

DANUBE REGION strategy

Energy



Powering Europe



Potential for integration of the gas markets in the Danube Region

*Case study: Austria, Slovakia
and the Czech Republic*

Σe^i

THE ENERGY ECONOMIC S
INSTITUTE

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LIST OF ABBREVIATIONS

ACER - Agency for the Cooperation of Energy Regulators

CEE – Central and Eastern Europe

CEETR – Central Eastern European Trading Region

CEF – Connecting Europe Facility

CEGH – Central European Gas Hub

EIB – European Investment Bank

EU – European Union

MS – EU Member States

PCIs – Projects of Common Interest

RONI – Slovak Regulatory Office for Network Industries

SPP – Slovenský plynárenský priemysel, Slovak Gas Industry

TSO – Transmission system operator

V4 – Visegrad 4

Introduction

Integration of the European energy market is one of the pivotal challenges for the European Union (EU) today. The EU in general is highly dependent on energy imports, since it produces only 45 % of its energy consumption.¹ This study will focus on the natural gas sector, which accounts for 24 % of the EU's primary energy mix and majority of it must be imported, mostly from the Russian Federation (41 %), Norway (32 %) and Algeria (14 %).² In order to increase its energy security and decrease the dependency on energy imports, the EU strives to create Internal Energy Market. This initiative should have been completed by 2014, but apparently this deadline cannot be reached. Although a significant progress could have been claimed (electricity prices are declining, gas prices are stable, consumers have wider choice of suppliers, many missing infrastructure is under construction, pipelines are used more efficiently, the energy market is more competitive) a lot still needs to be done (lack of investment in development of additional infrastructure, simple and harmonized rules for energy trade need to be implemented, the governments should not intervene in energy market unless a crisis situation occurs, regional cooperation should be deepened, consumers should play more active role in the energy market, consumer prices should further drop).³ In the Central and South East Europe the Danube Region Strategy is one of the leading regional initiatives dealing also with the integration of gas markets.

The Danube Region comprises of 9 EU Member States, namely Austria, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Romania, Slovakia and Slovenia and 5 non-EU countries - Bosnia and Herzegovina, Moldova, Montenegro, Serbia and Ukraine. The Danube Region Strategy introduced by the European Commission in 2011 in order to deepen macro-regional cooperation comprises of 11 priority areas including energy sector. Within the Priority Area 2 - "To encourage more sustainable energy", which is coordinated by the Czech Republic and Hungary, the Strategy focuses on the energy policy coordination, enhancing market integration of the non-EU countries and facilitating technology development. Within the Danube Region Strategy several initiatives or concepts for closer integration of energy markets are being examined, such as *the Danube Region Gas Market Model*, *the Danube Region Gas Storage Analysis* and many others which include other types of energy than natural gas.⁴

Despite a heterogeneous character of the Danube Region countries, different level of economic development and energy security challenges, considering the energy market, many common characteristics can be found. Natural gas in the Danube region represents significant share in the primary energy consumption: in some countries it equals to more than one third of primary energy consumption (Moldova, Ukraine, Hungary, Romania and Croatia). Less than 10 % of the primary energy consumption share is to be observed only in Montenegro and Bosnia and Herzegovina.⁵

¹ http://ec.europa.eu/energy/publications/doc/2013_pocketbook.pdf

² http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Trade_in_energy_products#Extra-EU_Trade_in_energy_products

³ http://ec.europa.eu/energy/gas_electricity/internal_market_en.htm

⁴ <http://groupspaces.com/Energy2/pages/the-concepts-of-the-pa2>

⁵ <http://www.iea.org/countries/> Data for IEA member countries are from the year 2012, non-member countries from 2 010.

The natural gas is mainly imported; none of the countries has significant domestic reserves, which makes the region dependent on external suppliers and vulnerable in terms of energy security. Some countries are less dependent, because they can at least partially rely on their own domestic natural gas production; this applies to Croatia, Romania or Ukraine. Other countries of the Danube region are nearly 100 % dependent on natural gas imports – such as Bulgaria, Bosnia and Herzegovina, Moldova, Serbia, Slovakia and Slovenia.⁶ Import dependency of the Czech Republic, Germany and Hungary also exceeds 75 %.⁷

As already mentioned, some countries of the region have some potential to increase their domestic production of natural gas due to significant proven reserves of natural gas on their territory. In the case of Ukraine, the reserves could even exceed 1 trillion m³; some reserves can be also found in Germany, Romania, or Serbia. In some countries these reserves cannot cover more than one year of domestic needs, like in the Czech Republic or Hungary.⁸ Up to 100 % of natural gas imports originates from Russia in Bulgaria, Romania, Slovakia, Serbia and Ukraine. Some countries are more successful in diversifying their sources of natural gas with Germany being the most successful one with “only” 39 % of its natural gas imports coming from Russia. Other important natural gas suppliers for the region are Norway, Algeria and the Netherlands.⁹

Energy prices in the region are relatively high, as well as transportation fees. The infrastructure is not sufficiently interconnected and the energy markets are fragmented. Closer energy markets integration and enhanced cooperation within the Danube region countries would significantly increase region’s energy security.

The aim of this study is to analyze the potential for closer integration of natural gas markets in this region. On the case of Austria, the Czech Republic and Slovakia the study assesses the current state of integration, conditions in respective countries and identifies main technical, legislative, commercial and political barriers of the integration. The market integration in this region would lead to a market with a common demand of some 25 bcm.¹⁰ The aggregated storage capacity in these three countries would be significant; more than half of the annual demand could be covered only by the gas reserves.

Many economic benefits would be achieved by market integration in this region. A common gas market would increase the liquidity, enable more competitive gas prices and most importantly

⁶ https://www.cia.gov/library/publications/the-world-factbook/wfbExt/region_eur.html

⁷ <http://www.energydelta.org/mainmenu/energy-knowledge/country-gas-profiles> Data for Montenegro, Moldova, Bosnia and Herzegovina and Ukraine were not available, other data from the year 2010.

⁸ https://www.cia.gov/library/publications/the-world-factbook/wfbExt/region_eur.html

⁹ <http://www.energydelta.org/mainmenu/energy-knowledge/country-gas-profiles> Data for Montenegro, Moldova and Bosnia and Herzegovina were not available, other data are from the year 2010.

¹⁰ J. Buchner, O. Floercken, N. Taume, Study on cross-border market integration. Macroeconomic analysis of the CEE Region, E-Bridge Consulting GmbH, June 2012; <http://www.acer.europa.eu/.../Pages/GRI-SSE-studies.aspx>

increase the energy security. The market integration of these countries would primarily lead to a better utilization of the interconnection capacities, significant transit flows and would enhance competition on the supply and demand side. With the integration the number of competing parties would increase and would enhance the pressure on competitive prices. Stable prices would increase transparency and create a more robust and reliable basis for trade at the exchanges as well as for the OTC trade.

Buchner et al. in their study estimated the macroeconomic benefits of the Austria-Czech Republic-Slovakia trading region by means of the estimation of efficiency improvements arising from alignment in the region. The calculated common social welfare gain from the integration in this region is estimated over 25 million € p.a. The social welfare gain is moderate, but would justify implementing an integrated market across the region.¹¹

The outcome of the study is a specification of recommendations for relevant stakeholders on steps which should be taken in order to achieve swift market integration. These recommendations could be consequently serve as a best practise to be applied to all the Danube Region countries and thereby promote natural gas market integration within this initiative.

1. Current state of integration within Austria, Slovakia and the Czech Republic

As already mentioned, one of the European Union's most important priorities in the field of energy policy is to finalize an internal energy market. Between 1996 and 2009, three legislative packages were adopted in order to liberalize the EU's energy market. In 2011 the European Council set an objective to create internal electricity and natural gas market by the end of 2014 – this initiative is called Single market for gas and electricity. This objective has not yet been fulfilled and the integration of respective markets will probably not be finished sooner than late 2015, as a lot of measures within the Third energy package are still to be implemented.¹²

Integration of the respective Member States' energy markets into bigger regional blocks is one of the main instruments in order to attain this goal. Austria, Czech Republic and Slovakia are involved in multiple common initiatives and organizations. They are involved in the Danube Region Strategy, Gas Regional Initiative South/South-East, North-South Gas Corridor and they are also active in the Energy Community. Within the Danube Region Strategy, energy is one of the main priorities, and the creation of an integrated energy market is one of its most important goals. The Gas Regional Initiative strives to develop integrated regional markets as an interim step towards the single European natural gas market. Within the Energy Community the EU extends its energy *acquis* to the non-EU countries in order to create a single pan-European energy market. Austrian (E-Control),

¹¹ Ibid.

¹² http://www.europarl.europa.eu/aboutparliament/en/displayFtu.html?ftuid=FTU_5.7.2.html

Czech (Energetický regulační úřad, Energy Regulatory Office) and Slovakian (Úrad pre reguláciu sieťových odvetví, Regulatory Office for Network Industries) national regulatory authorities cooperate within the Agency for the Cooperation of Energy Regulators (ACER).

The Czech Republic and Slovakia closely cooperate within the Visegrad 4 (V4) group. V4 created two important platforms in order to discuss energy security of the region: the V4 High-Level Working Group for Energy and the V4 Forum for Gas Market Integration.¹³ Within these initiatives the V4 member countries work closely together on increasing their energy security, also by closer regional energy market integration, which is seen as a first step towards the creation of a fully liberalised internal market. The V4 countries anticipate that bilateral cooperation with other neighbouring countries, including Austria, will be essential. Establishment of a common market between Austria, the Czech Republic and Slovakia is singled out, due to their existing interconnection.¹⁴ Other countries of the Danube Region Strategy are also perceived as partners for energy market integration with the V4 group, namely Croatia, Moldova, Romania and Ukraine.¹⁵

Austria, Czech Republic and Slovakia are all highly dependent on imports of natural gas and they are also important transit countries in the region, providing natural gas for destinations in Western Europe. Slovakia is an important transit country for natural gas from Russia through Ukraine to both Austria and the Czech Republic, which lead this gas further to the west and south Europe. Traditionally, the gas flowed only westwards and there was no possibility to bring gas from western European countries to the East. This situation became unbearable after the Russo-Ukrainian gas crisis in 2009 when the Eastern European states were severely affected by supply disruptions. As a consequence, greater emphasis was put on physical interconnection and reverse flow capabilities between respective member states.

Even if the physical interconnection status between Austria and Slovakia is sufficient for the market integration (detailed information about the technical details of interconnectors between respective states is to be found in chapters dedicated to technical conditions), current integration efforts are more visible between Austria and the Czech Republic. There is no physical connection between Austria and the Czech Republic, but both countries cooperate within several regional and European initiatives in order to integrate their energy markets. The biggest challenge for closer integration between the two countries is the construction of physical connection between them through building a new pipeline (Baumgarten-Lanžhot). Another possibility would be to use the indirect link – pipeline through Slovakia.

The trilateral discussions of TSOs on regional market integration started in 2011. Feasibility study on the Central Eastern European Trading Region (CEETR) was conducted and the outcome was that the trilateral

¹³ http://www.visegradgroup.eu/documents/presidency-programs/20142015-slovak#_8.%20NATURAL%20RESOURCES

¹⁴ OSW report: The Gas Target Model for the Visegrad 4 Region.

¹⁵ Road Map towards the regional gas market among Visegrad 4 countries.

market integration would be possible. However, in 2012 the Slovak TSO withdrew from the project after the change of ownership. Also the Slovak National Regulatory Authority rejected the project at the time. Bilateral discussions on natural gas market integration between the Czech and Austrian TSOs and regulatory authorities have been restored in 2014, due to the failure of trilateral discussions in 2012.¹⁶

The CEETR project (above-mentioned analysis of the creation of the Trading region in the CEE – the Republic of Austria, the Czech Republic and the Slovak Republic) took place in spring and summer 2012. Project was conducted by the CEGH (Central European Gas Hub AG), Energie-Control Austria, Eustream, A.S. and NET4GAS, s.r.o.¹⁷

The CEETR should be based on the following components: one trading region, one virtual trading point and three end user balancing zones, one per participating country. Network access should be organised as an integrated entry/exit network spanning all three participating countries. Within the trading region, national borders should be irrelevant, shippers don't have to explicitly book capacity at respective interconnection points. Trading region should enable one single wholesale market including all three countries. The CEETR stipulates the existence of one virtual trading point where a handover of gas between shippers can be accomplished; this point is the delivery point for any hub services and gas exchanges operating within the CEETR. Virtual trading point should enable an access to the end user balancing zones and to storage facilities. Each end user balancing zone includes all gas distribution systems and all end users of the participating country. Access to virtual trading point is granted on interruptible basis – i.e. it is only granted, if the total flow pattern in the network allows for it. Hence the sufficient border interconnection capacity is a condition sine qua non for any future market integration.¹⁸

The CEETR does not interfere with the national regulation model (revenue cap, tariff cap, etc.). However, after the realization of the project, all international border points between the countries cannot be booked by shippers anymore (which could potentially lead to a loss of tariff income by the TSOs). Nevertheless, according to design principles, this problem could be solved i.e. by inter-TSO compensation or by moderate increase of tariffs at bookable entry points of the network.¹⁹ In 2010 the EU Regulation 994/2010 aiming to safeguard the security of gas supply by ensuring both prevention and a coordinated response in the event of a supply disruption and by securing the proper and continuous functioning of the internal gas market has been adopted.²⁰ This regulation introduced two mechanisms: the N-1 rule and permanent bi-directional capacity (physical reverse

¹⁶ http://www.acer.europa.eu/Gas/Regional_%20Initiatives/South_South-East_GRI/15th_SEE_SG/Document%20Library/1/Point%204.1%20CEET-Rupdate_Milan.pdf

¹⁷ http://ec.europa.eu/energy/gas_electricity/gas/doc-23/11.09_mf23_background_by_acer_-_design_principles_of_the_cee_trading_region_-_basic_model_part_i_principles_cee_trading_region.pdf

¹⁸ http://ec.europa.eu/energy/gas_electricity/gas/doc-23/11.09_mf23_background_by_acer_-_design_principles_of_the_cee_trading_region_-_basic_model_part_i_principles_cee_trading_region.pdf

¹⁹ Ibid.

²⁰ http://europa.eu/legislation_summaries/energy/external_dimension_enlargement/en0026_en.htm

flow). The N-1 rule stipulates that those Member States who are dependent on a single import route has to develop sufficient underground storage facilities or other type of the critical infrastructure in order to make sure that demand can be covered in every situation, even if any of the main infrastructure elements fail. This rule has to be fulfilled till 3rd December 2014.

The Czech Republic is the most successful in implementing the N-1 rule while Slovakia and Austria are also being very progressive. The permanent bi-directional capacities on relevant cross-border interconnections in Europe should have been installed by December 2013 and till today nearly half of them is capable of bi-directional flows, including those between Austria, the Czech Republic and Slovakia.²¹ The reverse flow between Slovakia and Austria and Slovakia and the Czech Republic was installed in 2011. In case of major disruption, Austria and the Czech Republic are now able to provide Slovakia with certain amounts of gas and thus help to reduce incurred crisis situation.

Introduction of entry-exit system²² in Austria in January 2013 replaced the contractually agreed transport routes. It represents significant success in the terms of making the natural gas market more flexible while fostering the European natural gas market integration. Entry-exit system has been introduced in Slovakia already in 2004 and in the Czech Republic in 2011.²³

By the end of 2008 SPP (Slovenský plynárenský priemysel, Slovak Gas Industry), the biggest gas supplier in Slovakia, entered the Czech market through subsidiary company SPP CZ, a.s. SPP CZ is since then maintaining its role as an important supplier of gas on the Czech market with delivered amount of 252 mcm of gas in 2013. On the Czech market the company is supplying mostly big industrial customers and providing gas for heating. SPP is also one of the most active traders in the Baumgarten gas hub in Austria.²⁴ In 2012 Slovak Eustream joined the Central European Gas Hub (CEGH),²⁵ one of the most important natural gas trading platforms (since 1st January 2013 a virtual trading point) in the region, by acquiring 15 % of its stake. This change significantly increased the liquidity of the gas hub. A possible participation of other natural gas producers is not excluded in the future.²⁶ In December 2013 the CEGH Czech Gas Futures Market has been launched. The cooperation between CEGH and Power Exchange Central Europe (PXE) strengthened the possibility of development of liquid and competitive natural gas market in the Czech Republic and the whole region.²⁷

²¹ http://ec.europa.eu/energy/doc/nuclear/2014_energytestests_securityofgassupplysegluation_report.pdf

²² An entry-exit system is a gas network access model which allows network users to book capacity rights independently at entry and exit points, thereby creating gas transport through zones instead of along contractual paths. http://ec.europa.eu/energy/gas_electricity/studies/doc/gas/201307-entry-exit-regimes-in-gas-parta.pdf

²³ http://ec.europa.eu/energy/gas_electricity/studies/doc/gas/201307-entry-exit-regimes-in-gas-parta.pdf

²⁴ Annual report of the SPP for the year 2013, available on http://www.spp.sk/sk/Cds/AdminDownload/?filename=1092_SPP_VS_2013_SK.

²⁵ Central European Gas Hub is an operator of the Virtual Trading Point and thus a gateway for trading in the entry/exit zone of the Austrian market. CEGH functions as a cross regional balancing platform by offering trading activities and services for different markets: CEGH OTC (over-the-counter) Market, CEGH Gas Exchange Spot Market of Wiener Boerse (Day-Ahead and Within-Day Market) and CEGH Gas Exchange Futures Market of Wiener Boerse (Front Month, Quarter, Season, Year). <http://www.cegh.at/about-us>

²⁶ http://www.cegh.at/sites/default/files/eustream_english_final_0.pdf

²⁷ http://www.cegh.at/sites/default/files/cegh_pxe_cz_web.pdf

The countries of the region are eager to integrate their markets, which have been proved by several bilateral activities (cooperation between CEGH and PXE, introduction of entry-exit system in all the countries, introduction of reverse flows, and study on design of CEETR). However, continuous dialogue between TSOs is absent. Technical obstacles are still present, legislative framework is not unified and commercial hurdles are still to be observed. Following chapters concerning the situation in these areas in Austria, Slovakia and the Czech Republic examine existing issues in specific details. Basic information about the role of natural gas in energy mixes is also included.

2. Austria

Natural gas plays a significant role in Austria's energy mix as it accounts for up to 22 % of the country's total primary energy consumption.²⁸ Majority of this volume is imported from Russia respectively Norway;²⁹ usually based on long term take-or-pay contracts and the rest (some 20 %) is covered by domestic production.³⁰ In the last years, the significance of natural gas has been slightly declining. Domestic consumption is steadily declining from 10 bcm in 2010 to 8.5 bcm in 2013.³¹ Domestic production of natural gas decreased by 30 % in 2013 in comparison with the previous year;³² the volume of imports decreased from 13.4 bcm in 2011 to 10.4 bcm in 2013.³³ Proved reserves of conventional natural gas on the Austrian territory amount to 9.6 bcm (yearly consumption is 8.5 bcm) and are slowly declining and probably will be depleted around 2030.³⁴ Extraction of shale gas remains questionable, mainly because of strong public environmental-motivated opposition.³⁵ As a result of dependency on imports, Austria has built extensive storage capacities of 7.5 bcm (the volume amounts to around 84 % of the annual domestic consumption) which are usually filled before winter. These gas reservoirs alone could supply the domestic market even on peak consumption demand.³⁶

2.1 Technical Situation

The natural gas pipeline network in Austria is approximately 42 900 km long.³⁷ The two most important pipelines, the Trans Austrian Gas (TAG) and West-Austria-Gasleitung (WAG), transmit natural gas from Russia, which is, and in the near future will be, the biggest supplier of natural gas to Austria. Smaller pipelines usually connect border regions. There are several plans to build

²⁸ Austria – executive summary and key recommendations, 10.

²⁹ Country reports: Austria, 64.

³⁰ Energy Policies of IEA Countries - Austria, 49.

³¹ <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=3&pid=26&aid=2&cid=CG1,&syid=2009&eyid=2013&unit=BCF>

³² Ibid.

³³ Ibid.

³⁴ <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=3&pid=3&aid=6&cid=CG1,&syid=2010&eyid=2014&unit=TCF> + Energy Policies of IEA Countries - Austria, 49.

³⁵ Energy Policies of IEA Countries - Austria, 50.

³⁶ Natural Gas Storage Market Analysis in the Danube Region, 7-8.

³⁷ Eurogas statistical report 2013, 8.

a new infrastructure within international projects, like bi-directional Austrian-Czech Interconnector or South Stream and Nabucco projects.

TAG is formed by three parallel 380 km long pipelines which go from Baumgarten an der March at the Slovakian border to Arnoldstein while supplying Italy, Slovenia and Croatia. TAG was commissioned in 1974 and the newest branch was built in 2006. The pipeline is managed by the Trans Austria Gasleitung GmbH. The pipeline is able to perform reverse flows.³⁸

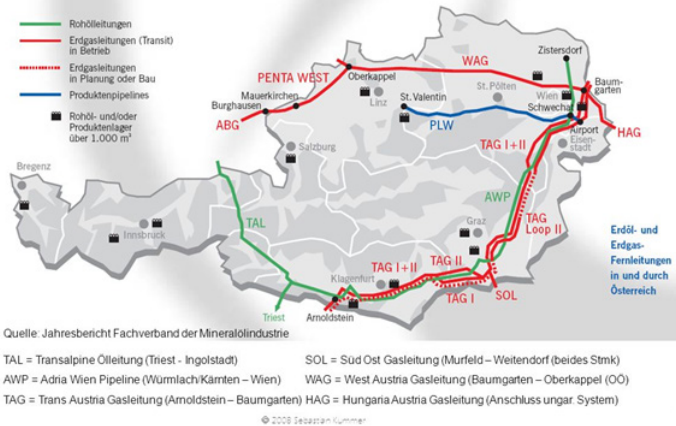
WAG is formed by two parallel pipelines, one 245 km long, the other 140 km long, which go from Baumgarten at Slovakian border to Oberkappel at the German border while supplying Germany and France. WAG was commissioned in 1980 and the newest branch, 63 km long "WAG Expansion 3" is being used since 2013. This project, together with WAG+600 which was put in operation in 2009, significantly increased the capacity of WAG both in East-West (80 %) and West-East (180 %) direction.³⁹ The pipeline is managed by the Gas Connect Austria which merged with Baumgarten-Oberkappel Gasleitungsgesellschaft m.b.H. on the 1st September 2014. The pipeline is also able to perform reverse flows.⁴⁰

³⁸ <http://www.gasconnect.at/en/Unser-Netz/Leitungssystem/TAG>

³⁹ <http://www.bog-gmbh.at/index.php?id=226>

⁴⁰ <http://www.gasconnect.at/en/Unser-Netz/Leitungssystem/WAG>

3.2.6 Rohrfernleitungen



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Source: http://images.slideplayer.de/1/1046/slides/slide_32.jpg, gas pipelines are marked by red colour.

The physical capacity at Baumgarten is currently 128 mcm/day. Majority of this capacity, 124 mcm/day is already booked, leaving only 3 % of the capacity non-booked.⁴¹ The reverse flow capacity from Austria to Slovakia at Baumgarten should stay stable, reaching 23.8 mcm/day from which usually not more than 20 % is booked a few months ahead.⁴² The physical transmission capacity of TAG will drop from 5.347 mcm/h in 2013-2017 to 5.299 mcm/h in 2018 while no plans for enlargement are anticipated.⁴³ WAG expansion 3 significantly increased the capacity of WAG to 1.408 mcm/h.⁴⁴

There are also several smaller pipelines, namely Hungaria-Austria-Gasleitung (HAG), Penta-West (PW), Kittsee-Petržalka-Gasleitung (KIP), Süd-Ost-Leitung (SOL), March-Baumgarten-Gasleitung (MAB).⁴⁵ The PW pipeline is important for closer energy markets integration with the Central Europe, because it is able to operate bi-directionally, thus it is able to supply Slovakia (and the Czech Republic via Slovakia) with natural gas. Another two pipelines important for further natural gas market integration in the region are 4 kms long KIP pipeline and the MAB pipeline. Both connects Austria and Slovakia, the second one connects Austrian-Slovak border to Baumgarten an der March. Concerning building interconnectors with neighbouring countries, Austria has always sought multiple diversification projects in order to increase its security of supply. However most of the diversification projects soon revealed to be unsustainable either from the economic point of view

⁴¹ http://www.taggmbh.at/allsite_prod1/ContentView/3/FrontEnd?pagelid=34568&language=en

⁴² <https://tis.eustream.sk/TIS/#/?nav=bd.ltc&lng=SK>, <https://tis.eustream.sk/TIS/#/?nav=bd.cap&lng=SK>

⁴³ Koordinierter Netzentwicklungsplan, 23.

⁴⁴ Ibid, 25.

⁴⁵ <http://www.gasconnect.at/en/Unser-Netz/Leitungssystem>

or lacked any assurances that the pipeline operator would be able to contract necessary volumes of gas. The project that has a high diversification of routes potential is the South Stream - bringing natural gas from Russia to Bulgaria and Austria via Serbia, Hungary and Slovenia. However in 2013 the European Commission concluded that the project fails to comply with the EU rules, in particular with the Third Party Access under the Third Liberalisation Package. Consequently, questions about the real benefits of the project aroused, especially concerning its contribution to the energy security of the transit countries. The project implementation has been postponed till the non-compliance case would be solved. Prospects of building new pipelines within above mentioned projects are thus very low.⁴⁶

Critically important project not only for Austria but for the whole CEE region is the construction of the Adria gas pipeline including the LNG terminal in Croatia (the terminal on the Krk island is scheduled to be completed around 2019),⁴⁷ which should be able to re-gasify 10, respectively 15 bcm annually. It is expected that the project would become part of the North-South gas corridor and include gas supply to Austria after expanding necessary transit facilities as ÖMV is one of the most important members within the Adria consortium with 32,47 % share.⁴⁸

The biggest technical obstacle for closer integration of natural gas markets with Slovakia and the Czech Republic is the lack of physical connection between Austria and the Czech Republic. Plans for bi-directional 60 km long transmission pipeline (BACI) are being thoroughly discussed among TSOs (Gas Connect Austria and Czech Net4Gas). This project has been chosen to receive financial support of maximum 66 148 EUR from the Connecting Europe Facility-Energy (CEF) to conduct a preparatory studies for the bi-directional interconnection.⁴⁹ Even though there are strong political signals from both side of the border, specific issues remain open, including the position of national regulators and availability of gas volumes. In the favorable conditions the pipeline could start operating in 2019.⁵⁰

High congestion of the Austrian transmission system poses another challenge to the gas market integration, especially within long distance pipelines (WAG, HAG). These bottlenecks could be overcome by tighter connection with the Czech Republic and Slovakia. It was already mentioned that only 9, respectively 5-6 % of the pipeline capacity will be free for allocation in the upcoming years. Unless the infrastructure is extended and planned projects implemented, the capacity for new players remains strictly limited. This significantly hinders any future integration.⁵¹

⁴⁶ More information about gas pipeline investment projects is available at: http://www.entsog.eu/public/uploads/files/publications/GRIPs/2012/GRIP_CEE_AnnexB_highres_L.pdf

⁴⁷ <http://www.balkaninsight.com/en/article/eu-to-back-croatian-gas-project-on-krk>

⁴⁸ <http://www.hydrocarbons-technology.com/projects/adrialngproject/>

⁴⁹ http://ec.europa.eu/energy/infrastructure/pci/doc/2014_cef_energy_lists.pdf, 4.

⁵⁰ <http://www.gasconnect.at/en/Unser-Netz/Projekte/BACI>

⁵¹ http://www.acer.europa.eu/Gas/Regional_%20Initiatives/South_South-East_GRI/Pages/GRI-SSE-studies.aspx

2.2.1. Legislative environment and obstacles

One of main goals of the EU Third Liberalisation Package is the ownership unbundling - TSOs cannot be involved in production or supply of natural gas. Austria, together with some other countries including Slovakia, proposed the model of ITO (Independent Transmission Operator) or so called legal unbundling. For the Austrian TSOs it was difficult to acquire the ITO status and to comply with the EU legislation. The applications of WAG and TAG in May 2013 were rejected at first, but since then a lot of structural and organizational measures has been taken. In the end of August 2014, both WAG and TAG got their certification, despite the fact that the TAG still had to fulfil remaining criteria such as independent managing and supervisory boards till the end of September 2014 in order not to lose the certification and finally meeting the criteria before the deadline.⁵²

As mentioned before, clear regulatory framework is one of the key drivers of the regional market integration. Austrian regulatory framework is constituted by the Austrian Natural Gas Act of 2011. The main issue is that the core of the Act is under the investigation of the European Commission as non-compliant with the EU legislation concerning the requirements for independent managing boards. Austrian regulatory authority E-Control is convinced that the level of independence of managing boards is sufficiently guaranteed by the Act.⁵³ This investigation might cause another substantial delay within the efforts of market coupling, as well as different requirements for safety, reliability and quality standards.⁵⁴

2.3. Commercial environment

While looking at the commercial obstacles, one of the most important issues for Austria are the long-term natural gas import contracts that significantly limit the competition. This issue is closely connected with the pricing system – the natural gas prices in Austria are relatively high and oil-indexed.⁵⁵ Furthermore, even though the storage facilities market in Austria is not concentrated (the biggest market player shares 36 % of the storage facilities),⁵⁶ it is not considered to be competitive. The storage capacity contracts are based on long term deals and the storage fees are one of the highest in the region so it is particularly difficult and expensive for new entrants to access the natural gas storage market in Austria. In a competitive market environment the Austrian storage facilities would not be fully utilized.⁵⁷ This rigid environment does not allow flexible reactions as well as entrance of the new actors on the Austrian natural gas market.

⁵² <http://www.e-control.at/de/presse/aktuelle-meldungen/zertifizierung-tag>

⁵³ <http://interfaxenergy.com/gasdaily/article/13540/austrias-tso-certification-clashes-with-eu-law>

⁵⁴ In Austria they are specified within the national 2011 Natural Gas Act. http://www.e-control.at/en/market_players/natural-gas/security-of-supply/quality-of-apply/network-service-quality

⁵⁵ Energy Policies of IEA Countries - Austria, 51.

⁵⁶ Natural Gas Storage Market Analysis in the Danube Region, 19.

⁵⁷ *Ibid*, 7, 19, 21, 29.

2.4. Political challenges

Political willpower to the energy market integration can often be derived from the national conceptualization of the Energy Security Strategy. If we accept the strategic approach to the energy security, we could argue that each state strives to protect its own interests. However as a part of the EU, Austria was willing to accept the market approach to the energy security. Austrian highest priority is to satisfy its domestic needs and ensure the security of the energy market and at the same time it also recognizes the need for cooperation and mutual solidarity within Europe. In its national Energy Strategy it even appeals to the EU to intensify its efforts to create common energy market.⁵⁸

What can become the real challenge for closer integration of the natural gas markets with the Czech Republic and Slovakia is the competition with other market projects, especially in the south-west direction. The benefits of integrated natural gas markets with the Czech Republic and Slovakia can for example hardly compete with benefits that cooperation with Italy could provide.⁵⁹

In the case of Austria we also have to take into consideration the high environmental awareness of the Austrian population. Some researches show that Austria has potential reserves of shale gas. Exploring these reserves would make Austria significantly less dependent on Russian natural gas. Even though the International Energy Agency recommends Austria to consider these reserves, the public opinion as well as the regulatory framework discourages from this kind of development.⁶⁰ The oil and gas company ÖMV was planning to develop Austrian reserves and even though new unconventional sources could supposedly cover 20 to 30 years of the Austrian domestic consumption, ÖMV withdrew from them in 2012,⁶¹ partially due to the strict environmental regulation that, made any such project to cease on its economical viability.⁶²

3. Czech Republic

In 2012, the share of natural gas in the Czech energy mix constituted 18 % with a slight gradual increase outlook for future. Domestic production of natural gas in the Czech Republic is negligible, in 2013 it covered only about 200 mcm; that equals to approximately 2 % of the annual gas consumption (8.28 bcm in 2013).⁶³ As the prospect of further domestic production increase is rather limited, the Czech Republic will stay almost fully dependent on the gas imports in the near future. Gas market liberalisation, finished in 2007, enabled the entrance of new gas suppliers to the market, enhanced competition and brought the possibility to change the gas supplier for all subjects in the

⁵⁸ Energie Strategie Österreich, 34-35.

⁵⁹ The Gas Target Model for the Visegrad 4 Region, 45.

⁶⁰ <http://www.ibtimes.co.uk/iea-urges-austria-loosen-russias-energy-grip-via-shale-gas-exploration-1444060>

⁶¹ Gas – Medium-Term Market Report 2014, 85.

⁶² <http://www.reuters.com/article/2012/09/17/omv-shale-austria-idUSLSE8KHHDG20120917>

⁶³ <http://energostat.cz/plynarenstvi-cr.html>

Czech Republic.⁶⁴ Due to this import dependency, ensuring the security of gas supplies in response to the changing European standards is an important strategic task.⁶⁵

3.1. Technical situation

Maximum daily consumption peak of the Czech Republic in the heating season reaches between 50 and 60 mcm whereas the average daily consumption is approximately 23 mcm.⁶⁶ Due to the high end user gas prices, no significant increase in these numbers is expected in next decades.⁶⁷ Volume of gas storage in the Czech Republic corresponds to between 30 and 40 % of the annual gas consumption. This significantly helps to ensure gas supplies in case of immediate need (in times of high demand or disruption for any reason). Distribution network in the Czech Republic is well established and the possible disruption of any system component should not endanger the continuity of gas supplies to the end customers (compliance with the N-1 rule).

Transit pipelines crossing the territory of the Czech Republic have the technical transmission capacity of around 80 bcm of gas per year. This represents a potential daily capacity of 220 mcm. Actual natural gas transit in 2012 reached roughly 35 bcm which represented 44 % of technical capacity and accounted to 95 mcm of daily transports. In 2013 contracted daily capacity was 150 mcm.⁶⁸

Net4Gas is the only gas transmission system operator in the Czech Republic. It separated itself from the RWE Group in 2013 in order to fulfil the EU legislative rules on the Independent Transmission System Operator. It operates three border transfer stations, four compression stations, almost a hundred transfer stations and manages over 3 800 km of gas pipelines. Its contemporary owners are Allianz Infrastructure Czech HoldCo II S.à.r.l and Borealis Novus Parent B.V, registered in Luxembourg and Netherlands.⁶⁹

The main gas transportation system consists of two core pipelines – the transit pipeline from Waidhaus to Lanžhot and the transit pipeline from Hora Svaté Kateřiny to Lanžhot – originally constructed for gas transit from East to West. These pipelines are part of “Bratrství” – Brotherhood pipeline system which leads from the Russian Federation to the Central Europe via Ukraine. With accent to the security of supply and market integration, the Czech Republic advanced its efforts on the further infrastructure development in the North-South direction; Gas pipeline Moravia

⁶⁴ <http://www.ery.cz/-/proces-liberalizace-trhu-s-plynem>

⁶⁵ Stepan, V., Gavor, J., Kansky, Z., & Klenha, D. (2014). Analýza ekonomických dopadů zajištění surovinové a energetické bezpečnosti v oblasti plynárenství - ENA Study for Ministry of Industry and Trade of the Czech Republic.

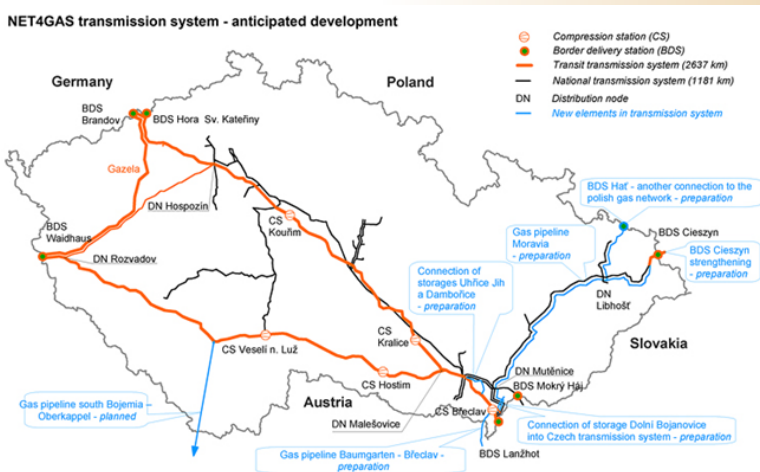
⁶⁶ <http://energostat.cz/plynarenstvi-cr.html>

⁶⁷ Ibid.

⁶⁸ Stepan, V., Gavor, J., Kansky, Z., & Klenha, D. (2014). Analýza ekonomických dopadů zajištění surovinové a energetické bezpečnosti v oblasti plynárenství - ENA Study for Ministry of Industry and Trade of the Czech Republic.

⁶⁹ <http://www.cenyenergie.cz/net4gas/>

should strengthen the connection to Poland. Newly built Gazelle pipeline, completed in 2013, in north-western part of the Czech Republic is being used for transit of gas between Germany and the Czech Republic. Pipeline enables reverse flow and thus in the event of an emergency situation may be used for transit of gas from both German transit routes. Also, part of Czech strategic gas reserves is placed in Germany.⁷⁰ Even though the Gazelle pipeline is crucial for transfer of gas from reservoirs in Germany and from Western Europe in general, Brotherhood pipeline still remains the most important transit route, supplying gas for domestic market.



Source: <https://www.ote-cr.cz/statistics/long-term-balance/gas-networks/Files-gas-networks/3-development.jpg>

Gas storage facilities are predominantly used for seasonal demand balancing and for protecting against supply disruption. Consumption is highly seasonal. Technically, storage units in the Danube Region are mostly depleted fields. In contrast to other Danube states, the Czech Republic also stores the gas in the salt cavity and in several small aquifers. Czech gas reservoirs currently have a capacity of 3.3 bcm which equals to approximately 35-40 % of annual domestic consumption. The withdrawal rate reaches between 55 mcm/day in early winter and 33 mcm/day in the end of winter.⁷¹

⁷⁰ Stepan, V., Gavor, J., Kanský, Z., & Klenha, D. (2014). Analýza ekonomických dopadů zajištění surovinové a energetické bezpečnosti v oblasti plynárenství - ENA Study for Ministry of Industry and Trade of the Czech Republic.

⁷¹ Regionalis Energiagazdasági Kutatóközpont (2013). Natural Gas Storage Market Analysis in the Danube Region - market analysis commissioned by the Sustainable Energy Priority Area of the Danube Region Strategy.

As stated above, the Czech Republic already has the possibility to deliver gas by various transit routes (either from West or East). Even though the Czech market has the lowest dependence on Russian supplies among the V4 countries, this still does not bring satisfactory results in terms of energy security. Its core issue remains the lack of diversification in terms of sources of supply, as the gas flowing through Gazelle pipeline (contracted in the German NCG and Gaspool hubs) is still of Russian origin.⁷² Therefore the internal policies of the Czech government, such as the updated State Energy Concept, put emphasis not only on investments in the maintenance and reconstruction area of existing network (in order to minimize losses and reduce operating costs) but also on the diversification of supply routes. The updated State Energy Concept states that the critical part of gas network is older than 35 years and will require extensive modernization and renovation. This renewal should be carried out in the following 10 to 15 years. At the same time it stresses the need to complete planned diversifications projects.⁷³

In terms of technical conditions, the Czech Republic has relatively high potential for market integration in comparison to other countries in the Danube region. Czech pipelines are able to provide gas transit from East to West and vice versa, and if planned projects are completed, also from North to South. It is one of the few national systems with spare capacity which provides the ground for market integration. The capacity of the Czech transportation system is currently sufficient to cover possible increased consumption in Slovakia and also able to deliver gas to other countries in Central Europe (based on the condition that the sufficient interconnections are completed).⁷⁴

For this reason, several of planned infrastructure projects in the Czech Republic were given a priority by the European Commission (within the scope of the Projects of Common Interest, PCIs). Among those PCIs with the highest priority for the regional market integration is the planned 100 km long Stork II pipeline between Moravia and Poland and the BACI pipeline - between cities Břeclav on the Czech border and Baumgarten and Reinthal in Austria. Through BACI pipeline the Czech Republic would be able to directly connect itself to the Gas Hub in Baumgarten.⁷⁵ The interconnection to Austria should be also strengthened by the Oberkappel pipeline between South Bohemia and Austria with the total length of 110 km.⁷⁶

⁷² Ascari, S., (2013). The gas target model for the Visegrad 4 region - Conceptual Analysis. Osrodek Studiów Wschodnich. ISBN: 978-83-62936-29-8

⁷³ Ministerstvo průmyslu a obchodu České republiky: Aktualizace státní energetické koncepce České republiky (listopad 2012).

⁷⁴ Ascari, S., (2013). The gas target model for the Visegrad 4 region - Conceptual Analysis. Osrodek Studiów Wschodnich. ISBN: 978-83-62936-29-8;

⁷⁵ Stepan, V., Gavor, J., Kansky, Z., & Klenha, D. (2014). Analýza ekonomických dopadů zajištění surovinové a energetické bezpečnosti v oblasti plynárenství - ENA Study for Ministry of Industry and Trade of the Czech Republic.

⁷⁶ http://ec.europa.eu/energy/infrastructure/pci/pci_en.htm

3.2. Legislative environment and obstacles

Czech gas system fully meets the requirements of the European Parliament and the European Council no. 994/2010 of 20 October 2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/ES.⁷⁷ The Czech Republic is obliged to implement necessary EU regulation concerning the market integration. However, this implementation represents the main issue. According to the Czech national authorities,⁷⁸ cooperation between TSOs, regulatory bodies and market operators is necessary for internal market completion.

3.3. Commercial environment

In comparison to the other central European countries, the Czech gas market is very open and advanced in terms of competitiveness, market organisation and supply diversification. End user prices are among the lowest in the region and below those of Western neighbours for industrial customers but are still relatively higher for the residential customers.⁷⁹ In 2013, over 30 suppliers of natural gas operated in the Czech Republic. The biggest of them was the RWE group with 1 700 000 customers (57 % market share), followed by Pražská Plynárenská with 15 % market share, ČEZ (11 %), Bohemia Energy (7 %), EON (6 %) and other companies (4 %).⁸⁰

In the Czech Republic new storage capacities are auctioned which provides a good estimate of their real value. Storage facilities then have to compete on the flexibility market with the spread of spot and long term contract prices.⁸¹

Transmission tariff levels in the Danube region vary between 0.5 and 2.5 €/MWh. The Czech Republic has nowadays one of the lowest tariff levels within the CEE region due to already commissioned infrastructure investment.⁸²

Despite the availability of resources is currently abundant in neighbouring German hubs, they cannot be used for balancing purposes. Imbalances are subject to administrative penalties that are linked to prices recorded at the German EEX exchange. The Czech market operator (OTE) has developed a platform for intra-day trade that is used by market players to achieve balancing requirements, including through a monthly ex-post trading of tolerances. Such a platform for short

⁷⁷ Plán preventivních opatření nezbytných k odstranění nebo ke zmírnění rizik pro zajištění dodávek zemního plynu v ČR (2012). Ministry of Industry and Trade of the Czech Republic.

⁷⁸ Interview with Mr. P. Zástěra, Head of Gas Unit, Ministry of Industry and Trade of the Czech Republic

⁷⁹ Ascaři, S., (2013). The gas target model for the Visegrad 4 region - Conceptual Analysis. Osrodek Studiów Wschodnich. ISBN: 978-83-62936-29-8

⁸⁰ http://www.rozhlas.cz/zpravy/domaciekonomika/_zprava/trh-s-plynem-v-cesku-se-nasycuje-novy-dodavatel-mnd-chce-ziskat-az-200-tisic-domacnosti--1308647

⁸¹ Regionalis Energiagazdasági Kutatóközpont (2013). Natural Gas Storage Market Analysis in the Danube Region - market analysis commissioned by the Sustainable Energy Priority Area of the Danube Region Strategy

term trading is unique in the region.⁸³ However, for achieving market integration, proper balancing market still needs to be created.

3.4. Political challenges

Market integration is a long-term priority of the Czech political representation and also of other players at the Czech Market (such as of the transmission system operator Net4Gas). The Czech Republic supports these efforts not only within the V4 group but also at the EU level. Already the EU Czech Presidency in the first half of 2009 gave the energy security a top priority.⁸⁴ The Russo-Ukrainian Crisis at the beginning of 2009 contributed to this development. The experience with sudden, unexpected interruption of gas supplies convinced political representation that without diversification of transit routes, energy security of the country cannot be assured in the long-term. Also, increasing the capacity of gas storages has become a priority.⁸⁵

The issue is thus not the reluctance to build new infrastructure but rather the means of financing. Situation in energy sector (decreasing consumption and volatile prices) leads to suspension of many projects and investment scepticism. As national governments are not able to provide financial support to huge infrastructure projects only by themselves, they seek for additional financial support from other institutions. This is also the case of the Czech Republic – the government pushes for better utilization of CEF instrument and of other European funds.

Another possibility to increase gas market liquidity would be the increase in domestic production, namely shale gas. In case of the Czech Republic some reserves of shale gas are expected to be located. However, till the end of 2014, there is a moratorium on exploration and extraction of shale gas in the Czech Republic.⁸⁶ Further development in this field depends on the Czech government.

4. Slovakia

Slovakia represents a country with almost no domestic natural gas production (only 0.1 bcm), meeting less than 2 % of its total energy demand from domestic sources (reference year: 2012). The country is highly dependent on gas deliveries from a single supplier - Russian Federation. Consumption of approximately 6 bcm of natural gas per year makes the country more than 98 % dependent on Russian gas supplies. Natural gas takes up to 30 % of total primary energy consumption making it a strategic resource. Gas is widely used in all the major segments in the Slovak economy. Industry,

⁸² Regionalis Energiagazdasagi Kutatokozpont (2013). Natural Gas Storage Market Analysis in the Danube Region - market analysis commissioned by the Sustainable Energy Priority Area of the Danube Region Strategy

⁸³ J. Buchner, O. Floercken, N. Taume, Study on cross-border market integration. Macroeconomic analysis of the CEE Region, E-Bridge Consulting GmbH, June 2012; <http://www.acer.europa.eu/.../Pages/GRI-SSE-studies.aspx>

⁸⁴ <https://www.euroskop.cz/349/sekke/priority-predsednictvi/>

⁸⁵ <http://vytapani.tzb-info.cz/106941-vystavba-novych-zasobniku-na-plyn-musi-byt-podle-necase-prioritou>

transport and residential sectors account each for nearly one quarter of total gas consumption. Services and agriculture sectors together account for 14 % of gas consumption and transport sector represents 9 % share. On the other hand, natural gas represents only some 7% of total electricity generated in Slovakia (year of reference for all the information: 2012).⁸⁷

The Slovak Republic is one of the most important transit countries within the CEE. It is worth mentioning that the total amount of transited gas was 71.4 bcm in 2010, of which only 6.2 bcm were designated for domestic consumption.⁸⁸ Since the Nordstream pipeline was completed the volume of transmitted natural gas has decreased. In 2012 transit volumes reached 56.5 bcm compared to 5.2 bcm of domestic consumption and transit capacity of 90 bcm/a. In 2013 due to the launch of Nordstream, transit volumes of Russian natural gas to the EU through Slovakia dropped from 80 % of total Russian flows to about 54 %.⁸⁹

The gas infrastructure in Slovakia is well developed. In 2012, 77 % of all municipalities accounting for 94 % of the population had access to gas,⁹⁰ making Slovakia the second most gasified country in the European Union right after the Netherlands.⁹¹ Internal gas market is fully liberalized in all the segments (even in the household segment). Since 2011 Slovak households have been able to choose their gas supplier. In 2013 approximately 71 000 households decided to use this option.⁹² The main supplier in the domestic market is SPP (Slovenský Plynárenský Priemysel) with the 63,2 % market share.⁹³

SPP, has a long-term contract with Gazprom export and a diversification contract with E.ON Ruhrgas. Moreover, by the end of the year 2008 it entered the Czech market through a subsidiary company SPP CZ, a.s. Since the accession, SPP CZ has developed into an important player in the Czech gas market and supplied about 252 mcm of gas in 2013. SPP CZ focuses mainly on big industrial and heating installations within the Czech market. SPP is also one of the most active traders in the Baumgarten gas hub in Austria.⁹⁴

4.1. Technical situation

Eustream, the only gas transmission system operator in Slovakia, was certified as an Independent Transmission System Operator in 2013.⁹⁵ It manages domestic and transit pipeline networks with

⁸⁶ http://www.enviprofi.cz/33/moratorium-na-pruzkum-bridlicoveho-plynu-uniqueidg0kE4NvrWu0KaDkQuox_Z0xqUbylSeepyYYnY-8H0RxA/?query=t%EC%BEBa+b%F8idlicov%E9ho&serp=1

⁸⁷ Energy Policies of IEA Countries, The Slovak Republic, 2012 Review, 75.

⁸⁸ http://ec.europa.eu/economy_finance/publications/occasional_paper/2013/pdf/ocp145_en.pdf, 246.

⁸⁹ http://ec.europa.eu/energy/gas_electricity/doc/2014_iem_communication_annex2.pdf, 191.

⁹⁰ Energy Policies of IEA Countries, The Slovak Republic, 2012 Review, 78.

⁹¹ http://ec.europa.eu/energy/gas_electricity/doc/2014_iem_communication_annex2.pdf

⁹² SPP, Výročná správa 2013, 12.

⁹³ Národná správa za rok 2013, Úrad pre reguláciu sieťových odvetví Slovensko, 13.

⁹⁴ SPP, Výročná správa 2013, 12-13.

three interconnection points. The network is used to transport natural gas for domestic consumption and to transit Russian gas west of the Slovak border. As mentioned above, the annual transmission capacity of Slovak pipelines exceeds 90 bcm. Transit gas flows to the transfer station Velké Kapušany on the border with Ukraine with capacity of 279 mcm/day and exits Slovakia through transfer station in Lanžhot on the Czech border with capacity of 117mcm/day and Baumgarten transfer station on the Austrian border with capacity of 137 mcm/day.⁹⁶

Access to the transmission system is entry-exit based. For entering and exiting the system customers can choose from the following entry/exit points:⁹⁷

- *Velké Kapušany* (one of the border points between Slovakia and Ukraine)
- *Budince* (one of the border points between Slovakia and Ukraine)
- *Baumgarten* (border point between Slovakia and Austria)
- *Lanžhot* (border point between Slovakia and the Czech Republic)
- *Domestic point* (virtual aggregated interconnection to and from domestic storage and distribution networks)⁹⁸

The reverse flow is possible both on the Czech and the Austrian borders. The reverse flow at Lanžhot could be implemented within two hours, with a capacity of 25 mcm/day. Possibility of reverse flow at the Baumgarten interconnection was introduced in October 2010, making it possible to bring 17 mcm/day of gas into the Slovak Republic from Austria.⁹⁹



Source: <https://tis.eustream.sk/TIS/#/?nav=bd.map&lng=SK>

⁹⁵ http://ec.europa.eu/energy/gas_electricity/doc/2014_jiem_communication_annex2.pdf

⁹⁶ Energy Policies of IEA Countries, The Slovak Republic, 2012 Review, 77.

⁹⁷ Plán rozvoja prepravnej siete spoločnosti eustream, a.s. na obdobie 2014 – 2023, 6.

⁹⁸ <https://tis.eustream.sk/TIS/#/?nav=gi.acs>.

Gas infrastructure in Slovakia currently lacks north-south interconnectors. This bottleneck substantially reduces possibilities to diversify import sources. The existing transit pipelines in Slovakia come from Russia through Ukraine and go to Austria and the Czech Republic.¹⁰⁰ The current length of the whole pipeline network in Slovakia is more than 35 000 kilometres.¹⁰¹

Slovakia is one of the most energy-intensive countries in the EU. However, the situation has been slowly, but steadily, improving. The energy intensity of the economy decreased by some 40 % between 2001 and 2010, signalling major improvement in the efficient use of energy sources.¹⁰² Energy efficient house design (insulation, switching to alternative heating sources) also lowers the country's energy intensity. On the other hand, this causes a lower use of low-pressure gas pipelines. The amount of distributed natural gas fell by 23 % within the last ten years while the length of mid-pressure and low-pressure pipelines increased by 6,5%. This suggests underutilisation of the oversized distribution network.¹⁰³

The total storage capacity in the Slovak Republic will reach 3.12 bcm (over 50 % of yearly consumption) after the completion of Gajary-Baden project as a part the of Láb complex in the western part of Slovakia. Maximum withdrawal rate shall reach 40 mcm/day, which is higher than the average winter gas demand. All capacities are underground storage facilities. Additionally, Dolní Bojanovice storage facility in the Czech Republic is directly connected to the Slovak system and is used for the balancing purposes in case the Slovak distribution network faces imbalances and in case the household security of supply would be questioned. Storage capacity of this site is 0.57 bcm and the maximum withdrawal rate is 8.8 mcm/day. Part of Slovak storage facilities is also used for supplying the Czech market.¹⁰⁴

4.2.1. Legislative environment and obstacles

In July 2012, Slovakia adopted laws to transpose the Directives of the Third Energy Package into the national legislation. The main purpose of such an action was further liberalization and harmonisation of the rules governing the functioning of the internal energy market and ensuring the compliance with the provisions of the Third Energy Package.¹⁰⁵

In May 2013, Regulatory Office for Network Industries (RONI) decided to change tariff pricing which caused that the price of gas transit in reversal flow through Lanžhot and Baumgarten rose steeply.¹⁰⁶

⁹⁹ Ibid.

¹⁰⁰ http://ec.europa.eu/economy_finance/publications/occasional_paper/2013/pdf/ocp145_en.pdf

¹⁰¹ Eurogas, Statistical report 2013, 8 http://www.eurogas.org/uploads/media/Eurogas_Statistical_Report_2013.pdf.

¹⁰² http://ec.europa.eu/economy_finance/publications/occasional_paper/2013/pdf/ocp145_en.pdf

¹⁰³ Národná správa za rok 2013, Úrad pre reguláciu sieťových odvetví Slovensko, 15-16.

¹⁰⁴ Energy Policies of IEA Countries, The Slovak Republic, 2012 Review, 78-79.

¹⁰⁵ http://ec.europa.eu/energy/gas_electricity/doc/2014_iem_communication_annex2.pdf

The main reason for this unexpected decision was a steadily declining gas flow from Ukraine, which could have a negative impact on set mechanism of tariff system.¹⁰⁷ The owners of Slovak pipelines were afraid that Gazprom would use cheaper tariffs on Slovak western border and so they requested a price increase. However, this operation had distorting effect on the competition at the Slovak market and thereby increased prices for local gas consumers. The extra fee is paid by alternative suppliers - mainly subsidiaries of German RWE Gas and Czech ČEZ at entry points at Lanžhot and Baumgarten.¹⁰⁸

The entry fees in Lanžhot and Baumgarten rose by some 250 % respectively 50 %.¹⁰⁹ This decision would decrease the risk of lower yields, in case Russian Gazprom decided to supply Italian and other South European customers with routes surpassing Ukraine. If the gas flow surpasses Veľké Kapušany on the Slovak - Ukrainian border, the loss of Eustream would be marginalised due to profits on the Slovak western border.

As mentioned above, alternative gas suppliers to the Slovak market need to import from the west. There is no liquid market in the Slovak Republic with a possibility to buy wholesale natural gas. The nearest liquid markets are in the Czech Republic and Austria. For example, RWE, the German company operating in the Czech Republic, has created a stock exchange, through which it sells gas surplus to smaller competitors. SPP doesn't offer anything alike and the company only operates on European markets. Alternative suppliers consider nonexistence of any platform for gas trading as the weakness of RONI. Therefore, the increased entry fees are perceived as a further obstacle in the market competition and SPP favouritism. This step hinders foreign gas suppliers accessing the Slovak market and thus represents a big obstacle to the regional market integration.¹¹⁰

4.3. Commercial environment

The key participants in the gas market in the Slovak Republic in 2013 were:

- The transmission system operator (Eustream, a.s.)
- Operator of the distribution network in the defined territory of the Slovak Republic (SPP-distribúcia, a.s.)
- Storage operators (POZAGAS a.s., NAFTA a.s.)
- 26 gas suppliers (some of which are gas traders at the same time; gas trader in the Slovak Republic holds a license which allows him to supply gas not only to end-users, but also to smaller suppliers of gas)
- End customers

¹⁰⁶ EA-ENERGETICKÝ TRH SR 2013 31

¹⁰⁷ Národná správa za rok 2013, Úrad pre reguláciu sieťových odvetví Slovensko, 20.

¹⁰⁸ <http://ekonomika.sme.sk/c/6941114/stat-na-jar-pomohol-eustreamu-no-poskodil-slovenskych-zakaznikov.html>

¹⁰⁹ <http://www.energie-portal.sk/Dokument/cena-plynu-zrejme-porastie-urso-schvalil-eustreamu-zvysenie-tarif-y-o-350-percent-101485.aspx>

The main gas suppliers to end-users in the Slovak Republic are SPP, a.s. with the 63,2 % market share, followed by RWE Gas Slovensko, s.r.o. with the 18,7 % share and ELGAS, s.r.o. with the 4,0 % market share. The rest – approximately 14,1 % of the market is divided in between other 23 smaller gas suppliers.¹¹¹

Eustream, a.s. has a lot of free transport capacity in pipelines under its operation. This represents an advantage for prospective parties interested in gas trade and a potential for further development of competition in the gas market in the Slovak Republic. The situation thus differs from the other European network operators, which usually lack free capacity.¹¹²

Apart from the positive features mentioned above, most of the gas traders in the market actually agree that the wholesale gas market in Slovakia does not exist, or rather exists in a very simple form. Therefore, Slovak traders use the wholesale market in the Czech Republic and the Austrian gas market hub in Baumgarten (since there is a possibility of a reverse flow between Slovakia and Austria). The 2013 pricing decision hindered the economic viability of this option.¹¹³

4.4. Political challenges

As an EU member state, the Slovak Republic is committed to implement the EU legislation. The country has implemented the second EU Gas Directive and liberalised its gas market. It is now in the process of implementing the third Energy Package. A progress has been made, particularly in the regulatory framework, e.g. the legal unbundling and third-party access to transmission and distribution pipelines as well as improving security of supply by realising a possibility of reverse flows (with the Czech Republic and Austria). Reliance on a single supplier makes the Slovak Republic vulnerable to supply disruption, as was demonstrated clearly during the Russo-Ukrainian gas crisis in 2009. The two reverse flow projects at combined capacity could counter a potential cut of Russian supplies.

The government's proactive approach to improve the security of gas supplies following the January 2009 gas crisis is noteworthy. A team to respond the crisis has been assembled and provides the basis for crisis response in the future.¹¹⁴ Other actions following the gas crisis have been undertaken. Such actions include expanding the storage capacities, and enabling reverse flows through the country's two western interconnectors.¹¹⁵ By such steps, Slovakia has significantly improved its ability to respond possible gas disruptions.

¹¹⁰ <http://ekonomika.sme.sk/c/6941114/stat-na-jar-pomohol-eustreamu-no-poskodil-slovenskych-zakaznikov.html>

¹¹¹ Národná správa za rok 2013, Úrad pre reguláciu sieťových odvetví Slovensko, 20.

¹¹² Národná správa za rok 2013, Úrad pre reguláciu sieťových odvetví Slovensko, 20.

¹¹³ Michal Hudec, Z. Lukáčová, L. Ferencáková, J. Smoleň, Energetický trh SR 2013, Market report, 2014 energy analytics, s.r.o., 31.

¹¹⁴ http://www.iea.org/publications/freepublications/publication/Slovak2012_free.pdf

In order to further enhance energy security and to achieve market integration, interconnection with neighbouring countries is needed. In addition, the Slovak gas storage market needs to be competitive with its regional competitors. The existing lengthy and burdensome regulatory framework may hamper the development of new, mainly short-term, storage products and subsequently may hinder the gas market completion.¹¹⁵

Conclusions: Obstacles preventing the market integration

Technical obstacles

For the purposes of one central trading region in the Czech Republic, Slovakia and Austria cross-border interconnections between the Czech Republic and Slovakia are sufficient. The main obstacle for integration is the lack of physical cross-border interconnection between the Czech Republic and Austria. It is absolutely necessary to strengthen cross-border interconnections between these countries because it is impossible to seriously consider the market integration between the countries, which do not have the physical interconnection pipeline with sufficient capacity between them. Without this physical connection the market liquidity would be poor and enhanced competition would never occur. As Slovakia hesitates to use its pipelines as a bypass for Czech-Austria gas connection (as seen on the introduction of higher tariffs on western borders), the physical interconnection between the Czech Republic and Austria is crucial for further integration. The necessary projects which should connect these two countries already exist but are still only in preliminary phase (not even under construction).

The growing network of pipelines in the European Union imposes a growing competition between these pipelines. This is also the case in the Danube Region – North-South corridor (pipelines heading from Poland to Slovakia and to the Czech Republic and interconnection between Austria and Croatia and other southern European countries) competes with the interconnections between the Czech Republic and Austria. The Moravia project, the part of this corridor passing through the Czech Republic, should replace the existing pipeline of a diameter of 700 mm with pipeline of a diameter of 1200 mm with a capacity of about 12 to 16 billion m³/year. Moravia project should secure supplies for the area of northern Moravia by importing gas from Poland.¹¹⁷ This represents an obstacle for future gas market integration of three countries.

Commercial obstacles

Usual practise of investors is to book significant amount of capacity of newly built pipelines. However, traders' interest in using the new infrastructure is only estimated on the basis of non-binding indications of the market. If the pipelines capacity should be used effectively, market

¹¹⁵ Emergency plan of the Slovak Republic (Ministry of Economics, May 2013)

¹¹⁶ Energy Policies of IEA Countries, The Slovak Republic, 2012 Review, 82-83.

players should cooperatively work on abolishing this practise. Otherwise it represents a substantial obstacle for future integration.

The trend in the CEE region in recent years is that the gas ceases to be purchased based on formulas linked to the price of oil. Instead of through long-term contracts based on these formulas, nowadays more and more gas is being bought on spot market. These short-term contracts are based on prices at Stock Exchange, which are approx. 20% lower than those based on the long-term contracts.¹¹⁸ In 2012 44% of gas consumption in Europe was priced on a gas-to-gas competition basis, while 51% was still oil-indexed. In 2013 for the first time in history the percentage share of gas bought on the market (53 %) exceeded in numbers the long-term oil indexed gas contracts (42 %).¹¹⁹ Above-mentioned long-term contracts represent another vital obstacle for market integration. Current trend should continue to further liberalise markets in the region.

Recommendations for relevant stakeholders

The key finding of the study is that there is a wide potential for further natural gas market integration between Austria, Czech Republic and Slovakia. Regional market coupling brings multi-level benefits, including price stability, security of supply enhancement and a better demand side management. Yet specific measures need to be implemented in order to deliver such outcomes. These measures can be divided into several priority areas.

Infrastructure projects

Governments should continue in their efforts to improve security of supply by diversifying supply routes and sources by promoting new interconnections with neighbouring countries and the creation of a regional gas market. Main integration goal for CEE region should be better interconnection of the gas networks in the region. The cross-border interconnections between the Czech Republic and Slovakia are on sufficient level, as well as between Austria and Slovakia, but there is no physical cross-border interconnection between the Czech Republic and Austria. The physical interconnection capacity will be enhanced by finishing the BACI project, which has currently a status of the Project of Common Interest. BACI project received limited European financial support (TEN-E¹²⁰) as it has been confirmed as a part of the North-South Corridor Project.

Essential are also Slovak – Hungarian interconnectors (scheduled on 2015¹²¹) and proposed Slovak – Polish interconnector, which would help in connecting the region with two planned LNG terminals

¹¹⁷ Stepan, V., Gavor, J., Kanský, Z., & Klenha, D. (2014). Analýza ekonomických dopadů zajištění surovinové a energetické bezpečnosti v oblasti plynárenství - ENA Study for Ministry of Industry and Trade of the Czech Republic.

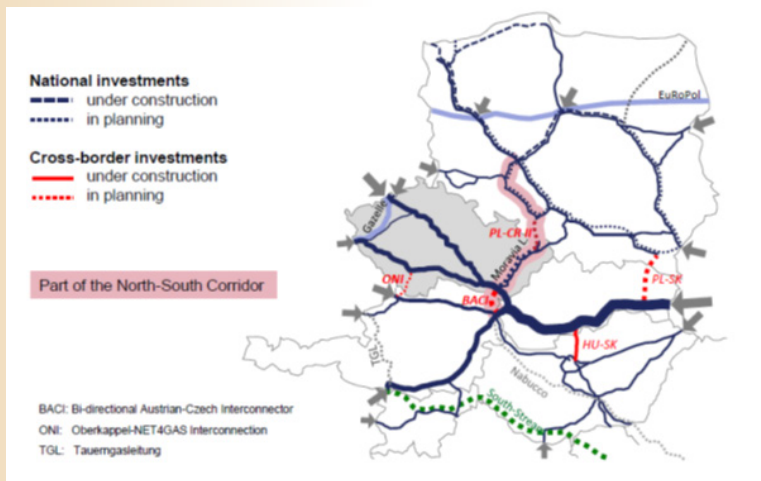
¹¹⁸ Ibid.

¹¹⁹ European Commission (2013). Quarterly report on European Gas Markets

¹²⁰ <http://www.net4gas.cz/en/1703/>

¹²¹ http://ec.europa.eu/energy/infrastructure/pci/pci_en.htm

in Poland and Croatia. The access to these LNG terminals would mean lower prices for gas end-users via increased competition and enhanced market liquidity. These projects are economically and socially relevant but currently commercially not viable. Therefore, additional financial support should be provided. European Investment Bank (EIB) could help with the funding, not only by direct loans, but also for example through project bonds. The EIB may provide collateral for bonds, ensuring their higher rating and possibly lower interest rates.



Source: <http://www.sfpa.sk/Ceec/2013/4ThomasKleefus.pdf>

The lack of financial incentives both on the national and the EU level is undoubtedly the main obstacle in strengthening regional gas network. Considering the need for investment in maintaining and refurbishing the natural gas networks, a combination of three basic tools can be recommended. A coordinated effort of the CEE countries should be targeted onto increased CEF funding possibilities with regards to their high vulnerability to the gas supply disruptions and a strategic priority of the North-South Gas Corridor. Additionally, countries should themselves contribute to the financing of these projects. According to the current philosophy of cost allocation all the countries for which there are significant benefits from the new infrastructure should contribute to cover costs associated with the implementation of new investments between the new countries.

Second tool is a revision of the national network fees and taxes. In close cooperation with the respective governments and TSOs, the regulatory authorities should assess whether network fees

are sufficient to cover these costs. And finally the third potential tool is a strategic partnership between governments and private companies that would secure public funding while respecting the EU liberalisation rules and allowing government share in private operations at the same time.

Natural gas market: competition, deregulation and pricing

In close cooperation with national regulatory bodies, governments should ensure that the regulatory framework promotes competition in the gas market and encourages new entities to enter the market. As the competition grows, the prices should be gradually deregulated. Partial price deregulation has already been implemented in Austria and the Czech Republic in the sense that the end customer has a choice between regulated and market price.¹²² In Slovakia the situation is different: both end-user prices for households in Slovakia and district heating companies that produce heat for households are regulated.¹²³ This could jeopardise necessary private investment in the market, particularly if the regulated market expands in the future. Stable legislation is a condition sine qua non for any investment; governments should avoid frequent regulatory changes to promote infrastructure investment which is crucial for the future market integration.

Well-functioning, flexible markets are the best way to enhance security of gas supply. Replacing the oil-indexed prices by more flexible hub pricing system and partial replacing of the long-term contracts by much more competitive spot-market are one of the key measures to achieve such a market. Governments should consider ways of facilitating the establishment of a gas spot market, for example by implementing the existing European regulatory framework for such trading, in collaboration with neighbouring countries.

Exploration and know-how exchange

Know-how sharing and exchange of experience (not only in technical area but also of best practises in implementing EU legislation) are indivisible components of natural gas market integration. Sharing of experience would allow the participating parties to take advantage of such partnership and help them build mutual trust. Governments should encourage a public debate on promotion of the natural gas usage as an environmentally-friendly source of energy and assess together the impact (positive and negative) of possible future development of unconventional gas reserves. In this context, gas market integration issue has to be raised in order to secure the public support. The political representation has to make sure that the debate on natural gas will include all the important actors (NGOs, TSOs, Regulatory Bodies) and define the energy security more as an European issue rather than only the national one.

¹²² http://www.iea.org/publications/freepublications/publication/chinagasreport_final_web.pdf

¹²³ <http://www.urso.gov.sk/?q=Inform%C3%A1cie%20pre%20spotrebite%C4%BEA/%C5%A0trukt%C3%BAra%20ceny%20za%20dod%C3%A1vku%20plynu%20pre%20dom%C3%A1cnosti>

Sources

Agency for the Cooperation of Energy Regulators (ACER)

- GRI South South-East studies, http://www.acer.europa.eu/Gas/Regional_%20Intiatives/South_South-East_GRI/Pages/GRI-SSE-studies.aspx
- Central East European Trading Region update, 26 pg., http://www.acer.europa.eu/Gas/Regional_%20Intiatives/South_South-East_GRI/15th_SEE_SG/Document%20Library/1/Point%204.1%20CEETRupdate_Milan.pdf

Central European Gas Hub

- Eustream joint Central European Gas Hub, 14. 9. 2012, http://www.cegh.at/sites/default/files/eustream_english_final_0.pdf
- CEGH Český trh se zemním plynem s futures produkty, http://www.cegh.at/sites/default/files/cegh_pxe_cz_web.pdf
- <http://www.cegh.at/about-us>

Central Intelligence Agency

- https://www.cia.gov/library/publications/the-world-factbook/wfbExt/region_eur.html

CenyEnergie.cz

- <http://www.cenyenergie.cz/net4gas/>

Danube Region Strategy

- www.danube-region.eu/about
- <http://groupspaces.com/Energy2/pages/the-concepts-of-the-pa2>
- Regionalis Energiagazdasagi Kutatokozpont (2013). Natural Gas Storage Market Analysis in the Danube Region - market analysis commissioned by the Sustainable Energy Priority Area of the Danube Region Strategy.

E-Bridge

- J. Buchner, O. Floercken, N. Taume, Study on cross-border market integration. Macroeconomic analysis of the CEE Region, E-Bridge Consulting GmbH, June 2012, 87 pg., http://www.acer.europa.eu/Gas/Regional_%20Intiatives/South_South-East_GRI/Documents/Final%20Report_2_cross-border_integration_part_I_and_II_20120918.pdf

E-Control

- http://www.e-control.at/en/market_players/natural-gas/natural-gas-market/storage
- http://www.e-control.at/en/market_players/natural-gas/security-of-supply/quality-of-upply/network-service-quality
- <http://www.e-control.at/de/presse/aktuelle-meldungen/zertifizierung-tag>

Energie-portal.sk

- <http://www.energie-portal.sk/Dokument/cena-plynu-zrejme-porastie-urso-schvalil-eustreamu-zvysenie-tarify-o-350-percent-101485.aspx>

Energiestrategie

- Federal Ministry of Science, Research and Economy, Energie Strategie Österreich, 2010, 140 pg., http://www.energiestrategie.at/images/stories/pdf/longversion/energiestrategie_oesterreich.pdf

Energostat

- <http://energostat.cz/plynarenstvi-cr.html>

Energy Delta Institute

- <http://www.energydelta.org/mainmenu/energy-knowledge/country-gas-profiles>

Energy Regulatory Office

- <http://www.eru.cz/-/proces-liberalizace-trhu-s-plynem>

Euroscop

- <https://www.euroskop.cz/349/sekce/priority-predsednictvi/>

Eurogas

- Eurogas, Statistical Report 2013, 16 pg., http://www.eurogas.org/uploads/media/Eurogas_Statistical_Report_2013.pdf

Europa.eu

- Regulation (EU) No 994/2010, http://europa.eu/legislation_summaries/energy/external_dimension_enlargement/en0026_en.htm

European Commission

- http://ec.europa.eu/energy/gas_electricity/internal_market_en.htm
- http://ec.europa.eu/energy/gas_electricity/studies/doc/gas/201307-entry-exit-regimes-in-gas-parta.pdf
- http://ec.europa.eu/energy/publications/doc/2013_pocketbook.pdf
- European Commission, Report on the implementation of Regulation (EU) 994/2010 and its contribution to solidarity and preparedness for gas disruptions in the EU, 16. 10. 2014, 27 pg., http://ec.europa.eu/energy/doc/nuclear/2014_energystresstests_securityofgassupplysegulation_report.pdf
- European Commission, Trends and Developments in European Energy Markets 2014, 13. 10. 2014, 33 pg., http://ec.europa.eu/energy/gas_electricity/doc/2014_iem_communication_annex1.pdf
- European Commission, Key Figures, 6/2011, 40pg., http://ec.europa.eu/energy/observatory/countries/doc/key_figures.pdf
- European Commission, Country Reports, 13. 10. 2014, 239 pg., http://ec.europa.eu/energy/gas_electricity/doc/2014_iem_communication_annex2.pdf
- European Commission (2013). Quarterly report on European Gas Markets., http://ec.europa.eu/energy/observatory/gas/doc/201410_q3-4_quarterly_report_gas_market.pdf
- European Commission, Member States Energy Dependence: An Indicator-Based Assessment, 4/2013, 270 pg., http://ec.europa.eu/economy_finance/publications/occasional_paper/2013/pdf/ocp145_en.pdf
- European Commission, Single Market for Gas & Electricity, Country Reports: Austria, pg. 62-66., http://ec.europa.eu/energy/gas_electricity/doc/20121115_iem_swd_0368_part2_austria.pdf
- European Commission, Study on Entry-Exit Regimes in Gas, December 2013, 100 pg., http://ec.europa.eu/energy/gas_electricity/studies/doc/gas/201307-entry-exit-regimes-in-gas-parta.pdf
- European Commission, Working Document: Progress towards completing the Internal Energy Market, 13.10.2014, 239 pg., http://ec.europa.eu/energy/gas_electricity/doc/2014_iem_communication_annex2.pdf
- European Commission, Indicative list of actions selected for receiving financial assistance under CEF-Energy, 29. 10. 2014, 5 pg., http://ec.europa.eu/energy/infrastructure/pci/doc/2014_cef_energy_lists.pdf
- European Commission, Commission Opinion: Austria – Certification of Trans Austria Gasleitung GmbH, 2013, 7 pg., http://ec.europa.eu/energy/gas_electricity/interpretative_notes/doc/certification/2012_049_at_en.pdf

European Network of Transmission System Operators for Gas

- ENTSOG, CEE Grip - Infrastructure projects, January 2012, 73 pg., http://www.entsog.eu/public/uploads/files/publications/GRIPs/2012/GRIP_CEE_AnnexB_highres_L.pdf

European Parliament

- European Parliament, Internal Energy Market, http://www.europarl.europa.eu/aboutparliament/en/displayFtu.html?ftuld=FTU_5.7.2.html

Eurostat

- Trade in energy products, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Trade_in_energy_products#Extra-EU

Eustream

- <https://tis.eustream.sk/TIS/#/?nav=bd.cap&lng=SK>

Gasconnect.at

- Koordinierter Netzentwicklungsplan (KNEP) 2013-2022, 36 pg. http://www.e-control.at/portal/page/portal/medienbibliothek/recht/dokumente/pdfs/Beilage_Koordinierter_Netzentwicklungsplan_2013-2022_121031_final%20geschw%C3%A4rzt.pdf
- <http://www.gasconnect.at/en/Unser-Netz/Leitungssystem/TAG>
- <http://www.gasconnect.at/en/Unser-Netz/Leitungssystem/WAG>
- <http://www.gasconnect.at/en/Unser-Netz/Leitungssystem>
- <http://www.gasconnect.at/en/Vor-Ort/Sicherheit-rund-um-die-Pipeline>
- <http://www.gasconnect.at/en/Unser-Netz/Projekte/BACI>

Hydrocarbons-technology

- Adria LNG Project, Croatia, <http://www.hydrocarbons-technology.com/projects/adrialngproject/>

INTERFAX

- Botzki, Annemarie: Austria's TSO certification clashes with EU law, 11.11.2014, <http://interfaxenergy.com/gasdaily/article/13540/austrias-tso-certification-clashes-with-eu-law>

International Business Times

- Croucher, Shane: IEA urges Austria to Loosen Russia's Energy Grip via Shale Gas Exploration, 9.4.2014, <http://www.ibtimes.co.uk/iea-urges-austria-loosen-russias-energy-grip-via-shale-gas-exploration-1444060>

International Energy Agency/OECD

- <http://www.iea.org/countries/>
- International Energy Agency: Gas Pricing and Regulation, 2012, 122pg., http://www.iea.org/publications/freepublications/publication/chinagasreport_final_web.pdf
- International Energy Agency: Energy Policies of IEA Countries - Austria, 2014, 148 pg.
- International Energy Agency: Energy Policies of IEA Countries – The Slovak Republic, 2012, 160 pg., http://www.iea.org/publications/freepublications/publication/slovak2012_free.pdf
- OECD/IEA: Gas – Medium-Term Market Report, 2014, 207 pg.
- OECD/IEA: Austria – executive summary and key recommendations, pg. 9-13, <http://www.iea.org/Textbase/npsum/austria2014SUM.pdf>

The Ministry of Industry and Trade of the Czech Republic

- Plán preventivních opatření nezbytných k odstranění nebo ke zmírnění rizik pro zajištění dodávek zemního plynu v ČR (2012). Ministry of Industry and Trade of the Czech Republic.
- Stepan, V., Gavor, J., Kansky, Z., & Klenha, D. (2014). Analýza ekonomických dopadů zajištění surovinové a energetické bezpečnosti v oblasti plynárenství - ENA Study for Ministry of Industry and Trade of the Czech Republic.
- Aktualizace Státní energetické koncepce České republiky (listopad 2012).

Net4Gas

- <http://www.net4gas.cz/en/1703/>

Ośrodek Studiów Wschodnich

- OSW report: The Gas Target Model for the Visegrad 4 Region, conceptual analysis, Sergio Ascari, Warsaw 5/2013, 78 pg.

Reuters

- <http://www.reuters.com/article/2012/09/17/omv-shale-austria-idUSL5E8KHHDG20120917>

Rozhlas.cz

- http://www.rozhlas.cz/zpravy/domacieekonomika/_zprava/trh-s-plynem-v-cesku-se-nasycuje-novy-dodavatel-mnd-chce-ziskat-az-200-tisic-domacnosti--1308647

Sme.sk

- <http://ekonomika.sme.sk/c/6941114/stat-na-jar-pomohol-eustreamu-no-poskodil-slovenskych-zakaznikov.html>

SPP

- http://www.spp.sk/sk/Cds/AdminDownload/?filename=1092_SPP_VS_2013_SK

TZB.info

- http://www.enviprofi.cz/33/moratorium-na-pruzkum-bridlicoveho-plynu-uniqueidgOkE4NvrWuOKaQDKuox_Z0xqUbylSeepyYYnY8H0RxA/?query=t%EC%BEba+b%F8idlicov%E9ho&serp=1

U.S. Energy Information Administration

- <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=3&pid=26&aid=1&cid=CG1,&syid=2009&eyid=2013&unit=BCF>
- <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=3&pid=3&aid=6&cid=CG1,&syid=2010&eyid=2014&unit=TCF>

Visegrad 4

- Road Map towards the regional gas market among Visegrad 4 countries, 6pg., <http://www.visegradgroup.eu/calendar/2013/v4-road-map-eng>
- http://www.visegradgroup.eu/documents/presidency-programs/20142015-slovak#_8.%20NATURAL%20RESOURCES

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