



*Natural Gas Reverse Flows
in the Danube Strategy Region
Current State and Outlook*

PREPARED BY



**The analysis was commissioned by the Priority Area 2
„To encourage more sustainable energy“ of the EU Strategy for Danube Region**

**Contact information:
www.danube-energy.eu**

**Prepared by:
Jan Osička, Filip Černoch, Tomáš Dráb, Tomáš Martanovič, Jiří Vlček
Center for Energy Studies**

**www.ceners.org
November 2014**

**Published by:
Masaryk University**

Brno 2015

**Office of the Government
of the Czech Republic**



The Sustainable Energy Priority Area of the Danube Region Strategy assumes no responsibility for the use that may be made of the information contained in this publication or any errors that may remain in the texts, despite the care taken in preparing them. All views, positions, and conclusions expressed in this publication should be understood to be solely those of the author.

This text may be used only for personal research purposes. Any additional reproduction for any other purposes, whether in hard copies or electronically, requires the consent of the authors. If cited or quoted, reference should be made to the full name of the authors, the title, the year and the publisher.

Authors:

Mgr. Jan Osička, Ph.D.

Mgr. Filip Černoch, Ph.D.

Mgr. Ing. Tomáš Dráb

Bc. Tomáš Martanovič

Bc. Jiří Vlček

Corresponding author:

Jan Osička (osicka@mail.muni.cz)

Reviewed by: Ing. Lubomír Pešák (on behalf of the Gas and Liquid Fuels Department,
Czech Ministry of Trade and Industry)

All rights reserved. No part of this e-book may be reproduced or transmitted in any form or by any means without prior written permission of copyright administrator which can be contacted at Masaryk University Press, Žerotínovo náměstí 9, 601 77 Brno.

© 2015 Jan Osička, Filip Černoch, Tomáš Dráb, Tomáš Martanovič, Jiří Vlček

© 2015 Masarykova univerzita

ISBN 978-80-210-8161-1.

TABLE OF CONTENT

1. Introduction 5

2. Theoretical Assumptions 5

3. BDICs: their role and financing 7

4. Scenarios 8

5. Interpretations 10

6. Recommendations 16

7. BDICs Appendix 18

 Austria - Slovenia 19

 Austria - Slovakia 21

 Czech Republic - Germany 23

 Czech Republic - Slovakia 31

 Austria - Czech Republic 34

 Austria - Germany 36

 Slovakia - Ukraine 43

 Croatia - Slovenia 50

 Austria - Hungary 55

 Croatia - Hungary 52

 Hungary - Romania 59

 Hungary - Serbia 64

 Hungary - Slovakia 67

 Hungary - Slovenia 71

 Hungary - Ukraine 73

 Moldova - Romania 78

 Bulgaria - Romania 82

Bosnia and Herzegovina - Croatia	85
Croatia - Montenegro	88
Croatia - Serbia	90
Romania - Ukraine	92
Bosnia and Herzegovina - Serbia	96
Bulgaria - Serbia	97
Montenegro - Serbia	99
8. References	100
9. List of Abbreviations	109
10. Nominal Index	111

1. Introduction

The continental natural gas market has undergone profound changes in recent years. Within a very short timeframe, the global economic crisis and the silent unconventional gas revolution in the U.S. have together shifted the global LNG market into a buyer's market. The resulting LNG glut in the Atlantic basin has crushed natural gas prices and greatly incentivized hub trading schemes over prevailing long-term contract arrangements. What we can now observe in Western Europe is an expansion of gas-to-gas competition based short term trading or spot-indexed contracts, which dramatically changes an environment that was originally designed to provide the suppliers with stable revenues over long periods of time in order to justify the large capital investments in developing the resources and necessary infrastructure.

In Central and Eastern Europe (CEE), this system has been maintained mostly by Gazprom's interests in the region. In this context, it is remarkable that many CEE countries were only able to take advantage of the changes which are happening in the Western Europe, and which pose a major challenge for the Gazprom export model due to the measures they have undertaken, after the gas crises of 2006 and 2009. Among these measures, bi-directional interconnectors (BDICs) play a substantial role. Nearly a decade after the 2006 crisis, it is now a good time to look at the ways they have been implemented, what changes they have introduced, and how they fit into the game-changing events of the past few years.

2. Theoretical Assumptions

With regards to energy-related policies, we argue in accordance with Adelman,¹ Yergin,² Noël,³ De Jong and van der Linde,⁴ and Nordhaus,⁵ that the very basis of international energy transactions is trade, i.e. mutually beneficial exchange that can be expressed in money. However, operating in a network industry such as the natural gas trade, the actor's business strategy may differ from strategies pursued in network-free markets.⁶ In Černoch et al.⁷ we used this line of reasoning to provide an alternative explanation for the Russian foreign energy policy vis-à-vis CEE to the currently prevailing geopolitical ones. We argue that the current setting of the regional gas market (i.e. limited interconnection, limited sources of supply, the netback pricing system, inflexible long-term take-or-pay contracts, and destination clauses) represents a legacy of the two formative decades of the regional natural gas industry, now helping Russia in achieving the highest possible margins. Conveniently enough, the dominant market position that results from this setting also

¹ Adelman 2004

² Yergin 2006

³ Noël 2007

⁴ De Jong and van der Linde 2008

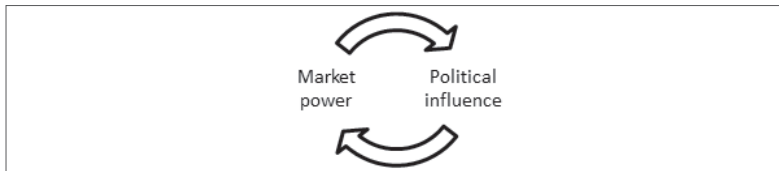
⁵ Nordhaus 2007, 2009

⁶ Cardell et al. 1997, Atkins et al. 2009, Holz 2009

⁷ Černoch et al. 2011

enables Russia to exert the highest amount of political influence on the respective countries. Hence, contrary to the geopolitical explanations, we argue that the Russian foreign energy policy towards the region is consistent with profit-seeking behavior. In the core of the Russian business activities, however, lies in the need to maintain the current market setting – and to maintain that, the Russians do not hesitate to use the political power that stems from it. We therefore see the nature of this policy as a vicious circle of market power leading to high margins and political influence that reinforce one another.

Fig 1: Russian gas export strategy



At this point it is necessary to acknowledge that many of the above mentioned long term contract instruments, such as take-or-pay or destination clauses were institutions that facilitated the development of natural gas trade as we know it today. The formative years of the natural gas industry were characterized by profound capital investments into gas field development and pipeline construction operations. These costs represented a significant financial burden as well as risk that had to be carried by the supplier. To spread the amount of risk evenly between the contracting parties, the obligation to offtake a certain amount of gas (take-or-pay clause) and to respect the diverse price levels in the target markets (destination clause) were introduced and agreed on by both parties.

Today, nearly 50 years after the first contracts were signed, the key components of the transmission network are long paid off and the respective clauses may not seem to be institutions that distribute the risks and benefits among the parties evenly. The purchasers' pressure on pricing gas as a standardized commodity rises.

The European Union, which is the key actor in shaping the continental energy market, sees gas-to-gas competition as the pricing system for its common energy market. The EU's notion of the desired continental market is therefore significantly different from the one held by Russia.

Tab. 1: Continental market according to EU and Russia

	EU	Russia
Continental market	Single European market	Set of isolated national markets
Network topology	Grid	Linear
Pricing	Gas-to-gas	Oil-indexed
Price levels	Hub pricing/single price	Set according to negotiation position
Secondary trade (re-export)	Desirable, necessary for sufficient hub liquidity	Prohibited via destination clause
Contract duration	1-5 years or spot	20-30 years, no spot
Contract flexibility	Full	Seasonal (10-15%)

3. BDICs: their role and financing

In the EU's striving for an integrated market, the infrastructure plays a crucial role. The grid-like topology of the transmission system can currently be found only in North-Western Europe and within the largest European markets such as Germany and Italy. The CEE region, on the other hand, is characterized by a unidirectional, linear network typically running in the East-West direction.

As natural gas infrastructure is a very capital-intensive venture, various schemes of financing have emerged to mitigate the related investment risks. Two ideal types of such investments can be identified: security of supply driven public investment and profit driven private investment. Between them exist many different investment instruments that combine public and private inputs.

The security of supply driven model aims at disruption risks. The related investment is usually provided by state, since market actors tend to reflect reliability risks in price or in other features of the contract. Typical examples of such investment can be the physical reverse capabilities installed after the 2009 gas crisis on the Czech Republic - Slovakia and Austria - Slovakia trunk lines.

The profit driven model seeks to capitalize the demand for transport capacities between producing and consuming markets, or between two consuming markets showing sufficiently different price levels. This model consists of two steps: a non-binding open season in which traders interested in using the new infrastructure indicate their capacity needs, and a binding open season, in which the future capacity is allocated under long term contracts. After the non-binding phase, the technical features of the pipeline and related infrastructure such as compressor stations are designed and costs calculated. After signing the shipping contracts, the project initiator, usually one or more

transmission system operators, is able to reach bank loans to finance the construction of the pipeline. During its operation, the transit tariffs collected from the shippers are used to pay off the loans as well as generate fair profit. This has been the case of the Hungary - Slovakia interconnector.

In between those models there is a variety of public support for *commercially nearly viable* projects. States may for example finance the preliminary phases of construction such as feasibility studies or impact assessments, effectively allowing the investors to examine the project without spending substantive capital; or they may directly co-finance the pipeline, if they manage to operate within the framework established by the EC article on state aid.⁸

Currently, one of the important means of financing BDICs and other infrastructure projects arises from the EU's endeavors towards a single energy market. After establishing the TEN-E rankings of infrastructure projects eligible for Community assistance, the Commission moves forward in taking part in financing the missing links in infrastructure directly.⁹ On 21 November 2014, the Commission decided on allocation of €647 million to key energy infrastructure projects under the Connecting Europe Facility (CEF). CEF has a €5.85 billion budget for supporting trans-European energy infrastructure until 2020.¹⁰ However negligible this budget may be faced with the needs of the 248 projects included in the list of Projects of Common Interests (PCIs) that are eligible for CEF support, its true impact is indirect. It marks the projects with the political support of the strongest actor in the structure, shifting a certain amount of risk from the investors on the one hand, and providing them with access to cheaper loans from European as well as private banks on the other. The economics of the projects are consequently more favorable and the whole process moves forward faster and smoother.

4. Scenarios

To assess the future level of interconnection in the region, we employ a model grounded in scenario analysis methodology. Scenario analysis is especially useful when focusing on the future state of a complex phenomena. It presupposes the creation of a variety of images of the future (scenarios), impacts of which are then analyzed. In our case, we use three scenarios:

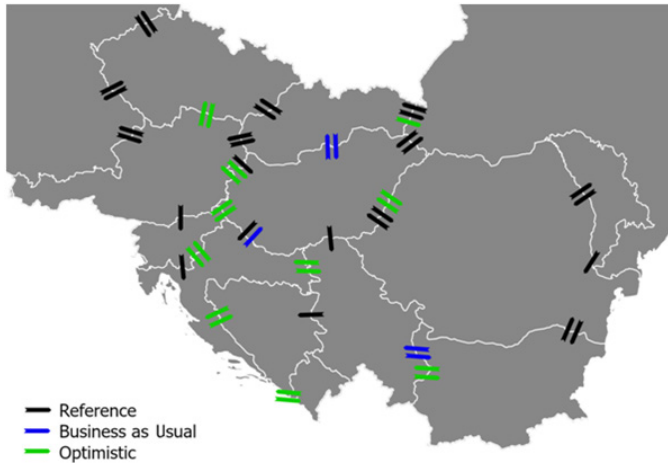
- (1) A Reference scenario describing the current state of interconnection among the national markets in the region. It serves as a starting point for comparison of the alternative images of the future.
- (2) A Business as Usual scenario postulating the situation in which all projects that have passed the final investment decision phase up to November 2014 are included in the picture.
- (3) An Optimistic scenario consisting of all projects that are at least in the planning phase and have been included in the European Commission's "Projects of Common Interests".

⁸ European Commission, n.d., Article 87 of the EC Treaty (ex Article 92).

⁹ Europa.eu, n.d.

¹⁰ European Commission 2013c

Fig. 2: Scenarios overview



Reference

In the Reference scenario, the regional gas market can be best characterized as non-existent. The traditional long term contract instruments prevail and, together with selective and unidirectional interconnection and scattered consumption, provide very little incentive for more competitive trading development.

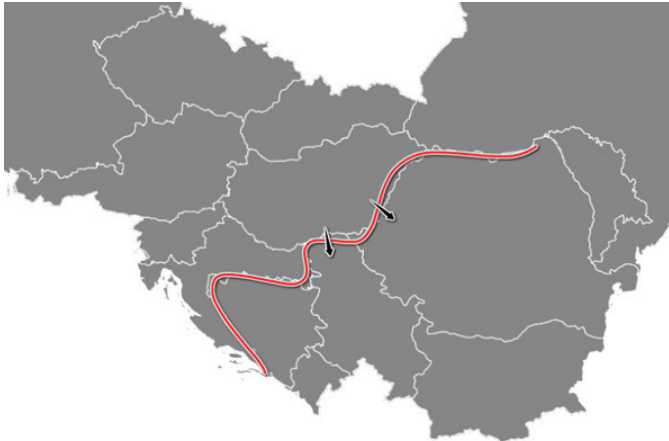
Business as Usual

In the Business as Usual scenario, the regional infrastructure projects that have already passed the final investment decision phase are added into the model. Increased liquidity can be observed in the Hungarian market, which is now accessible from Slovakia and Croatia. Gas coming from these directions originates mostly from West European hubs or the LNG terminal in Croatia, if already operational. Via Hungary, the traders are likely to seek premium markets such as Bulgaria, Serbia, and Ukraine, which, together with Poland, the Czech Republic, and Macedonia, show the highest prices for the bulk of their supplies coming from Russia. Infrastructure constraints continue to prevent deepening the market, although early signs of price convergence may be observed.

Optimistic

In the Optimistic scenario we see a significant increase in regional transmission capacities. Of crucial importance are the interconnections between Croatia and Serbia, and increased bidirectional capacity between Hungary and Romania, as at the moment the only contact between the markets located in the North-West and South-East Balkans is the Hungary - Romania interconnector of capacity 5.2 mcm/d on Hungarian exit and 0.3 mcm/d on Hungarian entry; and the unidirectional Hungary - Serbia interconnector of 13.2 mcm/d.

Fig 3: The Balkan Frontier



5. Interpretations

Despite the opportunities introduced in the period of 2010-2012, when significant disparity between volatile spot prices and inertia-driven contract prices¹¹ arose, passing unexploited in Eastern Europe and especially the Balkans, the way Western European actors capitalized the new status-quo provides additional opportunities even for isolated markets:

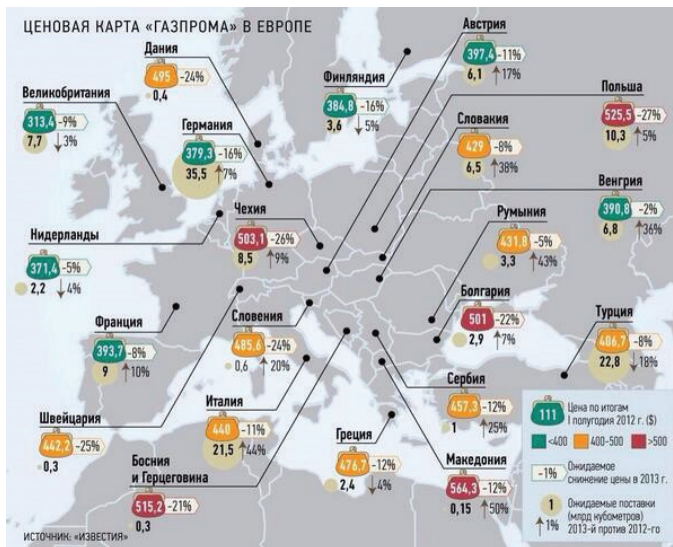
First of all, the decisions passed by the courts of arbitration during this period may be considered as patterns to follow even by less significant actors than RWE. They may not be able to avoid the unpaid take-or-pay liabilities, but increasing contract flexibility or cancelling destination clauses seem to be feasible, yet very significant outcomes.

¹¹ The contract price most often lags six to nine months behind the reference price (gasoil, heavy fuel oil or crude oil). For details, see Konoplyanik 2010.

Secondly, with the gradual development of hub trading in continental Europe (namely Germany and Italy), the geographical area of spot pricing or spot-indexed pricing is spreading towards the East. At the moment, as much as 50% of natural gas sold in Western Europe comes from spot or spot-indexed contracts. Although Eastern Europe remains almost entirely bound by oil-indexed contract, more and more actors are able to reach the West European hubs and take advantage of the lower prices there as much as contract flexibility allows them. As a result, we are now observing a shrinking distance between the sources of liquidity that spread eastward and until recently isolated markets that are reaching Western supplies via new infrastructure.

The abundant transmission capacity depicted in the Optimistic scenario is likely to provide sufficient incentive for more flexible contracts as soon as the existing ones expire, as significant price disparities exist in the region. The first impact of the increased transmission capacity in the region will thus be price divergence. In the region, where for example Macedonia pays 23% higher prices than neighboring Serbia, this is a crucial step.

Fig 4: Gazprom prices in Europe 2013¹²



¹² Source: Izvestija, Business New Europe, 2014.

Consequently, more flexible contracts and sufficient interconnection will create additional opportunities for traders interested in higher margins enjoyed in some Eastern European markets. The second step will therefore be certain price divergence between Western and Eastern Europe. At the same time, developed infrastructure will help overcome the biggest obstacle in bringing gas supplies from the Middle East and Central Asia: scattered markets. Despite the tempting price levels, the consumption levels of particular Balkan states are too low to attract additional suppliers. The combined consumption of Bosnia i Hercegovina, Bulgaria, Croatia, Monte Negro, and Serbia is 24.6 mcm/d (8.5 bcm/y) - just 12.5% of Italian or 5.8% of Chinese consumption. In this case, bigger markets are more interesting for suppliers as transaction costs are reduced and as it is generally more difficult to cut one's own profits by pouring too much commodity into the market and pushing the price down. In terms of absolute volume, the bigger markets also offer bigger sale opportunities, even if entirely locked by long term contracts. For example, if the whole of Italian consumption was to be covered by a standard long term contract with Russia, it could still accommodate the entirety of Azerbaijani exports within its contract flexibility level.¹³

From this point, two conclusions can be derived:

(1) Some of the markets most exposed to the aggressive Russian pricing are the smallest Balkan markets. This means that even small volumes coming from alternative sources such as Azerbaijan can make a big difference. And since one of the most criticised features of the Nabucco pipeline and/or of its successors is its only limited impact in overall EU gas balance, this vital importance for the most exposed markets needs to be acknowledged and stressed.

(2) Despite offering premium margins, the smaller Balkan markets will not attract sufficient attention from the Middle East/Central Asian suppliers without interconnection with bigger regional markets such as Romania, Hungary, or even Italy and Ukraine.

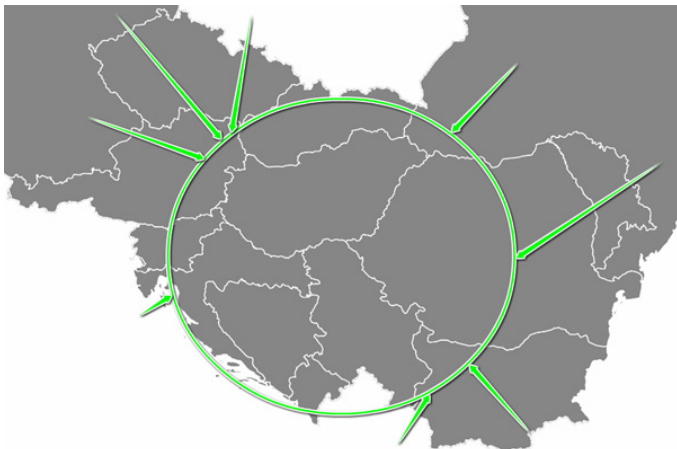
Therefore, sufficient infrastructure, represented by bi-directional interconnectors with guaranteed third party access, can trigger the shift from an inflexible linear market setting to a trading region with price convergence and arbitrage options. The next two figures show the depth of the changes. The green circle represents the new trading region within which the commodity is allowed to follow the price signals freely. The vast domestic production of Croatia, Hungary, and Romania competes not only with Russia, but also with gas coming through Turkey and to a much larger extent hub-traded gas from Germany, Italy, or Austria. Importantly, the already diversified Danube Strategy member states, such as Austria, Germany or the Czech Republic, benefit too. Due to the emergence of a new regional market in the Balkans, the German and Austrian hubs will see an increase of liquidity as more traders will be interested in using them as gates to reach it, while the resulting West-East/South trade flows will help the Czech Republic (and Slovakia) in utilizing their vast infrastructure.

¹³ 85-115% of the annual contract quantity. For more information, see Zajdler 2012, pp 86-87

Fig 5: Current gas flows



Fig 6: Gas flows in the Optimistic scenario



Such a change in market setting, however, would mean different outcomes for different actors. While it is not difficult to identify the 'winners', there are also a few 'losers' whose interests would be significantly challenged by the process.

Winners include:

States	
+	All Danube Strategy: dependence on Russia will be lower and shared among all market players.
+	Austria and Germany: Increased liquidity due to intensified trade movements in the West-East direction.
+	Central Europe: Access to a diversified source portfolio at the Austrian and German hubs; higher utilization of the vast transit capacity.
+	The Balkans: Supply security would grow significantly as gas could be imported from more sources via more routes.
Traders	
+	New export markets will open
+	New sources of gas will become available (namely those around Turkish borders)
Consumers	
+	Lower prices due to increased competition (not applicable for heavily regulated retail markets)

Losers include:

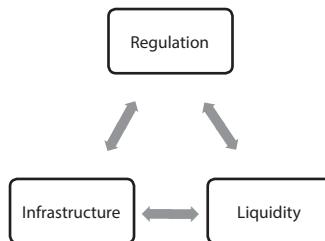
Gazprom	
-	New suppliers and secondary trading endanger Gazprom's dominance over individual markets, causing a deterioration of Gazprom's export strategy (see Chapter 2 for details)
Russia	
-	With Gazprom's position weakened/normalized, the political leverage against the target markets will decrease significantly.
-	Any political manipulation with supply or pricing will inevitably backfire, as it would affect all markets connected to the targeted market, calling Gazprom's reliability into question.
National monopolies and interest groups	
-	Actors involved in marketing Russian natural gas are likely to lose their above-standard revenues stemming from the monopolistic market setup.

As a result of increased interconnection between its member states, the Danube Strategy initiative will enjoy increased energy security in both its dimensions: increased security of supply due to more accessible sources and new routes; and pressures to decrease prices due to price convergence and new sources of supply introduced by profit-seeking traders.

Acknowledging that, one fundamental question arises: **If this market change is to bring such huge benefits, how is it possible it has not happened yet or is not happening faster?**

The answer seems as follows: together with supportive regulation and sufficient interest among suppliers (sources of liquidity), infrastructure forms a triad of conditions necessary for a competitive market to develop. At the same time, none of these conditions is sufficient. In other words, competitive markets do not emerge automatically when transmission capacity broadens and increases, when external suppliers wish to enter the market, or just because of the regulator intends it to emerge. All three conditions need to be met simultaneously and stay in line for a sufficient period of time. Also, in countries where there is a partially or fully publicly owned incumbent, it is very difficult to pursue policies going against the interest of such powerful entity.¹⁴ Public ownership of the key energy companies is also one of the preferred arrangements in countries with heavily subsidized retail markets. In such cases, the transaction costs related to administering the subsidies are lower. However, the downside of this model is the emergence of a subsidy rent that is transferred from the state budget to the hands of the incumbent, which consequently gains a stronger position over the domestic energy sector. In such a context, building a competitive market would directly jeopardize the very existence the government’s closest partner in securing the voters’ access to affordable energy.¹⁵

The components of a competitive market



Moreover, all three conditions influence one another. Without sufficient infrastructure, no liquidity can be achieved, and vice versa - without sufficient interest from suppliers, no company would invest in new pipelines. This chicken and egg problem can often only be overcome by strong commitment coming from the governments. One noteworthy case of political commitment failure is the Nabucco pipeline: despite the existence of markets capable of absorbing the considered quantities and although export capacities to fill the pipeline up were being developed or already existed too, the entity behind the project - the EU - failed to present a firm commitment to the project and break the chicken or egg circle.

¹⁴ See for example Černoch et al. 2012 for analysis of relations between the Polish Government and state-owned PGNiG.

¹⁵ For a brief illustration of the concepts see Liberalization of electricity market in Bulgaria...

6. Recommendations

The governments of the Danube Strategy member states can therefore be advised to pursue policies that will reflect the above outlined triad of conditions:

REGULATION AND PUBLIC POLICY

- **Follow and adopt the European Commission's policies on market liberalization and integration.** These policies are aimed at establishing a regulatory framework suitable for the development of a competitive market reaching beyond the national borders.
- **Do not link natural gas contracts with other (energy-related) arrangements with Russia.** However tempting short term benefits such as a gas price rebate may seem, the Belarusian and Ukrainian cases speak for themselves. By tying multiple issues into one package, those governments offered the Russians the opportunity to use the most sensitive one at the time of negotiations as the main leverage, and hence gain a stronger negotiation position than they would have had should these issues have remained separated. Despite the clear message that in the long run, such packages are always beneficial for Russia at the expense of its counterpart, some CEE governments keep engaging in similar agreements.
- **Cut the influence of energy incumbents and interest groups on public policies.** A regulatory framework co-authored by national incumbents will stimulate neither foreign traders to enter the market nor infrastructure development. If state ownership of a large energy company is considered necessary, its top managers should not be appointed as ministers and the ministers should not be allowed to serve as energy companies' top officials for a certain period of time.
- **Support non-EU partners in adopting the European legislation.** Countries like Macedonia or Albania may play an important role in bringing additional supplies through Turkish transit to Montenegro, Croatia, and Bosnia and Herzegovina. A compatible regulatory framework along the pipeline would ease securing the investments needed for its construction (the infrastructure - regulation nexus).

INFRASTRUCTURE

- **Consider direct or indirect forms of support to projects that enhance diversity of supply.** Joint public and private financing of a pipeline may provide extra capacity above the needs resulting from open season, increasing interconnectivity between national markets, preventing congestions if supply patterns change, and allowing the traders to reach more distant markets.

- **Insist on South Stream's compliance with the EU regulatory framework.** Should the pipeline be exempted from the third party access, it would cement Gazprom's position in the Balkans, prevent alternative supplies, and impose even higher prices on the customers: the total costs of the South Stream pipeline are now estimated at between 40 and 65 billion USD.¹⁶ The vast majority of this investment will be allocated to its feeding lines within Russian territory and its offshore section, i.e. the sections to be owned, operated, and regulated by Gazprom. Since Gazprom will also be the sole supplier using the pipeline, it seems extremely unlikely that Gazprom the "shipper" will impose high transit fees on Gazprom the "supplier". Hence, instead of being covered by the transit tariff, the capital costs of the pipeline will be included in the price of natural gas, which will be paid by the customers residing in countries with undiversified markets and in the Ukraine, which would lose the transit leverage.¹⁷ This is valid regardless of where the pipeline ends up entering the EU borders.¹⁸
- **Support offshoots from the emerging Turkey-Greece-Albania-Italy trunk line.** During the 2020s it is likely to become the preferential export route for Azerbaijani, Iraqi, Iranian, Cypriot, and Israeli production, should some of it be exported.

LIQUIDITY

- **Support the Turkey-Greece-Albania-Italy corridor although it circumvents the CEE markets.** It takes significantly less political and financial commitment to contract smaller quantities and fill up the corridor's offshoots than to back up mid/large scale project such as Nabucco West.
- **Initiate intergovernmental negotiations with Middle Eastern, Central Asian, and Mediterranean suppliers.** The geographical proximity and the premium margins offered by some CEE markets is an opportunity to be capitalized on as soon as viable.
- **The LNG terminal in Croatia may be an additional source of liquidity in the region.** At current price levels the LNG spot deliveries are competitive to the contract prices.
- **Initiate the dissolution of national incumbents.** The more actors responsible for securing supplies, the more likely competitive trading is to emerge. At the same time, the more scattered the market is, the less influence is exerted on the government to distort the market in favor of a particular actor.

¹⁶ See: Austria seals South Stream deal..., Full cost of the South Stream project...

¹⁷ For details on South Stream economic viability see Chyong, 2011.

¹⁸ See: Putin drops South Stream...

7. BDICs Appendix

Austria - Slovenia18

Austria - Slovakia.....20

Czech Republic - Germany22

Czech Republic - Slovakia29

Austria - Czech Republic.....32

Austria - Germany.....34

Slovakia - Ukraine.....40

Croatia - Slovenia44

Austria - Hungary47

Croatia - Hungary52

Hungary - Romania56

Hungary - Serbia61

Hungary - Slovakia64

Hungary - Slovenia.....68

Hungary - Ukraine70

Moldova - Romania74

Bulgaria - Romania.....78

Bosnia and Herzegovina - Croatia.....82

Croatia - Montenegro85

Croatia - Serbia87

Romania - Ukraine89

Bosnia and Herzegovina - Serbia.....92

Bulgaria - Serbia93

Montenegro - Serbia95

Austria - Slovenia



Source: ENTSOG 2014c.¹⁹

I. Upgrade of the existing IC between Austria and Slovenia

1. Introduction

The project is an upgrade of the transition system, which first started to operate in 1978, aimed at improving the capacity by 1.3 bcm/y, with the construction of two new pipelines running from the Austrian border to Croatia. The upgrade of Ceršak-Kidricevo started in July 2009, and finished in July 2012. The project improved the safety and reliability of the transmission network and contributed to the development of a common European gas market.²⁰

2. Initiators/shareholders

The project was initiated by Slovenian TSO Plinovodi d.o.o.

3. Length and geographical information

The total length of upgraded pipeline is 35.5 km.

¹⁹ All maps in this appendix are derived from ENTSOG Transmission Capacity Map 2014.

²⁰ Slovenia IC 2013: 1-3.

4. Capacity

Available capacity in the direction Austria-Slovenia is 3.85 bcm/y (10.55 mcm/d), with only virtual reverse in the Slovenia-Austria direction.

5. Financing

The project was mostly funded by Plinovodi d.o.o., with additional funding from the European Energy program for Recovery (EEPR)²¹

6. Schedule

Construction commencement	July 2009
Full operation	June 2012

Source: Slovenia IC 2013: 2.

7. Transit tariff

According to information provided by PRISMA, Murfeld has a regulated exit tariff of 4.16 €/kWh/h/d in the direction AT-SI and 2.08 €/kWh/h/d in direction SI-AT

8. Utilization

Utilization of the IC in the direction from Austria to Slovenia is shown in the following table:

	2009	2010	2011	2012**	2013	2014*
Capacity in bcm/y	2.55	2.55	2.55	3.85	3.85	3.85
Real gas flow in bcm/y	1.00	1.78	1.56	1.82	1.84	1.17
Capacity in mcm/d	6.99	6.99	6.99	10.55	10.55	10.55
Real gas flow in mcm/d	2.74	4.88	4.35	5.07	5.05	3.21
Used capacity in %	39.22	69.8	63.44	47.27	47.79	30.39

*data available till September 2014

**Upgraded section was finished in June 2012, capacity of 1.3bcm/y was added.

Data source: ENTSOG, IEA

Peak: 0.28 mcm/h

²¹ Upgrade of interconnection was part of bigger infrastructural project with a total cost of 283 million Euro, with support of 40 million from the EEPR. Information about the exact cost of the Čeršak-Kidricevo part is not available, but this part was mainly supported from EEPR funds.

9. Further information

The project was part of a bigger infrastructural upgrade in Slovenian gas infrastructure, improving the capacity of main pipeline going from the eastern border with Croatia towards Ljubljana (the Rogaška-Vodice pipeline), with total length of 104km²²

II. Other projects applicable to the dyad

At present, there is no other project applicable to the dyad.

Austria - Slovakia



I. Existing IC between Austria and Slovakia

1. Introduction

The Slovakia and Austria are currently connected by transit pipelines with a capacity of 60 bcm/y (165 mcm/d) in the direction Slovakia-Austria. A pipeline has been used for transporting gas from Russia to Austria since 1968.²³ Due to capacity of this pipeline, there are no projects for new interconnections between Slovakia and Austria.

2. Project initiators/shareholders

Slovakian TSO Eustream is working with three TSOs on the Austrian side. Those TSOs are BOG, Gas Connect Austria and TAG

²² Slovenia IC 2013: 2.

²³ Eustream history

3. Capacity

Available capacity in the direction Austria- Slovakia is 9.27 bcm/y (25.40 mcm/d).²⁴

Available capacity in the direction Slovakia- Austria is 60.23 bcm/y (165,01 mcm/d).²⁵

4. Transit tariff

According to information provided by PRISMA, Baumgarten has a regulated exit tariff of 0.70 €/kWh/h/d. in the direction SK-AT and 1.15 €/kWh/h/d in the direction AT-SK

5. Utilization

Utilization of the IC in the direction Slovakia Austria is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	60.23	60.23	60.23	60.23	60.23	60.23
Real gas flow in bcm/y	32.81	33.56	38.21	35	41.29	27.49
Capacity in mcm/d	165.01	165.01	165.01	165.01	165.01	165.01
Real gas flow in mcm/d	89.9	91.39	104.69	95.90	113.12	75.3
Used capacity in %	54.48	55.38	63.44	58.12	68.55	45.63

*data available till August 2014

Data source: ENTSOG, IEA

Peak: 6.27 mcm/h

Utilization of the IC in the direction Austria Slovakia:

There were no measured flows of gas in this direction in the measured period.

II. Other projects applicable to the dyad

At present, there is no other project applicable to the dyad.

²⁴ ENTSOG 2014c Connection is physically bi-directional between BOG and Eustream. TAG and Gas Connect Austria offers firm capacity in one direction, while Eustream declare this point physically bi-directional.

²⁵ ENTSOG 2014c Eustream declare all points physically bi-directional. Connection with BOG is bi-directional. Gas Connect Austria offers virtual backhaul capacity. TAG offers capacity only in one direction.

Czech Republic - Germany



I. Project Gazelle

1. Introduction

Gazelle is the project designation of the new pipeline connecting the Czech network with the German OPAL pipeline since January 2013. This new route connects the Czech Republic to Russian gas supplies coming into Europe. Nord Stream pipeline runs along the bed of the Baltic from Russia to Germany, where it connects with OPAL, which then goes towards the Czech border, where it meets with Gazelle. The pipeline goes further in a north-south direction and is connected to existing infrastructure near the cross border connection point at Waidhaus. The new pipeline reinforces the security and reliability of gas supplies.²⁶

2. Initiators/shareholders

Project was initiated by NET4GAS Czech TSO.

3. Length and geographical information

Gazelle is 166km long.

²⁶ Gazelle

4. Capacity

Available capacity in direction the direction from Germany to the Czech Republic is 35.56 bcm/y (97.42 mcm/d), only virtual backhaul capacity offered.²⁷

5. Financing

Gazelle was financed by NET4GAS. The total price of the project was 400 million euro.

6. Schedule

Construction commencement	September 2012
Full operation	January 2013

Source: NET4GAS

7. Third party access

Gazelle is exempt from third-party access requirements.

8. Transit tariff

According to information provided by PRISMA, Brandov has a partly regulated exit price of 3.06 EUR/kWh/h/y

Brandov-REGULIERT exit and entry is 0.80 EUR/kWh/h/y

Brandov-STEGAL has a regulated exit price of 0 EUR/kWh/h/y and entry price of 2.85 EUR/kWh/h/y

9. Utilization

Utilization of the Brandov IC in the direction Germany Czech Republic is shown in the following table:

	2009	2010	2011**	2012	2013	2014*
Capacity in bcm/y	0	0	35.56	35.56	35.56	35.56
Real gas flow in bcm/y	0	0	1.32	11.80	24.11	18.49
Capacity in mcm/d	0	0	97.42	97.42	97.42	97.42
Real gas flow in mcm/d	0	0	3.63	32.33	66.05	50.65
Used capacity in %	0	0	3.71	33.18	67.80	52.00

*data available till September 2014

**IC Brandov was opened in November 2011

Data source: ENTSOG, IEA, NET4GAS

Peak: D-CR 4.30 mcm/h

10. Further information

Gazelle is very important for the Czech Republic. Gazelle provides natural gas that comes from the Russian Nord Stream. This new IC provides the Czech Republic with increased security, so in the case of disagreement between Russia and Ukraine, such a dispute would not endanger the delivery of natural gas into the Central European region. Thanks to this connection, the Czech Republic remains an important country for gas transit into the EU member states.²⁸

II. Other existing ICs

1. Introduction

The Czech Republic and Germany are connected by four ICs. The above mentioned new connection at Brandov is the first one. Two more, Hora svaté Kateřiny and Olbernhau, are very close. The last one, Waidhaus connects the Czech Republic with Bavaria. Waidhaus is also important because it connects Czech gas infrastructure with the Megal international pipeline.

2. Initiators/shareholders

Czech TSO NET4GAS cooperates with a few German TSOs. Those are GRTgaz Deutschland and Open Grid Europe at Waidhaus. ONTRAS operates in Hora svaté Kateřiny and GASCADE in GASCADE.

²⁸ The Gazelle Gas Pipeline has Connected...frid

3. Length and geographical information

Waidhaus is located on the western border of the Czech Republic, connecting the Czech Republic and German Bavaria. Others are situated in the northeast, connecting the Czech Republic with Saxony.

4. Capacity

Waidhaus

Available capacity in the direction Czech Republic Germany is 30.69bcm/y (84.1 mcm/d), only virtual backhaul capacity offered in this direction. But at the same time, the IC is bi-directional.

Available capacity in the direction Germany Czech Republic is 15 bcm/y (41.1 mcm/d).

Hora svaté Kateřiny

Available capacity in the direction Czech Republic Germany is 6.7 bcm/y (18.37 mcm/d); the IC is bi-directional, with a capacity of 2.6bcm/y (7.21 mcm/d) being offered in the direction Germany Czech Republic.

Olbernhau

Available capacities in the direction Germany Czech Republic are 10.85 bcm/y (29.73 mcm/d), TSO currently offers firm capacity only in this direction. Capacities in the opposite direction were available until 2012.

5. Financing

No information available

6. Third party access

Regulated TPA regime under the EU law applies to these ICs. No exemption has been granted.

7. Transit tariff

Waidhaus

According to information provided by PRISMA, Waidhaus has prices for each TSO. The regulated capacity tariff for Open Grid Europe at exit is 0.00955 EUR/kWh/h/d plus Billing fee 0.00006EUR/kWh/h/d. Entry is for 0.00826 EUR/kWh/h/d

The regulated capacity tariff for GRTgaz Deutschland at exit consists of 2.40 EUR/kWh/h/y, with a measurement fee of 0.02688955 EUR/kWh/h/y and billing fee of 0.0033507 EUR/kWh/h/y

Exit for TGRgaz Deutschland consists of a regulated capacity tariff of 2.97 EUR/kWh/h/y, a measurement fee of 0.02688955 EUR/kWh/h/y and billing fee 0.0033507 of EUR/kWh/h/y

Olbernhau

According to information provided by PRISMA, Waidhaus has a regulated capacity tariff for exit priced at 2.81 EUR/kWh/h/y, plus a measurement fee of 0.02949 EUR/kWh/h/y and measuring operations fee 0.0247 EUR/kWh/h/y.

Hora svaté Kateřiny/Deutschneudorf

According to information provided by PRISMA, the Deutschneudorf exit has a regulated capacity tariff of 2.8835 EUR/kWh/h/y, measurement fee of 0.004015 EUR/kWh/h/y and billing fee of 0.025915 EUR/kWh/h/y

According to information provided by PRISMA, the Deutschneudorf entry has a regulated capacity tariff of 2.8835 EUR/kWh/h/y, a measurement fee of 0.004015 EUR/kWh/h/y and billing fee of 0.025915 EUR/kWh/h/y.

Utilization

Waidhaus IC

Utilization of the Waidhaus IC in the direction from the Czech Republic to Germany is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	30.69	30.69	30.69	30.69	30.69	30.69
Real gas flow in bcm/y	20.91	22.94	22.22	22.03	23.31	13.51
Capacity in mcm/d	84.1	84.1	84.1	84.1	84.1	84.1
Real gas flow in mcm/d	57.28	62.84	60.87	60.36	63.86	37.01
Used capacity in %	68.11	74.72	72.38	71.77	75.93	44.01

*data available till September 2014

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Utilization of the Waidhaus IC in direction from Germany to the Czech Republic is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	15	15	15	15	15	15
Real gas flow in bcm/y	0.69	3.34	3.98	3.02	0	0
Capacity in mcm/d	41.1	41.1	41.1	41.1	41.1	41.1
Real gas flow in mcm/d	1.91	9.15	10.91	8.27	0	0
Used capacity in %	4.65	22.26	26.55	20.12	0	0

*data available till September 2014

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Peak: CZ-DE 4.20 mcm/h

DE-CZ 3.90 mcm/h

Hora svaté Kateřiny/Deutschneudorf IC

Utilization of the Hora svaté Kateřiny IC in the direction from the Czech Republic to Germany is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	6.7	6.7	6.7	6.7	6.7	6.7
Real gas flow in bcm/y	4.28	3.41	2.95	1.48	3.13	1.12
Capacity in mcm/d	18.37	18.37	18.37	18.37	18.37	18.37
Real gas flow in mcm/d	11.71	9.35	8.09	4.05	8.58	3.09
Used capacity in %	63.75	50.90	44.04	22.05	46.71	16.82

*data available till September 2014

Data source: ENTSOG, IEA,

Utilization of the Hora svaté Kateřiny IC in the direction from Germany to the Czech Republic is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	2.6	2.6	2.6	2.6	2.6	2.6
Real gas flow in bcm/y	2.15	0.75	1.06	0.87	0.17	1.0
Capacity in mcm/d	7.21	7.21	7.21	7.21	7.21	7.21
Real gas flow in mcm/d	5.89	2.04	2.89	2.39	0.46	2.78
Used capacity in %	81.69	28.29	40.08	33.15	6.38	38.56

*data available till September 2014

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Peak: CZ-DE 1.81 mcm/h

DE-CZ 1.81 mcm/h

Olbernhau IC

Utilization of the Olbernhau IC in the direction from the Czech Republic to Germany is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	10.93	10.93	10.93	0	0	0
Real gas flow in bcm/y	0.91	1.39	1.45	0	0	0
Capacity in mcm/d	29.95	29.95	29.95	0	0	0
Real gas flow in mcm/d	2.48	3.79	3.98	0	0	0
Used capacity in %	8.28	12.65	13.29			

*data available till September 2014

Data source: ENTSOG, IEA, NET4GAS

Utilization of the Olbernhau IC the in direction from Germany to the Czech Republic is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	10.85	10.85	10.85	10.85	10.85	10.85
Real gas flow in bcm/y	6.49	3.53	2.27	5.88	5.26	6.15
Capacity in mcm/d	29.73	29.73	29.73	29.73	29.73	29.73
Real gas flow in mcm/d	17.78	9.68	6.21	16.10	14.41	16.86
Used capacity in %	59.80	23.56	20.89	54.15	48.47	56.71

*data available till September 2014

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Peak: DE-CZ 0.50 mcm/h

9. Further information

Current network capacity allows the movement of huge quantities of gas. Cross border ICs in the direction from Germany to the Czech Republic have a combined capacity of 62 bcm/y; the capacity in the opposite direction is over 37.5 bcm/y during normal conditions, with significant additional capacity available given a change of direction in the Gazelle pipeline.

Czech Republic - Slovakia



I. Existing ICs between the Czech and Slovak Republics

1. Summary

Gas interconnection of the Czech Republic and Slovakia is not a new project. The construction of interconnecting pipelines took place as part of the gas transit system delivering Russian gas to Austria, Germany and further into Europe in the late 1960s²⁹ and early 1970s. The interconnection pipeline appeared as such only after the breakup of Czechoslovakia in 1993.³⁰

2. Initiators/shareholders

Czech TSO NET4GAS and Slovakian Eustream operate the interconnection.

3. Length and geographical information

The interconnection point is located near the town of Lanžhot

4. Capacity

Available capacity in direction the Czech Republic-Slovakia is 29.14 bcm/y (79.84 mcm/d). Available capacity in the direction Slovakia-Czech Republic is 61.27 bcm/y (167.86 mcm/d).³¹ Physical reverse is possible.

²⁹ Eustream history

³⁰ History of...

³¹ ENTSOG 2014c, Capacity NET4GAS

5. Transit tariff

Slovakia and the Czech Republic use an Entry-Exit model for transit tariffs.

The Eustream price for exit at Lanžhot is 161.72 €/MWh/d/year

The Net4gas price for entry is 26.12 €/MWh/d/year³²

6. Utilization

Utilization of the IC in the direction Slovakia Czech Republic is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y **	61.27	61.27	61.27	61.27	61.27	61.27
Real gas flow in bcm/y	25.54	32.17	30.22	11.06	7.09	0.50
Capacity in mcm/d	167.86	167.86	167.86	167.86	167.86	167.86
Real gas flow in mcm/d	69.96	88.14	82.80	30.29	19.41	1.37
Used capacity in %	41.68	52.51	49.32	18.04	11.56	0.82

*data available till September 2014

**Capacity in direction SK-CZ varies by source. ENTSOG 19.8 bcm/y NET4GAS 61.3 bcm/y. The ENTSOG number is in this case probably wrong.

Data source: ENTSOG, IEA, FGSZ

Utilization of the IC in the direction Czech Republic Slovakia is shown in the following table:

	2009	2010	2011***	2012	2013**	2014*
Capacity in bcm/y	10.46	10.46	10.46	10,46	27.27	27.27
Real gas flow in bcm/y	0.56	3.71	2.72	0.26	0.54	5.65
Capacity in mcm/d	28.66	28.66	28.66	28.66	74.71	74.71
Real gas flow in mcm/d	1.54	10.17	7.44	0.59	1.49	15.48
Used capacity in %	5.37	35.48	25.96	2.06	1.99	20.72

*data available till September 2014

**Capacity in direction CZ-SK was added three times during 2013³³

***Capacity data after 2011 comes from NET4GAS database

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Peak: SK-CZ 6.5 mcm/h

Peak: CZ-SK 2.90 mcm/h

7. Further information

The Lanžhot connection point proved to be very important during the last gas crisis, and since that time, capacity in the direction Czech Republic Slovakia has been raised significantly, up to today's 27 bcm/y. To achieve this, the Czech transition system needed to be upgraded. Adaptation of the Lanžhot interchange station was part of the Reverse Flow West-East project; its goal was to raise gas transport capacity from direction of the Czech-German border towards the Czech-Slovak border. This change further diversified gas flows for Slovakia, Austria, Hungary and South Germany.³⁴

II. Other projects applicable to the dyad

At present, there is no other project applicable to the dyad.

³³ Capacity NET4GASn.s. First available data about addition of capacity are from 2011. The first upgrade was from September 2012 from 10.46 bcm/y to 15.13 bcm/y, than January 2013 to 22.89 bcm/y, April 27.27 bcm/y and last in September 2014 to 29.14 bcm/y.

³⁴ Reverse flow west...

Austria - Czech Republic



Austria and the Czech Republic have no IC yet. A minor cross-border connection point is located nearby Laa an der Thaya. Although there has been marginal physical flow of gas from Czech to Austria in recent years, it is not considered to be an IC, has no assigned transit tariff and its capacity cannot be booked, which makes the connection point irrelevant for this analysis and we will not occupy ourselves with it any further. There are three projects for the connection of gas grids between Czech and Austria; all of them have a nature of PCI and fall into the North-South Gas Corridor category. The first one is called BACI³⁵ and the second one is known as Oberkappel.

A bidirectional Austrian – Czech interconnection (BACI) between Baumgarten (AT) – Reinthal (CZ/AT) – Břeclav (CZ), formerly an LBL project, was announced in 2009. The main goal of this planned project is a direct connection of the Czech and Austrian gas transmission networks, which will create additional transportation possibilities and allow deeper and more flexible market integration.³⁶ The entire length of the pipeline comes to 61 km.³⁷ The IC will allow bidirectional gas flow. Its planned capacity varies by source (ENTSO-G, NET4GAS, PCI). It ranges from 6.6 to 20 bcm/y (18 to 55 mcm/d). BACI is a joint project of the Czech and Austrian TSO GCA. Transport is expected to start in 2020.

The ONI project should connect the south branch of the Czech transmission system with Oberkappel, which is the connecting point of the German and Austrian transmission systems. The project was first mentioned in 2011 and its main purposes are the integration of the Central European market

³⁵ Bidirectional Austria Czech Interconnector. Formerly referred to as LBL project.

³⁶ Projects of common...

³⁷ GasConnect 2014.

and increased diversification of sources and routes.³⁸ The pipeline will connect the Czech network with the German-Austrian border interconnector in Oberkappel, with a length of approximately 110km (80km in Czech Republic, Vodnany - Dolní Vltavice and 30 from the border to Oberkappel). The exact path of the pipeline and its border crossing point has not been specified yet.³⁹ The planned start of operation is 2022.

The last project is Mozart, a rival project to ONI. Mozart plans to connect the south branch of the Czech transmission system with the Austrian WAG pipeline. The project is driven by private investors. Czech gas transmission operator Net4gas prefers the ONI project to Mozart. The CEO of Net4gas argued against the project by raising the question of funding and operations, which is normally provided by TSOs. A second point is a problem with the location of Mozart. This IC would connect the WAG pipeline between the Oberkappel and Baumgarten trading points, where the existing pipeline is already quite loaded. The ONI project would overcome these problems.⁴⁰

II. Analysis

The projects are part of the currently missing North/South gas corridor in Central and Eastern Europe, which, once finished, will contribute to the diversification of gas supply, increased transportation opportunities, and will enhance market integration, competition and convergence of prices within the Central Eastern Europe.⁴¹

³⁸ Projects of common...

³⁹ TYNDP 2013: 67.

⁴⁰ Do plynovodů dáme dalších...

⁴¹ GasConnect 2014.

Austria - Germany



I. Existing ICs between Austria and Germany

1. Introduction

Germany and Austria are currently connected with four interconnectors, bi-directional Oberkappel; bi-directional Überackern II; Überackern, employed with virtual reverse in direction D-AT; and Kiefersfelden providing gas only in direction D-AT.

2. Initiators/shareholders

Two lines of Oberkappel are operated by Austrian TSO BOG and the German side, those are Open Grid Europe and GRTGZ Deutschland.

Gas Connect Austria and Bayernets operate Überackern I and II.

Open Grid Europe (D) and TIGAS operate Kiefersfelden.

3. Length and geographical information

The Oberkappel IC is located to the north of German-Austrian border, Überackern is located north of Salzburg. Kiefersfelden is located more to the east, supplying Innsbruck.

4. Capacity

Oberkappel

Available capacity in the direction Austria- Germany is 5.97 bcm/y (16.36 mcm/d)

Available capacity in the direction Germany-Austria is 7.45 bcm/y (20.41 mcm/d), physical reverse is possible.

Uberackern II

Available capacity in the direction Germany-Austria is 4.04 bcm/y (12.05 mcm/d)

Available capacity in the direction Austria- Germany is 8.6 bcm/y (21.56 mcm/d), physical reverse is possible.

Uberackern

Available capacity in the direction Austria- Germany is 2.03 bcm/y (5.56 mcm/d), virtual reverse is possible.

Kiefersfelden

Available capacity in the direction Germany-Austria is 0.07 bcm/y (0.44 mcm/d). Reverse is not possible.

5. Financing

No information available

6. Schedule

No information available

7. Third party access

In accordance with EU rules, third party access is fully granted.

8. Transit tariff

Oberkappel

According to information provided by PRISMA, Oberkappel has prices for each TSO and also for Baumgarten

The regulated capacity tariff for Open Grid Europe entry is 0.01045 EUR/kWh/h/d plus a billing fee of 0.00 EUR/kWh/h/Runtime

The regulated capacity tariff for Open Grid Europe exit is 0.01206 EUR/kWh/h/d plus a billing fee of 0.00006 EUR/kWh/h/d

The regulated capacity tariff for GRTgaz Deutschland entry is 2.40 EUR/kWh/h/y, with a measurement fee of 0.02688955 EUR/kWh/h/y and a billing fee of 0.0033507 EUR/kWh/h/y

The regulated capacity tariff for GRTgaz Deutschland exit is 2.97 EUR/kWh/h/y, with a measurement fee of 0.02688955 EUR/kWh/h/y, and a billing fee 0.0033507 EUR/kWh/h/y

The regulated capacity tariff for GAS CONNECT AUSTRIA entry is 1.39 EUR/kWh/h/y

The regulated capacity tariff for GAS CONNECT AUSTRIA exit is 2.97 EUR/kWh/h/y, with a measurement fee of 0.02688955 EUR/kWh/h/y, and a billing fee of 0.0033507 EUR/kWh/h/y

The regulated capacity tariff for Baumgarten GRTgaz Deutschland entry is 1.39 EUR/kWh/h/y, the regulated capacity tariff for Baumgarten GRTgaz Deutschland exit is 2.97 EUR/kWh/h/y, with a measurement fee of 0.02688955 EUR/kWh/h/y, and a billing fee of 0.0033507 EUR/kWh/h/y

The regulated capacity tariff for Open Grid Europe entry is 1.39 EUR/kWh/h/y. The regulated capacity tariff for Open Grid Europe exit is 0.01206 EUR/kWh/h/d, with a billing fee of 0.00006 EUR/kWh/h/d.

Kiefersfelden

The regulated capacity tariff for Open Grid Europe exit is 0.01206 EUR/kWh/h/d with a billing fee of 0.00006 EUR/kWh/h/d.

9. Utilization

Utilization of the Oberkappel IC in the direction from Austria to Germany is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	5.97	5.97	5.97	5.97	5.97	5.97
Real gas flow in bcm/y	0.15	0.12	0.16	0.21	0.31	0.06
Capacity in mcm/d	16.36	16.36	16.36	16.36	16.36	16.36
Real gas flow in mcm/d	0.40	0.33	0.44	0.59	0.84	0.23
Used capacity in %	2.51	2.01	2.68	3.52	5.19	1.01

*data available till September 2014

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Utilization of the Oberkappel IC the in direction from Germany to Austria is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	7.45	7.45	7.45	7.45	7.45	7.45
Real gas flow in bcm/y	4.57	5.17	6.83	6.64	6.69	7.28
Capacity in mcm/d	20.41	20.41	20.41	20.41	20.41	20.41
Real gas flow in mcm/d	12.52	14.17	18.70	18.20	18.33	19.95
Used capacity in %	61.34	69.40	91.68	89.13	89.80	97.72

*data available till September 2014

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Peak: D-AT 0.68 mcm/h

AT-D 0.51 mcm/h

Utilization of the Uberackern II IC in the direction from Germany to Austria is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	4.4	4.4	4.4	4.4	4.4	4.4
Real gas flow in bcm/y	0.47	0.53	0.70	0.68	0.68	0.62
Capacity in mcm/d	12.05	12.05	12.05	12.05	12.05	12.05
Real gas flow in mcm/d	1.28	1.44	1.91	1.86	1.87	1.69
Used capacity in %	10.62	11.95	15.85	15.44	15.52	14.02

*data available till September 2014

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Peak: AT-D 0.89 mcm/h

D-AT 0.45 mcm/h

Utilization of the Uberackern II IC in the direction from Austria to Germany is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	8.6	8.6	8.6	8.6	8.6	8.6
Real gas flow in bcm/y	2.14	1.75	2.31	3.10	4.43	8.83
Capacity in mcm/d	23.56	23.56	23.56	23.56	23.56	23.56
Real gas flow in mcm/d	5.79	4.78	6.34	8.50	12.14	2.42
Used capacity in %	24.58	20.29	26.91	36.08	51.53	10.27

*data available till September 2014

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Utilization of the Uberackern IC in the direction from Austria to Germany is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	2.03	2.03	2.03	2.03	2.03	2.03
Real gas flow in bcm/y	0.80	0.66	0.88	1.17	1.67	0.26
Capacity in mcm/d	5.56	5.56	5.56	5.56	5.56	5.56
Real gas flow in mcm/d	2.19	1.81	2.40	3.21	4.59	072
Used capacity in %	39.39	32.55	43.17	57.73	82.55	12.95

*data available till September 2014

Data source: ENTSOG, IEA, FGSZ, NET4GAS

Peak: AT-D 0.21 mcm/h

Utilization of the Kiefersfelden IC in the direction from Germany to Austria is shown in the following table:

	2009	2010	2011	2012	2013	2014*
Capacity in bcm/y	0.07	0.07	0.07	0.07	0.07	0.07
Real gas flow in bcm/y	0.16	0.18	0.24	0.23	0.23	0.23
Capacity in mcm/d	0.19	0.19	0.19	0.19	0.19	0.19
Real gas flow in mcm/d	0.44	0.49	0.65	0.63	0.64	0.62
Used capacity in %	231.60	257.90	342.10	331.57	336.84	336.32

*data available till September 2014

Data source: ENTSOG, IEA, GRTGAZ

Peak: D-AT 0.09 mcm/h

10. Further information

Close to Uberackern and Uberackern II interconnection pipelines there are also two crossborder storage points connecting big gas storages in Austria to the German network (Haiming 1/-USG Haidach and Haiming 2/- USG 7fields)⁴² Total volume to be moved between Germany and Austria in one year is 11.5 bcm/y in the direction DE-AT and 16.5 bcm/y from AT-DE.

⁴² 7 field gas storage

II. Other projects

Project Monaco I

Monaco I is a project dedicated to the enhancement of the Southern Bavarian network and the cross border capacity from and to Austria. TSO Bayernets is building Monaco I from Heiming /Burghausen to Finsing (near Munich).

Monaco I will be located near four existing cross border connections, Überackern, Überackern II, and two cross border connecting points connecting German network gas storages in Austria (Haiming 1/-USG Haidach and Haiming 2/- USG 7fields). Existing German infrastructure was not sufficient for firm filling and withdrawal of storages. TSO Bayernets had already reduced crossborder capacity for gas transport to shift this capacity to the cross border storage points. Monaco II, will follow the Monaco I project, extending a new pipeline further from Finsing to Amerdingen.

Schedule for Monaco I project:

Regional planning procedure	2011
Early public participation	2013
Planning permission procedure	2014
Special building constructions	2015
Building phase	2016
Commissioning	2017

Source: Bayernets Monaco I

Project Tauerngasleitung (TGL) pipeline

The TGL pipeline was planned to connect Haiming (AT)/Überackern (DE) – Tarvisio (IT) with a pipeline of a total length of 290km; daily capacity in both directions would be at maximum 31.2 mcm/d and with a total price estimated to be 1.4 billion euro. The transalpine route should run in a north-south direction, with a total estimated length of 290km. Major shareholders were E.ON, Energie AG Upper Austria and Salzburg AG. The project has currently lost its initial investors. The pipeline was attributed considerable importance due to its close proximity to major natural gas storage and LNG terminals. In April 2014, the owner of Tauerngasleitung Ltd. decided to liquidate the company. The owner of the project argued that a “conventional financing model no longer exists in the form of a credit protection through long-term transportation contracts”.

Slovakia - Ukraine



I. IC Velké Kapušany – Uzhgorod

1. Introduction

The Velké Kapušany – Uzhgorod interconnection point is part of the Brotherhood pipeline. Operating since 1967, Brotherhood is the largest customer pipeline in Europe. Almost half of all gas imports from Russia flow to Europe through Velké Kapušany - Uzghorod.

2. Initiators/shareholders

The interconnection is operated by Slovakian TSO Eustream and Ukrainian TSO Ukrtransgas; both companies are owned by their respective states.⁴³

3. Capacity

Capacity in the direction Ukraine-Slovakia is 85.48 bcm/y 234.19 mcm/d. Although the point is physically bidirectional, Slovakian TSO offers capacity only in one direction.⁴⁴

4. Operating

Third party access is not granted. Current rules follow the conditions of a legacy contract between Eustream and Gazprom.

⁴³ The investment is realized entirely from Eustream's own resources. The company didn't apply for subsidy either from Slovak republic, or from the European Union.

⁴⁴ Naftogaz The possibility for bi-directional operation is currently being blocked by Gazprom on the grounds of a legacy contract with Eustream.

5. Transit tariff

Price for entry at Velké Kapušany is 162.62 €/MWh/d/y.

6. Utilization

The utilization of the Ukraine Slovakia IC in the East-West direction is shown in the following table:

	2009*	2010	2011	2012	2013	2014**
Capacity in bcm/y	85.48	85.48	85.48	85.48	85.48	85.48
Real gas flow in bcm/y	31.6*	66.6	68.8	49.9	52.5	24.9**
Capacity in mcm/d	234.19	234.19	234.19	234.19	234.19	234.19
Real gas flow in mcm/d	86.7	183.4	188.2	136.5	144.6	68
Used capacity in %	37.02	78.31	80.36	58.29	61.74	29.03

*missing data since April till September 2009

**data available till August 2014

Data source: ENTSOG, IEA, FGSZ

Peak: 13.46 mcm/h

II. Project Vojany-Uzghorod

1. Introduction

The purpose of the Vojany-Uzghorod interconnection pipeline is to allow commercial reverse flows of gas from the EU to Ukraine via the Slovak Republic. The pipeline goes from the municipality of Vojany, which is located next to Velké Kapušany, to Uzghorod, where it is connected to already existing infrastructure.

2. Initiators/shareholders

The interconnection is operated by Slovakian TSO Eustream and Ukrainian TSO Ukrtransgas, both companies are owned by their respective states.

3. Length and geographical information

Information not available

4. Capacity

The interconnector is expected to have a capacity of 10 bcm/y (27 mcm/d).

5. Financing

The investment is realized entirely from Eustream’s own resources. The company didn’t apply for subsidy either from Slovak republic, or from the European Union.⁴⁵

Schedule

Memorandum signed by TSOs	April 2014
Construction finished/Test operation	August 2014
Full operation	March 2015

Source: Eustream

7. Third party access

In accordance with EU rules, third party access is fully granted.⁴⁶

8. Transit tariff

According to information provided by Eustream, the Budince point has the regulated exit tariff of 225.94 €/MWh/d/y

9. Utilization

The pipeline has been in operation since August 2014 (testing phase), the amount of gas transmitted during this month was 144 mcm 0.14bcm. In September, 765mcm 0.77bcm was transmitted.⁴⁷ The whole capacity of this IC has already been booked. Peak throughput has been 1.13 mcm/h.

10. Further information

A memorandum on the introduction of reverse gas flows from Slovakia to Ukraine was signed by the TSOs Eustream and Ukrtransgas on April 28th 2014 as a reaction to the new price policy

⁴⁵ History Eustream

⁴⁶ Reverse gas flow launched... The Ukrainian national energy company Naftogaz has purchased a major portion of the exit capacity of the Vojany-Uzhorod line from Eustream.

⁴⁷ Eustream, 2014 Vojany-Uzhorod pipeline will transport to Ukraine 10 bcm of natural gas per year (27 mcm/day). The mentioned volume is possible from the beginning of September on an interruptible basis and firmly from March 1.2015

of Gazprom, which almost doubled the gas prices for Ukraine in early April 2014.⁴⁸ On July 3, Ukrtransgas purchased the biggest part of the new gas pipeline's transit capacities until 2019. After the testing phase in August 2014, commercial operation began in early September 2014 with competitive prices and a capacity of up to 27 mcm/d (10 bcm/y).⁴⁹ Ukrainian officials and Ukraine's state gas transit company, Ukrtransgaz, originally pushed for Slovakia to reverse flow through four existing pipelines that connect the two countries. Bratislava was wary of such a move, fearing it would provoke its own dispute with Gazprom.⁵⁰ Other neighboring states with the ability to pump gas to Ukraine are Poland and Hungary, with a capacity of 4 mcm/d (1.46 bcm/y) and 6 mcm/d (2.2 bcm/y) for reverse flow.⁵¹

Gazprom CEO Alexei Miller made a comment on reverse flows coming from Europe to Ukraine. "A reverse flow is a semi-fraudulent mechanism whereby gas runs in circles. But this is Russian gas," and further said "Reverse-flow gas supplies run counter to the contracts with European companies that buy Russian gas, and for that reason restrictions may be imposed on them".⁵²

⁴⁸ SME, 2014

⁴⁹ NatutalgasEurope, 2014

⁵⁰ Slovak Ukraine gas deal

⁵¹ SME, 2014

⁵² Naftogaz of Ukraine reserves...

Croatia - Slovenia



I. Upgrade of IC between Slovenia and Croatia

1. Introduction

Along with the existing gas pipelines in the direction Bosiljevo-Karlovac-Lučko-Zabok-Rogatec (SLO), new pipelines are planned that would significantly increase the capacity of the interconnection of the Croatian and Slovenian gas transmission systems in this direction. Capacity of pipeline constructed back in 1978 and connecting the gas transmission systems of Slovakia, Austria, Slovenia and Croatia,⁵³ thus providing natural gas import into Croatia, is expected to increase from today's 2 bcm/y up to 5.5 bcm/y.⁵⁴

2. Initiators/shareholders

Plinacro (Croatian TSO) and Plinovodi d.o.o initiated the project.

3. Length and geographical information

The length of the planned pipeline is Bosiljevo-Karlovac 38km, Karlovac-Lučko 33km, Lučko-Zabok 43km and the Slovenian part Zabok-Rogatec 34km, for a total of 178km.

⁵³ PlinaCro, History.

⁵⁴ PlinaCro, History.

4. Capacity

The capacity of the new pipeline is expected to be 5.5 bcm/y (15 mcm/d). Considering almost all existing and new supply directions in the surrounding region, this opens significant transit potentials in both directions.⁵⁵

Current capacity is 1.98 bcm/y (5.42 mcm/d), with gas flowing only in the direction SI-CRO, but offering virtual backhaul capacity in the other direction.

5. Financing

Information is not available.

6. Schedule

An Environmental Impact Study on upgrade is in progress on all parts of pipeline. The tendering phase is also under preparation.

7. Third party access

In accordance with EU rules, third party access will be fully granted.

8. Transit tariff

According to information provided by Plina Cro, the Rogatec point has the regulated exit tariff of 0.41 €/kWh/d in the direction CRO-SI,⁵⁶

The upgrade on pipeline is still in the planning phase, future tariffs are unknown.

⁵⁵ PlinaCro, PCI.

⁵⁶ Average for conversion HRK/EUR in last 12 months is 7.63HNK/1EUR

9. Utilization

Current utilization of the IC in the direction from Slovenia to Croatia is shown in the following table; flow in the direction from Slovenia to Croatia is only virtual.

	2009*	2010	2011	2012	2013	2014**
Capacity in bcm/y	1.98	1.98	1.98	1.98	1.98	1.98
Real gas flow in bcm/y	0.56	1.11	1.19	1.31	0.61	0.40
Capacity in mcm/d	5.42	5.42	5.42	5.42	5.42	5.42
Real gas flow in mcm/d	1.53	3.03	3.27	3.59	1.68	1.09
Used capacity in %	28.30	56.06	60.10	66.17	30.81	20.20

*missing data since April till September 2009

**data available till August 2014

Data source: ENTSOG, IEA, FGSZ

Peak flow: 0.20 mcm/h

Further information

The interconnection with Croatia is primarily utilised to flow gas in and out of the Croatian Okoli storage, which is used by Slovenia as well.⁵⁷

II. LNG evacuation pipeline

Future gas Omišaj-Kalce is part of the Croatian LNG Regasification Vessel project located on Krk island. The future pipeline will enable natural gas transmission, primarily from the LNG terminal, to Slovenia and further to central European countries. The length of the Croatian part will be 54 km, M8 Jelšane-Kalce in Slovenia will be 51km. The capacity of Omišajl-Rupa (CRO) will be 15 bcm/y. The technical capacity of the Slovenian part Jelšane-Kalce will be 12.2 bcm/y⁵⁸ and physical reverse on this pipeline should be possible.

The future of this pipeline depends on the development of the Krk LNG regasification vessel, which is still under discussion. In October 2014 Washington supported the idea of the project⁵⁹ and during November 2014 the EU granted 5 million euro for the necessary documentation and feasibility study.⁶⁰ Considering recent development, the chances for the realization of the Krk LNG terminal and pipelines related to this project are increasing.

⁵⁷ 47 KEMA, 2013: 241-246.

⁵⁸ Plinovodi, 2012: 2-7

⁵⁹ Croatia restarts preparations...

⁶⁰ LNG terminal Krk...

Austria - Hungary



I. IC Austria Hungary expansion

1. Introduction

The Austria Hungary IC falls into a group North-South interconnections of the European gas infrastructure. Currently there is only a single cross-border connection of gas infrastructure between the two countries. The Austrian part of the IC (Hungaria-Austria-Gasleitung - HAG, including the IC point) is operated by Austrian TSO Gas Connect Austria (a member of the ÖMV Group), while the Hungarian part is operated by Hungarian TSO FGSZ (a member of the MOL Group).

The expansion of the Austria Hungary IC takes the form of the construction of two new pipelines and an enlargement of related infrastructure (particularly compressor stations) on Hungarian territory. The project is a part of the Cluster Romania – Hungary – Austria transmission corridor within the Gas East Priority Corridor and has the nature of a PCI. The new pipelines ought to deliver gas to new power plants, improve the security of supply in the Western region of Hungary, realize physical reverse flow between Hungary and Austria, establish a new delivery route between the Romanian/Hungarian border⁶¹ and the Hungarian/Austrian border and enable the IC to reach its design capacity of 153 GWh/d (5.2 bcm/y) in both directions.⁶²

2. Project initiators/shareholders

The only project initiator/shareholder is FGSZ.

3. Length and geographical information

The IC is situated nearby Mosonmagyaróvár (North-West of Hungary). Components of the expansion are planned to be the following: 210 km of pipeline between Városföld and Győr and the

⁶¹ EC 2013d: 7.

⁶² ENTSOG 2013: 231.

enlargement of Városföld Compressor station with a power of 5.7 MW (sometimes referred to as the Városföld - Ercsi - Győr pipeline), and 11 km of pipeline between Ercsi and Százhalombatta [in fact, a short branch towards the agglomeration of Budapest, insignificant with regard to the IC, TD] and an increase of the power of the compressor station with 52 MW.⁶³

The PCI list and TYNDP of 2011 also contain 188 km of pipeline between Győr, Mosonmagyaróvár and the Austro-Hungarian border and an increase of the power of the Mosonmagyaróvár compressor station with 5.7 MW.⁶⁴ However, this pipeline is not mentioned in any of recently published ENTSOG papers, so we deem this part of the project frozen and do not below analyse it.

4. Capacity

The IC is currently unidirectional with a gas flow from Austria to Hungary and a virtual backhaul capacity in the reverse direction. Currently available maximum capacity of the IC is 4.4 bcm/y (12.1 mcm/d), while design capacity is 5.2 bcm/y (14.2 mcm/d). The daily capacity of new pipelines is planned to be between 4.55 to 31.2 mcm/d⁶⁵ which makes 1.7 to 11.4 bcm/y. Currently available maximum capacity has been fully utilized over the recent years.⁶⁶ This state indicates a bottleneck existing from Austria to Hungary which has a noticeable impact on the transit capabilities of Hungary.

5. Schedule

Particular sections of the project have different schedules, as shown in the tables below.

Városföld - Ercsi - Győr pipeline:

	1st phase	2nd phase
End of permitting phase	Q4-2021	Q4-2022
FID	Q2-2020	Q2-2020
Construction	Q3-2021	Q3-2022
Commissioning	Q4-2022	Q4-2023

Source: ENTSOG 2014b: 54 - 55.66 - 67

⁶³ EC 2013c: 25; ENTSOG 2014a: 100 - 101; 110 - 113.

⁶⁴ EC 2013c: 25; ENTSOG 2011: 137.

⁶⁵ EC 2013c: 25.

⁶⁶ Compare with section 9. Utilization.

Ercsi - Szazhalombatta pipeline:

End of permitting phase	Q3-2022
FID	Q2-2021
Construction	Q2-2022
Commissioning	Q4-2023

Source: ENTSOG 2014b: 54 - 55.66 - 67

6. Financing

The whole project, including both the Városföld - Ercsi - Győr pipeline and the Ercsi - Szazhalombatta pipeline and extension of compressor stations, will be privately financed.⁶⁷

7. Operating

A regulated TPA regime under EU law is considered for the IC. No exemption has been applied for yet.

8. Transit tariff

The IC has an entry/exit tariff.

Tariffs in national currencies are shown in the following table:

Entry from Austria to Hungary	87 688.16 HUF/MWh/d/y
Exit from Hungary to Austria	29 925.04 HUF/MWh/d/y
Entry from Hungary to Austria	80 EUR/MWh/d/y
Exit from Austria to Hungary	80 EUR/MWh/d/y

Sources: FGSZ, PRISMA

Tariffs converted from national currencies to Euro are shown in the following table:*

Entry from Austria to Hungary	285.39 EUR/MWh/d/y
Exit from Hungary to Austria	97.39 EUR/MWh/d/y
Entry from Hungary to Austria	80 EUR/MWh/d/y
Exit from Austria to Hungary	80 EUR/MWh/d/y

*annual average exchange rate of national currency/EUR

9. Utilization

The utilization of the Austria Hungary IC is shown in the following table:

	2009*	2010	2011	2012	2013	2014**
Capacity in bcm/y	4.4	4.4	4.4	4.4	4.4	4.4
Real gas flow in bcm/y	3.49	4.63	4.41	4.60	3.80	4.03
Capacity in mcm/d	12.1	12.1	12.1	12.1	12.1	12.1
Real gas flow in mcm/d	9.68	12.86	12.26	12.77	10.54	11.19
Capacity in mcm/d	0.5	0.5	0.5	0.5	0.5	0.5
Used capacity in %	79.23	105.25	100.32	104.48	86.27	91.57

*missing data since April till September 2009

**data available till August 2014

Data source: ENTSOG, FGSZ, IEA

Peak: 0.48 mcm/h.

10. Further information

The national energy strategy of Hungary attaches great weight to the analyzed IC. It is the only connection to the increasingly competitive European gas market and still the only source of non-Russian gas supplies. A high degree of unilateral dependence on Russian gas is perceived as a serious supply security risk, implies a substantial price risk to Hungarian consumers and seriously limits the country's ability to benefit from the tough competition emerging on the European natural gas markets.⁶⁸ The Strategy prefers an enlargement of gas infrastructure in order to improve the negotiation position of Hungary concerning gas supplies and to access the gas markets of continental Europe. However, the Strategy does not rely solely on the Austria-Hungary IC expansion

⁶⁸ MND 2012: 127 - 129.

and takes into account other options too - the Hungary Croatia IC and namely the Hungary Slovakia IC. The latter option is considered to be an equal alternative to the expansion of the Austria Hungary IC. Implementation of only one option is deemed sufficient for the current decade.⁶⁹ On the other hand, EnergieStrategie Österreich does not mention either the IC Austria Hungary or its expansion at all.

II. Other projects applicable to the dyad

No information available.

III. Analysis

The Austria Hungary IC plays a crucial role in the connection of the country to Western gas markets and non-Russian sources of natural gas. The current capacity of the IC amounts to 4.4 bcm/y (129 GWh/d). This maximum capacity has been more or less fully utilized in recent years (see point 9). The main features of planned IC expansion are (1) the maximum capacity increase to 5.2 bcm/y (153 GWh/d) and (2) a possibility to reverse the usual AT>HU flow to Austria at the same maximum capacity. Despite the unquestionable importance of the IC, these features currently do not seem truly relevant for any of the involved parties - Hungary, Austria or the EU as a whole. The project has been seriously delayed and postponed several times. TYNDP 2013 - 2022 published in July 2013 states that FID ought to be made in Q2-2013 with construction beginning in Q1-2014. The planned date of completion in this case should have been 2015 - 2018.⁷⁰ The most recent data available show a horizon of 2020 to 2022 (see section 5).

We found no evidence that Austria attributes any significance to the IC's expansion. This is not surprising. Given the Austrian entry points of gas, the country's security of supply would not be much affected by mere IC expansion, nor even by the possibility of reverse flow. Hungary has only one other entry point from Ukraine. Yet the gas from Ukrainian transit pipelines reaches Baumgarten Hub through Slovakia.

The same conclusion does not apply to Hungary. We have already discussed the benefits of the IC expansion for the country earlier (see section 1). Yet we can recognize a reason why the project is not approached appropriately to its benefits by FGSZ. The South Stream pipeline, which could have much of the benefits for Hungary the IC expansion would, represents a tough competitor to the original IC, effectively making the expansion unnecessary. South Stream is also heavily supported by the Hungarian government. This allows the Austria Hungary IC expansion be put aside and to focus on ICs to other neighbouring states.

⁶⁹ Ibidem: 127.

⁷⁰ EC 2013d: 7.

Croatia - Hungary



I. Hungary Croatia IC

1. Introduction

The Hungary Croatia IC, which is a part of the North-South Gas Corridor, was established in 2011. It comprises one pipeline which brings gas from Hungary to Croatia. The IC is a part of the 293 km long Városföld - Slobodnica pipeline. This pipeline was a joint project of Hungarian and Croatian TSOs, FGSZ and Plinacro. The main purpose of the IC is a better connection of Croatia to European gas infrastructure, which was connected only to Slovenia before, and further of BIH and Italy in the future.⁷¹

2. Project initiators/shareholders

Project initiators/shareholders were Hungarian and Croatian TSOs, FGSZ and Plinacro.

3. Length and geographical information

The IC is located between Drávaszerdahely (Southern Hungary) and Donji Miholjac (Northern Croatia). The length of the pipeline accounts for 205 km between Városföld and Drávaszerdahely on the Hungarian territory and 88 km between Drávaszerdahely and Slobodnica on the Croatian territory. The entire length of the pipeline is 293 km.⁷²

⁷¹ Securing Eastern Europe's energy supply with pipelines...

⁷² Gas Pipeline between Városföld-Slobodnica...

4. Capacity

Although the IC allows bidirectional gas flow, it is currently unidirectional with physical flow from Hungary to Croatia and a virtual backhaul capacity in the reverse direction. The capacity of the IC is 6.5 bcm/y (19.2 mcm/d).⁷³ Reverse flow from Croatia to Hungary of 3 to 4 bcm/y (8.2 to 11 mcm/d) might be possible through “commercial pressure management agreement, without investment need.”⁷⁴

5. Schedule

MoU	31 July 2007
Feasibility study	20 September 2007
Agreement on Cooperation	3 July 2008
Construction commencement	Autumn 2009
Operation	12/2010
Full operation	08/2011

Sources: Gas Pipeline between Városföld-Slobodnica: n.s.; Bogoly 2009: 9.

6. Financing

The project was co-financed by FGSZ, Plinacro and the EU within the EEPR. Total costs amounted to 395 mln. EUR.⁷⁵

7. Operating

A regulated TPA regime under EU law applies for this IC. No exemption has been granted.

8. Transit tariff

The IC has an entry/exit tariff.

⁷³ ENTSOG capacity map of June 2014 states annual capacity of 2.6 bcm/y. However, we will work with the capacity of 6.5 bcm/y officially stated by FGSZ. FGSZ also states daily capacity of 19.2 mcm/d. Corresponding value to annual capacity of 6.5 bcm/y equals 17.8 mcm/d, though. We will again work with the capacity officially stated by FGSZ.

⁷⁴ Fehér 2013: 2.

⁷⁵ A Croatian-Hungarian gas interconnector...

Tariffs in national currencies are shown in the following table:

Entry from Hungary to Croatia	3 018 HRK/MWh/d/y
Exit from Croatia to Hungary	5 475 HRK/MWh/d/y
Entry from Croatia to Hungary	87 688.16 HUF/MWh/d/y
Exit from Hungary to Croatia	29 925.04 HUF/MWh/d/y

Sources: FGSZ, Plinacro

Tariffs converted from national currencies to Euro are shown in the following table:*

Entry from Hungary to Croatia	395.36 EUR/MWh/d/y
Exit from Croatia to Hungary	717.23 EUR/MWh/d/y
Entry from Croatia to Hungary	285.39 EUR/MWh/d/y
Exit from Hungary to Croatia	97.39 EUR/MWh/d/y

*annual average exchange rate of national currency/EUR

Utilization

The utilization of the Hungary Croatia IC is shown in the following table:

	2011*	2012	2013	2014**
Capacity in bcm/y	6.5	6.5	6.5	6.5
Real gas flow in bcm/y	0.15	0.14	0.21	0.09
Capacity in mcm/d	19.2	19.2	19.2	19.2
Real gas flow in mcm/d	0.43	0.39	0.59	0.26
Capacity in mcm/h	0.8	0.8	0.8	0.8
Used capacity in %	2.36	2.19	3.28	1.45

*the pipeline has been operational since August 2011

**data available till August 2014

Data source: FGSZ, IEA

Peak: 0.3 mcm/h.

10. Further information

Hungarian Energy Strategy mentions the IC as an important future source of Croatian LNG. The Strategy has counted on import from Croatia since 2013,⁷⁶ which has turned out to be too optimistic. The IC is emphasized in the long term, since gradual expansion of import through Croatia is anticipated in the document. The Energy Strategy of the Republic of Croatia (of 2009) particularly points out this IC as a priority project. Its purpose is seen in securing both gas supplies and electricity generation.⁷⁷ There is also a connection between the IC and a corruption affair of MOL which erupted in mid-2011. Former Croatian Prime Minister Ivo Sanader was accused of taking a bribe of 10 mln. EUR from MOL board chairman Zsolt Hernadi in return for allowing the Hungarian company to have a dominant position in Croatian state-owned oil and gas company INA. Since then, there has been an as yet unresolved dispute over managing INA between MOL and Croatia. In addition to that, the Croatian government made a series of decisions in 2013 and early 2014 that forced a subsidiary of INA to sell a majority of its underground gas reserves deeply below market price which caused huge losses to INA and MOL.⁷⁸

II. Other projects applicable to the dyad

LNGRV

The proposed building of an LNG terminal is closely related to the Hungary Croatia IC. It shall be situated in Omišalj on the island of Krk. The project enjoys general international support and its implementation seems sure, however, it has been delayed and its launch is now planned for 2019.⁷⁹ The LNG terminal will be directly linked to the Városföld - Slobodnica pipeline through a newly constructed Zlobin - Slobodnica pipeline. That will allow the delivery of gas from the Terminal straight to Hungary through the existing IC.

III. Analysis

Like several other ICs in CEE, the Hungary Croatia IC is still waiting for its full employment. Current utilization of the IC is extremely low and only unidirectional. Despite reverse flow being practically feasible straight away, the construction of an LNG terminal is necessary as a source of gas which would be delivered in this direction. This is not supposed to happen over the next five years. The IC to Hungary, along with the proposed LNG terminal and its further pipeline connection to the IC, make up key elements of present and future Croatian gas infrastructure. At present, Croatia is able to import gas through Hungary that is cheaper than that coming from Slovenia. The possibility of imports from Hungary proved to be essential in February 2012 when gas supply to the country

⁷⁶ MND 2012: 128.

⁷⁷ MELE 2009: 63.

⁷⁸ For more details and see Chronology of INA-MOL...; Improving Croatia's energy security

⁷⁹ EU to Back Croatian Gas Project on Krk

was threatened due to an unplanned pause in production of the North Adriatic gas fields.⁸⁰ Croatia is also building a cross-border connection to BIH from Slobodnica. After completion of all these projects the Hungary Croatia IC might become one of the most important ICs in CEE.

Hungary - Romania



I. IC Hungary Romania Reverse

1. Introduction

The Hungary Romania IC falls into a group North-South interconnections of the European gas infrastructure. Currently there is only a single cross-border connection of gas infrastructure between both countries. This pipeline was a joint project of Hungarian and Romanian TSOs, FGSZ and Transgaz. A memorandum of understanding between both operators concerning the construction of the IC was signed in January 2008 with construction accomplished in summer 2010.⁸¹ The pipeline has been suitable for bidirectional transmission since February 2014;⁸² however, the capacity from Romania to Hungary is rather token. The main purpose of the IC is the connection of Romania and indirectly Bulgaria and Moldova to the EU gas infrastructure. Both sides are currently working on the significant expansion of reverse flow capacity. The project, which is a part of PCI, includes the construction of a new pipeline on the Romanian side and a compressor station on the Hungarian side.

2. Project initiators/shareholders

Project initiators/shareholders are Hungarian and Romanian TSOs, FGSZ and Transgaz.

⁸⁰ Improving Croatia's energy security

⁸¹ Gas Pipeline between Arad and Szeged

⁸² Gas Pipeline between Arad and Szeged

3. Length and geographical information

The IC is situated nearby Csanádpalota (South-East of Hungary). It is a part of the 109 km long Arad - Szeged pipeline. The length of the planned pipeline linked to the reverse flow expansion accounts for 6 km.⁸³ This pipeline is a part of a plan of construction of 167 km of pipelines and two compressor stations on the Romanian territory.⁸⁴ This plan is a part of a wider project named Development on the Romanian territory of the National Transmission System along the corridor Bulgaria-Romania-Hungary-Austria.⁸⁵ However, this wider project is not directly linked to the reverse flow expansion of this IC.

4. Capacity

The IC allows bidirectional gas flow. The capacity of the IC is 1.75 bcm/y (4.76 mcm/d) from Hungary to Romania and 0.09 bcm/y (0.24 mcm/d) from Romania to Hungary. The planned expansion of the reverse capacity is equal to current maximum capacity from Hungary to Romania, 1.75 bcm/y. The Arad - Szeged pipeline has been built with annual design capacity of 4.5 bcm/y (12.3 mcm/d).⁸⁶ Reaching its design capacity would require additional investments.

5. Schedule

The reverse flow expansion of the IC is in fact divided into two separate projects with different schedules as shown in the tables below.

New compressor station at Csanádpalota:

End of permitting phase	Q2/2015
FID	Q1/2015
Construction	Q3/2015
Commissioning	Q2/2017

Source: ENTSOG 2014b: 110.

New pipeline and two compressor stations on the Romanian territory:

Commissioning	2016
---------------	------

Source: ENTSOG 2014b: 86.

⁸³ EC 2013c: 25

⁸⁴ ENTSOG 2014b: 87.

⁸⁵ ENTSOG 2014b: 87.

⁸⁶ Arad-Szeged Gas Pipeline, Hungary

According to an agreement between FGSZ and Transgaz, the reverse flow expansion should be implemented by 2016.⁸⁷

6. Financing

The whole project including the new pipeline and all compressor stations will be privately financed by Transgaz and FGSZ.

7. Operating

A regulated TPA regime under EU law applies for this IC. No exemption has been granted.

8. Transit tariff

The IC has an entry/exit tariff.

Tariffs in national currencies are shown in the following table:

Entry from Hungary to Romania	575.08 RON/MWh/d/y
Exit from Romania to Hungary	4 664.7 RON/MWh/d/y
Entry from Romania to Hungary	34 398.8 HUF/MWh/d/y
Exit from Hungary to Romania	34 398.8 HUF/MWh/d/y

Sources: FGSZ, Transgaz

Tariffs converted from national currencies to Euro are shown in the following table:*

Entry from Hungary to Romania	129.26 EUR/MWh/d/y
Exit from Romania to Hungary	1048.69 EUR/MWh/d/y
Entry from Romania to Hungary	111.95 EUR/MWh/d/y
Exit from Hungary to Romania	111.95 EUR/MWh/d/y

*annual average exchange rate of national currency/EUR

⁸⁷ Romania will export gas to Hungary...

9. Utilization

The utilization of the Hungary Romania IC is shown in the following tables:

H -> RO

	2010*	2011	2012	2013	2014**
Capacity in bcm/y	1.75	1.75	1.75	1.75	1.75
Real gas flow in bcm/y	0.12	0.45	0.49	0.12	0.01
Capacity in mcm/d	4.80	4.80	4.80	4.80	4.80
Real gas flow in mcm/d	0.33	1.26	1.36	0.34	0.03
Capacity in mcm/h	0.2	0.2	0.2	0.2	0.2
Used capacity in %	6.81	26.22	28.36	7.06	0.52

*The pipeline has been operational since August 2010

**data available till August 2014

Data source: ENTSOG, IEA

RO -> H

	2010*	2011	2012	2013	2014**
Capacity in bcm/y	0.09	0.09	0.09	0.09	0.09
Real gas flow in bcm/y	0	0	0	0	0
Capacity in mcm/d	0.25	0.25	0.25	0.25	0.25
Real gas flow in mcm/d	0	0	0	0	0
Capacity in mcm/h	0.01	0.01	0.01	0.01	0.01
Used capacity in %	0	0	0	0	0

*The pipeline in this direction has been operational since February 2014

**data available till August 2014

Data source: ENTSOG, IEA

Peaks: 0.2 mcm/h for both directions.

10. Further information

The possibility of reverse flow of the IC does not seem to have vital importance for Hungary. According to the Hungarian Energy Strategy, the IC from Romania is planned to provide gas from the Caspian region or function as an alternative route for Russian gas.⁸⁸ It is mentioned in the context of the projected AGRI pipeline, which is briefly discussed below. Although Romania is in a somewhat different position, the IC to Hungary is not deemed a strategic priority in her *Strategia Energetică*. This document also gives this IC in the context of the AGRI pipeline.⁸⁹

II. Other projects applicable to the dyad

Nabucco West

This giant project of a pipeline running from the Bulgarian/Turkish border via Bulgaria, Romania and Hungary to Austria is now frozen. Its future remains uncertain. Currently there is no reason to presume this pipeline should play any role in the interconnection of Romania and Hungary in the following years.

AGRI LNG

The AGRI (Azerbaijan - Georgia - Romania) project will carry gas from the Caspian region across the Black Sea (in the form of LNG) through Romania to Hungary. The pipeline section is planned to utilize current IC between Romania and Hungary and a part of the Arad - Szeged pipeline. Not many details can be added, since the project is in a reassessment phase⁹⁰ with an unclear future.

III. Analysis

The sharp difference between the apparent importance of the IC and physical flow of gas since its launch shows a quite obvious lack of actual utilization of the cross-border connection. Given that the gas flow is virtually unidirectional, a brief look at Romania and her cross-border connection to Moldova and Bulgaria provides sufficient explanation of the situation. Romania is capable of securing most of her gas needs by domestic production and is struggling for complete independence. The remaining amount is brought from Russia. Although Moldova is eager for diversification of gas supplies to the West, these are made impossible for a number of reasons we discuss in the Romania Moldova IC case study. Bulgaria - similarly to Moldova - imports gas from Russia. Moreover, there is both insufficient interconnection to Romania and Romanian domestic gas infrastructure to allow Bulgaria to be supplied from Hungary. The Romania Hungary IC could gain greater significance after the expansion of reverse capacity due to possible future Romanian shale gas export to the West. However, the current high exit tariff from Romania might prevent the reverse flow from gaining significance.

⁸⁸ MND 2012: 64.

⁸⁹ *Strategia Energetică...*: 71.

⁹⁰ ENTSOG 2014b: 91.

Hungary - Serbia



1. IC Hungary Serbia

1. Introduction

The Hungary Serbia IC comprises one unidirectional pipeline built in the Soviet era, delivering Russian gas through Hungary to Serbia. Up until now, it has been the only entry point of gas to Serbia and indirectly to BiH. These two countries are the final destinations of gas flowing through this IC, since they have no other exit points. At present there is no firm intention to construct another IC or expand the capacity of the current one.

2. Project initiators/shareholders

No information available.

3. Length and geographical information

The IC is located nearby Kiskundorozsma (Szeged agglomeration, in the North-East of Hungary).

4. Capacity

The IC allows unidirectional gas flow from Hungary to Serbia without any possibility of reverse flow. The capacity of the IC is 4.8 bcm/y (13.2 mcm/d).⁹¹

5. Schedule

No information available.

6. Financing

No information available.

7. Operating

As for each member of the EU, a regulated TPA regime under EU law applies for this IC in the case of Hungary. Serbia as an EU membership candidate has applied TPA rules, for the most part complying with the EU rules already. There are several minor cases of non-compliance with the gas acquis concerning South Stream and UGS,⁹² which should not affect the operation of this IC.

8. Transit tariff

The IC has an entry/exit tariff.

Tariffs in national currencies are shown in the following table:

Entry from Hungary to Serbia	5 737.04 RSD/MWh/d/y
Exit from Serbia to Hungary	Non-existent
Entry from Serbia to Hungary	Non-existent
Exit from Hungary to Serbia	76 665.67 HUF/MWh/d/y

Sources: AERS, FGSZ

⁹¹ Fehér 2013: 2.

⁹² Serbia gas

Tariffs converted from national currencies to Euro are shown in the following table:*

Entry from Hungary to Serbia	49.34 EUR/MWh/d/y
Exit from Serbia to Hungary	Non-existent
Entry from Serbia to Hungary	Non-existent
Exit from Hungary to Serbia	249.51 EUR/MWh/d/y

*annual average exchange rate of national currency/EUR

Utilization

The utilization of the Hungary Serbia IC is shown in the following table:

	2009*	2010	2011	2012	2013	2014**
Capacity in bcm/y	4.8	4.8	4.8	4.8	4.8	4.8
Real gas flow in bcm/y	2.63	2.15	2.24	2.05	1.94	1.61
Capacity in mcm/d	13.2	13.2	13.2	13.2	13.2	13.2
Real gas flow in mcm/d	7.29	5.98	6.24	5.69	5.40	4.46
Capacity in mcm/h	0.55	0.55	0.55	0.55	0.55	0.55
Used capacity in %	54.71	44.81	46.77	42.71	40.48	33.44

*missing data since April 2009 till September 2009

**data available till August 2014

Data source: ENTSOG, FGSZ, IEA

Peak: 0.55 mcm/h.

Further information

The only significance of the IC for Hungary consists in revenues from gas transit to Serbia, which are relatively high in comparison with remaining exit points from Hungary. Besides that, the IC plays a marginal role in Hungarian Energy Strategy or in ensuring the energy security of the country. As the only entry point of gas, the IC is of vital importance for Serbia. However, the Energy Sector Development Strategy of the Republic of Serbia by 2015 does not pay attention to the evaluation of gas ICs.

II. Other projects applicable to the dyad

No information available.

III. Analysis

The IC may have a greater potential than it seems to, yet it depends on several circumstances. Despite the significance for Hungary being very low, Serbia should be able to import gas from the European market through this IC in the future.

Hungary - Slovakia



I. Hungary Slovakia IC

1. Introduction

The gas grids of Hungary and Slovakia had not been connected until recently. The IC between both countries was accomplished in 2014. The whole pipeline falls into a group of PCI and the North-South Gas Corridor. The pipeline was constructed by the Slovakian TSO Eustream in Slovakia and MGT, an operator of the Hungarian part of the pipeline,⁹³ in Hungary. The operation of the pipeline is currently being tested. Its full operation is expected on 1 January 2015. The main purpose of the IC is to increase the security of the gas supply in both countries, enabling solidarity with regards to cross-border actions in the case of a gas crisis, while also contributing to future diversification of gas supply sources (via the LNG terminal in Croatia).⁹⁴

⁹³ For more details see About Us

⁹⁴ EC 2013

2. Project initiators/shareholders

Project initiators/shareholders are state-owned company MGT, semi-state Slovakian TSO Eustream, and the EU.

3. Length and geographical information

The IC is situated nearby Balassagyarmat (Northern Hungary). It constitutes a part of the newly built pipeline between Vecsés (H) and Vel'ké Zlievce (SK). The length of the pipeline accounts for 94 km between Vecsés and Balassagyarmat on Hungarian territory and 21 km between Balassagyarmat and Vel'ké Zlievce on Slovakian territory. The entire length of the pipeline is 115 km.⁹⁵

4. Capacity

The IC allows physical bidirectional gas flow. The capacity of the IC is 5 bcm/y (13.7 mcm/d) in both directions.⁹⁶

5. Schedule

FID	Q1/2010
MoU	09/2011
End of permitting phase	Q1/2012
Construction commencement	Q2/2012
Operation	09/2014
Full operation	01/2015

Sources: ENTSOG 2014b: 23; Hungarian-Slovak gas interconnector...: n.s.; Our Activity: n.s.

6. Financing

Total costs of the project amount to 170 mln. EUR.⁹⁷ 62 mln. EUR, of which 30 mln. is non-refundable, was provided by the EU within the EEP.⁹⁸ The rest of the costs were carried by MGT and for the lesser part Eustream. MGT was provided a loan of 75 mln. EUR by the EIB on financing the construction.⁹⁹

⁹⁵ EC 2013

⁹⁶ Fehér 2013: 2.

⁹⁷ MHSR 2014: 52.

⁹⁸ EC 2013

⁹⁹ Preparatory work on the Slovak-Hungarian Interconnector...

7. Operating

A regulated TPA regime under EU law applies for this IC. An exemption from applying the ownership unbundling rules for a period of 25 years has been granted by the EC;¹⁰⁰ however, it does not affect TPA.

8. Transit tariff

The IC has an entry/exit tariff.

Tariffs in national currencies are shown in the following table:

Entry from Hungary to Slovakia	107.22 EUR/MWh/d/y
Exit from Slovakia to Hungary	183.92 EUR/MWh/d/y
Entry from Slovakia to Hungary	87 688.15 HUF/MWh/d/y
Exit from Hungary to Slovakia	29 925.04 HUF/MWh/d/y

Sources: Eustream, MGT

Tariffs converted from national currencies to Euro are shown in the following table:*

Entry from Hungary to Slovakia	107.22 EUR/MWh/d/y
Exit from Slovakia to Hungary	183.92 EUR/MWh/d/y
Entry from Slovakia to Hungary	285.39 EUR/MWh/d/y
Exit from Hungary to Slovakia	111.95 EUR/MWh/d/y

*annual average exchange rate of national currency/EUR

9. Utilization

Given that the pipeline is not fully operational yet, no applicable data exist.

10. Further information

The construction of the IC between Hungary and Slovakia was originally agreed between Eustream and FGSZ in June 2009. Since two consecutive open seasons did not attract sufficient binding interest from shippers, in 2011 FGSZ withdrew from the project. The Hungarian government has subsequently mandated state-owned energy group MVM to take over the project on an interim basis. On 1 January 2012 MGT was established and took over the project.¹⁰¹

¹⁰⁰ For more details see EC 2013b.

¹⁰¹ EC 2013b: 3.

The Energy Strategy of Hungary attaches great weight to cross-border connection to Slovakia. It should ensure access to Western European gas market (especially the German spot market) and the projected LNG terminal in Polish Świnoujście, and possibly to Polish shale gas supplies and even to Norwegian gas in the future.¹⁰² It is obvious that the connection to Slovakia plays a central role in the diversification of gas supplies to Hungary. It is forecast that the Slovakian route will be the most significant source of non-Russian gas supplies.¹⁰³ The Proposal of Energy Policy of Slovakia also stresses the brand new IC to Hungary for its role in the diversification of the country's gas supplies. The IC will enable future import of LNG from Croatia to Slovakia.¹⁰⁴

II. Other projects applicable to the dyad

No information available.

III. Analysis

The Hungary Slovakia IC is one of the most important cross-border connections in the CEE region. It significantly increases the energy security of both Hungary and Slovakia. Its strategic relevance is in sharp contrast with the lack of interest among shippers that forced FGSZ to withdraw from the project and complicated its implementation. Regular supplies can be expected from Slovakia to Hungary. The reverse flow should be utilized more in the case of a gas crisis, since Hungary does not have other functional entry points than that of Austria and the Ukraine, which countries also neighbour Slovakia and have already existing ICs. This will change after the completion of LNG terminals in Croatia and Poland and an IC between Slovakia and Poland. It will allow the import of Polish LNG to Hungary and Croatian LNG to Slovakia. The Hungary Slovakia IC will then become a truly essential point of the North South Gas Corridor.

¹⁰² MND 2012: 26.63.

¹⁰³ MND 2012: 128.

¹⁰⁴ MHSR 2014: 22.55.

Hungary - Slovenia



I. Hungary Slovenia IC

1. Introduction

The gas grids of Hungary and Slovenia are not connected at the moment. The IC, including new pipelines on both Hungarian and Slovenian territory, falls into a group of PCIs. The IC should contribute to integration of the European gas market.

2. Project initiators/shareholders

Project initiators/shareholders are Hungarian and Slovenian TSOs, FGSZ and Plinovodi.

3. Length and geographical information

The planned IC between both countries will be situated between Tornyiszentmiklós (Western Hungary) and Lendava (Eastern Slovenia). The length of the pipeline accounts for 41 km between Nagykanizsa and Tornyiszentmiklós on the Hungarian territory¹⁰⁵ and 72 km between Lendava and Kidričevo on the Slovenian territory.¹⁰⁶ The entire length of the pipeline is 115 km.

4. Capacity

The IC should allow bidirectional gas flow. Its planned capacity varies by source (EC, ENTSOG, FGSZ), and ranges from 0.5 to 1.5 bcm/y (1.4 to 4.1 mcm/d).

¹⁰⁵ ENTSOG 2014b: 118.

¹⁰⁶ ENTSOG 2013: 430.

5. Schedule

MoU	1 July 2009
End of permitting phase	Q3/2016
FID	Q2/2015
Construction	Q3/2016
Commissioning	Q4/2017

Source: ENTSOG 2014b: 118; Hungarian-Slovenian Memorandum: n.s.

6. Financing

The whole project will be privately financed.

7. Operating

A regulated TPA Regime under EU law is considered for the IC. No exemption has been applied for yet.

8. Transit tariff

Given that the IC has not been built yet, no detailed information exists.

9. Utilization

Given that the IC has not been built yet, no applicable data exist.

10. Further information

Hungarian Energy Strategy does not mention the construction or relevance of this IC at all. It only hints at a distant future vision of gas supplies through Slovenia without providing any details. A Proposal of the National Energy Programme of the Republic of Slovenia speaks even more generally, suggesting only broad measures in terms of gas supply without mentioning any particular projects.

II. Other projects applicable to the dyad

No information available.

III. Analysis

Slovenia is the only country neighbouring to Hungary with which it still does not have a gas IC. It will remain so for a couple of years ahead. The immediate construction of the IC seems unnecessary at the moment, because it would hardly find any use. Hungary acquires a sufficient amount of gas from Ukraine and Austria and soon will be able to import gas also from Slovakia (see the Hungary Slovakia IC case study). Slovenia imports its entire gas consumption from Austria and Italy. Neither Hungary nor Slovenia has a significant amount of gas that could be delivered in one direction or the other. This temporary status quo is about to change after the construction of the LNG terminal in Croatia.

Hungary - Ukraine



I. Hungary Ukraine IC

1. Introduction

The Hungary Ukraine IC comprises two unidirectional pipelines. The first one, built in the Soviet era, brings Russian gas through Ukraine to Hungary and further to Serbia. The second one, which is part of an import capacity expansion project by FGSZ, delivers gas from Hungary to Ukraine. The whole project of increasing import capacity included the construction of over 200 km of pipelines on Hungarian territory (namely Beregdaróc - Hajdúszoboszló pipeline) and several compressor stations during 2007 - 2011.¹⁰⁷ At present there is no firm intention to construct another IC or expand the capacity of the current one.

¹⁰⁷ Import Capacity Expansion

2. Project initiators/shareholders

No information available.

3. Length and geographical information

The IC is located between Beregdaróc (North-East of Hungary) and Beregdovo (Western Ukraine).

4. Capacity

The IC allows bidirectional gas flow. The capacity of the IC is 21.9 bcm/y (60 mcm/d) from Ukraine to Hungary and 8.8 bcm/y (24.1 mcm/d) from Hungary to Ukraine.¹⁰⁸

5. Schedule

No information available.

6. Financing

No information available.

7. Operating

As for each member of the EU, a regulated TPA regime under EU law applies for this IC in the case of Hungary. No exemption has been granted. The situation in Ukraine is more complicated. Ukrainian Gas Law grants the right to connection and TPA under regulated conditions to all system users. Despite that fact, some problems, the main of which we will mention further, persist. The Gas Law fails to define possible exemptions and does not contain rules on exemption from TPA. Another area of concern is the rules on capacity allocation. Capacity allocation is currently not performed through market procedures or in a transparent manner. The rules in place also grant discriminatory priority access to suppliers under public service obligations and companies with long-term capacity contracts.¹⁰⁹

8. Transit tariff

The IC has an entry/exit tariff.

¹⁰⁸ Fehér 2013: 2.

¹⁰⁹ Ukraine gas

Tariffs in national currencies are shown in the following table:

Entry from Ukraine to Hungary	87 688.15 HUF/MWh/d/y
Exit from Hungary to Ukraine	29 925.04 HUF/MWh/d/y
Entry from Hungary to Ukraine	Not found ¹¹⁰
Exit from Ukraine to Hungary	Not found

Source: FGSZ

Tariffs converted from national currencies to Euro are shown in the following table:*

Entry from Ukraine to Hungary	285.39 EUR/MWh/d/y
Exit from Hungary to Ukraine	97.39 EUR/MWh/d/y
Entry from Hungary to Ukraine	Not found
Exit from Ukraine to Hungary	Not found

*annual average exchange rate of national currency/EUR

9. Utilization

The utilization of the Hungary Ukraine IC is shown in the following tables:

UA -> H

	2009*	2010	2011	2012	2013	2014**
Capacity in bcm/y	21.9	21.9	21.9	21.9	21.9	21.9
Real gas flow in bcm/y	9.70	6.98	5.80	5.58	6.32	6.01
Capacity in mcm/d	60	60	60	60	60	60
Real gas flow in mcm/d	26.93	19.39	16.11	15.50	17.57	16.68
Capacity in mcm/h	2.5	2.5	2.5	2.5	2.5	2.5
Used capacity in %	44.27	31.87	26.48	25.48	28.88	27.42

*missing data from April till September 2009

**data available till August 2014

Data source: ENTSOG, FGSZ, IEA

¹¹⁰ For more information on recent development of Ukrainian system of tariffs see <http://euromaidanpress.com/2014/10/10/time-for-court-ukraine-raises-gas-transit-prices/>

H -> UA

	2009	2010	2011	2012	2013	2014
Capacity in bcm/y	8.8	8.8	8.8	8.8	8.8	8.8
Real gas flow in bcm/y	0	0	0	0	1.50	0.73
Capacity in mcm/d	24.1	24.1	24.1	24.1	24.1	24.1
Real gas flow in mcm/d	0	0	0	0	4.17	2.03
Capacity in mcm/h	1	1	1	1	1	1
Used capacity in %	0	0	0	0	17.08	8.30

*gas flow to the Ukraine has been operational since April 2013

**data available till August 2014

Data source: ENTSOG, FGSZ, IEA

Peaks:

UA -> H: 2.35 mcm/h.

H -> UA: 0.7 mcm/h.

10. Further information

Russian gas, along with the Ukrainian gas route, is still of vital importance for Hungary. However, the country is actively establishing ICs to neighbouring countries in her struggle for diversification of routes and sources. Development of these ICs is preferred to the development of the IC to Ukraine. The possibility of non-Russian gas supplies has a great significance for a Ukraine persistently threaten by Russian power politics. This year's Energy Strategy of Ukraine emphasizes the need to diversify gas supplies. Gas imports from Europe are among the measures introduced but do not play a central role.

II. Other projects applicable to the dyad

At present there is no other project applicable to the dyad.

III. Analysis

As was mentioned above, the IC has vital importance for Hungary. Although it has sufficient import capacity, there is a huge risk of supply interruptions from Ukraine as we have seen in the past. Thus we presume that its significance will shrink gradually hand in hand with diversification of routes and supplies. We cannot neglect a distinction between the capacity and its physical utilization, which is

already obvious. Ukraine's position is different. The country's interest is to fully utilize the capacity of pipelines in both directions, because of revenues from transit fees which constitute a "...significant element in Ukraine's fiscal regime."¹¹¹ The flow of gas to the Ukraine offers great potential since its cross-border capacity accounts for a significant amount of the country's gas imports. However, the capacity cannot be fully utilized at the moment due to an insufficient entry capacity to Hungary. Thus the real utilization is rather modest, as we can observe in the table above. Moreover, it is only a part of the problem. In September 2014, Hungary halted its entire gas export to Ukraine in order to fill underground gas storage before winter.¹¹² The gas flow should be restored on 1 January.¹¹³ Speculation arose that this step had geopolitical foundations, due to the close relations that Hungary is establishing with Russia.¹¹⁴ Even if it were not the case, we may suppose that Hungary could halt the entire flow of gas to Ukraine whenever she feels the need to ensure her own energy security. This greatly undermines the reliability of the diversified gas route to Ukraine through Hungary.

¹¹¹ IEA 2012: 4.

¹¹² Hungary halts gas exports to Ukraine...

¹¹³ Hungary prepared to renew gas shipments...

¹¹⁴ After meeting with Gazprom...

Moldova - Romania



I. Romania Moldova IC

1. Introduction

The Romania Moldova IC was opened on 27 August 2014.¹¹⁵ It is a single cross-border IC between both countries. The main purpose of the pipeline is to break Russian Gazprom's import monopoly to Moldova by allowing the inflow of gas from Romania and also to move closer to the European energy market.¹¹⁶ The IC is expected to improve Moldova's, and also the eastern part of Romania's, energy security by diversifying gas supply sources, to bring commercial benefits to both Moldova and Romania, and contribute to physical integration of the European gas market.¹¹⁷

2. Project initiators/shareholders

The project initiators were the Romanian and Moldovan governments, and the EU. The project shareholders are Romanian TSO Transgaz and the newly constituted Moldovan TSO Vestmoldtransgaz, which has yet to acquire its license in order to legally operate on the Moldovan market.¹¹⁸

¹¹⁵ Empty pipeline shows difficulty of breaking...

¹¹⁶ Moldova, Romania inaugurate Iasi-Ungheni pipeline

¹¹⁷ Romanian-Moldavian gas pipeline works inaugurated; The Romania-Moldova Gas Pipeline...

¹¹⁸ The Fairytale That Wasn't...

3. Length and geographical information

The IC is located between Iași (North-East of Romania) and Ungheni (Western Moldova). The length of the pipeline accounts for 32 km on Romanian territory and 11 km on Moldovan territory. The entire length of the pipeline is 43 km.¹¹⁹

4. Capacity

The IC allows bidirectional gas flow. The capacity of the IC is 1.5 bcm/y¹²⁰ (4.1 mcm/d) in both directions.

5. Schedule

Government approval	Q2/2012
Public tender announcement	04 - 05/2013
Construction	08/2013 - 01/2014
Launch	08/2014

Sources: Romania Announces Public Tender for Iasi-Ungheni Pipeline: n.s.; Romanian Government Approves Gas Pipeline...: n.s.

6. Financing

The construction was publicly financed by the governments involved and the EU. The Romanian government invested 12 M EUR¹²¹ and further assisted the Moldovan government with 9 M EUR.¹²² The EU provided a 7 M EUR non-refundable grant from the European Neighbourhood Policy Instrument (ENPI) and the Cross-border Cooperation (CBC) Programme Romania-Ukraine-Moldova 2007-2013 and assisted Moldova with an additional 5 M EUR for building the necessary infrastructure to cross the Prut River, which is not included in the total costs of the pipeline.¹²³ Total costs amount to 28 mln. EUR.

7. Operating

As for each member of the EU, a regulated TPA regime under EU law applies for this IC in the case of Romania. No exemption has been granted. The TPA rules of Moldova are unclear.

¹¹⁹ Empty pipeline shows difficulty of breaking...: n.s

¹²⁰ Empty pipeline shows difficulty of breaking...: n.s

¹²¹ Romanian-Moldavian gas pipeline works inaugurated: n.s

¹²² Consortium Completes Iasi-Ungheni Pipeline

¹²³ Romanian-Moldavian gas pipeline works inaugurated: n.s

8. Transit tariff

The IC has an entry/exit tariff.

Tariffs in national currencies are shown in the following table:

Entry from Moldova to Romania	Information unavailable
Exit from Romania to Moldova	162 RON/MWh/d/y
Entry from Romania to Moldova	Information unavailable
Exit from Moldova to Romania	Information unavailable

Source: Transgaz

Tariffs converted from national currencies to Euro are shown in the following table:*

Entry from Moldova to Romania	Information unavailable
Exit from Romania to Moldova	36.42 EUR/MWh/d/y
Entry from Romania to Moldova	Information unavailable
Exit from Moldova to Romania	Information unavailable

*annual average exchange rate of national currency/EUR

9. Utilization

Given that there has not been physical gas flow through the pipeline yet, no applicable data exist.

10. Further information

Given the statements of government officials, the project has been strategically important for both sides and even of vital importance for a Moldova seeking diversification of gas sources. The very short time period between government approval of the project and its launch indicates no serious obstacles to the construction. The same cannot be said about the real functioning of the pipeline. According to the latest information, Moldova's natural-gas provider and owner of the country's gas infrastructure, Moldovagaz, of which Gazprom holds a 50% share, has been purposefully delaying the import of gas from Romania at least for the whole September.¹²⁴ Data provided by the Romanian TSO Transgaz show there had been no physical flow of gas from Romania to Moldova till at least 6 November. Moldovagaz did not respond to requests for comment on the situation.¹²⁵

¹²⁴ Empty pipeline shows difficulty of breaking...

¹²⁵ Empty pipeline shows difficulty of breaking...

II. Other projects applicable to the dyad

No information available.

III. Analysis

Despite the bold statements of the Moldovan Prime Minister Iurie Leancă and EC Commissioner for Energy Günther Oettinger about connecting Moldova to the European gas market, an operational IC between Romania and Moldova still remains a vision. The pipeline that has been built is more an investment in the near future than an immediate release of Moldova from dependence on Russian gas. There are several obstacles that need to be resolved in order to get the IC to fulfill its purpose. The struggle to block the project by Moldovagaz (Gazprom), which has a strong interest in remaining the sole provider of expensive Russian gas,¹²⁶ has already been mentioned. Moreover, there is a lack of infrastructure which would bring the gas from the IC to the capital city of Chişinău, and compressor stations on the Romanian side are also missing.¹²⁷ Additional costs on construction of this infrastructure are evaluated to 200 mln. EUR.¹²⁸ The connection of Moldova to European markets is rather non-existent at the moment. Even if Moldovagaz stopped blocking the flow of gas to Moldova, there is a lack of gas that would fill the pipeline anyway. If we look at physical flow of gas through the Hungary - Romania IC, we can see it has been marginal since its launch, especially over the last two years. The possibility of Romanian gas supply to Moldova is rather questionable too. As Anita Sobják writes, the Romanian market is still highly regulated and an export ban was only lifted in July 2013. Under pressure from industry, the two gas producers, Romgaz and ÖMV Petrom, made commitments to the government that they would not export gas until after 2015.¹²⁹ Despite significant domestic production, Romania remains a net importer of gas. Although Romania has been exploring its shale gas reserves in order to become self-sufficient and even an exporter of gas, the real potential of shale gas remains to be seen. The latest news is of failed expectations.¹³⁰

¹²⁶ Moldova is now paying about \$420/m3 of Russian gas.

¹²⁷ Empty pipeline shows difficulty of breaking...

¹²⁸ Empty pipeline shows difficulty of breaking...

¹²⁹ Sobják 2013: 2.

¹³⁰ Update - Romania Has No Shale Gas Reserves...

Bulgaria - Romania



I. Bulgaria – Romania IC

1. Introduction

As of October 2014, there is only one operational IC between Romania and Bulgaria. The Negru Vodă (Romania) – Kardam (Bulgaria) IC has been supplying Bulgaria with Russian natural gas since 1974. In one part of this IC, reverse flow modification has been implemented recently. Another project called Interconnection Bulgaria – Romania (IBR) is being built currently.

2. Project initiators/shareholders

Project initiators were the Romanian and Bulgarian government. Project shareholders are Romanian TSO, Transgaz and Bulgarian TSO Bulgartransgaz.

3. Length

The length of IBR will be 25 km (7.2 km in RO from Giurgiu, 1.2 crossing under the river Danube and 15.4 km in BG to Ruse).¹³¹

¹³¹ Gas interconnection Bulgaria Romania

4. Capacity

The capacity of the IBR in the direction from BG to RO will be 1.5 bcm/y¹³² (approximately 4.3 mcm/d).

Other cross border interconnection passes through The Negru Vodă station and consists of three pipelines: Negru Vodă I, with the future possibility of bidirectional flow with capacity of 4. 4 bcm/y (app. 12. 1 mcm/d) from Bulgaria to Romania and 5. 7 bcm/y (app. 15.56 mcm/d) from Romania to Bulgaria, and Negru Vodă II and III with a combined capacity of 22. 5 bcm/y (app. 61. 6 mcm/d) in the direction Bulgaria Romania. In the direction Romania Bulgaria only virtual backhaul exist.

5. Schedule

Government approval	06/2009
Public tender announcement	Q3/2009
Construction	10/2009 – Q4/2014
Launch	? (Q 12015)

6. Financing

Total IBR budget is € 23.8 m, of which promoters will pay € 14.9 m and EEPR support will be € 8.9 m (funding rate of 37.4 %).¹³³

7. Operating

No information available.

8. Transit tariff

The tariffs at IBR are as yet unknown. The Romanian TSO has an entry/exit tariff of interconnection with other EU countries, but in November 2014 there was an IC just with Hungary (see dyad Hungary – Romania); The Bulgarian TSO has a price 19.73 BGN/1000m³ (app 10.01 EUR/1000m³; no information about entry/exit tariff).

¹³² The capacity from RO to BG will be around 0.5 bcm/y.

¹³³ Gas interconnection Bulgaria Romania; Gas IBR

9. Utilization

The utilization of the Negru Vodă IC in the direction from Romania to Bulgaria is shown in the following table:

	2009*	2010	2011	2012	2013	2014**
Capacity in bcm/y	28.17	28.17	28.17	28.17	28.17	28.17
Real gas flow in bcm/y	7.21	14.65	17.44	17.01	18.15	13.29
Capacity in mcm/d	77.17	77.17	77.17	77.17	77.17	77.17
Real gas flow in mcm/d	19.73	40.15	47.79	46.84	49.73	36.40
Used capacity in %	25.57	52.03	61.93	60.70	64.44	47.17

*missing data since April till September 2009

**data available till September 2014

Data source: ENTSOG, IEA

Peak flow: RO-BG 3.32 mcm/h

Given that there has not been any physical gas flow through the pipeline in direction Bulgaria Romania, no applicable data exist yet.

Further information

II. Other projects applicable to the dyad

Currently, there is an intention to construct a reverse flow at Isaccea (Romania) to secure the gas supply for consumers in Bulgaria and Romania in case of interruption of the gas supply via Ukraine. The project consists in the construction of a link between the transit pipeline from Ukraine to Bulgaria and the Romanian national transition system. In fact it is an interconnection with Bulgaria (via transit pipeline), but it will be built on the Romanian border with Ukraine. As it will be built on Romanian territory, the only project initiator is S.N.T.G.N. Transgaz S.A (Romanian TSO). The IC will allow bidirectional gas flow. The capacity of the IC will be 0.9 bcm/y (app. 2.5 mcm/d). Total cost of the project is € 3.120mln. EEPR support will be 50% (€ 1.560mln.) and the same amount will be paid by the Romanian TSO. In October 2013, project promoters were facing technical and commercial difficulties in implementing the project. No further information has been published yet.¹³⁴

III. Analysis

The construction of IBR is useful for interconnection between those two countries as currently there is only one IC at the Negru Vodă transit pipeline. Construction of IBR will give Romania a better position to export its own gas (through IBR or Isaccea reverse flow) or (in case of emergency) to import some from Bulgaria. Considering the other constructions of ICs (with Greece, Turkey and Serbia), the diversification of natural gas transit routes will be higher than nowadays.

Bosnia and Herzegovina - Croatia



I. Bosnia and Herzegovina - Croatia IC

1. Introduction

The gas grids of Croatia and Bosnia and Herzegovina are not connected at the moment. The IC fall into a group of PCI and will connect grids through pipeline from Slobodnica (Croatia) to Bosanski Brod (Bosnia and Herzegovina). It would enable the possibility to connect with Hungarian transmission system through the pipeline Slavonski Brod to Donji Miholjac.

2. Project initiators/shareholders

The project should be implemented in cooperation by Plinacro d. o. o. (Croatian TSO) and BH-Gas d.o.o. Sarajevo (Bosnian TSO).

3. Length

The whole new pipeline will have a total length of approximately 120-5 km (5 km in Croatia, 115-120 in Bosnia and Herzegovina).¹³⁵

4. Capacity

It is unknown if the IC should allow bidirectional gas flow. Its planned capacity will be 2.9 – 4.3 mcm/d (1-1.5 bcm/y).

5. Schedule

MoU ¹³⁶	May 2013
--------------------	----------

No more information available.

6. Financing

Given that the IC has not been built and there are no contracts yet, no detailed information exists. (Total investment costs for the IC amounts to 94 mil. € - 10 paid by Croatia and 84 by Bosnia).

7. Operating

No information available.

8. Transit tariff

No information available.

9. Utilization

No information available.

10. Further information

¹³⁵ Security of energy supply in Bosnia and Herzegovina: 7-8

¹³⁶ Albania, Bosnia and Herzegovina, Croatia and Montenegro sign [have signed?] MoU supporting TAP and IAP

II. Other projects applicable to the dyad

There is also another project of interconnection. It should connect gas the grids via the route Ploče-Mostar-Sarajevo/Zagvozd-Posušje/Travnik. This project could diversify routes of natural gas import to Bosnia and Herzegovina and should be connected to the planned Ionian Adriatic Pipeline (from Albania to Croatia). An LNG regasification terminal could also be used if this IC is built. There are two possible options for this IC. The first will cost 98 mil €, 16 to be paid by the Croatian side (Plinacro d.o.o. as a TSO) and 82 by the Bosnian (BH-Gas d.o.o. Sarajevo as a TSO). The second option estimates a cost of 95 mil € (6 by Croatia and 89 by Bosnia).¹³⁷

III. Analysis

Currently, Bosnia and Herzegovina is totally dependent on gas imports from Russia. Planned projects will help to diversify routes and secure a different type of supplies (LNG). Bosnia and Herzegovina needs to avoid the risk of supply interruption, which could have (especially in winter) severe consequences. In contrast, Croatia will improve its position as a transit country.

¹³⁷ Energy Community 2013: 93-98

Croatia - Montenegro



I. Croatia – Montenegro (part of IAP) IC

1. Introduction

The gas grids of Croatia and Montenegro are not connected at the moment. The IC including new pipelines on both territories fall into a group of PCI and shall serve also as a part of the IAP (Ionian Adriatic Pipeline) project. The IAP intends to connect the existing gas transmission system of the Republic of Croatia, via Montenegro, and Albania with the Trans Adriatic Pipeline (TAP) system.¹³⁸

2. Project initiators/shareholders

A Project Stakeholder Group (PSG) has been established to provide steering and guidance to the project team. Its members are Interstate Committee, Plinacro d. o. o. (Croatia TSO), European Commission, EIB, WB, EBRD, and (if nominated) TSO in Montenegro and Albania.¹³⁹

¹³⁸ FS and ESIA for the Ionian – Adriatic Pipeline (IAP): 34-40

¹³⁹ Ibidem

3. Length

The new pipeline will be mainly onshore, but also offshore with a total length of 540 km (250 km in Croatia, 110 in Montenegro, and 180 in Albania).

4. Capacity

The IC should allow bidirectional gas flow. Its planned capacity will be 14 mcm/d (4.8 bcm/y).

5. Schedule

MoU ¹⁴⁰	September 25th 2007
Feasibility study	1/2014

6. Financing

Total investment costs for the IAP amount to 618 mil. EUR.¹⁴¹ One financing variant presupposes equity of 30% and 70% financed by financial institutions (50% International Financing Institutions loan, 50% Export Credit Agency covered tranche).¹⁴² Total Capital Expenditure for Montenegro will be 119 mil. EUR and 330 mil. EUR for Croatia.¹⁴³ The rest will be paid by Albania.

7. Operating

No information available.

8. Transit tariff

No information available.

9. Utilization

No information available.

II. Another projects applicable to the dyad

No information available.

¹⁴⁰ Minister declaration on IAP project: 1-2

¹⁴¹ FS and ESIA for the Ionian – Adriatic Pipeline (IAP): 34-40

¹⁴² FS and ESIA for the Ionian – Adriatic Pipeline (IAP): 146

¹⁴³ FS and ESIA for the Ionian – Adriatic Pipeline (IAP): 22-24

III. Analysis

Of the involved countries, only Croatia has a developed natural gas system (the IAP will be connected to it near Ploče). The main purpose is to connect with Albania and Montenegro and the creation of a new transit system in Western Balkans. There is also a possibility of future connection to Bosnia and Herzegovina. The planned date of completion was 2018, but this now looks very unlikely.

Croatia - Serbia



I. Croatia - Serbia IC

1. Introduction

Slobodnica – Sotin - Bačko Novo Selo is the gas pipeline which will connect the Croatian and Serbian gas transmission systems and provide gas transmission in both directions. The gas grids of both countries are not connected at the moment.

2. Project initiators/shareholders

Project will be implemented by Plinacro d. o. o. (Croatia TSO) and J. P. Srbijagas (Serbia TSO).

3. Length

No information available.

4. Capacity

The IC should allow bidirectional gas flow. Its planned capacity will be up to 6 bcm/y (17.3 mcm/d)

5. Schedule

Even though it is a PCI, there is no detailed information about MoU or a possible date of construction.

6. Financing

No information available.

7. Operating

No information available.

8. Transit tariff

No information available.

9. Utilization

No information available.

10. Further information

No information available.

II. Other projects applicable to the dyad

No information available.

III. Analysis

This project could improve positions of both countries. This pipeline would enable the transit from the LNG solution in Croatia to Serbia. It will be a possible new gas source for the markets of Serbia, Romania and Bulgaria from the future LNG solution on the island of Krk. This kind of diversification will insure Serbian security of supplies and consolidate the future position of Croatia as a transit country.

Romania - Ukraine



I. Romania - Ukraine IC

1. Introduction

Currently, there are two ICs between Romania and Ukraine. The first one is located between Orlovka (Ukraine) and Isaccea (Romania), the second one is between Tekovo (Ukraine) and Mediesu Aurit (Romania). Both were built as uni-directional connections (from Ukraine to Romania).

2. Project initiators/shareholders

No information available.

3. Length

No information available.

4. Capacity

Mediesu Aurit

The capacity of the Mediesu Aurit cross border interconnection point is 4.2 bcm/y (app. 11.6 mcm/d). TSO offers firm capacity only in the direction Ukraine Romania. Virtual backhaul is not offered.

Issacea¹⁴⁴

The capacity of the Issacea cross border connection point is 42.9 bcm/y (app. 117.5 mcm/d). TSO offers firm capacity only in the direction Ukraine Romania. Virtual backhaul is not offered.

5. Schedule

No information available.

6. Financing

No information available.

7. Operating

No information available.

8. Transit tariff

The IC has an entry/exit tariff.

Tariffs in national currencies are shown in the following table:

Entry from Ukraine to Romania	886.08 RON/MWh/d/y
Exit from Romania to Ukraine	No exit point
Entry from Romania to Ukraine	Not found ¹⁴⁵
Exit from Ukraine to Romania	Not found

Source: TRANSGAZ S. A.

¹⁴⁴ The Issacea cross border interconnection point consists of 4 pipelines. Capacity data are available for only 2 of them; the first is 14.75bcm/r, the second 28.13bcm/r 77.07 mcm/d 40.41 mcm/dhttp://www.entsog.eu/public/uploads/files/maps/transmissioncapacity/2014/ENTSOG_140612_CAP_JUNE2014.pdf

¹⁴⁵ For more information on recent development of the Ukrainian system of tariffs see <http://euromaidanpress.com/2014/10/10/time-for-court-ukraine-raises-gas-transit-prices/>

Tariffs converted from national currencies to Euro are shown in the following table:*

Entry from Ukraine to Romania	200 EUR/MWh/d/y
Exit from Romania to Ukraine	No exit point
Entry from Romania to Ukraine	Not found
Exit from Ukraine to Romania	Not found

*annual average exchange rate of national currency/EUR

9. Utilization

The utilization of the Romania Ukraine IC is shown in the following tables:

Orlovka (Ukraine) -> Isaccea (Romania)¹⁴⁶

	2009*	2010	2011	2012	2013	2014**
Capacity in bcm/y	42.88	42.88	42.88	42.88	42.88	42.88
Real gas flow in bcm/y	7.86	16.67	19.90	19.28	19.31	13.71
Capacity in mcm/d	117.48	117.48	117.48	117.48	117.48	117.48
Real gas flow in mcm/d	21.54	45.68	54.53	52.83	52.92	37.55
Used capacity in %	18.34	38.88	46.42	44.97	45.05	31.96

*missing data since April till September 2009

**data available till September 2014

Data source: ENTSOG, IEA

¹⁴⁶ Data are measured only as a sum of both pipelines in use.

Tekovo (Ukraine) -> Mediesu Aurit (Romania)

	2009*	2010	2011	2012	2013	2014**
Capacity in bcm/y	4.22	4.22	4.22	4.22	4.22	4.22
Real gas flow in bcm/y	0.08	0.31	0.72	0.26	0.44	0.04
Capacity in mcm/d	11.56	11.56	11.56	11.56	11.56	11.56
Real gas flow in mcm/d	0.22	0.84	1.97	0.72	0.67	0.12
Used capacity in %	1.90	7.27	17.04	6.23	5.80	1.04

*missing data since April till September 2009

**data available till September 2014

Data source: ENTSOG, IEA

Peaks:

Orlovka to Isaccea: 4.00 mcm/h.

Tekovo to Mediesu Aurit: 0.38 mcm/h.

10. Further information

No information available.

II. Other projects applicable to the dyad

No information available.

Bosnia and Herzegovina - Serbia



Currently, the only connection between the two grids exists near Zvornik (Bosnia) and Loznica (Serbia) and its capacity should be increased but there are insufficient data about it.¹⁴⁷ Now it has a capacity of 13.7 bcm/y (app. 39.6 mcm/d) and gas flows only from Serbia (TSO Srbijagas) to Bosnia (TSO BH-gas).¹⁴⁸

There are no other projects planned as PCIs.

¹⁴⁷ Energy Community 2013: 93-98

¹⁴⁸ There are no other data for this IC in IEA flow (<http://www.iea.org/gtf/index.asp>) nor by TSOs of both countries.

Bulgaria - Serbia



I. Bulgaria - Serbia IC

1. Introduction

The gas grids of Bulgaria and Serbia are not connected at the moment. The IC including new pipelines on both territories falls into a group of PCIs. It will connect Sofia (Bulgaria) and Niš (Serbia) through Dimitrovgrad (Serbia).

2. Project initiators/shareholders

The project initiators were the governments of Bulgaria and Serbia, the EBRD, Srbijagas (Serbian TSO) and Bulgartransgaz (Bulgarian TSO).¹⁴⁹

3. Length

The total length will be 150 km (50 km in Bulgaria, 100 in Serbia).

4. Capacity

The IC should allow bidirectional gas flow. Its planned capacity will be 1.8 bcm/y (5.2 mcm/d), with the option to further increase the volumes up to 4.5 bcm/y (13 mcm/d).

¹⁴⁹ Gas infrastructure investments: 2

5. Schedule ¹⁵⁰

MoU	12/2012
Feasibility studies	1/2013
Approval	Q2-3/2013
Start of construction	Q1/2014
Launch	2015 - 2016

6. Financing

The project is expected to cost €48m and 90 % (€43.2m) will be financed by Operational Programme Competitiveness (OPC).¹⁵¹

7. Operating

No information available.

8. Transit tariff

No information available.

9. Utilization

No information available.

10. Further information

No information available.

II. Other projects applicable to the dyad

No information available.

¹⁵⁰ Gas Interconnection Bulgaria Serbia

¹⁵¹ Gas Interconnection Bulgaria Serbia

Montenegro - Serbia



The gas grids of Serbia and Montenegro are not connected at the moment and there is no information about even planning such a connection.

8. References

7fieldgas storage (<http://www.open-grid-europe.com/cps/rde/xchg/open-grid-europe-internet/hs.xsl/1674.htm?rdeLocaleAttr=en&NewsGuid=5490FEFC-56D0-4471-8709-40A66C76B5F1&rdeCOQ=SID-D2BD3C99-25944E5E>) ověřeno k 29. 11. 2014.

A Croatian-Hungarian gas interconnector has been put into operation (<http://www.osw.waw.pl/en/publikacje/analyses/2011-08-10/a-croatian-hungarian-gas-interconnector-has-been-put-operation>); ověřeno k 15. 11. 2014.

About Us (<http://www.gaztranzit.hu/en/balmenu/about-us/Lapok/default.aspx>); ověřeno k 15. 11. 2014.

Adelman M. A. 2004, The Real Oil Problem, MIT, (http://web.mit.edu/ceepr/www/publications/reprints/Reprint_171_WC.pdf)

After meeting with Gazprom, Hungary stops flow of gas to Ukraine (<http://www.euro-petrole.com/after-meeting-with-gazprom-hungary-stops-flow-of-gas-to-ukraine-n-i-10231>); ověřeno k 15. 11. 2014.

Albania, Bosnia and Herzegovina, Croatia and Montenegro sign MoU supporting TAP and IAP, (<http://www.tap-ag.com/news-and-events/2013/05/23/albania-bosnia-and-herzegovina-croatia-and-montenegro-sign-mou-supporting-tap-and-iap>); ověřeno k 23. 11. 2014

Arad-Szeged Gas Pipeline, Hungary (<http://www.hydrocarbons-technology.com/projects/arad-szeged-pipeline>); ověřeno k 15. 11. 2014.

Atkins, K. et al., 2009, Locational market power in network constrained markets, Journal of Economic Behavior & Organization 70 (1-2), (<http://www.sciencedirect.com/science/article/pii/S0167268108002199>), ověřeno k 23. 7. 2014.

Aus für Milliardenprojekt Tauerngasleitung (<http://derstandard.at/1395364181244/Tauerngasleitung-kommt-nicht>) ověřeno k 29. 11. 2014

Austria seals South Stream deal with Gazprom, (<http://www.euractiv.com/sections/energy/austria-seals-south-stream-deal-gazprom-303046>), OVĚŘENO K 22. 11. 2014.

Business New Europe, 2014, Russia cuts Ukrainian gas supplies, (<http://www.bne.eu/content/story/russia-cuts-ukrainian-gas-supplies>), OVĚŘENO K 22. 11. 2014.

Capacity NET4GAS (http://extranet.net4gas.cz/capacity_ee.aspx) ověřeno k 29. 11. 2014.

Cardell, J. B. et al., 1997, Market power and strategic interaction in electricity network, Resource and Energy Economics 19 (1-2), (<http://www.sciencedirect.com/science/article/pii/S0928765597000067>), ověřeno k 23. 7. 2014.

Central European Gas Corridor. Kleefus (<http://www.sfpa.sk/Ceec/2013/4ThomasKleefus.pdf>) ověřeno k 29. 11. 2014

Consortium Completes Iasi-Ungheni Pipeline (<http://www.naturalgaseurope.com/iasi-ungheni-pipeline-construction-complete/>); ověřeno k 15. 11. 2014.

Croatia restarts preparations for LNG terminal at Krk (<http://www.hellenicshippingnews.com/croatia-restarts-preparations-for-lng-terminal-at-krk/>) ověřeno k 29. 11. 2014

Černoch, F. et al., 2011, The Future of Natural Gas Security in the V4 Countries: A Scenario Analysis and the EU Dimension, Brno: International Institute of Political Science.

Černoch, F. et al., 2012, Unconventional Sources of Natural Gas: Development and Possible Consequences for the Central Eastern European Region, Brno: International Institute of Political Science.

De Jong, J. and van der Linde, C., 2008, EU Energy Policy in a Supply-constrained World, Swedish Institute for European Policy Issues, (www.sieps.se/sites/default/files/432-200811epa.pdf), ověřeno k 23. 7. 2014.

Do plynovodů dáme dalších 15 miliard (<http://euro.e15.cz/archiv/do-plynovodu-dame-dalsich-15-miliard-970892>) ověřeno k 29. 11. 2014.

Empty pipeline shows difficulty of breaking Moldova's Gazprom addiction (<http://www.naturalgaseurope.com/empty-pipeline-shows-difficulty-of-breaking-moldova-gazprom/>); ověřeno k 15. 11. 2014.

ENTSOG 2011. *Ten-Year Network Development Plan 2011 - 2020. Annex A: Infrastructure Projects.*

ENTSOG 2013. *Ten-Year Network Development Plan 2013 - 2022. Annex A: Infrastructure Projects.*

ENTSOG 2013. *Ten-Year Network Development Plan 2013 - 2022. Annex A: Infrastructure Projects.*

ENTSOG 2014a. Gas Regional Investment Plan 2014 - 2023. Central Eastern Europe. Annex B: Infrastructure Projects.

ENTSOG 2014a. *Gas Regional Investment Plan 2014 - 2023. Central Eastern Europe. Annex B: Infrastructure Projects.*

ENTSOG 2014b. Gas Regional Investment Plan 2014 - 2023. Southern Corridor. Annex B: Infrastructure Projects.

ENTSOG 2014b. *Gas Regional Investment Plan 2014 - 2023. Southern Corridor. Annex B: Infrastructure Projects.*

ENTSOG 2014c. THE EUROPEAN NATURAK GAS NETWORK 2014 (http://www.entsog.eu/public/uploads/files/maps/transmissioncapacity/2014/ENTSOG_140612_CAP_JUNE2014.pdf) ověřeno k 29. 11. 2014.

ERU 2013. National report of the national regulatory office., http://www.eru.cz/documents/10540/488714/NR_ERU_2013.pdf/363e4602-c886-485f-a731-245502b34ba4) ověřeno k 29. 11. 2014.

EU to Back Croatian Gas Project on Krk (<http://www.balkaninsight.com/en/article/eu-to-back-croatian-gas-project-on-krk>)

European Commission, n.d., Article 87 of the EC Treaty (ex Article 92), (http://ec.europa.eu/competition/legislation/treaties/ec/art87_en.html), OVĚŘENO K 22. 11. 2014.

Europa.eu, n.d., Trans-European energy networks, (http://europa.eu/legislation_summaries/energy/internal_energy_market/l27066_en.htm), OVĚŘENO K 22. 11. 2014.

European Commission 2013. *Gas Interconnection Slovakia - Hungary.*

European Commission 2013. Projects of Common Interest.

European Commission 2013b. *Commission Decision on the exemption of the Slovakian-Hungarian natural gas interconnector from ownership unbundling rules in Article 9 of Directive 2009/73/EC.*

European Commission 2013c. *Projects of Common Interest.*

European Commission 2013d. *List of projects submitted to be considered as potential Projects of Common Interest in energy infrastructure - Gas.*

Fehér, J. 2013. *Developing natural gas infrastructure and internal market in a highly volatile environment: Central-Eastern European perspective.* QED Conferences - European Energy Infrastructure, Brussels, 16 October 2013.

FS and ESIA for the Ionian – Adriatic Pipeline (IAP) (<http://www.energy-community.org/pls/portal/docs/3096031.PDF>); ověřeno k 23. 11. 2014

Full cost of the South Stream project to exceed €50 Billion, (http://www.eegas.com/S-Stream_cost_en.htm), OVĚŘENO K 22. 11. 2014.

Gas IBR (http://ec.europa.eu/energy/eepr/projects/files/gas-interconnections-and-reverse-flow/romania-bulgaria-ro-bg_en.pdf); ověřeno k 23. 11. 2014

Gas infrastructure investments (<http://www.energy-community.org/pls/portal/docs/556180.PDF>); ověřeno k 23. 11. 2014

Gas interconnection Bulgaria Romania (<http://www.mi.government.bg/en/themes/gas-interconnection-bulgaria-romania-ibr-911-347.html>); ověřeno k 23. 11. 2014

Gas Interconnection Bulgaria Serbia (<http://www.mi.government.bg/en/themes/gas-interconnection-bulgaria-serbia-ibs-912-347.html>); ověřeno k 23. 11. 2014

Gas interconnection Romania reverse flow (http://ec.europa.eu/energy/eepr/projects/files/gas-interconnections-and-reverse-flow/reverse-flow-ro_en.pdf); ověřeno k 23. 11. 2014

Gas Pipeline between Arad and Szeged (<https://fgsz.hu/en/content/gas-pipeline-between-arad-and-szeged>); ověřeno k 15. 11. 2014.

Gas Pipeline between Városföld-Slobodnica (<https://fgsz.hu/en/content/gas-pipeline-between-varosfold-slobodnica>); ověřeno k 15. 11. 2014.

GasConnect 2014. Project BACI., http://www.gasconnect.at/en/Unser-Netz/~/link.aspx?id=29A4B6CA1A004F30A8131D4E5EF1FA91&_z=z) ověřeno k 29. 11. 2014.

Gazellea NET4GAS (<http://www.net4gas.cz/en/projekt-gazela/>) ověřeno k 29. 11. 2014.

Gazelleb NET4GAS (<http://www.net4gas.cz/en/faq-gazela/>) ověřeno k 29. 11. 2014.

History Eustream (www.eustream.sk/en_company-eustream/en_history) ověřeno k 29. 11. 2014.

History NET4GAS (<http://www.net4gas.cz/en/history/>) ověřeno k 29. 11. 2014.

History of Gas Transmission Activity in Croatia (<http://www.plinacro.hr/default.aspx?id=470>)
ověřeno k 29. 11. 2014

Holz, F., 2009, Modeling the European Natural Gas Market - Static and Dynamic Perspectives of an Oligopolistic Market, Berlin: Technische Universität Berlin, (http://opus4.kobv.de/opus4-tuberlin/files/2044/holz_franziska.pdf), ověřeno k 23. 7. 2014.

<http://www.energy-community.org/pls/portal/docs/1920180.XLS>; ověřeno k 23. 11. 2014

Hungarian-Slovak gas interconnector project pursued by involved companies (http://www.bbj.hu/business/hungarian-slovak-gas-interconnector-project-pursued-by-involved-companies_60124);
ověřeno k 15. 11. 2014.

Hungarian-Slovenian Memorandum (<http://fgsz.hu/en/hir/hungarian-slovenian-memorandum>);
ověřeno k 15. 11. 2014.

Hungary halts gas exports to Ukraine on domestic market needs: ministry (<http://www.platts.com/latest-news/natural-gas/budapest/hungary-halts-gas-exports-to-ukraine-on-domestic-21293440>);
ověřeno k 15. 11. 2014.

Hungary prepared to renew gas shipments to Ukraine on Jan 1 (<http://en.interfax.com.ua/news/economic/227771.html>); ověřeno k 15. 11. 2014.

Chronology of INA-MOL:10 yrs from strategic partnership to intl. dispute (<http://dalje.com/en-croatia/chronology-of-ina-mol-10-yrs-from-strategic-partnership-to-intl-dispute/485934>); ověřeno k 15. 11. 2014.

Chyong, Ch., 2011, The Economics of the South Stream pipeline in the context of Russo-Ukrainian gas bargaining, (<http://www.usaee.org/usaee2011/best/chyong.pdf>), OVĚŘENO K 22. 11. 2014.

IEA 2012. *Ukraine 2012: Executive summary*. Paris: IEA Publications.

Import Capacity Expansion (<https://fgsz.hu/en/content/import-capacity-expansion>); ověřeno k 15. 11. 2014.

Improving Croatia's energy security (<http://www.molincroatia.com/mols-contribution-to-croatia/improving-croatiass-energy-security>); ověřeno k 15. 11. 2014.

ISSUU, 2012. North West Gas Regional Investment Plan 2013-2022., http://issuu.com/waxjeroen/docs/entsog_mainreport_northwest_grip_de/60) ověřeno k 29. 11. 2014.

KEMA, 2013. Country factsheets (http://ec.europa.eu/energy/gas_electricity/studies/doc/gas/201307-entry-exit-regimes-in-gas-parta-appendix.pdf) ověřeno k 29. 11. 2014.

Konoplyanik, A. A., 2010, Gazprom's price changes in Europe: between oil formula and spot market, (<http://www.konoplyanik.ru/speeches/211p.pdf>), OVĚŘENO K 22. 11. 2014.

Liberalization of electricity market in Bulgaria will not lead to lower prices, experts say, (<http://bnr.bg/en/post/100193596/liberalization-of-electricity-market-in-bulgaria-will-not-lead-to-lower-prices-experts-say>), OVĚŘENO K 22. 11. 2014.

LNG terminal at Krk gets an EU push (<http://www.lngworldnews.com/lng-terminal-at-krk-gets-an-eu-push/>) OVĚŘENO K 22. 11. 2014

Minister declaration on IAP project (<http://www.energy-community.org/pls/portal/docs/40178.PDF>); ověřeno k 23. 11. 2014

Ministerstvo hospodárstva Slovenskej republiky 2014. *Návrh Energetickej politiky Slovenskej republiky*.

Ministry of Economy, Labour and Entrepreneurship 2009. *Energy Strategy of the Republic of Croatia*.

Ministry of National Development 2012. *National Energy Strategy 2030*.

Moldova, Romania inaugurate Iasi-Ungheni pipeline (<http://www.naturalgaseurope.com/moldova-romania-iasi-ungheni-pipeline>); ověřeno k 15. 11. 2014.

Monaco I, bayernets, Monaco I., http://www.bayernets.de/start_netzinformation_en.aspx?int_name=_75624) ověřeno k 29. 11. 2014.

Naftogaz of Ukraine reserves Vojany-Uzhgorod pipeline for reverse-flow supplies (<http://en.itar-tass.com/economy/738930>) ověřeno k 29. 11. 2014.

Naftogaz urges expansion of Slovakia-Ukraine gas transmission interconnector capacity, (<http://www.naftogaz.com/www/3/nakweben.nsf/0/FB15F484CD353311C2257D780053C744>) ověřeno k 29. 11. 2014.

Noël, P., 2007, Beyond Dependence: How to Deal with Russian Gas, European Council on Foreign Relations, (http://www.ecfr.eu/page/-/ECFR-09-BEYOND_DEPENDENCE-HOW_TO_DEAL_WITH_RUSSIAN_GAS.pdf), ověřeno k 23. 7. 2014.

Nordhaus, W. D., 2007, Who's Afraid of a Big Bad Oil Shock?, Brookings Papers on Economic Activity 2, (www.econ.yale.edu/~nordhaus/homepage/10922-Nordhaus.pdf), ověřeno k 23. 7. 2014.

Nordhaus, W. D., 2009, The Economics of an Integrated World Oil Market, Venice: Keynote Address International Energy Workshop, (www.econ.yale.edu/~nordhaus/homepage/documents/iew_052909.pdf), ověřeno k 23. 7. 2014.

Our Activity (<http://www.gaztranzit.hu/en/balmenu/about-us/activity/Lapok/default.aspx>); ověřeno k 15. 11. 2014.

Plinovodi, 2012.M8, Jelšane-Kalce (http://www.plinovodi.si/wp-content/uploads/2014/01/pci_m8_jelsane_kalce.pdf) ověřeno k 29. 11. 2014

Preparatory work on the Slovak-Hungarian Interconnector Gas Pipeline started (<http://www.gaztranzit.hu/en/press-room/news/SitePages/newsDetails.aspx?newsID=6>); ověřeno k 15. 11. 2014.

Projects of common interest (<http://www.net4gas.cz/cs/1709/>) ověřeno k 29. 11. 2014

Projects of Common Interest (PCI), PlinaVro (<http://www.plinacro.hr/default.aspx?id=649>) ověřeno k 29. 11. 2014

Putin drops South Stream gas pipeline to EU, courts Turkey, (<http://www.reuters.com/article/2014/12/01/us-russia-gas-gazprom-pipeline-idUSKCN0JF30A20141201>), OVĚŘENO K 22. 11. 2014.

Reverse flow west east (<http://www.net4gas.cz/cs/zpetny-tok-zapad-vychod/>) ověřeno k 29. 11. 2014

Reverse gas flow launched (http://spectator.sme.sk/articles/view/55161/3/reverse_gas_flow_launched.html) ověřeno k 29. 11. 2014.

Romania Announces Public Tender for Iasi-Ungheni Pipeline (<http://www.naturalgaseurope.com/romania-public-tender-iasi-ungheni-pipeline>); ověřeno k 15. 11. 2014.

Romania will export gas to Hungary before end-of-year (<http://www.naturalgaseurope.com/romania-hungary-pipeline-december>); ověřeno k 15. 11. 2014.

Romanian Government Approves Gas Pipeline between Romania and Moldova (<http://www.naturalgaseurope.com/gas-pipeline-between-romania-and-moldova>); ověřeno k 15. 11. 2014.

Romanian-Moldavian gas pipeline works inaugurated (<http://www.naturalgaseurope.com/inaugurates-romanian-moldavian-gas-pipeline>); ověřeno k 15. 11. 2014.

Securing Eastern Europe's energy supply with pipelines (http://pipelinesinternational.com/news/securing_eastern_europes_energy_supply_with_pipelines/067030/); ověřeno k 15. 11. 2014.

Security of energy supply in Bosnia and Herzegovina (<http://www.osce.org/eea/71268?download=true>); ověřeno k 23. 11. 2014

Serbia gas (http://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/Implementation/Serbia/Gas); ověřeno k 15. 11. 2014.

Serbian gas sector (http://www.unece.org/fileadmin/DAM/ie/se/pdfs/wpgas/countries/serbia_gas.pdf); ověřeno k 23. 11. 2014

Slovak Ukraine gas deal (<http://www.economist.com/blogs/easternapproaches/2014/04/slovak-ukrainian-gas-deal>) ověřeno k 29. 11. 2014

Slovenia interconnection, 2013. Slovenia (http://ec.europa.eu/energy/eepr/projects/files/gas-interconnections-and-reverse-flow/slovenia_en.pdf) ověřeno k 29. 11. 2014.

Sobják, A. 2013. *The Romania-Moldova Gas Pipeline: Does a Connection to the EU Mean a Disconnect from Russia?*. PISM Bulletin, No. 93 (546), 9 September 2013.

Strategia Energetică a României Pentru Perioada 2007 - 2020 Actualizată Pentru Perioada 2011 - 2020.

The Fairytale That Wasn't: The Iași-Ungheni Gas Interconnector (<http://www.naturalgaseurope.com/iasi-ungheni-gas-interconnector>); ověřeno k 15. 11. 2014.

The Gazelle Gas Pipeline has Connected the Czech Republic with Nord Stream., <http://www.naturalgaseurope.com/gazelle-gas-pipeline-czech-republic-nord-stream>) ověřeno k 29. 11. 2014.

The investment is realized entirely from own resources of Eustream (http://www.eustream.sk/en_media/en_news/6) ověřeno k 29. 11. 2014

The Romania-Moldova Gas Pipeline: A Chance for Moldova to Connect to the EU (<http://www.naturalgaseurope.com/romania-moldova-gas-pipeline>); ověřeno k 15. 11. 2014.

TYNPD 2013. TEN YEAR NETWORK DEVELOPMENT PLAN 2013-2022 (<http://www.entsog.eu/publications/tyndp/2013#ENTSOG-TEN-YEAR-NETWORK-DEVELOPMENT-PLAN-2013-2022>) ověřeno k 29. 11. 2014

Ukraine gas (http://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/Implementation/Ukraine/Gas); ověřeno k 15. 11. 2014.

Update - Romania Has No Shale Gas Reserves, Says PM Ponta (<http://www.naturalgaseurope.com/romania-shale-gas-reserves-pm-ponta-chevron>); ověřeno k 15. 11. 2014.

Yergin, D. 2006, Ensuring Energy Security, Foreign Affairs 85 (2), (<http://www.foreignaffairs.com/articles/61510/daniel-yergin/ensuring-energy-security>), ověřeno k 23. 7. 2014.

Zajdler, R., 2012, The future of gas pricing in long-term contracts in Central Eastern Europe. Global market trends versus regional particularities, (http://www.sobieski.org.pl/wp-content/uploads/the-future-of-gas-pricing_e_book.pdf), OVĚŘENO K 22. 11. 2014.

9. List of Abbreviations

AERS	Energy Agency of the Republic of Serbia
AGRI	Azerbaijan - Georgia - Romania Interconnector
App.	Approximately
AT	Austria
bcm/y	billion cubic meters/year
BIH	Bosnia i Hercegovina
CEE	Central Eastern Europe
CR	Czech Republic
DE	Federal Republic of Germany
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EEPR	European Energy Programme for Recovery
ENTSO-G	European Network of Transmission System Operators for Gas
EU	European Union
EUR	euro
FGSZ	Földgázszállító
FID	final investment decision
GCA	Gas Connect Austria
HR	Croatia
HRK	Croatian Kuna
HUF	Hungarian Forint
IAP	Ionian Adriatic Pipeline
IBR	Interconnection Bulgaria Romania

IC	interconnector
IEA	International Energy Agency
IT	Italy
LNG	liquefied natural gas
LNGRV	liquefied natural gas regasification vehicle
mcm/d	million cubic meters/day
mcm/h	million cubic meters/hour
MGT	Magyar Gáz Tranzit
mln.	million
MoU	Memorandum of Understanding
MVM	Magyar Villamos Művek
ONI	Oberkappel-Net4gas interconnector
OPC	Operational Programme Competitiveness
PCI	Projects of Common Interest
PSG	Project Stakeholder Group
RON	Romanian New Lei
RSD	Serbian Dinar
SI	Slovenia
SK	Slovak Republic
TAP	Trans Adriatic Pipeline
TGL	Tauerngasleitung pipeline
TPA	third party access
TSO	transmission system operator
TYNDP	Ten-Year Network Development Plan
UA	Ukraine

10. Nominal Index

Miller, Alexei 46

Sanader, Ivo 56

Hernadi, Zsolt 56

**Natural Gas Reverse Flows in the Danube Strategy Region
Current State and Outlook**

Jan Osička, Filip Černoch, Tomáš Dráb, Tomáš Martanovič, Jiří Vlček

Published by Masaryk University Press, Žerotínovo náměstí 9, 601 77 Brno
2015
1st Edition

ISBN 978-80-210-8161-1

Contact information:
www.danube-energy.eu



The project is supported
by the European Union