

Riga Technical University

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**The World oil market influence on gas
market in Latvia: technical and
commercial aspects**

Summary of the Promotional Work

Riga 2006

Summary

In the mission statement of the European Commission Directorate General of Energy and Transport of 2006 it is stated: "Energy and transport are at the heart of European policy and have a considerable impact on everyday life of citizens." Pursuant to the Directive of security of natural gas supply the appropriate measures in cooperation with another EU member state to achieve the security of supply standards using gas storage facilities located within that other EU member state is highly recommended. Natural gas, which is regarded as the preferred fuel for electricity production in European Union, is becoming increasingly important source of energy. Europe is in relatively strong position as regards gas supplies, as it has significant reserves of its own and 70%-80% of the world reserves are within the European market's economic reach.

The problems of natural gas supply system in Latvia had attracted attention of several scientists, in particular, A. Davis, E. Dzelzitis, J. Ekmanis, I. Kudrenickis, M. Gedrovics, A. Kreslins, A. Magidenko, I. Platais, P. Sipkovs, V. Zebergs, N. Zeltins and others. However, no research has been performed concerning problems of possible gas market opening and liberalization and very limited concerning privatization of gas branch.

The aim of the promotional work is to assess world oil market influence on gas market in Latvia. In particular, to analyze energy market and, especially, gas market trends and changes during last decade starting with situation in gas supply in Latvia soon after Latvia had regained independence. Focus will be made both, on gas supply chain technical and economic conditions.

Particular attention in the thesis is paid to:

- analysis of gas market in Latvia and its changes;
- privatization issues;
- development of tariffs and gas pricing; technical modernization of gas supply system.

Since the author of these thesis was privileged to be part of the team that reorganize and modernize Latvian gas supply system the emphasize will be made on practical implementation of reorganization and modernization measures related to gas supply system and gas market development. In work it is analyzed and explained how and why joint stock company "Latvijas Gaze" from almost bankrupted company have become a flourishing company, and natural gas- the most preferred fuel.

In addition, issues of gas market opening and liberalization in Latvia is analyzed, as well as options of incorporation of Latvian gas supply system into European gas supply network and options of increasing of regional gas supply safety by utilization of existing and potential underground gas storages in Latvia.

All kind of analysis is based on practical examples, actions that are implemented and conditions after implementation assessed.

The results of the promotional work are used for preparation of normative documents of national level and the gas branch and incorporated into programs for engineers and masters studies of department of Heat, Gas and Water Technologies of Riga Technical University.

The results of the work are reported at 12 international conferences and they are reflected in 13 publications. The promotional work consists of introduction, eight captures, 39 pictures, 21 tables, four appendixes, and list of 98 references.

Results of the work have been reported in the following publications:

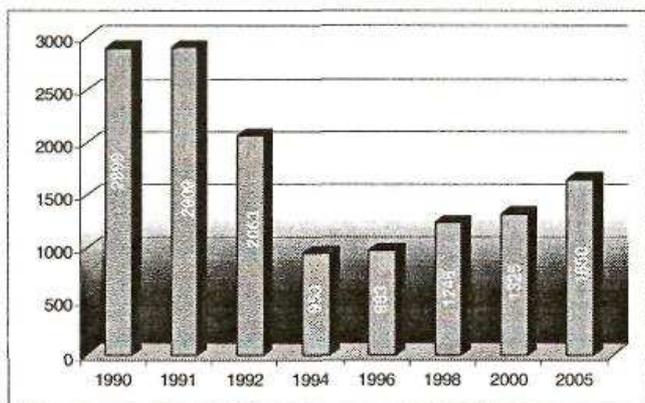
1. Jesinska A. Latest Information about the Latvian Gas Industry // *The third Annual High-Level UN ECE Gas Centre Conference "Reform and restructuring of the Gas Industry in Economies in Transition" Milan, 1998, p. 12*
2. Davis A., Jesinska A. Prospects of Latvian Underground Storage Potential Integration in European Gas and Russian Gas Networks// *International Conference "Investment in the Baltic Sea Region" Riga, Latvia 1999, p.119*
3. Jesinska A. Privatization of JSC Latvijas Gaze// *Baltic Energy Conference Tallinn, Estonia 1999, p.1-19*
4. Jesinska A. Latvia: Privatization and the Role of Foreign Partners// *The fourth Annual High-Level UN ECE Gas Centre Conference Essen, Germany 1999, p.105-112*
5. Jesinska A. Progress and experience of Latvia// *Gas Workshop for Accession Candidate Countries Paris, France 2000, pp.8*
6. Jesinska A. Natural gas industry in Latvia // "Working Party on Gas" Geneva, Switzerland 2002, pp. 9
7. Jesinska A. Natural gas industry in Latvia-experience and development of "Latvijas Gaze"// *Baltic Energy Conference II Tallinn, Estonia 2002, p 1-11.*
8. Kreslins A., Gedrovics M., Jesinska A. On the Substitutability of Natural Gas and Liquid Fuels (oil products) // *Latvian Journal of Physics and Technical Sciences, 2003, No. 6, p 3-15.*
9. Kreslins A. Jesinska A. : Privatization the Key to Success?, // *PowerGen 2004 Conference, Barcelona, Spain, May 2004, 10 p. on CD-ROM*
10. Broks A., Kreslins A., Jesinska A. Latvian Natural Gas Supply System// *6th International Conference Energy for Buildings, Vilnius, October 2004, 10 p. on CD-ROM*
11. Jesinska A. Natural Gas Market in Latvia-One Year After EU Accession//*Baltic Economic Forum, Riga, May 19-20, 2005, 3 p.*
12. Jesinska A. Gas storage-key for reliable regional gas supply// *12th Annual Flame Conference Amsterdam, March 14-16, 2006, 12 p. on CD-ROM*
13. Davis A., Jesinska A., Kreslins A., Zebergs V., Zeltins N., Increasing role of underground gas storage for reliable supply of gas to Latvia, Lithuania, Estonia and NW Russia and of development of Incukalns UGS//*23rd World Gas Conference, Amsterdam, June 2006, 13 p. on CD-ROM*

1. World energy market and gas supply system in Latvia in 90s

Natural gas accounts for 21% of global energy supply with slightly higher proportions in the relatively mature markets of North America and Europe. Rapid growth since 2000 is expected to moderate in the second half of the decade, but in the next five years, global gas demand is projected to increase to 3.2 trillion cubic meters, or 2.4% per year. Even if high gas prices persist, a decrease in growth is only likely to be felt after 2010.

Natural gas competes with other sources of energy as oil, electricity or coal. Natural gas price is particularly pegged to that of oil, since oil is natural gas closest substitute and supply of oil and natural gas are closely linked. Like most commodities, natural gas prices are cyclical.

The first natural gas supplies to Latvia were started in the year 1962 when the gas pipeline was built from Dashava in Ukraine. Gas supply system in Latvia was projected and created as a component of a unified Soviet Union gas supply system, in which an important role was played by Incukalns Underground Gas Storage (hereinafter - Incukalns UGS), which started its operation in 1968 and was projected as a gas supply seasonal regulator of regional significance. After Latvia regained independence economics experienced rapid changes. In connection with the insufficient work efficiency and quality upon extraordinary rapid growth of power resource prices, all major industrial companies actually ceased to exist in Latvia, and it materially influenced the natural gas consumption in Latvia.



Picture 1.1.
Consumption of
natural gas in Latvia
(million m³)

Some gas pipeline sections and equipment constructed in the early 60s had to be replaced. A major problem was reconstruction of compressor equipment at Incukalns UGS. Also the systems of distribution pipelines constructed according to the USSR construction norms did not correspond to the requirements of international standards. Gas consumption metering equipment did not ensure exact control of the volume of purchased and sold gas. There were no gas meters in apartments. In 1991, Latvia consumed 2909.4 million m³ of natural gas, but due to increase of gas purchase prices in the next two years from 17 Russian Roubles to 83 USD per 1000 m³, which, given the exchange rate of those times, is almost 300 times more, fall of industry and availability of cheap mazut in the market, the gas consumption rapidly decreased and in 1994 reached the minimum - 953 million m³, which was only 16.9% of the total balance of primary power resources consumption. The increase of natural gas price

was a reason for its replacement with other fuels. The sales of natural gas in Latvia highly depend on its competitiveness with heavy fuel oil. The condition was even more complicated by the fact that in connection with the price jump consumers were unable to make settlements for gas and in 1993 on average only 30% paid for the received gas. The fact that natural gas prices for different groups of customers were not cost based and were not taking into consideration price of competitive fuels even worsen situation. The state joint stock company "Latvijas Gaze" had only one option - to take loans for settlement of payment to gas supplier for crediting of consumers that could not pay for consumed gas, for purchase of gas meters and for urgent repair and modernization works, among the most important urgent reconstruction of compressor facility of Incukalna UGS. In 1994, the net sales of the state joint stock company "Latvijas Gaze" was only 70.1 million LVL, whereas payables reached 48.6 million LVL, and the company's long-term loans from credit institutions - 20.5 million LVL. During the next couple of years it was forecasted that the company would become insolvent and subsequently go bankrupt. In 1995 the joint stock company "Latvijas Gaze" under privatization was a horizontally integrated company with complex structure and many branch offices. The number of Company's employees reached 3387 employees. Latvia receives natural gas, which is supplied in summer months, through pipelines only from Russia. At this time the gas, which is not necessary for final consumers, is pumped in Incukalna UGS. Whereas, in winter months Latvian consumers receive natural gas solely from the storage and Latvia is the only country in the EU, which does not receive gas from the supplier in winter months. In winter months, from Incukalna UGS through the same pipelines, by which the gas was supplied, it is delivered also to Western regions of Russia and also to Estonia through a pipeline, which connects Latvia and Estonia.

The Baltic gas supply system is not connected with the European Union's gas supply system, and Russia is the one that supplies gas to all the Baltic States. The stability of natural gas supply in Latvia is ensured by Incukalna UGS. The total volume of the storage is 4.4 BCM, and active volume 2.3 BCM. There are unique geological conditions for creation of the system of natural underground gas storages in Latvia in the future with an active total volume of up to 50 BCM. Latvia could become a major seasonal regulator of natural gas for Western region of Russia and for Baltic Sea countries: Lithuania, Estonia, Finland, and Sweden. By integration of Latvian underground gas storage system in joint Russian - European gas transmission system unevenness of winter consumption for European countries partly can be covered.

Problems related to natural gas market and gas supply system in mid of 90s

- 1. Impossibility of efficient management due to complicated structure of the company**
- 2. The whole natural gas business owned by the State**
- 3. Gas prices set without taking into consideration energy market trends and there are cross subsidies between the groups of customers**
- 4. Many customers were not paying for natural gas, natural gas consumption dropped and number of customers was decreasing**
- 5. Technical conditions of the gas supply system poor**
- 6. Gas market isolated and there is lack of connections with joint European gas grid**

2. Privatization and restructuring

In such difficult economic situation for the joint stock company "Latvijas Gaze", the Cabinet of Ministers of the Republic of Latvia on August 2, 1995 made a decision to include the joint stock company "Latvijas Gaze" into the list of companies that should be privatized, but on November 24, 1995 the Cabinet of Ministers approved the Basic Terms and Conditions of Privatization, which planned company's privatization by means of foreign capital acquire method by choosing two strategic investors, from which one should be the gas supplier. On April 2, 1997 the Latvian State, the German Group consisting of Ruhrgas AG and PreussenElektra AG and AS "Gazprom" signed the share purchase agreements and shareholders' agreement. In total there have been seven stages of privatization. The last auction took place on December 20, 2001 when last 3% of the State owned shares were sold for privatisation vouchers. At present state keep only 117 shares.

After transfer of the shares by E.ON Energie (former PreussenElektra) to Ruhrgas and sales of Itera Latvija to Gazprom the shareholder structure of the company is the following:

E.ON Ruhrgas International AG 47.2%
OAO "Gazprom" 34%
SIA "Itera Latvija" 16%
Others 2.8%

In accordance with the Company's share purchase agreement with strategic investors, the Latvian State granted the Company exclusive rights for storage, transmission, distribution and sale of natural gas, which is reflected in the respective licenses, which are in force until February 10, 2017. Whereas, the strategic investors were placed a duty to take over all debt liabilities of the Company, were banned to reduce the number of employees for 2 years, as well as a range of other requirements were set forth. In order to ensure operational effectiveness and improve the financial condition, gradually business process optimization and the company's restructuring were carried out. Step by step, structural units, which were engaged in business types uncharacteristic for a natural gas company: medical and leisure complex, liquefied gas branch, etc., were separated and sold. When taking the measures for structural optimization, which were basically finished in 2002, but completely - in 2004, an integral company was established, which by minimum resources and number of employees could perform the necessary functions? In 2004, the number of employees in a/s "Latvijas Gaze" was 1267 people, which is 37% of the number of employees before starting of privatization.

3. Development of energy market in Latvia

The natural gas sales gradually increased, and in 2004 reached 1621 million m³, which, however, is only 55% of the sales in 1991, but it is expected that until the year 2010 the natural gas sales will reach 2200 million m³ per year. In general, the prices for mazut in Latvia followed the world oil pattern, and natural gas was out-competed by heavy fuel oil in the country, and the natural gas share in 1998 decreased to 26%, with the heavy fuel oil accounting for 16%. After the mazut price increased, the natural gas share was increasing gradually, reaching 36% with heavy fuel oil shrinking to 4% in 2001. World energy market is undergoing permanent changes with one energy source substituting others. The global trend is- natural gas replacing other fossil fuels, in particular oil and coal.

There is cost driven viable energy market in Latvia, in particular natural gas is competing with heavy fuel oil, and depending on price large customers tend to opt between natural gas and heavy fuel oil, whatever is cheaper. Using existing technology, natural gas and oil products such as heavy fuel oil are substitutable in the same furnace, as are pulverised solid fuels, irrespective of the fact that the combustion of gas and oil products is homogeneous whereas the combustion of solid fuels is heterogeneous.

In general, natural gas price in Latvia shall be determined in accordance with the following formula:

$$P_t = P_o \left(\frac{(FO)_t}{(FO)_o} + c \frac{(PPI)_t}{(PPI)_o} \right) + \dots \quad (3.1)$$

or

$$P_t = P_o + B\{(FO)_t - (FO)_o\} + C\{(PPI)_t - (PPI)_o\} + \dots \quad (3.2)$$

where:

P_t - price of natural gas at time t ;

$(GO)_t$ - price of gas oil at time t ;

$(FO)_t$ - price of fuel oil at time t ;

$(PPI)_t$ - Producer Price Index at time t - a measure of inflation;

t - an agreed time period prior to time t - the time lag effect;

P_o , $(GO)_o$, $(FO)_o$ and $(PPI)_o$ are the values of the respective variables at time zero $a+b+c+\dots=1$.

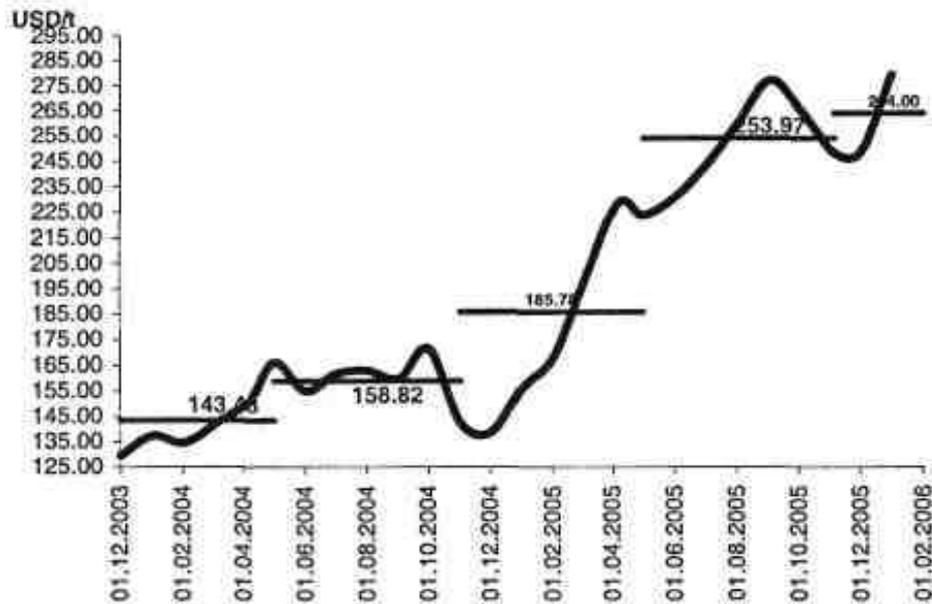
Taking into consideration above facts, since January 1, 2000 gas purchase price from the natural gas supplier in Latvia is based on heavy fuel oil price in international markets.

Since there is not available accurate and independent statistics regarding heavy fuel oil price in Latvia it was decided to use the price of heavy fuel oil, calculated as average mathematical figure for six calendar months before the month of supply of gas, as provided for by Reuters in «Platt's Oilgram Price Report» in the section «European low/high averages. BARGES FOB ARA».

The author has collected and analysed monthly and semi-annual values of the Averages Barges FOB ARA starting from 2002. Since, for time period till 2005 for price settlement purposes heavy fuel oil (HFO) with sulphur content of 3.5% was used and from 2005 HFO with sulphur content of 1% is applied, information is provided accordingly. The reason for "switching" from HFO with sulphur content of 3.5% to one with 1% are changes in Latvian fuel market due to joining EU, where usage of HFO with sulphur content of 3.5% is restricted.

However, for purpose of comparison and in order to show extremely rapid increase of HFO price in time period from December 2003 to January 2006 price of HFO with sulphur content of 3.5% is shown separately. Slight increase of HFO price started in second half of 2002 and gently continued in 2003 and 2004. The average semi-annual values increased from 140.67 in second half of 2002 to 158.82 USD/t in second half of 2004. The real rally of HFO prices started in 2005 when they jumped from 158.82 USD/t in second semi-annum of 2004 to 253.97 USD/t in second half of 2005 and in beginning of 2006 reached 264 USD/t (two months average). In the time period from January 2002 to January 2006 price increase was 2.6 times.

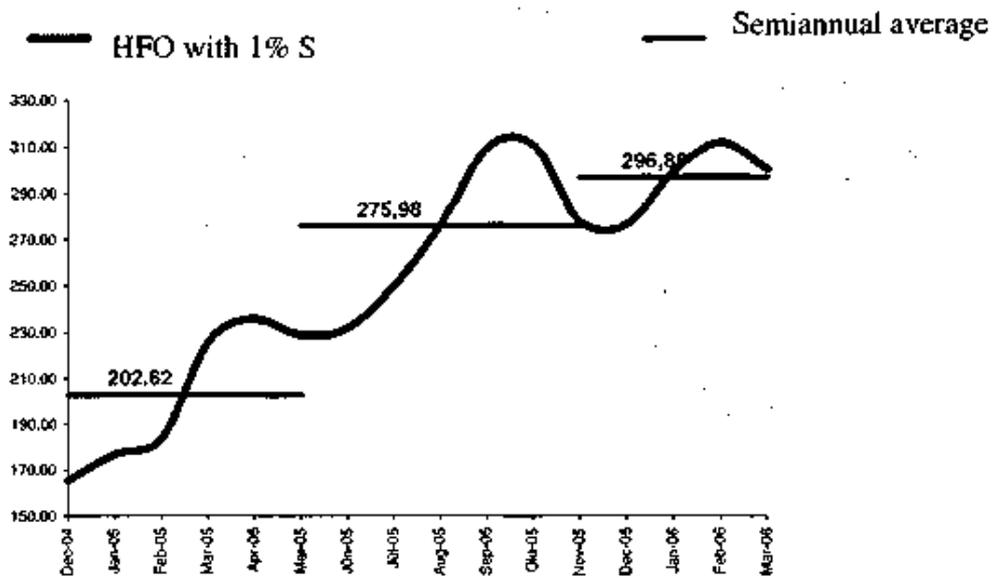
Price of HFO with sulphur content 3.5% from Dec 2003



Picture. 3.1. Price of HFO with sulphur content of 3.5%

Concerning increase of price of HFO with sulphur content of 1% the situation is very similar: it rose from 202.62 USD/t in first half of 2005 to 296.86 USD/t in first months of 2006.

Price of HFO with sulphur content of 1% from Dec 2004



Picture 3.2. Price of HFO with sulphur content of 1%

Gas transmission, distribution, storage and end-user tariffs in Latvia are set by PUC for the tariff cycle of three years. Tariff ceiling method is used for setting of the tariffs. The regulator is performing cost and profit analysis and assessment. Tariff ceiling principle provides for that within the tariff review cycle the actual tariff value (FTV_t) at no point of tariff review cycle shall exceed the tariff ceiling value (TGV_t):

$$FTV_t \leq TGV_t$$

and end-user sales tariffs are calculated as follows:

$$T_{(1-8) \text{ end sales } H.p.} = C_{\text{average gas purchase.}} + T_{TSO} + T_{GSO} + T_{\text{diff}(1-8), DSO} \quad (3.3)$$

$$T_{1-8) \text{ end sales } MLp} = C_{\text{average gas purchase.}} + T_{TSO} + T_{GSO} + T_{\text{diff}(1-8) DSO} \quad (3.4)$$

$T_{(1-8) \text{ end sales } H.p.}$ - differentiated sales end-user tariffs for users connected to the high pressure distribution system

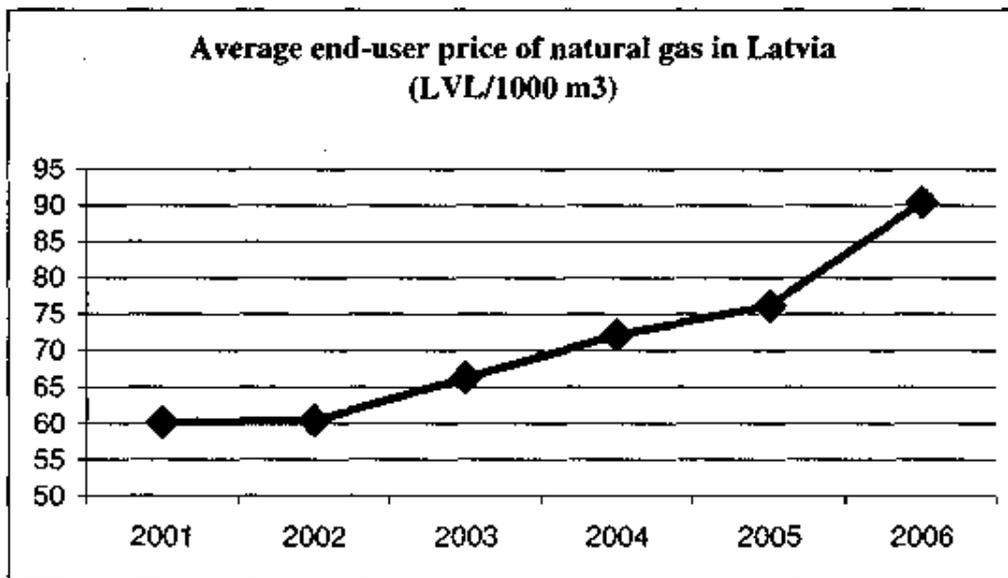
$C_{\text{average gas purchase.}}$ - the average forecasted natural gas purchase price,

T_{TSO} - natural gas transmission service tariff;

T_{GSO} - natural gas storage service tariff;

$T_{\text{diff}, DSO}$ - differentiated distribution service tariffs for distribution system users depending on connection pressure and natural gas consumption volume.

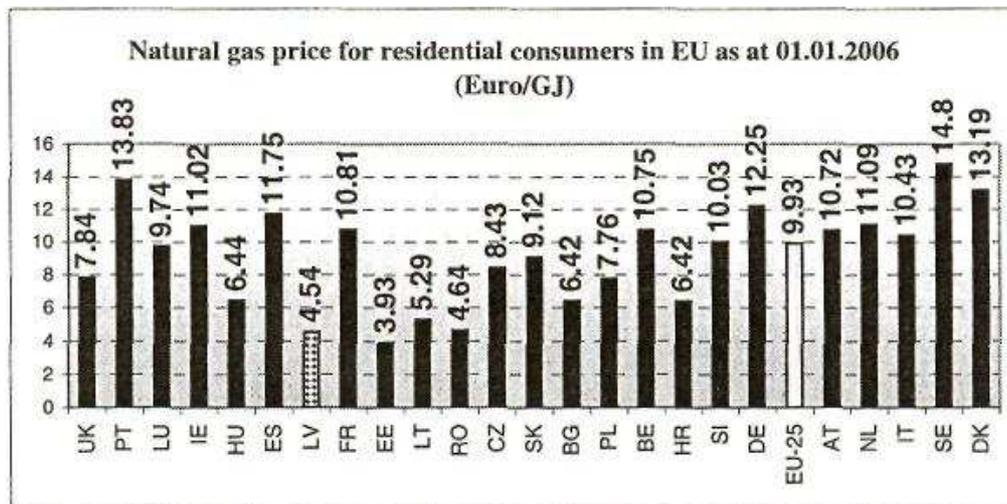
$T_{1-8) \text{ end sales } MLp}$ - differentiated sales end-user tariffs for users connected to the medium or low pressure distribution system.



Picture 3.3. Average end-user prices on Latvia

However, natural gas price for end-users in Latvia remains one of the lowest in EU for different groups of customers.

Picture 3.4. Natural gas price for residential consumers in EU



4. Technical description of gas supply system in Latvia and its development

JSC "Latvijas Gaze" permanently is investing in modernization activities. Since end of 90s, the following modernization programs were implemented: reconstruction and modernization of gas regulation stations and installations, modernization of dispatching system and construction of modern dispatching center, implementation of modern SCADA system, inline diagnostics of gas transmission pipelines and elimination of defects, construction of new compressor facility and installation of new gas turbine type compressor in Incukalns UGS etc. Starting from year 2000 to 2005 the company has spent almost LVL 90 million in implementation of the mentioned programs. Many of these programs are completed, and in March of this year the Council of the company approved new program for further improvement of safety of supply till year 2010 providing for investment of LVL 73.8 million in improvement of gas supply security.

5. Issues of gas market opening and liberalization in Latvia

JSC "Latvijas Gaze" and Latvian Government requested European Commission to grant derogation from gas market liberalization. Saeima (Latvian parliament) had passed a special Law on postponement of becoming effective several articles of the Energy Law till January 1, 2010, which actually mean that gas market opening in Latvia is postponed to year 2010. EC have not objected to the decision of the Saeima.

6. Prospects of development of Incukalns UGS and integration of underground gas storage potential into European Gas Network

To provide customers with reliable and secure gas supply, market situation have been analysed for the region of countries, including Latvia, Lithuania, Estonia, Finland and NW Russia for the time period that ends in year 2020, and the following main conclusions have been drawn:

- need for natural gas will increase and seasonal unevenness of gas consumption will remain;
- in order to ensure reliable gas supply for Finnish customers and meet their increasing demands, underground gas storage is advised to be used;
- due to lack of possibility to develop seasonal underground gas storage in Finland and limited options for development of other storages in the region it is advised to use Incukalns Underground Gas Storage in Latvia, which already is used for customers in Latvia, Estonia, NW Russia and, most probably, in the nearest future will be used for Lithuanian customers on commercial terms too;
- for gas supply from Incukalns Underground Gas Storage new submarine gas pipeline shall be built and to meet increasing demand for gas storage volume, Incukalns Underground Gas Storage has to be expended.

Initial calculations show that there are certain perspectives to incorporate new perspective UGS capacities in Latvia (total capacity over 50. 10⁹m³) into European gas supply system especially due to insufficient gas supply security to Europe.

7. Evaluation of economic position of the JSC "Latvijas Gaze" in the future

In accordance with the Investment program approved by the Council, the company is planning to invest 73.8 Mio LVL in improvement of gas supply security till 2010.

- Prediction of revenues and expenses of the JSC "Latvijas Gaze", 2006-2011., thousand LVL

PROFIT OR LOSS STATEMENT	2006	2007	2008	2009	2010	2011	2012
Net turnover (NT)	170733	204879	256099	281709	302837	317979	333878
<i>Growth</i>	28%	20%	25%	10%	8%	5%	5%
Production expenses	141653	169130	217130	239176	252165	264644	277253
<i>including depreciation</i>	13289	15314	16282	16 562	16 629	15 470	13 644
Gross profit (GP)	29080	35749	38969	42534	50672	53335	56626
<i>GP/NT</i>	17%	17%	15%	15%	17%	17%	17%
Administrative expenses (AE)	6134	6472	6731	7000	7280	7571	7874
<i>AE/NT</i>	4%	3%	3%	2.5%	2.4%	2.4%	2.4%
Balance of other revenues/expenses			121				
Profit before taxes	22946	29277	32360	35534	43392	45764	48752
<i>Taxable income</i>	8370	12678	14792	17686	25478	29008	33822
Enterprise income tax	1256	1902	2219	2653	3822	4351	5073
Other taxes	1286	1286	1286	1286	1286	1286	1286
Net profit (NP)	20404	26090	28855	31595	38285	40127	42392
<i>Profitability (NP/NT)</i>	12.0%	12.7%	11.3%	11.2%	12.6%	12.6%	12.7%

8. Results of solution of the problems experienced by JSC "Latvijas Gaze" in the middle of 90s and evaluation of implemented measures

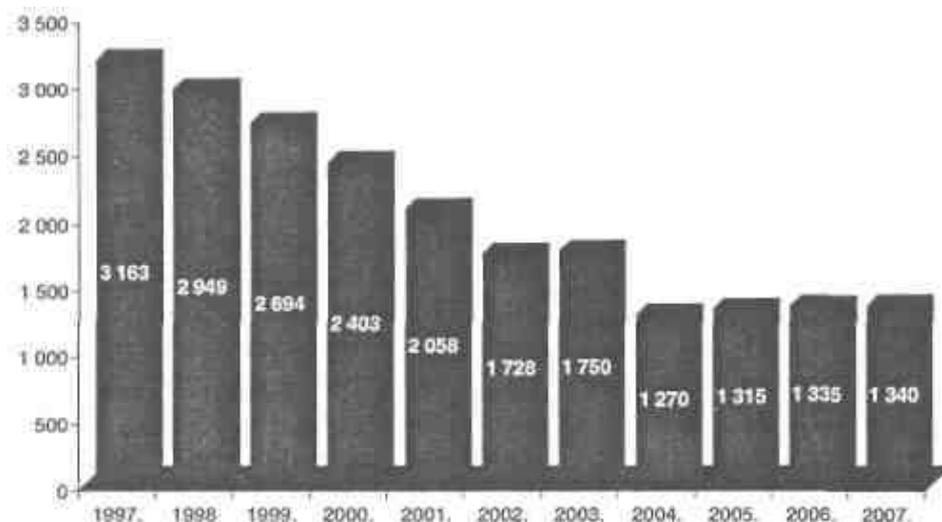
1. Restructuring of the JSC "Latvijas Gaze" and optimization of business processes

In 1995 the stock company "Latvijas Gaze" under privatization was a horizontally integrated company with complex structure and many branch offices. The number of

Company's employees reached 3387 employees. In order to ensure operational effectiveness and improve the financial condition, gradually business process optimization and the company's restructuring were carried out. Step by step structural units, which were engaged in business types uncharacteristic for a natural gas company: medical and leisure complex, liquefied gas branch, etc., were separated and sold. When taking the measures for structural optimization, which were basically finished in 2002, but completely - in 2004, an integral company was established, which by minimum resources and number of employees could perform the necessary functions? In 2004, the number of employees in a/s "Latvijas Gaze" was 1270 people, which is 37% of the number of employees before starting of privatization.

In 2004 restructuring process was completed and there is no further reduction of employees expected (picture 8.1).

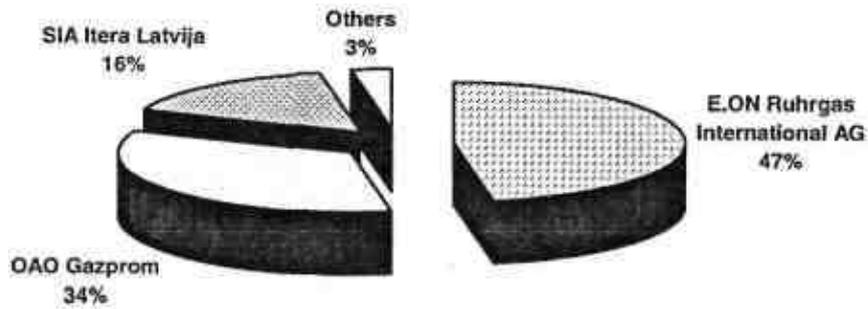
Picture 8.1. Changes of number of employees



2. Privatization process successfully completed

The complex privatization process was completed on December 20, 2001 when last 3% of the State owned shares were sold for privatization vouchers. At present state keep only 117 shares. It is necessary to admit, that the choice of strategic investors was very successful.

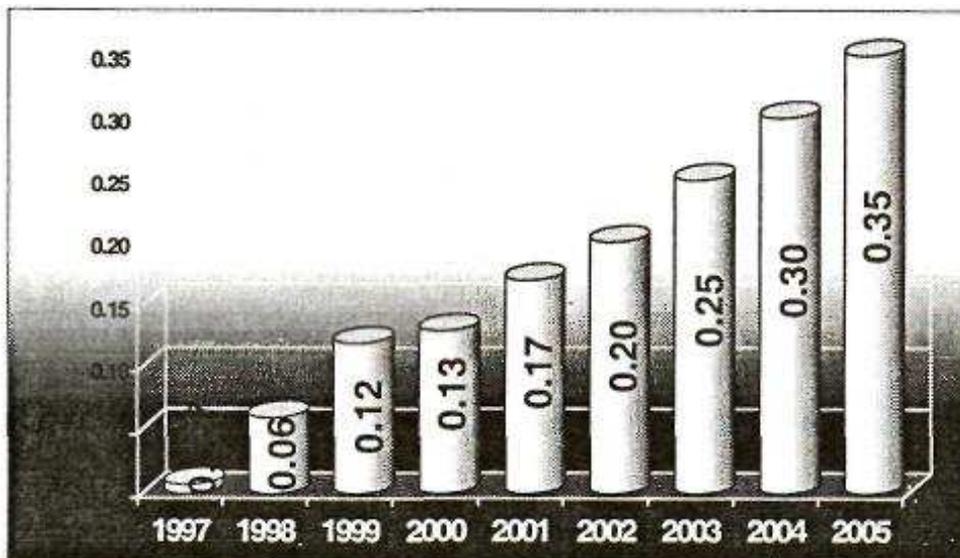
After transfer of the shares by E.ON Energie (former PreussenElektra) to Ruhrgas and sales of Itera Latvija to Gazprom the shareholder structure of the company is the following (picture 8.2):



Picture 8.2. Ownership structure of JSC "Latvijas Gaze"

In general, JSC "Latvijas Gaze" privatization was one of the first completed privatization cases in Eastern and Central Europe in gas branch and was estimated as one of the very successful ones by case study group concerning privatization issues for World Gas Conference in 2000.

The shares of the JSC "Latvijas Gaze" are quoted in the Official List of Riga Stock Exchange and Baltic Stock Exchange. At the end of 2005 the capitalization value of the company reached LVL 383.44 million, but price of one share since summer of 2006 is exceeding LVL 10. From almost insolvent company in mid of 90s, JSC "Latvijas Gaze" has become a profit generating company to its shareholders and during last years have been able to increase amount that is paid in dividends (picture 8.3)



Picture 8.3. Amount of dividends paid by JSC „Latvijas Gaze” to its shareholders

3. Gas prices for end- consumers are set using complex method in order to consider real costs of every group of customers

As it was explained earlier, the new method of tariff setting approved by Council of PUC on 30 November 2005 consists of four different tariffs: for gas transmission, storage, distribution and sales. All justified costs are included, and reasonable profit to the company guaranteed. Gas purchase costs, which are set depending on HFO with sulphur content 1% price in Amsterdam region, form the basis for calculation. There are eight groups of customers established. Such complicated system gives the possibility to set tariffs for end-consumers, which are based on real costs of gas supply depending on place in gas supply chain and there is no place for any market distortions.

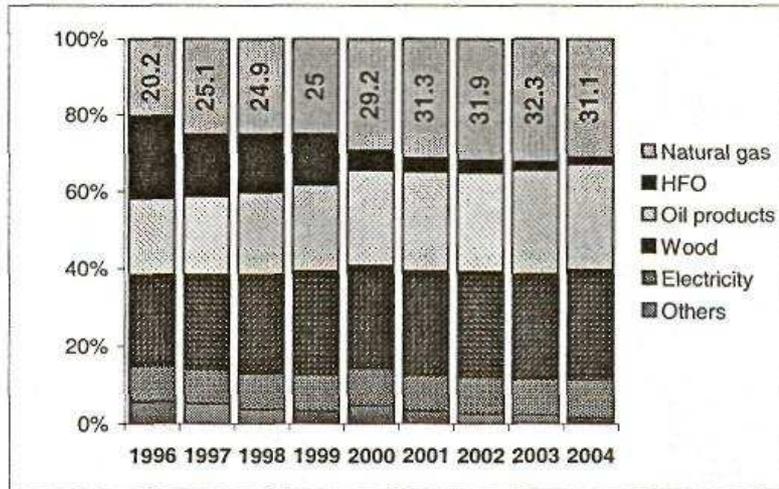
At the same time, it is necessary admit that natural gas tariffs for end consumers in Latvia remain among the lowest in EU. There are few reasons for that, however, the three most important are:

- closeness to the supplier in comparison with other countries,
- having gas suppliers among major shareholders and
- having Incukalns UGS, which is required by gas supplier in winter for reliable gas supplies to other countries.

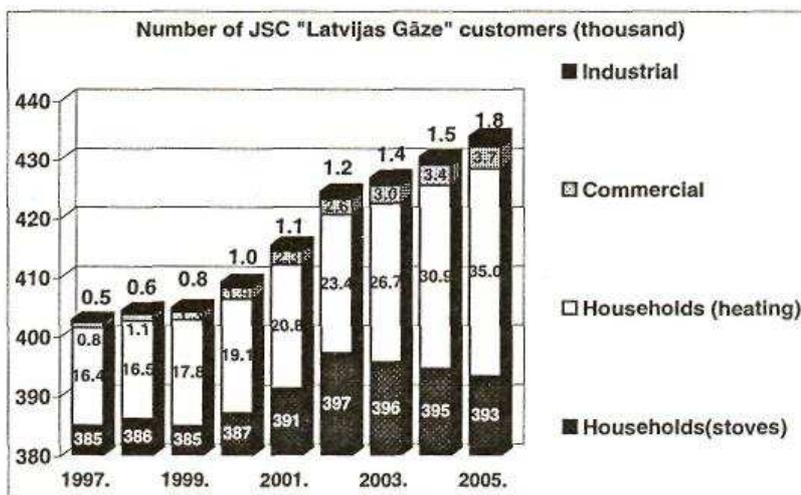
Positive influence on keeping low end-user prices in current conditions has also resolution of Saeima about postponement of gas market opening in Latvia. Because, as it was in detail explained earlier, lack of connections with joint EU gas network prevents Latvia from receiving natural gas from any other supplier except suppliers in Russian Federation and access to gas network in Russia is limited, hence there is no possibility to develop gas market in Latvia. Therefore, any formal measures of gas market liberalization will only increase costs, thus increasing gas prices to end-consumers.

4. Natural gas consumption and number of customers are increasing, there are no significant debts of customers

As it was described earlier, natural gas consumption in Latvia is increasing year by year and in 2005 reached 1.664 BCM. Natural gas in Latvia is preferred kind of fuel for few years and keeps its place in balance of primary energy consumption (PEC) since year 2001 above 30%.



Picture 8.4.
Natural gas
share in
PEC in
Latvia

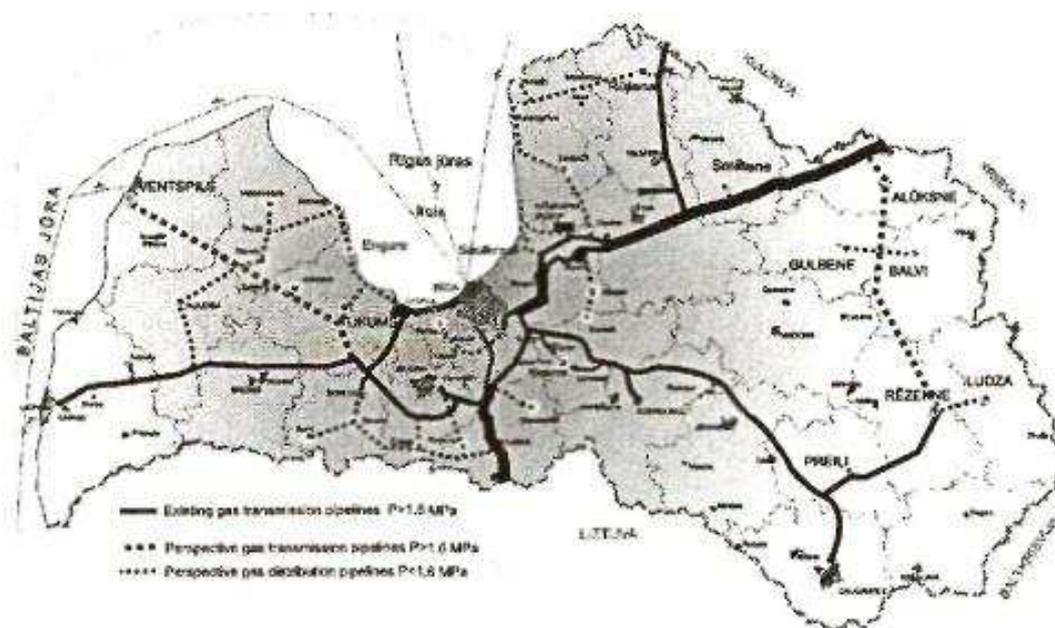


Picture 8.5. Increase of number of natural gas customers

There are few reasons for stable increase of natural gas consumption. Among others, important is permanent increase of the number of customers (picture 8.5) due to attractiveness of natural gas because it's reasonable price comparing to other competitive fuels, its cleanness and easiness to use. Number of customers and consumption is increasing also because the company pays great attention to further expansion of natural gas networks. In 2005, 250 km of gas distribution networks and 46 km of gas transmission pipelines were constructed.

Regarding construction of new pipelines and attraction of new customers, JSC "Latvijas Gāze" has elaborated further development plans and has prepared schemes for expansion of existing gas network in Latvia (picture 8.6).

Possible directions of gas supply development



Picture 8.6. Possible directions of gas supply network development

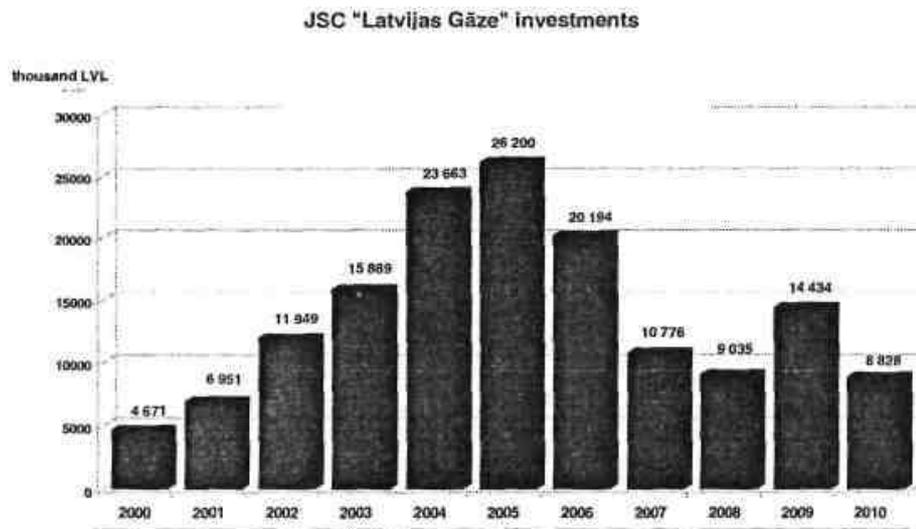
At the moment the company is initiated work with municipalities on finding a cooperation schemes with the aim to find a solution for using EU funds for construction of new gas pipelines because National Strategic Reference Framework for year 2007-2013 does not provide such possibility to the company directly.

5. Technical conditions of the gas supply system

As it was described earlier JSC "Latvijas Gaze" permanently is investing in modernization of existing facilities and construction of new ones.

Since end of 90s after agreements with strategic investors about privatization of the company were signed, the shareholders paid great attention to modernization issues. In particular, during this period of time there had been started such modernization programs as reconstruction of gas regulation stations of gas transmission network, modernization of gas regulation stations and regulation units of gas distribution networks, modernization of dispatching system and construction of modern dispatching center and implementation of modern SCADA system, inline diagnostics of gas transmission pipelines and elimination of defects, construction of new compressor facility and installation of new gas turbine type compressor in Incukalns UGS etc. Many of these programs are completed, and in March of this year the Council of the company approved new program for further improvement of safety of supply till year 2010.

Starting from year 2000 to 2005 the company has spent almost LVL 90 million in implementation of the mentioned programs. During the next years till 2010 it is planned for to spend more than 56% for needs of Incukalns UGS.



Picture 8.7. JSC "Latvijas Gāze" investments 2000-2010

6. Gas market is still isolated and there are no connections with joint EU grid

One of the biggest problems of gas supply in Latvia is lack of connections with joint EU gas grid. That is the reason, why there are no possibilities of alternative gas supply, at least in conventional manner, by pipeline. That is also the main reason why true competition in gas market in Latvia is not possible. That is also the reason why Latvian Government by adopting

Basic Guidelines for Energy Sector Development for 2006-2016 have expressed concern about Latvia's dependence on one supplier and have suggested consider alternative fuels. At the same time lack of connections between gas supply networks of the Baltic Countries and other Europe prevents of utilization of potential of underground gas potential in Latvia. JSC "Latvijas Gāze" with the support of Ministry of Economics and Ministry of Foreign Affairs have proposed to include several projects into list of EU TEN projects as provided for by guidelines for trans-European energy networks (expansion and development of underground gas storages, Nordic Gas Grid project, gas pipeline connecting gas depositories in Russia for gas supply to Germany via Latvia, so called Amber project, etc.).

However, now hope on EC support in construction of connecting gas pipelines gives the last decision of the European Parliament and the Council on Trans-European energy networks, where among first priority projects in the 1st annex is stated: " NG.1. United Kingdom — northern continental Europe, including the Netherlands, Belgium, Denmark, Sweden and Germany — Poland — Lithuania — Latvia — Estonia — Finland — Russia:

Gas pipelines to connect some of the main sources of gas supply in Europe, improve network interoperability, and increase security of supply, including natural gas pipelines via the offshore route from Russia to the EU and the onshore route from Russia to Poland and Germany, new pipeline building and network capacity increases in and between Germany, Denmark, and Sweden, and in and between Poland, the Czech Republic, Slovakia, Germany, and Austria."

In parallel to activities on European level, JSC "Latvijas Gāze" together with OAO "Gazprom" and Gaum OY is working on implementation of connection Finland-Estonia with the aim to use Incukalns UGS for needs of Finland.

Conclusions

1. It has been performed the analysis of gas market as a component of the energy market taking into consideration patterns of development of world oil market and estimated related changes in the gas supply system in Latvia during the last decade, starting with grave situation in mid of 90s and privatisation process in 1997 till its accomplishment in 2002 and business processes optimisation in 2004.
2. As the result of analysis of technical and commercial aspects of Latvian gas supply system it has been proved that there is a cost driven viable energy market in Latvia characterized by a large representation of a dual fired gas equipment, which generates a strong correlation between the price of natural gas and competing energies, primary heavy fuel oil.
3. It has been developed a method of gas purchase price justification based on heavy fuel oil with sulphur content of 1% semi-annual average price (till 2005 heavy fuel oil with sulphur content 3.5%).
4. It is offered mathematical model of setting of tariffs for gas transmission, distribution, storage and sales for the tariff cycle of three years according to ceiling method based on objective analysis of costs and profit depending on place of the customer in gas supply chain thus preventing market distortions.
5. It has been analyzed technical and economic feasibility of investments in modernization of Latvian gas supply system: reconstruction and modernization of gas regulation stations and installations, modernization of dispatching system and construction of modern dispatching center, implementation of modern SCADA system, inline diagnostics of gas transmission pipelines and elimination of defects, construction of new compressor facility and installation of new gas turbine type compressor in Incukalns UGS.
6. There have been assessed possibilities of expansion of Latvian underground gas storage facilities from current active volume of 2.3 billion cubic meters to 2.6 billion cubic meters and further to 3.2 billion cubic meters, what will pave a way for their utilization for needs of Finland. Principles of method of optimization of planning of European gas supply system are outlined, which corresponds to the last decision of the European Parliament and the Council on Trans-European energy networks, and which could convert Latvia into considerable gas storage site for the whole Europe.
7. The results of the work are implemented in the restructuring of JSC "Latvijas Gaze" in process of privatization, in developing the technical conditions of the Latvian gas supply system that corresponds to the requirements of the European Norms and Standards, through Public Utility Commission and amendments to the Latvian legislation by implementing the European Directives, developing of the gas branch into profit generating industry, at the same time achieving one of the lowest end-user prices in European Union, which in time period from 2002 to 2006 have increased by about 50% comparing to 2.6 times of heavy fuel oil price in average in Europe.
8. The methods offered in the promotional work are incorporated into program for the engineers and masters studies of the Department of Heat, Gas and Water Technologies of the Riga Technical University "Regional planning of gas supply".