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WHY EUROPE SHOULD SUPPORT REFORM OF THE UKRAINIAN GAS MARKET – OR RISK A CUT-OFF

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SUMMARY

The debate about Europe's energy security and in particular the security of gas supply to Europe has focused on Russian aggression towards Ukraine and its willingness and ability to use energy as a coercive policy against Ukraine – and, by extension, Europe. Less well understood than European dependence on Russia, however, is why Ukraine has been an insecure transit country for Russian gas flows to Europe. For years, Ukraine has been using its transit monopoly position to bargain with Russia for cheap gas, thus creating a fragile environment for business and politics. There is now an imminent risk that Russia will cut off gas to Europe as it did in 2009.

This brief argues that, in addition to the Energy Security Strategy (ESS) developed by the European Commission, Europe should support Ukraine in reforming its energy sector. In particular, as well as helping Ukraine to develop its upstream gas potential and import gas from Europe in the long term, Europe should provide financial support to Ukraine and press it to increase gas prices for households and heating companies. This would reduce the importance of gas transit for Ukraine's economic policy and sovereignty, and improve energy efficiency. Doing so would help Ukraine integrate into Europe's single gas market and help depoliticise both Ukraine's and Europe's gas relationship with Russia.

The dramatic events in Ukraine since February have once again put the question of security of gas supplies to Europe high on the political agenda.¹ The debate about Europe's energy security and in particular the security of gas supply to Europe has focused on Russian aggression towards Ukraine and its willingness and ability to use energy as a coercive policy against Ukraine – and, by extension, Europe. Many analysts argue that Europe should therefore reduce its dependence on Russian gas. However, this analysis tends to ignore Ukraine's dominant role as a gas transit country for Russian gas exports to Europe. Since gas supplies from Russia intended for Ukraine's citizens were cut off in June, Ukraine could soon be forced to tap into supplies destined for Europe. Russia would likely respond by cutting off these supplies as well – as it did in 2009.

This brief argues that, in addition to the measures outlined in the newly adopted Energy Security Strategy (ESS) and in the 2030 framework for climate and energy policies, Europe should press Ukraine for full and strict reform of its energy and the gas sector in particular, which is notorious for its corruption and inefficiency.² This would allow Europe to fulfil two important foreign and energy policy objectives. First, it would integrate Ukraine into Europe's single gas market and hence bring Ukraine closer to Europe. Second,

¹ See, for example, the conclusions from the discussions at the European Council meeting, 20–21 March, Brussels, available at <http://register.consilium.europa.eu/doc/srv?l=EN&t=PDF&gc=true&sc=false&f=ST%207%202014%20INIT>; Joint Statement of the G7 Rome Energy Ministerial Meeting, 5–6 May, Rome, available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/308669/Final_Joint_Declaration_may_6th_2014_DEFINITIVO.pdf.

it would help normalise gas relations with Russia. Rather than trying to isolate the Ukrainian economy from that of Russia, Europe should look at ways of diminishing Ukraine's systemic vulnerabilities.

Ukraine's role in the supply of Russian gas to Europe

It is well known that Russian gas plays a major role in the European energy market – in 2013, Russia supplied 39 percent of the EU's gas imports or 27 percent of its annual consumption. Russia is the sole external supplier of gas for six EU member states (Estonia, Latvia, Lithuania, Finland, Bulgaria, and Slovakia); for Slovakia, Latvia, and Lithuania, gas makes up over a quarter of their total energy needs. In the past few years, supply of Russian gas has been seen as increasingly insecure and the EU has actively pursued strategies to transport energy from new suppliers (such as Azerbaijani gas via the Trans Adriatic Pipeline project) and make the European energy market more efficient (via market integration and liberalisation).

Less well understood than European dependence on Russia, however, is why Ukraine has been an insecure transit country for Russian gas flows to Europe. New bypass projects such as Nord Stream notwithstanding, Ukraine remains the most important transit country for this gas. After invading and annexing Crimea this year, Russia cut off natural gas supplies to Ukraine in June in a dispute over unpaid bills. Escalation of the nearly decade-long argument between Moscow and Kyiv over gas imports has raised concerns about a disruption of supplies to the rest of Europe. When Russia limits or cuts off Ukrainian gas, it becomes a European problem because Ukraine then siphons off Russian gas destined for European customers.

To understand why Ukraine is an insecure gas transit country, it is necessary to analyse the role of gas in Ukraine's economy and politics. Before the fall of the Soviet system, the Ukrainian and Polish economies were comparable, but 25 years later Poland's GDP is three times higher than that of Ukraine. Since becoming independent in 1991, Ukraine's economy has failed to diversify. Its economic development and welfare largely still depend on exports of low value-added commodities such as steel and basic chemical and agricultural products. Ukrainian exports of low value-added raw materials and goods such as metal products are three times higher than the countries of Central and Eastern Europe. Meanwhile, Ukrainian exports of machinery and mechanical products (high value-added products) are two to three times lower than exports of these products from Central European countries. On the other hand, mineral products, such as natural gas, crude oil, and coal make up one-third of Ukraine's imports – two to three times higher than Central European countries.

² See *European Energy Security Strategy*, 28 May 2014, available at http://ec.europa.eu/energy/doc/20140528_energy_security_communication.pdf; "2030 climate and energy goals for a competitive, secure and low-carbon EU economy", European Commission press release, Brussels, 22 January 2014, available at http://europa.eu/rapid/press-release_IP-14-54_en.htm.

As of 2013, steel and chemical industries – which rely to a large extent on natural gas – generated about 35 percent of all exports from Ukraine. Together, the two industries consumed about 12 billion cubic metres (bcm) per year in 2013, or 40 percent of total gas imports from Russia. These two industries are extremely sensitive to the import price of gas. For example, the cost of gas constitutes 75 percent of a unit cost of nitrogen fertiliser production in Ukraine whereas energy costs represent 50 percent of the steel industry's total costs (the global average is 20–25 percent). In recent years, the preferential price of natural gas from Russia and Central Asia has ceased and in 2013 natural gas imports accounted for 15 percent of Ukraine's total import bill. Therefore, the price of natural gas is extremely important for Ukraine's macroeconomic condition and especially for the competitiveness of its two export-oriented, economic growth-generating industries.

Given this heavy reliance of its economic growth on exports of these raw materials and products, restructuring and diversification of Ukraine's economy and particularly the gas sector should have been a top priority for Ukraine since its independence. Nevertheless, instead of embarking on these economic reforms, for years Ukraine has been using its transit monopoly position to bargain with Russia for cheap gas, thus creating a fragile environment for business and politics and risking gas supply disruptions that would affect European customers.

Gas and the Russo-Ukrainian relationship

During the Cold War, there was not a single disruption of gas supplies from Russia. Natural gas transit through the republics of the Soviet Union was not an issue, because the pipeline system was under uniform management through the Soviet centralised system. Security of gas supplies to Europe only became an issue after the dissolution of the Soviet Union, which altered the environment of Russian gas exports to Europe substantially. The single pipeline system, developed during the Soviet era, was split and brought under the control and management of the newly independent states. Ukraine became the single most important transit country for Russian gas exports to Europe – between 1991 and 2000, it transported roughly 93 percent (106 billion cubic metres per year) of all Russian gas exports to European countries. Thus, security of gas supplies to Europe became very dependent on the bilateral relations between Russia and Ukraine: any dispute between them over the terms of the gas trade put European gas supplies at risk.

In the period before 2006, gas relations between Ukraine and Russia were based on barter deals, which allowed Ukraine to import cheap gas from Russia and Central Asia in exchange for cheap and secure gas transit to Europe. Even with relatively cheap gas imports, Ukraine could not pay for its gas due to economic hardship resulting from structural breaks in Ukraine's economy after its withdrawal from the Soviet Union. Several gas supply disruptions happened

during that period due to Ukraine's non-payment of its gas bills and debt accumulation for gas imports from Russia and Central Asia. The first dispute between Russia and Ukraine over the gas trade was reported as early as 1992. Ukraine's first attempt to divert Russian gas transits to Europe was in 1993, when Russia stopped supplies to Ukraine during another gas dispute.

As the price of oil and gas continued to rise since the early 2000s, so did the opportunity cost for Russia to maintain secure transit through Ukraine in particular and Russia's energy relations with Ukraine more generally. In this environment, Russia – and in particular Gazprom – had a huge economic interest to end the barter deals (cheap gas for Ukraine in exchange for secure gas transit to Europe). Russia's quest to eliminate cheap barter deals ended in a gas dispute at the end of 2005 which resulted in a three-day cut-off of supplies to Ukraine in January 2006. Ukraine, in turn, took gas intended for European consumers. The resolution of the crisis was the conclusion of the commercial contracts regulating both supplies and transit through Ukraine.

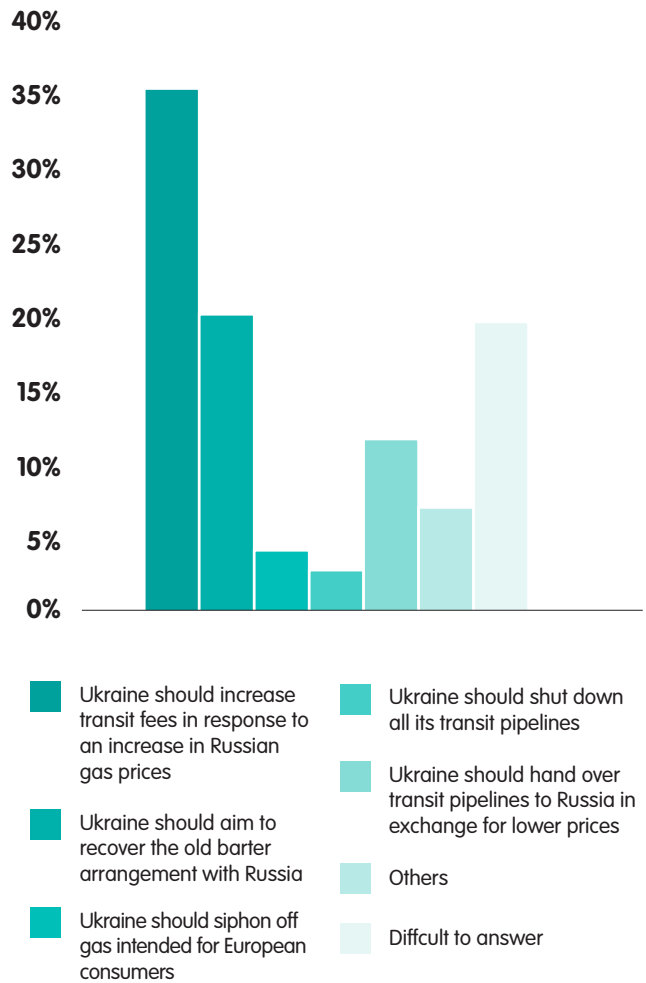
However, recurrent disputes between Russia and Ukraine over the terms of the gas trade continued between 2006 and 2008, culminating in a major gas transit disruption in January 2009, which was the most severe gas disruption since the beginning of gas exports from Russia to Europe. As a result, two long-term contracts regulating supplies to and transit through Ukraine were signed by Russia and Ukraine. In particular, Gazprom was able to eliminate its opportunity cost of transporting gas through Ukraine by increasing the import price to the Western European parity level.

Because for years Ukraine's transit monopoly position allowed it to receive cheap gas imports from Russia, it had little incentive to reduce excessive gas consumption and to diversify away from Russia. Corruption and bad governance thrived on intransparent and non-commercial gas deals. In fact, Ukrainian politicians and citizens tended to see the country's transit monopoly as an important bargaining chip in negotiations with Russia and as a deterrent to higher import prices from Russia. Russian leaders were happy to keep neighbouring Ukraine in check by exerting pressure on the energy, economic, and political fronts, in order not only to secure transit but also to retain its nearly total influence over the former Soviet republic.

After the infamous gas dispute between Russia and Ukraine in 2006, Ukrainians were polled about how they thought their country should react to Russia's threat to cut off Ukraine's gas supplies (see figure 1). The results were striking: a majority of respondents supported either a "tit for tat" policy (a high import price for Ukraine means a higher transit fee for Russia and hence higher prices for Europe) or older barter schemes to maintain low import prices from Russia. Other options such as reforming Ukraine's gas sector or energy consumption conservation were not even on the list of possible answers and only 7 percent of respondents would choose "others" as a response.

Figure 1
Public opinion on the Ukrainian gas crisis of 2006

Source: Razumkov Centre (2006)³



Meanwhile, the gas transit pipeline has turned into a source of national pride. In a 2013 survey, 60 percent of Ukrainian respondents said they would not hand over their "strategic" pipelines to Russia even if this meant lower prices for their gas consumption.⁴ The idea of privatising the transit pipelines is as unpopular as it was in 2006 – only 15 percent of respondents agreed that an international consortium of private companies from Europe, Russia, and Ukraine should manage the transit pipelines.

However, although politicians seem to be oblivious to this, the value of Ukraine's "strategic" pipelines is dramatically falling. In the late 1990s, Russia was 93 percent reliant on the Ukrainian pipelines. But in 2014 this figure dropped to just over 49 percent (see figure 2) due to Moscow exporting gas through other routes: Belarus; Nord Stream; Blue Stream; and direct supplies to the Baltic countries and Finland.

³ Sociological poll carried out by the Razumkov Centre, a non-governmental Ukrainian think tank, from 12-17 January 2006, available (in Ukrainian) at: http://razumkov.org.ua/ukr/poll.php?poll_id=250

⁴ Sociological poll carried out by Razumkov Centre, a Ukrainian non-governmental think-tank, 12-16 April 2013, available (in Ukrainian) at http://razumkov.org.ua/ukr/poll.php?poll_id=889 (hereafter, Razumkov Centre poll).

Figure 2
Russian dependence on the Ukrainian transit pipelines

Note: Russia's dependence on the Ukrainian route is defined as gas exports through Ukraine divided by total exports to Europe;

Source: Author's calculations based on data from the State Statistics Service of Ukraine, the Ministry of Energy and Coal Industry of Ukraine, International Energy Agency (IEA), Energobusiness, and other sources.

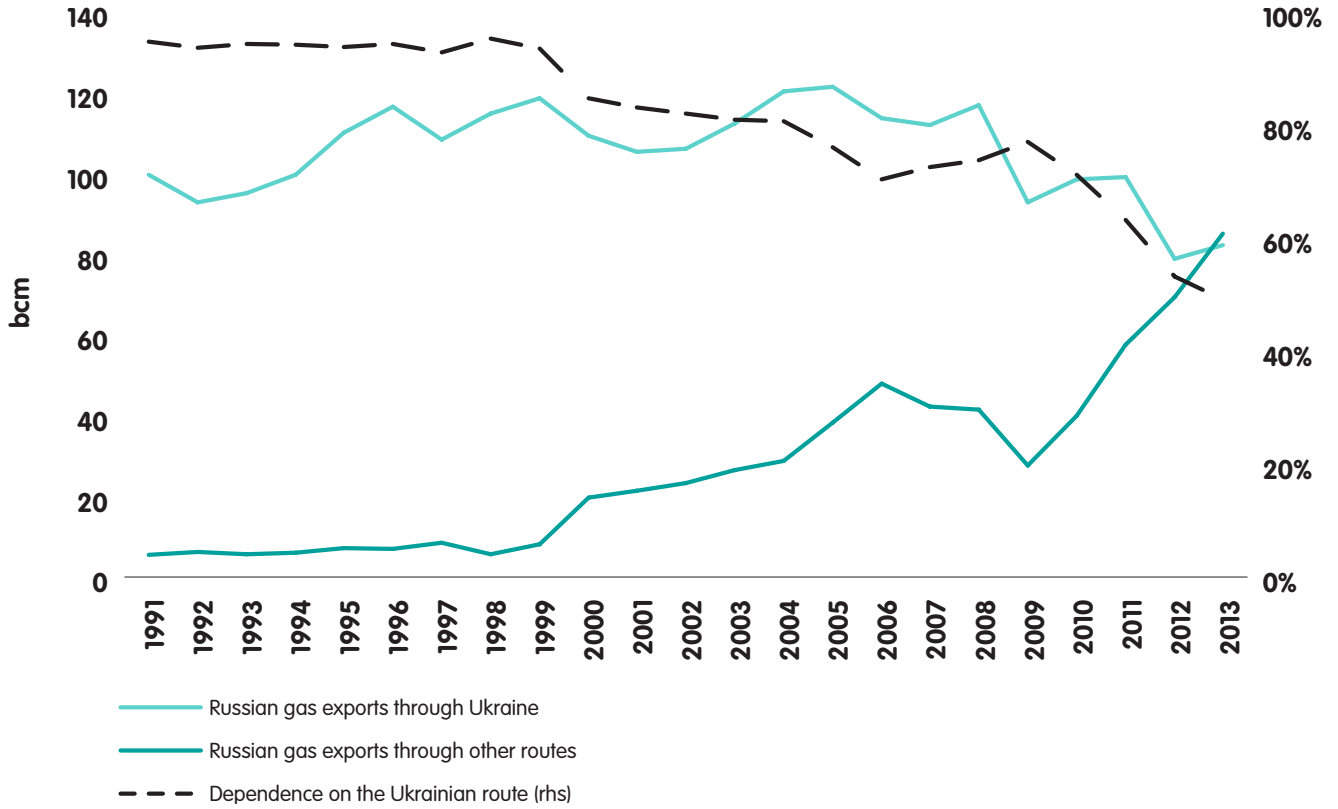
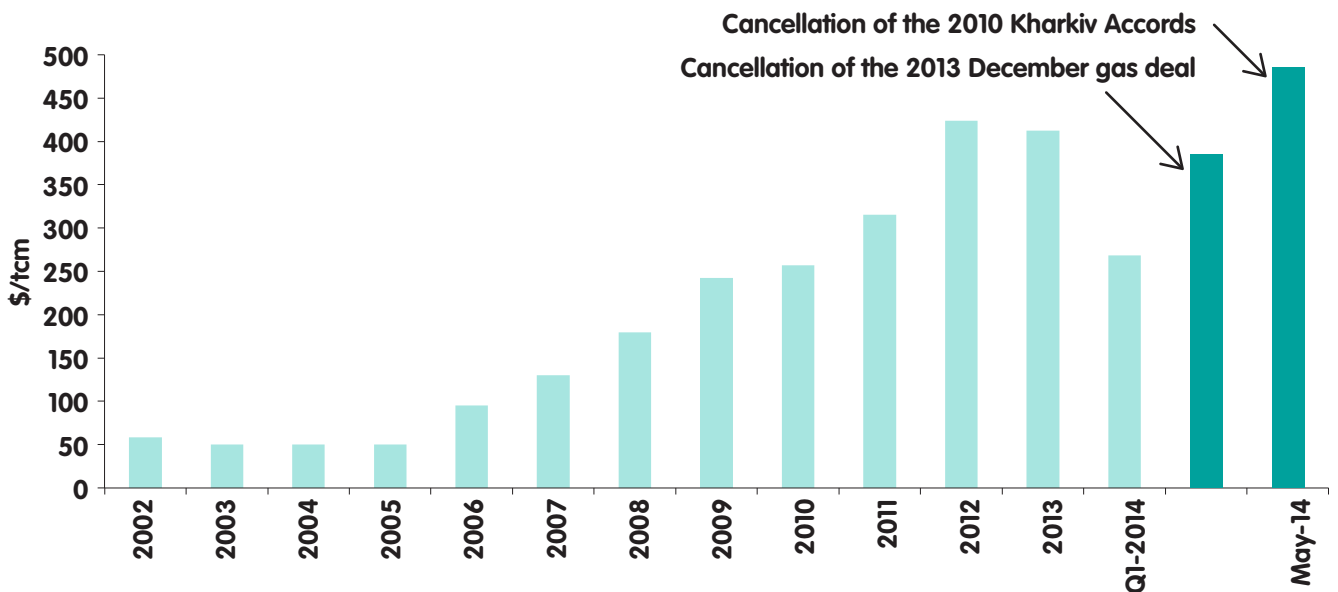


Figure 3
Russian gas price for Ukraine

Source: Author's calculations based on data from the State Statistics Service of Ukraine, the Ministry of Energy and Coal Industry of Ukraine, and others



As a result, Ukrainian leaders have found themselves in a weaker and weaker position in negotiations with Russia. In 2010, President Viktor Yanukovich renegotiated the 2009 supply contract by extending the lease of Russia's Naval Fleet in Crimea until 2042 in exchange for a 30 percent discount on the gas price until 2019. In a subsequent deal, in December 2013, Yanukovich was able to negotiate a further 33 percent discount on the gas price until the end of the supply contract, reportedly by refusing to sign the Association Agreement with the EU.

However, after Yanukovich fell from power, Russia cancelled these two gas price discounts (see figure 3). The current government in Ukraine refuses to pay for Russian gas at this much higher undiscounted price (\$485.5/tcm). In turn, Gazprom demanded pre-payment from Ukraine. In mid-June, after talks mediated by the European Commission failed, Gazprom cut off supplies to Ukraine. Russia's position is that negotiations can only continue after Ukraine settles its debts. But even if a solution is found, it will be unstable unless Ukraine reforms its gas industry and shields itself from the unpredictability of that non-transparent and politicised price-negotiating process.

The role of natural gas in Ukraine's politics

By trading security over gas transit for cheap gas, Ukraine has remained as dependent on Russian gas as it was 23 years ago. In fact, until recently, policy options such as diversification from Russia and the restructuring of its energy sector were not even on the political agenda in Ukraine. Instead, Ukraine's political elite has sought to use its transit monopoly position to extract economic rents from Russia and Europe. Just as natural gas plays a central role in Ukraine's economy, it also does so in its domestic politics. Natural gas consumption in Ukraine resembles its economic structure – while generating half of Ukraine's GDP, the eastern and southern regions of Ukraine are also the largest gas consumers and together account for about half of Ukraine's natural gas consumption.

Gas is extremely important for the industrial sector (such as the chemical, steel, and mining industries), which are mostly located in the eastern part of Ukraine. The eastern part of Ukraine, which consists of five regions – Dnipropetrovsk, Donetsk, Zaporizhia, Luhansk, and Kharkiv – accounts for 41 percent of Ukraine's annual gas consumption while generating 35 percent of Ukraine's GDP and 50 percent of its total exports. Gas is less important in the regional economies of the central and western regions because the industrial sector only accounts for 25–29 percent of regional gas consumption and these industries are of much less importance to Ukraine's economy. Thus, as the largest importers of gas, the eastern and southern parts of Ukraine have a much greater interest in good relations with Russia (see figure 4).

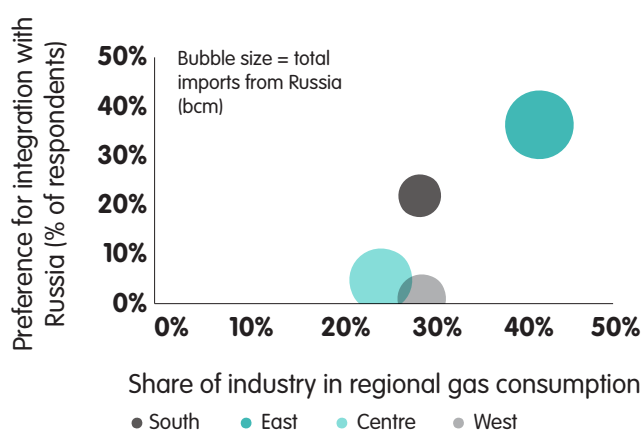
In western Ukraine, gas is mainly used for household and district heating consumption. This gas consumption, being mostly concentrated in non-industrial sectors, does not generate economic growth. Further, gas production in these regions is marginal compared to their consumption, hence these regions must rely on relatively expensive gas imports from Russia. The situation is exacerbated by the fact that gas tariffs for household and heat producers are extremely low compared to the Russian import price, thus contributing to the state's large gas tariff deficit.

All in all, the benefit of having the lower import price for Russian gas is concentrated in key economic sectors as well as regions (the southern and eastern regions) whereas the benefit from transporting Russian gas is widely diffused to Ukrainian society. This is precisely why there has been such a strong incentive for Ukrainian politicians to bargain with Russia for cheap gas in exchange for keeping the gas transit fee low and secure. In a recent poll, 35 percent of Ukrainian respondents stated that keeping Russian gas cheap would unite all of the Ukrainian regions, whereas 24 percent of respondents agreed that Ukraine's integration into the EU would unite all of its regions.⁵ In other words, the division of Ukraine into a pro-Western west and a pro-Russian east is based not only on cultural factors such as language and ethnicity, but also on the structure of the Ukrainian economy and its dependence on gas. Thus, gas plays a fundamental role in the political preferences of Ukraine's regions and hence in its domestic politics (see figure 4).

Figure 4

Economic integration with Russia and regional gas consumption in Ukraine

Source: Author's calculations based on data from the State Statistics Service of Ukraine, the Ministry of Energy and Coal Industry of Ukraine, Energobusiness, and Razumkov Centre



Ukraine's gas dependency problem is of a long-term, structural nature – a combination of widespread corruption in the energy sector and regional difference in dependence on export of commodities and imports of critical inputs (natural gas) for production of these commodities. Thus, eliminating this structural problem would require a credible, long-term strategy of diversifying its economy away from exports of raw materials as well as sources of energy supplies, improving energy efficiency of key gas consumption sectors, and reorganising its energy decision-making to minimise opportunities for corruption.⁶

Alternative sources of Ukrainian energy?

For 23 years since independence, Ukraine has failed to develop a sustainable energy policy. But the current political crisis is an opportunity for Ukraine and Europe to push ahead with the economic and energy reform agenda and to improve Ukraine's own – and Europe's – energy security. One way to do so in the long term would be to reduce Ukraine's own dependence on Russian gas. This could be done by developing Ukraine's upstream gas potential and importing gas from Europe.

Upstream gas potential

Ukraine has huge potential to improve its gas security through developing its own gas resources. Ukraine has proven gas reserves of 680 bcm – equivalent to roughly ten years of annual consumption (assuming a 85 percent recovery rate for proved gas reserves) of which 83 percent are located in the east of Ukraine (in particular, in the Dnieper-Donets Basin) and 10 percent are in the south (in particular, the North Black Sea-Crimea Basin); only 7 percent are in the west. Developing Ukraine's contingent and prospective resources of 4.7 trillion cubic metres (tcm) would involve great geological and economic uncertainties. However, a successful development of these resources would give Ukraine about 1.8 tcm (assuming a 65 percent recovery rate for contingent gas resources and 30 percent for prospective gas resources) or 33 years of annual consumption at the level of 55 bcm/a. However, by annexing Crimea in March, Russia deprived Ukraine of gas resources in the Black Sea deposits, which accounts for 42 percent of Ukraine's total contingent and prospective gas resources.

Thus, given that most gas resources in Ukraine are concentrated in the east and south of the country, the prospect of developing these resources is rather uncertain given Russian attempts to destabilise those regions. Thus, it is essential to re-establish security there. But there are also other obstacles that hinder the development of the conventional gas resources in Ukraine. First, there is the

inefficient multi-tier gas pricing system: household and heat producers are essentially being subsidised with low gas prices compared to the import price. Second, the artificially low level of remuneration for indigenous gas production creates disincentives for gas producers to invest in developing more complex and risky gas resources and to implement modern exploration and production technologies.

Under the current gas market framework, all domestically produced gas is sold to Naftogaz of Ukraine, the state-owned gas monopolist, for further distribution to household and heating companies at a regulated price of around \$50–60/tcm, which is far below the long-run marginal cost of production for gas from new fields of \$150–250/tcm. In this situation, gas pricing reform is the first and most important step to “unlock” Ukraine's gas potential as well as improving Europe's energy security.

In addition to conventional gas resources, Ukraine also has vast resources of shale gas. The US Energy Information Administration estimated that Ukraine has approximately 4.5 tcm of technically recoverable shale gas, most of which are located in the east and the west of the country. Successful development of shale gas could make the country gas-independent for at least 75 years. But although shale gas resources are abundant in Ukraine, the cost of developing these resources is considerably higher than the cost of conventional gas (though, given the current high price of Russian gas for Ukraine, there is a chance that it could be economically feasible to exploit some shale gas formations). In addition, there are uncertainties about the quality of Ukrainian shale gas. In any case, as with conventional gas reserves, the development of shale gas depends on stability – particularly in eastern Ukraine.

Importing gas from Europe

Second, Ukraine could diversify away from Russia by importing gas from Europe – so-called reverse flow. There are two ways how this could be done: virtual reverse flow by contracting gas with Gazprom's European customers and physical reverse flow by building new pipeline interconnectors. The first approach is straightforward and requires no major investment but is legally and practically impossible under the current contractual arrangements between Gazprom, Ukraine, and European energy companies. The second approach requires some investment infrastructure and could potentially create enough capacity from Europe to Ukraine to remove Russian gas from Ukraine's energy mix. However, this would depend on available gas supply in Europe, the price of which might sometimes be above the import price of Russian gas. So far, Ukraine has been unable to work with Slovakia to have a reverse flow through existing pipelines – presumably because Gazprom has contracted all transport capacity and blocked all such attempts.

⁶ For a detailed account of corruption in the gas trade between Ukraine, Russia, and Central Asian states, see Global Witness, “It's a Gas: Funny Business in the Turkmen-Ukraine Gas Trade”, April 2006, available at http://www.globalwitness.org/sites/default/files/library/its_a_gas_april_2006_lowres.pdf.

Another way for Ukraine to reduce its dependence on Russia would be for it to import liquefied natural gas (LNG). The Ukrainian government has proposed the construction of an LNG plant on the Black Sea coast. But this option faces similar problems as physical reverse flow from Europe: investment requirements; supply availability on the global LNG markets; prices; and traffic issues through the Bosphorus Strait. Thus, while Ukraine should develop upstream gas potential and import gas from Europe, these are long-term rather than short-term solutions to the problem of its energy security.

Reform of Ukraine's gas pricing policy

In the meantime, Ukraine should reform its gas pricing policy. Currently, Ukraine maintains an inefficient multi-tier gas pricing system, which leads to overconsumption of gas, especially by households and heat producers. Based on the principle of import price parity, the Ukrainian National Energy Regulatory Commission (NERC) sets the wholesale gas price for industry and budgetary (that is, governmental) organisations. The gas price for households is set by NERC based on cost-plus methodology applied to gas produced in Ukraine.⁷ Thus, all domestically produced gas should be directed to household consumption and to heat producers.

In theory, NERC sets the price for heat producers based on a mix of import price and domestic supply cost because Ukraine's current indigenous gas production is not sufficient to cover demand by these consumers. However, in practice, the gas price for heat producers has been close to the household price and hence Naftogaz's losses on sales to heat producers is covered from the state budget. The policy of implicitly subsidising households through under-priced gas relative to its marginal cost (import price) has become extremely costly for Ukraine: Naftogaz's losses due to sales to households and heat producers at below cost-recovery were estimated at 1.5 percent of GDP in 2011.

Until 2009, Ukraine enjoyed relatively cheap gas from Russia, which made its economy grossly inefficient: its gas consumption per GDP is roughly four times higher than that of Poland or the United States; even Russia, with its vast energy resources, is 25 percent more energy efficient than Ukraine. Thus, there is huge potential for reducing excessive energy consumption in Ukraine in both the residential and industrial sectors.

The cheapest energy-saving option is to reform the residential sector, which could save about 9.3 million tonnes of oil equivalent (Mtoe), or 7.5 percent of Ukraine primary energy consumption in 2012.⁸ This is equivalent to 11.2 bcm of gas, or \$5.44 billion valued at the current Russian gas import price for Ukraine (\$485.5/tcm). The

main factors contributing to this gross inefficiency are the under-pricing of gas for households and heat producers, which creates obstacles to invest in energy efficiency and lowers incentives for households to save energy; the lack of energy consumption meters; and the heavy monopolisation of the utility sector in Ukraine.

Heating and hot water supplies constitute up to three-quarters of energy consumption in the residential sector in Ukraine. Pilot investment projects to improve the energy efficiency of large housing blocks have already been implemented and have commercial potential even in the environment of low heating tariffs.⁹ Indeed, since the first price spike of Russian gas in 2006, heat producers have been able to reduce gas consumption by 37 percent while the gas consumption by households has been reduced by 28 percent. As a result, in 2013, the combined gas consumption of district heating and households was about a quarter higher than the Ukrainian domestic gas production. Based on the results of the International Monetary Fund (IMF) study published in 2012, a gradual increase in gas prices for households and heating companies to the level of the Russian gas import price in the next five years would reduce gas consumption in the domestic sector by 42 percent, to 10 bcm/a, and in the heating sector by 7 percent, to 8 bcm/a.¹⁰

There is also huge potential for energy savings in the industrial sector – particularly in the steel and chemical industries, the production of non-metallic mineral products, and the mining sector. Ukrainian steel plants are twice as energy inefficient as the global average and would benefit from the installation of more efficient blast furnaces, electricity generation from metallurgical gases, and steel production using oxygen furnaces (which have a more energy efficient production process) rather than using inefficient open-hearth furnace (OHF) technology. OHF is no longer used in the EU and only 10 percent of Russian steel production uses it.

Ukrainian steel producers have already been implementing these measures since the increase in energy prices in Ukraine. For example, the energy inefficient steel production capacity, OHF, has been cut from 49 percent of total production capacity in 2005 to 23 percent today. The replacement of steel production technology, the more efficient use of by-product gases and the installation of CCGT to produce electricity by recycling exhaust gases from steel production

⁷ More precisely, price setting for households is based on the principle of monopoly regulation and would include long-run marginal supply costs for conventional gas produced in Ukraine, investment mark-up, and transport costs for both transmission and distribution pipelines.

⁸ The 9.3 Mtoe figure is taken from Borys Dodonov, "Energy Efficiency Rankings of the Regions of Ukraine", report by BEST (analytical centre), 2013, available at http://www.energy-index.com.ua/media/report/pdf/_UEI_13_ENG.pdf (hereafter, Dodonov, "Energy Efficiency Rankings"). The figure of 7.5 percent is calculated by the author based on BP Statistical Review of World Energy, June 2013, available at http://www.bp.com/content/dam/bp/pdf/statistical-review/statistical_review_of_world_energy_2013.pdf.

⁹ According to Dodonov, one pilot project cost UAH 2 million and achieved energy savings of 50 percent in one year and an estimated saving of UAH 143 thousand per year at 2011 tariff level. Thus, the investment will be repaid in 14 years and, with a doubling of heating tariff for households, this could be as low as seven years.

¹⁰ Pritha Mitra and Ruben Atoyan, "Ukraine Gas Pricing Policy: Distributional Consequences of Tariff Increases", IMF Working Paper, WP/12/247, 2012, available at <http://www.imf.org/external/pubs/ft/wp/2012/wp12247.pdf> (hereafter, Mitra and Atoyan, "Ukraine Gas Pricing Policy").

could potentially save Ukraine up to 4.16 bcm/a.¹¹ All in all, implementing all of these energy-saving measures could save Ukraine at least 6 Mtoe of energy per year.¹²

The Ukrainian chemical industry is also grossly inefficient: its energy efficiency is five times lower than the EU average.¹³ Most of Ukraine's chemical plants produce energy-intensive basic chemical and mineral fertilisers, and are therefore highly sensitive to energy prices, particularly to the price of natural gas. Since the increase in gas prices in 2006, the chemical industry has begun to modernise and has already reduced gas consumption by 20–25 percent. The modernisation has included production-capacity expansions, general refurbishing of plants as well as implementation of energy-saving measures. Full modernisation of all chemical plants in Ukraine would allow the sector to save up to 1.7 bcm/a, or 20 percent at the 2011 consumption level.¹⁴

To summarise, the potential gas consumption savings in the three sectors – households, heat producers, and industry – is huge. If the pricing policy is implemented as discussed above, Ukraine could in a few years save as much as 13.1 bcm/a, or \$6.36 billion at an import price of \$485.5/tcm. Reform of the residential sector is the most straightforward energy-saving option due to its inefficiencies and overconsumption stimulated by the current pricing and subsidy regime. Pilot investment projects in reducing energy consumption in residential blocks in Ukraine show that they have commercial potential even in the environment of low energy prices.

The politics of raising gas prices

Reforming Ukraine's gas sector, and in particular eliminating the inefficient multi-tier pricing policy and gradually increasing gas prices to import parity level, is the easiest way for Ukraine to improve its energy security. The proposed schedule is not politically unrealistic – in fact, the proposed gradual increase in gas prices for households and heat producers is consistent with the recent Ukrainian government policy of bringing these prices to the import parity level by 2018.¹⁵ Ukrainian Prime Minister Arseniy Yatsenyuk announced that the household gas price would be increased by 50 percent in 2014, 40 percent in 2015, 20 percent in 2016, and 20 percent in 2017. European Enlargement Commissioner Stefan Füle announced in July that energy sector reform in Ukraine would be a condition for further financial support from the EU.

¹¹ Author's own calculations based on information in Dodonov, "Energy Efficiency Rankings"; and in IHS CERA/Ministry of Energy and Coal Industry of Ukraine, *Special Report: Natural Gas and Ukraine's Energy Future*, February 2012, available at <http://so5.static-shell.com/content/dam/shell-new/local/country/zaf/downloads/pdf/research-reports/Ukraine-Policy-Dialogue-report.pdf> (hereafter, IHS CERA, *Special Report*).

¹² Dodonov, "Energy Efficiency Rankings".

¹³ Dodonov, "Energy Efficiency Rankings", p. 24.

¹⁴ IHS CERA, *Special Report*.

¹⁵ In particular, we have assumed the following price-increase schedule for the household sector: an increase of the household gas tariff by 50 percent in 2014, by 50 percent in 2015, by 40 percent in 2016, by 25 percent in 2017, and by 18 percent in 2018.

There may be political resistance to raising gas prices for households in Ukrainian regions, especially in poor regions in the west and in Donetsk and Luhansk in the east. Due to the lower incomes of households in western regions compared to the industrialised eastern and southern regions, the overall increase in the energy tariff might be material. Due to the conflict in the two eastern regions, industrial production to date has fallen by 25 percent, although real wages and unemployment have not so far been affected.¹⁶ The distributional effects of increases in gas prices for low-income households could be addressed through direct support of the most vulnerable consumers in all regions of Ukraine. Such direct targeting should ensure that the utility bills of low-income households would not rise because of price increases. This could be achieved through redistributing (in the form of cash assistance, for example) government's receipts due to higher gas prices. The implicit subsidies in the gas and heating sector (that is, the difference between retail gas prices for households and heating companies and the import price from Russia) amount to 5 percent of GDP per year, or \$9.1 billion in 2012.¹⁷ In addition to direct support of poor households, this increase in government receipts should be channelled to finance energy-saving technologies, funding exploration of indigenous conventional and unconventional gas, and supporting a higher quality of life for all Ukrainian citizens.

The politics of raising gas prices in Ukraine has always been challenging and difficult due to the perception that energy is a basic product and hence should be affordable to all citizens at low prices, and to large gas price differentials between households and industrial consumers, which creates incentives for illegal arbitrage between the two consumer groups. In turn, this creates political opposition to reforming gas pricing from large and politically powerful industrial consumers (primarily in the east) that benefit from the current inefficient gas pricing system. However, in light of Russian aggression in eastern Ukraine, Ukrainian officials seem to understand that overconsumption of energy stimulated by the current inefficient pricing system and subsidies has a direct implication on Ukraine's national security and its sovereignty.¹⁸

Going forward, political barriers and opposition to reforming the gas sector should be minimal. The law on the reorganisation of Naftogaz of Ukraine has already passed a parliamentary vote in August and retail gas prices for households have been increased by 50 percent this year. In any case, reform of the gas sector and in particular elimination of Naftogaz's tariff deficit by increasing gas prices for households and heating companies is a precondition for continued support from international financial institutions, particularly from the IMF.

¹⁶ Donetsk Regional Statistical Service, "Socio-economic situation of the Donetsk region in January-July 2014," available (in Russian) at http://donetskstat.gov.ua/region/ek_r.php?dn=0714.

¹⁷ Mitra and Atoyan, "Ukraine Gas Pricing Policy".

¹⁸ See a recent discussion by the head of Naftogaz of Ukraine regarding the situation with energy consumption, available (in Russian) at http://gazeta.zn.ua/energy_market/kak-my-budem-zimovat-.html.

The geopolitical implications of gas market reform

If Ukraine were to take further steps in reforming its gas market, it could have far-reaching geopolitical implications. It would reduce the economic pressure that Russia could exert on Ukraine through its natural gas export policy. Introducing a competitive energy market in Ukraine would depoliticise energy trade, minimise the danger of state capture, and thus increase Ukraine's ability to conduct an independent economic and foreign policy. An unreformed and highly corrupted gas sector in Ukraine makes its energy decision-making highly fragmented, giving Russia even more power to influence Ukraine through its gas export policy than its supply monopoly position gives it. Because Ukraine would no longer be using its gas pipelines to extract economic rents from Russia in the form of cheap gas, the stated rationale for Russia's attempt to build bypass pipelines such as South Stream would disappear and it would have to justify them in commercial terms.¹⁹ Thus, successful economic reforms in the Ukrainian energy sector would help depoliticise energy relations between the EU and Russia.

It could also help overcome European divisions over Russia. Since the last gas disruption, in 2009, Gazprom's large gas contracts with European energy utilities have been renegotiated to include price indexation to trading hubs in Europe, which has minimised Russian gas "divisiveness".²⁰ The price Europeans pay for Russian gas is now partly determined by a large gas market with plenty of buyers and sellers rather than by bilateral negotiations between European governments and its energy companies on one side and Russia and Gazprom on the other. However, Europeans remain divided about bypass pipelines such as South Stream. But if reform of the Ukrainian energy market brings security of Russian gas supplies to Europe without the need to invest in bypass pipelines, one might see a complete normalisation of the energy trade between Europe and Russia.

How can Europe support Ukraine's gas market reforms?

Reform of the Ukrainian gas market would also be good for Europe. Many analysts argue that Europe should try to reduce its dependence on Russian gas. But if Europe is serious about meeting its ambitious climate and environmental targets at a competitive price, Russian gas will remain part of Europe's energy mix in the medium term. Europe therefore needs depoliticised and commercially based gas relations with Russia and Ukraine. It needs to

find a way to limit the spillover from Ukraine's battles with Russia over energy – and in particular to eliminate the danger of energy cut-offs to EU member states. Europeans should therefore press Ukraine to reform its gas market.

Gas market reform would be a first step towards integration of Ukraine into the EU. In this respect, Ukraine's accession to the European Energy Community (EEC) in 2011 was a good opportunity for Ukraine to embark on reforms of its gas sector and reduce the energy intensity of its economy. But it has so far made little progress with its obligations as a member of the community.²¹ Given the current crisis and Ukraine's complete dependence on Western financial and political support, European authorities and international organisations should now work closely with the new Ukrainian government to ensure that the country has well-functioning energy markets through proper restructuring, deregulation, and liberalisation of its gas and utility sectors.

Above all, gas pricing reform is the best and cheapest way for Europe to improve the security of gas supply through Ukraine. Europe should press Ukraine to remove subsidies to households and heat producers. By gradually increasing the gas prices for these two consumer groups, Ukraine could reduce its gas import bills substantially and improve gas supply security for the country and for Europe. Bringing gas prices for households and heat producers to the parity level of the Russian gas import price would allow Ukraine's domestic production to cover consumption for households and district heating. If there were a gas dispute with Russia, Ukraine would then no longer siphon Russian gas transit destined for European customers as in the past, but rather (assuming that large industrial consumers in Ukraine will be on interruptible contracts) use its indigenous supplies to meet demand from the most vulnerable consumers.

The current Ukrainian government has already taken a number of constructive steps that will help to diversify away from Russia and achieve energy security. In particular, it has begun to deregulate the gas transmission and storage sectors. Western financial institutions should give it support to take further steps. Of the \$25.5 billion that Western financial institutions have pledged to help Ukraine's economy, only \$0.38 billion will be given by the World Bank for projects to improve the energy efficiency of district heating in Ukraine. The majority of the money will come from a five-year IMF standby programme. It is largely targeted at improving the overall financial situation in Ukraine but requires Naftogaz of Ukraine to increase transparency, begin restructuring, and, importantly, eliminate the tariff deficit by increasing retail gas prices for household and heat producers to the import parity level – an important pre-condition for an efficient and liberalised energy market.

¹⁹ For a detailed economic analysis of the South Stream project and its impact on European gas markets, see C.K. Chyong and B.F. Hobbs, "Strategic Eurasian Natural Gas Market Model for Energy Security and Policy Analysis: Formulation and Application to South Stream", *Energy Economics*, 2014, Vol. 44, pp. 198–211.

²⁰ For an excellent discussion and analysis of Russian gas "divisiveness" in Europe, see Pierre Noel, "Beyond Dependence: How to Deal with Russian Gas", European Council on Foreign Relations, November 2008, available at http://ecfr.3cdn.net/c2ab0bed62962b5479_ggm6banc4.pdf.

²¹ See the 2012/2013 Annual Implementation Report by the Secretariat of the EEC, available at <http://www.energy-community.org/pls/portal/docs/2304177.PDF>.

The EU could provide further financial support in two ways that would help reform the Ukrainian energy sector. First, it could provide grants and loans to improve energy efficiency for both residential as well as industrial sectors. This would improve security of supply as well as creating business opportunities for European companies with know-how in energy efficiency. Second, it could provide financial support directed towards reducing the cost of financing energy infrastructure projects in Ukraine. In light of the uncertain political and economic situation in Ukraine, the cost of capital to finance energy infrastructure projects could be a major obstacle for participation of private companies. In this regard, European financial institutions such as the European Bank for Reconstruction and Development and the European Investment Bank could provide preferential loans and grants to projects that would lead to an improvement in energy security of the country.

In addition to financial support, Europe could help Ukraine to improve its energy security by:

- ensuring that Ukraine, as a member of the EEC, implements elements of the EU's Acquis on Energy Efficiency such as Directive 2006/32/EC on energy end-use efficiency and Directive 2010/31/EU on the energy performance of buildings.
- ensuring unimpeded gas imports from Europe to Ukraine. The European Commission should ensure that Ukraine's call to import gas from Central Europe translates into necessary investments in pipeline interconnectors. For this to happen, the Commission should review its regulatory regime governing wholesale gas trade and investment in transport capacity so that calls for west to east gas flows materialise without "unnecessary" delays.
- in the longer term, toward the expiration of the 2009 transit contract between Ukraine and Russia, the European Commission should help Ukraine to make sure that whatever the country signs with Russia for gas transit to Europe complies with the EU's Third Energy Package gas *acquis*. This should facilitate greater market entry, challenging Russia's dominant position in Ukraine, as well as allowing European companies to sign separate direct transport contracts with Ukraine. This would in turn remove the temptation for Ukraine to negotiate with Russia over gas prices using transit pipelines. More importantly, this would allow Ukraine to import gas from European companies that have contracts with Gazprom at "European" prices and give Ukraine access to a more diverse West-European gas markets.

Despite all the promises and efforts by the new Ukrainian government, Europe should provide incremental support conditioned on rigorous evaluation of progress made by Ukraine in reforming its energy markets. The IMF is already taking a similar approach. After receiving the first few financial tranches from the IMF under the standby programmes of 2008 and 2010, the previous Ukrainian governments failed to implement conditions stipulated in those programmes. But the first steps taken by the new leadership in Kyiv gives reason to hope that the moment for the long-delayed reform of Ukraine's energy sector has finally arrived.

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