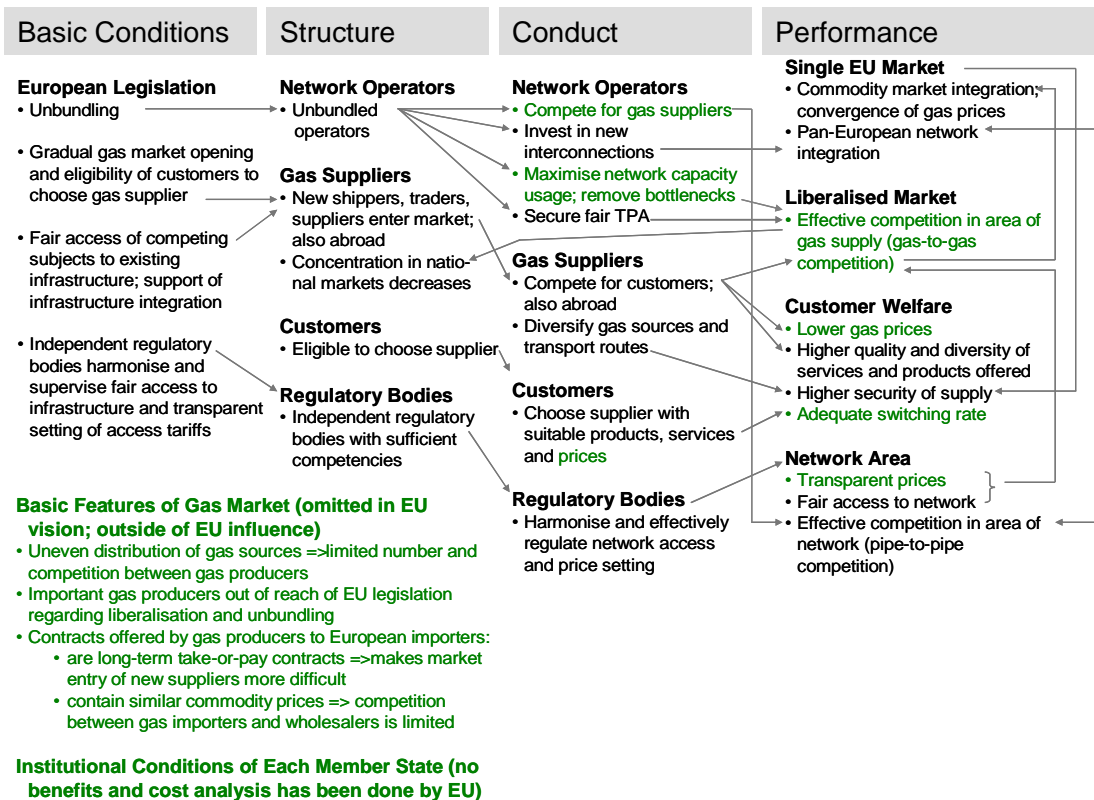
To structure the abovementioned EU vision, I have used the so-called “Structure-Conduct-Performance” model (SCP), defined by Scherer (1980). He took the hypothesis that the Basic conditions influence the market Structure. Basic conditions and market Structure influence the Conduct of market players, thus further determining the sector Performance. The consequences also run in reverse (e.g. performance influences the market structure, etc).

*Figure 1: Basic Scheme of Structure-Conduct-Performance Model (SCP)*



Under Basic conditions, I understand the legislative (legislation, regulation) and economic framework (ownership of sources, production technology, existence of substitutes, entry barriers, etc.) within which the sector operates. I further characterize the market Structure by the number and size of firms on the market, meaning market concentration. As sector Performance, I define the goals that were set by the EU to be reached through the liberalisation process.

Figure 2: Single Liberalized EU Market for Natural Gas - EU VISION (SCP Scheme)<sup>3</sup>



## Basic Features of Gas Market and Czech Institutional Settings

The abovementioned EU vision regarding goals and instruments appears relatively logical. However, there are some **basic features of the gas market** that are omitted in the EU vision and are outside of EU influence, which hinder fully reaching the EU goals. The most important factor is the uneven distribution of gas sources across the world. This causes the lack of self-sufficiency and the geopolitical dependency on importation of much of Europe on the oligopoly nature of only a limited number of important gas producers out of reach of EU legislation. Limited competition in gas production and the high costs of gas extraction influence the content of European gas import contracts, which, out of reach of EU influence, seem to be crucial for success in the EU liberalisation process:

- Firstly, gas producers secure their investments in production fields by long-term take-or-pay export contracts. The long-term characteristics of the European import contracts make market entry for new players more difficult
- Secondly, as referenced by the European Commission in its 2004 benchmarking report on implementing an internal market in the gas sector, wholesale gas prices in most Member States are

<sup>3</sup> Source: Author's chart based on the following documents: Directive 2003/55/EC, European Commission (2000 b, 2005 a,b, 2007 a,b,c,e), Joint Working Group of the European Gas Regulatory Forum (2001), Kroes (2007 a-c).

similar, whereas at the retail level considerable divergences occur<sup>4</sup>. But what does this mean? The impossibility to import gas at significantly lower prices implies that, in reality, commodity price competition between importers does not exist. So the price competition of EU importers, wholesalers and retailers is limited to *margin-based competition* only.

Next to these basic factors, there are also **different institutional conditions of individual Member States**, which determine European implementation into the practise of each country (gas source structures, national legislation and regulation, technical infrastructure, pre-liberalisation structure of end-customer prices, organizational and ownership structure of the sector):

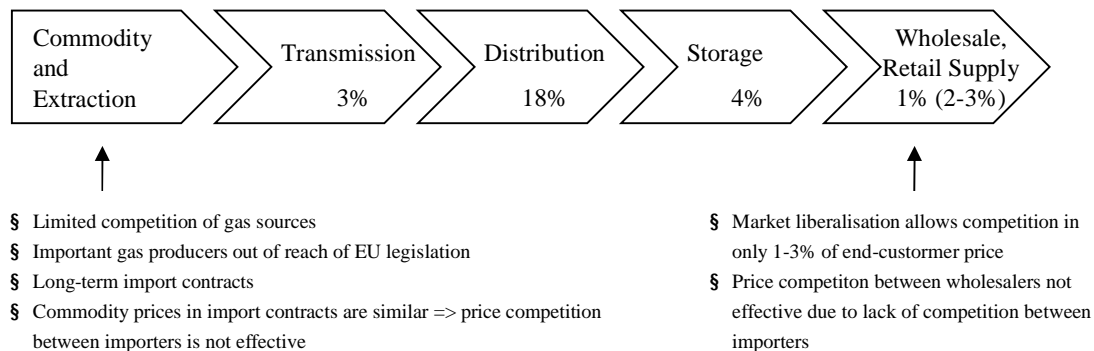
- a) The Czech Republic is not self-sufficient in natural gas sources; in fact, 99% of the natural gas consumption is imported. The import diversification rate is low: 75% of imports come from the Russian company Gazprom, and 25% from a consortium of Norwegian producers. Natural gas prices in import contracts are linked to the price of oil derivatives<sup>5</sup>.
- b) The transmission system of the CR is, to a significant extent, connected to the European system and, contrary to most other Member States, shows an excess of free contractual and physical capacity.
- c) On the Czech market, there were nine VIU before liberalisation: eight regional companies in the field of distribution and retail supply, and the company RWE Transgas holding a monopoly in the field of transmission, import and wholesale supply and with a dominant position in the field of gas storage. Gas extraction (1%) and storage have, to a small degree, also been provided by two other companies.
- d) Supply margins on the Czech market were already low before liberalisation. Approximately 74% of the natural gas price for the Czech end-customer is untouchable by the EU – it is a commodity price assessed by producers outside of the EU and linked to oil prices. About 25% of the end-price is determined by transmission, distribution and storage activities, and just 1-3% of the price is obtained by wholesale and retail supply activities.

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<sup>4</sup> European Commission (2007d, p. 8)

<sup>5</sup> From the rest of the EU, only the Netherlands and Great Britain have own gas sources worth mentioning. On the other hand, the Central and Eastern European countries of Estonia, Latvia, Lithuania, Poland, the Czech Republic, Slovakia, Hungary and Slovenia import gas only or mainly from Russia. The EU as a whole imports some 60% of its annual consumption mainly from Russia (23% of annual consumption), Norway 16% and Algeria 10%. Other sources cover not more than 2% of annual consumption.

Figure 3: Composition of Gas Price for Czech End-customer (according to value chain)<sup>6</sup>



In the Czech Republic, the market was gradually opened to competition between 2005 and 2007, with all customers becoming eligible to choose their supplier. Transmission system operator has been legally unbundled since 2006, followed by distribution system operators in 2007. However, although the legislative framework of the Czech Republic (CR) copies the EU Directives and Regulations, the impact of liberalisation on the Czech gas sector is not positive in all respects. In the next chapter, I describe the impact of the liberalisation process in the CR consequent to the basic features of the gas market and the specific Czech institutional settings.

## ***Consequences of Liberalisation Process in Czech Republic***

### **Unbundling**

Natural gas prices have increased as a result of unbundling. The implementation of accounting, functional and legal unbundling created additional costs for TSO and DSOs, especially in the area of information systems; moreover, legal unbundling led to a loss of synergies of VIU, above all in the sphere of internal services, such as Human Resources, Finance, Controlling, etc. All of these costs will ultimately be borne by the customers.

The number of the original nine VIU on the Czech market have more than doubled as a consequence of legal unbundling (the consolidation of the number of successor companies has been hindered by the minority shareholder structure which was set up in the privatisation that took place before the liberalisation). With the goal of optimising the group structure, VIU have established service companies and have begun to share some services within the group. The cost structure of TSO and DSOs has been fundamentally changed: the share of primary costs created by the regulated company has decreased in

<sup>6</sup> I have quoted the figures from the Energy Regulatory Office (2005 a). Some other sources quote a 2-3% share of wholesale and retail supply activities on the total end-customer price. The percentage can differ slightly in different periods of time and for different customer categories because of volatile commodity prices and different allocations of costs of gas companies into each customer category.

favour of the costs for services outsourced to service companies and other group companies. Generally, it can be summarized that, from the regulator's point of view, legal unbundling, contrary to vertically integrated configuration, decreased the cost-transparency of the network companies. On the other hand, the question remains whether regulators actually see the costs of network operators from the bottom-up perspective on the basis of benchmarking individual network activities, or instead from the political top-down perspective.

### **Liberalisation in Commercial Area**

In the Czech Republic, gas market liberalisation has brought decreasing market concentration: among others, 2 new importers/suppliers have cropped up, linked to Russian producer Gazprom (WINGAS, VEMEX), and even if the number of eligible customers who voluntarily switched their supplier is relatively small (68 out of more than 2.7 million customers from the market opening on 1/1/2005 until the end of 2007), the incumbents have recently lost around 30% of the market if measured by volume.

So, the market opening and low level of gas source diversification (RWE Transgas imports 75% of its gas supply from Gazprom; WINGAS and VEMEX, 100%) in connection with unintended costs born by incumbents marks a tendency towards the strengthening of the producers' bargaining positions and towards the future transfer of profits abroad. As a logical consequence, economic competition is not very efficient. Gazprom has clearly proclaimed its strategy to penetrate the European wholesale and retail market: it either uses its affiliates (e.g. VEMEX and WINGAS) or in the short run sells gas to new subjects. This also highlights the fact that long-term contracts between incumbent wholesalers and Gazprom, which are being prolonged, do not count with the gas volume increase, although gas consumption in the EU will rise.

Market concentration may potentially further decrease by the entry of existing international companies on the Czech market. Their entry is already made possible by unused transmission capacity and the significant connection of the Czech transmission system to the European infrastructure.

A deepening of economic competition can be expected in terms of gas source diversification and improving services and products offered by suppliers, but not in terms of price competition:

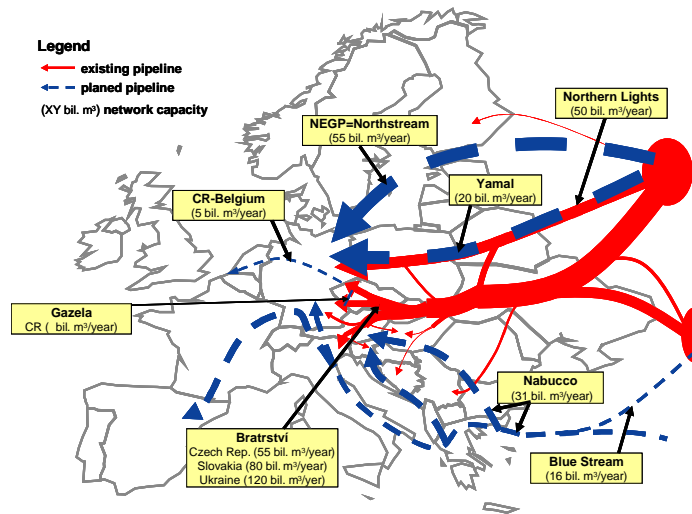
- § Gas source diversification may increase after new sources have been won by suppliers, whether incumbents, new national players or existing international companies entering the Czech wholesale market. Transporting new gas is already made possible by the significant connection of the Czech transmission system to the European infrastructure and by unused transmission capacity.
- § Price competition in the case of the CR is not effective. With similar commodity prices of EU importers, price competition between EU players is limited to margin-based competition. But the margins in the Czech Republic were already low before liberalisation. Even the hardest fought

competition can bring savings of only up to 1-3% of the gas price to the end-customers (this comprises the share of the wholesale/retail supply activities within the total composition of the CR gas price).

### Non-discriminatory Third Party Access

The opening up of the market and implementation of non-discriminatory third party access has a positive impact on the establishment of pipe-to-pipe competition. TSOs will have to mutually compete for Gazprom and European suppliers using the transmission capacity. This forces TSOs to further integrate with the European infrastructure. RWE Transgas plans to build a new pipeline connecting the CR and Belgium<sup>7</sup>; moreover, two branches of the existing transmission system in the CR should be connected in the north-south direction.

*Figure 4: Pipe-to-Pipe Competition Enforces Network Integration (Is unbundling really necessary in all countries?)<sup>8</sup>*



<sup>7</sup> This connection should bring more Russian gas to Europe, but also gas from the Near and Middle East, as well as Egypt.

<sup>8</sup> Source: GTE (2005), Homann (2003), European Commission (2007a), [www.rwe-transgasnet.cz](http://www.rwe-transgasnet.cz)

## Customer welfare

As of today, all Czech customers are eligible to choose their supplier; nevertheless, they do not switch enough. This is caused by limited price competition between suppliers.

The implementation of the European proposals in the CR will probably not bring the anticipated<sup>9</sup> decrease in the price of gas; the effect of the price increase as a consequence of unbundling will probably not be outweighed by the effect of savings from introducing competition in the area of supply. Czech gas prices will further increase due to the convergence towards EU price levels, as market integration continues. The only factor able to bring gas prices down is the willingness of gas producers and/or the decreasing price of oil derivatives.

*Table 1: Average Prices for End-customers in Czech Republic (CZK/MWh, before VAT, rounded to whole CZK)*

Customer category according to Eurostat	2004 - before market opening	2005	2006
I4-1	500	518-674	786-827
I1	553	586-742	699-742
D3	666	687-829	834-871

*Note: In 2005 and 2006, minimum and maximum quarterly prices are quoted*

*Source: Energy Regulatory Office (2005b, 2006, 2007)*

Market opening and infrastructure interconnection can potentially increase the security of supply for Czech customers, as it may add new sources from North Africa, the Caspian Sea region, etc. to the existing imports from Russia and Norway.

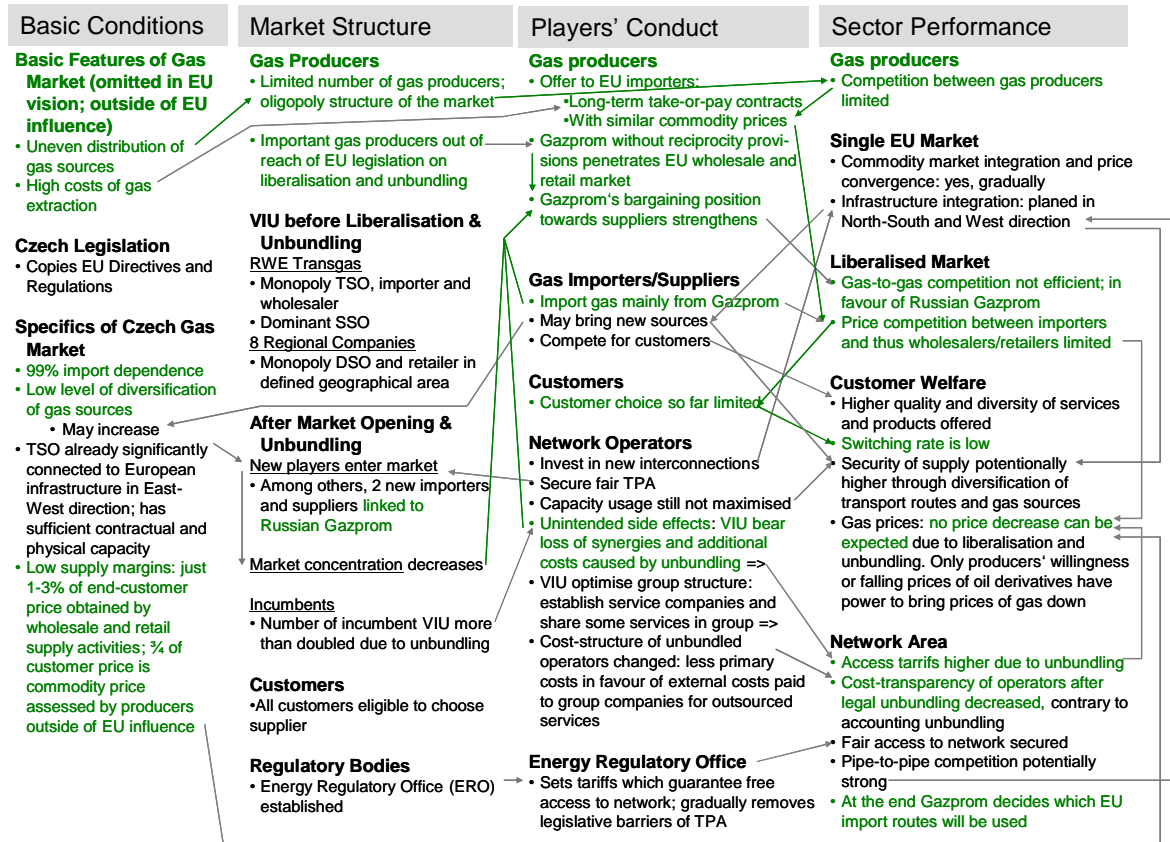
A deepening of economic competition can be expected in terms of improving the services and products offered by suppliers.

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<sup>9</sup> European Commission (2000b, p. 1): “Empowering the customer through customer choice will give rise to many effects, as it puts pressure on all operators along the gas chain to improve customer service, cut costs and reduce prices. Opportunities for new entrants into the gas market will increase this pressure to the advantage of customers.”

In order to summarize the consequences of the liberalisation process in the Czech Republic and to visualise different causes and consequences, I again use the SCP scheme. This should be compared with the SCP model based on the EU vision.

Figure 5: Liberalisation of Gas Market – Czech Reality (SCP Model)<sup>10</sup>



<sup>10</sup> Source: Author's chart based on Basic features of gas market and the experience from the Czech Republic.



## ***What general conclusions can be drawn from the case of the Czech Republic, and what about the future?***

Restructuring and *legal* unbundling were incorporated into the EU directives on the basis of a political decision to liberalise the market, not on the basis of benefits and cost analysis. *Legal* unbundling as a means of gas market liberalisation has side effects that act against EU goals, especially from the viewpoint of the price and in some cases of transparency. In countries with capacity bottlenecks, legal unbundling may be the instrument for securing fair TPA, capacity extensions and new network interconnections. But the question is whether legal unbundling is necessary in Member States with enough free transmission capacity and where the impetus for investments in network interconnection comes from the existence of pipe-to-pipe competition alone.

As the commodity prices in European gas import contracts are similar, *price competition* between European importers and thus wholesale and retail suppliers *is limited to margin-based competition*. The introduction/deepening of competition in the commercial area can bring a decrease in prices only in Member States where high *wholesale and/or retail* margins have been achieved before liberalisation (e.g. Great Britain) and where the additional costs caused by unbundling were not exceedingly high. In other cases, savings created through competition will instead be outweighed by the costs of establishing competition itself.

In September 2007, the European Commission published the proposal of the third legislative package on a single energy market. The proposed provisions will influence legal and regulatory rules (deepening regulation and harmonization in the network area) and have an impact on market structure (ownership unbundling of TSO, respectively, the concept of an independent system operator, ISO). However, none of these provisions have the power to change the key characteristics of the gas market, namely the lack of self-sufficiency of the EU with regard to natural gas sources and the oligopoly nature of important gas producers out of reach of EU legislation. The impossibility to change these key characteristics of the gas market indicates that a more important challenge than the third package will be active foreign policy of the EU, aimed either at opening markets beyond the EU border or at protecting fragile European competition from third countries. If this sphere will not be handled adequately, even the third package will not be as effective as the EU wishes:

- a) The opening up of the market in states with strategic importance of natural gas importation without reaching reciprocal provisions behind the EU creates an imbalance between a limited number of strong producers (i.e. Gazprom), on one hand, and the European suppliers, which are exposed to competitive pressure, on the other. The less diversified the gas import structure, the stronger the potential imbalance.
- b) Ownership unbundling in a negative case could mean a sell-off of European pipelines to subjects related to undertakings from third countries, which are already shippers/traders/suppliers. A 'reciprocity clause' was introduced by the Commission as part of the 3rd package, under which any

company from a third country will have to “demonstrably and unequivocally comply with the same unbundling requirements as EU companies”. Nevertheless, observation of the ownership unbundling principle outside of the EU would be very difficult to control and enforce.

- c) In January 2009, the conflict between Russia and Ukraine regarding gas prices (being renegotiated each year) resulted in an interruption of Gazprom’s gas deliveries to Europe via Ukraine. Affected were the Central and Eastern European countries highly dependent on Russian gas.

*Figure 6: January 2009: Countries Affected by Gas Restrictions<sup>11</sup>*



The European network is being integrated in order to increase the security of supply. However, at the end it will ultimately be Gazprom who decides which transport routes to Europe will be used. This is very interesting, as Gazprom participates or plans to participate as co-investor in building new pipelines to Europe and storage facilities (e.g. North European Gas Pipeline, and storage facilities in Germany, the Czech Republic, etc.)

<sup>11</sup> Source: <http://www.tagesschau.de>

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