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UKRAINE AND THE ENERGY UNION

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Contents

Preface

The aim of this publication is to examine prospects for boosting reforms in the energy sector of Ukraine and its integration into the Energy Union through the development of its bilateral and regional cooperation with Slovakia and the Visegrad Four countries.

It analyses both barriers and opportunities for the accession of Ukraine to the developing Central European energy market in natural gas (Visegrad Four) and electricity (Czech Republic –Slovakia - Hungary- Romania market coupling). In addition to infrastructural and technical preconditions for Ukraine's accession, it, first, examines potential for strengthening cooperation in the field of supply security and transit of natural gas; second, evaluates implementation of reforms in the energy sector of Ukraine in line with the Energy Community Treaty and Association Agreement with the EU, third, analyses potential for improving energy efficiency and the use of renewables with focus on municipal level; and finally, elaborates policy recommendations on bilateral Slovak-Ukrainian and regional V4 – Ukraine cooperation in the field of energy.

This publication includes analytical contributions prepared by authors from Ukraine and Slovakia. In the first chapter Alexander Duleba (Director of the Research Center of the Slovak Foreign Policy Association and the head of authors's team) analyses a new momentum in Slovak-Ukrainian bilateral relations in energy policy brought by the reverse flow of gas from Europe to Ukraine via the territory of Slovakia that has been put into operation in 2014 together with common stance of both countries on the Nord Stream 2 gas pipeline project, including their readiness to defend their interests as gas transit countries. It also scrutinize controversies between Ukraine and Slovakia in the field of energy policy in the past and seeks to answer the question why it took more than two decades for Slovakia and Ukraine to understand that they share integral interests when it comes to transit of Russian gas to Europe. It also offers policy recommendations on how to fix a new momentum and to sustain energy partnership between Slovakia and Ukraine.

In the second chapter Karel Hirman (Member of the Strategic Advisory Group for Support Ukrainian Reforms at the Government of Ukraine) looks through the actual conditions of all key sub-sectors of Ukraine's energy with focus on domestic production capacities and supply security (natural gas, oil, electricity, including nuclear energy and the use of renewables, heat-power engineering and energy efficiency). It identifies challenges in all respective sub-sectors of Ukraine's energy and offers policy recommendations how to address them.

Author of the third chapter Andriy Chubyk (Research Fellow of the Centre for Global Studies Strategy XXI, Kyiv) scrutinizes the ongoing reforms of Ukraine's

energy sector, including harmonization of respective national legislation in the context of the accession of Ukraine to the Energy Community Treaty, including implementation of its Association Agreement with the EU. In the concluding part of the third chapter Lukáš Lehotský (Lecturer and Research fellow of the Masaryk University in Brno) looks at potential of the Visegrad Four countries in sharing their experiences with Ukraine in the field of improving energy efficiency.

Authors of the fourth chapter Ihor Ponomarenko (Head of the Gas Transit Direction at the Kyiv International Energy Club, and former Deputy Head of the Executive Board of the Ukratransgaz), Mykhaylo Gonchar (President of the Centre for Global Studies Strategy XXI, Kyiv), Serhiy Dyachenko (Director of the Complex Analysis Buereau, and former head of the Information and Analysis Department at the Ministry of Energy and Coal Industry of Ukraine) and Andriy Chubyk (Research Fellow of the Centre for Global Studies Strategy XXI, Kyiv) offer their analytical perspective on prospects for integration of Ukraine to the emerging Central European energy market in natural gas (Visegrad Four) and electricity (Czech Republic –Slovakia - Hungary- Romania market coupling). In addition, Mykhaylo Gonchar in two separate parts of this book (4.1.4 and 5) elaborates on current problematic issues in Ukraine's relations with the EU, especially in the context of the Nord Stream 2 project initiated by Gazprom and consequent decision of the European Commission on the OPAL gas pipeline. In the concluding part of this chapter he raises question about capacity of the EU to meet its commitments towards Ukraine steming from the Association Agreement. Finally, this publication includes policy recommendations on further development of Slovak/V4-Ukraine cooperation in the field of energy.

We do hope that this publication will contribute to better understanding of Ukraine's energy needs as well as will inspire both political and practical cooperation of Slovakia and the Visegrad countries with Ukraine for the sake of enhanced energy security of the region of Central Europe.

Alexander Duleba

1. Slovak-Ukrainian relations in energy policy: lessons learned

Alexander Duleba

This chapter summarizes main lessons learned from bilateral Slovak-Ukrainian cooperation in the field of energy over the last two decades. Its aim is, first, to identify importance of energy cooperation between the two countries; second, to analyse omissions from the past; and third, to explore potential for bilateral cooperation in the future.

Energy sector has become the priority area for bilateral cooperation between Slovakia and Ukraine in the course of the post-Maydan developments in Ukraine. Dramatic events in Ukraine – massive political and social protests in Kyiv and other Ukrainian cities in the course of November 2013 – February 2014 followed by Russia's military invasion and occupation of Crimea at the end of February 2014, including Russia's decision to fully stop the supply of natural gas to Ukraine in June 2014[1] - highlighted strategic role of Slovakia in the energy security of Ukraine.

In addition, announcement of Russian Gazprom that it will fully stop transit of gas to Europe via Ukraine after expiration of its transit contract with Naftogaz after 2019,[2] together with the notice realised at the beginning of September 2015 that Gazprom creates consortia with five European gas companies in order to implement the so-called Nord Stream 2 gas pipeline project,[3] finally, brought Slovakia and Ukraine to clear determination that they share integral interests in the field of supply security as well as transit of natural gas. However, the crucial question sounds why it took more than two decades for both countries to understand importance of their cooperation in the field of energy from point of their national interests.

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1 "Ukraine crisis: Russia halts gas supplies to Kiev" *BBC News*, June 16, 2016. Available online: http://www.bbc.com/news/world-europe-27862849 (accessed on December 19, 2016).

2 For more see Pirani, S., Yafimava, K., *Russian Gas Transit Across Ukraine Post-2019: pipeline scenarios, gas flow consequences, and regulatory constraints*. OIES Paper: NG 105. The Oxford Institute for Energy Studies, February 2016.

3 "Gazprom, BASF, E.ON, ENGIE, OMV and Shell Sign Shareholders Agreement on the Nord Stream 2 Project". *Nord Stream 2*, September 4, 2016. Available online: https://www.nord-stream2.com/media-info/news-events/gazprom-basf-e-on-engie-omv-and-shell-sign-shareholders-agreement-on-the-nord-stream-2-project-2/ (accessed on December 19, 2016).

1.1 Security of gas supply: discovering strategic partnership (after Maydan)

When Russia stopped the flow of gas to Ukraine, it was only thanks to an agreement between the governments of Ukraine and Slovakia on reverse flow of gas (with the participation of the national gas transit system operators, Ukrtransagaz, which is a subsidiary of Naftogaz of Ukraine, Slovak TSO Eustream, a.s. and the European Commission) that Ukraine gained access to an alternative route and sources of the supply of natural gas. Reverse flow via Slovakia helped Ukraine to manage its basic energy needs and to survive the winter period of 2014–2015.[4] Notwithstanding the fact that the reverse flow of gas itself is a business transaction and thus beneficial to both parties, this demonstrated Slovakia's strategic importance for the energy security of Ukraine.

In April 2014, the Slovak government reached a deal with its Ukrainian counterpart, which was hoping to secure alternative gas supplies after Gazprom raised its prices to levels Ukraine refused to pay. The Slovak government did not, however, go so far as acceding to Ukraine's push for the use of Slovakia's main transit pipelines – with a free capacity exceeding 50 bcm a year, which would have given Ukraine access to larger volumes of gas – arguing that this would violate Slovakia's transit contract with Gazprom.[5] SPP (Slovenský plynárenský priemysel, a.s., which is major player on the Slovak gas market) and Eustream, a.s. signed the long-term (20 years) contracts with Gazprom and its subsidiary Gazprom Export in 2008, according to which SPP will purchase 130 bcm of gas and Eustream will transit at least 50 bcm/year of Russian gas to European clients of Gazprom, until 2028.[6]

Nevertheless, an alternative technical solution for the reverse flow of gas from Europe to Ukraine via Slovakia was found, by upgrading a previously unused pipeline running from Slovakia's Vojany power station near the Slovak-Ukrainian border to Uzhgorod. This technical solution was necessary in order not to violate the contract between Eustream and Gazprom Export, which stipulates that the only company that can issue shipper codes at the Uzhgorod–Veľké Kapušany dispatching centre on the main transit pipelines at the Slovak–Ukrainian border is Gazprom. At the same time the contract includes a "shift or pay" provision,

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4 See "Robert Fico: Sme pripravení spustiť vyššiu kapacitu plynu na Ukrajinu," [Robert Fico: We are ready to launch higher capacity of gas transit to Ukraine] *TASR*, February 6, 2015.

5 "Slovakia reaches reverse gas flow deal with Ukraine," *Reuters*, April 22, 2014. Available online: http://www.reuters.com/article/2014/04/26/ukraine-crisis-slovakia-gas-idUSL6N0NI0HU20140426 (accessed on September 13, 2015).

6 "Predstavitelia spoločností skupiny SPP a Gazprom Export sa stretli v Bratislave," [Representatives of SPP Group and Gazprom Export meet in Bratislava] SPP, 3.12.2008, http://www.spp.sk/sk/vsetky-segmenty/o-spp/media/46-predstavitelia-spolocnosti-skupiny-spp-a-gazprom-export-sa-stretli-v-bratislave/ (accessed on September 13, 2015).

which incurs liability on Gazprom to pay for booked transit capacity of Eustream in amount of 50 bcm/year till 2028 even if Gazprom will not use it in physical terms. In the light of statements of Russian leaders that Gazprom will fully stop transit of Russian gas via Ukraine to European markets after expiration of its transit contract with Naftogaz in 2019;[7] Ukrainian side had to accept legitimate interest of Slovak counterpart in avoiding violation of its long-term contract with Gazprom, which serves its business interest till 2028. Anyway, on September 2, 2014, a new interconnector running from Vojany to the Ukrainian border, with newly installed metering station, was launched into operation with an annual capacity of 10 bcm. Two months later its capacity was increased to 11.4 bcm per year; and finally, starting from March 2015 to more than 14.5 bcm per year.[8]

Even though Russia repeatedly warned that it considers reverse flows illegal[9] and, moreover, has responded to the Slovak–Ukrainian reverse flow deal by reducing its delivery of gas to Slovakia, foreign minister M. Lajčák has absolutely denied that the Slovak Government would stop the reverse flow of gas to Ukraine. At the Foreign Affairs Council of the EU held in Luxemburg in October 2014, he said: "Our reverse flow has already saved approximately a half billion USD to Ukraine, as confirmed by high representative of the Ukrainian Government. We continue with practical help to Ukraine through the reverse flow despite the 50 % gas supply reduction for Slovakia. This is our concrete contribution to the discussion on how to help Ukraine to survive this winter."[10]

According to a statement by Ukrainian Prime Minister Arseniy Yatseniuk on December 30, 2014, Ukraine saved almost 1 billion US dollars in 2014 thanks to this reverse flow, due to the difference between Russian and European gas prices. The gas supply to Ukraine has been diversified – Ukraine has switched its gas supply from Russia to the European Union by 60 per cent.[11] The Vojany interconnector that was launched into operation in September 2014 now plays an important role in the energy security of Ukraine.

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7 "Gazprom warns it will stop gas transit through Ukraine after 2019", *Ukraine Today*, June 9, 2015. Available online: http://uatoday.tv/business/gazprom-warns-it-will-stop-gas-transit-through-ukraine-after-2019-435621.html (accessed on December 19, 2016).

8 "Robert Fico...," op. cit.

9 For analysis see: "Through Slovakia, Russia Loses Power Over Ukraine". *Stratfor*, April 7, 2015. Available online: https://www.stratfor.com/analysis/through-slovakia-russia-loses-power-over-ukraine (accessed on January 3, 2017).

10 "Lajčák: It's necessary to formulate our expectations of the future Ukrainian Government to be formed after the parliamentary elections," Ministry of Foreign and European Affairs of the Slovak Republic, October 20, 2014. Available online: http://www.mzv.sk/App/WCM/Aktualit.nsf/EA51CA63AD2CE05FC1257672004E2408/E896A80E94BCB4C5C1257D7900285C02 (accessed on September 13, 2015).

11 "Arseniy Yatsenyuk: one of the Kremlin's political ideas was the economic blockade of Ukraine," *Governmental portal*, December 30, 2014. Available online: http://www.kmu.gov.ua/control/en/publish/article?art_id=247853281&cat_id=244314975 (accessed on September 13, 2015).

As for now, the transmission systems of Slovakia, Hungary and Poland together can ensure an alternative supply for Ukraine's natural gas import needs, which according to the *New Energy Strategy of Ukraine* projection will be 20 bcm of gas per year until 2020.[12] This allowed Naftogaz for full stopping of gas imports from Russia starting as from 25 November 2015. In 2015, 63 % of imported gas was supplied to Ukraine from Europe, and 37 % came from Russia. In 2016 the proportion will be 100 % from Europe and 0 % from Russia. In its press-release at the occasion of a one year of working without gas imports from Russia Naftogaz points out: "Without alternative gas supplies from Europe, we would have had to buy gas from Russia at non-market prices, with billions of dollars additionally paid to Gazprom for the gas which had not been used in previous years (the take-or-pay principle), as well as to pay for supplies to the occupied Donbas that are beyond our control. Breaking the gas supply monopoly of Russia enables us to fight for Ukraine's gas independence in arbitration now."[13]

Share of Slovakia in the transit of natural gas from Europe to Ukraine was around 70 % in 2015 and 2016 respectively. At the same time 100 % of gas imports of Slovakia that come from Russia on the base of long-term contract between SPP and Gazprom flow via the transit system of Ukraine. The above figures illustrate well correlative importance of both countries to each other in the field of security of gas supply.

1.2 Controversies in the past (before Maydan)

Ukraine and Slovakia together with getting their independence and state sovereignty in early 1990s inherited from the former Soviet Union and Czechoslovakia the most robust transit route connecting natural gas fields in Russia with European markets. The pipeline Urengoy–Pomary–Uzhgorod ("Bratstvo" – "Brotherhood") is the largest transportation route for Russian gas to Europe. It can carry 110 bcm of gas per year, transiting Ukraine and running to Slovakia. In Slovakia, the pipeline divides, one branch continuing to the Czech Republic and the other to Austria. Gas deliveries through the Brotherhood pipeline began in 1967.[14]

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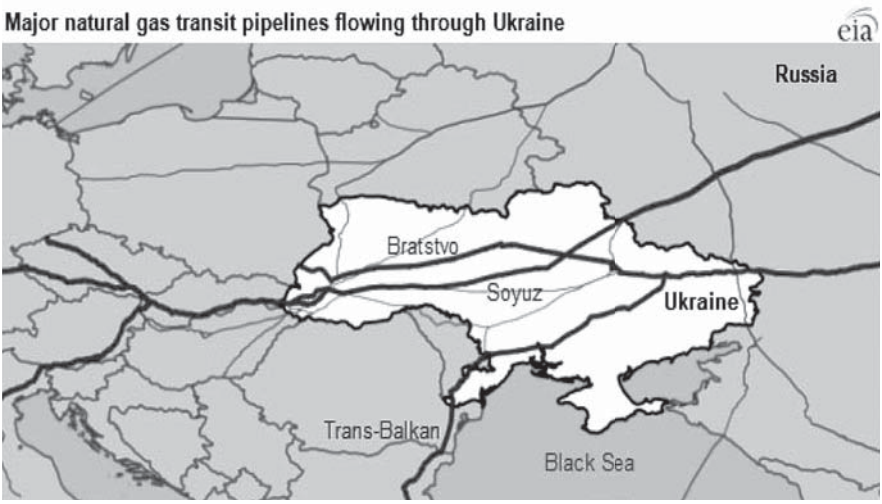
12 "Nova enerhetychna stratehiya Ukrayiny: bezpeka, enerhoefektyvnist, konkurentsiya," [New energy strategy of Ukraine: security, energy efficiency, competitiveness]. Ministry of Energy and Coal Industry of Ukraine, 2015. Available online: http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?art_id=245032413&cat_id=244946928 (accessed on September 5, 2015).

13 "Vidkrytyy lyst Naftohazu z nahody roku roboty bez importu hazu z Rosiyi" [Open letter of Naftogaz at the occasion of a year of its activities without gas imports from Russia] *Naftogaz of Ukraine*, November 25, 2016. Available online: http://www.naftogaz.com/www/3/nakweb.nsf/0/589EF410D9E31C15C225807600312477?OpenDocument&year=2016&month=11&nt=%D0%9D%D0%BE%D0%B2%D0%B8%D0%BD%D0%B8& (accessed on November 27, 2016).

14 Transportation. *Gazprom Export*. Available online: http://www.gazpromexport.ru/en/projects/transportation/ (accessed on September 13, 2015).

However, it should be noted that the first gas supplied from the Soviet Union to Czechoslovakia and Austria in 1967 came from the gas fields in Western Ukraine. The supply of gas from Russian fields located in Western Siberia to Europe via the Brotherhood pipeline started in the second half of 1970s.



Source: U.S. Energy Information Administration, 2014

Naturally, one could assume that sharing of the same gas transit infrastructure by Ukraine and Slovakia, which, first, has a critical importance for gas supply security of Europe, and second, brings important financial benefits to their state-controlled gas companies and consequently to their national budgets, should mean also that both countries share common interest vis-à-vis Russia and its European consumers. Consequently, one would expect that they are able to coordinate their policies in the field in order to defend their interests as the largest gas transit countries in Europe. However, for more than two last decades both countries have not been able to speak "one voice" on the matter. Quite on the contrary, instead of becoming a common ground for strategic partnership and cooperation, transit of Russian gas to Europe became rather a source of controversies in Slovak-Ukrainian bilateral relations in the last two decades.

The first Russian gas pipeline project bypassing Ukrainian-Slovak Brotherhood transit system was initiated by Gazprom under the name of Yamal-Europe pipeline via the territory of Belarus and Poland to Germany yet at early 1990s. The construction of Yamal pipeline has been finalized in 1999. After completion of all envisaged compressor stations it achieved its existing transit capacity of 32.9 bcm/year in 2006.[15] Kyiv classified the construction of the Yamal project as an anti-

[15] "Yamal - Europe". *Gazprom*. Available online: http://www.gazprom.com/about/production/pro-

Ukrainian move of Russia, because it limits Ukraine's bargaining position vis-à-vis Moscow.[16] Slovakia did not coordinate its position on Yamal with Ukraine, but in the bargain with Russia it demanded to construct an extra pipeline connecting the Yamal pipeline from the territory of Poland to Southern Europe via the territory of Slovakia. In June 1995 the then Slovak Prime Minister Vladimír Mečiar during his official visit to Kyiv pointed out that "the fact that Yamal-Europe system is going to be constructed not over the territory of the Ukraine and Slovakia but over Belarus and Poland," he considers "a cardinal mistake of recent Ukrainian policy".[17]

On the other hand, during 1996 bilateral intergovernmental talks in High Tatras the then Ukrainian Prime Mnister Yevheniy Marchuk outlined some possibilities of both countries for coordination of their policies on the transit of Russian natural gas and oil. Next Ukrainian Prime Minister Pavlo Lazarenko has repeated the same a year later during Slovak-Ukrainian intergovernmental talks in Uzhgorod in March 1997.[18] But, no real results emerged.

Quite on the contrary, misunderstandings over Yamal project have been repeated some years after under the new Slovak cabinet led by Mikuláš Dzurinda, this time in respect of the planned construction of the second pipeline of the Yamal – Europe project (so called Yamal 2 pipeline). At the beginning of March 2000 Russian Gazprom has addressed the governments of Slovakia and Poland with the proposal to construct a new pipeline that would connect the planned Yamal 2 pipeline on the territory of Poland with the Slovak gas transit network, thus bypassing territory of Ukraine.[19] Unlike Slovakia, Poland together with Ukraine took a cautious approach to this initiative. Russian diplomacy worked extraordinarily hard to cement Slovakia in its positive and obliging position. At the official meetings of the top representatives from both sides during the respective period a common position of Russia and Slovakia on this issue has been stressed, providing a diplomatic opportunity to demonstrate a good shape of bilateral relationship. For instance, Russian President Vladimir Putin during the Slovak President Rudolf Schuster official visit to Moscow in November 2001 underlined the importance of bilateral cooperation on the transit of Russian gas, and called Slovakia "the most accommodating and natural partner" for Russia on this issue.[20]

jects/pipelines/active/yamal-evropa/ (accessed on December 21, 2016).

16 For more see Akino, Y., Smith Albion, A. *Russia-Ukraine-Visegrad Four: The Kozyrev Doctrine in Action*. Prague-New York: Institute of EastWest Studies 1993.

17 Interview with Vladimír Mečiar in *Kiyevskiye Vedomosti,* June 14, 1995.

18 See Matejovič, R.,"Ruská surovinová kazajka" [Russian raw material jacket]. *Slovenský profit*, no. 12, 1997, p. 5; for analysis see Duleba, A. *The Blind Pragmatism of Slovak Eastern Policy. The Actual Agenda of Slovak-Russian Bilateral Relations*. Working Paper No. 1, 1996. Bratislava: Research Centre of the Slovak Foreign Policy Association.

19 For more see Hirman, K., Gazprom tlačí na Slovensko a Poľsko [Gazprom pushes on Slovakia and Poland). *Trend*, March 8, 2000.

20 *Vystupleniye Prezidenta Rossiyskoy Federatsiyi V.V. Putina po itogam besedy s Prezidentom Slo-*

However, in February 2002 Gazprom has announced that it postpones the implementation of the Yamal 2 project. Finally, in November 2007, the then Russian Minister of Industry and Energy Viktor Khristenko said that Russia has dropped the idea of building the second leg of the Yamal pipeline preferring construction of the Nord Stream pipeline connecting directly Russia with Germany under the Baltic Sea.[21] Thus, Slovakia without discussing the issue with Ukraine supported the Russian project, which Kyiv understood as an anti-Ukrainian one, and which, in the end, was never implemented. Slovak position on the Yamal 2 being more close to the Russian one than to that of its direct neighbours Poland and Ukraine proved to be one of the biggest stumbles of the Slovak foreign policy under the Dzurinda government.[22]

An eventual implementation of the Yamal 2 project would mean a cut down of Russian gas quantity transported via territory of Ukraine and consequently a slump of its gains from a transit fees. The planned capacity of the Yamal 2 pipeline was 30 billion of cubic meters of gas per year, which would bypass the territory of Ukraine and thus decrease the amount of gas transport through Ukraine from a level of 120 billion cubic meters of gas to circa 90 billion. Automatically, a decline of gains from the transit fees would be lower in about a quarter. At early 2000s Ukraine needed for its domestic consumption about 75 bcm of gas annually of which 30 bcm it was receiving from Russia as payment in kind equal to the price for transit of Russian gas. If Yamal 2 would become a reality that would mean for Ukraine that it has to buy additional amount of 7-8 bcm/year of gas for about $300-400 million annually according to the prices as of 2000. Following the above figures, it becomes evident that Ukrainian government could not welcome a positive approach of the Slovak side towards the Russian Yamal 2 project.

Position of the first government led by Mikuláš Dzurinda (1998-2002) regarding the Yamal 2 project contradicted to its proclaimed will to change the attitudes and practices of the previous Mečiar's years towards Russia and Ukraine. Whereas Mečiar's governments (1992-1994 and 1994-1998) prioritised relations with Russia, Dzurinda's government declared it wants to develop balanced relations with Eastern neighbours prioritizing support for democratic change in Ukraine, including its European integration process. However, quite on the contrary, the first two years of Dzurinda's government at power (1998-2000) could be characterized as the most problematic years in the Slovak-Ukrainian modern relationship since the

vatskoy Respubliki R. Schusterom [Address of Russian President V.V. Putin after talks with Slovak President R. Schuster]. Moscow, Press Service of the President of Russian Federation, November 13, 2001.

21 "Russia drops second leg of gas pipeline via Belarus". *Sputnik International*, November 1, 2007. Available online: https://sputniknews.com/russia/2007110186223448/ (accessed on January 7, 2017).

22 For analysis see Duleba, A., "Jamalská lekcia – o chybách slovenskej diplomacie [A Yamal lesson - on mistakes of Slovak diplomacy). *Listy SFPA*, January – February 2002.

beginning of 1990s. In addition to controversies over Yamal 2 project, in 1999 both countries were competing for a seat in the UN Security Council representing the East-European group of countries. Moreover, Dzurinda's government decided to introduce visa regime against Ukrainian citizens yet in 2000 arguing that Slovakia must to bring its visa policy in a line with the EU standards, a step that Ukraine evaluated as being a "premature" one referring to Poland and Hungary that unlike Slovakia were not in hurry in meeting this EU requirement far before the conclusion of their accession talks. On its hand, Ukrainian government has decided to respond with denouncing the readmission treaty with Slovakia, etc.[23]

In the context of the period of 1999-2000, the year of 2001 might be characterized as a year of positive shift in Slovak-Ukrainian relations. The crucial momentum took place at the end of 2000 when the then Ukrainian Prime Minister Viktor Yushchenko visited Slovakia. The main topics of his talks with Slovak Prime Minister Dzurinda and President Rudolf Schuster were, among others, the effects of visa regime on bilateral relationship, the danger of Ukraine's reneging on its readmission treaty with Slovakia, the positions of both sides on Yamal 2 gas pipeline, and finally a completely new theme in Slovak-Ukrainian talks and namely bilateral cooperation on getting Caspian oil to European markets through existing transit oil pipeline network shared by both Slovakia and Ukraine. At least following official statements after bilateral talks Prime Ministers Yushchenko and Dzurinda have achieved a progress on two of these topics: the visa regime and working together on transport of the Caspian oil.[24]

During his December 2000 visit to Slovakia Prime Minister Yushchenko visited Slovak oil transiting company Transpetrol, where he has presented a project on an oil pipeline link between the Yuzhny sea oil terminal at Odessa and the Brody compressor station on Ukrainian territory located on the arm of the Druzhba (Friendship) oil pipeline leading to Slovakia. The project on interconnection of Ukrainian and Slovak oil transit systems for transiting of Caspian oil from the Black Sea to European markets had been developed by Ukrainian state companies company Mahistral'ni naftoprovody Druzhba (Druzhba Trunk Oil Pipelines). It was expected that that from 28 to circa 67 million tons of oil would be transported annually on the Odessa – Brody arm. While the Slovak arm of Druzhba pipeline transport capacity was 21 million tons of oil a year, it has been used at less than a half of its capacity.[25]

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[23] For detail analysis, see: Duleba, A. *Ukrajina a Slovensko* [Ukraine and Slovakia]. Bratislava: VEDA, 2000.

[24] For more see Solodkiy, S.: "Ukrajina – Slovachchyna: chas pryynyattya rishen" [Ukraine - Slovakia: a time to make decisions]. *Den*, December 7, 2000.

[25] For more see Duleba, A. (ed), *Ukrajina a Slovensko. Hľadanie spoločných záujmov* [Ukraine and Slovakia. In a Search for Common Interests). Bratislava: Research Center of the Slovak Foreign Policy Association, Friedrich Ebert Foundation, 2001; especially Chapter V: Transport of natural gas and oil to European markets, pp. 76-80.

Oil pipelines in Europe and North-Western Asia

Source: United States Department of Energy, 2007

In the case of transportation of Caspian oil Slovakia's strategic interest here was not so much the transit fees it might gain, but the fact that the country could finally diversify its sources of oil imports having an access to Caspian resources via the territory of Ukraine, and thus in reducing reliance on Russian oil and increasing its energy security. The Ukrainian-Slovak accord was in the strategic interests of both countries, and following Yushchenko – Dzurinda's talks, Slovak officials became more cautious on the subject of building a southern arm to the Yamal 2 gas pipeline that would bypass Ukraine.[26] In the context of previous practice of Slovak-Ukrainian relations, the most important fact is that both countries managed to raise a new positive topic of their bilateral agenda, which was quite a new element in their bilateral relationship, especially in the field of transiting energy resources.

However, cooperation on transit of Caspian oil what seemed to be a new page in Slovak-Ukrainian cooperation after Yushchenko – Dzurinda talks in Bratislava at the end of 2000, has never become a matter of fact. In December 2001 the Russian oil concern Yukos won a tender for 49 % percent stake control in the Slovak state company Transpetrol, which operates transmission oil pipelines on the territory of Slovakia, together with the control over the company's management

[26] For commentary see Javurkova, B. "Rusko hľadá k inému Slovensku iný prístup" [Russia looks for a new approach to a new Slovakia]. *Sme*, February 2, 2001.

with an offer of $74 million.[27] Yukos as the oil producing company had no interest in transiting oil of competing oil producers, including from the Caspian basin, via territory of Slovakia. After Yukos's entry to Transpetrol at the end of 2001 Slovak-Ukrainian intergovernmental talks on transit of Caspian oil via the shared Druzhba oil pipeline were brought to a halt.

However, a "Yukos investment story" has been so far the most negative experience with a foreign investor in Slovakia at all since 1993. After Yukos came into bankruptcy process in Russia in 2004 albeit due to political reasons, Slovak governments led by Dzurinda and Robert Fico (in office since 2006) were aiming at retrieving the control over Yukos share in Transpetrol. During the talks with Russian President Vladimir Putin and Prime Minister Mikhail Fradkov in May 2007, Slovak PM Robert Fico expressed interest in a "timely solution to the situation in Transpetrol, a.s." and Putin pledged help to the Slovak government in this issue."[28] Finally, the Slovak government managed to regain the control of the 49 % stocks buying it back from Yukos Finance in 2009 for $240 million.[29] Due to re-buying of the investor's share the Slovak government lost about $180 millions in the privatization deal with Yukos. Even though Fico government recaptured the full control over Transpetrol in 2009, transit of Caspian crude oil to the European markets via the terminal Yuzhniy – Brody – and the Slovak segment of the Druzhba oil pipeline has not become anymore a serious issue for the Slovak government, although, Ukrainian side tried repeatedly to raise it.

The Ukrainian President Viktor Yushchenko invited Prime Minister Robert Fico to participate in the Energy Summit, which took place in Kyiv in May 2008. The objective of the summit was to focus on the interest of transit countries in the context of increasing Europe's energy security and development of EU's common energy policy. The Slovak response to the Ukrainian invitation was unclear and on the Kyiv energy summit, Slovakia unlike other seven countries (Azerbaijan, Estonia, Georgia, Latvia, Lithuania, Poland and Ukraine) was represented by the Foreign Minister, not by the Prime Minister or the President of the SR. Slovakia also did not sign the Kyiv Energy Summit declaration *On the Principles of Global Energy Security*, which emphasizes the position, significance, and interests of transit countries for Europe's energy security.[30] In 2008 Slovak government under

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27 See "Yukos priobretayet aktsiyi slovatskoy kompaniyi Transpetrol" [Yukos acquires stakes of the Slovak company Transpetrol]. *Yukos Novosti*, December 10, 2001.

28 *Informácia o priebehu a výsledkoch oficiálnej návštevy predsedu vlády Slovenskej republiky Roberta Fica* v Ruskej federácii dňa 4. *mája 2007* [Report on the outcomes of the PM Robert Fico official visit to Russian Federation on 4 May 2007]. Bratislava: Government of the Slovak Republic, 2007. http://www.rokovania.sk/appl/material.nsf/0/2A5FC6BB35397F74C12572EA0047DC18?OpenDocument.

29 "Transpetrol je už doma" [Transpetrol has come to home yet]. *Sme*, March 26, 2009.

30 Socor, V. "Slovak Detour Would Defeat Odessa-Brody Oil Transport Project". *Eurasia Daily Monitor*, February 28, 2007; see also "Participants in Kyiv Energy Summit Declare Energy Cannot Be Used as Political Lever". *Interfax Ukrajina*, May 23, 2008.

Robert Fico believed that Russia should be part of any talks on natural gas supply to Europe as it, following the then Foreign Minister of Slovakia Ján Kubiš, "proved to be reliable partner when it comes to supply of oil and natural gas to the EU".[31] However, gas crisis of January 2009 has significantly disturbed previous stereotypes when it comes to both perceptions and policies of Slovakia in the field of energy security.

Slovakia has been challenged by a full cut-off of natural gas delivery from Russia via the territory of Ukraine for almost two weeks as of 7-18 January 2009. It happened for the first time since 1967 when the "Brotherhood" transit gas pipelines on the territory of Slovakia came into operation that there was a "zero" pressure in the Veľké Kapušany compressor station on the border with Ukraine. The Slovak government had to introduce an emergency regulation for the intake of natural gas by companies in order to ensure supply to households. The regulation concerned all companies with annual intake exceeding 60 thousand cubic meters of gas. The total number of concerned companies that consequently had to stop their economic activity was almost one thousand. Following the estimates of Slovak finance and economy ministries Slovakia was losing circa 100 million of euros a day during the crisis. The total loss from the two-week gas crisis for the Slovak economy has been estimated in circa one billion of euros.[32]

On 14 January 2009 the Slovak governmental delegation led by Prime Minister Fico paid an extraordinary visit to Kyiv and Moscow with the aim to resolve the crisis. In Kyiv Fico met the then Prime Minister of Ukraine Yulia Tymoshenko. Following the official information about the talks provided by the Office of the Slovak Government, "despite of the agreed time for the start of the meeting Ukrainian side put it back for several times. The feel of the meeting has been affected by an effort of Ukrainian side to delay the start of talks what has created time pressure problems for the Slovak delegation scheduled to travel to Moscow on the same day. In the end, talks in Kyiv lasted for about 20 minutes, including time needed for a simultaneous translation. The given time was enough just for presenting a Slovak quest for a help, including some Slovak positions on how to resolve the crisis, which were de facto refused by Ukrainian side.[33]

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31 "Kubiš: Rusko je spoľahlivý, aj keď zložitý partner" [Kubiš: Russia is a reliable although difficult partner]. *SITA*, September 4, 2008.

32 For analysis see Duleba, A. "Príčiny rusko-ukrajinského plynového sporu a poučenia pre Slovensko" [The causes of Russia-Ukraine gas dispute and lessons learned for Slovakia]. *Slovgas*, 1/2009, pp. 4-6.

33 *Informácia o priebehu a výsledkoch pracovnej návštevy predsedu vlády Slovenskej republiky Roberta Fica na Ukrajine a v Ruskej federácii dňa 14. januára 2009* [Information about the course and outcomes of PM Robert Fico's visit to Ukraine and Russian Federation on 14 Janury 2009]. Bratislava: Office of the Government of the Slovak Republic, 2009. Available online: www.rokovania.sk/File.aspx/Index/Mater-Dokum-181454 *(accessed on January 4, 2017).*

Among other scenarios for resolving the crisis Slovakia requested Ukraine to supply at least some volume of gas to Slovak grid from its underground storages located in the Western Ukraine. In January 2009 compressor capacities on the Slovak gas grid did not allow for delivering gas from the underground storages located in the Western part of the country next to the borders on Austria and the Czech Republic (with capacity of circa 2 bcm) to the Eastern part of Slovakia. The solution would be to get at least minimal volume of gas from Ukraine at the level of a "something above zero" pressure at the dispatching centre Veľké Kapušany – Uzhgorod on border with Ukraine. In technical terms that would be enough to use the stored gas on the territory of Slovakia and to ensure supplying the whole country within months to come. However, due to technical reasons, including the need to use existing pressure within its own gas grid, as well as in order to be able to manage a reverse flow of gas from its own storages in Western Ukraine to its Eastern regions Ukraine had to have a zero pressure in the dispatching centre on its border with Slovakia, and therefore, PM Yulia Tymoshenko refused the Slovak request at the talks in Kyiv on 14 January 2009 arguing that Ukraine does not have enough gas to share it with Slovakia.[34]

On the same day in Moscow PM Fico during his talks to the then Russian PM Vladimir Putin aimed at agreeing a sort of swap operation between Russia, Ukraine and Slovakia. It would mean that Russia supplies some minimal volume of gas to Ukraine and consequently Ukraine supplies the same volume of gas from its underground storages to Slovakia. Even though, following the official information by the Office of the Slovak Government about Fico's talks in Moscow, Russian PM Putin supported the idea of a swap operation;[35] the true is that it never has been materialized. In the end, PM Fico failed to find a fast-acting solution for Slovakia to the gas crisis during his talks in Kyiv and Moscow on 14 January 2009.

From today's perspective it is difficult to assume what could be outcomes of Fico's talks with Tymoshenko on 14 January 2009 should he as well as his forerunners on the post of Slovak Prime Ministers Mečiar and Dzurinda took more engaged approach towards interests of Ukraine in its relations with Russia, including when it comes to transit of natural gas and oil. At the same time it is logical to assume that a lack of understanding over energy transit issues between Slovakia and Ukraine in the 1990s and 2000s did not help to create a positive environment for talks between Fico and Tymoshenko in January 2009.

Anyway the 2009 gas crisis brought rather heavy clouds into the Slovak-Ukrainian relations. After his unsuccessful negotiations in Kyiv and Moscow Fico alleged Ukrainian authorities for being responsible for the gas crisis adding that both Russia and Ukraine proved to be unreliable energy partners. As to his words, Slova-

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[34] Ibid.; for detail analysis see Duleba, A. "Príčiny rusko-ukrajinského plynového sporu a poučenia pre Slovensko", op.cit.

[35] "Informácia o priebehu...", op. cit.

kia might reconsider its support for Euro-Atlantic aspirations of Ukraine.[36] Even though hard words of Fico addressed to Ukrainian government led by Tymoshenko the fact is that Slovakia did nothing in the post-gas crisis period what could prove the above embittered Fico's statement. Quite on the contrary, in the post-gas crisis period Slovak diplomacy under Foreign Minister Miroslav Lajčák together with the V4 partners became one of the leading supporters of the Eastern Partnership initiative launched at the Prague summit in May 2009, which has been aiming at achieving political association and economic integration of Ukraine with the EU.[37]

Despite the fact that a solution to a gas crisis for Slovakia in January 2009 did not come from a governmental talks in the East, it has come from the corporate sector of the West. Thanks to the agreement between SPP, a.s. and its than shareholders E.ON Ruhrgas and Gaz de France Suez (both controlled 49 % of stock share in SPP, a.s. at the time of crisis) and the RWE Transgas, which operated gas transit pipelines on the territory of the Czech Republic, Slovakia got gas from the territory of Germany. For the first time in the history of gas supply, on 18 January 2009, Slovakia has received gas from the West, not from the East. Finally, after Russia and Ukraine settled their dispute and signed the agreement on 19 January 2009, the delivery of natural gas from Russia via Ukraine has been restored.[38] One way or another, since the 2009 gas crisis reverse flow of gas from the West, what has been initially a forced solution adapted for the first time in case of Slovakia to help it to face up the full cut-off of natural gas delivery from the East in January 2009, has become a pillar of a gas supply security for Slovakia, but also countries of Central Europe, and in the end, including also for Ukraine as from 2014.

In January 2009 Slovakia as a third party suffered from a dispute between Russia and Ukraine learning that it has no leverage to force both or any one of them to respect Slovakia's interests. Thus, the gas crisis of January 2009 had three main implications on Slovakia's Eastern policy. First, the Fico government changed its previously rather reluctant position vis-à-vis a need to diversify routes of natural gas supply; second, it started to getting rid of an "old" illusion of Slovak Eastern policy believing that "if we manage to achieve agreement with Russia, we manage to agree everything in Eastern Europe"[39]; and third, that challenges coming from the East can be faced in much efficient way together with partners from the West

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36 "Vystúpenie predsedu vlády SR Roberta Fica v diskusnej relácii "O päť minút dvanásť" [Address by Prime Minister Robert Fico at a TV discussion "It is twelve, in five minutes"). *STV 1*, January 18, 2009.

37 See Duleba, A., Bilčík, V. (eds) *Taking Stock of the Eastern Partnership in Ukraine, Moldova, Visegrad Four, and the EU*. Bratislava: Research Center of the Slovak Foreign Policy Association, 2011.

38 For more see Duleba, A. "Príčiny rusko-ukrajinského plynového sporu…", op. cit.

39 For analysis see Duleba, A. "Slovakia's Relations with Russia and Eastern Neighbours". *East European Studies,* No. 1, 2009. EU-Russian Relations and the Eastern Partnership. Central-East European Member-State Interests and Positions. – Gábor Fóti and Zsuzsa Ludvig (eds.). Budapest : Institute for World Economics of the Hungarian Academy of Sciences, pp. 7-60.

and/or as one could express it also in other words: that the best Slovak Eastern policy is the EU one. Anyway, Slovak Eastern policy has acquired much more realistic shape in the aftermath of the 2009 gas crisis.

1.3 Shared transit interests: a belated lesson (?)

In addition to Eastern policy lessons Slovakia has learned from the gas crisis in 2009 also key energy security ones. The gas supply security of the country has been substantially strengthened in the course of last eight years in comparison with the pre-crisis period. Nowadays, the installed capacity of reverse flows of natural gas from Austria (launched into operation in October 2010 with capacity 16.8 mcm/day), the Czech Republic (firstly launched yet in January 2009 as mentioned above as part of an effort to find a solution to the gas crisis; and finally, in November 2011 it achieved the current transit capacity 35.3 mcm/day) and Hungary (starting from July 2015 with capacity 1.8 bcm/year) exceed far above historical maximum of daily gas consumption in Slovakia equal to 46.9 mcm, which was measured on 14 December 2001. Together with the construction of new compressor capacities, which for now allow transmission of gas on the whole territory of Slovakia from the West to the Eastern border with Ukraine, including from the underground gas storage facilities located in Western part of Slovakia (with the current storage capacity of 3.6 bcm), cross-border interconnectors with Austria, the Czech Republic, and Hungary, are main pillars of Slovakia's gas supply security. The construction of Polish-Slovak interconnector, which is expected to be launched into operation in 2021, will complete the process of developing infrastructural interconnection of Slovakia with all neighbouring countries.[40]

The above security measures adopted by Slovakia after the 2009 gas crisis prepared the Slovak gas grid to serve as main transit route for reverse flow of gas from Europe to Ukraine starting as from September 2014 with its current capacity of 14.5 bcm/year (see the part 1 of this chapter). In addition, in the course of last three years Slovakia and Ukraine came into understanding of their integral interests when it comes to transit of Russian gas to Europe. Here, the most challenging issue for Slovakia and Ukraine in the field of natural gas when it comes to both its supply and transit via their territories is a plan of Gazprom to construct the so called Nord Stream 2 (NS 2) project that would allow Gazprom to materialize statements of its leaders that Russia will fully stop transit of its gas to Europe via territory of Ukraine, and that means also via territory of Slovakia. The plan to construct the NS 2 pipeline by the end of 2019 coincides with the termination of Russian-Ukrainian gas transit contract.[41]

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[40] Data prepared by author on the base of following sources: *Eustream*, a.s., *Ministry of Economy of the Slovak Republic* and *Nafta*, a.s.

[41] For more see Pirani, S., Yafimava, K., 2016, op. cit.

Finally, Slovak authorities understood that Slovak and Ukrainian gas transmission systems do represent a sort of "communicating vessels" united by a rule of full proportionality: the smaller volume of Russian gas will enter Ukrainian transmission system, the smaller volume of it will be transited via the Slovak territory. In four days after Gazprom announced the creation of a NS 2 consortia on 4 September 2016,[42] Prime Ministers of Slovakia and Ukraine Robert Fico and Arseniy Yatsenyuk met on bilateral talks in Bratislava on 10 September 2016. The main topic of their talks was a coordination of activities of both countries with the aim to prevent construction of NS 2 and thus to defend positions of Ukraine and Slovakia as the largest gas transit countries in Europe. At their joint press conference after the talks both Robert Fico and Arseniy Yatsenyuk stated that, in economic terms, should the NS 2 project be implemented, this will mean considerable decrease of incomes for the Slovak budget from gas transit fees, i.e. circa 400 million euros/year. Ukraine will also lose a considerable amount of finances (circa 2.5 billion USD/year), which will make its economic situation even more difficult. On the margin of the EU based companies that declared their interest in joining the NS 2 consortia with Gazprom, PM Fico said: "They make idiots out of us. They betrayed the member state of the EU, Slovakia. They act in a sharp contradiction to political talks we have been holding with Ukraine at the Council of Europe." [43]

At the meeting of the Council of Europe in Brussels on 18 December 2015, Slovakia being supported by other 9 member states (Visegrad Four countries, Estonia, Latvia, Lithuania, Bulgaria, Romania and Italy) that signed a respective joint letter, raised protest against the implementation of NS 2 project calling for solidarity of the all EU member states. At the Council's meeting Slovak PM Robert Fico pointed out that the NS 2 project has no economic reasons as the already existing pipeline (NS 1) is being used only up to 50 % of its transit capacity. He added that the EU cannot to cut away Ukraine from transiting Russian gas to Europe as that would bring financial loss to it in more than two billion of US dollars. At the summit, leaders of the EU member states agreed to authorize European Commission

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[42] "Gazprom, BASF, E.ON, ENGIE, OMV and Shell Sign Shareholders Agreement on the Nord Stream 2 Project", op. cit.

[43] Quoted from Majerský, I. "Robia z nás idiotov, kritizujú Fico s Jaceňukom rozšírenie Nord Stream" [They make idiots out of us, Fico and Yatsenyuk criticize expansion of Nord Stream]. *Pravda*, 10.9.2015. Available online: http://spravy.pravda.sk/domace/clanok/367178-slovensko-navstivi-vo-stvrtok-ukrajinsky-premier-arsenij-jacenuk/ (accessed on January 5, 2017). It should be specified here that a potential financial loss of Slovakia in case of implementation of NS 2 and consequently full stoppage of transit of Russian gas via Brotherhood pipeline system would be 800 million euros/year. At the press conference with PM Yatsenyuk PM Fico spoke about 400 million of euros/year as a potential loss to the state budget of the Slovak Republic as the government shares 49 % of stocks in the Slovak gas TSO Eustream, a.s. However, the total estimated financial loss of Eustream would be circa 800 million of euros, of which additional circa 400 million of euros would be a loss to EPH company, which is a privately owned corporate entity, sharing 51 % of stocks in the Eustream, a.s.

to make an assessment of NS 2 conformity with the EU legislation as well as rules and principles of the Energy Union.[44]

Thanks to the support of the EU member states from Central Europe and Italy the Slovak-Ukrainian opposition towards NS 2 got a wider international support. The main arguments against the implementation of the NS 2 project might be summarized as follows:

- first, the NS 2 project, if implemented, will undermine security of gas supply to the whole region of Central Europe;
- second, it could stop not only transit of Russian gas via the territory of Ukraine and Slovakia (Brotherhood pipeline), but also via the territory of Belarus and Poland (Yamal pipeline); third, NS 2 project will decrease competiveness on Central European gas markets as it will strengthen monopoly position of Russian Gazprom as the external gas supplier;
- fourth, transferring the whole transit capacity of Russian gas to one spot in Germany might have serious consequences not only to Central and Eastern Europe, but also for Germany; fifth, if the whole amount of Russian gas export to European consumers will be transferred to one spot in Germany, it should subsequently be distributed to Central, Southern and Eastern Europe. However, the infrastructure for such distribution is not ready and in place at all as many South-Eastern European countries are not interconnected to West European pipelines and infrastructure; and finally,
- sixth, NS 2 will hit Ukraine's economy what clearly contradicts to political goals of the EU, including the EU commitments sequent upon the Association Agreement with Ukraine.[45]

The three post-Maydan years brought dramatic changes to Slovak-Ukrainian relations in the field of energy. First of all, reverse flow of gas via territory of Slovakia launched into operation in 2014 proved to have a critical importance for Ukraine's energy security, including its energy independence on Russia. In addition, in 2015 both countries not only understood that they share integral interests when it comes to transit of Russian gas to Europe, but finally, they started to act in a coordinated

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44 "R. Fico: Nord Stream 2 je čisto politický, nie komerčný projekt" [R. Fico: Nord Stream 2 is purely political project, it is not a business one at all] . *TASR*, December 18, 2015. Available online: http://www.teraz.sk/ekonomika/fico-nord-stream-2-politicky-projekt/172221-clanok.html (accessed on January 5, 2017). See also Ružinská, V. "Vzbura desiatich štátov proti plynovej fraške" [A rebellion of ten states against a gas farce]. *Pravda*, November 28, 2015. Available online: http://spravy.pravda.sk/ekonomika/clanok/375267-vzbura-desiatich-statov-proti-plynovej-fraske/ (accessed on January 5, 2017).

45 The main arguments against the implementation of NS 2 project were prepared by author on the base of several sources, including proceedings of the *Central European Day of Energy* conference organized by the Central European Energy Partners together with the European Commission, which took place in Brussels on 9 December 2016. For the conference report see CEDE: Central European Day of Energy. *CEEP Report*, No. 10 (47), December 2016. Available online: http://www.ceep.be/ceep-monthly-reports/ (accessed on January 5, 2017).

manner vis-à-vis Russia and its European consumers with the aim to defend their interest as gas transit countries. Slovak-Ukrainian rapprochement in the field of energy in the course of last three years, which clearly serves national interests of both countries, is a new momentum for their bilateral relationship. From today's perspective it is difficult to understand why both countries were not able to speak one voice on the matter for more than two decades foregoing the Maydan.

1.4 Energy efficiency: a new field for bilateral cooperation

The above strategic rapprochement changed significantly the position of Ukraine in Slovak political discourse, although, it should be noted that Slovakia under Fico's government has sent rather ambivalent messages regarding the Russia-Ukraine conflict started by Russian occupation of Crimea at the end of February 2014. Slovakia's Ministry of Foreign Affairs under Minister Miroslav Lajčák has shown it is one of the strongest promoters among EU member states of Ukraine's European integration, while at the same time Prime Minister Fico is one of the strongest opponents among EU leaders of EU sanctions against Russia. Even though Fico has condemned the Russian annexation of Crimea classifying it as act violating international law, he has been continuing to back the argument that the EU sanctions against Russia are useless and do not help to resolve the Russian-Ukrainian conflict.[46]

Nevertheless, one of the main achievements of Slovakia's Presidency in the Visegrad Group (within the period of July 2014 – June 2015) was an agreement among the V4 countries coordinating the Group's assistance to Ukraine. The agreement was achieved at a meeting of deputy foreign ministers in Lviv in October 2014 and reconfirmed by V4 foreign ministers at a meeting with their Ukrainian counterpart Pavlo Klimkin in Kyiv in December 2014. The V4 countries agreed on their specific roles with respect to the sectorial focus of their assistance to Ukraine in its reform process related to the implementation of the Association Agreement with the EU. Slovakia took on a leadership role in the fields of energy security and security sector reform, Czech Republic in the field of education and civil society, Hungary in the field of support for SME and implementation of DCFTA, and Poland respectively in the field of public administration reform, including fiscal decentralization).[47] Slovakia's bilateral assistance to Ukraine in the

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[46] For analysis see Duleba, A. "Slovakia's foreign policy towards the Russian-Ukrainian conflict". In: Kucharczyk, J., Mesežnikov, G. (eds) *Diverging Voices, Converging Policies: The Visegrad States' Reactions to the Russia-Ukraine Conflict*. Warsaw: Heinrich-Böll-Stiftung, 2015, pp. 161-174. Available online: https://www.boell.de/sites/default/files/2015-diverging_voices_converging_policies.pdf (accessed on January 6, 2017).

[47] "P. Burian vo Ľvove: Ponúkame Vám naše autentické reformné a integračné skúsenosti" [P.Burian in Lviv: We Offer to You Our Authentic Experiences from Reforms and Integration Process]. Bratislava: *Ministerstvo zahraničných vecí a európskych záležitostí Slovenskej republiky*, October 7, 2014.

form of development projects, technical assistance and humanitarian aid funded from both governmental sources and public collections organized by Slovak NGOs in 2014 amounted to circa EUR 900,000.[48]

The above agreement on the V4 level has had a significant impact on the policy planning for Slovak Official Development Assistance (ODA) to Ukraine for the period to come. With its newly formulated political commitments, statements, and strategic documents on the table, in February 2015, the Slovak Agency for International Development Assistance announced its call for proposals for bilateral development projects, with a special focus on Ukraine (including a more significant financial allocation of 700,000 euros),[49] with energy security and efficiency as one of the three priority areas (along with good governance and security sector reforms).[50]

Starting from 2015 Slovakia has become an active actor in assisting Ukraine in reforming its energy sector. The Regulatory Office for Network Industries of the Slovak Republic (ÚRSO) implements the twinning project funded by the EU. Its goal is to provide assistance to the National Regulatory Authority of Ukraine for Energy and Public Services (NEURC) in the field of natural gas sector and electricity market reforms. The two-year project started in the autumn of 2015 with the aim of harmonizing Ukraine's national legislation and institutional setup in the field of gas and electricity markets, so that Ukraine is able to meet conditions for its integration into the EU energy market. The task for the ÚRSO is to share experience of forming the relevant legislation with the NEURC, and to supervise the drafting of new Ukrainian laws in the field, with the following goals: first, to achieve the progressive liberalization of the Ukrainian energy market; second, to introduce standard practices and methods of regulatory policy in Ukraine; and third, to create both legislative and regulatory conditions for Ukraine's integration into the EU energy market.[51] Cooperation between the national energy regulatory authorities of Slovakia and Ukraine is an important complementary element of bilateral cooperation in the energy sector.

Since October 2015 the Research Center of the Slovak Foreign Policy Association has been implementing a rather complex project focused on the building of capacities for energy sector reform in Ukraine. The project facilitates the sharing

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48 Data were provided by the Ministry of Foreign and European Affairs of the Slovak Republic in response to the author's request.

49 Before 2015, Ukraine was part of the Eastern partnership package of countries, with an overall amount of 300,000–500,000 euros on average for all of the countries.

50 "Grantové výzvy 2015," [SlovakAid. Call for proposals]. Available online: http://www.slovakaid.sk/sk/grantove-vyzvy/grantove-vyzvy-2015 (accessed on 29 August 2015).

51 "ÚRSO bude pomáhať regulačnému úradu Ukrajiny," [URSO will be providing assistance to Ukrainian regulatory authority]. Bratislava: Regulatory Office for Network Industries, June 4, 2015. Available online: http://www.urso.gov.sk/?q=Aktuality/%C3%9ARSO%20bude%20pom%C3%A1ha%C5%A5%20regula%C4%8Dn%C3%A9mu%20%C3%BAradu%20na%20Ukrajine (accessed on September 13, 2015).

of Slovak experience with Ukrainian partners in the field of energy sector reform, with a focus on improving energy efficiency and the use of renewables on municipal level, including experience of the implementation of relevant EU legislation and programs, their transposition into national legislation and policies, and learning from the best practices and successfully implemented projects in the field.[52]

There is enormous potential for bilateral Slovak–Ukrainian cooperation in the field of improving energy efficiency and the use of renewable energy sources. 405 projects (with a total investment of 167 million euros) were implemented in Slovakia at the municipal level during the years 2007–2013. Approximately one third of these projects concerned the installation of boilers based on biomass fuels for the district heating systems of towns and villages. Apart from the installation of green boilers, most projects concerned the installation of modern public lighting in municipalities (including some based on LED technologies), or improving the energy efficiency of buildings, including their heat cladding. Thanks to the harmonization of the relevant national legislation with that of the EU, as well as to adopted measures and implemented projects, the share of renewables in the total energy consumption of Slovakia grew from 6 per cent in 2005 to 9.5 per cent in 2009 and 12 per cent in 2014.[53] Slovakia is able and willing to share with Ukraine its experience in adapting national legislation to the EU's energy and climate policy (including when it comes to the regulatory framework for providing energy services), energy auditing, strategies for the renovation of buildings, financial mechanisms for implementing projects, and raising public awareness in the field of energy savings. In addition, an added value for Ukraine in Slovakia's acquired know-how in the field of energy efficiency is that it has already adapted green technologies to centralized district heating systems, a task that should also be undertaken by Ukraine, with its huge potential in the field. Slovak and Ukrainian municipalities share similar centralized district heating systems at the municipal level, which is their common infrastructural heritage from the former communist period.[54]

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52 Information about the project "Building capacities for energy sector reform in Ukraine", which RC SFPA has been implementing with the support of the SlovakAid, International Visegrad Fund, and the USAID, including the project activities and outcomes are available on the web page of the Slovak Foreign Policy Association: http://www.sfpa.sk/projects/building-capacities-for-energy-sector-reform-in-ukraine/ (accessed on January 6, 2017).

53 "Ročná správa o pokroku pri dosahovaní národných cieľov energetickej efektívnosti za rok 2014," [Annual report on the implementation of national goals in the field of energy efficiency in 2014] Ministry of Economy of SR. Available online: https://ec.europa.eu/energy/sites/ener/files/documents/SK_Annual%20Report%202015_sk.pdf (accessed on September 13, 2015).

54 For analysis of a potential of Slovakia to provide development assistance to Ukraine in the field of improving energy efficiency, including policy coherence of Slovak Official Development Assistance to Ukraine in the field of energy sector reform see Duleba, A., Brezáni, P. "Slovakia's Energy Policy Towards Ukraine. A good beginning for Slovakia's policy coherence [for development]". In: Bazyl, J. (ed.) *Policy Coherence for Development in Eastern Partnership Countries. Case Studies*. Warsaw: Grupa Zagranica, 2015, pp. 32-43. Available online: http://zagranica.org.pl/sites/zagranica.org.pl/

On September 10, 2015, the State Agency for Energy Efficiency of Ukraine (SAEE) and the Slovak Innovation and Energy Agency (SIEA) signed a Memorandum on Cooperation on Energy Efficiency, Energy Saving and Renewable Energy, which should frame further bilateral cooperation in the field, including the pertinent assistance of Slovakia to Ukraine.[55] The head of SAEE, Serhiy Savchuk, has identified Ukraine's interest in Slovak experience as follows: "The Memo signed is an important document for Ukraine in the areas of energy efficiency, energy saving and renewable energy, as Slovakia has passed the way Ukraine is going now. According to the national strategy for home renewal in Slovakia, in 2013 the heating efficiency of 50.38 per cent of the country's apartment blocks, and of 33 per cent of its private houses, was modernized. By 2020, these indicators are to grow to 72.15 per cent and 47.61 per cent respectively. It is important for us to use the experience of Slovakia, as 80 per cent of the housing in Ukraine requires modernization. He added that in Slovakia, from 2005 to 2013, 599 projects in residential buildings, worth a total of 91.5 million euros, were completed. According to Savchuk, the Ukrainian energy efficiency program was drawn up on the basis of European experience, including the experience of Slovakia, and since the moment in was put in place it has proven its effectiveness.[56] Under the memo, the SAEE and SIEA are to exchange experience on the introduction of effective financial schemes for supporting the implementation of projects in energy efficiency, renewable energy, and the use of alternative fuel.

According to the report by International Energy Agency (2012) Ukraine's ratio of total primary energy supply (TPES) to GDP in 2010 was ten times more than the OECD average. Calculated in terms of purchasing power parity (PPP), Ukraine used about 3.2 times more energy per unit of GDP than the average for OECD countries. The IEA estimated Ukraine's energy efficiency potential at 20–30 per cent of its energy supply in 2012. This potential should be tapped mainly by power and heating sector retrofitting, industry modernization, and streamlining the energy usage of domestic consumers. If Ukraine were to increase energy efficiency to the EU average level, its annual energy savings would be about 27 million tons of oil equivalent (Mtoe), or about 34 bcm of natural gas a year.[57]

Considering enormous potential of Ukraine when it comes to improving its energy efficiency as well as respective positive experiences acquired by Slovakia in the course of last decade makes bilateral cooperation of both countries in the

files/attachments/Publikacje/PCD/pcd_in_eastern_partnership_countries_grupa_zagranica_final.pdf (accessed on January 6, 2017).

55 "Ukraine, Slovakia to cooperate on energy efficiency area," *Interfax-Ukraine*, September 11, 2015, http://en.interfax.com.ua/news/economic/289579.html (accessed on September 13, 2015).

56 Ibid.

57 *Ukraine 2012*. Paris: International Energy Agency, 2012, p. 33. Available online: https://www.iea.org/publications/freepublications/publication/Ukraine2012_free.pdf (accessed on September 7, 2015). Calculations are based on the data from 2010.

field of energy efficiency and the use of renewables an additional important component of their strategic partnership in energy.

1.5 Instead of conclusion: how to sustain a momentum

Following the above analysis one could conclude that Slovakia and Ukraine finally came into understanding that they share common interests in the field of energy, which do have strategic meaning for both of them. Slovakia has become a strategic partner for Ukraine ensuring alternative supply of natural gas from the EU under situation of full stoppage of its supply from Russia. Both countries are interested in maintaining their positions as the largest transit countries for supplying Russian gas to Europe. Furthermore, they are ready to work together to defend their integral transit interests vis-à-vis Russia and European consumers of Russian gas what is a dramatic difference to what they have been showing in the course of two decades before the Maydan. In addition to gas sector they managed to expand their bilateral energy cooperation, including in energy sector reform, improving energy efficiency and the use of renewables with focus on municipal level. It looks like they learned that working together in the field of energy better serves their national interests. One can conclude that this is definitely a new momentum in Slovak-Ukrainian bilateral relations, especially against the misunderstandings or even controversies they have had in the field of energy in the years before the Maydan. However, it would be naive to conclude that recent positive changes are done once and for ever. There are risks that might undermine the existing partnership and bring Slovak-Ukrainian relations in energy back to 1990s or 2000s.

Considering that Slovak-Ukrainian energy partnership is rather a new momentum, it will take some time for it to take roots into the ground of their bilateral relationship. If one learns carefully lessons from the previous controversies between Slovakia and Ukraine when it comes to transit of energy sources from Russia to Europe, one can find that their main cause was a different reading of each country's interests in relations with Russia and/or in other words, different projections of their national interests towards Russia. Whereas Slovak political elites - under Prime Ministers Vladimír Mečiar, Robert Fico, but also Mikuláš Dzurinda if one refers on the stance of his government towards the Yamal 2 project - believed they should prioritize relations with Russia in order to ensure Slovakia's energy interests in Eastern Europe, Ukrainian political elites - under Presidents Leonid Kravchuk, Leonid Kuchma, Viktor Yushchenko, including Viktor Yanukovych in the end - have been gradually learning in the course of 1990s and 2000s that the way Russia pursues its interests within the post-Soviet area does not serve national interests of Ukraine. Failure of Russian political elites – under Presidents Boris Yeltsin and Vladimir Putin - to develop and pursue constructive agenda with its post-Soviet neighbors, an integrative type of relations based on full respect for equality and sovereignty of post-Soviet states,

brought to existence a growing numbers of conflicts in their relations with Russia, especially in the course of 2000s. Let us mention here gas disputes between Russia and Belarus (2004), Ukraine (2006, 2008 and finally 2009), Russia's military intervention in Georgia (2008), and finally its occupation of Ukrainian Crimea as well as its engagement in Donbas (as from 2014).

From the very beginning of the Russian-Ukrainian conflict in 2014 Slovak foreign policy under Fico's government tried to pursue a double-track policy: to have good relations with both Ukraine and Russia. This is the only way how one can explain Fico's policy and/or (in)coherence between his decision to facilitate a reverse flow of gas to Ukraine via Slovakia, which provided a strategic backing for Ukraine by clearing down gas supply as a tool of Russian aggression against Ukraine on one hand, and his anti-sanction rhetorics on the other.[58] Of course, from a Ukrainian perspective there is no coherence in such positions rather there is a clear contradiction between the two. Nevertheless, each party should try at least to understand the logic of policy approach of the other. For Slovak government under Fico it became clear in the meantime that having good relations with both Ukraine and Russia when they are in conflict with each other is a mission impossible. However, the real turning point in recent Fico's Eastern policy was an announcement of Gazprom on creation of international consortia on the construction of NS 2 project at the beginning of September 2015. It should be noted here that it was a renewed lesson for Fico's government after the gas crisis in January 2009. He finally learned that Russia simply ignores interests of Slovakia and that the only way to defend them is to defend also transit interests of Ukraine. It does not mean though that Fico will change his stance over the EU sanctions on Russia; however, it does mean he understands common interests of Slovakia and Ukraine in the field of transit of Russian gas to Europe. And that is the political momentum that should be fixed up and be built on in bilateral relations should the energy partnership between Slovakia and Ukraine become a long term deal, not just a short post-Maydan episode.

Analysis of a political context of Slovak-Ukrainian energy partnership is a must in order to understand that it is a new phenomenon with very fresh and fragile roots. Its sustainability fully depends on political will as well as a capacity of each side to reflect upon national interests of the other. Here, on side of Slovakia, risks are connected with a duplicitous shape of its Eastern policy. The post-Maydan developments

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[58] For analysis see Duleba, A. "Východná politika SR v znamení rusko-ukrajinskej krízy" [Eastern policy of Slovak Republic in the context of Russian-Ukrainian crisis]. In: Brezáni, P. (ed) *Ročenka zahraničnej politiky Slovenskej republiky 2014*. Bratislava: Výskumné centrum Slovenskej spoločnosti pre zahrančú politiku, 2015, pp. 81-100. Available online: http://www.sfpa.sk/wp-content/uploads/2014/02/R2014.pdf (accessed on January 7, 2017); and Duleba, A. "Tri tváre slovenskej východnej politiky v roku 2015" [Three faces of Slovakia's Eastern policy in 2015]. In: Brezáni, P. (ed) *Ročenka zahraničnej politiky Slovenskej republiky 2015*. Bratislava: Výskumné centrum Slovenskej spoločnosti pre zahraničnú politiku, 2016, pp. 85-100. Available online: http://www.sfpa.sk/wp-content/uploads/2016/04/R2015.pdf (accessed on January 6, 2017).

changed a lot in Slovak perception of Eastern Europe, including Russia and Ukraine, however, there are long term political and historical factors that shape Slovak foreign policy identity and definitely they will not disappear over a couple of years.[59]

On side of Ukraine, main political risks when it comes to sustaining the momentum of energy partnership with Slovakia, concerns a lurking underestimation of Slovakia still being viewed in Kyiv as a "smaller neighbour". Many in Kyiv still believe that "if we manage to agree with Brussels, Berlin or Warsaw, Bratislava will follow." That's a similar mistake as Slovakia's former (under Mečiar's foreign policy in the 1990s) believe that "if we manage to agree with Moscow, Kyiv will follow." Unlike Ukrainian political class, a Slovak one got rid of the above illusion at the beginning of 2000s. However, in Kyiv, underestimation of Slovakia as a political actor continues to be a part of Ukrainian foreign policy thinking. The above approach of Ukraine towards Slovakia as a "smaller neighbour" creates serious difficulties in bilateral relations.

Let us illustrate the above approach by referring on the cancelled event within the V4 Road Show under auspices of Slovakia that has been intended to take place in Ivano-Frankivsk in June 2015. The V4 Road Show series of events in regional centres of Ukraine is part of the agreement between V4 and Ukraine on specific sectorial focus of the V4 countries assistance to Ukraine managed by Slovak Presidency in the V4 at the end of 2014. Under the agreement each V4 country took over obligation to co-organize a thematic and reform oriented event in Ukraine once a year at least. Slovakia was preparing the event in Ivano-Frankivsk to be held on 23 June 2015 with thematic focus on the energy efficiency, a sectorial priority it identified for its assistance to Ukraine. While the Slovak Ministry of Foreign and European Affairs together with other Slovak organizations and respective agencies together with their non-governmental Ukrainian partners have been preparing the event for several months, Ukrainian MFA, being informed about the agenda of the event from the very start of its preparation, shortly before the date of the event came up with a request to include also reverse flow of gas as the topic to the event's agenda. Moreover, it raised a requirement that Slovak side should ensure participation of representatives of respective V4 ministries with a gas portfolio. Given the fact that Ukrainian side raised its requests a week before the date of the event, it was simply impossible to manage them. In the end, the event in Ivano-Frankivsk was cancelled.[60] Moreover, on 24 June 2015 – a day after the cancelled event - Ukrainian government submitted a claim to the European Commission concerning Slovakia's would-be violation of the EU legislation due to the Eustream

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[59] For summary of main historical and political factors that form present Slovak foreign policy identity see Duleba, A. "Slovakia's foreign policy towards the Russian-Ukrainian conflict". In: Kucharczyk, J., Mesežnikov, G. (eds), 2015, op. cit.; for more detail analysis see Duleba, A. "Slovakia's Historical and Cultural Relations with Russia and Ukraine." In: Kempe, I., Meuers, W. van, and Ow, B. von (eds) The EU Accession States and Their Eastern Neighbours. Gütersloh: Verlag Bertelsmann Stiftung, 1999.

[60] For detail information about the "Ivano-Frankivsk cause" in recent Slovak-Ukrainian relations see Duleba, A. "Tri tváre slovenskej východnej politiky v roku 2015", op. cit.

transit contract with the Gazprom-Export, which does not allow full-fledged access of Naftogaz to the main gas pipelines on Slovak border and/or so called "big reverse flow" from Slovakia.[61]

In Slovakia, the way Ukrainian side approached the energy efficiency event in Ivano-Frankivsk followed by a claim addressed to the European Commission was assessed as a gesture of diplomatic arrogance of Ukraine. First of all, reverse flow of gas to Ukraine was brought in line with both European legislation and the transit contract of Eustream with Gazprom-Export yet in 2014. Everything in this context has been agreed and Slovakia did deliver gas to Ukraine during the critical winter period of 2014-2015. Surprisingly for Slovak side, Ukrainian one decided that it can use Brussels and the European Commission as a tool of exerting its influence over Slovakia. Second, the so-called "small reverse flow" via Vojany – Uzhgorod pipeline was increased into capacity of 14.5 bcm/year starting as from March 2015, what together with reverse flows available from Poland and Hungary exceeds expected and announced import needs of Ukraine, e.g. 20 bcm/year. In addition, in 2016 Ukraine imported just 11.78 bcm of gas what is a less than existing transit capacity of the so-called "small reverse flow" from Slovakia alone without Polish and Hungarian reverse flows. In other words, a Slovak "small reverse flow" against reality is not so much small for Ukraine. And finally, the thematic focus of the Ivano-Frankivsk was V4 support for energy efficiency in Ukraine on a local level, not a reverse flow of gas. Many in Slovakia, who were engaged in preparation of the Ivano-Frankivsk event, raised the question: should we invest our time and energy in providing assistance to Ukraine if it does not want it?[62]

The bad frame of mind in Slovak-Ukrainian relations due to an arrogant approach of Ukraine, which resulted in cancelling of a "Slovak" energy efficiency event in Ivano-Frankivsk, lasted till the meeting of Prime Ministers Fico and Yatsenyuk in Bratislava on 10 September 2015, which as we pointed out above has been a turning point for Fico's Eastern policy. Anyhow, the way in which Ukrainian side approached the event in Ivano-Frankivsk has shown exactly the way how it shall not work with Slovakia.

In order to sustain a critical momentum in their bilateral relations as well as to maintain a newly open page of their strategic partnership in the field of energy, both Slovakia and Ukraine have to, first, learn carefully lessons from mistakes they did in the past, second, to show more empathy to each other projection of national interests, and third, to improve understanding of each other national foreign policy identity. As the recent developments prove it if they work together they are more efficient in serving their national interests.

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[61] Tóda, M.: Naše vzťahy s Ukrajinou sa zhoršili. Kyjev napadol Slovensko za zmluvu s Gazpromom [Our relations with Ukraine got worse. Kyiv attacks Slovakia for its agreement with Gazprom]. *Denník N*, 24.6.2015. Available online: https://dennikn.sk/168993/nase-vztahy-s-ukrajinou-sa-zhorsili-kyjev-napadol-slovensko-za-zmluvu-s-gazpromom/ (accessed on January 6, 2017).

[62] Ibidem

2. Current balance of the energy sector of Ukraine and a way ahead

Karel Hirman

In the past three years following the events on Maydan, Ukraine took more reform steps in the energy sector than during the entire previous period of its independence that started in 1991. However, until now, numerous fundamental laws in the field have not been adopted yet what would allow for launching thorough and complex de-monopolisation and liberalisation of the Ukrainian energy market. Until the end of August 2016, Ukraine had still no independent legislative energy regulator, act on regulation of the electricity market is missing as well, and the existing legislative regulation of the gas market is not sufficient to start proper liberalisation. Moreover, considering that the decision of the government on the unbundling of Naftohaz is rather formal in nature as the implementation thereof shall be delayed until the the resolution of arbitration procedure between Naftohaz and Gazprom.[63] Finally, the situation in the energy sector remains very critical especially when it comes to heat supply to housholds.

What we may consider the most important success stories and changes seen until now in reality is the diversification of deliveries of the two key energy commodities dominating the energy mix in Ukraine – natural gas and nuclear fuel. This includes the decision of the Ukrainian government to even the prices of gas for households out with the commercial level so as to reflect actual expenditures incurred on the purchase of gas abroad and the production thereof in Ukraine.[64] Owing to that, Naftohaz will in 2016 - for the first time since 2006 – be able to

[63] The Ukrainian company Naftohaz and the Russian company Gazprom have over time submitted with the arbitration court in Stockholm since 2014 mutual entries for trial claiming failure to perform business contracts on the purchase and delivery of natural gas and the transit thereof amounting in total to more than 50 billion USD. The last entry for trial was submitted by both companies in the summer of 2016 in relation to the deliveries of Russian natural gas to the separatist regions of Donbas and the failure to abide by the conditions of the Transit Contract. The first judgments of the arbitration court are expected in the first half of 2017. See for example "Vzaimnie pretenzii Naftogazai Gazproma v Stokgolskom arbitraze dostigli $50 mld. - Kobolev". *BiznesCensor*, 20.04.2016. Available online: http://biz.censor.net.ua/news/2837/vzaimnye_pretenzii_34naftogaza34_i_34gazproma34_v_stokgolmskom_arbitraje_dostigli_50_mlrd_kobolev (accessed on October 9, 2016).

[64] The decision of the Government of Ukraine No.: 315 of 27.4.2016 establishing a uniform commercial level of the wholesale gas price for heat producers delivering to households amounting to 4942 hryvnias (circa 170 Euros) for one thousand cubic metres and a uniform maximum price of gas delivered to households amounting to 6879 hryvnias (circa 237 Euros) for one thousand cubic metres. The process for other consumer categories remains unregulated since October 2015.

make it without financial aid from the state budget to cover for the losses of selling gas to the housholds and vice versa, will, according to the expectations of the management, make profit at the end of the year amounting to 16 to 18 billion hryvnias upon taxation. A major share of that will of course be the revenue made on the transit of Russian gas to Europe amounting to 2 billion USD annually.[65] Despite the fact that the basic price of gas was increased to a price for which Ukraine purchases gas from the EU as to Deputy Minister of the Ministry of Economic Development and Commerce Olga Kovaliv, the price of gas delivered to Ukrainian households remains one of the lowest in Europe.[66]

Looking more specifically at the diversification of nuclear fuel supply, in the first half of 2016 more than 40 % of imported nuclear fuel delivered to Ukrainian nuclear power plants came from the Swedish production plant of the American and Japanese corporation Westinghouse, while the rest was delivered by the traditional Russian supplier company TVEL.[67] In the case of natural gas, the share of Russian deliveries was also decreased dramatically, whereby from November 25, 2015 the import from Russia was stopped completely.[68] During the summer of 2016, the highest-ranking official of the Ukrainian state oil and gas holding Naftohaz Andrey Kobolyev repeatedly declared that they, being the key importer and supplier of gas in Ukraine in 2016, didn't plan to purchase natural gas from the Russian Gazprom, since the entire volume of gas for winter 2016/2017 would be covered by the supply from the EU and by domestic production. "We expect that towards the beginning of the heating season (October 2016 – author's comment) we shall collect and store approximately 14.5 bcm of gas, which seems to be an amount to comfortably manage the period of autumn and winter," Kobolyev claimed speaking to Ukrainian media and to the government.[69] However, in the summer doubts arose in relation to

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65 "Naftogaz ozhidaet 16-18 milliardov cistoi pribili v 2016 godu". *BiznesCensor*, 18.8.2016. Available online: http://biz.censor.net.ua/news/9899/34naftogaz34_ojidaet_1618_milliardov_chistoyi_pribyli_v_2016_godu (accessed on September 10, 2017).

66 "Roznicnaya cena prirodnovo gaza dlia naselenia v Ukraine ostaetsa odnoi iz samikh nizkih v Evrope". *BiznesCensor*, May 11, 2016. Available online: http://censor.net.ua/photo_news/387908/roznichnaya_tsena_prirodnogo_gaza_dlya_naseleniya_v_ukraine_ostaetsya_odnoyi_iz_samyh_nizkih_v_evrope (accessed on February 10, 2017).

67 "Ukraina za pivroku importuvala zi Shvetsii 42% yadernovo paliva, reshtu – z Rosii". *UNIAN*, 22.8.2016. Prístupné na internete: http://economics.unian.ua/energetics/1481489-ukrajina-za-pivroku-importuvala-zi-shvetsiji-42-yadernogo-paliva-reshtu-z-rosiji.html (accessed on February 10, 2017).

68 "V pervom polugodii Ukraina importirovala 3 milliarda kubometrov gaza po sredney tsene 195,2 USD za tisyachu kubometrov". *BiznesCensor*, August 22, 2016. Available online: http://biz.censor.net.ua/news/10009/v_pervom_polugodii_ukraina_importirovala_3_milliarda_kubometrov_gaza_po_sredneyi_tsene_1952_za_tysyachu (accessed on February 10, 2017).

69 "Naftogaz gotov vpervie zavershit podgotovku k zime bez zakupok gaza v Rossii". *BiznesCensor*, 19.08.2016. Available online: http://biz.censor.net.ua/events/9901/34naftogaz34_gotov_vpervye_zavershit_podgotovku_k_zime_bez_zakupok_gaza_v_rossii (accessed on February 10, 2017).

the sufficiency of such volumes of stored gas not only among Ukrainian independent experts and within the European Commission, but also among the members of the Ukrainian government, including the Prime Minister Volodymyr Groysman.[70]

The course of the heating season 2016-2017 will be the key factor for testing public support to the Ukrainian government in promoting domestic reforms in the energy sector as well as the position of Ukraine as a stable and credible country able to transit Russian natural gas to the EU. Problems with the safeguarding of continuous and fluent deliveries onto the domestic market or with the transit itself might lead to a severe questioning of reforms and significantly strengthen the position of gas pipelines bypassing Ukraine – Nord Stream 2 and Turkish Stream – which had been initiated by Russia. Energy, and especially its gas sector, remains one of the fundamental strategic factors that influence not only the internal political situation and stability in Ukraine, but also the international security and the economic position of Kiev.

2.1 Gas sector

2.1.1 Reverse flow of gas

A cardinal turn in Ukrainian energy sector, and in the overall strengthening of energy security of Ukraine, was taken by gradually putting into operation the cross-border gas pipeline connection with Hungary, Poland, and especially with Slovakia. This allowed the company Naftohaz and some other business companies to purchase natural gas on EU markets (especially in the so called gas hubs and business platforms in Germany, Austria and Slovakia) and subsequently physically import gas to Ukraine. The first reverse deliveries of gas, under the rule of the government set up by the President Viktor Yanukovych, were made from Poland and Hungary already at the end of 2013, in the overall volume of around two billion cubic metres. Considering the small technical capacity of Polish and Hungarian pipelines of that time, however, the signing of agreement on the reverse flow through the Slovak and Ukrainian gas pipeline leading from Vojany to Užhorod in April 2014 with the initial daily capacity of 22 mcm (around 8 bcm annually) was a major step forward. The significance of the said agreement was reflected also in the presence of the then President of the European Commission José Manuel Barroso at the ceremonial signing thereof in Bratislava.[71]

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[70] Discussion during a special meeting between the Prime Minister of Ukraine and the Members of the Government with the representatives of energy companies regarding the problems of the energy sector and the preparation thereof for the period of autumn and winter 2016/2017 held on July 21, 2016 in the Office of the Government attended by the author. See also "Groysman o zapasakh gaza na zimu: ishchem optimalnuyu cifru mezhdu 14.5 i 17 milliardami kubov". *UNIAN*, September 2, 2016: http://economics.unian.net/energetics/1500808-groysman-o-zapsah-gaza-na-zimu-ischem-optimalnuyu-tsifru-mejdu-145-i-17-milliardami-kubov.html (accessed on February 10, 2017).

[71] "The agreement of the flow of gas to Ukraine has been signed". *EurActiv.sk,* April 28, 2014. Avail-

"I warmly congratulate all parties involved on the breakthrough in the negotiations on gas flows from Slovakia to Ukraine. This is an important first step to diversify Ukraine's sources of gas supply and contributes to greater energy security in Eastern Europe and the EU as a whole," said Barroso. "Gas via Slovakia will bring a considerable addition to the volumes that Ukraine can already import from Hungary and Poland. Deliveries from EU Member States offer Ukraine access to gas priced on the basis of fair and transparent principles," explained the then Commissioner for Energy Günther Oettinger in Bratislava. The Slovak Prime Minister Robert Fico highlighted that the agreement proved that it was possible to rely on Slovakia. "Speaking of concerns related to financial issues, it is a standard operation including gas deliveries onto a territory another state with payments and all the related actions," Fico noted. At the same time he highlighted that the agreement on the so called "small reverse flow" was the best solution from the political, legal, economic as well as financial point of view. According to him, the proposals that were submitted at the beginning, which counted on the taking advantage of the free capacity of pipelines leading from Užhorod to Veľké Kapušany (the so called "big reverse flow" on the major transit corridor – author's comment) would significantly jeopardise the transfer of gas from Russia to Slovakia.[72]

The point is that the Ukrainian part first insisted on the reverse flow going from Slovakia through the transit corridor which leads Russian gas via Ukraine and Slovakia to the EU. The Slovak government as well as the Eustream company which owns and operates the transit gas pipeline system on the territory of Slovakia, however, declined this possibility, pointing out to the valid agreements on transit conditions made with the Russian company Gazprom but also with other European companies that purchase gas from Gazprom on the Slovak-Ukrainian border in Veľké Kapušany. The Slovak party at the same kept arguing that the gas pipe leading from Vojany to Užhorod, which is not part of the above transit corridor, was thus not governed by the transit contracts with Gazprom, and was therefore a suitable solution not only from the business, but also from the legal and technical point of view, as its capacity could be increased. This was later verified, and, by implementing joint measures on the part of Eustream and Ukrtransgaz, its daily capacity was gradually doubled to the current level of over 40 mcm (around 15 bcm). In 2015, according to the General Director of Eustream Rastislav Ňukovič, some 10 bcm were delivered to Ukraine, which, in his words, repeatedly verifies that the so called big reverse flow wasn't necessary, indeed.[73]

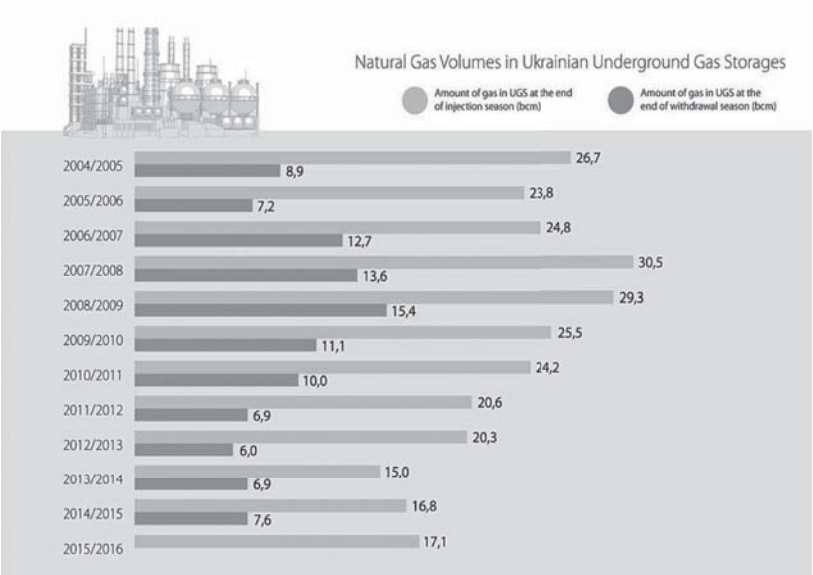
able online: http://euractiv.sk/clanky/energetika/dohody-o-toku-plynu-na-ukrajinu-su-podpisane-022350/ (accessed on May 13, 2017).

72 Ibidem.

73 "A. Kiska: Nord Stream 2 should be perceived as an immense threat to Ukraine". *TASR*, June 9, 2016. Available online: www.teraz.sk/ekonomika/akiska-nordstream-ukrajina-plynovod/200898-clanok.html (accessed on May 13, 2017).

2.1.2 Winter factor

The Ukrainian energy sector survived the last two winters without problems and the transit of natural gas from Russia to the EU was undisturbed. In order to maintain the stability of the entire gas pipeline system in Ukraine from the point of view of domestic deliveries as well as international gas transportation, the underground gas storages are of key importance. The largest of them are located in Western Ukraine, in the area called Bogorodčany in the vicinity of the Carpathian Mountains, taking advantage of the geologic structures of former gas fields. Their total gas storage volume amounts to around 30 bcm.[74]



Source: Naftohaz

In the past two years (winter 2014-2015 and 2015-2016) the volume of gas stored before the winter was around 16 - 17 bcm. In the past years the consumption of gas in Ukraine decreased quite significantly especially as a result of notable economic decline, the annexation of Crimea and separatist controlled part of Donbas, and also due to unusually warm winters. Because of those reasons, at the end of the last heating season, in April 2016, more than 8 bcm of gas were left in the gas storages. Out of that, there were around two billion cubic metres of active gas, and the rest was the so called cushion gas, which cannot be extracted from the gas storage in order to maintain suitable geological conditions and retain the storage capacity.

[74] Source: *Ukrtransgas*: www.utg.ua.

This allowed Naftohaz at the beginning of 2016 to limit the import of gas. In the first half of 2016 Ukraine only imported three bcm, whereby the average price of such gas amounted to 195.2 USD per tcm. During this entire period there were negotiations held with the Russian Gazprom to set the price and the logistic conditions to re-launch the deliveries. The management of Naftohaz at the same time claimed that the purchase of gas from the EU would only start in the summer, when the prices on the market are low. "Because we understood that in the third quarter there was the possibility that Gasprom adopts a negative attitude, the gas purchasing schedule was prepared so as to purchase the entire volume from the European direction, what we also started doing in July," explained the President of Naftohaz A. Kobolyev.[75] Starting in July 2016, Naftohaz, together with several other Ukrainian business companies, gradually increased the daily import from Poland, Hungary, and predominantly from Slovakia up to the level of 45-46 mcm.[76] Ukrainians also took advantage of the significant price drop on the spot markets in Central Europe. While in June the price was approximately 165 USD/tcm, in the second half of July it dropped by around 25 %. Naftohaz has ben purchasing gas on the market one month ahead. In July (with a delivery in August) the prices in the two key German gas hubs - Gaspool and NCG - dropped to 148 - 158 USD/tcm which, together with the price of transportation to the Slovak-Ukrainian border, amounted to around 173 - 180 USD. The prices for September dropped even more, to around 138 USD/tcm (around 163 USD on the Slovak-Ukrainian border). The Business Director of Naftohaz Yuriy Vitrenko confirmed that the price on European gas on the border of Ukraine fell significantly under 185 USD/tcm, which was the price suggested by Gazprom on the Russian-Ukrainian border for the third quarter of 2016.[77]

Naftohaz purchased gas from the EU using its own financial resources as well as a loan from the European Bank for Reconstruction and Development (EBRD) amounting to 300 million Euros. Should the amount of stored gas be increased to the level of 17 bcm, a loan was to be provided by the World Bank in the volume of additional 500 million USD.[78] According to the director of Naftohaz A. Kobolyev, the company has a diversified portfolio of gas suppliers, which reflects the fact that in 2016 they purchased gas from as many as 14 European companies.[79] With such import level and the daily domestic production of around 55 mcm, out of

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75 Author's interview with A. Kobolyev, Kyiv, July 2016.

76 "Naftogaz gotov vpervie zavershit podgotovku k zime bez zakupok gaza v Rossii", op. cit.

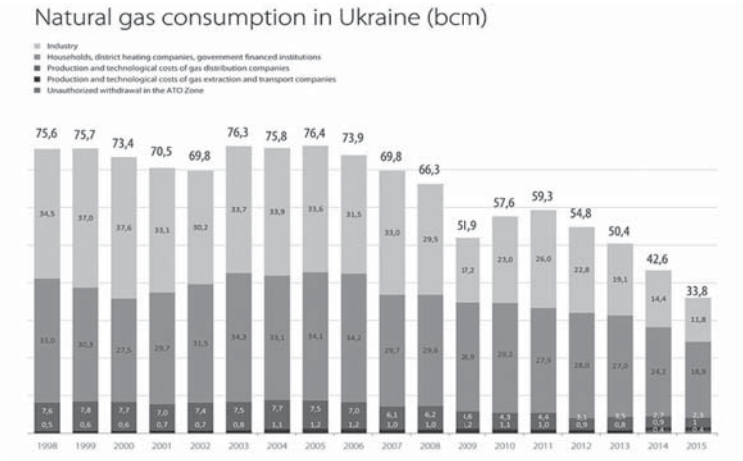
77 "Ceny na gaz dlia Ukraini iz Evropi upali nizhe "gazpromovskikh". *BiznesCensor*, August 25, 2016. Available online: http://biz.censor.net.ua/events/10149/tseny_na_gaz_dlya_ukrainy_iz_evropy_upali_nije_34gazpromovskih34 (accessed on May 13, 2017).

78 "Naftogaz osvoil 90.7 % kreditnikh sredstv EBRR na zakupku gaza iz Yevropy". *BiznesCensor*, August 18, 2016. Available online: http://biz.censor.net/news/9900/34naftogaz34_osvoil_907_kreditnyh_sredstv_ebrr_na_zakupku_gaza_iz_evropy (accessed on May 13, 2017).

79 "14 evropeyskikh kompanii prodayut gaz Ukraine – Kobolyev". *BiznesCensor*, September 9, 2016. Available online: http://censor.net.ua/news/405191/14_evropeyiskih_kompaniyi_prodayut_gaz_ukraine_kobolev (accessed on May 13, 2017).

which approximately 20 mcm were injected back to the gas storages, it was possible in August and September to fill the gas storages with approximately 1.8 bcm of gas each month. This way until mid-October 2016 – the beginning of the heating season - Ukrainian gas storages would hold up to 15 bcm of gas. However, already at the end of August the government announced they wished Naftohaz to increase the storage capacity up to the level of previous winters, i.e. up to 16 to17 bcm, in order to ensure fluent deliveries in the winter season.[80] This request was also raised during a visit to Kiev paid by the Vice-Chairman of the European Commissioner for the Energy Union Maroš Šefčovič at the beginning of September as part of the negotiations held with the Ukrainian Prime Minister.[81]

The fact is that the consumption of gas in Ukraine dropped significantly in the last period due to various reasons (economic recession, annexation of Crimea, and the fighting in Donbas, warm winters). According to the data provided by the company Ukrtransgaz the consumption of gas dropped by around 18 % to 18 bcm in the first eight months of 2016 in comparison with the same period of the last year. In 2015 that was the total of 33.7 bcm, which, compared to 2014, was a decrease by nearly 21 %.[82]



Source: Naftohaz

80 "Kabmin khocet uvelicit zapasy gaza na zimu do 17 milliardov kubov." *UNIAN*, August 31, 2016. Available online: http://economics.unian.net/energetics/1496231-kabmin-hochet-uvelichit-zapasyi-gaza-na-zimu-do-17-milliardov-kubov.html (accessed on May 13, 2017).

81 "Volodymyr Groysman and Maros Sefcovic discuss ways of strengthening cooperation between Ukraine and the EU in the energy sector." Press release. Government of Ukraine, September 2, 2016. Available online: http://kmu.gov.ua/control/en/publish/article?art_id=249280270&cat_id=244314971 (accessed on May 13, 2017).

82 "Ukraina s nacala goda sokratila potreblenie gaza pochti na 18 %." *UNIAN*, September 2, 2016. Available online: http://economics.unian.net/energetics/1500173-ukraina-s-nachala-goda-sokratila-potreblenie-gaza-pochti-na-18.html (accessed on May 13, 2017).

The problem with an optimal volume of gas stored for the winter consists not only in the overall volume of consumption, but also in a daily course depending on the development of climate conditions and temperature. What is a specific problem of the Ukrainian gas sector is the significant volume and length of the transit routes and what it makes even more complicated is the fact that the transit system is not separated from the domestic distribution system (unlike Slovakia, for instance). Underground gas storages thus have to cover not only the peak domestic consumption during the freezing cold winter days, as it is the case in other gas infrastructures in Europe, but also the fluctuations in the transit transportation flow via its own territory leading from Russia to Europe. Another specific problem is the design and the technical quality of Ukrainian underground gas storages. Already the mentioned potential storage volume, which goes well beyond the real volumes of stored gas, results in limited working pressure in the gas storages. It drops notably especially during extremely freezing cold days, or towards the end of the heating season, when the volume of stored gas is significantly decreased. According to the data provided by Ukrainian experts who are well acquainted with the operation of gas storages, the declared stored volume of up to 15 bcm at the beginning of the heating season (October) will provide for the daily working performance of 130 mcm at the maximum during the cold days of January. With the stored volume of 16.5 to 17 bcm, the maximum performance increases to more than 180 mcm. The standard daily consumption in January reaches some 200 mcm; however, in case of a significant decrease in temperature lasting for a few days, it goes beyond 300 mcm. The daily winter consumption course is also influenced by the fact that the total annual gas consumption shows a significantly decreasing tendency. And this also stirs discussions on sufficient volumes of stored gas in Ukraine.[83]

In order to prevent the reoccurrence of problems with the sufficiency of stored gas volumes before the winter season, an essential technical modernization of gas storages is necessary, which will allow for their increased daily flexibility and working pressure. In addition, the transit system should be technically separated from the domestic distribution system in order to set up conditions for creation of an international consortium - transit network operator - and carry out the unbundling process of Naftohaz.[84] At the same time it seems necessary, based on technical

[83] Author's interview with representatives of Ukrtransgaz co. who operate underground gas storages, controll transit and the distribution networks.

[84] Ukraine started negotiations with the European Commission, the EU Member States, the United States and certain foreign companies – gas transit operators – on the possibility of establishing an international operator of the Ukrainian transit system. Kyiv aims at safeguarding that the Ukrainian transit system remains attractive for the transit of Russian natural gas to Europe also after 2019 after the termination of the current transit contract between Naftohaz and Gazprom. The Vice President of the European Commission M. Šefčovič during his visit to Kyiv on September 2, 2016, stated that the Commission asked European operators to start negotiations with Ukraine

analyses, that Ukrtransgaz maintains the ownership over a portion of gas storages necessary in order to stabilise the operation of the transit system, while the remaining capacity of gas storages should be allocated to serve the needs of the domestic gas market. Before unbundling of Naftogaz and separating Ukrtransgaz (which will be possible only after the finalisation of the arbitration dispute between Naftohaz and Gazprom) the government must strengthen the managerial and decision-making competences as well as the financial and economic independence of Ukrtransgaz within the corporate regulations of the Naftohaz Group.

2.1.3 Gas and oil production

The objective of the decision made by the Ukrainian government on April 27, 2016, was to determine a unified commercial price on gas for households, and also to create conditions for the support of domestic gas production. The government declared that until 2020 it wants to achieve a level of domestic production amounting to the volume of 29 bcm/year. In the past few years, however, the production was dropping. While in 2013 it reached 20.4 bcm, a year after it amounted only to 19.7 bcm and to 19.2 bcm in 2015 (the data do not include the production volume on the annexed territory of Crimea and the separatist Donbas). This means that last year the domestic production covered around 57 % of total annual consumption. A slight decrease was observed also in the first seven months of 2016, when in comparison with the same period of 2015, gas production dropped by 0.3 %. An even more significant drop was observed in the production of oil; however, Ukraine cannot cover its consumption and has to import most of oil products. In 2015 the oil production decreased semi-annually by nearly 12 % to around 1.8 million tons and this trend continued also in the period from January to July 2016, when oil production dropped by around 12 % to 958 thousand tons.[85] The major producers of hydrocarbons still include the affiliate companies of Naftohaz – Ukrgazvydobuvania and Ukrnafta.

Increased domestic production is hindered by the lack of transparency and the corruption in the entire sector, including the granting production licences by the state. Considering the quite difficult geological conditions, the lack or absence of modern production equipment and know-how necessary in production, as well as the lack of financial resources, any further significant increase in the production of gas or oil is to be considered hardly possible without participation of experienced

on the possibilities and conditions of their cooperation in order to establish international operator of Ukrainian gas transit system. "Evrokomissia potvedrzdaet gotovnost ucastvovat v modernizacii ukrainskoi GTS." *UNIAN*, September 2, 2016. Available online: http://economics.unian.net/energetics/1499838-evrokomissiya-podtverjdaet-gotovnost-uchastvovat-v-modernizatsii-ukrainskoy-gts.html a z 11.08.2016 (accessed on May 13, 2017).

85 "V Ukraine s nachala goda sokratilas dobycha nefti i gaza." *UNIAN*, August 23, 2016. Available online: http://economics.unian.net/energetics/1482909-v-ukraine-s-nachala-goda-sokratilas-dobyicha-nefti-i-gaza.html (accessed on May 13, 2017).

Western producers. Those are not only put off by insufficient legislative guarantees and the said lack of transparency in the business environment, but also by the inappropriately high royalties paid for the production of hydrocarbons. In the case of private gas investors they currently reach 29 %, which is well beyond the average in Europe. The management reform in production companies of Naftohaz, which was introduced by the government in the past period, will probably not be sufficient in order to meet the declared objectives, especially with the royalties for Ukrgazvydobuvania amounting to 50 %.

In order to see a significant increase in the production of hydrocarbons (especially of gas), the government should decrease the royalties substantially so as they reach an acceptable European level of around 12-15 %. At the same time the government should create transparent conditions for granting licences as well as stabile legislative conditions, which will allow for the signing of long-term production agreements with relevant foreign companies.

2.2 Power sector

2.2.1 Consumption decline

Both consumption and generation of electricity has been showing a declining trend in Ukraine in the past few years similarly to natural gas, even if the decline is not that significant as in case of gas. According to the data provided by the Ministry of Energy and Coal Industry of Ukraine the consumption (including technical losses) decreased in 2015 compared to 2014 by more than 11 % to the total amount of 150.6 billion kWh. A drop by nearly 5.5 % was also observed in the first half of 2016 compared to the same period of previous year and the total consumption thus reached 73.5 billion kWh. Again, the most significant drop was observed in the amount consumed by the industry (by 5.1 %) and by the population (by nearly 6 %), whereby the portion consumed by the industry amounted approximately to 42 %, and the portion consumed by the population went slightly above 31 % in relation to total consumption.[86]

Practically at the same time there also was a decrease in electricity production. Compared and contrasted against the same period of 2015, in the first seven months 2016 it dropped by around 5 % (by 4.8 billion kWh) to the total volume of 88.3 billion kWh. The most significant decrease in production by 10 % was observed in nuclear plants, and the production of hydroelectric power plants, including pumping stations, increased by nearly 25.5 %, showing the opposite tendency. On the other hand, the export of electricity was increased by as much as 9 %

[86] "Potreblenie elektroenergii v Ukraine za 6 mes. 2016 sokratilos na 5,4 %." *Interfax-Ukraina*, July 18, 2016. Available online: http://uaenergy.com.ua/post/26603/potreblenie-elektroenergii-v-ukraine-za-6-mes-2016-g/ (accessed on May 13, 2017).

reaching the total volume of nearly 2.5 billion kWh, which was reflected in revenues amounting to 98 million USD. As for the entire year of 2015, the production of electricity decreased semi-annually by 13.6 % to the level of 157.3 billion kWh. Its export dropped even more significantly - 2.2 times - to the level of 3.64 billion kWh, whereby the drop went beyond 3 times in financial terms (from 487 million USD in 2014 to 150 million USD in 2015).[87]

2.2.2 Problematic supply of coal from Donbas

Since the eruption of fighting in Donbas in April 2014, the Ukrainian energy sector has been facing serious problems with the supply of thermal coal produced in this area. What is a specific problem is anthracite coal, as practically all mines producing this type of coal are located within the territory controlled by the separatists. The production of electricity in thermal power plants, which are located within the territory controlled by the central government, are technologically dependent on anthracite coal (every coal boiler is technologically adjusted to consume coal of a certain quality and it is impossible to mix various qualities or switch to a different type of coal without making major technical adjustments to the boilers, or even without completely replacing them with new ones). On the territory of Ukraine controlled by Kiev there is a sufficient number of coal mines and unused production capacities producing another type of thermal coal – the so called "gas coal". However, this type of coal, which in comparison with anthracite has a lower calorific value, cannot be used in thermal power plants due to lack of suitable boilers. The government would therefore like to initiate the process of making necessary technological adjustments to the boilers in question, which in many power plants wouldn't really be time and money consuming. However, the entire process is complicated by the fact that anthracite mines and the thermal power plants that consume this type of coal are controlled mainly (around 70 %) by the major private Ukrainian energy holding Detek owned by the oligarch Rinat Akhmetov.[88]

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87 "Proizvodstvo elektroenergii v Ukraine s nacala goda upalo na 5%, eksport-vyros na 9 %." *BiznisCensor*, 18.08.2016. Available online: http://biz.censor.net.ua/news/9828/proizvodstvo_elekroenergii_v_ukraine_s_nachala_goda_upalo_na_5_eksport_vyros_na_9 (accessed on May 13, 2017).

88 Author's own calculation. See also "Zapasi deficitnovo uglia na ukrainskih TES sokratilis do minimuma s iyunia proslovo goda." *UNIAN*, 29.06.2016. Available online: http://conomics.unian.net/energetics/1391170-zapasyi-defitsitnogo-uglya-na-ukrainskih-tes-sokratilis-do-minimuma-s-iyunya-proshlogo-goda.html (accessed on May 13, 2017).

The share of fuels used in the total energy consumption of Ukraine in 2014 by their type (with the exception of Crimea and the separatist zone of Donbas)

Type of fuel	Share (in percentages)
Coal	34
Natural gas	31
Nuclear fuel	22
Oil	10
Renewable resources	3
Note: Total consumption represents 105.7 million tons of oil equivalent	

Source: Ministry of Regional Development, Building and Housing of Ukraine, 2016.

The situation with the deliveries of coal from the separatist Donbas was already complicated in 2015; however, in the spring and summer of 2016 it escalated even more. The deliveries were practically stopped at the end of April.[89] On the background of a supplier conflict that clearly had underlying political and security causes relating to the situation in Donbas, there was a continuous decrease in coal production as such. In the first half of 2016, the production dropped by 2.5 % in comparison with the same period of 2015 when only around 18.8 million tons of coal were produced. Out of the above volume, 16 % (around 3 million tons) were produced in state owned mines. That was a continuation of the trend of 2015, when the production was stagnating because of the conflict in Donbas and decreased semi-annually 1.6 times (from 65 million tons in 2014 to around 39.8 million tons in 2015). This drop concerned especially anthracite coal, which is being produced predominantly on the separatist territory.[90]

Interruptions in the deliveries of coal from Donbas were partially compensated by its import from abroad. According to the data provided by the State Financial Service, the import of coal amounted to 902 million USD in financial terms in the first eight months of 2016. The greatest volume – for as much as 595 million USD - was imported from Russia, followed by import from the U.S. (132 million USD), Australia (nearly 50 million USD), and from other countries (125 million USD). In 2015 Ukraine imported various types of coal (used in the sector of energy production and metallurgy) amounting to 1.6 billion USD.[91]

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89 Ibidem.

90 "Ukraina s nacala goda sokratila dobicu uglia do 19 millionov tonn." *UNIAN*, June 4, 2016. Available online: http://economics.unian.net/energetics/1399920-ukraina-s-nachala-goda-sokratila-dobyichu-uglya-do-19-millionov-tonn.html (accessed on May 13, 2017).

91 "Ukraina importirovala uglia na $900 millionov, bolshe vsevo-iz Rossii". *UNIAN*, September 5, 2016. Available online: http://economics.unian.net/energetics/1504284-ukraina-importirovala-uglya-na-900-millionov-bolshe-vsego-iz-rossii.html (accessed on May 13, 2017).

The problems with coal supply brought complications to the electricity generation as well as the grid stability as a result of peaking consumption during the extremely long heat waves in July 2016 affecting the entire territory of Ukraine, reminiscent of the situation when the deliveries of electricity in the summer as well as the winter months of 2015 were cut completely. The consumption reached the peak in the summer due to massive utilisation of air conditioning units on numerous hot days (with temperatures of up to 35 degrees of Celsius), reaching a level that is characteristic of the coldest winter days. The situation in the summer of 2016 was also complicated by the stoppages in several blocks of nuclear power plants because of planned schedule for maintenance and repair, which were unexpectedly prolonged due to various reasons. The situation with the coal delivery has not been improved by the end of the summer. The government plans to prepare the energy sector for the period of autumn and winter in 2016/2017 counted with the stored capacity in the storages of power and heating plants at the beginning of the heating season to be around 2.8 million tons (the same portion of anthracite coal and gas coal). However, at the beginning of September the total volume of stored coal only amounted to 950 thousand tons. Because of that the state budget allocated means to purchase suitable anthracite coal from the South African Republic to be provided by the state electricity company Centrenergo.

The Ministry of Energy and Coal Industry of Ukraine prepared a coal industry reform plan in this complicated situation. According to the plan, the state budget will apply subsidies to cover the losses of production and modernise state mines only in 2016 and 2017, in the summary amount of around 5.8 billion hryvnias. The total cost of reforms in the coal sector until 2020 should amount to more than 25 billion hryvnias, out of which 10.5 billion hryvnias would be expenditures made from the state budget. The Ministry expects that this reform will make the production of coal in mines more efficient and will increase it by 2.8 million tons a year to the total volume of 9.2 million tons in 2020.[92] According to the Minister Ihor Nasalik, it would mean that out of the current number of 33 coal state mines the state would keep eight mines which have the best prospects (with the expected extractable deposits of 469 million tons and the annual production of approximately 11 million tons), in 14 mines (with the total stored volume of approximately 594 million tons) the state would want to eliminate loss-making and privatise them subsequently, and 11 mines would be closed completely. In 2013 and 2014 (until the loss of control over the mines on the separatist territory of Donbas) state subsidies invested to cover the loss-generating production in state coal mines amounted to the sum of 22 billion hryvnias, whereby in the past few

[92] "Minenergouglia khocet reformirovat gosshakty za 25 milliardov." *UNIAN*, August 30, 2016. Available online: http://economics.unian.net/energetics/1493926-minenergouglya-hochet-reformirovat-gosshahtyi-za-25-milliardov.html (accessed on May 13, 2017).

years during the government of Viktor Yanukovych, multiple schemes of their wilful economic plundering were introduced.[93]

The government should urgently adopt a plan to privatise all coal mines regardless of their current economic returns and sell them in a transparent international tender. The profit made from privatisation should be used to close the unsold mines, including on respective social programmes. At the same time, the government should privatise the state coal power plants roofed under Centrenergo. The revenue made on their privatisation could be used to cover the costs relating to the closing down of state coal mines and the decay of the mining industry.

2.2.3 Growing share of hydroenergy

The above complicated situation with electricity supply was stabilised thanks to the generation by hydroelectric power plants including pumping stations (see the above mentioned data on the increase in their production from January to July 2016), as the utilisation of production capacity electricity on the base of natural gas was rejected by the government. In this situation, in July 2016 the government adopted a program on increasing production capacities of hydroelectric power plants (by 3500 MW from the current 5 thousand MW) until 2026, which should thus reach a 15.5 % share in the total production of electricity. Hydroelectric power plants (located mainly on the rivers Dneper and Dnester) are controlled by the state company Ukrgydroenergo. The programme envisages modernisation and increase of capacities of the current hydroelectric power plants as well as the construction of new capacities at the total cost of nearly 84 billion hryvnias (approximately 2.9 billion Euros), out of which as much as 49 billion hryvnias (1.7 billion Euros) ought to be financed by foreign financial institutions. The financial plan of the company Ukrgydroenergo for 2016 projects a total income amounting to 4.84 billion hryvnias (approximately 167 million Euros), and a net profit of 1.2 billion hryvnias with the sales price of 0.61 hryvnias/kWh (around 2.1 cent).[94]

The plan to develop hydroelectric power plants is the right solution which will help increase the stability of the entire energy system in Ukraine. It represents electricity produced on the base of domestic renewable resources - and that without emissions. It will also help create technical conditions which will make the future connection between the Ukrainian and the European system possible. However, the government also ought to create conditions to support the construction of hydroelectric power plants from private resources. This would increase carbon-free production capacities based on renewable resources, while taking into

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[93] "Minenergouglia o sudbe gosshakht: 8 sokhranit, 14 privatiziruyut i 11 likvidiruyut." *UNIAN*, June 30, 2016. Available online: http://economics.unian.net/industry/1493634-minenergouglya-o-sudbe-gosshaht-8-sohranyat-14-privatiziruyut-i-11-likvidiruyut.html (accessed on May 13, 2017).

[94] "Kabmin nameren do 2026 goda udvoit doliu gidroenergetiki v energobalanse." *UNIAN*, July 13, 2016. Available online: http://economics.unian.net/energetics/1415592-kabmin-nameren-do-2026-goda-udvoit-dolyu-gidroenergetiki-v-energobalanse.html (accessed on May 13, 2017).

consideration all environmental criteria and stability of the electric distribution network operation.

2.2.4. Nuclear energy

Current priorities related to nuclear energy in Ukraine and to its safety operation include the diversification of nuclear fuel supply, the establishment of an efficient system to process spent nuclear fuel and introduce the most up-to-date nuclear technologies. According to the President of the state nuclear company Energoatom Yuriy Nedashovskiy, the priorities in this context include the construction of a central storage to store spent nuclear fuel in cooperation with American companies and with the support of the US Department of Energy and the qualification of nuclear fuel from the Japanese and American company Westinghouse to be used in all nuclear blocks. "What we consider of key success is the normal utilisation of the modernised Westinghouse fuel in the third block of South Ukraine Nuclear Power Plant and the recent delivery of the first volumes of fuel to the fifth block of Zaporizhia Nuclear Power Plant which now operates with full installed power capacity," clarified the President of Energoatom. He also highlighted that in case of need, Ukraine today can ensure supply of alternative nuclear fuel to all 13 blocks of the nuclear power plants made in Russia - VVER 1000. Currently we run a complex program to increase safety in the entire nuclear complex in Ukraine, which is based on new knowledge of operation and technologies used in nuclear plants. The said program is financed from resources provided by EBRD and Euroatom in the volume of 600 million Euros.[95] According to the President of Energoatom, it is a strategic objective for the entire Ukrainian energy sector to be integrated with the European Energy system ENTSO-E. This relates to the additional construction of the third and the fourth blocks of Khmelnitskiy Nuclear Power Plant, which should, together with the already existing second block, be connected to the European system via Poland.[96]

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95 "Prezident Energoatoma Yuriy Nedashovskiy dolozhil ob aktualnikh proyektakh po nacbezopasnosti na vstreche Atlanticeskovo soveta." *UNIAN*, August 10, 2016. Available online: http://economics.unian.net/energetics/1462201-prezident-energoatoma-yuriy-nedashovskiy-dolojil-ob-aktualnyih-proektah-po-natsbezopasnosti-na-vstreche-atlanticheskogo-soveta.html (accessed on May 13, 2017).

96 In 2015 Energoatom and the Polish company Polenergia signed a memorandum on cooperation on implementing the energy bridge project between Ukraine and the EU. The project foresees the construction of a 750 kW line between the Khmelnitskiy Nuclear Power Plant and the Polish city of Rzeszow, which is located at the southeast of Poland on the border with Ukraine. What is interesting from the point of view of Slovakia is the fact that near to Rzeszow there is a line connecting the Polish and Slovak power systems. For more details see "Energoatom i Polenergia budut vmeste realizovat proekt po eksportu elektroenergii v ES." *UNIAN*, March 18, 2015. Available online: http://economics.unian.net/energetics/1056882-energoatom-i-polenergia-budut-vmeste-realizovat-proekt-po-eksportu-elektroenergii-v-es.html (accessed on May 13, 2017).

Energoatom signed a memorandum on cooperation with the South Korean energy corporation Korea Hydro&Nuclear Power on the construction of two additional blocks in Khmelnitskiy Nuclear Power Plant in August 2016, whereby the cooperation should also include the already mentioned "energy bridge between Ukraine and the EU". In four nuclear power plants, Energoatom operates the total number of 13 Soviet-type nuclear energy blocks - VVER 1000 - and two VVER 440 blocks with the total installed power capacity of 13.835 thousand MW. Two other blocks in the Khmelnitskiy Nuclear Power Plant are being finalised and their planned combined installed power capacity amounts to 2 thousand MW.[97] The main objective of Energoatom in the course of the next six years is to prolong the production licence for those nine blocks for which the current licence shall expire in 2020. The first block to go through this licence granting procedure is the block 2 in the biggest nuclear power plant in Europe – Zaporizhia Nuclear Power Plant. It operates the total of six blocks with 1000 MW installed power capacity each, which were gradually launched into operation between 1984 and 1995 (the second block was launched into operation in 1985).[98]

Nuclear power plants currently provide for more than 50 % of the total volume of produced electricity. Considering the severe problems with the deliveries of coal from the territory of Donbas, nuclear energy has become a key strategic factor for safeguarding stabile supply of electricity. Moreover, Energoatom has improved its management lately owing to a gradual increase in electricity prices to an appropriate commercial level. In 2014 the company's income increased semi-annually by nearly 35 % to some 28 billion hryvnias and last year the increase was even more prominent by nearly 42 % (over 39 billion hryvnias). In the first seven months of 2016 the increase was somewhat lower, only by around 4.5 % with the total revenue amounting to less than 23 billion hryvnias.[99]

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97 "Energoatom i koreyskaya KHNP budut sotrudnicat v dostroike dvukh blokov Khmelnickoi AES." *UNIAN*, August 31, 2016. Available online: http://economics.unian.net/energetics/1495631-energoatom-i-koreyskaya-khnp-budut-sotrudnichat-v-dostroyke-dvuh-blokov-hmelnitskoy-aes.html (accessed on May 13, 2017).

98 "Gosatomregulirovaniya nacalo proverku bloka No.2 Zaporozskoi AES dlia prodlenia sroka evo ekspluatacii." *UNIAN*, August 17, 2016. Available online: http://economics.unian.net/energetics/1475014-gosatomregulirovaniya-nachalo-proverku-bloka-2-zaporojskoy-aes-dlya-prodleniya-stroka-ego-ekspluatatsii.html (accessed on May 13, 2017).

99 "Energoatom uvelicil dokhod ot realizacii elektroenergii pocti do 23 milliardov." *UNIAN*, August 16, 2016. Available online: http://economics.unian.net/energetics/1472786-energoatom-uvelichil-dohod-ot-realizatsii-elektroenergii-pochti-do-23-milliardov.html (accessed on May 13, 2017).

Type of fuel	Share (in %)
Nuclear fuel	53
Coal and turf	42
Natural gas	3
Renewable Resources	2

Source: Ministry of Regional Development, Building and Housing of Ukraine, 2016.

The government and Energoatom could take advantage of the know-how gained in the Czech and Slovak nuclear power plants with a safe increase of installed power capacity of the VVER 1000 and VVER 440 reactors. This would make it possible to quickly acquire – with relatively small investments (in comparison with the construction of now resources) - hundreds of megawatt hours of additional power capacity which could substitute the problematic coal resources in the production of base load electricity. Coal consuming power plants, together with the development of capacities of hydroelectric power plants, would serve mainly to the need to supply electricity for balancing the grid networks. An increased production of base load electricity in nuclear power plants could become also a suitable source of more efficient heating at the expense of gas.

2.3 Heat supply and energy efficiency

Out of the total consumption of gas in Ukraine around 40 % is consumed by the industry and as much as 60 % is used to produce heat delivered to buildings, whereby as much as two thirds of the said heat is consumed by households. Around 40 % of heat used by households is produced and supplied through municipal central heating systems.[100] As to 1st May 2016, heat and gas subsidies were provided to six million households. After the prices were increased to reach a uniform level of 6879 hryvnias/tcm, a decision was passed by the regulatory authority as on June 1, 2016 to increase also the price on heat from approximately 652 hryvnias for a gigacalorie by 75 to 90 % on the average.[101] As a result of this, the Minister of Social Policy Andrei Reva expected that out of the total number of 15 million households as many as nine million shall be entitled to obtain subsidies, as the share they have

[100] According to the data taken from the analytical material of the working group at the Ministry of Regional Development, Building and Housing of Ukraine: *Teplova energetika u ZKCH: stan ta perspektivi*, z 25.03.2016.

[101] "Teplo v Ukraine podorozhalo na 75-90%." *UNIAN*, 05.05.2016. Available online: http://economics.unian.net/energetics/1337904-teplo-v-ukraine-podorojalo-na-75-90.html (accessed on May 13, 2017).

to pay to cover municipal services including energies would go above 15 % of their overall income.[102]

In the first quarter of 2016 (before the price of gas and heat increased), Ukrainian households spent 16.4 % of their expenses on municipal services and energies on the average, which was the second biggest share in their spending after the food (41.5 %).[103] The Minister highlighted that the subsidies provided to households from the state budget in 2016 would amount to 40 billion hryvnias. If there was no increase in gas tariffs and subsequently in heat prices, the budget would have to compensate the resulting loses to the state holding Naftohaz, which would cost as much as 170 billion hryvnias. In the end, the state budget will save some money.

What is a major problem is the high level of energy consumption in Ukrainian residential sector as well as administrative buildings. According to the data provided by the Ukrainian government, the average consumption of heat in residential houses is nearly three times higher than in the EU countries amounting to approximately 230 – 240 kWh/m^2.[104] A similar situation is also related to the consumption of heat and other types of energy in the state budgetary sphere, where, according to Minister of Energy Ihor Nasalik, losses caused by inefficient operation amount to 70 %.[105] According to the analyses done by the Ministry of Regional Development of Ukraine, potential savings achievable in heating the buildings could amount to more than 11 bcm of gas a year. In Ukraine it is necessary to modernise around 90 % of residential houses. The worst thermal insulation properties are found in residential buildings constructed between 1971 and 1980, and their total number all over the entire country goes well beyond 18 thousand (which is more than 100 msm of floorage). The second priority group considered for heat modernisation is made up residential buildings constructed between 1981 and 1990, the number of which goes beyond 22 thousand (more than 135 millions of m^2 of residential space).[106]

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[102] "V novom otopitelnom sezone v 1,5 raza mozhet uvelicitsa cislo domokhozaistv s subsidiami." *Interfax-Ukraina*, 25.08.2016. Available online: http://interfax.com.ua/news/ecnomics/365818.html (accessed on May 13, 2017).

[103] "Ukrainci tratiat na produkti pitania i kommunalnie uslugi bolshe polovini dokhodov – Gosstat." *UNIAN*, 22.06.2016. Available online: http://economics.unian.net/finance/1383391-ukraintsyi-tratyat-na-produktyi-pitaniya-i-kommunalnyie-uslugi-bolshe-polovinyi-dohodov.html (accessed on May 13, 2017).

[104] Interview of the Minister of Regional Development Gennadi Zubko for the Interfax-Ukraine - "Zubko: Nelzia platit evropeiskuyu cenu za gaz, a potrebliat po-sovetski." *Interfax-Ukraine*, 1.07.2016. Available online: http://interfax.com.ua/news/interview/353806.html (accessed on May 13, 2017).

[105] "V Ukraine vozmozno za sciet energoeffektivnosti sokratit potreblenie energii na 40% - Nasalik." *Censor*, August 25, 2016. Available online: http://censor.net.ua/news/403003/v_ukraine_vozmojno_za_schet_energoeffektivnosti_sokratit_potreblenie_energii_na_40_nasalik (accessed on May 13, 2017).

[106] "Kabmin skoncentriruetsa na energoeffektivnosti – faktore obretenia Ukrainoi energonezavisimosti,- Hroysman." *Censor*, June 7, 2016. Available online: http://censor.net.ua/news/392242/kabmin_skontsentiruetsya_na_energoeffektivnosti_faktore_obreteniya_ukrainoyi_energonezavisimosti_

In order to support the accelerated implementation of projects focusing on energy efficiency in buildings, the government, using the support of Germany, the European Union and other international organisations, decided to establish the Energy Efficiency Fund. According to preliminary plans, the fund ought to be established in the course of 2017 and should gain financial resources from the state budget and foreign donors amounting to 20 billion hryvnias[107]. In order for the fund to start functioning properly and most of all efficiently, it is necessary, first, adopt the required legislation. In the first place, this concerns laws on energy meters (and the prompt installation thereof in practice, including household heat consumption meters, which until the first half of 2016 were only present in around 60 % of houses), the laws on energy efficiency of buildings and municipal services and the related fees.

Share of fuels in the centralised generation of heat in Ukraine in 2014 by their type (with the exception of Crimea and the separatist zone in Donbas).

Type of fuel	Share (in %)
Natural gas	73
Coal and turf	22
Biofuel and waste	3
Other	2

Source: Ministry of Regional Development, Building and Housing of Ukraine, 2016.

However, the government must also find the tools to support the formation and operation of apartment owners associations. They face enormous problems and deal with obstacles related to their establishment and operation, posed especially by local authorities (municipal authorities and the management of municipal companies, which were until now managed by housing funds) and energy suppliers and municipal services (that have inappropriate demands when entering into new contracts). State authorities are not making it easier for the apartment owners either. As seen in practice in the Visegrad Four countries, without a proper everyday operation of apartment owners associations from the legal and economic point of view, it is impossible to achieve a massive implementation of complex modernisation programmes in residential houses. According to available information, the number of apartment owners associations in Ukraine as to the half of 2016 was only slightly above 20 thousand, whereby the total number of residential houses in Ukraine goes well beyond 100 thousand.[108]

groyisman (accessed on May 13, 2017).

[107] "Germania pomozhet Ukraine sozdat Fond energoeffektivnosti – Zubko." *UNIAN*, August 12, 2016: http://economics/unian.net/energetics/1466123-germaniya-pomojet-ukraine-sozdat-fond-energoeffektivnosti-vitse-premer-zubko.html (accessed on May 13, 2017).

[108] Author's interview with representatives of the Ministry of Regional Development, Construction and Housing of Ukraine.

3. Reforms and harmonization with the EU energy legislation

Andriy Chubyk

The energy sector of Ukraine has traditionally been the basis of the national economy. It has served the needs of both population and industrial sectors and brought a significant share of revenues to the state budget.

The merging of financial, industrial and political groups, since the mid-1990s, caused sectoral monopolization, minimized competition, and modernization of assets became meaningless. The energy sector functioned in conditions of tariff populism, growth of financial burden on the state budget and progressive aging of basic assets. Energy efficiency and energy conservation as components of the state policy in the energy sector by 2014 were mainly implemented formally. Renewable sources of energy were monopolized and turned into a source of income for the oligarchic groups of Rinat Akhmetov as well as Klyuyev brothers.

Memorandum of Understanding on Co-operation in the Field of Energy between Ukraine and the EU (MoU), concluded on 1 December 2005, [109] did not mark the beginning of systemic reforms. The Brussels Declaration [110] dated on 23 March 2009, only in 2013 became one of the international documents providing basis for a cooperation development between Ukraine and the EU in the part of modernization of the domestic gas transportation system for the needs of gas transit.

On 1 February 2011 Ukraine became a member of the Energy Community. This created prerequisites for the systematic implementation of reforms in accordance with obligations undertaken by the country. Following the Protocol on Ukraine's Accession to the Treaty Establishing the Energy Community, [111] ratified by the Verkhovna Rada of Ukraine on 15 December 2010, the Ukrainian government undertook commitment to implement a number of European acquies with a clear time frame. At the same time, Ukrainian government paid more attention to obtaining additional funding from international institutions than to serious reforms in the energy sector.

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[109] *Memorandum of Understanding on Co-operation in the Field of Energy between Ukraine and the EU (MoU)*, concluded on December 1, 2005. Available online: http://zakon3.rada.gov.ua/laws/show/994_694 (accessed on May 13, 2017).

[110] *Joint Declaration Joint EU-Ukraine International Investment Conference on the Modernisation of Ukraine's Gas Transit System*, 23 March 2009. Available online: http://www.naftogaz.com/files/DECLARATION-Ukraine-EC-engl.pdf (accessed on May 13, 2017).

[111] *Protocol on Ukraine's Accession to the Treaty Establishing the Energy Community*, 24 September 2010. Available online: http://zakon5.rada.gov.ua/laws/show/994_a27 (accessed on May 13, 2017).

3.1 Power sector

Directive 2003/54/EC concerning common rules for internal electricity market had to be adapted by passing relevant law before January 2012. [112] However, at that time the Verkhovna Rada was able only to make several amendments to the legislation in force, to regulate certain provisions on the alternative energy sources use. The Technical Regulation (EC) 1228/2003 on the conditions for access to the network of cross-border electricity exchanges was to be adapted also before 1 January 2012, however this requirement was not implemented.

Ukraine did not fulfil its obligations under the recommendations listed above. The latter concerned the EU's Second Energy Package, and in 2012 the process of adaptation to the provisions of the Third Energy Package began. The implementation of the Directive 2009/72 / EC and the Technical Regulation (EC) 714/2009 has become relevant. However, in subsequent years, only several amendements were made to the already adopted legislation, while the adoption of a new law was postponed and delayed in every possible way. For example, in the Verkhovna Rada of Ukraine, the draft law No. 4493 On the Electricity Market of Ukraine [113] dated 21.04.2016, which is generally in compliance with the norms of the Third Energy Package – Directive 2009/72 / EC and the Technical Regulation 714/2009, - remains still only a law under consideration.

The electricity market remains the most attractive for domestic oligarchs due to the extremely complicated regulation system and the possibility of influencing the national regulator (NKREKP), the existing system of cross-subsidies and government subsidies. Owners of private generating assets, especially thermal power plants use all possible tools, including sabotage of the dispatcher orders of the Ukrenergo United Power Grid, emergency shutdowns, and blackmail by means of energy supply failures and strikes by workers and miners with the aim to preserve the existing status quo.

The adoption of the law on electricity market will create conditions for market reform, producers competition, direct relations with consumers, free access to transport infrastructure and development of cooperation with neighboring countries. The Secretariat of the Energy Community, in cooperation with a number of domestic and European experts, developed a secondary legislation draft to regulate separation procedure for the generation and sale of electricity, access to networks and cross-border points, suppliers' selection, market balancing rules, guaranteed suppliers, introduction of effective instruments for unbalances solving

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[112] *2011 Annual Report on the Implementation of the Acquis under the Treaty Establishing the Energy Community*, p.16. Available online: https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/1146177/0633975AB4F77B9CE053C92FA8C06338.PDF (accessed on May 13, 2017).

[113] Draft Law of Ukraine *On the Electricity Market of Ukraine.* Available online: http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=58829 (accessed on May 13, 2017).

and so on. However, there is a question of the political will of the Parliament and the President of Ukraine to implement the necessary reforms in the power sector.

3.2 Gas sector

One of the prerequisites for joining the Energy Community was the adoption of the Law of Ukraine No. 2467-VI On the Principles of the Natural Gas Market Functioning [114] dated 08.07.2010. This fact was positively assessed in the Energy Community report for 2011 with the expectations of further progress in the gas sector reform. Thus, Ukraine complied with the requirement on the implementation of the Directive 2003/55 / EC. However, the Regulation (EC) 1775/2005 on the conditions for access to natural gas transportation system was not adapted to national legislation by 1 January 2012.

Because of the need to implement the Third Energy Package, Ukraine has started with preparation of a new draft law on the natural gas market in accordance with the Directive 2009/73 / EC and Regulation (EC) 715/2009. On 9 April 2015, the Law of Ukraine No. 329-19 On the Natural Gas Market [115] was adopted, which became the basic document for further reforming of the gas sector. The relevant provisions of the Technical Regulation 715/2009 form the basis for regulatory legal acts on the specifics of the access to gas transportation networks and are currently being implemented.

The fulfillment of the "unbundling" conditions of Naftogaz of Ukraine NJSC is delayed for a number of reasons, including: the extreme complexity of infrastructure separation, which includes trunk gas pipelines, medium and low pressure networks, branches and bridges, gas storage facilities, gas preparation points at their own fields, etc.; the constant threat of Russia to use a gas supply as a tool for exerting political pressure on Ukraine and the EU as an element of a hybrid war; enourmous resistance of domestic financial and industrial groups and political forces affiliated with them, where the latter, in particular, the Opposition Block, overtly advocates for the interests of Russia's Gazprom. However, the "unbundling" of Naftogaz as well as lobbying for further privatization of mining and transport assets are rather questionable as in the face of continuing confrontation with Russia they weaken the government's ability to respond to hybrid threats and ensure uninterrupted gas supplies both to the domestic market and the transit of gas to the EU.

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[114] Law of Ukraine *On the Principles of the Natural Gas Market Functioning*, 8 July 2010. Available online: http://zakon5.rada.gov.ua/laws/show/2467-17 (accessed on May 13, 2017).

[115] Law of Ukraine *On the Natural Gas Market*, 9 April 2015. Available online: http://zakon5.rada.gov.ua/laws/show/329-19 (accessed on May 13, 2017).

For almost three years of confrontation with Russia, no case of violation of the transit regime has occured; Ukrtransgaz employees have ensured the stable functionning of the gas transportation network even during the handling consequences of diversionary actions, in particular, in Poltava and Ivano-Frankivsk regions in 2014. In December 2014, the European Investment Bank and the European Bank for Reconstruction and Development allocated loans of € 150 million and $ 200 million, respectively, which will be used for the reconstruction of the main trunk gas pipelines, in particular, Urengoy-Pomary-Uzhgorod.

The Ukrtransgaz signed the interconnection agreements with Hungary (on all gas pipelines), Slovakia and Poland (gas pipelines of the physical reverse). However, the full use of network codes and the transition to full utilization of available transport capacity is postponed due to the physical presence of representatives of the Russian Gazprom Export at gas measuring stations with Slovakia and Poland, as well as the existence of long-term contracts for gas supply with the delivery point on the Western border of Ukraine, which are still in force and no one has changed them as to the date.

It is extremely important to preserve the integrity of Naftogaz of Ukraine in the context of lawsuits against Russian Gazprom in Stockholm Arbitration. Without exaggeration, these cases will become the most serious in terms of financial claims and the most severe, since none of the parties intends to back down. The result may be similar to the YUKOS case, where malicious sabotage can be expected for Ukraine from the Russian Gazprom. And the EU will face a choice whether to carry out the sentence and intensificate the confrontation with the Russian Federation or to search again “compromises”, which in practice can bring down to zero even the most positive decision of arbitration.

On the agenda of gas market reforming, there remains work to be done by the national regulator, namely elaboration of the methodology for tariffs determining for distribution and storage, certification rules, licensing conditions for market participants, adjustment of disputes settlement rules. It is also necessary to amend the current legislation, in particular, to bring the Law of Ukraine On Licensing of Economic Activities and the Law of Ukraine On Natural Monopolies into the line with the new law on natural gas market.

3.3 Oil sector

Ukraine is a major oil products importer, despite its refineries and domestic oil production at the level around 2.43 million tons in 2015. This situation occured following the systematic disregard of the state’s responsibilities on ensuring strategic reserves of oil and oil products, functionality of domestic oil-producing and oil-refining industry. The destroying of Ukraine’s transit and processing capacity was caused mostly by Russia’s systemic activities and the opaque privatization of

oil refineries, as a result of which the Kherson plant turned into scrap, and two oil refineries in Western part of Ukraine became technologically obsolete and were used as oil terminals and storage facilities. Lisichansk oil refinery is in the fighting zone in the East of Ukraine and does not function, also because of the legal affiliation with Russian company Rosneft. At the Odessa oil refinery there was a complicated history of owner changing and unresolved issue of the resource base. A Kremenchug oil refinery is under the private control of Igor Kolomoisky's Privat Group and is used to preserve the market monopoly of the group in domestic oil refining industry.

By 2016 Ukraine has no legal framework for the creation of oil and oil products strategic reserves. Under the State Reserve Agency of Ukraine there is a working group whose task is to elaborate a long-term program for the 2016-2022 period on creation of a strategic reserve of more than 2 million tons.[116] However, experts note the complexity of such process, since it is difficult to predict possible dynamics of oil prices, problems with both oil processing undertime and ensuring supplies to the regions required. At the same time, experts point out the advantage of the oil products stock excahnge as a more prompt source for responding to eventual deficits in the fuel market.[117]

3.4 Renewable energy

Before joining the Energy Community, Ukraine already had a legislation regulating the use of alternative energy sources [118] and fuel.[119] As far back as in 2009, amendments to the legislation on the electricity market were made, they introduced the so-called "green tariffs" for renewable energy. The tariffs were set up for each particular project based on the calculations of the National Electricity Regulatory Commission.

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[116] Strategic oil reserve will appear in Ukraine in 2017. *News of the State Reserve Agency of Ukraine*, 7 June 2016, Available online: http://www.gosrezerv.gov.ua/reserv/control/uk/publish/article;jsessionid=B2B80179153AC249F13249E28004C402.app1?art_id=163210&cat_id=45334 (accessed on May 13, 2017).

[117] Strategic fuel reserve: motorists will pay again for everything, Голос Столиці, 07.06.2016. Available online: http://newsradio.com.ua/archives/20160607/1342182.html (accessed on May 13, 2017).

[118] Law of Ukraine On Alternative Energy Sources, 20.02.2003 № 555-IV. Available online: http://zakon5.rada.gov.ua/laws/show/555-15 (accessed on May 13, 2017).

[119] Law of Ukraine On Alternative Fuels 14.01.2000 № 1391-XIV, Available online: http://zakon5.rada.gov.ua/laws/show/1391-14 (accessed on May 13, 2017).

In June 2011, amendments introducing state guarantees for the purchase of electricity produced by renewable sources were made to the existing legislation. At the same time, legislative amendments were adopted to establish the mandatory use of local resources, equipment and services in an increasing progression until 2018. In general, the legislative process focused on the creation of preferential conditions for the development of renewable energy under the leadership of several Ukrainian oligarchic groups, in particular, Rinat Akhmetov (wind power) and Klyuyev brothers (solar energy). At the same time barriers to the market entry were created for other companies and new technologies. Adopted amendments on state guarantees for the electricity purchase were designed to operate an unreformed model of the electricity market, where the Energorynok State-Owned Enterprice, acting as a regulator of the wholesale market, simultaneously provided calculations for each type of generation. Folowing switching to direct bilateral contracts, there may occur problems with the fulfillment of government obligations to buy out the produced "green electricity" since there is no procedure for cost recording in the end user price of such generation and delivery.

Ukraine has committed to implement the provisions of the Directive 2009/28 / EC,[120] however in 2015 the growth of the renewable energy share in the overall energy balance of the state was extremely slow (according to the calculation methodology applied in Ukraine, the aggregate installed capacity was 1.84 % for 2015, [121] however, Eurostat estimates it was 3.8 % at the end of 2014), which signals a significant gap as the approved target that should be achieved in 2020 is 11 %.

The National Action Plan for Renewable Energy for the period until 2020 has not been supported by the necessary legislative framework also because it was associated with the adoption of a new law on the electricity market. The situation further reduces chances for achieving the stated goals. At mid-2016, the negative impact of restrictions on the mandatory use of the local resources in new renewable energy projects was eliminated what has opened an access for foreign investors. At the same time, rather complicated system of obtaining permits and licenses remained due to the lack of progress in creating of a so-called "single window" for investors. This increases the preparation period for the project implementation and, accordingly, its payback period.

As it was noted, a significant part of unresolved issues relates to the lack of law on the electricity market, in particular, a compensation system for current

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[120] Order of the Cabinet of Ministers of Ukraine No. 791-r, 3 September 2014 *On Approval of the Action Plan for the Implementation of the Directive of the European Parliament and of the Council 2009/28 / EC*. Availbale online: http://zakon5.rada.gov.ua/laws/show/791-2014-%D1%80 (accessed on May 13, 2017).

[121] Presentation "Current state and problems of renewable energy development in Ukraine". *State Agency on Energy Efficiency and Energy Saving of Ukraine*, 2015. Available online: http://saee.gov.ua/sites/default/files/Orzhel.pdf (accessed on May 13, 2017).

generation capacities, transmission and distribution networks, technical specifications for accession to the distribution network, prospects for the modernization of transmission networks and investment plans for their development, strategies for further use of growing volumes of "green energy", etc.

Since 2014, Ukrainian government has introduced a number of incentives for switching to alternative fuels for hot water and heating supply. One of the directions was the state support for the purchase of boilers, functionning without natural gas, under the Heat Loans Program for private households and associations of co-owners of apartment buildings. At mid-2016, households purchased more than 18.000 boilers for alternative fuels and received more than 64 million UAH of compensation under the Heat Loans Program. At the same time, there is a problem of monitoring the effectiveness of this program since large number of producers of such equipment do not have international quality standards, and its installation takes place without proper monitoring and assessing of the replacement effect.

Also, private households are able to install solar power plants with a capacity of up to 30 kW with an appropriate guaranteed connection to the general transmission network under the "green tariff" and get a repayment of the entire amount of the electricity produced. The development of the RES is hampered by the relatively high cost of capital expenditures for such a power plant and the lack of opportunities to obtain loans with acceptable interest rates.

The most difficult situation concerns expansion of renewable energy in the transport sector of Ukraine, where only 1 % of the planned 10 % (to be achieved by 2020) has been met so far. Despite the efforts done in the area of promoting the use of bioethanol and biodiesel in transport, the general very bad situation when it comes to fuel quality and its control does not contribute to the use of RES in transport. In order to overcome this problem, it is necessary to create an effective biofuel certification system that will expand this market in Ukraine and open up opportunities for national producers to export their products also to the EU market.

3.5 Energy efficiency

In 2016 economy of Ukraine began to grow gradually – GDP grew by 1.5% - while a tendency of reducing of the energy consumption of basic resources remained. The reduction in energy consumption is the result of the influence of rising prices, rather than the systematic work of responsible state authorities and the effect of the updated legislation. The current Law of Ukraine On Energy Saving No. 74/94-VR dated 1 July 1994 [122] does not comply with the requirements of the Directive

[122] The Law of Ukraine *On Energy Saving,* Verkhovna Rada of Ukraine, 1 July 1994. Available online: http://zakon3.rada.gov.ua/laws/show/74/94-%D0%B2%D1%80 (accessed on May 13, 2017).

2012/27 / EU on energy efficiency, despite its numerous changes and additions. The draft law On Commercial Accounting of Public Utilities No. 4901 adopted 6 July 2016 [123] should become a basis for the regulation of providing basic public services and provide interest in reduction of a consumption.

On 11 July 2016 the draft law On Energy Efficiency of Buildings No. 4941 was also registered in the Verkhovna Rada of Ukraine.[124] This law determines legal and organizational frameworks in the field of energy efficiency of buildings and is aimed at creating conditions for reducing energy consumption in buildings. In parallel, the work is under way to develop technical standards for the construction sector that would take into account requirements for energy efficiency of buildings, creation of software products calculating the energy parameters of buildings, database of certified auditors and the national database of energy certificates for buildings.

In November 2015 Ukraine approved the first National Action Plan for Energy Efficiency for the period until 2020,[125] determining the energy saving indicator at 9 % of the total energy consumption, that is, a reduction of 6.5 million tons of the equivalent fuel in the specified period. Its effective application is hampered by a delay of the legislation implementation; in particular, the above mentioned legal acts, as well as delayed creation of a special state fund for energy efficiency. A major role in the implementation of the plan is attained to the coordination of efforts of central and local authorities, as well as their ability to ensure a realistic annual planning and ensuring the financial support for respective activities.

The measures listed above are designed to ensure formation of a sustainable national program on supporting energy savings and energy efficiency measures. In parallel with the legislative process, in Ukraine, since 2014, the National Heat Loans Program has been initiated to support private households and associations of owners of apartment buildings (housing cooperatives). The State Agency for Energy Efficiency and Energy Conservation of Ukraine (Derzhenergo) became the manager of the state budget funds, while state-owned banks Oschadbank, Ukrgasbank, Ukreximbank became its partners, to which Derzhenergo transfered funds to be used as compensation for loans. The above funds are available for public in two main areas – purchasing of boilers operating on other than gas base as well as energy efficient materials and equipment.

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[123] Draft Law of Ukraine *On Commercial Accounting for Public Utilities*, Verkhovna Rada of Ukraine, 6 July 2016. Available online: http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=59553 (accessed on May 13, 2017).

[124] Draft Law of Ukraine *On Energy Efficiency of Buildings*, Ліга3акон. Available online: http://search.ligazakon.ua/l_doc2.nsf/link1/JH3T900A.html (accessed on May 13, 2017).

[125] Cabinet of Ministers of Ukraine, Order No. 1228-r, 25 November 2015, On the National Energy Efficiency Action Plan for the period up to 2020. Available online: http://zakon2.rada.gov.ua/laws/show/1228-2015-%D1%80 (accessed on May 13, 2017).

In 2015-2016 more than 1.1 billion UAH was transferred from the state budget to compensate respective loans to the public. At the same time, control over the targeted use of funds is carried out only at the stage of issuing loans, while the quality of materials and equipment is not under the control. However, energy consumption characteristics of newly installed equipment are not assessed. The state program allows carrying out complex thermomodernization and replacement of equipment only for housing cooperatives. Private households are limited in compensation amounting to 14.000 UAH per person.

On 7 April 2016 The European Bank for Reconstruction and Development launched the Energy Efficiency Financing Program in the housing sector of Ukraine "IQ energy"[126] with a sum of 75 million Euros until 2020. The program is implemented through the partner banks UkrSibbank, OTP Bank and Megabank and involves the possibility of financial reimbursement of a part of the loan (15-20 % for individuals and up to 35 % for housing cooperatives) as well as technical assistance funded by the E5P and the Swedish International Development Cooperation Agency (SIDA).

Ukraine set a goal to create a special fund for financing projects on energy efficiency and energy saving. On 13 July 2016 The Cabinet of Ministers of Ukraine by Order No. 489-r approved the Concept for the Implementation of Stable Financing Mechanisms for Energy Efficiency Activities [127] (establishment of the Energy Efficiency Fund), within which it was planned to develop an appropriate Action Plan. It was even planned to adopt a corresponding draft law; international experts, representatives of Derzhenergo, Minregionstroi, and other state institutions worked on proposals, however, the relevant document has not been as yet submitted to the parliament.

In response to the low activity of public authorities in the implementation of energy efficiency and energy conservation policy of the state, representatives of public organizations and independent experts formulated a step-by-step Action Program, the implementation of which corresponds with Ukraine's commitments to the Energy Community and is able to launch effective reforms. The main Action Plan in the area of public administration should include the adoption of a strategic document on the energy policy of the state. On the basis of this document, an integrated humanitarian and technical program should be developed to train specialists in the energy efficiency and increase national awaraness concerning the rational use of energy resources. There is a need to harmonize the national

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[126] "EBRD launches Ukraine Residential Energy Efficiency Financing Facility." Available online: http://www.iqenergy.org.ua/news/ebrd-launches-ukraine-residential-energy-efficiency-financing-facility (accessed on May 13, 2017).

[127] Decree of the Cabinet of Ministers of 13 July 2016 No. 489-p., *On Approval of the Concept for the Implementation of Stable Financing Mechanisms for Energy Efficiency Activities (Establishment of the Energy Efficiency Fund).* Available online: http://zakon5.rada.gov.ua/laws/show/489-2016-%D1%80 (accessed on May 13, 2017).

standards on energy efficiency with international ones, primarily European legislation, and provide for unified standards of energy intensity. State enterprises and institutions should introduce energy management, define a central executive authority responsible for the national policy shaping in the field of energy efficiency and monitoring the implementation of approved indicators. Energy saving and energy efficiency should become basic principles for the formation of a set of governmental measures on stimulation to reduce energy intensity of the national economy and carry out thermomodernization of housings as well as adoption of Action Program at the level of municipalities.

The priority at the first stage of the Action Plan implementation should be given to the promotion of energy efficiency at the level of end consumers. The second stage should be focused on modernization of transmission and distribution networks. And, finally, the third one should aim to achieve a cardinal modernization of power generation, during which a rational replacement of energy resources should be facilitated.

The National Agency for Energy Efficiency (NAEE) should be reformed in order to enhance its institutional capacity and to be free of dealing with non-core tasks. In particular, it is necessary to pass the agenda of renewable energy to the Ministry of Energy and Coal Industry – to ensure formation of an appropriate public policy. Issues of development and modernization of municipal heat and power engineering are to be transferred to the Ministry of Regional Development. NAEE should be given a right to inspect the level of energy consumption of state enterprises and institutions, to establish the regional network of its representatives and give them appropriate competencies in monitoring the implementation of public policy in the field of energy efficiency. NAEE should get relevant competencies and be directly subordinated to the Cabinet of Ministers of Ukraine and the Vice Premier Mnister responsible for economic or energy policy.

3.5.1 Visegrad lessons for Ukraine

Lukáš Lehotský

This part of the chapter focuses on prospects of sharing acquired know-how from Visegrad countries in improving energy efficiency with Ukraine. Given the scope, it selects only few cases, where substantial insights have been acquired – both positive and negative.

Countries of V4 are obliged to comply with energy-efficiency legislation of the EU. The implementation of the European directive 2012/27/EU (Energy Efficiency Directive, EED) is the cornerstone of energy savings' targets in the region and – at the same time – main legislative frame. V4 countries differ over mechanisms of achieving savings – while Poland is almost entirely relying on implementation of energy efficiency obligation scheme (further referred to as EEOS) originally envis-

aged in the Article 7 of EED, other V4 countries chose to implement alternative measures in order to avoid EEOS.[128] All V4 countries rely to some extent on European funding coming from the Cohesion Fund and the European Regional Development Fund. These measures are not relevant to Ukraine under current circumstances, thus, will be intentionally omitted from the discussion in the chapter. The focus will look at measures financed by other sources instead, mostly revolving around green investment schemes (GIS) implementation. GIS's are based on bilateral trade of unused AAU emission allowances (Assigned Amount Units), assigned to countries in line with the Kyoto protocol. Revenues from transactions are usually directed to finance greening projects – projects which decrease environmental impact of economies. As Central European countries (including Ukraine) own most surplus AAU units, these schemes and their implementation impacts are highly relevant.

Czech Republic

In Czech Republic, the GIS scheme is called Green Savings, with current iteration being called New Green Savings (NGS). The main body running the scheme in Czech Republic is environment ministry's State Environmental Fund. The goal of the scheme is to finance exclusively greening of the residential buildings. Financing is provided to existing residential buildings (retrofitting) or new ones (achievement of near-zero energy standards). Mechanism of support is predominantly based on direct financial subsidies. Houses and apartment-blocks are eligible for support in separate sub-schemes. Eligible costs in existing houses are spent on insulation of the outer shell, as well as replacement of heating source;[129] while in new houses, maximal heating consumption lower than 20 kWh per square meter per year should be achieved.[130] Quality is ensured through requirement of utilization of certain certified products, proper project documentation, and energy certification by approved certification authorities at the end of the process. The subsidy is transferred to the grantee after the project has been finished.

The first iteration of the scheme planned to run between 2009-2012 encountered problems, when a huge surge of applications and mismanagement at the side of the fund led to premature and abrupt halt of application collection in

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[128] *Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC Text with EEA relevance*. Brussels, 2012. Available online: http://data.europa.eu/eli/dir/2012/27/oj (accessed on September 10, 2016).

[129] "Závazné pokyny pro žadatele a příjemce podpory z podprogramu Nová zelená úsporám: RODINNÉ DOMY v rámci 3. výzvy k podávání žádostí". State Environmental Fund, Praha, 2015, pp. 5–8. Available online: http://www.novazelenausporam.cz/file/476/zavazne-pokyny-pro-zadatele-rd_3_vyzva.pdf (accessed on September 15, 2016).

[130] "Závazné pokyny pro žadatele a příjemce podpory z podprogramu Nová zelená úsporám: RODINNÉ DOMY v rámci 3. výzvy k podávání žádostí", op. cit., p. 9.

2010.[131] It became clear that large number of legitimate applications could not be satisfied from the planned program budget, ending the original scheme entirely.[132] It took another two years to find additional resources in order to process all submitted applications.[133] The second iteration ran in 2013 has been reduced to smaller scale.[134] Since 2014, a current iteration was introduced. Compared to its predecessors, current NGS is continuous and processes applications as they arrive. The scheme is supposed to be in place at least by 2021.[135] The current scheme should substantively contribute to achievement of the energy savings target in line with EED – up to 14 petajoules (PJ) of savings out of the 50 PJ target.[136]

Poland

Poland chose to continue with the system of white certificates envisaged in European directive 2006/32/EC – predecessor to EED.[137] The scheme was implemented in 2011 via the update of the Act on Energy Efficiency.[138] Companies providing energy as well as consumers became parties in the scheme, obliged to

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[131] TZB Info, "Panelové domy v programu Zelená úsporám skončily, alespoň prozatím," 2010. Available online: http://www.tzb-info.cz/106546-ministerstvo-zivotniho-prostredi-rozhodlo-ze-dnes-od-15-00-hodin-docasne (accessed on September 15, 2016); Bohuslávek, P."Příjem žádostí Zelená úsporám končí", 2010. Available online: http://stavba.tzb-info.cz/zelena-usporam-na-tzb-info/6881-prijem-zadosti-zelena-usporam-skoncil (accessed on September 15, 2016).

[132] See for example Ministry of Environment, "Ministr představil další postup v programu Zelená úsporám. Peníze jsou na všechny řádné žádosti. Žadatelé s chybami budou vyzváni k opravě a postupně vypláceni." 2011. Available online: http://www.zelenausporam.cz/clanek/193/1178/ministr-predstavil-dalsi-postup-v-programu-zelena-usporam-penize-jsou-na-vsechny-radne-zadosti-zadatele-s-chybami-budou-vyzvani-k-oprave-a-postupne-vyplaceni/ (accessed on September 15, 2016).

[133] See State Environmental Fund, "Výroční zpráva programu Zelená úsporám za rok 2012." Praha, 2013, pp. 21–2. Available online: http://www.zelenausporam.cz/soubor-ke-stazeni/17/5112-vz_zu_2012_cz.pdf (accessed on September 27, 2016).

[134] See "O Programu" State Environmental Fund, Praha, Nová zelená úsporám 2013, 2013. Available online: http://www.nzu2013.cz/o-programu/ (accessed on November 26, 2016).

[135] "O Programu" State Environmental Fund, Praha, Nová zelená úsporám. Available online: http://www.novazelenausporam.cz/zadatele-o-dotaci/rodinne-domy/3-vyzva-rodinne-domy/o-programu-3-vyzva/ (accessed on November 26, 2016).

[136] "Národní akční plán energetické účinnosti ČR 2016", Praha, 2016, pp. 43–4. Available online: http://download.mpo.cz/get/50711/63238/651838/priloha004.pdf (accessed on September 6, 2016).

[137] *Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC* (Text with EEA relevance). European Parliament and the Council of the European Union, 2006. Available online: http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32006L0032 (accessed on November 19, 2016).

[138] See G. Berent-Kowalska, S. Peryt, R. Wnuk, et al., "Energy efficiency trends and policies in Poland: ODYSSEE-MURE 2015 Monitoring EU and national energy efficiency targets". *ODYSSEE-MURE*, 2015, p. 8. Available online: http://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-poland.pdf (accessed on November 19, 2016).

decrease consumption of energy. Each reduction in energy was approved by earning a white certificate. This was the main single mechanism aimed at achieving energy savings, amounting to 38 per cent of all designed savings.[139] In order to secure earn the certificate, any obliged party was invited to participate in certification tenders, where best projects were selected by energy regulatory office (Urząd Regulacji Energetyki). Tender winning projects were awarded certificates, which were than registered at the commodity exchange and subsequently traded, earning resources to finance projects. Each obligated party was mandated to earn certain number of white certificates, or pay substitution fee if they failed to accomplish the obligation.[140]

Such scheme motivates in theory to achieve savings in an efficient manner, as certificates are selected through competition. This proved to be problematic at the same time, as it became obvious the tendering part of the scheme made the whole process overly complicated. This turned into smaller-than-expected interest and hence low number of bids, further rejection of bids and small amount of certificates to be awarded, and long evaluation time.[141] New demands stemming from EED, inefficiencies of the existing system,[142] and expiration of the scheme in 2016 led to a new reworked energy efficiency act. White certificates scheme was substantially simplified - most importantly, leaving out the tendering part of the process.[143] The impact of this change is yet to be seen, as the scheme should be implemented in following years.

Apart from that, Poland utilizes green investment scheme based on sale of AAU units as well. Unlike in the Czech case, Polish scheme has not been primarily directed at greening of residential sector, but has been financing other measures

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[139] See "Poland Energy Report". *Enerdata*, 2013, p. 6.

[140] See *National Energy Efficiency Action Plan for Poland 2014*. Ministry of Economy of Poland, 2014, pp. 22–5. Available online: https://ec.europa.eu/energy/sites/ener/files/documents/NEEAP_Poland_ENG_2014_ENER-2014-1003-0-0-EN-TRA-0.pdf (accessed on November 18, 2016); Berent-Kowalska et al., op. cit., p. 9.

[141] See A. Bator, "System of white certificates to change: The requirements introduced by Article 7 of the Directive 2012/27/UE on energy efficiency and the Polish system of white certificates - Legal analysis". *ClientEarth*, 2014, pp. 19–20. Available online: http://www.clientearth.org/reports/20140724-energy-White-Certificates-System-to-change.pdf (accessed on November 18, 2016).

[142] Bator, "System of white certificates to change: The requirements introduced by Article 7 of the Directive 2012/27/UE on energy efficiency and the Polish system of white certificates - Legal analysis", op. cit.

[143] S. Sekuła-Baranska, "New Act on Energy Efficiency passed in Poland," *Noerr*, May 24, 2016. Available online: https://www.noerr.com/en/newsroom/News/new-act-on-energy-efficiency-passed-in-poland.aspx (accessed on November 19, 2016); "New Energy Efficiency Act signed in Poland". *CMS Law-Now*, June 15, 2016. Available online: http://www.cms-lawnow.com/ealerts/2016/06/new-energy-efficiency-act-signed-in-poland (accessed on November 19, 2016); Bator, "System of white certificates to change: The requirements introduced by Article 7 of the Directive 2012/27/UE on energy efficiency and the Polish system of white certificates - Legal analysis", op. cit.

instead. The scope of measures is broad and has allowed to finance refit of public buildings; agricultural biogas works; biomass plants; efficient street lighting; or low-emission urban transport.[144] National Fund for Environmental Protection and Water Management is the main body responsible to disseminate financial resources. Each sub-program has its own setup and timing. Financial support is provided either through subsidies or loans. Most programs end their support by 2016 or 2017, though. The most relevant sub-scheme has been funding thermal modernization of public buildings, running from 2010 to 2017. [145] It is wort mentioning grants and loans have been provided equally, with approximately the same allocation of funds.[146]

Slovak Republic

Slovak Republic is approaching savings' targets differently. In industry, it is aiming to achieve energy efficiency mostly through utilization of own resources, which come from state budget, or commercial loans with private financing, instead of using subsidies.[147] This comes in stark contrast with Czech Republic, which plans to utilize mostly European resources. In Slovakia, EU funds have been used mostly in public sector (public buildings), transportation or regional development.[148]

Current Slovak variation of GIS is slightly different from other V4 countries and is worth pointing out. Finances coming from AAU trade are directed towards a Green Carbon Fund under Multilateral Carbon Credit Fund of the European Bank for Reconstruction and Development. The scheme is called SlovSEFF (Slovak Sustainable Energy Finance Facility).[149] The logic of scheme is based on a combination

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[144] A. Marcu, T. Chruszczow, D. Belis, et al., "Country case study - Poland: Climate for Sustainable Growth". *Centre for European Policy Studies*, Brussels, November 2015, pp. 39–40. Available online: http://www.ceps-ech.eu/sites/default/files/20160115 Poland case study CfSG_0.pdf (accessed on November 19, 2016); "REGULATION OF THE COUNCIL OF MINISTERS of 20 October 2009 on types of programmes and projects to be implemented under the National Green Investment Scheme". *Journal of Laws*, Vol. 187 2009. Available online: http://www.nfosigw.gov.pl/download/gfx/nfosigw/en/nfoopisy/4/1/9/gis_regulation_on_types_of_programmes_and_projects_20.10.2009.pdf (accessed on November 19, 2016).

[145] "PROGRAM PRIORYTETOWY: System zielonych inwestycji (GIS – Green Investment Scheme) Część 1) Zarządzanie energią w budynkach użyteczności publicznej". *National Fund for Environmental Protection and Water Management*, Warsaw, 2013. Available online: http://www.nfosigw.gov.pl/download/gfx/nfosigw/pl/nfoopisy/566/1/78/program_gis_cz._1_zarzadzanie_energia_-_22.10.2013.pdf (accessed on November 28, 2016).

[146] "National Energy Efficiency Action Plan for Poland 2014". *Ministry of Economy of Poland*, Warsaw, 2014, p. 47. Available online: http://www.me.gov.pl/files/upload/14830/NEEAP_Poland_ENG_2014.pdf (accessed on November 28, 2016).

[147] See *Akčný plán energetickej efektívnosti na roky 2014-2016 s výhľadom do roku 2020*. Ministry of Economy of SR, Bratislava, 2014, pp. 14–8. Available online: https://ec.europa.eu/energy/sites/ener/files/documents/2014_neeap_sk_slovakia.pdf (accessed on November 29, 2016).

[148] See *Akčný plán energetickej efektívnosti na roky 2014-2016 s výhľadom do roku 2020*, op. cit.

[149] A. Reiserer, "EBRD facilitates first carbon credit transaction between Slovak Republic and Spain".

of grant and loan. At first, the applicant is provided with a commercial loan provided by scheme's partner banks. The loan finances energy saving measures. After installation of measures, their energy performance is assessed, and if successful, a subsidy is paid to the applicant.[150] The subsidy stimulus is interesting to point out, as it is calculated on the basis of the amount of CO_2 emission savings stemming from the project. Subsidy is ranging from minimum 5 percent to maximum 20 percent of the loan value.[151] The scheme is directed to three areas: industrial production, renewable sources of energy, and condominium housing.[152] Current SlovSEFF mechanism is the third iteration of the scheme, but first to be financed from the AAU trade.

It is worth noting Slovak Republic has also experienced issues with AAU trade, as some of them have been undersold (at a half-price in comparison to Czech Republic) to an unknown company InterBlue in a shady and opaque deal. This resulted in a substantial loss of finances (at least 66 million EUR), which could be used for greening projects.[153] The trade deal was not revoked, with little investigation outcomes.

Hungary

Hungary implemented a green investment scheme as the first country from all V4 members, targeting predominantly the housing sector. This is similar to Czech Republic, however, outcomes are different. The first program started in 2008. Subsequent programs were running by 2011, but after that, there have been no new schemes announced, according to the original website of the program.[154] By 2010, there were four sub-programs in place – on refurbishment of concrete apartment blocks; houses; appliances; and interior lighting.[155] In 2011, financing was directed

European Bank for Reconstruction and Development, May 28, 2014. Available online: http://www.ebrd.com/news/2014/ebrd-facilitates-first-carbon-credit-transaction-between-slovak-republic-and-spain.html (accessed on November 26, 2016).

150 "Ako to funguje." *SlovSEFF*, Bratislava. Available online: http://www.slovseff.eu/index.php/sk/ako-to-funguje# (accessed on November 26, 2016).

151 "Mechanizmus výpočtu grantu". *SlovSEFF*, Bratislava. Available online: http://www.slovseff.eu/index.php/sk/mechanizmus-vypoctu-grantu# (accessed on November 26, 2016).

152 "Oprávnené Projekty". *SlovSEFF, Bratislava*. Available online: http://www.slovseff.eu/index.php/sk/vhodne-projekty (accessed on November 26, 2016).

153 See K. Slovák, G. Beer, "Ďalší kšeft SNS: Horúci vzduch." *TREND.sk*, December 3, 2008. Available online: http://www.etrend.sk/ekonomika/dalsi-kseft-sns-horuci-vzduch.html (accessed on November 26, 2016); R. Baťo, "Slovenské pozadie veľkého kšeftu". *TREND.sk*, April 22, 2009. Available online: http://www.etrend.sk/ekonomika/slovenske-pozadie-velkeho-kseftu.html (accessed on November 26, 2016).

154 *ZBR alprogramok*. Zöld Beruházási Rendszer, Budapest. Available online: http://zbr.kormany.hu/zbr (accessed on November 28, 2016).

155 See *2009.* évi *ZBR alprogramok*. Zöld Beruházási Rendszer, Budapest. Available online: http://zbr.kormany.hu/2009-es-zbr-alprogramok (accessed on November 26, 2016); *2010.* évi *ZBR alpro-*

at retrofit and renewable sources of energy.[156] Supposedly, the scheme was met with high interest from consumers.[157] However, the scheme had issues with additionality in the first run in 2008, as well as with issues concerning of opaque financial spending.[158] This information seems to be corroborated by another study, which points to issues appearing in 2009 scheme (retrofit of concrete condominium housing). The scheme was administered with huge lag in financing, administering applications through 2010-2011 and reimbursing costs by 2013. This resulted in immediate issues with cash-flow of running projects – applicants either took commercial loan to bridge the financing gap, or shifted the burden to construction companies.[159] In longer run, subsequent schemes became much smaller and more targeted.[160] In recent time, there has been launched a new scheme, based on AAU units as well, titled Green Economy Financing Scheme. It's first application call was launched in 2015.[161] However, there are little more information available.

Concluding note

Actors implementing energy efficiency and savings policies in Visegrad countries face very similar tasks, such as mitigation of inefficiency in industrial processes, or refurbishment of underinvested and obsolete housing stock. Many of these policies are dependent on availability of financial resources needed for investments. European funding supports these goals to a varying extent within the V4. On one side, EU resources are most heavily utilized in the Czech Republic, while on the other, Poland is relying heavily on domestic market-driven efficiency invest-

gramok. Zöld Beruházási Rendszer, Budapest. Available online: http://zbr.kormany.hu/2010-evi-zbr-alprogramok (accessed on November 26, 2016).

156 *2011. évi ZBR alprogramok*. Zöld Beruházási Rendszer, Budapest. Available online: http://zbr.kormany.hu/2011-evi-zbr-alprogramok (accessed on November 26, 2016).

157 Compare "Hungarian Green Investment Scheme". Ministry of National Development, Budapest, March 2011. Available online: http://zbr.kormany.hu/download/a/72/00000/Interested in buying AAUs from Hungary _EHval.pdf (accessed on November 30, 2016).

158 See A. Tuerk, D. Frieden, M. Sharmina, et al., "Green Investment Schemes: First experiences and lessons learned". 2010, p. 9. Available online: http://www.accc.gv.at/pdf/JoanneumResearch_GIS-WorkingPaper_April2010.pdf (accessed on November 30, 2016); "The wrong sort of recycling". *The Economist,* March 25, 2010. Available online: http://www.economist.com/node/15774368 (accessed on November 26, 2016).

159 É. Gerőházi, H. Szemző, "Analysis of subsidy schemes aiming to support energy efficient renovation of multi-family buildings in selected countries of Central and Eastern Europe: Lessons for Armenia and Bosnia & Herzegovina". Budapest, September 2015, pp. 36–8. Available online: www.housingeurope.eu/file/459/download (accessed on November 25, 2016).

160 Gerőházi & Szemző, "Analysis of subsidy schemes aiming to support energy efficient renovation of multi-family buildings in selected countries of Central and Eastern Europe: Lessons for Armenia and Bosnia & Herzegovina", op. cit., p. 38.

161 Gerőházi & Szemző, "Analysis of subsidy schemes aiming to support energy efficient renovation of multi-family buildings in selected countries of Central and Eastern Europe: Lessons for Armenia and Bosnia & Herzegovina", op. cit., p. 36.

ment stemming from energy obligation scheme. The most similar efficiency programs are green investment schemes, which were covered in the preceding pages.

The success of all of these schemes stems from providing funding which might be spent directly on greening projects. Hence, environmental benefits and energy savings are achieved at the same time. If working, these schemes proved to generate demand for efficiency measures, as was seen in all implementations of Czech Green Savings scheme. If there is a support and cooperation with well-established and credible partners, this might further provide new financial instruments beyond subsidies, as proven in the case of Slovakia and SlovSEFF mechanism.

As already hinted, there issues that should be pointed out. Firstly, proper setup of schemes is crucial. The case of first implementation of Czech Green Savings program illustrates this well, despite its success in achieving savings in the end. Lacking thorough setup in the beginning, mismanagement, improper monitoring and lack of standardized processes to manage unexpected demand for modernization resulted in abrupt termination of the scheme and subsequent lack of funding. It took another two and half years to process all applications. Comparably, delays in application processing and funding in Hungarian scheme resulted in abovementioned negative consequences. The question of proper setup of schemes applies to some extent also to the case of Polish obligation scheme. Overly complicated program resulted in little interest, thus missing its basic goal throughout first few years.

Secondly, lack of transparency resulted in low credibility of Slovakia. Undervalued unit price and opaque structure of emissions' trade resulted into huge loss of money to a shell company. For Slovakia, this unfavorable trade was a missed opportunity. Had Slovakia sold its AAU allowances for a price comparable to its neighbors, significantly more resources could finance greening projects.

4. Prospects for market integration

Ihor Ponomarenko, Mykhaylo Gonchar and Andriy Chubyk

4.1 Ukraine and Central European gas market

Ukraine's gas sector, which has traditionally been the "Achilles' heel" of Ukrainian economy, is undergoing major changes caused by both reforms in the energy sector and Russian aggression against Ukraine. It is sufficient to look at changes in the gas balance of the country and compare the pre-war (2013) indicators of gas consumption and imports with the ones in 2016:

The gas balance of Ukraine, 2013 – 2016, bcm

	2013	2014	2015	2016
Output, total	**21,40**	**20,50**	**19,91**	**20,20**
State Company "UkrGasVydobuvannya"	15,00	15,10	14,53	14,60
Open Joint Stock Company "Ukrnafta"	1,70	1,70	1,50	1,30
State unitary enterprise " Chornomornaftogaz"	1,70	0,30	0,00	0,00
Private companies	3,00	3,30	3,88	4,30
Import, total	**28,00**	**19,50**	**16,40**	**11,10**
From Russian Federation, Open Joint Stock Company "Gazprom"	25,90	14,40	6,14	0,00
From Europe through gas metering stations:	2,09	5,02	10,32	11,09
- Hermanowice (Poland)	0,94	0,88	0,15	0,97
- Beregdaróc (Hungary)	1,15	0,59	0,47	1,03
- Budince (Slovakia)		3,55	9,70	9,09
Consumption, total	50,40	42,60	33,92	33,32
Consumers of Ukraine	**47,00**	**39,80**	**31,38**	**30,29**
Industrial and technological needs of the gas transmission system	3,40	2,80	2,44	2,93
Transit, total	86,10	62,20	67,08	82,20

To Europe through gas metering stations:	**83,70**	**59,40**	**64,16**	**79,30**
- Uzhhorod	53,50	31,40	37,80	48,80
- Tekove	0,20			0,80
- Berehove	6,40	6,50	5,90	6,70
- Drozdovychi	3,90	3,50	3,70	4,50
- Orlovka, direction:	19,70	18,00	16,70	18,50
Bulgaria	2,50	2,70	2,90	3,00
Romania	1,10	0,60	0,20	0,70
Turkey	16,10	14,70	13,60	14,80
To CIS countries:	2,40	2,80	2,92	3,00
Moldova	2,40	2,80	2,92	3,00
Gas injection into underground gas storage	11,60	9,80	9,50	6,40

Ukraine has a developed gas transmission network that provides both transportation of natural gas from producing regions to the end consumers and transit to Central European countries. In the 1970s Ukraine has exported domestic gas output to today's Visegrad countries, and since the 1980s it provided uninterrupted transit from Central Asian and Siberian gas fields.

The period of 1960s and 1970s was marked by the rapid development of gas transmission system (GTS). After the trunk gas pipeline Dolyna-Uzhhorod-state border started its functioning in 1967, the natural gas supply, first from Ukraine, and later also from Russia and Central Asia to Central and Western Europe, began. This was the beginning of the largest, up to the present day, corridor for the transit of Russian gas, and the Ukrainian-Slovak route became the largest transit route for natural gas supply to the EU.

4.1.1 Gas transit system of Ukraine

Ukrainian gas transmission system (GTS) is closely connected with the systems of neighbouring countries – Russia, Belarus, Poland, Slovakia, Hungary, Romania and Moldova. According to its scale and capacity, it is on the second position in Europe. The length of pipelines in a single-strand measurement amounts 38 thousand kilometres,[162] including 1.5 thousand kilometres of Ukraine's temporarily uncontrolled territories as they are occupied by Russia and comprise East Donbas and Crimea peninsula. The capacity of the system at the input is 302 billion cubic meters, including 21 billion cubic meters in Europe, while at the output – 178 bil-

[162] Hereinafter (in the section 4.1.) the figures are based on data from corporate sources of Naftogaz of Ukraine, Ukrtransgaz, NaftoGazBudInformatika ltd. and the Ministry of Energy and Coal Industry of Ukraine.

lion cubic meters of gas per year, and among them – 146 billion cubic meters to Europe, including Moldova, Turkey, Balkans countries.

Reliability of both transit gas supply and gas supply to domestic consumers is ensured by a set of 13 underground gas storage facilities with a total volume 30.95 billion cubic meters that provides high manoeuvrability of gas flows, optimization of systems' operating mode, creation of necessary operational and strategic gas backlog, which is important in market conditions. Underground gas storage facilities have for many years provided a reliable transit of Russian gas to European countries, especially in winter, compensating the daily fluctuations of gas revenues and extraction. Also underground gas storage facilities ensure reliable and uninterrupted supply of gas to consumers in Ukraine. The gas volume in the underground storage facilities necessary for providing domestic consumers with it in recent years counts about 15 billion cubic meters. Thus, there is a real possibility to store a natural gas for European companies in the underground gas storage facilities of Ukraine amounting to 15 billion cubic meters in western Ukraine.

Source: Ukrtransgaz

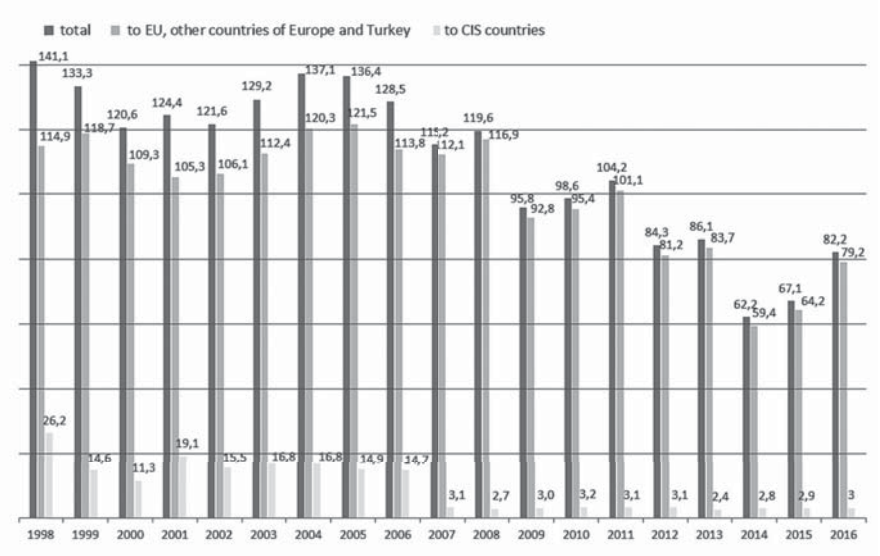
The branched system of gas pipelines allows to react promptly on emergency situations on separate gas pipelines and to restore the necessary gas flows. In a representative case of sabotage on trunk gas pipelines in 2014 in Poltava and Ivano-Frankivsk regions the gas transit to the EU did not stop and the gas characteristics were not violated due to the technical capabilities of the gas transmission system.

The GTS of Ukraine was established to carry out technological operations for pumping gas produced in Ukraine, delivering gas from Russia and Central Asia to consumers in Ukraine, as well as providing transit to Europe. The transit function of the GTS of Ukraine is very important since it marks the main loading of the system.

The maximum volume of gas transit through the gas transmission system in Ukraine in 2005 reached 136.3 billion cubic meters, including 121.4 billion cubic meters to the countries of Central Europe and Turkey. After Russia put into operation new gas pipelines such as the Blue Stream gas pipeline through the Black Sea in 2003 and the Nord Stream (the first line was launched in November 2011 and the second one in October 2012), the volume of gas transit through the Ukrainian GTS was reduced to 62 billion cubic meters in 2014. During 2015-2016 it has grown to the level of 82.2 billion cubic meters due to the increase of Russian gas sales to European customers.

In the Slovak direction (through "Uzhhorod" gas metering station) with a maximum capacity of 92 billion cubic meters per year the transit volume varied from 90.8 billion cubic meters in 1999 to 31.4 billion cubic meters in 2014, however in 2015 the volume increased to 37.8 billion cubic meters. In the Hungarian Direction (through "Berehove" gas metering station) with a capacity of 13.2 billion cubic meters, the transit volume changed from a maximum 12.1 billion cubic meters in 2008 to 6 billion cubic meters in 2015. In terms of Polish direction (via "Drozdovychi" gas metering station), with a capacity of 5 billion cubic meters per year, the transit volume varied from a maximum of 5.3 billion cubic meters in 1991 to the current 3.5 billion cubic meters. In the Romanian direction (via "Orlovka" gas metering station) with a capacity of 26.8 billion cubic meters the transit volume was changed from a maximum 23.1 billion cubic meters in 2007 to 16.7 billion cubic meters in 2015.

Gas Transit through the GTS of Ukraine, 1998-2016



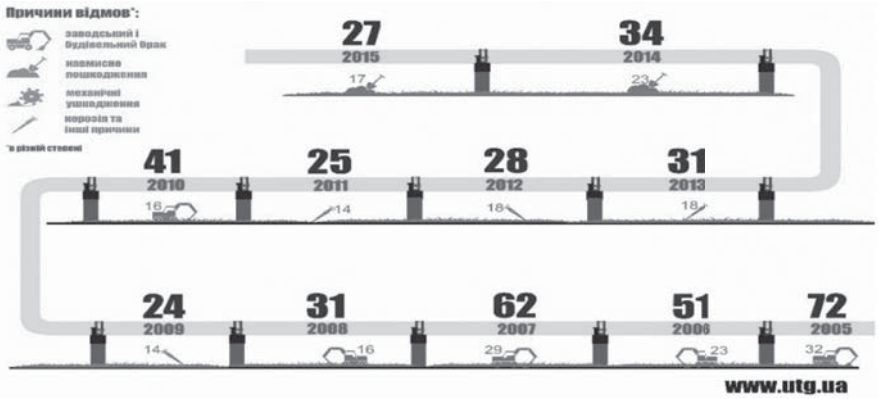
Source: Naftogaz

Thus, the reserve of the transit capacity of the gas transmission system of Ukraine is 60-80 billion cubic meters per year, which is equivalent to the capacity of the planned Nord Stream-2 (55 billion cubic meters per year), or together with one thread of the Turkish Stream (16 billion cubic meters per year). In the Slovak direction, the reserve capacity is about 54 billion cubic meters per year; the reserve in the Hungarian direction is about 7 billion cubic meters, in the Polish direction it comprises 1.5 billion cubic meters and in the Southern (Balkan) direction – about 10 billion cubic meters. Following the Conclusions of the Joint Working Group of Experts of Ukraine and the European Union working within the INOGATE Program, the technical conditions of the transit gas system were recognized as satisfactory and capable of providing transit volume at the level of 140 billion cubic meters per year.

In order to preserve the competitiveness and attractiveness of the Ukrainian gas transportation system, the programs on the reconstruction of compressor stations, the linear part of the system, gas distribution and gas metering stations have been developed and are being implemented in accordance with modern requirements of reliability and functionality for the gas exporters and importers.

The statistics testifies the technical reliability of the Ukrainian GTS. The number of failures on pipelines tends to decrease, as it can be seen from the Diagram:

The number of failures on trunk gas pipelines of Ukraine



Reasons of failures (in varying degree):

- material and construction defects
- willful damages
- mechanical damages
- corrosion and other damages

Source: Ukrtransgaz

For comparison, Gazprom is not so transparent in providing primary data. Its “Informatoriy” gives a generalized figure: “... on average, on Russian trunk gas

pipelines, the accident rate is 0.2 accidents per year per 1000 km." Considering that the length of Gazprom gas pipelines, following its own data, is 168 300 km, it is easy to get the indicator of 33.7 accidents per year. In comparison to the average data of Ukrtransgaz for the last 5 years (an average – 29 accidents per year) the Russian figure is clearly inferior to the Ukrainian one.

4.1.2 Economic conditions and a rentability potential

After the declaration of independence, Ukraine did not take its advantage of the opportunities for an independent policy making in the energy sector. Among other things, this affected the preservation of the Soviet scheme of contractual relations between energy companies with the EU and Russia with reference to the point of receipt and delivery of natural gas on the Western border of Ukraine. Thus, in spite of the fact that the USSR has not existed for more than a quarter of a century, the Soviet "gas frontier" remains in force up to this day, since with the tacit consent of Gazprom, its European clients and the European Commission, this practice is prolonged as "business as usual".

The beginning of the real reforms in gas sector as from 2014 makes it possible to present an economic attractiveness of the relevant assets and their use within parameters familiar to the EU. In particular, the spread of the European energy legislation on the Ukrainian gas sector opens the possibility for the EU companies to operate in the market, particularly in the gas production segment, taking into account the process of price equalization for all consumers, providing a free access to transportation networks and simplifying cooperation with consumers. There is also an interest in the use of underground gas storage facilities, considering the transition to a flexible format of the European gas market based on short-term contracts, as it allows flexible response on demand fluctuations. There is an interest in establishing an operator of the GTS with guaranteed financial revenues and a long-term period of operation. The applied approach of NJSC Naftogaz of Ukraine to the accelerated depreciation of the GTS through the increase of transit fee in the case that it wins the case in the Stockholm Arbitration will allow for both maintaining the high functionality of the GTS and ensuring an attractive tariff for its further operation.

The transition to an "entry-exit" system opens up opportunities for a withdrawal from the post-Soviet system of contractual relations and shifting the point of receiving and delivery to the Eastern/Northern border, which in turn will upgrade the gas trade both on Ukrainian market and at the regional level. It is in the common interest of Ukraine and countries of Central Europe to achieve, first, the termination of Gazprom's exclusive right to use the Russian GTS and second, to provide access Russian independent gas producers to Ukrainian transit facilities.

The expected growth in gas production in Ukraine and the overall growth of the liquidity of domestic gas market are also positive economic factors that should stimulate interest in developing business between Ukraine and the Visegrad Group. Ukrainian energy companies after 2025 can get economic and resource opportuni-

ties to enter the EU gas market as it is now happening in other sectors of Ukrainian economy. This will promote the spread of competition in the EU and contribute to diversification of supply routes.

4.1.3 Cooperation with the Visegrad Group

For both Ukraine and for Central European countries, the issue of diversifying the sources and routes of energy supplies remains topical, especially in the field of natural gas. Under the current political and economic challenges, the issue of ensuring energy security is of special importance for Ukraine, since it is an integral part of national security. In the Central European region the EU policy is implemented in the field of diversification of sources and routes of energy supplies, which should be reflected in the implementation of a number of infrastructure projects until 2020:

- Nowadays the interconnector between Poland and the Czech Republic is operating with a total capacity of 0.9 billion cubic meters per year.
- In 2015, the construction and testing of the Hungary-Slovakia interconnector were carried out with the capacity from Slovakia to Hungary 4.45 billion cubic meters per year and from Hungary to Slovakia – 1.78 billion cubic meters per year.
- The first phase of Świnoujście LNG terminal with a capacity 5 billion cubic meters per year was set in operation. In 2017 it is planned to put into operation the second stage of the terminal, which will increase its capacity to 7.5 billion cubic meters per year.
- An interconnector between Bulgaria and Romania (IBR) was completed on 11 November, 2016 with the carrying capacity from Bulgaria to Romania 1.5 billion cubic meters per year and from Romania to Bulgaria – 0.5 billion cubic meters per year. Providing for supplies from Romania to Bulgaria will be possible only after construction of a compressor station in Romania, which is scheduled for 2017.
- In 2017 it is planned to finish the construction and put into operation the interconnector between Bulgaria and Serbia with a capacity from 1.8 to 5 billion cubic meters per year.
- In 2018 it is planned to put into operation an interconnector between Bulgaria and Turkey with annual capacity 3 billion cubic meters.
- In 2018, it is planned to put into operation an interconnector between Bulgaria and Greece with annual capacity 3 billion cubic meters and with the possibility of expanding up to 5 billion cubic meters. Another option is considered to continue the interconnector to the Southern Corridor.
- By 2019 Romania plans to complete the construction of the South Corridor gas pipeline, which must pass from Constanta to Chanadpalota (Hungary) in the South and Southwest of Romania. The designed capacity of this gas pipeline is 4.4 billion cubic meters per year, and the capacity at the Chanadalota point will be 1.75 billion cubic meters per year.

- By 2021 Poland and Slovakia are planning to complete the construction and put into operation a joint gas pipeline-interconnector with a capacity from Slovakia to Poland 5.7 billion cubic meters per year and from Poland to Slovakia – 4.7 billion cubic meters per year.
- By 2019 it is planned to put into operation the Trans Anatolian Pipeline (TANAP). This gas pipeline must ensure the transit of natural gas from Azerbaijan to European countries; its estimated capacity (first stage) is 16 billion cubic meters per year.
- In 2020 the Trans Adriatic Pipeline (TAP) is planned to be commissioned, it will provide transit of natural gas from the border of Turkey and Greece to Italy through Greece and Albania, the total length of the gas pipeline is 870 km, the carrying capacity is 10 billion cubic meters per year. If necessary, it is possible to expand the capacity to 20 billion cubic meters per year, subject to the construction of two additional compressor stations.

Ukraine is interested in participating in projects with both its immediate neighbours and in the development of new corridors. The Government of Ukraine is implementing the reform of the gas sector in accordance with the requirements of the energy legislation of the EU – Second and Third Energy Packages. The process of unbundling Naftogaz began. This process is not easy. The government of Ukraine and the corporate sector are focused on attracting the best European practices. Ukraine's energy strategy, which is currently under review, formulates a three-pronged policy – reducing gas consumption with simultaneous gas saving and gas utilization efficiency and increasing its own gas production with the prospect of refusing imports. The ambitious goal is set to reduce gas consumption in Ukraine to the level of 26 billion cubic meters by 2020 and increase its own gas production to the same level. As already noted, its own production is more than 20 billion cubic meters. It seems quite real to increase in 4-5 years the production at 6-7 billion cubic meters through the intensification of production at existing wells and drilling of new ones applying the latest technologies in cooperation with a number of American and European companies.

As for gas transit, the three basic scenarios are considered:

1. Preservation of the existing status quo with the level of transit within the range of 60-80 billion cubic meters per year.
2. The fall of transit, not from 2020, rather later – 2022-2023 - when Russia, although with a delay, but will realize bypass projects via the Baltic and Black Sea.
3. "Zero transit" since 2020, when Russia, regardless of the degree of implementation of its bypass projects, refuses to use the Ukrainian GTS for its gas supplies to Europe.

It can be assumed that a common sense and economic realities will prevail over Russia's political and geopolitical ambitions and Europe's fears. International Energy Agency (IEA) calculations confirm that the Ukrainian-Slovak route is the

most optimal one, and it will remain the same, both for Russian supplies to Europe and for supplies from non-Russian sources to Ukraine. Yet, Ukraine is also preparing for the worst scenario, when it will be necessary to optimize the GTS, reduce transport capacities, and reorient the GTS exclusively to internal operations. It is unlikely that the loss of the Ukrainian gas transmission system from the gas supply routes to the EU will work for Europe's benefit.

It is obvious that for Ukraine the environment for cooperation is the Central European region and, especially, its neighbours – Slovakia, Poland, Hungary and Romania. In particular, the construction of a new interconnector Drozdovichi – Bilce-Volitsa between Ukraine and Poland is expected with a length of 99.3 km, carrying capacity of 7-8 billion cubic meters per year, and cost of $ 245 million, since the existing interconnector is obsolete and inefficient. The projects of attracting European partners to the GTS of Ukraine are also under consideration. And here it is possible to note cooperation with the Slovak TSO Eustream. Underground gas storage facilities in Western Ukraine can become a basis for cooperation on gas storage in the future, if appropriate prerequisites are created.

In the result of negotiations, contracts for gas supply from Europe were signed and gas supplies to Ukraine started first in two directions: from Poland and Hungary (which were called "reverse" in the press, although they are direct deliveries to Ukraine). Since November 2012 natural gas has begun to flow from Poland through the gas metering station Hermanowice, and since March 2013 – from Hungary through the gas metering station Beregdaróc. In April 2014, a Memorandum of Understanding was signed between Ukrtransgaz and the Slovak company Eustream, and since September 2014, natural gas supplies has been started from Slovakia to Ukraine – the largest gas supply channel from Europe.

Year Indicators	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Consumption, *bn m³ per year*	59.3	54.8	50.358	42.5	33.727	30,3
Output, *bn m³ per year*	20.6	20.2	20.998	20.5*	19.896*	20.290*
Import, *bn m³ per year*	44.8	32.9	27.974: 25.842–RF 2.132– EU	19.6: 14.450– RF 5.016– EU	16.442: 10.302– EU 6.140– RF	11.078: 11.078– EU 00,000– RF

** - without production on the shelf of the Black Sea, captured by the Russian Federation during the occupation of the Crimea, and the occupied areas of Donetsk and Lugansk regions.*

To date, the total capacity of gas from Europe is 21 billion cubic meters per year, including 14.5 billion cubic meters from Slovakia through Budince gas metering station, 5.4 billion cubic meters from Hungary – Beregdaróc gas metering station and 1, 5 billion cubic meters from Polish gas metering station Hermanowice. During 2012-2015, Ukraine received 17.6 billion cubic meters of gas from Europe, including 13.3 billion cubic meters through Slovakia, 2.2 billion cubic meters from Hungary, and 2.1 billion cubic meters of gas from Poland. In 2015, gas imports from Europe to Ukraine for the first time exceeded the volume of imports from Russia and amounted to 63%. In 2016, Ukraine did not import gas from Russia, and all necessary imports were provided by reverse supplies from Europe, mainly through Slovakia.

The data on the dynamics of changes in consumption and import of gas indicate fundamental changes in the gas sector of Ukraine in favour of reducing its excessive role in the energy and economy, optimizing its use and harmonizing with other types of energy resources in the country's overall energy balance. The most important is that the import dependence from Russian supplies – which were reduced to zero – has been overcome, while the effectiveness of diversification reverse schemes is demonstrated, where the main place belongs to the Slovak direction.

4.1.3.1 Looking-out for expanding interconnectivity

Slovak direction

The Slovak direction is currently – and for the future – the most powerful route for gas supplies from Europe to Ukraine, however at present there are problems stemming from political reasons. Today, due to historical factors lasting from the USSR times, the Gazprom Export supplier (on behalf of Gazprom), which is not the operator of the gas transportation system adjacent to Slovakia, is involved into the scheme of the physical gas flow transmission on the Ukrainian-Slovak border. In fact, on the exit of the Ukrainian GTS (Uzhgorod gas metering station), the Russian side when receiving gas volumes from Ukrtransgaz after its transit through the territory of Ukraine, subsequently transfers gas and data on its distribution to European consumers in a temporary and daily form (matching-procedure) to Eustream (Slovakia). The current procedure contradicts the EU business rules and the norms of the Third Energy Package, which determines the direct interaction of operators of connecting systems on the basis of Interconnection Agreements.

Despite repeated long negotiations with the Slovak party, including the involvement of the European Commission representatives, it was not possible to sign the Interconnection Agreement (at the Veľké Kapušany connection point) between Ukrtransgaz and Eustream. The Slovak party, motivating its actions by the fact that Ukrtransgaz does not have data for the maching procedure, refuses to

accept gas and to sign the Agreement; it continues to work through the pseudo-operator Gazprom Export.

To solve the virtual reverse, it is necessary, at the initiative of the Slovak party, to exclude the pseudo-operator from the procedure for registering gas transmission to the gas metering station Uzhhorod and Veľké Kapušany by amending existing contracts between Eustream and Gazprom Export as well as Naftogaz Ukraine and Gazprom, and to switch to direct relations of operators of connecting systems in gas flows maching procedure.

Polish direction

The current state of the GTS network between Poland and Ukraine, as mentioned, allows to get a natural gas through the gas metering station Hermanowice in a volume of up to 1.5 billion cubic meters per year, or up to 4.3 million cubic meters per day. The project of expanding gas pipeline system on the territories of Ukraine and Poland is being realized now with the two objectives. First, to increase the volume of gas imports from Europe to Ukraine through Poland, including from the new liquefied natural gas (LNG) terminal in Świnoujście (Poland) on the shores of the Baltic Sea. Second, to ensure the storage of European gas in the underground gas storage facilities in Western Ukraine and its supply to consumers in the EU (the real possibility of downloading, storing and extracting natural gas for European companies from the underground gas storage facilities of PJSC Ukrtransgaz is 10-15 billion cubic meters, which in the long term may become a powerful gas hub for the countries of Central Europe).

On the territory of Ukraine, as the main expansion option, the construction of the Drozdovichi-Bilche-Volitsa interconnector gas pipeline with the following characteristics was determined: length – 99.3 km, nominal diameter – 1000 mm, working pressure 7.4 MPa, capacity: in the Poland-Ukraine direction – 8 billion cubic meters per year, in the Ukraine-Poland direction – 7 billion cubic meters per year. The estimated cost of construction of the main interconnector gas pipeline on the territory of Ukraine is $ 245 million.

East-European Gas Hub Development Project

Source: Ukrtransgaz

At the present, the Technical and Economic Estimates “Construction of the Drozdovichi-Bilche-Volitsa Interconnector Gas Pipeline” has been developed and the agreement was signed between PJSC Ukrtransgaz and Gaz-Szystem S.A. (Poland). It provides for a detailed analysis of gas flows and market feasibility study, including justification of the project. Gas transport operators in Ukraine – Ukrtransgaz and in Poland – Gaz-System are ready to start design works, the construction of the gas pipeline is scheduled for 2017. During the construction of the gas pipeline, when water barriers are crossed, progressive horizontal directional drilling technology will be used that will allow the reservoir to pass through layers of the earth‘s crust that are below natural occurrence. The chosen route of the gas pipeline crosses 24 rivers, 27 motorways, one railway route and 14 other gas pipelines.

The parties plan to fully implement this project in 2020. The integration of the Polish and Ukrainian GTS is part of the North-South Gas Corridor, which will unite the LNG terminal in the Świnoujście port with the individual countries of Central and Western Europe, including their cross-border infrastructure. The goal is to create a flexible gas supply infrastructure in the countries connecting Western, Central and Eastern Europe, as well as the Baltic countries.

Hungarian direction

The accounting of gas takes place at the Beregdaróc gas metering station (Hungary). The capacities at the Beregdaróc point are currently offered on an interrupted basis, the maximum supply is 5.4 billion cubic meters per year or 16.8 million cubic meters per day. Ukrtransgaz PJSC technically can provide a reception of up to 35 million cubic meters per day. As of today the system is underloaded, the reason is the lack of technical capability of the Hungarian operator – FGSZ (Földgázszállító) to provide the appropriate transportation. In order to increase a supply volume to Ukraine, the Hungarian side needs to expand the appropriate gas transmission capacities for ensuring the supply of natural gas on an ongoing basis.

The Balkan direction

As to date, the natural gas transportation from Ukraine to the Balkan states and Turkey is carried out through the Orlovka gas metering station (on the Ukrainian-Romanian border) via the GTS of both Romania (183 km) and Bulgaria (261 km). The analysis of transit volumes in recent years shows that the system in this direction works with a significant reserve of power (carrying capacity) – up to 10 billion cubic meters per year.

The transit of natural gas is carried out in the three directions – to Turkey (Du1000), Greece (Du1000 / Du700) and Macedonia (Du700). The volume of transit supplies provides 100% of consumption in Macedonia, about 60% of Greece's consumption and 35% of Turkey's one. At present, the pipelines of Romania, Bulgaria, Moldova and Ukraine provide for the supply of contracted volumes of natural gas transit from Ukraine to the Balkan countries and Turkey. However, in order to ensure reliable gas transportation for a long time in the future, it is necessary to modernize and reconstruct sections of gas pipelines and compressor stations.

The possibility of diversifying gas supplies from the Southern direction to Ukraine is based primarily on the existence of powerful potential sources of gas in the region. These are the countries of the Caspian region, Central Asia and the Middle East – Azerbaijan, Turkmenistan, Iran and others. Under the auspices of the European Commission, projects for the gas transportation from the Caspian region to Europe – such as Nabucco, Trans-Aanatolian Gas Pipeline (TANAP), Trans Adriatic Pipeline (TAP) – are already being developed, and they are part of the overall Southern Corridor project. Thus, following the first stage of the TANAP project, 16 billion cubic meters of gas from the Shah Deniz gas field are expected to be supplied, of which 10 billion cubic meters are planned to be supplied to Europe.

Projects on transit routes of gas supply to Ukraine

Source: Ukrtrasngaz

According to the location of the main gas pipelines, the following technological options for gas reception from the territory of Romania can be considered:

- through the Orlovka / Isakcha gas metering station – after the gas metering station conversion for circle functioning;
- through the Orlovka / Isakcha gas metering station (up to 12 billion cubic meters per year) - a physical gas flow from Romania to consumers of Ukraine if the reverse direction of gas transit is agreed upon with JSC “Moldovagaz”;
- Through the Tekovo gas metering station – after the border areas reconstruction.

During the past years, the Ukrainian side has held preliminary negotiations with the gas companies of Romania, Bulgaria, Greece and Turkey on the possibility of gas supplying from Romania to Ukraine through the Orlovka gas metering station. As a result of more detailed negotiations with Romania’s representatives on future gas supplies to Ukraine through the gas transmission systems of Romania, Bulgaria and Turkey, and iIn order to expand further the opportunities for diversification, in July 2016 Ukraine and Romania signed an agreement on connecting gas transmission systems (GTS) for gas transportation to Bulgaria through the territory of Romania and in the reverse direction.

The agreement is extended to the route of the gas pipeline, which is used to transport gas from Ukraine to Bulgaria (Negru Voda-1 connection point) through the territory of Romania. According to the agreement, separate gas pipelines will

be used for supplies in one and the opposite direction. In October 2016, the Romanian contract with Gazprom is expiring. The agreement on connection to the international gas pipeline fully complies with the requirements of the EU regulation 2015/703 of 30April 2015, which introduces a network code of rules for compatibility and data exchange. Historically, this route has been used by Gazprom to supply gas to Bulgaria, however upon the term expiry of the contract on the gas pipeline use, the operators of the gas transportation systems of Ukraine and Romania decided to follow the legal regulation of the EU in their activities. The agreement on connection to the international gas pipeline is a part of the CESEC initiative (Central and South Eastern Europe Gas Connectivity) led by the European Commission to improve the reliability of interconnection in this region.

Together with the recently signed agreements between Greece and Bulgaria, Bulgaria and Romania on the connection to the international gas pipeline, this agreement will ensure a bilateral direction (meanwhile only virtual North direction however) of the gas flow from Ukraine to Greece, and thus it will facilitate opportunities for local users diversify significantly gas supply routes.

Two new agreements (Interconnection Agreement) between Bulgaria and Romania, as well as between Romania and Ukraine, which entered into force on October 1, 2016, are aimed at further integration of the region's gas markets. They are an important step towards the opening of the Trans-Balkan pipeline system between Greece and Ukraine for gas transportation and trade under the EU rules. The Cabinet of Ministers of Ukraine in its action plan announced its intention to sign before 1 October 2016 an agreement on the merger of cross-border gas pipelines with Slovakia, Poland and Romania.

To ensure the practical supplies of natural gas from Romanian direction, it is necessary to determine the sources of natural gas. One of the possible options considers the gas supply from Turkey through Bulgaria. To date, there is a technical opportunity to transport a natural gas through Negro Water gas metering station (Romania / Bulgaria). To ensure a reverse flow to Romania and further to Ukraine, it is necessary to build 20 km of gas pipelines on the territory of Bulgaria in the area of Lozinec compressor station.

4.1.3.2 Concluding notes

Recent developments in the European gas market indicate a number of threats for the energy security of European countries, especially for countries in Central and Eastern Europe with their limited access to the diversification of sources. The model of the European gas market, built on the principles of diversification, supplies security, interconnectivity and liberalization, should ideally provide Europe's gas transit countries with new opportunities. The gradual market transition in Europe to spot gas markets will promote a competitive pricing. However, the rejection of long-term gas supply contracts creates a high level of uncertainty and price volatility for countries in Central and Eastern Europe that do not have diversified

sources of supply. This will force these countries to look for new sources of supply, sign contracts for reverse supplies along with the Third Energy Package, invest in a new transit infrastructure and interconnectors and develop gas "hubs" to better coordinate gas supply and demand in the region. These problems should be considered in terms of deeper cooperation between the main countries providing transit of gas in the region, including Ukraine.

Investments in gas systems are of great importance today. It is difficult to forecast their return under free market conditions, so it is necessary to develop spot markets for efficient gas trading, which in Europe are much smaller and less cashable compared to the USA, for example. They act on the basis of long-term contracts and are partly supplied by providers. The spot market in Central and Eastern Europe is even less developed than in the Western one. Central European gas hub in Baumgarten (Austria) is tied mainly to gas transit. Therefore, the countries of Central and Eastern Europe and Ukraine need to co-ordinate their national energy policies and take into account Europe's energy goals for the next decades. The security of supplies to the countries of Central and Eastern Europe will be increased if they get access to the Ukrainian GTS, including access of European gas traders to Ukrainian underground gas storage facilities. The introduction of gas trade on the Eastern border of the EU based on Ukraine's gas storage facilities in line with the Third Energy Package can improve energy security in the region. In order to solve the problem of diversification of gas supplies, governments in Central and Eastern Europe need to encourage national companies to coordinate large infrastructure projects (LNG terminals, interconnectors) and jointly lobby for the EU funding. In order to combat the monopolization of the market by Gazprom, the countries of Central and Eastern Europe should help the European Commission in the antimonopoly investigation against Gazprom and national companies and should encourage representatives of the European Commission to negotiate with Gazprom.

One of the goals supporting efforts of Ukraine and V4 should be their coordination in achieving a change when it comes to a role of the Russian Federation, namely that it should work in accordance with the general principles of the EU – that is, free access to the GTS for all extracting companies, shift to the entry-exit transportation, the introduction of an economic principles instead of political governance in gas export. At the same time, V4 + Ukraine have the opportunity to create a joint regional gas market, since the region as a whole tends to reduce gas consumption. Ukraine has unified the gas price on the domestic market what made it attractive for European companies. However, these opportunities are still hypothetical against the background of ambiguous processes in the EU, V4 and Ukraine itself.

4.1.4 Problematic aspects of cooperation

Mykhaylo Gonchar

The Article 274 of the EU–Ukraine Association Agreement "Cooperation on infrastructure" clearly indicates: "The Parties shall endeavour to facilitate the use of gas transmission infrastructure and gas storage facilities and shall *consult or coordinate*, as appropriate, *with each other on infrastructure developments*. The Parties shall cooperate on matters related to trade in natural gas, sustainability and security of supply. With a view to further integrate markets of energy goods, *each Party shall take into account the energy networks and capacities of the other Party when developing policy documents regarding demand and supply scenarios, interconnections, energy strategies and infrastructure development plans*."[163] (italics by author).

This article of the Association Agreement is important because it requires from the parties – both Ukraine and the European Union – to coordinate their plans, programs, and projects as well as to take into account the existing potential for implementing common projects. In the context of the decision taken by the European Commission on 28 October 2016, which allows Gazprom to practically monopolize the OPAL gas pipeline, the EU should take into account the almost 50 percent surplus of the Ukrainian gas transmission system capacity in order to provide additional gas flows to European consumers. If these capacities of Ukraine would be insufficient then it would be absolutely logical that the European Commission (EC) should make the appropriate decision to expand the volumes of Gazprom's supplies using the reserves of the Nord Stream system – the OPAL-Gazela.

However, when it comes to the above decision of EC it ignored its own documents issued in February 2015 and February 2016 on the formation of the Energy Union. In these documents "Energy Union Package. A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy" and "Proposal for a Regulation of the European Parliament and of the Council concerning measures for safeguard of gas supply and repealing Regulation (EU) № 994/2010" it is planned to update and launch a renovated strategic energy partnership with Ukraine. The decision of the EC on the OPAL did not contribute to the update of strategic partnership with Ukraine; neither has it corresponded to the concept of Energy Union as such.

If Gazprom will supply gas, instead of Ukrainian route, through the Nord Stream – OPAL system, following the decision of the EC, the Ukrainian GTS objectively can become technologically unstable when Gazprom does not ensure the proper pressure, as it happened during the second half of 2016. Ukrtransgaz covered a low

[163] EU-Ukraine Association Agreement. Available online: http://zakon4.rada.gov.ua/laws/show/984_011 (accessed on May 14, 2017).

pressure at the exit point of Russian pipes with its own gas in order not to violate the existing technical conditions for gas transit and transportation to European consumers at the exit points. In these circumstances, with the above decision of the EC, the Ukrainian party should completely relieve itself for responsibility and pass it to the European Commission, especially since Naftogaz is not a third party in bilateral contracts between Gazprom and its European clients.

By its decision, the EC essentially created for Gazprom a legal prerequisite to manipulating the directions and volumes of gas supplies to Europe that could lead to additional turbulence in the EU gas market. The matter concerns the Article 276 of the AA on the "Interruption". It clearly states that "transmission system operators take the necessary measures to ..."a) minimize the risk of accidental interruption, reduction or stoppage of transit and transport". [164] The decision of the EC increases these risks, as Gazprom, reducing supplies to the EU to the minimum levels – as it did already in the first quarter of 2015 with the aim to exclude reverse pumping from Europe to Ukraine – could destabilize and cause unstable transit or its interruption. Of course, the responsibility will be entrusted to the Ukrainian party through the massive propaganda. Although, this article has a paragraph 3, which clearly states that the Party shall not be held liable for an interruption or reduction supplies as a result of actions associated with a third country or an entity under the control or jurisdiction of a third country. But, as the events of 2009 show, the European Commission is not capable to identify promptly the initiator of malicious acts. Actually, the inability or unwillingness of Brussels to officially "make a verdict" about what happened in January 2009 – Ukraine interrupted transit or Russia stopped deliveries – and encourages the Russian side to repeat the crisis scenario. And the latter is very necessary for Russia as the last argument to convince the EC of the need to give consent about the Nord Stream-2, motivating it with the unreliability of the transit link – the GTS of Ukraine.

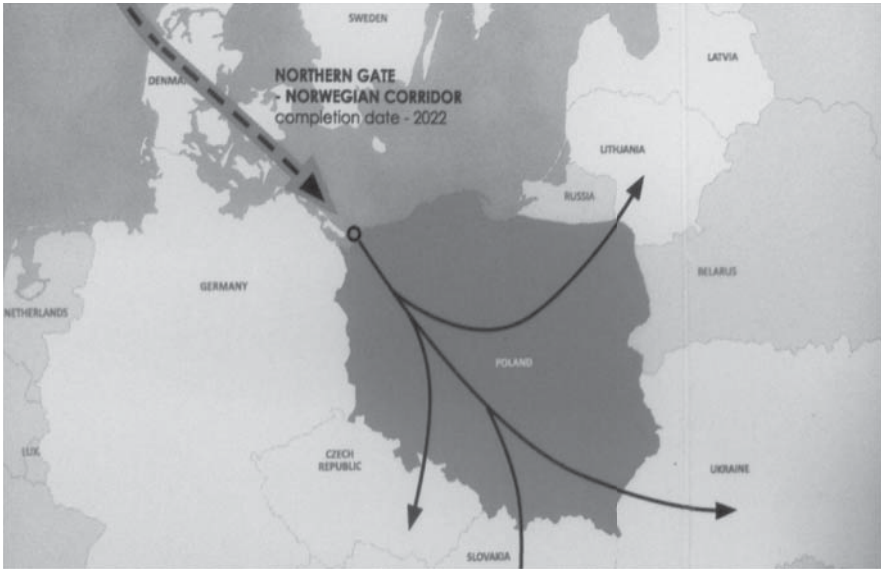
The decision of the European Commission of 28 October 2016 remained completely unpublished. While the European Court ruling dated 23 December 2016 to suspend the decision of the EC was ignored by the EC, Gazprom and German regulator. This negatively affects the reform of the Ukrainian gas sector. First, the situation demonstrates a non-transparency in the EC's responsible decisions, affecting both the interests of the EU member states and countries that are not members of the EU, but having an association agreement and membership in the Energy Community Treaty. Second, the decision was made in favour of the entity from a country that was not a member of the EC (Gazprom, Russia), while ignoring the interests of the entities from the EU member state (PGNiG, Poland) and entities from the country, which had the Association Agreement and was a member of the Energy Community (Naftogaz of Ukraine NJSC, Ukrtransgas JSC, Ukraine). Third, the situation with ignoring the European Court's decision indicates that the

[164] Ibid.

EU legal system does not work, it can be ignored. Fourth, the European Commission did not engage the mechanism of consultations with the Ukrainian side, as it regarded by the Article 274 of the Association Agreement, which means total disregard for the partner country. Fifth, the decision causes the economic damage, since it helps to reduce transit through the Ukrainian GTS. Sixth, this creates a prerequisite for a positive solution for the Russian Nord Stream-2 project.

Under these circumstances, the Ukrainian party has the right to suspend unbundling, which is predictably leading to a decrease in the profitability of the Ukrainian GTS following the decision of the European Commission on the OPAL gas pipeline. The EC consent to implement the Nord Stream-2 project will also cause Ukraine's unprofitable status. After all, not only Gazprom, but, in fact, its joint actions with the European Commission will deprive the GTS of Ukraine of transit, and, accordingly, of $ 2 billion in transit revenues. In such a situation, the launch of an advisory mechanism from the EC is necessary. Ultimately, if the EC decides to compensate Ukraine for losses from the permission granted to Gazprom to maximize the use of OPAL, then we can talk about further steps in the reorganization of Naftogaz.

It is surprising that the EC, for some reasons, focused primarily on Gazprom's comfort in the EU markets, stubbornly ignores other opportunities that are consistent with the fundamental principle of diversifying sources, routes and suppliers. For example, the EC does not make any demands for the Russian Federation to unblock the natural gas transit from Central Asia to Europe through Ukraine. The EC does not raise the issue of the possibility to buy gas from independent producers in Russia, for which it should provide free access to pipeline capacities. No steps are being taken to create attractive conditions for LNG imports from the USA, the first pilot supplies of which have already started in 2016. American companies are increasing their liquefaction and export capacity. The EC did not pay enough attention to the Polish-Norwegian project Northern Gate, according to which gas from the North Sea may reach Poland and other countries in Central and Eastern Europe.



EurActiv.com, 2016

With extremely ambiguous processes in the EU and its institutional weakening, Ukraine should identify the depth of integration, primarily in the energy sector, so as not to create additional excessive dependencies – if negative trends continue in the EU. The positive, basically, Polish idea of the Energy Union within the EU is almost doomed to fail. Under the dictates of strong EU members and their ignoring of the interests and protests of the smaller actors, it will become a copy of the already established in 2005 Energy Community, the same weak and ineffective international organization.

4.2 Ukraine and the CZ-SK-HU-RO market coupling in electricity

Serhiy Dyachenko

4.2.1 United energy system of Ukraine

The power complex of Ukraine is based on the United Energy System (UES) - a set of power stations, electricity and heat transmission networks, other power plants, which are united by a common regime of production, transmission and distribution of electricity and heat energy within the centralized operational dispatch management. The UES of Ukraine provides electricity to Ukrainian consumers, cooperates with the energy systems of neighbouring countries ensuring export and import of electricity.

United Energy System of Ukraine

Source: Ukrenergoexport

The total installed generation capacity of the power plants that belong to the UES of Ukraine is 55.5 GW (without the Crimea), of which 61.4 % is allocated to thermal power plants (heat power stations), 24.8 % - nuclear power plants, 11.1 % - hydropower stations and hydroelectric pumped storage power plants, 2.7 % - power plants operating on alternative energy sources (wind power stations, solar power plants, biological power plants).[165] In 2015, 157.6 billion kW was produced at the power plants of the UES of Ukraine (without the Crimea). At the same time, 87.6 billion kW were produced at nuclear power plants; 49.4 billion kW – at thermal power plants; 6 billion kW – heat electro power stations; hydropower plants – 5.2 billion kW; hydroelectric pumped storage power plants – 1.6 billion kW; heat electro power stations for general use – 4.5 billion kW; wind power stations – 0.9 billion kW; solar power stations – 0.5 billion kW; biomass power plants – 0.13 billion kW; block stations and other sources – 1.8 billion kW.

During 2015, the main part of the Ukrainian energy system worked in parallel regime with the energy systems of Russia, Belarus and Moldova, and the "island" of the Burshtyn thermal power plant, worked in parallel with the European energy systems – ENTSO-E (in addition to the Burshtyn thermal power plant, the loading

[165] Hereinafter (in the section 4.2) the figures are based on data provided by the NEC Ukrenergo, NNEGC Energoatom and the Ministry of Energy and Coal Industry of Ukraine.

of the Burshtyn island consumers is carried out by the Kalushska heat power plant (Ivano-Frankivsk oblast) and Tereblya-Rikska hydroelectric power station (Transcarpathian oblast), the total available generation of which is estimated at 1950 MW.

Thanks to the inter-state connections of transmission systems of the UES of Ukraine, the electricity is exchanged with the energy systems of Hungary, Slovakia, Poland, Romania, Moldova, Russia and Belarus. Transmission connections have been established with Hungary, Slovakia and Romania at 220, 400 and 750 kW. In total, within the Burshtyna island network seven electrical substations, with a voltage of 220 and 400 kWh with a total transformer capacity of 1800 MW and an autotransformer 750/330 kW with a capacity of 1000 MW at 750 kWh substation Zapadnoukrainskaya, are involved. The length of the island's power lines is as follows: 750 kW - 209 km, 400 kW - 340 km, 330 kW - 42 km, 220 kW - 600 km.).

4.2.2 Central European market in electricity

The countries of Central Europe have started to integrate their electric power markets on the basis of the Market Coupling principle. This is done in a line with the implementation of the EU Third Energy Package provisions, including the Energy Union program, which suports further energy integration on a regional scale. In this case the initiative includes the Czech Republic, Slovakia, Hungary and Romania. The integration of the above countries' markets for a day-ahead electricity trading required significant organizational efforts between the National Regulatory Authorities (NRAs), energy tarders (Power Exchanges, PX), network operators (Transmission System Operators, TSOs) and has been implemented in several stages.

First, a common electricity trading market was established between the Czech Republic and Slovakia. Within cooperation between the energy traders of the two countries – OTE (Czech Republic) and OKTE (Slovakia), and with the support of the operators of networks ČEPS (Czech Republic) and SEPS (Slovakia), an algorithm for estimating cross-border flows (the algorithm of combining market prices) was developed and introduced on the basis of contracts within trade systems OTE and OKTE. The second stage comprised the accession of Hungary to the Czech-Slovak integrated electricity trading market. The Hungarian electricity day-ahead trading market was organized by the HUPX – energy trader of the country owned by MAVIR from 20 July 2010.[166] The intentions to create a tripartite coupled market were confirmed by signing on 30 May 2011 of a Memorandum of Understanding between representatives of regulators, energy traders, and network operators in the Czech Republic, Slovakia and Hungary. The full functioning of the tripartite electricity trading market began on 11 September 2012.

[166] "4M Market Coupling. Extended High Level Market Design", 29 April 204. Available online: http://www.ote-cr.cz/o-spolecnosti/files-novinky/4M_MC_Public_High_Level_MarketDesign.pdf (accessed on May 14, 2017).

At the third stage, the tripartite integrated market was acceesed by Romania, which also actively looked for opportunities for participation in regional energy integration. On 6 December 2011, the Romanian NRA, TSO and PX sent an official letter of intent, emphasizing their readiness to join the Czech-Slovak-Hungarian electricity market coupling. The project of the four-party market coupling was launched in 2013. During the years of 2013-2014 technical, procedural and legal opportunities for a merger have been explored. The full coupling of the electricity markets of the four countries took place on 19 November 2014, when representatives of Czech, Slovak, Hungarian and Romanian national regulators, electricity network operators and energy traders signed an agreement on Romania's full accession to the United Power Market of the Czech Republic, Slovakia and Hungary. This regional initiative is labbelled 4M MC (4 markets, Market Coupling). [167] Romania's accession to the coupled market increased liquidity on the Hungarian-Romanian border and ensured a more efficient procedure for the redistribution of electricity on cross-border passing.

Poland also planned to join the tripartite regional project together with Romania. On July 11, 2013, a Memorandum of Understanding was signed between five participants: Czech Republic – Slovakia – Hungary – Romania and Poland. However, Polish party decided to postpone temporarily its participation in this regional project due to certain operational disagreements.[168]

The 4M MC project applies the Price Coupling of Regions (PCR) method based on the EUPHEMIA (Pan-European Hybrid Electricity Market Integration Algorithm) - a market unifying algorithm developed and implemented by the N-SIDE company. The PCR is already used by 15 European countries and the 4M MC is seen as an intermediate step towards joining the single European electricity a day-ahead market.[169] The integration of national electricity markets based on the target model – the United Market with a single price used for a day-ahead electricity trading and the corresponding provision of opportunities for cross-border power flows – should ensure a coordinated approach to the organization of the market, more efficient use of cross-border flows, strengthening competitevness as well as provide for a stable wholesale pricing on electricity, including greater liquidity of the market.[170]

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[167] "Memorandum of Understanding aiming to extend the CZ-SK-HU Market Coupling towards RO and PL markets", *OTE*. Available online: http://www.ote-cr.cz/about-ote/OTE_news/Memorandum-of-Understanding-aiming-to-extend-the-CZ-SK-HU-Market-Coupling-towards-RO-and-PL-markets (accessed on May 14, 2017).

[168] Zagrodna, K. "CEE electricity market coupling timing links Romania but not Poland", *ICIS*, 27 August 2013. Available online: http://www.icis.com/resources/news/2013/08/27/9700704/cee-electricity-market-coupling-timing-links-romania-but-not-poland/ (accessed on May 14, 2017).

[169] "Energy Solutions", *N-SIDE*. Available online: http://energy.n-side.com/cee-market-coupling-pcr-euphemia/ (accessed on May 14, 2017).

[170] "Memorandum of Understanding aiming to extend the CZ-SK-HU Market Coupling towards RO and

The technical and economic goals of the project were to simplify relations between market participants. This centralized architecture extends the integration of the electricity market into other areas of market relations. Before the start of the project, the parties agreed to implement a number of measures to provide for maximum compatibility with the coupled market of the Western European region in order to ensure the future preparation for a multi-regional coupling. That is why the full compatibility of the inputs and outputs of the algorithm for the assessment of the combined electricity market was realized in order to allow the merger of the two regions or joining of new members in the future. This effective approach means the introduction of the principles of the North-Western European power market adapting them to the conditions of 4M MC. In addition, it was decided to take where it is possible and rational the same roles and responsibilities that already exist in the North-Western European market. This concerns, in particular, the centralized system of operators of trunk transmission lines and their activities. The main goal of this step was also to create conditions for coupling markets with other countries focusing mainly on the region of Central and Eastern Europe, as well as South-Eastern Europe.[171] The successful integration of the Czech, Slovak, Hungarian and Romanian electricity markets has proved that it brought benefits to all partners by reducing price fluctuations and increasing transparency of the electricity trade in the region.

Bulgaria also plans to join the 4M MC in the mid-2017. The electricity a day-ahead market in Bulgaria was founded by the IBEX energy trader only on 19 January 2016. For progress in this direction Bulgaria needs to solve the issue of the Gate Closure Time (GCT). In the 4M MC it is set at 11.00, while both in Bulgaria and the North-Western European market it is set at 12.00. [172] Participants of the 4M MC project plan to agree on the time of the trade closure with the North-Western European market in 2018 together with their accession to the Project of a multiregional coupling of electricity markets.[173]

The success of the market-coupling process within the 4M MC is the reason for expanding it towards Moldova and Ukraine. Moldova, with the assistance of European partners, is conducting research on the possibilities for integration of Moldovan and Romanian energy systems. In particular, the Romanian Institute for

PL markets", op.cit.

[171] "CZ-SK-HU-RO Market Coupling", *HUPX Hungarian Power Exchange*. Available online: https://www.hupx.hu/en/Market%20Coupling/marketcouplinghistory/Pages/4mmc.aspx (accessed on May 14, 2017).

[172] Peltegova, I. "Bulgaria to join 4M market coupling by mid-2017 - TSO", *ICIS*, 16 March 2016. Available online: http://www.icis.com/resources/news/2016/03/16/9979257/bulgaria-to-join-4m-market-coupling-by-mid-2017-tso/ (accessed on May 14, 2017).

[173] Peltegova, I. "Bulgarian IBEX exchange attracts strong participation", *ICIS*, 26 February 2016. Available online: http://www.icis.com/resources/news/2016/02/26/9973456/bulgarian-ibex-exchange-attracts-strong-participation/ (accessed on May 14, 2017).

Research and Energy Projects, until December 2016, should complete a full feasibility study for the synchronization of transmission lines operation of Moldova and Romania. A corresponding contract with the Romanian company was signed by the state enterprise Moldelectrica. The Romanian Institute should analyze the possibility for synchronization of Romanian and Moldovan energy systems on the basis of the three projects on Back-to-Back conversion stations construction (in order to synchronize technical parameters in both countries) on high-voltage power lines Vulcănești – Isaccea, Strășeni – Ungheni – Jassy and Bălţi – Suceava (the latter is planned to be constructed).[174]

These projects will help Moldova to integrate into the EU market through the European energy system (ENTSO-E). The electricity supply from Romania will, first, improve the security of Moldova's energy supply, which, according to data for the first half of 2015, was provided for about 80 % by the Moldovan GRES[175] on the territory of Transnistria, and, second, reduce a supply dependence on Russian company Inter RAO UES.

4.2.3 Assessing integration prospects

Ukraine has been negotiating its accession to the ENTSO-E since 2006, including the preparion of respective planning documents. In 2014 an agreement was signed on elaboration of a feasibility study on connecting the UESs of Moldova and Ukraine with the ENTSO-E.[176] At the present the implementation of the project "Investigation of the possibility for synchronous integration of the Ukrainian and Moldovan energy systems with the European continental ENTSO-E energy system" goes on. The carrying into execution a feasibility study is a prerequisite for any applicant for connection with the European synchronous zone. The main purpose of this study is to identify and develop measures that should prevent the negative impact of the accession of a new potential participant in the synchronous zone (UES of Ukraine) on the actual working conditions of the all actual participants (ENTSO-E European power systems). Moreover, the responsibility for the analysis and preparation of the conclusions of such study is exclusively entrusted to operators of the transmission system – the members of the ENTSO-E.

At the same time, in addition to above mentioned issues, which are of primary interest to European countries, there are internal challenges Ukraine has to face. They are related to the operation of the electricity grids of the UES of Ukraine,

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[174] "Vzaimopodlyucheniye energositem Moldova-Rumyniya", *Moldelectrica*. Available online: http://www.moldelectrica.md/ru/finances/mold_rom_project (accessed on May 14, 2017).

[175] "Bucharest podgotovit proyekt vzaimopodklyucheniya elektrosetey Moldovy i Rumyniyi", *Novosti Pridnestroviya*, 16.12.2015. Available online: http://novostipmr.com/ru/news/15-12-16/buharest-podgotovit-proekt-vzaimopodklyucheniya-elektrosetey (accessed on May 14, 2017).

[176] "TEO sinkhronnogo podklyucheniya Ukrainskoy i Moldavskoy Eneregeticjeskikh Sistem k ENTSO-E". Moldelctrica. Available online: http://www.moldelectrica.md/ru/finances/connection_project (accessed on May 14, 2017).

which are connected with Russia and Belarus, and thus to the impact of a separation from the energy systems of Belarus and the Russian Federation for Ukraine. The study of the operation of the border grids of Ukraine's energy system is aimed at solving these problems. Their relevance has increased during the occupation of Crimea and parts of the Donbas, because a considerable number of objects forming the power infrastructure of the UES of Ukraine remains damaged and/or switched off. The transition of the UES of Ukraine to synchronous operation with the energy systems of European countries will require the separation (physical separation) from the power grids of those energy systems that are not ENTSO-E participants, that is, the energy systems of Russia and Belarus.

It is worth noting that the historically established topology of international and trunk electricity transmission networks of the relevant border regions has a direct impact on the conditions of operating modes and reliable power supply to consumers of the UES of Ukraine. Following the results of the above mentioned study, analysis has to be carried out on the operating conditions of the UES of Ukraine's transmission grids, including on border power units, existing power generating facilities, power transmission schemes of which involve interstate transmission connections, entities transmitting power, whose particular facilities are oriented to the reception of power from interstate power lines, etc., after its separation from Russian and Belarusian power systems. The study should provide for technical solutions and recommendations, the implementation of which will ensure reliable and high quality power supply to Ukrainian consumers under appropriate conditions.

The above mentioned work was also done within the Program of Priority Organizational and Technical Measures for the Preparation of the UES of Ukraine for the Work with the Union of the Power Systems of European States for the Period until 2016 (approved by the Order of the Ministry of Energy of Ukraine No. 840 dated November 25, 2014). The Public Enterprise NEC Ukrenergo has been set to be a responsible implementing organization (expected value - 1.2 million UAH excluding VAT) while the funding for the project has been included in the tariff for services of NEC Ukrenergo. The completion of the project has been expected in late 2016.[177]

Experts of the NEC Ukrenergo consider that it is possible to manage a synchronized functioning of the UES of Ukraine with the European energy system ENTSO-E as early as in 2018. This was stated by Aleksey Brecht, the head of the Ukrenergo department for strategic development and planning of power systems during the presentation of the project on the development of domestic energy system for the period until 2025.[178] Experts regard this forecast as extremely optimistic consider-

[177] "Intehratsiya do ENTSO-E", *Ukrenergo*. Available online: https://ua.energy/majbutnye-ukrenergo/integratsiya-do-entso-e/ (accessed on May 14, 2017).

[178] "Intehratsiya do ENTSO-E", op. cit.

ing that synchronization of Ukrainian and European power systems is more realistic to expect only after 2020. According to Ukrenergo estimates, the maximum possible amount of flows between the power systems, if unified, can be: from Ukraine and Moldova to ENTSO-E – 2350 MW in summer and 1800 MW in winter; from ENTSO-E in the opposite direction – 2000 MW.

During the first phase of the synchronization project with the ENTSO-E, separate power units of thermal power plants and hydropower plants were tested for their use in primary and secondary control of frequency and power. In addition, the legal framework for compliance with the ENTSO-E and the EU requirements was analyzed, and a final report draft on the possibility of synchronization of power systems was prepared. The work is carried out jointly with a consortium of European operators of national power systems, led by the Romanian Transelectrica. The result of the first phase will be the development of a catalogue of technical and organizational measures that will allow Ukraine to proceed with the synchronization. The second phase of the project will be the realization of the catalogue of actions, and here everything will depend on the capacity of Ukraine to implement them. This phase can last up to one year. At this stage, in particular, it will be necessary to make adjustments to the automatic frequency and power management system of the United Energy System of Ukraine (UES), which currently regulates only cross-flows between the CIS countries.

Also, according to the European Technical Principles of the Operation Handbook, it is necessary to make changes to operational and market rules in terms of frequency maintenance and to ensure correct operation in the part of relay protection and automatic frequency unloading. After getting to this point, it would be possible to proceed to the third phase during which the synchronization of power systems will be examined in the testing mode. The third phase can also take about a year.[179]

In addition, an important prerequisite for the integration of the electricity market of Ukraine with European markets is not just the solution of technical issues but also the adaptation of the regulatory framework. On 22 September 2016, the bill On the Electricity Market of Ukraine was adopted in the first reading, it is designed to provide a reliable and safe supply of electricity to consumers, taking into account their interests, minimizing costs of supply services by defining at the legislative level the organizational structure and principles of the functioning of electricity market, grounds and prerequisites for its further reforming.

[179] "Nekonkurentnyy kilovatt: naskolko realna energointegrtsiya Ukrayiny v Yevropu", Forbes Ukrayina, 26.1.2016. Available online: *http://forbes.net.ua/nation/1409732-nekonkurentnyj-kilovatt-naskolko-realna-energointegraciya-ukrainy-v-evropu* (accessed on May 14, 2017).

5. Ukraine and the EU: what next in the field of energy?

Mykhaylo Gonchar

As it was stated in the "Framework Strategy for a Sustainable Energy Union with a Long-Term Policy on Climate Change Prevention" of the EU dated on February 25, 2015: "Particular attention will be paid to the strategic partnership update in the energy sector with Ukraine. This will solve issues related to Ukraine as a transit country, as well as those related to market reforms in the Ukrainian energy sector, for example, modernization of its gas transmission network, creation of an appropriate legal framework for the electricity market and energy efficiency in Ukraine".[180] Furthemrore, as it was fixed in the statement "Energy Union. A Year Later" dated on February 25, 2016[181] it is expected "to see more cooperation between the EU and its Mediterranean neighbours, as well as partners in the Southern Gas Corridor, to deepen the energy dialogue with key partners, including the United States, Norway and Canada, and to launch a strategic energy partnership with Ukraine." Both above documents define relations with Ukraine in the field of energy as a strategic partnership.

In addition, at the Ukraine-EU summit in Brussels on 24 November 2016 the Memorandum of Understanding on a Strategic Energy Partnership was signed between Ukraine, the European Union and the European Atomic Energy Community.[182] Unlike the Memorandum between Ukraine and the European Union on mutual understanding on cooperation in the energy sector signed in 2005, which was at that time a breakthrough and a signpost in energy relations, the new memorandum does not create such an impression. The fact of signing two memorandums the one 12 years ago and the new one in 2016, which are, however, not legally binding documents indicates that Kyiv and Brussels keep running around in circles.

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[180] *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank. A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy*. Brussels, 25.2.2015. Available online: http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1431711858167&uri=CELEX:52015DC0080 (accessed on May 14, 2017).

[181] "One Year of the Energy Union". Available online: https://ec.europa.eu/energy/en/news/one-year-energy-union (accessed on May 14, 2017).

[182] *Memorandum of Understanding on a Strategic Energy Partnership between Ukraine and the European Union together with the European Atomic Energy Community*. Available online: https://geostrategy.org.ua/en/analitika/item/1107-memorandum-pro-vza (accessed on May 14, 2017).

Nevertheless, the times have changed. The EU strategic document "Common Vision, a Unified Approach: a Strong Europe. The European Union's Global Strategy on Foreign and Security Policy" adopted in June 2016 offeres an accurate description of the present times: "...terrorism, hybrid threats, economic instability, climate change and unreliable energy supply present a danger to our citizens and the region today."[183] Different answers to new challenges are needed. However, in Brussels the EU officals look at Ukraine as a problem on the Eastern border of Europe, not realizing that now the EU is increasingly becoming a problem for Kyiv. The extremely ambiguous decision of the European Commission on the OPAL gas pipeline as of 28 October 2016, which ignores the decision of the European Court of Justice as of 23 December 2016, the Russian-German efforts to implement the Nord Stream 2 gas pipeline project, and at the same time ignorance of the European Commission towards the Polish project "Northern Gate", which is in interest of Ukraine as it could open the route for supplying the Norwegian gas to Ukraine – that is not a full list of problems the EU creates and imposes on Kyiv. There are also other issues on which the EC does not follow a clear policy line as for example, the construction of Ostrovets nuclear power plant in Belarus by Russia, at which it violates ESPOO Convention, what on the other hand, brings negative responses from a number of the EU countries, primarily Lithuania, but also Ukraine.

Under the conditions of the EU's uncertainty and amorphousness, Ukraine has to rely on its own energy resources, energy savings, energy efficiency, minimization of energy imports, its deep diversification, elimination or, if impossible, minimizing existing dependencies and preventing the creation of new ones. It is necessary to take into account the provisions of the current National Security Strategy, in particular paragraph 4.10. "Ensuring Energy Security," where priorities have already been identified:

- diversification of sources and routes of energy supply, overcoming the dependence on Russia in the supply of energy resources and technologies, development of renewable and nuclear power…;
- creation of conditions for reliable energy supply and transit of energy resources through the territory of Ukraine, protection of energy infrastructure from the terrorist threat;
- formation of the energy supply system to the national economy and society in a special period of time.[184]

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[183] *Shared Vision, Common Action: a Stronger Europe. A Global Strategy for the European Union's Foreign And Security Policy*. Available online: https://eeas.europa.eu/sites/eeas/files/feature_eu_global_strategy_full_text.pdf (accessed on May 14, 2017).

[184] Decree of the President of Ukraine. *On the decision of the National Security and Defense Council of Ukraine on May 6, 2015 On National Security Strategy of Ukraine.* Kyiv, 26 May 2015, № 287/2015. Available online: http://zakon4.rada.gov.ua/laws/show/287/2015 (accessed on May 14, 2017).

These positions corresponds with the provisions of the above-mentioned EU Global Strategy: "...we will focus our efforts on defence, counterterrorism, cyber security, energy and strategic communications"[185] as well as with the provisions of the signed Ukraine-EU Memorandum: "cooperation in implementing joint initiatives and ways to diversify as well as improving security of energy supply, including the protection of critical energy structures and protection from cyber security threats."[186] Thus, at the declarative level, the intentions of Ukraine and the EU look quite harmonized. However, what should be done in practice?

In 2010 the International Energy Agency proclaimed the beginning of the "golden era" of natural gas as the most environmentally friendly fossil fuel as it induces a minimum of CO_2 emissions compared to other fossil fuels. The use of low-emission and non-emission types of energy resources, in particular for production of electricity and heat, is in line with the goal of decarbonisation. It became a global task after the Paris 2015 World Climate Summit and the ratification of the Paris Climate Agreement, including by Ukraine.

Ukraine having joined the Energy Community created the basis for the bi-parallel process of "reforms – integration" in the energy sector, which was the benchmark for activities of both the government and the Verkhovna Rada of Ukraine. The essence of this process is the following: energy sector reforms contribute to the integration into the EU energy area while the integration process encourages internal reforms. However, in Western Europe, following consequences of the referendum in the Netherlands on the EU-Ukraine Association Agreement, a vision is spreading among politicians that Ukraine should not claim the EU membership.[187] Therefore, the European integration prospects for Ukraine, including respective incentive to pay a high price for harmonization with the EU, under the conditions of chaos within the EU itself, become illusory.

In Ukraine, we canot ignore the negative trends that have emerged in the EU and which, since 2017, are already damaging Ukraine and its interests. This refers to the decline in in incomes for transiting Russian gas to Europe brought by the decision of the EC on the gas pipeline OPAL. Following contradictory processes in the EU and the weakening of its institutions, especially of the European Com-

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185 *Shared Vision, Common Action: a Stronger Europe*, op. cit.

186 *Memorandum of Understanding on a Strategic Energy Partnership between Ukraine and the European Union together with the European Atomic Energy Community*, op. cit.

187 In a declaration, which should become an annex to the EU-Ukraine Association Agreement, the Netherlands proposes to add: "In the effort to establish by the agreement close and long-term relationship between the EU and Ukraine, based on common values, this agreement does not grant to Ukraine the status of a candidate country for the EU Accession and does not provide for an obligation to grant such a status to Ukraine in the future". See Yeremitsa, V. "Niderlandy ta YeS ukhvalyly dodatok do Uhody pro Asotsiatsiyu. Teper cherha za niderlandskym parlamentom", *Radiyo Svoboda*, 15.12.2016. Available online: http://www.radiosvoboda.org/a/28178804.html (accessed on May 14, 2017).

mission and, especially, in the energy sector, cooperation with the EU should not create additional dependencies for Ukraine. National interests should be above all, while priorities are to be set in bilateral and multilateral cooperation with the neighbouring EU states, V4 members: Poland and Slovakia. Current trends in energy, taking into account strategies and practices of neighbours in the East (Russia) and the West (EU), as well as the dynamics of internal development, mean several fundamental priorities:

1) The development of natural gas production to the level of supplying national needs and allowing for stopping import of gas;
2) The development of the non-emission nuclear power engineering based on the new non-Russian technologies;
3) Modernization and development of modern power generation with subsequent reduction of share of coal (up to zero in the future);
4) Expanding the use of renewable energy resources, especially of biomass, taking into account the volume of agricultural waste available in Ukraine;
5) Synchronization of the functioning of the gas transportation system and the UES of Ukraine with the relevant systems in the EU within the ENTSO-G and ENTSO-E.

Hence, the program suggests boosting national gas production to the level of 26-27 billion cubic meters in 2020, together with a set of measures that will create a comfortable fiscal and investment climate for the UkrGasVydobuvannya PJSC and the Association of Gas Producers. They should receive a green light and practical support for expanding their production activities, not just a verbal support from MPs and the Government of Ukraine.

The fate of the gas transportation system and underground gas storage facilities will be of great importance for the future of Ukrainian gas sector. The signed Memorandum reaffirms Ukraine‘s strategic role for the EU as a gas transit state. “The parties must continue cooperation to ensure the safe, reliable and transparent transit of gas through the territory of Ukraine, in particular, by fully implementing the provisions of the Joint Declaration of Ukraine and the EU on modernization of the Ukrainian gas transportation system in 2009. Considering this, the EU supports Ukraine‘s efforts aimed at preserving the role of an important gas transit state”, document says. Taking that into account, it is important that Ukraine acts not in a formal way in meeting EU’s requirements on unbudling of Natogaz. It should not separate the gas transmission system from the Naftogaz by separating pipes and gas storage facilities from the domestic distribution. They function in the mode of an organizationally and technologically integrated system. Perhaps, such a separation can be made later in the future, however, the current turbulent period is not suitable for quick and formal decisions, even if the Memorandum states that “Ukraine intends to carry out quickly the separation of the natural gas transportation (the activity of the operator of the gas transportation system) from

the production and supply of natural gas (unbundling decision) in relation to the Naftogaz of Ukraine.[188] Following the decision of the European Commission concerning the OPAL pipeline, which favours Gazprom's inerests, there is no need for Ukraine to be in a hurry.

The development of the power industry has become the basic priority. Electricity, due to its universality and mobility, is in great demand. Revolutionary technological innovations are already matter of fact in the field of storage of electricity and its use in the transport sector. Even now the world enters the period of transformation of a significant part of the transport on the basis of an internal combustion engine into an emission-free environmentally friendly electric transport. The main question is: where can we take electricity? Definitely, it should be environmentally friendly electricity, produced on the no-emission or low-emission basis.

Therefore, the key priority for the Ukrainian power industry is the development of a nuclear generation on a non-Russian technological basis and creation of new transmission capabilities both within the country and for the power export abroad. The project "Energy Bridge Ukraine – European Union" of NNEGC Energoatom is a promising one, following which the second unit of the Khmelnitsky nuclear power plant (KhNPP) will be connected to the Burshtyn Energy Island, and using the restored 750 kW KhNPP - Rzeszow (Poland) power line and the existing KhNPP – Albertirsa (Hungary) power line, Ukraine will be able to export additional volumes of the electricity. The implementation of this project is an important step towards Ukraine's accession to the European market in electricity. The "Energy Bridge" allows for expanding the synchronous zone with the ENTSO-E, increasing the capacity of international power lines and simultaneously opens the way to the construction of third and fourth units of the Khmelnitsky nuclear power plant.

Considering the importance of nuclear power generation for ensuring energy security of the country, it is necessary to implement a program on increasing the efficiency of Ukraine's nuclear power plants, taking into account nuclear safety norms in accordance with the standards of the Western European Nuclear Regulatory Association (WENRA). This will broght the increase in power generation and expand the export capabilities of the Energoatom towards the EU for what the "Energy Bridge" is needed. It will be important to continue cooperation with the alternative supplier of nuclear fuel from Sweden (Westinghouse Electric Sweden) with respect to efforts for further diversification of nuclear fuel supplies. In 2016, Ukraine set two records – zero gas imports from Russia and a sharp increase of nuclear fuel supplies from an alternative source from the previous years' level of 6-7 % to almost one-third. Obviously, in future the preference shoulb be given to reaching an approximate parity of supplies taking into account a complex nature of nuclear safety. The EU-Ukraine Memorandum deals with cooperation in "ensur-

[188] *Memorandum of Understanding on a Strategic Energy Partnership between Ukraine and the European Union together with the European Atomic Energy Community*, op. cit.

ing a high level of nuclear safety, cooperation on diversifying sources of nuclear fuel supplies for VVER nuclear reactors, including those based on local reserves, focusing on the issue of the fuel licensing from alternative providers."[189]

***Energy Bridge* Project**

Source: Enerhoatom

The cooperation of Ukraine with the EU is of particular importance "in order to ensure the synchronous functioning of the United Energy System of Ukraine and the energy system of Central European countries in the long run and the improvement of the asynchronous functioning of power systems in the short run, where appropriate."[190] A positive aspect is the statement in the Memorandum on intentions of supporting cooperation between various institutions from both the EU and Ukraine: "The parties aim to promote close cooperation between energy regulators, operators and their associations existing in Ukraine and the EU, including, among the others, the Regulatory Cooperation Agency (ACER), The Council of European Energy Regulators (CEER), the European Network of Transmission System Operators (ENTSO-E) and the European Network of System Operators of Natural Gas Supply (ENTSO-G), as well as between national authorities on a bilateral

[189] Ibid.

[190] Ibid.

basis. In particular, the Parties plan to make joint efforts to provide the national regulator in the energy sector of Ukraine with observer status, as well as observer status with a subsequent full membership of Ukrainian system operators in the electricity and natural gas supply to ENTSO-E and ENTSO-G (respectively)."[191]

Under the Russian aggression of a hybrid type, the need to protect critical energy infrastructure, especially from cyber attacks, is growing. In this context, Ukraine's accession to the NATO Energy Security Centre of Excellence and NATO Cooperative Cyber Defence Centre of Excellence is of great importance. By the way, the above mentioned Global Strategy of the EU focuses on cooperation between the EU and NATO: "The EU will deepen its partnership with NATO through coordinated defence capability development, parallel and synchronised exercises, and mutually reinforcing actions to build the capacities of our partners, counter hybrid and cyber threats…."[192] The concentration of efforts on certain strategic directions will create a more balanced energy system of Ukraine beyond the horizon of 2020, which in the future will be able to be transformed not only into a self-sufficient national system, but also into a contributor to the energy security of Europe after 2025.

The reform of the energy sector is one of the conditions for the success of economic reform. However, it is necessary to solve the problems that go beyond the sectoral framework of the energy sector:

- power system de-ofshorisation – following the ban on the use of offshore property schemes and the calculation of energy and gas distribution companies (regional energy supply companies, regional gas distribution companies);
- the return of financial resources into Ukraine, which for a long time were withdrawn from the energy sector of Ukraine and accumulated in offshore accounts;
- creation of a favourable investment climate through public-private partnership mechanisms and transparent regulation of the European model;
- further transparency of public procurement;
- ensuring independence of regulation of natural monopolies in the energy sector.

Without the above mentioned reforms in the economy, it is impossible to implement successful reforms in the energy sector of Ukraine.

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[191] Ibid.

[192] *Shared Vision, Common Action: a Stronger Europe. A Global Strategy for the European Union's Foreign And Security Policy*, op. cit.

6. Policy recommendations

Alexander Duleba

Slovakia and Ukraine have a significant capacity to cooperate in the field if energy, mainly in the following three areas. First, in the natural gas sector both countries can enhance each other supply security as well as defend their interests as the gas transit countries. Second, Slovakia can support reforms in the energy sector of Ukraine, including when it comes to improving energy efficiency and the use of renewables. And, finally, Slovakia can help Ukraine to integrate into the emerging Central European gas and electricity markets, which might be a milestone on the road of Ukraine towards becoming part of the EU energy market.

Ukraine and Slovakia share the largest gas transmission system in Europe, which is relevant to ensuring the gas supply security of the wider region of Central and Southeastern Europe. Keeping in mind the strategic importance of bilateral cooperation in the field of energy security, which has a wider regional relevance, Ukraine and Slovakia should approach their bilateral relations as a core element of the wider regional cooperation taking place under the formula V4 plus Ukraine. First, there is room for cooperation on the gradual accession of Ukraine to the ongoing process of creating a regional gas market among the V4 countries, following the Road Map agreed by V4 Prime Ministers in 2013. Second, it is also in the interests of both Slovakia and Ukraine to explore ways for effecting the future integration of Ukraine (and also Moldova) into the market-coupling of electricity markets between the Czech Republic–Slovakia (established in 2009)–Hungary (accessed in 2012) and Romania (in 2014).

On October 31, 2012, the V4 ministers responsible for energy signed a MoU on the integration of the V4 regional gas market, setting out a timetable of actions leading to the endorsement of a Road Map towards a Regional V4 Gas Market, which was subsequently adopted by the V4 prime ministers during the V4 summit on June 16, 2013.[193] The key priorities of the Road Map are: first, to maintain coordinated support for developing a key gas infrastructure in the region – i.e. the interconnectors between V4 countries and internal gas networks that are needed to ensure a free flow of gas in the region; second, to continue working on an optimal market model for the region – a "no-regret" open approach that takes account of

[193] "Road map towards the regional gas market among Visegrad 4 countries," Polish Presidency of the Visegrad Group July 2012–June 2013. Available online: http://www.acer.europa.eu/Gas/Regional_%20Intiatives/South_South-East_GRI/Documents/Road_Map_toward_%20the_V4_regional_gas_market.pdf (accessed on January 10, 2017).

changes in the market and the challenges likely to occur in the coming years. This includes coordinating the implementation of EU gas network codes in the region, drafting an operational study to implement the multi-coupled market zones model in the V4, and taking decisions about its future shape and progress. In the end, this should result in the standardization of national gas market regulations in the V4 region, thus guaranteeing optimal use of the gas transmission infrastructure created. And finally, there is a need in establishing the V4 Forum for Gas Market Integration that should be used as an institutional basis of cooperation. The forum should serve to strengthen cooperation between decision makers and gas sector representatives, with a view to developing an optimal market model.[194]

The formation of the V4 regional gas market cluster fully corresponds with the stated priority of the Energy Union program of the European Commission to achieve a fully integrated energy market within the European Union. After the creation of regional market clusters within the EU, the next step will be their gradual interconnection, which in the end will result in the creation of a single energy market in natural gas and electricity among EU member states.[195] In addition to the V4 countries' regional gas market initiative, there is the ongoing process of the formation of a regional electricity market in Central Europe.

The project of regional integration of electricity markets started from the coupling of day-ahead electricity markets between the Czech Republic (CZ) and Slovakia (SK) in 2009. Hungary (HU) joined the CZ–SK project in 2012, followed by Romania (RO) in 2014. On November 19, 2014, the CZ–SK–HU–RO Market Coupling (also called 4M Market Coupling or 4M MC) was successfully launched, integrating the Czech, Slovak, Hungarian and Romanian day-ahead electricity markets. The project started in August 2013 with the aim of extending the CZ–SK–HU Market Coupling to Romania and implementing the PCR (Price Coupling of Regions) solution. Transmission system operators (ČEPS, SEPS, MAVIR and Transelectrica), together with power exchanges (OTE, OKTE, HUPX and OPCOM), and supported by national energy regulators (ERÚ, ÚRSO, MEKH and ANRE), collaborated to develop and implement all the solutions necessary for ensuring the technical and procedural compatibility of 4M MC with the target European solution, which is already implemented in other coupled European regions. Market coupling allows higher efficiency of trading and capacity allocation, which should lead to higher security of supply, higher liquidity and lower price volatility.[196]

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[194] Ibid.

[195] "Energy Union Package. A framework strategy for a resilient Energy Union with a forward-looking climate change policy. Communication of the European Commission," COM(2015) 80 final, February 25, 2015.Available online: http://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:52015DC0080&from=EN (accessed on January 10, 2017).

[196] O. Stanciu, "The Czech-Slovak-Hungarian-Romanian day-ahead electricity market coupling successfully started," *Visegrad Plus*, November 27, 2014. Available online: http://visegradplus.org/czech-slovak-hungarian-romanian-day-ahead-electricity-market-coupling-successfully-started/ (accessed

The proposed New Energy Strategy of Ukraine identifies Ukraine's integration into the energy market of the EU as the long-term priority.[197] The only way for Ukraine to implement this priority is first to get access to the emerging regional energy market in Central Europe, with respect both to natural gas and electricity. As Slovakia is a part of both regional initiatives, both Slovakia and Ukraine should improve their engagement with the existing regional formats that have been established with the aim of facilitating cooperative planning on the further development of regional interconnections and cross border infrastructure in the field of transmission of natural gas and electricity.

First of all, the government of Slovakia, together with its V4 partners, should consider the option of including Ukraine in the work of the V4 High Level Group on Energy Security (V4 HLGES) under formula V4 plus Ukraine. The V4 HLGES has proved to be a very efficient platform for achieving regional agreement on the development of priority interconnectors, which, first, have significantly strengthened the security of gas supply in the region (as compared with the situation before the 2009 gas crisis), and second, comprise the physical fundamentals of the future regional energy market. Accordingly, Ukraine should consider the option of applying for observer status in the CZ–SK–HU–RO market-coupling in electricity, as has Poland, for example. Although the gradual inclusion of Ukraine in the creation of the regional Central European energy market is rather a long-term goal, it should be viewed as a strategic framework for bilateral Slovak-Ukrainian cooperation in the field of energy.

Another important regional energy forum in which Slovakia and Ukraine should coordinate their activities is the CESEC (Central East South Europe Gas Connectivity). The CESEC initiative was launched by the European Commission in February 2015 along with the Energy Union program, with the aim of identifying key infrastructural projects in Central and South Eastern Europe that should enhance the security of the natural gas supply. The participants of the CESEC are EU member states (Austria, Bulgaria, Croatia, Greece, Hungary, Italy, Romania, Slovenia and Slovakia, as well as the European Commission represented by Vice-President for Energy Union Maroš Šefčovič and Commissioner for Climate Action & Energy Miguel Arias Cañete), whereas contracting parties to the Energy Community, including Ukraine, will participate in the work of the CESEC HLG upon ad hoc invitation. The aim of the CESEC HLG is to establish a regional priority infrastructure roadmap and to advance its implementation, in order to develop missing infrastructure and improve security of gas supplies so that each EU member state in the region can have access to at least three different sources of gas. The

on January 9, 2017).

[197] "Nova enerhetychna stratehiya Ukrayiny: bezpeka, enerhoefektyvnist, konkurentsiya," [New energy strategy of Ukraine: security, energy efficiency, competitiveness]. Ministry of Energy and Coal Industry of Ukraine, 2015. Available online: http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?art_id=245032413&cat_id=244946928 (accessed on September 5, 2015).

CESEC is a relevant regional format for cooperation between EU member states and non-members that are contracting parties to the Energy Community.[198] Slovakia and Ukraine might work together within the CESEC with the aim of bridging the Energy Union and the Energy Community, at least in the field of security of natural gas supply.

In order to follow a strategic framework for Slovak–Ukrainian energy cooperation as recommended above – and to achieve the ability to work together within the regional formats – first, Slovakia and Ukraine must upgrade their existing trilateral and bilateral formats for energy dialogue, these being the two main formats for the relevant energy dialogue, as follows: the trilateral format (Ukraine–Slovakia–European Commission) on the supply of natural gas, and the Working Group on Energy established as a part of the bilateral Slovak–Ukrainian Intergovernmental Commission for Economic, Industrial and Scientific Cooperation. Again, with the strategic importance of bilateral Slovak–Ukrainian cooperation in the field of energy security having a wider regional relevance, both Ukraine and Slovakia should approach their bilateral relations as a core element of the wider regional cooperation.

[198] *Central East South Europe Gas Connectivity.* Available online: https://ec.europa.eu/energy/en/topics/infrastructure/central-and-south-eastern-europe-gas-connectivity (accessed on January 10, 2017).

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