

Secondary shale markets

Secondary shale markets

Similar to the *CEE region's leading shale markets*, the *secondary shale markets* – Lithuania, Hungary, and Bulgaria – also have good potential for shale gas development. In general, these countries' political and legal environments present a fairly stable atmosphere in which investment risk is not a primary concern.

However, due to their rather smaller sizes and lower levels of domestic gas consumption, these markets demonstrate correspondingly less investment opportunity for shale gas E&P companies. Shale gas development in these countries will primarily be driven by the economics of extraction and will likely follow the exploration and production examples of larger shale gas countries in the CEE region.

6.4. Lithuania

Overview

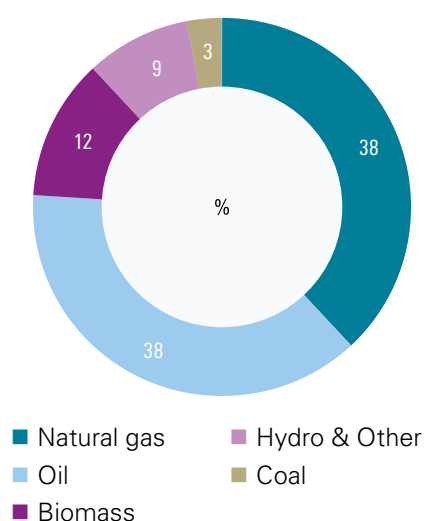
Before the closure of the Ignalina nuclear power plant at the end of 2009, nuclear power was the leading source of primary energy for Lithuania, accounting for approximately one-third of consumption. As a portion of Lithuania's total primary energy consumption in 2010, natural gas and oil had the highest share at 38% each. They were followed by biomass, hydropower, and coal, with shares of 12%, 9%, and 3%, respectively.²⁵³

Lithuania is fully dependent on Russian natural gas, with imports covering 100% of domestic consumption.²⁵⁴ The country's gas imports are subject to long-term agreements with the largest and only gas supplier, Gazprom (though gas is partly bought through intermediary LT Gas Stream AG). Key agreements are due to expire at the end of 2012 and 2015 for two of the biggest suppliers to local household and non-household users, Dujotekana and Lietuvos Dujos,²⁵⁵ and in 2013 for a smaller company, Haupas.²⁵⁶ Another big importer, Achema, has just re-signed another long-term deal with Gazprom, thereby reinforcing the supply of natural gas.²⁵⁷

Gazprom is a 99% stakeholder of Kaunas Heat and Power Plant,²⁵⁸ and owns 37.1% of Lietuvos Dujos.²⁵⁹

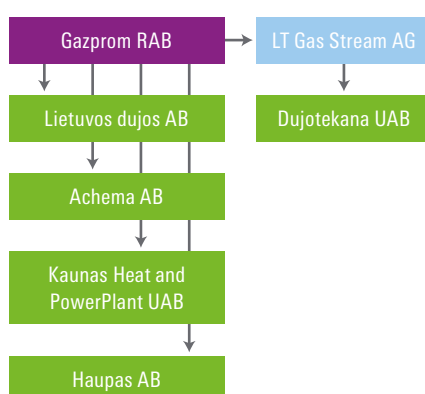
Imported gas is pumped into the Lithuanian gas transmission system at one entry point, Kotlovka, at the Belarusian border. The Lithuanian gas market is not connected to other EU countries, except for the emergency Kiemenai interconnection with Latvia, which is only used in the event of disruptions to the main interconnection with Belarus, or due to a large increase in demand. Otherwise, the Kotlovka connection is sufficient to meet the needs of Lithuanian customers. Lithuania has no domestic production. The main consumers of natural gas are power plants (45%), industry (33%),²⁶⁰ and the residential, commercial, and agriculture sectors (10%).²⁶¹

Figure 27: Total primary energy consumption of Lithuania (2010)



Source: Lithuania Energy Report, September 2011

Figure 28: Lithuanian natural gas imports by control structure (2011)



Source: Report of natural gas monitoring 2011, Q2, National Control Commission for Prices and Energy

²⁵³ Source: Enerdata, Lithuania Energy Report, September 2011

²⁵⁴ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁵⁵ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁵⁶ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2010

²⁵⁷ Source: Lietuvos Žinios, Vyriausybei nosį nušluostė verslas, February 8, 2012

²⁵⁸ Source: Gazprom, Companies with Gazprom's participation and other affiliated entities, March 31, 2012

²⁵⁹ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁶⁰ Note: Including non-energy uses

²⁶¹ Source: Enerdata, Lithuania Energy Report, September 2011

Table 12: Gas flows of Lithuania, 2010

Category	Bcm
Production	0
Import	3.07
Apparent consumption	(3.07)
Import/consumption ratio	100%

Source: U.S. Energy Information Administration,
December 2011

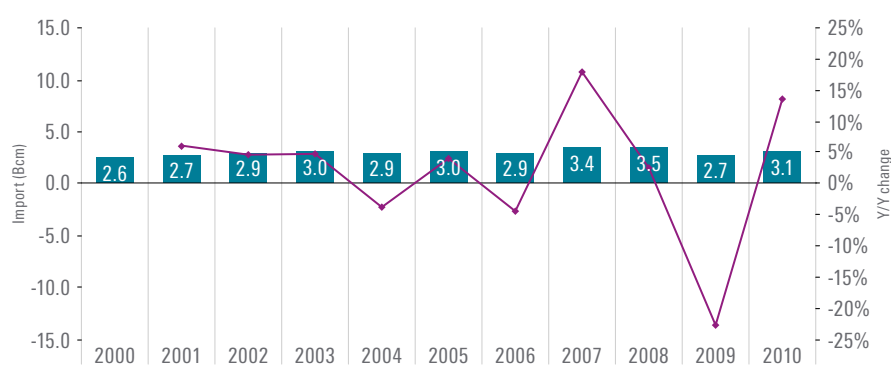
Natural gas supply trends

As mentioned above, Lithuania has no conventional gas reserves, and must therefore import natural gas to meet consumer needs.

Based on long-term contracts, Russian natural gas imports play a key role in Lithuania's energy supply. In 2010, imports of Russian gas via Belarus amounted to 100% of total consumption.²⁶²

Among the five natural gas importers, Achema and the Kaunas Heat and Power Plant imported natural gas primarily for their own use,²⁶³ while the other three importers – Lietuvos Dujos, Dujotekana, and Haupas – exist as suppliers to other users in the country. Achema recently became the biggest importer of natural gas in Lithuania,²⁶⁴ while the biggest supplier to household and non-household consumers (73.5% market share in 2010²⁶⁵), Lietuvos Dujos, is owned by E.ON Ruhrgas International and Gazprom, with shares of 38.9% and 37.1%, respectively, while the remaining 17.7% is held by Lithuania's State Property Fund.²⁶⁶ Dujotekana (25.4% market share in 2010²⁶⁷) sells natural gas to non-household customers only. Haupas is a very small market player, selling less than 1% of total natural gas to customers in the Druskininkai region, who are not connected to the main natural gas system.²⁶⁸

Although the Lithuanian gas market is considered to be liberalized, some areas of the market may be less competitive due to the concentration of natural gas suppliers. However, a gas exchange is planned upon the completion of interconnection projects with Poland, and the construction of a liquefied natural gas terminal.²⁶⁹ In line with demand, the total amount of imported gas transported to Lithuania via pipeline in 2010 was 3.07 Bcm.²⁷⁰

Figure 29: Historical development of natural gas imports in Lithuania

Note: Dry natural gas imports

Source: U.S. Energy Information Administration, December 2011

²⁶² Source: Enerdata, Lithuania Energy Report, September 2011

²⁶³ Source: National Energy Commission, Lietuvos Energetikos Įrenginių Eksploatavimo Būklės 2008-2009 m. Apžvalga, 2010

²⁶⁴ Source: National Control Commission for Prices and Energy, Gamtinių Dujų Rinkos Stebėsenos Ataskaita už 2011 m. III ketv., 2011

²⁶⁵ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

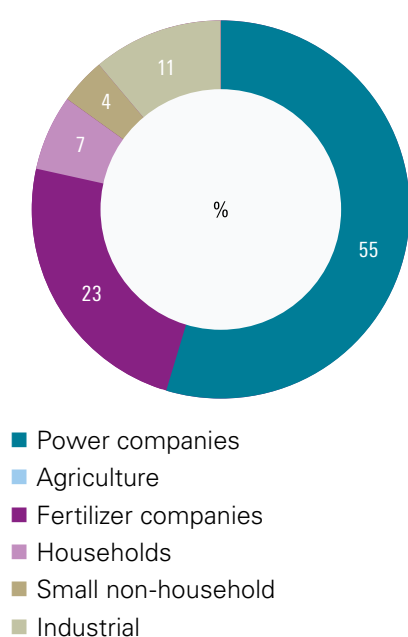
²⁶⁶ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁶⁷ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁶⁸ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁶⁹ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁷⁰ Source: US Energy Information Administration, December 2011

Figure 30: Gas consumption by sector in Lithuania (2010)

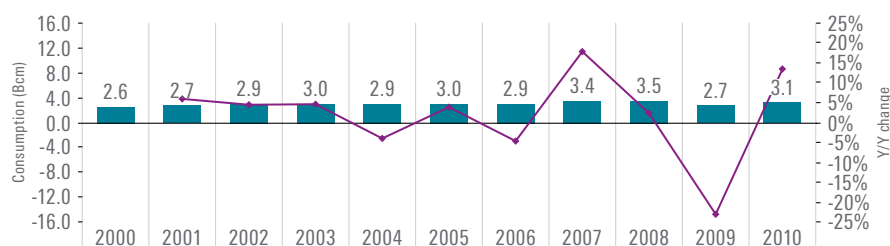
Source: Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

There are several plans to increase the energy security of Lithuania, by diversifying the sources of natural gas supply and/or supply routes, and by reducing the bottlenecks at certain entry points. Some of the major developments involving Lithuania include an LNG terminal at Klaipėda, the Jurbarkas–Klaipėda gas line, the Lithuania–Poland pipeline, and a storage facility in Syderiai.²⁷¹

Natural gas demand trends

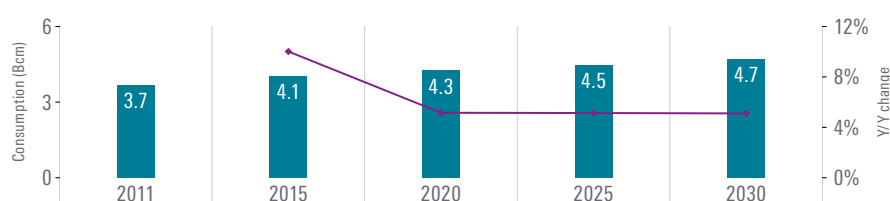
As mentioned above, the main consumers of natural gas in Lithuania are power plants, but a range of other consumers including fertilizer and other industrial industry companies, households, and small non-household companies also make up the consumer market in the country.

Between 2000 and 2010, apparent dry natural gas consumption in Lithuania fluctuated around an average level of 2.96 Bcm. Consumption is mainly driven by gas-fired power plants, industrial production, and residential heating. The significant decrease in demand during 2009 was caused by reduced consumption due to the financial crisis.

Figure 31: Historical development of natural gas consumption in Lithuania

Note: Apparent dry natural gas consumption
Source: U.S. Energy Information Administration, December 2011

The National Energy (Independence) Strategy of Lithuania²⁷² defines energy-related goals for the country, which are expected to affect both natural gas supply and demand, and increase the consumption of alternative energy sources. Despite these plans, Lithuania's natural gas consumption is expected to reach 4.71 Bcm by 2030,²⁷³ largely due to the country's continued economic growth. However, other sources forecast a decrease in natural gas consumption if the National Energy (Independence) Strategy is fulfilled.

Figure 32: Forecasted natural gas consumption in Lithuania

Source: Datamonitor, 2010

²⁷¹ Source: Enerdata, Lithuania Energy Report, September 2011

²⁷² Source: National Energy (Independence) Strategy, October 6, 2010

²⁷³ Source: Datamonitor, Gas and Power Fundamentals Outlook: Europe, April 2010

Figure 33: Lithuanian natural gas imports by control structure (2011)



- Gas pipeline
- - - Gas pipeline under construction or planned
- (36) Pipeline diameter in inches (major pipelines only)

Source: Petroleum Economist, BP, Enerdata Estimate.

Table 13: Natural gas distributors in Lithuania

Distributors 2011	Amount of natural gas distributed in Mcm (Q1 – 3 2011)
Lietuvos Dujos AB	758.45
Intergas UAB	14.13
Fortum Heat Lietuva UAB	3.15
Druskininku dujos UAB	0.174
Josvainiai AB	1.79
Achema AB	0
TOTAL	777.69

Source: Report of natural gas monitoring for Q1 2011, Q2 2011 and Q3 2011

Gas infrastructure

In 2010, Lithuanian gas consumers used 3.106 Bcm of natural gas. The highest-ever usage of the import pipeline's capacity was 75.4%, thus leaving 24.6% unused. Current interruptible capacity contracts dictate that system users are allowed to have access to these available, unused capacities.²⁷⁴

Transmission

Lithuania's high-pressure natural gas transmission system is 1,865km long, and covers almost the entire country. It is connected to the transmission systems of Belarus for imports, Latvia (bidirectional), and Russia (for transit). International connections with these countries are regulated on a contractual basis. The main purpose of the transit transmission network is to provide gas to the enclave of Kaliningrad, Russia. The transmission system is owned and solely operated by the largest natural gas TSO in the Baltic states, Lietuvos Dujos. Lithuania's gas network has a capacity of 11.8 Bcm/year.²⁷⁵

The natural gas import infrastructure from Belarus has an import capacity of 9.2 Bcm/year, while the interconnection with Latvia has a relatively smaller import capacity of 730 Mcm/year, but an export capacity of 1.8 Bcm/year. The Lithuania – Latvia interconnection is bidirectional and has the capacity of 5.2 Mcm/day at the cross-border point (127 thousand m³/day in 2010).²⁷⁶

Distribution and storage

In Lithuania, six companies have distribution licenses, however only five are actively involved in the operation of the natural gas distribution system of Lithuania, the biggest one being Lietuvos Dujos.

The distribution system is comprised of 8,120 kilometers of pipeline, supplying approximately 555 thousand consumers (of which 549 thousand are households and 5.8 thousand industrial users).²⁷⁷

There is only one operative natural gas storage facility available to Baltic countries, which is located in Inčukalns, Latvia and operated by Latvijas Gāze. The capacity of this facility is 4.47 Bcm (in 2008), of which 2.32 Bcm was active, or regularly extracted, natural gas.²⁷⁸ Natural gas is supplied during the heating season to customers in Latvia, Estonia, northwestern Russia, and (in smaller amounts) to Lithuania. In 2010, 29.25 Mcm of Lithuanian gas reserves were stored there, which would ensure a 30-day uninterrupted gas supply to household customers during the cold season.²⁷⁹

In addition to this commercial storage facility, underground natural gas storage is planned to be built in Syderiai, Lithuania, which will have a minimum useful volume of 500 Mcm, and be completed by the end of 2016.²⁸⁰ This strategic gas storage would expand Lithuania's gas storage capacity to cover household consumers' natural gas consumption for 60 days, together with the existing Inčukalns storage facility.²⁸¹

²⁷⁴ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁷⁵ Source: Enerdata, Lithuania Energy Report, September 2011

²⁷⁶ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁷⁷ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁷⁸ Source: Latvijas Gāze, Description of the Storage Facility, March 31, 2012

²⁷⁹ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁸⁰ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁸¹ Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

LNG

By the end of 2014, Lithuania plans to complete construction of a floating LNG terminal in Klaipėda. The new terminal is being built as part of the National Energy Strategy and is intended to diversify the natural gas supply to Lithuania, thereby increasing the energy security of the country. With total capacity projected to be 2-3 Bcm/year, the terminal is expected to cost €200-300 million (approx. \$260-390 million).²⁸² Norway's Hoegh LNG will construct and supply the facility.²⁸³

Prospects for shale gas development

Unconventional resources, such as shale gas, are under exploration in Lithuania. Shale gas exploration is included in the National Energy (Independence) Strategy as one of the five strategic initiatives. Minijos Nafta plans to launch exploration and test drilling for shale resources in 2012, in the western part of the country.²⁸⁴ The exact amount of Lithuanian shale gas resources is still uncertain, but the US Energy Information Administration estimated in April 2011 that Lithuania may hold approximately 120 Bcm of shale gas reserves in the southwestern part of the country, not far from the Polish border. Earlier estimates have even put potential amounts of reserves at 480 Bcm, but, these were only theoretical and not based on geological data.²⁸⁵

Moreover, according to the Lithuanian Geological Survey, any shale gas in the country lies about two kilometers deep, as compared to four kilometers in Poland, and should therefore be comparatively more easily extractable.²⁸⁶

The Lithuanian Geological Survey is planning to undertake an international tender for licenses for hydrocarbons exploration, including shale gas, in 2012. These licenses would cover two additional fields of 2,000 sq km, in addition to current licenses covering about 6,300 sq km,²⁸⁷ which are held by six companies: Minijos Nafta, Geonafta, Manifoldas, Investicijos, Geobaltic, and Genciu Nafta.²⁸⁸ Minijos Nafta has been engaged in the exploration of shale gas in Lithuania for the last two years, thus is ahead of its competition. They plan to invest another \$3.72 million this year in shale gas exploration activities, and to frack an existing vertical well during the first half of 2012. A new well for shale gas exploration is to be drilled during the latter half of the year.²⁸⁹

Regulatory bodies and relevant legislation

The EU determines the principles of Lithuanian gas market regulation, while there is no specific Lithuanian legislation related to shale gas.

The relevant regulatory bodies in Lithuania include the **Ministry of Energy of the Republic of Lithuania**, the **National Control Commission for Prices and Energy (NCCPE)**, the **Geological Survey of Lithuania**, and the **Ministry of Environment of the Republic of Lithuania**. Concerning the exploration of unconventional resources, the Geological Survey of Lithuania is the most relevant regulatory body, as it is responsible for the organization and execution of state geological investigations, as well as state regulation of subterranean activities. It is also the entity that issues exploration and production licenses.

²⁸² Source: National Control Commission for Prices and Energy, Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission, 2011

²⁸³ Source: Lrytas, „Klaipėdos naftai“ pavesta testuoti suskystintų dujų terminalo projekto įgyvendinimą, February 15, 2012

²⁸⁴ Source: Platts Energy in East Europe, Lithuania to explore shale gas potential, January 27, 2012

²⁸⁵ Source: Natural Gas Europe, Lithuania looks to accelerate shale gas development, May 26, 2011

²⁸⁶ Source: Natural Gas Europe, Lithuania optimistic about shale gas, May 13, 2011

²⁸⁷ Source: Platts Energy in East Europe, Lithuania to explore shale gas potential, January 27, 2012

²⁸⁸ Source: Information based on the database of the Geological Survey of Lithuania, March 2012

²⁸⁹ Source: Platts Energy in East Europe, Lithuania to explore shale gas potential, January 27, 2012

Environmental policy

There are no special restrictions in connection with the exploration of shale gas in Lithuania.

Lithuania's legal regulation in connection with earth depths exploration is compliant with the Directive of the European Parliament and Council (94/22/EC).

Tax policy

There are no specific tax regulations related to shale gas in Lithuania, which is currently not expected to change in the near future, nor is there any special tax allowance for gas exploitation. However, Lithuania does offer some incentives for foreign investors, such as guarantees against expropriation, income tax and profit tax reliefs, depreciation allowance, custom duties relief, and tax-free interest on loans, etc.²⁹⁰

From July 2012, the basic rate levied for the exploitation of oil and gas natural resources is variable from 2% to 20%, depending on the location of the natural resource and the quantity exploited. An additional compensation rate of 9% applies for resources that were discovered and explored using state funds, and is reduced proportionally to the privately funded share of the exploration costs, but to no less than 4.5%.²⁹¹

Conclusion

With an estimated 120 Bcm of unconventional reserves in place, and a strong desire to decrease its independence from Russian natural gas imports, the Lithuanian government sees shale gas development as an important energy supply alternative for the future.²⁹²

Shale gas exploration is still in its infancy in Lithuania, with only one company having undertaken efforts to assess the country's potential shale gas reserves, although it has plans to invest more into exploration over the course of 2012.²⁹³ Like Poland, Lithuania has a relatively stable regulatory and legal environment, which should help to form the foundation for future shale gas development, thereby leaving the economics of extraction as the main driver behind the industry's prospective development. Minijos Nafta is ahead of its competitors in shale gas exploration, while the results of its drilling activities in late 2012 will provide the best indication so far of Lithuania's shale gas potential.²⁹⁴

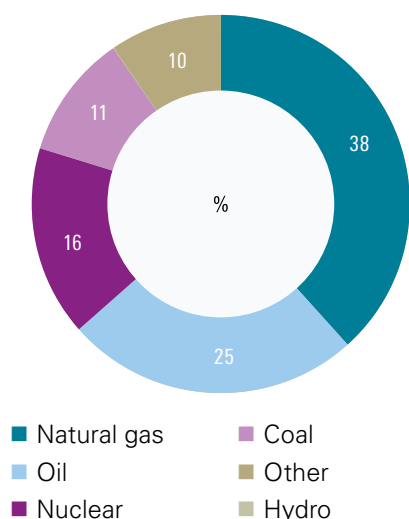
²⁹⁰ Source: As per Article 12 of the Law of Investments

²⁹¹ Source: KPMG in Lithuania, KPMG Baltics Tax Newsletter, March 2012

²⁹² Source: Natural Gas Europe, LNG, Shale Gas Make Headlines in Lithuania, January 23, 2012

²⁹³ Source: Platts Energy in East Europe, Lithuania to explore shale gas potential, January 27, 2012

²⁹⁴ Source: Platts Energy in East Europe, Lithuania to explore shale gas potential, January 27, 2012

Figure 34: Total primary energy supply of Hungary (2010)

Note: 2010 estimates
Source: International Energy Agency, 2011

Table 14: Gas flows of Hungary, 2010

Category	Bcm
Production	2.84
Import	9.53
Decrease/(increase) in stocks	(0.23)
Export	(0.22)
Apparent consumption	(11.92)
Import/consumption ratio	80%

Note: Change of stocks is calculated based on the difference of closing minus opening stocks
Source: U.S. Energy Information Administration, December 2011

6.5. Hungary

Overview

Hungary relies upon natural gas for the largest portion of its total primary energy supply, accounting for 38% of the total supply in 2010 - almost double the share of oil and nuclear, combined.

Hungary is highly dependent on Russian natural gas,²⁹⁵ with imports from that country covering nearly 80% of domestic consumption.²⁹⁶ The country's 20-year contract with the largest gas importer, Panrusgáz – a Gazprom subsidiary – is set to expire in the coming years, and will be subject to renegotiation in 2015.^{297, 298}

Imported gas is pumped into the Hungarian gas transmission system at three entry points: Beregdaróc, at the Ukrainian border, at Mosonmagyaróvár, at the Austrian border and at Donji Miholjac, at the Croatian border.²⁹⁹ In 2010, imported natural gas amounted to 9.53 Bcm.³⁰⁰

In addition to imported gas, domestic production totaled 2.84 Bcm in 2010, which was mostly carried out by MOL Nyrt., the largest oil and gas company in Hungary. The main consumers of natural gas are the residential sector (35%), power generation (30%), and the commercial sector (17%).^{301, 302}

Natural gas supply trends

Between 2000 and 2010, the average domestic production in Hungary was 2.94 Bcm, after slightly decreasing from 3.2 Bcm in 2000, to 2.8 Bcm in 2010. During the past ten years, production has been dominated by state-owned MOL. Between 2000 and 2010, MOL's average share of total Hungarian production was approximately 94%,³⁰³ with production of 2.19 Bcm in 2010.³⁰⁴ The remaining production was delivered by six smaller companies, such as Magyar Horizont Energia Kft.³⁰⁵

Figure 35: Historical development of domestic natural gas production in Hungary

Note: Dry natural gas production
Source: U.S. Energy Information Administration, December 2011

295 Source: BP, Statistical review of World energy, June 2011

296 Source: US Energy Information Administration, December 2011

297 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

298 Source: Mergermarket, Panrusgáz: Gazprom to increase stake to 65% by acquiring shares from E.ON, March 2012

299 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

300 Source: US Energy Information Administration, December 2011

301 Note: 2009 data

302 Source: International Energy Agency, Energy balances of OECD countries (2011 edition), 2011

303 Source: KPMG analysis based on MOL Group's financial reporting tables and US Energy Information Administration production data for Hungary

304 Source: MOL Group, 2011

305 Source: Hungarian Office for Mining and Geology, Bányászati területek nyilvántartása, December 17, 2010

According to the US Energy Information Administration, proved natural gas reserves of Hungary was estimated to be around 8.01 Bcm in 2010.

Based on long-term contracts, Russian natural gas imports play a key role in Hungary's energy supply. In 2010, imports of Russian gas via Ukraine and Austria amounted to approximately 80 percent of total consumption.³⁰⁶ Natural gas imported by Gaz de France and E.ON Ruhrgas Austria was also mostly of Russian origin.³⁰⁷

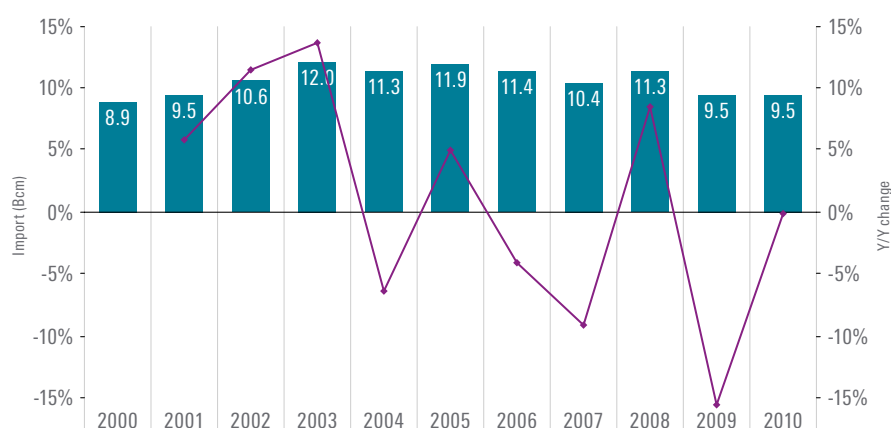
Table 15: Hungary import relationships

Partner	Amount per annum (Bcm)	Maturity of contract
Panrusgáz	9.0	2015
E.ON Ruhrgas	0.5	2015
Bothli Trade AG	0.9	2014
Gaz de France	0.6	2012
TOTAL	11.0	

Source: Hungarian Energy Office, 2011

Among the main importers, Panrusgáz is the largest, and operates as a joint venture between E.ON Ruhrgas and Gazprom.³⁰⁸ In addition to Panrusgáz, Gazprom is also present in Hungary via another subsidiary, Centrex Hungária, which has a long-term contract with Gazprom that expires in 2028.³⁰⁹ In line with demand, the total amount of imported gas transported to Hungary via pipeline in 2010 was 9.53 Bcm.³¹⁰

Figure 36: Historical development of natural gas imports in Hungary



Note: Dry natural gas imports

Source: U.S. Energy Information Administration, December 2011

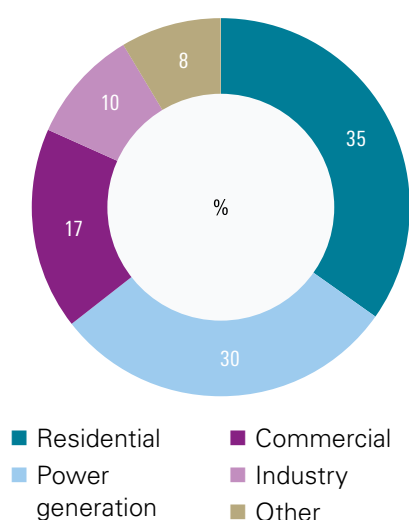
306 Source: US Energy Information Administration, December 2011

307 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

308 Source: Mergermarket, Panrusgáz: Gazprom to increase stake to 65% by acquiring shares from E.ON, March 2012

309 Source: Világgazdaság Online, Előretört a Centrex a piacon, July 22, 2011

310 Source: US Energy Information Administration, December 2011

Figure 37: Natural gas consumption by sector in Hungary (2009)

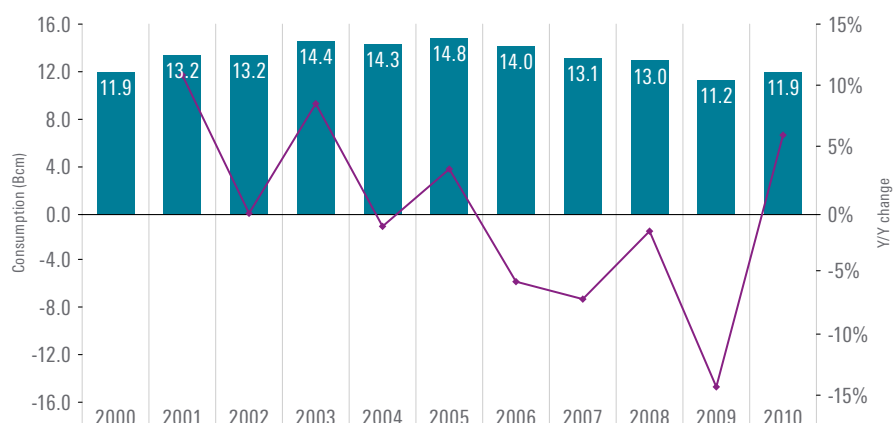
Note: Other includes energy industry own use, losses, transport, agriculture, non-energy use
 Source: International Energy Agency, 2011

There are several plans to increase the energy security of Hungary by diversifying the sources of natural gas supply and/or supply routes, and by reducing the bottlenecks at certain entry points. Some of the major developments involving Hungary include the South Stream pipeline, and the North-South Corridor interconnection.

Natural gas demand trends

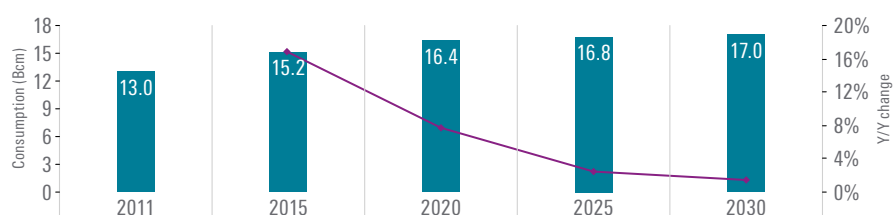
As mentioned above, the main consumers of natural gas in Hungary are the residential, power generation, and commercial sectors.

Between 2000 and 2010, apparent dry natural gas consumption in Hungary fluctuated around an average level of 13.19 Bcm. Consumption is driven mainly by residential heating, gas-fired power plants and industrial production.³¹¹

Figure 38: Historical development of natural gas consumption in Hungary

Note: Apparent dry natural gas consumption
 Source: U.S. Energy Information Administration, December 2011

The Hungarian National Energy Strategy 2030 defines ambitious goals for Hungary, which are expected to affect natural gas demand. These include the renegotiation of supply contracts to incorporate spot prices in their calculation, as well as demand-side management programs. Despite these measures, Hungary's natural gas consumption is expected to exceed historical levels to reach 17 Bcm by 2030,³¹² largely due to the country's continued economic growth.

Figure 39: Forecasted natural gas consumption in Hungary

Source: Datamonitor, 2010

311 Source: International Energy Agency, Energy balances of OECD countries (2011 edition), 2011

312 Source: Datamonitor, Gas and Power Fundamentals Outlook: Europe, April 2011

Between 2000 and 2010, Hungary exported an average 0.04 Bcm of dry natural gas per year, with the highest amount being 0.22 Bcm in 2010.³¹³

Gas infrastructure

The highest natural gas consumption on a single day in Hungary was 89.5 Mcm (on February 9, 2005), while the nominal daily capacity of the Hungarian gas infrastructure substantially exceeds this figure, at approximately 182.9 Mcm per day (as of October 15, 2010).³¹⁴

Transmission

Hungary's high-pressure natural gas transmission system is 5,782km long, and covers almost the entire country.³¹⁵ The transit transmission network is 370km long, and is operated by FGSZ Földgázszállító Zrt. which, fully owned by MOL.³¹⁶ FGSZ is, however, legally unbundled.³¹⁷

Physical natural gas exports are not possible to the west, since the Hungary-Austria Gas (HAG) pipeline is unidirectional, coming from Austria into Hungary.³¹⁸ Physical exports are only possible to the south towards Croatia, Serbia, and Romania.³¹⁹

To increase Hungary's cross-border capacities, and diversify the sources of imports, the development of cross border points is expected in the near future. Some of the major expansion plans include the Austrian-Hungarian interconnector extension – which is scheduled for completion in 2012 – and the development of the Slovakian-Hungarian interconnector by 2015.³²⁰

Distribution and storage

Hungary's gas distribution segment is characterized by the ownership of large, vertically integrated energy companies with only a small part of the market held in state ownership. In Hungary, eleven companies are involved in the operation of the domestic natural gas distribution system.

The distribution system includes 82,624 kilometers of pipeline, supplying approximately 3.5 million consumers.³²¹

There are five commercial natural gas storage facilities in operation in Hungary, which are operated by E.ON Földgáz Storage and MMBF Földgáztároló: Pusztaderics, Kardoskút, Hajdúszoboszló, Zsana, and Szőreg-1. The total nominal capacity of the commercial facilities is 4,930 Mcm, with a daily withdrawal capacity of 59.1 Mcm.³²²

In addition to commercial storage facilities, since January 2010, part of Szőreg-1 has served as Hungary's strategic storage facility, with a working capacity of 1,200 Mcm and a daily withdrawal capacity of 20 Mcm.³²³

The strategic gas storage may only be used for residential purposes, enough to cover natural gas consumption for 60 days.³²⁴

Table 16: Nominal daily capacities in Hungary	
	Nominal daily capacity (Mcm)
Production	10.5
Import (from West)	13.1
Import (from East)	56.3
Import (from South-East)	4.8
Import (from South)	19.1
Commercial gas storage	59.1
Strategic gas storage	20.0
TOTAL	182.9

Source: Hungarian Energy Office, 2011

313 Source: KPMG analysis based on information by US Energy Information Administration

314 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

315 Source: Földgázszállító Zrt., Éves jelentés 2010, 2011

316 Source: Földgázszállító Zrt., Éves jelentés 2010, 2011

317 Source: Földgázszállító Zrt., Éves jelentés 2010, 2011

318 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

319 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

320 Source: Government of Hungary, Nemzeti Energiestratégia 2030, August 2011

321 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

322 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

323 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

324 Source: Hungarian Energy Office, Tájékoztató a Magyar Energia Hivatal 2010. évi tevékenységéről, September 2011

Prospects for shale gas development

According to the US Energy Information Administration, the joint reserves for Romanian, Bulgarian, and Hungarian shale gas in the Carpathian-Balkan basin is around 538 Bcm.³²⁵ The most promising exploration area is considered to be the Makó basin, which is located in the southern part of Hungary.³²⁶ The licenses of the mining properties of the Makó belong to MOL and TXM Olaj- és Gázkutató Kft.³²⁷

The first major milestone of shale gas development in Hungary was in May 2007, when MOL signed a joint venture agreement with ExxonMobil to evaluate the unconventional potential of the Makó and Békés basins.³²⁸ In April 2008, based on the promising results of the joint technical study, MOL started the exploration of the Makó trough. However, the exploration resulted in unfavorable data, and ExxonMobil ended the partnership in 2010. According to MOL,³²⁹ it would have required approximately 2,000 wells to produce shale gas in the Makó trough over a 30-year period, suggesting a significant investment of \$150-250 million.³³⁰

MOL's other partnership at the Makó trough with TXM Olaj- és Gázkutató Kft. (an affiliate of Falcon Oil & Gas) also ended in 2010. In this case, however, MOL decided to withdraw, as the exploration results were below expectations; samples from three fractures did not suggest the existence of any significant reserves. MOL is currently exploring other areas of Hungary, such as the Derecske basin, which may have an estimated resource of 58 Bcm of gas.³³¹ TXM Olaj- és Gázkutató has continued its exploration activity in the Makó trough, and is currently in partnership with Serbian E&P Naftna Industrija Srbije j.s.c. (a Gazprom affiliate).³³² In December 2011, Ascent Resources, a UK company, announced that it had discovered 11.7 Bcm of unconventional gas near the Slovenian-Hungarian border.³³³

There are a number of other companies involved in shale gas exploration in Hungary, such as RAG Hungary Kft. and Cuadrilla Resources Ltd, which are actively seeking reserves in various parts of the country.³³⁴

Regulatory bodies and relevant legislation

The EU determines the principles of Hungarian gas market regulation; however, with regard to gas production activities, there are no direct EU regulatory provisions. There is no specific Hungarian legislation related to shale gas, and it is not yet part of the long-term National Energy Strategy.³³⁵

The relevant regulatory bodies in Hungary include the **Ministry of National Development**, the **Hungarian Energy Office**, and the **Hungarian Mining and Geological Office**. In terms of the exploration of unconventional resources, the Hungarian Mining and Geological Office is the most relevant regulatory body, as it is responsible for issuing exploration permits.

325 Source: US Energy Information Administration, *World shale gas resources*, April 2011

326 Source: Government of Hungary, *National Energy Strategy 2030*, August 2011

327 Source: Hungarian Office for Mining and Geology, *Bányászati területek nyilvántartása*, January 13, 2012

328 Source: MOL Group, *Unconventional exploration as a way of organic growth in Upstream*, 2008

329 Source: MOL Group, *Unconventional exploration as a way of organic growth in Upstream*, 2008

330 Source: MOL Group, *Unconventional exploration as a way of organic growth in Upstream*, 2008

331 Source: Natural Gas Europe, *Hungary Getting Deeper into Unconventional Gas*, November 9, 2011

332 Source: Natural Gas Europe, *NIS signs deal with Falcon Oil & Gas for Hungary project*, June 9, 2011

333 Source: Index.hu, *Gázmezőt találtak a szlovén határnál*, December 8, 2011

334 Source: KPMG analysis based on information by the Hungarian Mining and Geological Office

335 Source: Government of Hungary, *National Energy Strategy 2030*, August 2011

Environmental policy

There are no special restrictions in connection with the exploration of shale gas in Hungary.

In connection with natural gas exploration, government decree Nr. 314/2005 (XII.25.) outlines the steps of the licensing procedure and summarizes the conditions of each activity to be undertaken. The decree is compliant with the IPPC Directive of the European Union (96/61/EC).

Tax policy

There are no specific tax regulations related to shale gas in Hungary, which is currently not expected to change in the near future. However there is a special royalty rate for the production of unconventional gas reserves. The exploration of non-renewable natural resources is subject to royalty, which varies,³³⁶ depending on the type of natural resource and the quantity exploited, between 0% and 30%. If the natural gas is coming from unconventional sources and extractable by special procedures such as fracturing, the royalty rate is fixed at 12%.

Conclusion

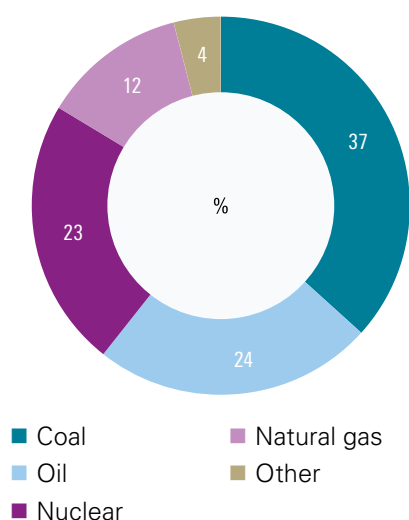
With an estimated 3,282.44 Bcm of unconventional reserves³³⁷ – which largely includes other types of unconventional gas – and a strong desire to decrease its overreliance on foreign gas, the Hungarian government sees shale gas as an important energy supply alternative in the future.

The framework of Hungarian legislation is in compliance with the norms of the European Union, although Hungarian regulations primarily cover the natural gas sector, and do not include specific articles on shale gas. From an environmental perspective, Hungarian legislation does not restrict the extraction of shale gas, or define any specific regulations.

Shale gas exploration is still in an early phase in Hungary, with only a handful of companies having undertaken efforts to assess the country's potential reserves. Initial indications are that the economics of extraction may not be competitive, however, thereby tempering the enthusiasm behind Hungary's shale gas potential. On the other hand, although the future of shale gas in Hungary remains a question, the country currently has a rather favorable investment and regulatory environment aimed at supporting future exploration endeavors.

³³⁶ Source: Act No. 48/1993 on Mining

³³⁷ Source: Website of Hungarian Office for Mining and Geology, January 19, 2011

Figure 40: Total primary energy supply of Bulgaria (2009)

Note: Other includes renewables, biofuels & waste, electricity and heat

Source: International Energy Agency, 2011

Table 17: Gas flows of Bulgaria, 2010

Category	Bcm
Production	0.01
Import	2.14
Decrease/(increase) in stocks	(0.00)
Export	-
Apparent consumption	(2.15)
Import/consumption ratio	100%

Note: Change of stocks is calculated based on the difference of closing minus opening stocks

Source: U.S. Energy Information Administration, December 2011

6.6. Bulgaria

Overview

In 2009, coal was the dominant sources of energy in Bulgaria's primary energy supply in 2009, with natural gas providing the fourth largest source of energy, at 12%. Other major sources of energy supply include oil (24%) and nuclear power (23%).

In 2010, almost all of Bulgaria's natural gas consumption was covered by imports from Russia, which has been supplying the country since 1974.³³⁸ Natural gas imports are based on long-term contracts³³⁹ between the state-owned incumbent national gas company Bulgargaz EAD and affiliates of Russian Gazprom.³⁴⁰

Imported gas is pumped into the Bulgarian gas transmission system at a single entry point at Negru Voda at the Romanian border,³⁴¹ with imports in 2010 amounting to 2.14 Bcm.³⁴²

Domestic production of natural gas in Bulgaria was marginal before the Galata offshore gas field in the Black Sea was developed in 2004.³⁴³ Between 2004 and 2008, natural gas production at Galata amounted to approximately 2.0 Bcm.³⁴⁴ The Galata field was shut down in January 2009 with about 0.2 Bcm of gas reserves left in the ground,³⁴⁵ and it is now slated to be converted into an underground gas storage facility. As replacements to Galata, Bulgaria's two new offshore gas blocks, Kavarna and Kaliakra, have covered the production of Galata since 2011.³⁴⁶

Natural gas consumption in 2010 was almost entirely covered by imports, on account of the small levels of domestic production. In 2010, natural gas was mainly utilized by the power generation (44%), industrial (28%), and transport sectors (9%).³⁴⁷

Natural gas supply trends

As mentioned above, domestic production in Bulgaria has historically been relatively insignificant.³⁴⁸ The Galata offshore gas field is located about 20 kilometers from the eastern port of Varna, in the shallow waters of the Black Sea.³⁴⁹ With the opening of the Galata in 2004, domestic production increased from around 13-18 Mcm to 528 Mcm in 2005.³⁵⁰ During the five years of its operation, the total amount of gas produced at Galata was 2.0 Bcm,³⁵¹ before its subsequent closure and planned conversion into a gas storage facility.³⁵² Domestic production in 2009 and 2010 was marginal.³⁵³

³³⁸ Source: Website of Gazprom Export, Partners - Bulgaria, March 2012

³³⁹ Source: SEWRC Bulgaria, 2010 Annual Report of the European Commission, July 2011

³⁴⁰ Source: Website of Gazprom, About us - Subsidiaries, March 2012

³⁴¹ Source: ENTSO-G, Ten Year National Development Plan 2011-2020, 2011

³⁴² Source: US Energy Information Administration, December 2011

³⁴³ Source: Website of WIEE, Bulgaria, March 2012

³⁴⁴ Source: SEWRC Bulgaria, 2010 Annual Report of the European Commission, July 2011

³⁴⁵ Source: Offshore Technology, Projects – Galata field, March 2012

³⁴⁶ Source: Melrose Resources plc, 2011 Production and year end reserves report and operational update, February 17, 2012

³⁴⁷ Source: US Energy Information Administration, December 2011

³⁴⁸ Source: SEWRC Bulgaria, 2010 Annual Report of the European Commission, July 2011

³⁴⁹ Source: Offshore Technology, Projects – Galata field, March 2012

³⁵⁰ Source: SEWRC Bulgaria, 2010 Annual Report of the European Commission, July 2011

³⁵¹ Source: SEWRC Bulgaria, 2010 Annual Report of the European Commission, July 2011

³⁵² Source: Offshore Technology, Projects – Galata field, March 2012

³⁵³ Source: SEWRC Bulgaria, 2010 Annual Report of the European Commission, July 2011

Two new offshore gas fields were discovered close to Galata in 2007 and 2008.³⁵⁴ Kaliakra and Kavarna were brought into production in late 2010 via subsea connections to the existing Galata platform³⁵⁵ and have a combined ultimate volume of proven and probable reserves of 1.28 Bcm. They are producing at a combined rate of 1.26 Mcm per day.³⁵⁶ In addition to these two fields, the recently-discovered Kavarna East gas field is set for development in 2012, with further exploration planned to the north of the existing blocks.³⁵⁷

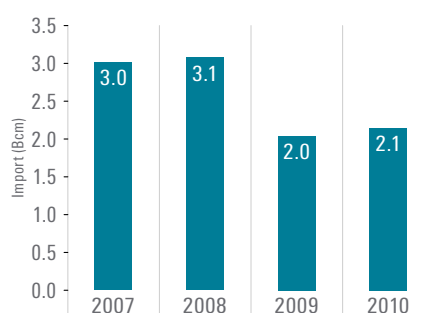
The only significant gas producer in Bulgaria is Melrose Resources plc, through its wholly owned subsidiary Petreco SARL.³⁵⁸ According to Melrose Resources, which is the LSE-listed developer of the Galata, Kaliakra, Kavarna, and Kavarna East offshore gas fields, the 1,790km² area controlled by the company has an estimated 1.6 Bcm of proven and probable gas reserves, as of December 31, 2011.³⁵⁹ The offshore gas fields that are being explored are estimated to include 3.64 Bcm of prospective resources.³⁶⁰

Table 18: Bulgarian import relationships

Partner	Amount per annum (Bcm)	Maturity of contract
Overgas Inc	2.5	2012
WIEE	0.6	2011
TOTAL	3.1	

Source: Gazprom Export, OSW, 2012

Figure 41: Historical development of natural gas imports in Bulgaria



Note: Dry natural gas imports

Source: U.S. Energy Information Administration, December 2011

Based on long-term contracts, Russian natural gas imports play a key role in Bulgaria's energy supply. The main wholesale company in Bulgaria is Bulgargaz EAD, a state-owned company that is responsible for the supply of 99.5% of imported natural gas.³⁶¹ In 2010, imports of Russian gas via Romania covered nearly 100% of total consumption, however, with the increase of domestic production, this lessened somewhat in 2011.³⁶² Bulgaria has two major, long-term natural gas contracts:

Both import partners, Overgas Inc., a Russian-Bulgarian company, and Wintershall Erdgas Handelshaus Zug AG, a Russian-Swiss company, were supplied by Russian natural gas. Overgas also operates as a retail gas provider to end users.³⁶³

In 2010-2011, Bulgaria made significant efforts to reach a reduction in Russian gas prices with Gazprom, and to contract supplies directly with the Russian giant.³⁶⁴ However, as of April 2012, the two parties had still not been able to agree on the terms of the new gas supply contract.

In line with demand, the total amount of imported gas transported to Bulgaria via pipeline in 2010 was 2.1 Bcm.³⁶⁵

Bulgaria has been looking for opportunities to diversify its imports, and has entered into negotiations with Azerbaijan, Egypt, and Qatar,³⁶⁶ as imports could be possible from these countries should a number of contemplated infrastructure developments be completed.

To enhance the flexibility of its transmission system, and in order to increase the security of its supply, Bulgaria is involved in several regional infrastructure projects, including, among others, the South Stream pipeline project and a compressed natural gas discharge terminal in Varna.³⁶⁷

354 Source: Website of Melrose Resources plc, Bulgaria, March 2012

355 Source: Website of Melrose Resources plc, Bulgaria, March 2012

356 Source: Website of Melrose Resources plc, Bulgaria, March 2012

357 Source: Website of Melrose Resources plc, Bulgaria, March 2012

358 Source: International Finance Corporation, March 2012

359 Source: Melrose Resources plc, 2011 production and year end reserves report and operational update, February 17, 2012

360 Source: Website of Melrose Resources plc, Bulgaria, March 2012

361 Source: Enerdata, Bulgaria energy report, May 2011

362 Source: US Energy Information Administration, December 2011

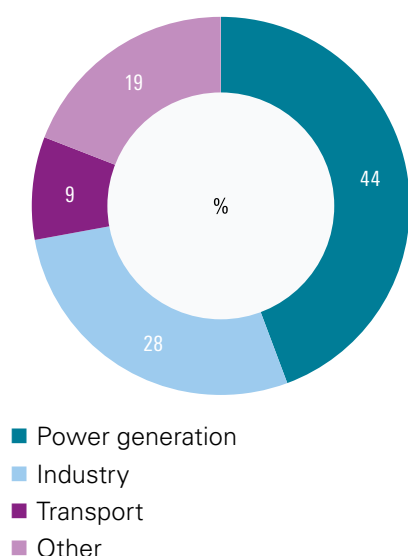
363 Source: Centre for Eastern Studies Commentary, Bulgarian-Russian games in the energy sector: an outcome is getting closer, October 5, 2010

364 Source: Centre for Eastern Studies Commentary, Bulgarian-Russian games in the energy sector: an outcome is getting closer, October 5, 2010

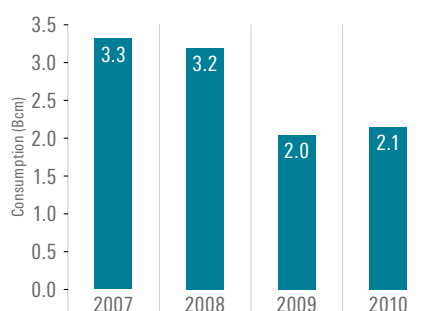
365 Source: US Energy Information Administration, December 2011

366 Source: Enerdata, Bulgaria energy report, May 2011

367 Source: ENTSO-G, Gas Regional Investment Plan Central-Eastern Europe 2012-2021, January 2012

Figure 42: Natural gas consumption by sector in Bulgaria (2009)

Note: Other includes energy industry own use, losses, residential, commercial, agricultural and non-energy use
 Source: International Energy Agency, 2011

Figure 43: Historical development of natural gas consumption in Bulgaria

Note: Apparent dry natural gas consumption
 Source: U.S. Energy Information Administration, December 2011

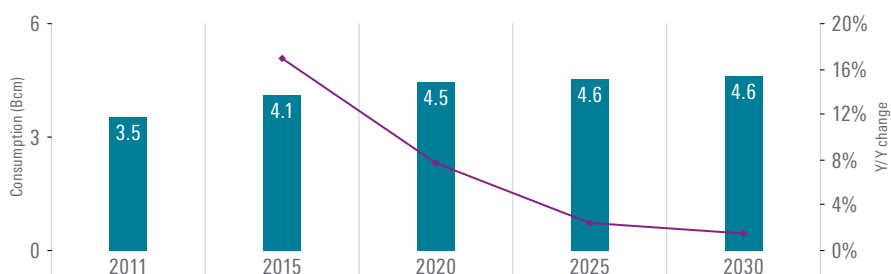
Natural gas demand trends

Natural gas in Bulgaria is mainly used by the power generation sector (primarily combined heat and power plants, and heat plants), the industrial sector (primarily non-metallic minerals, chemicals, and petrochemicals), and the transport sector.³⁶⁸ Gas usage for transport includes the use of gas for pipeline and road transport purposes.³⁶⁹

Only 1.5% of total households have access to natural gas,³⁷⁰ primarily due to the country's underdeveloped transmission and distribution system.³⁷¹

Between 2007 and 2010, apparent dry natural gas consumption in Bulgaria fluctuated around an average level of 2.67 Bcm.³⁷² Consumption is primarily driven by industrial production. Due to the slowdown in industrial output during the financial crisis,³⁷³ demand for natural gas declined by 35%, from 3.1 Bcm in 2008 to 2.0 Bcm in 2009.³⁷⁴

Bulgaria's energy strategy³⁷⁵ identifies several measures that could potentially affect the country's demand for natural gas, including the replacement of electricity with natural gas for heating and household purposes, or the expansion of natural gas usage in road transport. Natural gas consumption is expected to exceed historical levels, to reach 4.6 Bcm by 2030.³⁷⁶

Figure 44: Forecasted natural gas consumption in Bulgaria

Source: Datamonitor, 2010

Due to the small level of production between 2000 and 2010, which was entirely consumed domestically, Bulgaria did not export any natural gas to other countries.³⁷⁷

Gas infrastructure

The average natural gas consumption in Bulgaria on a single day in 2010 was 5.87 Mcm,³⁷⁸ while the nominal daily capacity of the Bulgarian gas infrastructure greatly exceeded this figure, amounting to 75.9 Mcm/day.

³⁶⁸ Source: US Energy Information Administration, December 2011

³⁶⁹ Source: US Energy Information Administration, December 2011

³⁷⁰ Source: Council of Ministers, Bulgarian Energy Strategy by 2020 – Draft version, November 2008

³⁷¹ Source: Council of Ministers, Bulgarian Energy Strategy by 2020 – Draft version, November 2008

³⁷² Source: US Energy Information Administration, December 2011

³⁷³ Source: SEWRC Bulgaria, 2007-2010 National reports to the European Commission

³⁷⁴ Source: US Energy Information Administration, December 2011

³⁷⁵ Source: Council of Ministers, Bulgarian Energy Strategy by 2020 – Draft version, November 2008

³⁷⁶ Source: Datamonitor, Gas and Power Fundamentals Outlook: Europe, April 2010

³⁷⁷ Source: US Energy Information Administration, December 2011

³⁷⁸ Source: US Energy Information Administration, December 2011

Table 19: Bulgarian nominal daily capacities

Nominal daily capacity (Mcm)	
Import	72.6
Gas storage	3.3
TOTAL	75.9

Source: KPMG analysis based on information of
ENTSO-G, Gas Infrastructure Europe

Transmission

Bulgaria's high-pressure natural gas transmission system is 2,645km long, and connects most of its cities.³⁷⁹ The transit transmission network spans 945km and is operated by Bulgartransgaz.³⁸⁰

The physical flow of gas from other countries is only available at the Romanian border, which is, as with all other current interconnections, unidirectional.³⁸¹ Russian natural gas is pumped into the Bulgarian gas system via two entry points at Negru Voda at the Romanian border, while approximately 17.8 Bcm/year³⁸² is transported through the Bratstvo transit pipeline to Turkey (14 Bcm/year),³⁸³ Greece (3 Bcm/year),³⁸⁴ and Macedonia (0.8 Bcm/year).³⁸⁵

To enhance the flexibility of the transmission system, and to increase its security of supply, Bulgaria is involved in several infrastructure development projects³⁸⁶ including, among others, the extension of the gas transmission network, the increase of existing domestic storage capacity, and the construction of an additional Bulgaria-Romania interconnection, which is to be completed in 2012.³⁸⁷

Distribution and storage

Bulgaria's transmission and distribution system is underdeveloped, on account of several fundamental difficulties and challenges related to its physical and administrative health, such as, for example, unclear legal differentiation between transmission and distribution networks, which foments disputes between companies on both networks.³⁸⁸ Nevertheless, the planned developments with regard to the transmission and distribution network should improve this situation.

The gas distribution segment is characterized by five major distribution companies, each with market shares exceeding 5%: Overgaz East (18.7% share), Overgaz North (16.58% share), Sofiagaz (14.58%), Citygaz Bulgaria (11.66% share), and Overgaz West (6.56%).³⁸⁹ Except for Citygaz Bulgaria, the other four major distributors, representing a combined market share of 56.42%, are owned by Overgas, a Gazprom affiliate and the major importer of Russian gas in Bulgaria.³⁹⁰ In 2010, Overgas' distribution network included 2,057km of pipeline, distributing 302 Mcm of natural gas to 49 thousand consumers.³⁹¹

There is one underground storage facility in Bulgaria, which is located at Chiren. The facility was built using a depleted gas field. It is operated by Bulgartransgaz, and has a working capacity of 450 Mcm and withdrawal rate of 3.3 Mcm/day.³⁹² Based on the development plans of Bulgartransgaz, the facility's working capacity will be increased to 1 Bcm by 2017.³⁹³

³⁷⁹ Source: Website of Bulgartransgaz EAD, March 2012

³⁸⁰ Source: Website of Bulgartransgaz EAD, March 2012

³⁸¹ Source: ENTSO-G, Ten Year National Development Plan 2011-2020, 2011

³⁸² Source: Website of Gazprom Export, Partners - Bulgaria, March 2012

³⁸³ Source: Centre for Eastern Studies Commentary, Bulgarian-Russian games in the energy sector: an outcome is getting closer, October 5, 2010

³⁸⁴ Source: Centre for Eastern Studies Commentary, Bulgarian-Russian games in the energy sector: an outcome is getting closer, October 5, 2010

³⁸⁵ Source: KPMG analysis based on information by Centre for Eastern Studies Commentary, Bulgarian-Russian games in the energy sector: an outcome is getting closer, October 5, 2010

³⁸⁶ Source: ENTSO-G, Gas Regional Investment Plan Central-Eastern Europe 2012-2021, January 2012

³⁸⁷ Source: ENTSO-G, Gas Regional Investment Plan Central-Eastern Europe 2012-2021, January 2012

³⁸⁸ Source: Council of Ministers, Bulgarian Energy Strategy by 2020 – Draft version, November 2008

³⁸⁹ Source: SEWRC Bulgaria, 2010 Annual Report of the European Commission, July 2011

³⁹⁰ Source: Website of Overgaz, Shareholders, March 2012

³⁹¹ Source: Overgas, 2010 annual report, 2011

³⁹² Source: Gas Infrastructure Europe, Gas storage map database, August 2011

³⁹³ Source: ENTSO-G, Gas Regional Investment Plan Central-Eastern Europe 2012-2021, January 2012

There are plans to construct an additional gas storage facility by 2018, in order to enhance the security of gas supply and comply with EU Regulation 994/2010 on gas infrastructure.³⁹⁴

Prospects for shale gas development

Due to its dependency on imported gas, shale gas is considered to be a potential source of diversification for Bulgaria's energy supplies.

Part of Bulgaria's territory is located in the Carpathian-Balkan Basin, which is considered to be a prospective area for shale gas development by the EIA.³⁹⁵ The potential of the Carpathian-Balkan Basin was first realized by Direct Petroleum Exploration, which estimated the amount of shale gas reserves to be around 300 Bcm.³⁹⁶ Others, including Chevron and BKN Petroleum, estimate the amount of shale gas reserves to be between 300 Bcm and 1 Tcm at the Novi Pazar area.³⁹⁷

Similar to activities in other Eastern European countries, shale gas development has been led by North American companies, with Direct Petroleum Exploration being the first company to enter the market, followed by Canadian Park Place Energy Corp in 2010.³⁹⁸ The issuance of exploration permits were soon followed by the first discoveries, suggesting approximately 300 Bcm of shale gas in the ground, which in turn caught the attention of Chevron.³⁹⁹ When the Bulgarian government announced a tender for new exploration permits, Chevron outbid BNK Petroleum by \$30 million in May 2011,⁴⁰⁰ and was granted permits related to the gas fields near Novi Pazar.⁴⁰¹

Due to political pressure over environmental concerns, a moratorium related to shale gas production was issued as of January 2012 concerning activities involving hydraulic fracturing in Bulgaria, and the permits that Chevron won have since been revoked. This occurred after protests against shale gas exploration started during the summer of 2011, not long after Chevron's winning bid.⁴⁰² As such, other companies with valid licenses (TransAtlantic Petroleum Ltd and Park Place Energy) have suspended their shale gas exploration activities in Bulgaria.⁴⁰³

Although shale gas would mean a potential alternative to imported gas, the current political environment has rendered the future of Bulgarian shale gas development uncertain.

Regulatory bodies and relevant legislation

The EU determines the principles of Bulgarian gas market regulation; however, there are no direct EU regulatory provisions concerning gas production activities. There is no Bulgarian legislation specific to the regulation of shale gas.

The relevant regulatory bodies in Bulgaria include the **Ministry of Economy, Energy and Tourism**, the **Ministry of Environment and Water**, and the **State Energy and Water Regulatory Commission**. In terms of the exploration of unconventional resources, the Ministry of Economy, Energy

394 Source: ENTSO-G, *Gas Regional Investment Plan Central-Eastern Europe 2012-2021*, January 2012

395 Source: US Energy Information Administration, *World Shale Gas Resources*, April 2011

396 Source: *Platts Energy in East Europe, Bulgaria's great shale expectations*, August 26, 2011

397 Source: *Platts Energy in East Europe, Bulgaria's great shale expectations*, August 26, 2011

398 Source: *Natural Gas Europe, Bulgaria grants permit for shale gas prospecting*, October 7, 2010

399 Source: *Natural Gas Europe, Direct Petroleum high on Bulgarian shale*, November 22, 2010

400 Source: *Natural Gas Europe, Chevron secures Bulgarian shale concession*, May 28, 2011

401 Source: *Natural Gas Europe, Chevron secures Bulgarian shale concession*, May 28, 2011

402 Source: *Natural Gas Europe, Bulgaria addresses environmental concerns over shale gas*, July 19, 2011

403 Source: *Centre for Eastern Studies, Bulgaria is no longer interested in shale gas*, January 25, 2012

and Tourism is the most relevant regulatory body, as it is responsible for issuing exploration permits. In more detail, these bodies are each given the administration over select responsibilities.

Environmental policy

Due to environmental concerns, hydraulic fracturing has been under a moratorium since the beginning of 2012. The use of other technologies for the exploration and production of natural gas, however, is permitted. Natural gas exploration is subject to a positive environmental impact assessment made by the Ministry of Environment and Water. The Protection of the Environment Act of 2002 details the licensing procedure and summarizes the conditions of applicable activities. The Act is compliant with the IPPC Directive of the European Union (96/61/EC).

Tax policy

There are no specific tax regulations related to shale gas in Bulgaria. Exploration of natural gas is subject to an annual fee based on the size of the exploration area.⁴⁰⁴ The production of natural gas is subject to royalty, which is based on the produced quantities and specific conditions.⁴⁰⁵ This royalty can vary between 2.5% and 30%.⁴⁰⁶

Conclusion

With a low level of domestic natural gas production, Bulgaria is highly dependent on Russian imports, which are supplied via a single pipeline.^{407, 408} However, the Bulgarian government has recently been making significant efforts to diversify and increase the flexibility of its gas supplies.⁴⁰⁹ Several infrastructure developments are being considered, which would enable the country to increase its energy security by importing gas from alternative sources at potentially lower prices.

Compared to other European countries, the share of natural gas in Bulgaria's total primary energy supply is quite low, with natural gas being mostly used for industrial purposes.^{410, 411} Only 1.5% of households have access to natural gas, as electricity is used by 40% of households for heating and other purposes (EU average 11%).⁴¹² Bulgaria's underdeveloped gas transmission and distribution network stifles residential natural gas consumption.⁴¹³ However, based on planned infrastructure developments, the accession of households to the distribution system will present significant potential for the gas sector.⁴¹⁴

Bulgaria, however, has issued a moratorium on the practice of hydraulic fracturing,⁴¹⁵ and is thus unique among Central and Eastern European countries. However, despite this temporary ban, the potential still exists for shale gas in Bulgaria, as political support could quickly strengthen, should unconventional gas developments advance in the CEE region.

404 Source: Global Legal Group, *The International Comparative Legal Guide to Gas Regulation 2012: Bulgaria*, 2012

405 Source: Global Legal Group, *The International Comparative Legal Guide to Gas Regulation 2012: Bulgaria*, 2012

406 Source: Transatlantic Petroleum Ltd., *Bulgaria overview*, May 2011

407 Source: BP, *Statistical Review of World Energy*, June 2011

408 Source: Website of Bulgartransgaz, *About us – Gas infrastructure*, March 2012

409 Source: Centre for Eastern Studies Commentary, *Bulgarian-Russian games in the energy sector: an outcome is getting closer*, October 5, 2010

410 Source: International Energy Agency, *Energy balances of non-OECD countries (2011 edition)*, 2011

411 Source: International Energy Agency, *Energy balances of OECD countries (2011 edition)*, 2011

412 Source: Council of Ministers, *Bulgarian Energy Strategy by 2020 – Draft version*, November 2008

413 Source: Council of Ministers, *Bulgarian Energy Strategy by 2020 – Draft version*, November 2008

414 Source: Council of Ministers, *Bulgarian Energy Strategy by 2020 – Draft version*, November 2008

415 *Natural Gas Europe: Bulgaria to 'postpone' shale gas development*, January 16, 2012

Potential shale markets

6.7. Potential shale markets

Overview

The potential development of shale gas resources among other countries in the CEE region, while relatively small, varies significantly. The Baltic countries of Estonia and Latvia have expressed interest in developing their potential unconventional resources, though the former has focused on its substantial shale oil reserves. Still others, such as the Czech and Slovak Republics, are at very early stages of exploration, while the potential reserves in those countries are not expected to be very large. In the Slovak Republic, extraction could also be limited due to environmental considerations regarding water tables around the Danube, where some shale gas reserves are thought to exist.

Southeastern European countries such as Albania, Bosnia and Herzegovina, and Macedonia are not currently focused on the development of shale gas resources, largely because of their historical reliance on hydroelectric energy or coal, while their territories have also largely been unexplored for any potential gas resources – conventional or otherwise. Other countries such as Croatia or Serbia are thought to have good prospects for shale resources, but gas exploration in those countries is still rather limited.

Furthermore, due to their having little or no experience in gas exploration and extraction, several of these countries have few trained personnel or technological capabilities that can be used to support shale gas production – thereby suggesting that these countries will rely more heavily on foreign expertise, should it be determined that they have recoverable shale gas reserves.

Baltic region

Domestic potential

Estonia depends fully on Russia as its sole source of natural gas, which amounts to 14% of the country's total primary energy supply.^{416, 417} The economic downturn had severe consequences on Estonia's gas market, as domestic consumption fell 35%, from 1.0 Bcm in 2007 to 0.6 Bcm in 2009.⁴¹⁸ One of the main factors contributing to this sharp decrease was the suspension of production at Nitrofert AS.⁴¹⁹ As one of the largest industrial companies in Estonia, Nitrofert processed natural gas into fertilizers, and accounted for more than 26% of Estonia's gas consumption in 2007.⁴²⁰ Other factors that contributed to the decrease in gas consumption were the commissioning of two wood and peat fired cogeneration plants in Tallinn and Tartu.⁴²¹

Eesti Energia, the state-owned energy and electricity company, is responsible for the production of oil shales in Estonia. In 2008, 14 Mt of oil shale was mined and processed into approximately 220,000 tons of crude shale oil.⁴²² In an ongoing project, Eesti Energia is also constructing a shale oil condensation unit with engineering partner Neste Jacobs, which is scheduled for completion at the end of 2012.⁴²³ If the project succeeds, Estonia's liquid shale oil fuel production will continue to increase, following recent trends.

⁴¹⁶ Source: BP, *Statistical review of World energy*, June 2011

⁴¹⁷ Source: International Energy Agency, *Energy balances of OECD countries (2011 edition)*, 2011

⁴¹⁸ Source: Estonian Competition Authority, *Estonian Electricity and Gas Market Report 2010, 2011*

⁴¹⁹ Source: Estonian Competition Authority, *Estonian Electricity and Gas Market Report 2010, 2011*

⁴²⁰ Source: Estonian Competition Authority, *Estonian Electricity and Gas Market Report 2010, 2011*

⁴²¹ Source: Estonian Competition Authority, *Estonian Electricity and Gas Market Report 2010, 2011*

⁴²² Source: Enerdata, *Estonia Energy Report*, March 2010

⁴²³ Source: Neste Oil, *Neste Jacobs and Eesti Energia agreed on building a shale oil condensation unit in Estonia*, April 29, 2010

Latvia does not have any natural gas reserves, as all of its supply is imported from Russia. Data from 2009 indicate that gas represents 30% of Latvia's total primary energy share,⁴²⁴ which in 2010 a total of 1.82 Bcm of natural gas was consumed.⁴²⁵ The energy sector accounted for 1.2 Bcm of this total, followed by industrial use (302 Mcm), household consumption (155 Mcm), agriculture and forestry (19 Mcm), and others (144 Mcm).⁴²⁶

Eesti Gaas is the only importer of gas in Estonia.⁴²⁷ In November 2011, in a report commissioned by Estonia's national TSO Elering, Finnish consultancy Poyry advised Estonia to nationalize Eesti Gaas in order to further the country's domestic gas interests.⁴²⁸ However, as the region's only gas supplier and largest stakeholder of Eesti Gaas, Gazprom has voiced its opposition to such a move.⁴²⁹

The vertically integrated Latvijas Gāze is the only provider in Latvia's gas sector, with exclusive licenses for exploration, storage, transmission, distribution, and trading of natural gas under the supervision of Latvia's Public Utilities Commission.⁴³⁰ The gas market was authorized for liberalization in 2001, but Gazprom has opposed this move as well,⁴³¹ and Latvijas Gāze will likely remain Latvia's only gas company until 2017.⁴³²

Assessment of potential

To further reduce the Baltic countries' gas dependency on Russia, LNG terminals have been considered as part of efforts to increasing energy security in the region; in Estonia, a 3 Bcm/year terminal has been planned for construction on the shores of Paldiski.⁴³³ As each of the Baltic countries would like to build a LNG terminal on their own territories, a consensus has not yet been reached on the final location, while the European Commission has been asked to advise on the matter.⁴³⁴

Latvia's subsoil is suitable for gas storage, and currently accommodates the third largest storage site in Europe at Inčukalns, with a total capacity of 4.14 Bcm.⁴³⁵ There is potential for another 11 sites to be developed as gas storage, with an estimated total capacity of 58 Bcm.⁴³⁶

Shale gas potential

Latvia's Prime Minister has expressed his country's intention to explore for shale gas opportunities, in order to diversify domestic gas supply.⁴³⁷ Preliminary indications point to the existence of considerable reserves underneath Latvian soil.⁴³⁸ Estonia's focus has been more on its shale oil resources.⁴³⁹

424 Source: Enerdata, *Latvia Energy Report*, July 2011

425 Source: Latvia Public Utilities Commission, *2010 Annual Report of the Public Utilities Commission of the Republic of Latvia on the National Energy Sector*, 2011

426 Source: Latvia Public Utilities Commission, *2010 Annual Report of the Public Utilities Commission of the Republic of Latvia on the National Energy Sector*, 2011

427 Source: Eesti Gaas, February 2011

428 Source: *Natural Gas Europe*, *Estonia Advised to Nationalise Eesti Gaas*, November 2011

429 Source: Bloomberg, *Estonia gas grid nationalization seen as last option*, Ansip says, December 21, 2011

430 Source: Latvia Public Utilities Commission, *2010 Annual Report of the Public Utilities Commission of the Republic of Latvia on the National Energy Sector*, 2011

431 Source: *The Baltic Course*, *Latvia will support Commission's gas market liberalization plans*, February 27, 2008

432 Source: Enerdata, *Latvia Energy Report*, July 2011

433 Source: *Gas Infrastructure Europe*, *LNG Investment Database*, September 2011

434 Source: *Natural Gas Europe*, *Latvia, Poland, Estonia Turn to EU After Hitting LNG Stalemate*, November 14, 2011

435 Source: Enerdata, *Latvia Energy Report*, July 2011

436 Source: Enerdata, *Latvia Energy Report*, July 2011

437 Source: *Natural Gas Europe*, *Latvia to Pursue Shale Gas Development*, July 21, 2011

438 Source: US Energy Information Administration, *World shale gas resources*, April 2011

439 Source: Estonian Competition Authority, *Estonian Electricity and Gas Market Report 2010*, 2011

Czech and Slovak Republics

Domestic potential

The origin of most natural gas that is consumed in the Czech and Slovak Republics is predominantly Russian. Out of the total 8.4 Bcm imported in the Czech Republic in 2010,⁴⁴⁰ 64.1% came from Russia. The remaining balance is satisfied by natural gas imports from Norway and other EU countries, accounting for 12.4% and 23.5% of supply, respectively.⁴⁴¹ The ratio of domestic production as a portion of total natural gas consumption was merely 2%. Czech domestic production of natural gas was about 0.2 Bcm, while the country's total reserves were estimated at 4 Bcm in 2010.⁴⁴² Slovak domestic production is also relatively small, hovering around 0.10 Bcm in the last 4 years.⁴⁴³

Natural gas consumption in the Czech Republic has been virtually unchanged during the past decade, where it has remained constant at around 9.13 Bcm.⁴⁴⁴ Electricity generation accounts for about 12% of the country's gas consumption, while commercial, public, residential, and agriculture demand account for about half of consumption, of which commercial and residential are expected to experience the strongest growth.⁴⁴⁵ In the Slovak Republic, natural gas consumption in 2009 had a relatively balanced split among the residential (29%), industrial (25%), and power generation (21%) sectors.⁴⁴⁶

A major transit country, the Slovak Republic maintains a unique position among European Union countries, supplying about 14% of total EU consumption in 2010.⁴⁴⁷ SPP, the Slovak Republic's leading natural gas-related business that is involved in gas imports, transportation and distribution, recently signed a 20-year contract with Gazprom, securing the gas supply from Russia until 2028.⁴⁴⁸

There are eight operational storage facilities in the Czech Republic, with a combined technical storage capacity of 3.1 Bcm. They have an aggregated 51.5 Mcm/day withdrawal capacity, and a 36.8 Mcm/day injection capacity.⁴⁴⁹ The Slovak Republic can store up to 2.8 Bcm of gas in two storage facilities. The largest thereof is able to hold 2.2 Bcm and has a maximum withdrawal rate of 30.5 Mcm/day. The two countries' also cooperate on gas storage, as the Slovak Republic has access to an underground facility in the Czech Republic through a subsidy of the Slovak national oil and gas company, SPP, which is used for stabilizing the flow of resources on the Slovak distribution network.⁴⁵⁰

Assessment of potential

Through 2030, the Czech Republic's demand for natural gas is expected to grow by a compound annual rate of 4%, to reach 12.1 Bcm.⁴⁵¹ The fastest growth is expected over the next five years, which is partly attributable to the planned development of new gas-fired power stations, which are expected to balance

440 Source: US Energy Information Administration, December 2011

441 Source: Energy Regulatory Office, *The Czech Republic's National Report on the Electricity and Gas Industries for 2010*, July 2011

442 Source: US Energy Information Administration, December 2011

443 Source: US Energy Information Administration, December 2011

444 Source: US Energy Information Administration, December 2011

445 Source: Energy Delta Institute, *Country Gas Profile – Czech Republic*, January 2012

446 Source: International Energy Agency, *Natural gas information (2011 edition)*, 2011

447 Source: Website of Eustream, *Our Company*, January 2012

448 Source: Enerdata, *Slovakia energy report*, May 2011

449 Source: Energy Regulatory Office, *The Czech Republic's National Report on the Electricity and Gas Industries for 2010*, July 2011

450 Source: Website of SPP, *Basic information – Transmission and distribution of natural gas*, January 2012

451 Source: Datamonitor, *Gas and Power Fundamentals Outlook: Europe*, April 2010

new renewable energy capacities, such as solar and wind energy. While most countries intend to diversify away from natural gas, the Czech Republic plans to increase the use of gas-fired electricity generation capacity as a percentage in its generation mix, from a relatively low 6.2% in 2009 to 7.6% by 2013.⁴⁵²

As Slovak demand for energy has not changed dramatically over the past decade, the historical development of imports has fluctuated only modestly and has ultimately followed a decreasing trend. Peaking at 7.32 Bcm in 2005, the Slovak Republic's imports have seen a small contraction of 1.6% over the course of ten years.⁴⁵³

Shale gas potential

A number of domestic and foreign companies have applied for shale gas exploration permits in the Czech Republic. Applicants include the UK's Cuadrilla Resources, Australia-based Basgas, and domestic upstream company Moravské Naftové Doly (MND).⁴⁵⁴

Because there is not expected to be any definitive evidence of the existence of shale gas for another five years, there are no specific regulations in place. The Czech Republic is still at an early stage, whereby only a few companies are engaging in exploration.

Czech O&G company MND has plans to explore a new site for conventional natural gas reserves in southern Moravia, near the border with Slovakia. It plans to sign up a drilling partner by the end of 2013. The drilling required at this site is more than three times the depth of current drilling in the country,⁴⁵⁵ while it could potentially mean tens of billions of cubic meters of additional reserves for the country, if successful. In addition to conventional gas, the 644km² area will also be explored for shale gas.⁴⁵⁶ Basgas has applied for exploration permits covering an area of 93km² around Beroun in the center of the Czech Republic, and a 777.5km² area around Trutnov in the north-east of the country, where exploration plans have been met with some local resistance.⁴⁵⁷ Cuadrilla Resources has also applied for exploration rights for a 946km² area in Moravia, between Hranice, Příbor, and Valašské Meziříčí.⁴⁵⁸

In the Slovak Republic, the country's storage and E&P company, NAFTA, entered into a cooperation agreement with the Austrian company OMV at the end of 2007 for two exploration licenses in the Slovak part of the Vienna Basin, for the exploration of hydrocarbons (including shale gas reserves), covering an area of about 1,400km².⁴⁵⁹ In 2010, the cooperation executed drilling in the Húšky area, near the Slovak-Austrian-Czech border triangle, which did not result in proving the existence of hydrocarbons. Drilling was subsequently carried out in the Závod area.⁴⁶⁰ While NAFTA continues to focus its shale exploration activities in this area, any development potential may be limited due to possible concerns over its impact on water tables in the Eastern Slovakian Lowlands, near Bratislava, or on the Danube.

452 Source: Business Monitor International, November 21, 2011

453 Source: US Energy Information Administration, December 2011

454 Source: Rigzone, Foreign companies apply for Czech shale gas exploration permits, September 6, 2011

455 Source: Platts Energy in East Europe, MND seeks drilling partner, January 13, 2012

456 Source: Platts Energy in East Europe, MND seeks drilling partner, January 13, 2012

457 Source: Energia SK, Česi podpisují petici proti těžbě bradlicového plynu, March 13, 2012

458 Source: Business News Europe, Companies prospect for Czech shale gas, August 3, 2011

459 Source: Platts Energy in East Europe, OMV upbeat on Slovak gas production, March 28, 2008

460 Source: NAFTA a.s., Annual Report 2010, 2011

Croatia and Serbia

Domestic potential

Croatia can lay claim to a number of indigenous sources of gas and oil, as the country is able to supply a majority of its own demand from domestic production. There are 17 onshore and 6 offshore gas fields across Croatia, with a total annual output of 1.9 Bcm.⁴⁶¹ This capacity is able to meet the majority of national demand, which includes more than 685,000 gas customers.⁴⁶² Croatia's natural gas reserves are estimated to amount to 30.5 Bcm.⁴⁶³

While only 30% of Croatia's gas supply originates from abroad, gas supply in Serbia is heavily dependent on imports, with about three-fourths thereof of foreign origin.⁴⁶⁴ Natural gas in the latter country represented a 10% share in 2009,^{465, 466} about two-thirds of which was consumed by the industrial sector, or 26.6 Mcm, and 27% by the residential and service sector, at approximately 10.8 Mcm. Serbia's remaining consumption went to non-energy uses (5%) and transport (1%).⁴⁶⁷

Gas consumption in Croatia is around 2.9 Bcm per year.⁴⁶⁸ Industrial gas consumption accounts for 39% of demand, which is mainly used by the petrochemical industry, while power generation accounts for 24%.⁴⁶⁹

An annual 1.1 Bcm of natural gas was imported to Croatia from Russia within the framework of a long-term contract, which was not extended at the end of 2010.⁴⁷⁰ Instead, in December 2010, a 3-year contract was signed with Italy's ENI for the supply of natural gas to Croatia, ending Croatia's 10-year exclusive partnership with Gazprom.⁴⁷¹ Since January 2011, an annual supply of approximately 750 Mcm of natural gas has been imported via this new agreement.⁴⁷²

Gazprom still supplies Serbia through state-owned Srbijagas, with 1.4 Bcm of gas in 2011.⁴⁷³ All natural gas is imported from Russia over one pipeline via Hungary, through an entry point at Kiskundorozsma.⁴⁷⁴

Croatia is connected to Slovenia via a gas pipeline with a capacity of 1.5 Bcm/year. In August 2011, a gas pipeline between Slobodnica and Városföld in Hungary was completed, with a capacity of 6.5 Bcm/year, thereby providing Croatia access to Hungary's gas storage facilities.⁴⁷⁵ Plinacro, the national operator of the gas transmission system, plans to increase the capacity of the gas pipeline with Slovenia from 1.5 Bcm to 3.5 Bcm, and to build gas pipelines to Split, Bosnia-Herzegovina, and Serbia.⁴⁷⁶

Local gas production in Serbia has remained at low levels, in recent years staying in the range 0.10 Bcm and 0.35 Bcm.⁴⁷⁷

461 Source: US Energy Information Administration, December 2011

462 Source: International Gas Union, International Gas Magazine – The Croatian gas industry, October 2011

463 Source: US Energy Information Administration, December 2011

464 Source: Austrian Energy Agency, Energy in Central & Eastern Europe – Serbia, 2012

465 Source: International Energy Agency, Energy balances of non-OECD countries (2011 edition), 2011

466 Note: Shares of under 0.1% are not included and consequently the total may not add up to 100%

467 Source: Austrian Energy Agency, Energy in Central & Eastern Europe – Serbia, 2012

468 Source: US Energy Information Administration, December 2011

469 Source: Enerdata, Croatia Energy Report, August 2011

470 Source: US Energy Information Administration, December 2011

471 Source: Centre for Eastern Studies, Croatia ends Gazprom's monopoly, December 19, 2010

472 Source: Centre for Eastern Studies, Croatia ends Gazprom's monopoly, December 19, 2010

473 Source: Gazprom, Banatski Dvor UGS facility smoothes out gas consumption peaks in Serbia during abnormally cold snaps, February 22, 2012

474 Source: ENTSO-G, European Ten Year Network Development Plan 2011-2020, 2011

475 Source: Enerdata, Croatia Energy Report, August 2011

476 Source: Enerdata, Croatia Energy Report, August 2011

477 Source: US Energy Information Administration, December 2011

Assessment of potential

Croatia is planning the construction of a 15 Bcm/year LNG regasification terminal on the island of Krk. Current estimates predict the LNG terminal to be operational by 2016 or 2017, although a number of delays in its development have already been experienced.⁴⁷⁸ An existing 550 Mcm gas storage facility in Okoli is currently being used, the capacity of which is slated for expansion by 400 Mcm. Plinacro, the TSO, is also considering building another storage facility with an initial capacity of 500 Mcm. A gas storage facility was recently constructed in the Serbian city of Banatski Dvor, under the direct of a joint venture with Gazprom, and has a maximum delivery capacity of 5 Mcm/day, while it can store up to 450 Mcm.⁴⁷⁹

State-owned power utility Hrvatska Elektroprivreda (HEP) is currently building a 230 MW combined cycle power plant, which is scheduled for commissioning in 2012. With the exception of small renewable power generators, HEP is currently the only electricity company in Croatia. Thanks to Croatia's unique geography, hydroelectric power plants provide 52% of the country's total generation capacity. The electricity market was fully opened in 2008, as was the gas market, following the adoption of new gas laws in 2007.⁴⁸⁰

In order to address economic growth and diversify its primary energy supply, Serbia has recently undertaken steps to expand its channels for imports, and build out its gas network. The majority of the distribution network is operated by Srbijagas, and to a lesser extent by Yugorosgaz, which is controlled by Gazprom and local distributors.⁴⁸¹

Shale gas potential

Although no identified shale formations have been confirmed in Croatia, there is an estimated 18 to 30 Bcm of unconventional gas in the Drava Depression.⁴⁸² Both tight gas and deep shale formations, ranging from 3,400 to 4,400 meters, are expected to hold large quantities of gas. Croatia's national oil and gas company, INA, believes that there is even more unconventional gas available, however further exploration still has to take place in order to gain more knowledge and understanding of potential source areas.⁴⁸³

Serbia's domestic shale prospects may be expected to advance as its regulatory approach to unconventional resources progresses. In this regard, the country has so far been primarily focused on its shale oil basins. However, NIS invited bids last year for the exploration of unconventional gas in the northern part of the country, at the southern edge of the Pannonian Basin. Drilling was proposed to extend to a maximum depth of 4,500m and extend over five phases, the last of which was expected to terminate in early 2012, over a total area of 532km² over two fields.⁴⁸⁴ Regardless of these results, the cost-competitiveness of Serbian shale gas development will be weighed against existing gas supply from Russia and related pipeline projects.

478 Source: International Gas Union, *International Gas Magazine – The Croatian gas industry*, October 2011

479 Source: South Stream, *Gazprom and Srbijagas commission South Stream's first facility – Banatski Dvor UGS*, November 21, 2011

480 Source: Enerdata, *Croatia Energy Report*, August 2011

481 Source: Ministry of Infrastructure and Energy, *Security of supply statement of Republic of Serbia*, September 2011

482 Source: E&P Magazine, *Unconventional play takes shape in Croatia*, June 17, 2010

483 Source: E&P Magazine, *Unconventional play takes shape in Croatia*, June 17, 2010

484 Source: *Platts Energy in East Europe*, *Bids sought for shale gas survey*, February 11, 2011

Southeastern Europe

Domestic potential

Gas is not a commonly used energy source in southeastern Europe, as most countries in the region have traditionally relied on other resources such as coal or hydro to address their domestic power needs. The share of natural gas as a portion of any one country's primary energy supply never tops 5%, and in many cases is non-existent. However, in countries like Albania, this is mainly due to the fact that much of the country is simply unexplored. In Bosnia and Herzegovina, gas consumption is mainly consumed by its Mittal Zenica steel and Birač Zvornik aluminum plants,⁴⁸⁵ aside from households in Sarajevo.⁴⁸⁶

Albania has plans to diversify its supply structure away from its primary sources of oil and hydropower. However, because of insufficient funding, the production of oil has declined rapidly in the country. Albania's exhausted gas fields are able to provide good locations for future gas storage facilities. The country's gas reserves amounted to 0.84 Bcm in 2010,⁴⁸⁷ however Albania's depleted gas fields and salt domes could provide 1.1 Bcm of gas storage capacity.⁴⁸⁸

Albania is also expecting to see improvements to its pipeline network, as it lies at the crossroads of several gas pipeline projects, and the Italian Falcione Group agreed in December 2008 to the construction of a 9-12 Bcm/year LNG regasification plant near the Albanian city of Fier, whose construction began in 2010, along with a subsea pipeline to deliver gas to Italy.⁴⁸⁹

Kosovo's primary energy source is coal (lignite), serving 55% of the total energy consumption, and any gas consumption is only limited to bottled LPG,⁴⁹⁰ as is also the case in Montenegro.⁴⁹¹ There is no gas production or gas storage in Macedonia, and at present there are no plans to build any.⁴⁹² Imported gas is only used in the industrial and power generation sector, such as the TE-TO Skopje power plant, the Zelezarnica steel plant, and the Cementarnica cement plant, and in Skopje's district heating.^{493, 494}

The power generation mix of Slovenia is composed of 3 major sources: coal-fired power plants (31.8%), nuclear energy (35.2%), and hydroelectric generators (28.2%).⁴⁹⁵ Electricity production totaled 15,317 GWh in 2010, with gas-fired power plants accounting only for 3% of production that year.⁴⁹⁶

In 2010, 47% of Slovenia's gas imports came from Russia, 33% from Algeria, 15% from Austria, 5% from Italy, and another 3% from other countries, totaling 1.04 Bcm.⁴⁹⁷ Indigenous gas production amounts to a total of only 7 Mcm in 2010.⁴⁹⁸

485 Source: Enerdata, Bosnia-Herzegovina energy report, January 2011

486 Source: The World Bank, The Future of the Natural Gas Market in Southeast Europe

487 Source: US Energy Information Administration, December 2011

488 Source: Acturca, Albania could import LNG from 2009 on Swiss-led plans, May 7, 2006

489 Source: Staffetta News, LNG Albania, construction begins in 2010, November 12, 2009

490 Source: Global Legal Group, The International Comparative Legal Guide to Gas Regulation 2012: Kosovo, March 2012

491 Source: Montenegro Ministry of Economy, Energy Efficiency Action Plan - for the period 2010-2012

492 Source: The World Bank, The Future of the Natural Gas Market in Southeast Europe, 2010

493 Source: Setimes, Macedonia focuses on natural gas energy priority, March 15, 2010

494 Source: Gilani Research Foundation, Project on business and politics in the Muslim world, March 24, 2010

495 Source: Energy Agency of Slovenia, Report on the Energy Sector in Slovenia for 2010, June 2011

496 Source: Energy Agency of Slovenia, Report on the Energy Sector in Slovenia for 2010, June 2011

497 Source: Energy Agency of Slovenia, Report on the Energy Sector in Slovenia for 2010, June 2011

498 Source: International Energy Agency, Natural Gas Information (2011 edition), 2011

Assessment of potential

In Bosnia and Herzegovina, Srbijagas plans to link Republika Srpska to its network with a branch that is able to carry 1.5 Bcm.⁴⁹⁹ It also offers an arm of the pipeline to the Federation of Bosnia and Herzegovina.⁵⁰⁰ Jadran (Adriatic)-Naftagas^{501, 502} (a joint venture of the Russian Neftegazinkor and the Serbian oil firm NIS) and Shell Exploration Company⁵⁰³ both received oil and natural gas exploration rights in 2011 in Republika Srpska. An international tender for gas exploration and exploitation was called in Montenegro in the same year, with 15 companies expressing interest at the beginning of 2011.⁵⁰⁴

Srbijagas, sister-company of Gazprom majority-owned NIS Energogas, claims the rights to build a pipeline in Kosovo, connecting it to southern Serbia (between Niš and Prishtina⁵⁰⁵).⁵⁰⁶ Based on ENTSO-G estimations, Kosovo will probably use approximately 20 Mcm of natural gas in 2015.⁵⁰⁷ According to a World Bank study, with the expected development of the gas infrastructure, Kosovo's annual natural gas demand will grow to 900 Mcm by 2025.⁵⁰⁸

The national TSO in Slovenia, Plinovodi, signed an agreement to join the South Stream project in 2009 which will deliver up to 63 Bcm of natural gas per year through Slovenia if the section is constructed.⁵⁰⁹ Additionally, TGE Gas Engineering received permission to construct an LNG terminal in Koper in September 2010, which would provide gas for the nearby 234-MW CCGT power plant due next year.⁵¹⁰

Shale gas potential

Shale gas potential in Albania, Bosnia and Herzegovina, and Macedonia is currently out of scope for most energy companies, as conventional gas exploration is to be executed first.

In Slovenia, Ascent Resources completed a fracture stimulation in November 2011 of a well at Petišovci, where tight gas was found. As of February 2012, tight gas reserves have been estimated to amount to 14.3 Bcm at the Petišovci Project,⁵¹¹ which would significantly change the state of the Slovenian gas market and render it less dependent on imports.

499 Source: Natural Gas Europe, *Bosnian Federation Reaches Out to Nabucco*, August 20, 2010

500 Source: Reuters, *Serbia's gas monopoly eyes pipeline in Bosnia*, October 15, 2009

501 Source: Balkans.com, *Exploring of natural gas in Bosnia's Republic Srpska starts this year*, October 14, 2010;

502 Source: Serbia Energy, *Bosnia Region, Shell in oil exploration deal*, October 17, 2011

503 Source: Natural Gas Europe, *Bosnian Government signs preliminary exploration deal with Shell*, November 3, 2011

504 Source: Alexander's gas and oil connections, *Montenegro attracts 15 firms for oil concessions*, February 21, 2011

505 Source: Energy-Community, *South East Europe: Regional Gasification Study*, October, 2007

506 Source: Economic Consulting Associates, *South East Europe: Regional Gasification Study – Kosovo Market Report*, 2007

507 Source: ENTSO-G, *European Ten Year Network Development Plan 2010-2019*, 2009

508 Source: The World Bank, *The Future of the Natural Gas Market in Southeast Europe*, 2010

509 Source: Enerdata, *Slovenia Energy Report*, December 2010

510 Source: Enerdata, *Slovenia Energy Report*, December 2010

511 Source: Natural Gas Europe, *Slovenia: Ascent Resources Increases Gas-In-Place Reserves in Petišovci Project*, February 2012



7. Investment potentials

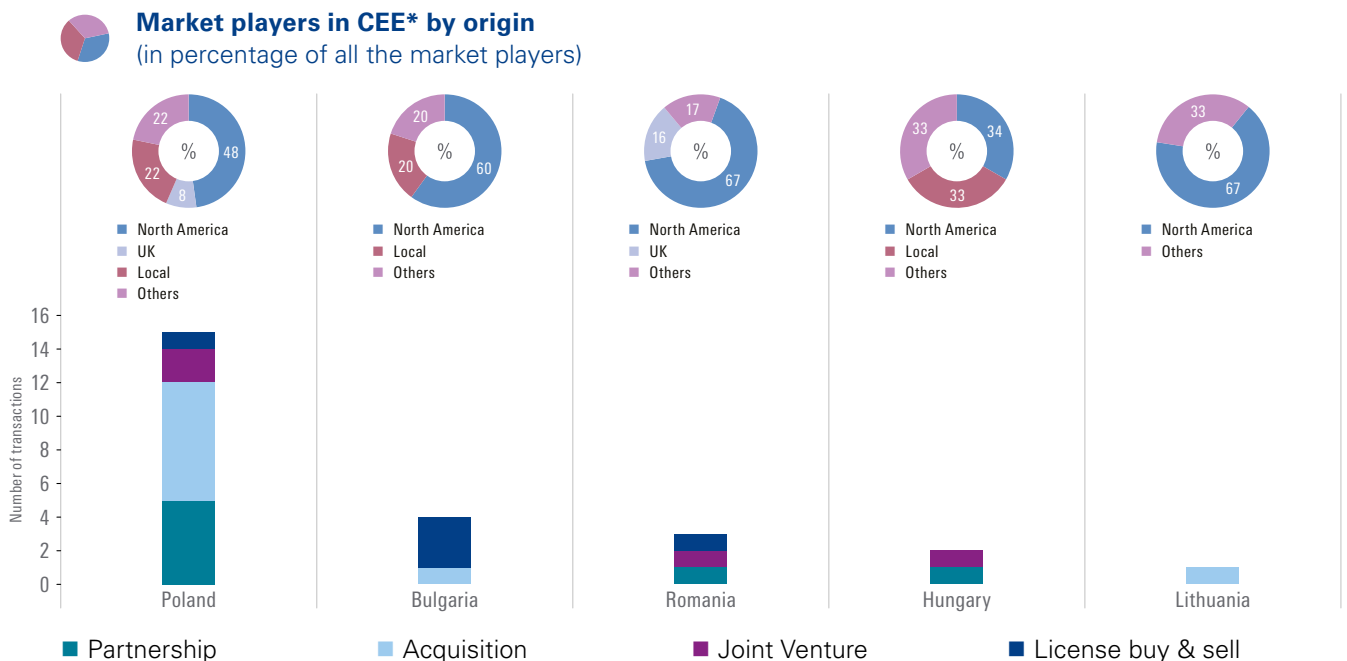
Shale gas transactions in CEE

With substantial funding required for the development of shale gas in the CEE region, a significant portion of investment funds will need to come from foreign partners, which can bring both capital and shale gas expertise. Unlike in North America, however, where much of the initial exploration activity was led by small or mid-size independents, that in many cases were subsequently acquired, state-owned oil and gas companies are expected to play a greater role in the CEE region, as they aim to be actively involved in the development of their country's shale gas reserves.

As a result, a greater proportion of investment flows will likely come into the CEE shale gas sector via joint ventures, in addition to acquisitions. Partnering with state-owned companies or other strong local partners may also be an approach that is preferred by foreign investors, as they stand to benefit from the contacts and market knowledge of their local partners, while at the same time, sharing a greater portion of both exploration and market-specific risks.

As might be expected, most noteworthy investments in the CEE region to date have occurred in Poland. ExxonMobil and Hutton Energy, for example, formed four joint ventures there in 2011 to explore for shale gas, while in 2010, the Italian company Eni acquired Minsk Energy Resources, which holds 3 exploration licenses in Poland. For its part, Eni was able to bring not only capital, but also its experience from work in the Barrett Shale in Texas.⁵¹²

Figure 45: Historical shale gas transactions in CEE, 2009-2012



Note: Acquisitions include partial acquisitions as well. *Countries: Poland, Bulgaria, Romania, Hungary, Lithuania
Source: www.naturalgaseurope.com; www.mergermarket.com; www.ijonline.com

512 Source: Mergermarket, March 2012

Other markets, such as Hungary or Romania, have also seen some investment activity, despite the fact that their shale gas formations are at an earlier stage of exploration than those of Poland. And while Bulgaria had been considered a promising target for foreign companies looking for acquisition or joint venture opportunities, its recent ban on shale gas drilling has limited developments there.⁵¹³

There has been some consolidation among local players as well, as such action by local companies has at times been encouraged by the state. The Polish Treasury Minister, for example, has expressed the preference to take maximum advantage of local synergies between companies in the domestic energy sector,⁵¹⁴ and, accordingly, mergers in the country over the last two years have largely been between Polish companies. At the same time, during the period from 2009 to early 2012, acquisitions in Central and Eastern European EU countries accounted for 36% of shale gas-related transactions, while partnerships represented 28% of transactions, joint ventures 16%, with the remainder being for licenses.⁵¹⁵

As the number of successful drilling operations increase, and as the development of the legal framework for shale gas exploration and production improves over time, the number of companies involved in the shale gas market may be expected to expand. Several further transactions throughout the region are already being considered, particularly between larger multinational companies and local firms, and, if realized, their outcomes could have a significant impact on the speed of shale gas development in CEE.

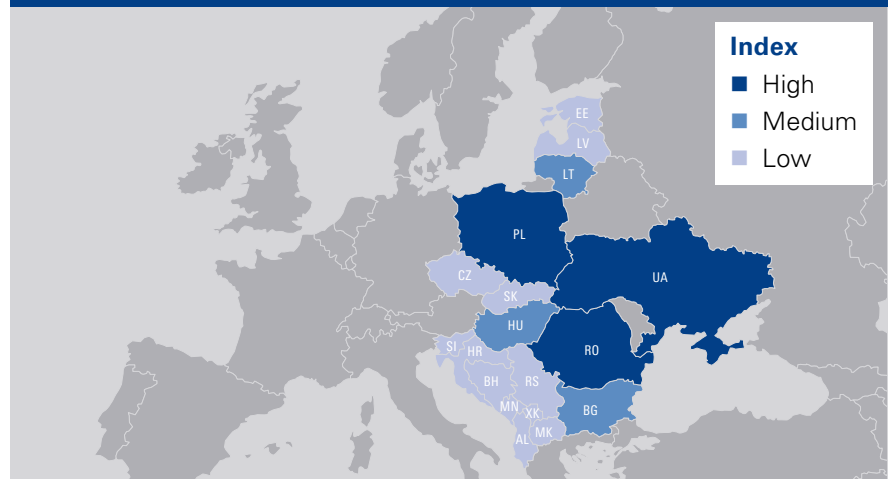
Shale gas potential index in CEE

As a complement to our country-specific analysis, we have produced an indicative tool, the **Shale Gas Potential Index in CEE**, by which we have summarized the shale gas development potential of Central and Eastern European countries. In addition to our findings in the sections above, the Index provides a regional overview for potential investors in the sector.

⁵¹³ Source: BBC News, *Bulgaria bans shale gas drilling with 'fracking' method*, January 19, 2012

⁵¹⁴ Source: Embassy of the Republic of Poland in Cairo, *Polish energy sector should consolidate efforts in shale gas search*, December 29, 2011

⁵¹⁵ Source: KPMG analysis based on information from Mergermarket, *Natural Gas for Europe and Infrastructure Journal*, March 2012

Figure 46: Shale gas potential index in CEE

As previously indicated, Poland, Romania, and Ukraine have the highest shale gas development potential, followed by Lithuania, Hungary, and Bulgaria, which, while having good initial indications of unconventional gas reserves, have somewhat lower potential than their larger neighbors.

Due to a number of factors, including their relatively favorable investment climate, larger domestic gas market, size of potential shale gas resources, and rather stable regulatory and legal environments, Poland and Romania rank the highest on our index. They are followed by Ukraine, which, despite its less favorable investment climate and somewhat more unstable legal environment, also has a considerable amount of domestic gas resources and shale gas development potential.

Lithuania, Hungary, and Bulgaria are considered to have medium potential due to their smaller sizes, which are mostly offset by their generally predictable investment environments and significant potential amounts of extractable shale gas resources. While Hungary has a favorable royalty regime regarding shale gas development, its fairly challenging geological characteristics have tempered earlier expectations. Bulgaria's riskier investment climate and temporary ban on hydraulic fracturing have also had a mitigating effect on shale gas developments there.

Other countries in the CEE region, due to a limited view of potential shale gas resources, or a historical focus on other energy sources, are characterized as having lower shale gas potential. Should further information on shale gas reserves become available in countries such as the Slovak and Czech Republics, or Croatia, then these countries may become more promising due to their already existing favorable investment climates. Due to the riskier investment environments and relatively undeveloped gas sectors of other southeast European countries, shale gas development in the region might be more complex, and may require additional upstream labor and technological transfer than other, more historically gas-focused countries in the region.

Acronyms

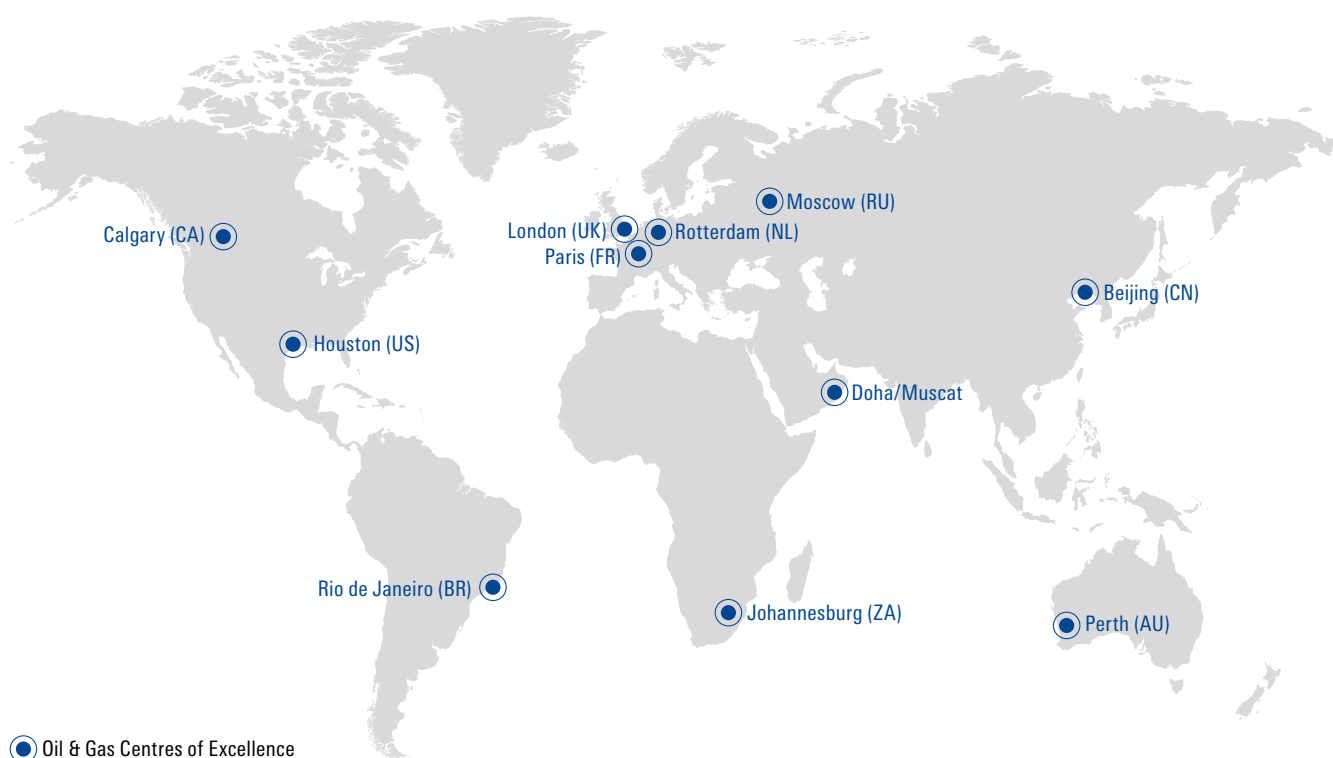
3D	3-dimension
Bcm	Billion cubic meters
CAGR	Compound Annual Growth Rate
CCGT	Combined Cycle Gas Turbine
E&P company	Energy and Petroleum company
EC	European Commission
FGSZ	Földgázszállító Zrt. (Hungarian natural gas transmission company)
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GJ	Gigajoule
GSGI	Global Shale Gas Initiative
HAG	Hungary-Austria Gas pipeline
HEP	Hrvatska Elektroprivreda (Croatian national power company)
NIS	Naftna Industrija Srbije (Serbian national oil company)
HUF	Hungarian Forint
IMF	International Monetary Fund
INA	Industrija Nafta (Croatian oil company)
IPO	Initial Public Offering
km⁽²⁾	(Square) kilometer
LSE	London Stock Exchange
LNG	Liquefied Natural Gas
m⁽³⁾	(Cubic) meter
Mmcf	Million cubic feet
Mcm	Million cubic meters
mm	Millimeter
MOL	Magyar Olaj- és Gázipari Nyrt. (Hungarian oil and gas company)
MWh	Megawatt hour
NAFTA	Slovakian oil and gas company
O&G company	Oil and Gas company
OECD	Organization for Economic Co-operation and Development
OMV	Austrian oil and gas company
PGNiG	Polskie Górnictwo Naftowe i Gazownictwo (Polish Petroleum and Gas Mining)
SPP	Slovenský plynárenský priemysel (Slovakian natural gas company)
Tcm	Trillion cubic meters
TPES	Total primary energy supply
TSO	Transmission system operator
UGS	Underground gas storage
USD	United States dollar
VAT	Value added tax

Country abbreviations

AL	Albania
AU	Australia
BA	Bosnia and Herzegovina
BG	Bulgaria
BR	Brazil
CA	Canada
CEE	Central and Eastern Europe
CIS	Commonwealth of Independent States
CN	China
CZ	Czech Republic
EE	Estonia
EU	European Union
EU-15	Pre-2004 EU member states
FR	France
HR	Croatia
HU	Hungary
LT	Lithuania
LV	Latvia
ME	Montenegro
MK	Macedonia
NL	The Netherlands
OM	Oman
PL	Poland
RO	Romania
RS	Serbia
RU	Russia
SI	Slovenia
SK	Slovak Republic
UA	Ukraine
UK	United Kingdom
US	United States of America
XK	Kosovo
ZA	South Africa

Oil & Gas Centers of Excellence

KPMG member firms offer global connectivity. We have 11 dedicated oil & Gas Centers of Excellence in key locations around the world, working as part of our global network. The Centers are located in Beijing, Calgary, Houston, Johannesburg, London, Moscow, Doha/Muscat, Paris, Perth, Rio de Janeiro and Rotterdam. Our Centers of Excellence enable us to transfer knowledge and information globally, quickly, and openly. With regular calls and effective communications tools, we share observations and insights, debate new emerging issues, and discuss what is on our firms' clients' management agendas. The Centers also produce regular surveys and commentary on issues impacting the sector, business trends, changes in regulations, and the commercial, risk, and financial challenges of doing business.



KPMG's Global Oil & Gas Network

Algeria	Brazil	Egypt	India	Korea	New Zealand	Poland	South Africa	United Arab Emirates
Angola	Canada	Finland	Indonesia	Kuwait	Nigeria	Portugal	Spain	United Kingdom
Argentina	China	France	Italy	Malaysia	Norway	Qatar	Sweden	United States
Australia	Colombia	Germany	Japan	Mexico	Oman	Russia	Thailand	Venezuela
Austria	Denmark	Hungary	Kazakhstan	Netherlands	Peru	Saudi Arabia	Trinidad and Tobago	

What can KPMG offer to the shale gas sector

An overview of our audit services to the oil and gas sector

Client business issues/risks	KPMG firms services	Service description
Compliance with accounting standards	International Financial Reporting Standards (IFRS) advisory	<ul style="list-style-type: none"> – Preparing and helping clients manage the change to IFRS – Provision of training
	US accounts and reporting	<ul style="list-style-type: none"> – Compliance with US GAAP an SEC requirements – Provision of training
Cost audits	Cost assurance and audit	<ul style="list-style-type: none"> – Audit of costs incurred by contractors or being claimed as variations
Hydrocarbon emissions	Hydrocarbon emission audits	<ul style="list-style-type: none"> – Audit of hydrocarbon emissions, carbon storage, and carbon credits
IT projects implementation	IT risk management	<ul style="list-style-type: none"> – Pre- and post-implementation reviews of major ERP systems – Automated controls reviews
Joint ventures	Joint venture audit	<ul style="list-style-type: none"> – Audit of JV statements – Assurance over costs subject to cost recovery under production sharing agreements
Major project assurance	Financial management	<ul style="list-style-type: none"> – Provide assurance to senior management that major projects are well managed and issues are flagged early
	Project governance	<ul style="list-style-type: none"> – Established approach on all major projects, including IT implementation, outsourcing of back- and middle-office functions, major refinery builds, liquefied natural gas projects, and offshore oil field developments
Quality reporting	Financial statement audit HSE report	<ul style="list-style-type: none"> – Provision of statutory financial statements audits – Provision of assurance services in relation to HSE reports

An overview of our tax services to the oil and gas sector

Business issues and risks	KPMG firms' services	What we can do
Engaging the "green" agenda	Regulatory and sustainability business strategies	<ul style="list-style-type: none"> – Clean development mechanism issues – Re-emergence of nuclear energy and tax incentives in certain jurisdictions for nuclear energy – Tax incentives for renewable energy and renewable fuel projects
	Windfall profits	<ul style="list-style-type: none"> – The potential impact on profits resulting from government-imposed fuel taxes being implemented or contemplated
	Trading energy and emissions	<ul style="list-style-type: none"> – Tax characteristics of carbon credits
	Transfer pricing	<ul style="list-style-type: none"> – Implications of Certified Emissions Reduction (CER) forward contracts
	Indirect tax	<ul style="list-style-type: none"> – Tax credits for production or purchase of "green" products

Business issues and risks	KPMG firms' services	What we can do
Managing joint ventures and other third-party relationships	Tax due diligence	<ul style="list-style-type: none"> – Addressing tax exposures items – Partnership agreements review – Tax implications of financial instruments
	Tax-efficient structuring	<ul style="list-style-type: none"> – Worldwide income tax considerations – Modeling cash implications – Business entity selection – Communicating tax planning to the board and management – Purchase price considerations
	Implementation assistance	<ul style="list-style-type: none"> – Assistance with local tax rulings – Monitoring key tax issues included in contracts – Registration and approval assistance
	Post-venture tax structuring	<ul style="list-style-type: none"> – Tax structure simplification – Dissolution
Managing major capital expenditure projects and energy investment requirements	Indirect taxes	<ul style="list-style-type: none"> – Recovery of VAT expenditures – Identification of VAT tied up in financing transactions impacting working capital and cash flows
	Structured financing	<ul style="list-style-type: none"> – Debt-to-equity requirements and characterization – Principal payments, interest expenses, and cash flow implications of debt and deemed debt obligations – Related-party and cross-border transactions – Indemnity clauses and default provisions – Required opinions and filing requirements
Meeting the increasing regulatory, government, and multiple stakeholder demands	Assessment	<ul style="list-style-type: none"> – Tax process documentation – Internal control testing – Personnel and process interviews – Identifying opportunities
	Quantification and aggregation	<ul style="list-style-type: none"> – Provide detailed picture of global tax regulatory and compliance obligation – Gap analysis – Participate in designing an aggregated model – Create concept for mitigation – End user training
	Monitoring and reporting	<ul style="list-style-type: none"> – Thorough global tax examination work plans – Formalize appropriate global communication channels to support tax process – Build key performance indicators and metrics to measure progress – Controversy – Ongoing monitoring and testing
	Controls	<ul style="list-style-type: none"> – Review technical merits of planning approaches – Provide methodologies to help mitigate taxes and penalties associated with exposures – Key findings and recommendations discussions – Tax aligned with corporate goals

Business issues and risks	KPMG firms' services	What we can do
Security of supply	Transfer pricing	<ul style="list-style-type: none"> – Tax efficient supply chain management – Evaluation services – Documentation and reporting
	Indirect taxes	<ul style="list-style-type: none"> – Customs, trade, and excise duties – Value-added, excise, and sales and use taxes – Severance – Ad valorem taxes
	Mergers & acquisitions	<ul style="list-style-type: none"> – Mergers and acquisitions in new supply and demand markets – Tax-efficient structuring
	Managing operational efficiency	<ul style="list-style-type: none"> – Integrating business objectives with tax objectives – Manufacturing deductions – Tax credits for energy-efficient technologies – Tax credits and deductions for research and experimentation – Costs: expenditures vs. capitalization
	Trading energy and emissions Tax due diligence	<ul style="list-style-type: none"> – Merchant trading – Tax implications of financing instruments

An overview of our advisory services to the oil and gas sector

Business issues and risks	KPMG firms' services	What we can do
Board assurance as to operation of business model and controls	Internal audit	<ul style="list-style-type: none"> – Internal audit sourcing services to help address significant control and monitoring issues
Capital projects	Major projects programs	<ul style="list-style-type: none"> – Project advisory and monitoring services to project owners focusing on project governance, processes, and management outputs – Objective feedback on project health or status
Capitalize on different technology investments	Technology optimization	<ul style="list-style-type: none"> – IT project portfolio optimization – Strategic assessment of major investment areas in IT budget
Climate change	Emission reporting system	<ul style="list-style-type: none"> – Initial impact assessment – Collecting data and reporting support – Strategic analysis to address climate change
Credit facilities	Debt renegotiations and corporate financial restructuring	<ul style="list-style-type: none"> – Assist clients in forecasting and identifying future financing needs and funding options – Renegotiation and restructuring financing lines support
	Economic assessment of risk	<ul style="list-style-type: none"> – Use economic models and forecasting to analyze future elasticity of demand, pricing, costs, return on capital, and other critical performance indicators
	Debt refinancing	<ul style="list-style-type: none"> – Identify a range of financing options, assess the impact of alternative funding routes
	Liquidity risk assessment	<ul style="list-style-type: none"> – Assess financial soundness and benchmark current operations against leading practice

Business issues and risks	KPMG firms' services	What we can do
Effective board oversight	Performance measurement and board reporting	– Advise on the changing corporate governance structures
Ensuring business continuity and the capability to recover	Business continuity management	– Assess and guide knowledge management information systems governance, security, and risk management
Financial forecasting	Financial modeling	– Develop financial models and analyze existing forecasts and associated scenarios
Improvements in corporate governance	Corporate governance advisory	– Advise on compliance, leading practices, and Sarbanes-Oxley implementation
Issue recognition and strategy development	Climate change	– Advise on greenhouse gas emissions controls and energy trading
	Corporate responsibility assurance	– Advise on environmental and stakeholder issues, including sustainability reporting reviews, global reporting initiative developments, and greenhouse gas issues and audits
	Decision support	– Assist with end-to-end business intelligence strategy, including measurement definition, reporting design, and performance management
Major transaction management	Transaction services	– Project due diligence for assessment of new ventures, investments, and joint venture support
	Valuations	– Asset and company valuations and independent reports
	Project finance and debt advisory services	– Company and asset mergers, acquisitions, and divestments
Management of the finance function	Transforming the finance function	– Advise on immediate needs, such as meeting new IFRS accounting standards, integrating systems, and coping
	Advisory on shared-service centers	– Assist clients with creating a shared-service center (outsourced or internal) and identify performance improvements
Management of procurement spend	Supply chain optimization	– Help in streamlining cost of procurement, identifying cost-saving opportunities, and reducing overall spend – Use Lean Six Sigma techniques to deliver productivity improvements
Outsourcing versus in-sourcing	Sourcing strategy	– Assist with the design and implementation of new processes and shared-service models – Assist with structuring the sourcing strategy and vendor selection – Service level definition and contract renewal support – Define monitoring controls and processes to mitigate risks in outsourcing relationships
Protection of intellectual property	Intellectual property advice	– Advise on brand, processes, and intellectual property rights
Reporting and communications	Performance insight	– Assist clients to effectively communicate their business performance – Advise on rewards management, the cost of capital, reputation, and licenses to operate – Advise on common reporting processes to help with automation
Risk identification	Enterprise risk management	– Perform a top-down risk assessment to balance the cost of compliance with financial risk – Identify environmental and regulatory risks across segments of the business and help design processes to monitor and manage change
Real-time assurance on capital expenditure management	CapEx monitor	– Assistance with monitoring expenditure for capital intensive projects

Further insight

Recent KPMG Power & Utilities Thought Leadership



Power Sector Development in Europe – Lenders’ Perspectives 2011:

The report, based on interviews with a selection of top European banks, aims to provide power and utilities market participants worldwide with insight into lenders’ perspectives on the future of financing for power and utilities projects in Europe



New Nuclear – An Economic Perspective: We are pleased to announce the launch of a recent whitepaper titled: New Nuclear – An Economic Perspective. This paper discusses recent events at Fukushima Nuclear Power Plant, which have brought the safety record of nuclear power under intense public scrutiny.

KPMG International’s Taxes and Incentives for Renewable Energy – 2011 Edition: KPMG’s Taxes and Incentives for Renewable Energy – 2011 is designed to help energy companies, investors and other entities stay current with local country policies and programs supporting renewable energy around the world.

Impact of IFRS: Power & Utilities: This paper provides a high level introduction to key IFRS technical accounting matters across companies within the power and utilities industry. It also analyzes how conversion to IFRS may affect information technology systems, people, and business processes.

Netherlands Smart Metering Survey: This vision paper provides an insight into the most significant changes that await the energy business.

Green Power: 2012: The KPMG renewable energy M&A report looks at changes and trends in the renewable energy sector to provide insight on where the market is heading.

The Rising Sun – A Point of View on the Solar Energy Sector in India: In this report, KPMG analyzes how solar power can contribute to addressing the energy challenges facing India today.

A New Energy World, New Business Models: This vision paper provides an insight into the most significant changes that await the energy business.

Recent KPMG Oil & Gas Thought Leadership



Shale Gas – A Global Perspective: this publication examines the state of gas development in selected countries and offers views on the prospects of shale gas as part of the world's energy mix and whether this source of energy is a game-changer as some have claimed.

After the Gulf of Mexico oil spill: recent developments in the oil and gas industry. this paper reviews some of the many impacts of the spill, including changes to operating models, contractor relationships, business risks and a number of new and proposed regulations.



Procurement in Oil & Gas, published by KPMG's Global Energy institute, focuses on procurement in the oil and gas industry and highlights trends and tools as well as issues and challenges in both up-stream and down-stream sectors of the industry.

Accounting for Carbon discusses the impact of carbon trading on financial statements. It provides insights and strategies to help organizations understand and manage the business implications of climate change.

Impact of IFRS – Oil and Gas (September 2011): This publication provides assistance to companies in the oil and gas sector who are considering converting to IFRS. It gives an overview of the IFRS conversion process and looks at the impact of conversion on IT systems, people and business processes.

The KPMG Global Energy Conference

The KPMG Global Energy Conference (GEC) is KPMG's premier event for financial executives in the energy industry. Presented by the KPMG Global Energy Institute, the GEC attracts more than 600 professionals each year and brings together energy financial executives from around the world in a series of interactive discussions with industry luminaries. The goal of the conference is to provide participants with new insights, tools, and strategies to help them manage industry-related issues and challenges.

www.kpmgglobalenergyconference.com

Save the Date – 2012 KPMG Global Energy Conference | May 16-17

Recent Global Energy Institute Webcasts

1. Oil & Gas Trends and M&A Landscape
2. Transfer Pricing Issues in the Oil & Gas Supply Chain
3. Key Tax Developments and Issues Affecting the Oil and Gas Industry
4. Oil and Gas Tax
5. Shale Gas – A global perspective
6. Shale Gas – Merger and acquisition trends

For more information please visit:

www.kpmg.com/energy
www.kpmgglobalenergyinstitute.com
www.kpmg.com/powerconference
www.kpmgglobalenergyconference.com



Contact Us

Michiel Soeting

Global Chairman Energy & Natural Resources

KPMG in the UK

T: +44 20 7694 3052

E: michiel.soeting@kpmg.co.uk

Wayne Chodzicki

Global Head of Oil & Gas

KPMG in Canada

T: +1 403 691 8004

E: wchodzicki@kpmg.ca

Péter Kiss

Global Head of Power & Utilities, Head of Energy Sector

KPMG in Central and Eastern Europe

T: +36 1 887 7384

E: pkiss@kpmg.com

Marcin Rudnicki

Partner

KPMG in Poland

T: +48 22 528 1177

E: mrudnicki@kpmg.pl

Steve Butler

Director

KPMG in Hungary

T: +36 1 887 7391

E: williamstephen.butler@kpmg.hu

www.kpmg.com/energy

www.kpmgglobalenergyinstitute.com

www.kpmg.com/powerconference

www.kpmgglobalenergyconference.com

The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavor to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.

The KPMG name, logo and "cutting through complexity" are registered trademarks or trademarks of KPMG International.

© 2012 KPMG International Cooperative ("KPMG International"), a Swiss entity. Member firms of the KPMG network of independent firms are affiliated with KPMG International. KPMG International provides no client services. No member firm has any authority to obligate or bind KPMG International or any other member firm vis-à-vis third parties, nor does KPMG International have any such authority to obligate or bind any member firm. All rights reserved.