

How Would the Development of Shale Gas Resources in Ukraine Impact Europe's (energy) Security?

By Gordon Little*

Ukraine should set the targetubling its production of oil and gas within a decade and become self-sufficient in energy. – Anders Aslund & Oleksander Paskhaver

Natural gas is increasingly appearing crucial to a future where growing energy demand is to be tempered with reductions in carbon emissions. The 2010 World Economic Outlook forecasts global primary energy demand to increase 36% by 2035, or between 1.2% to 1.4% per annum. While fossil fuels are expected to supply more than one half of this growing demand, natural gas is the only fossil fuel expected to be consumed in greater quantities than today.¹

Ensuring uninterrupted natural gas supplies is thus going to be a pivotal part of energy security arrangements. Although there is currently a glut of natural gas globally, it is expensive and volatile to transport. Accessing this commodity domestically is preferable to importing it long distances or even relying on neighboring gas-exporting nations, which can cut their exports at any time. In 2006 and 2009, the European Union (EU) – the world's largest net gas importer – learned this bitter lesson. Gas exports via pipeline from Russia via Ukraine were reduced, then cut, depriving the continent of 20% of its gas supply for a fortnight during winter.² A state of emergency was declared. Energy security reemerged as a priority issue for Europe's future. This paper examines future European energy security arrangements from the perspective of new gas sources, focusing particularly on shale gas production in Ukraine.

Unconventional Gas Sources are Already Playing an Important Role in Geopolitics

The world's natural gas reserves stand at around 6,621.2 trillion cubic feet (tcf), with about two-thirds in the Middle East and Russia. With technology improvements in exploration and production, producible gas reserves have grown by as much as 50% since 1989. Conventional gas represents the majority, but unconventional sources play a large part. In fact, unconventional sources are forecast to meet a third of global gas production by 2035. Shale gas is one of these unconventional sources.

Shale gas is natural gas from shale rock formations. While it is more difficult to tap and produce than conventional gas, it can add significantly to a country's own gas reserves, improving its energy security outlook. How much will shale change the picture of global gas reserves? It is hard to tell, but many think it could be revolutionary. According to Amy Myers Jaffe, "shale gas will revolutionize the industry—and change the world—in the coming decades. It will prevent the rise of any new cartels. It will alter geopolitics".³ Likewise, for Kenneth B. Medlock, shale "dramatically changes the dynamics at the negotiating table and geopolitically."⁴

The United States affords an example of the effect of shale gas on geopolitics. Since the commercial production of domestic shale gas mid-decade, the United States' reserves have increased up to 35%. Shale gas contributes at least one tenth of the country's dry gas production. Big international energy companies have already invested billions of dollars in shale production. Now, with shale gas production depressing U.S. gas prices (down 14% in 2010), budgets are down for countries that rely on gas exports, such as Russia.⁵ This means Russia loses some leverage on the geopolitical chessboard, increasing the relative influence of the United States. Meanwhile, cheaper American gas can help decrease the role of coal in electricity production, or oil in transportation, in preference to natural gas. If this could displace some oil imports, it would help reduce the trade deficit.⁶

In Europe, shale gas could have equivalent, or more important effects. The EU has already been diversifying its energy supply in order to avoid repeating the gas crises of 2006 and 2009. Its main avenues to supply diversification are increased energy efficiency, renewables investment and new gas and oil pipelines. Shale exploration could become another. The EU is the only place in the world with an emissions trading scheme, pricing carbon in order to make lower emitting sources more competitive. Investment in

renewable sources has been prolific, though driven as much by carbon sensitivity as energy security. The EU has set a target of 20% of energy from renewable sources by 2020, including a 10% share specifically in the transport sector.

The EU has also pursued oil and gas pipeline diversification, such as the 3,300km Nabucco Pipeline which would bring up to 31bcm of gas from the Cas-

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pian region to Europe without transiting Russia. Pipelines, however, are slow and expensive to construct. Nabucco negotiations since 2002 have proceeded at a glacial pace, and there is competition from alternative pipeline projects such as the Russian-backed South Stream Pipeline. Construction of South Stream is slated to start in 2013, with a total estimated capacity of 63cbm, considerably higher than Nabucco.⁷ However, neither pipeline project is guaranteed. This makes the advent of shale gas a welcome opportunity for the EU as another pillar in improving energy security, and several EU countries have already provided prospecting and exploration licenses for shale gas to major oil and gas companies.⁸

Shale gas in Europe is, however, no panacea.⁹

First, shale gas production exists so far only in the United States. European geology is less favorable to shale exploration, there are few tax breaks and the service industry for onshore drilling lags behind that in the United States.¹⁰ Second, there is considerable environmental skepticism regarding shale gas drilling. Scientific research into the hydraulic fracturing (“fracking”) procedure, integral to accessing the gas, has so far been unable to categorically disprove concerns that it pollutes underground aquifers.¹¹ Given the prevailing environmental sensitivities in Europe, there would likely be considerable debate before signing production agreements that could have potentially disastrous environmental effects. Third, shale gas deposits are spread over wider areas, requiring a greater number of wells to be drilled if gas is to be accessed. This presents problems to countries that have high population density (at least more than the United States) such as France or Germany. Fourth, it is unclear how long shale gas fields actually remain viable. As shale gas wells have only been in operation in the United States for three to four years, it is not possible to forecast long-term output, hence clouding investment decisions.

Shale Gas in Ukraine: New Perspectives on European (energy) Security?

There is much speculation (and possibly just hype) into whether there could be a shale revolution in Europe, but one underexplored area is the possible impact of a Ukrainian shale gas industry on European geopolitics. Ukraine is important to Europe because it is the transit country for 80% of Russia-EU gas exports, supplying one-quarter of EU gas demand. Ukraine is also the easternmost border of the EU, comprising a population of forty-six million people who, generally speaking, hope to see themselves as part of the Union someday.

But Ukraine is also a Former Soviet Union country with persistent ties, both economic and psychological, to Russia. Russia has been able to exert continued control over Ukrainian politics in part due to Ukraine’s gas dependence (60% of its own gas demand is met by Russia). Russia sees Ukraine as vital because it contributes much of its own geopolitical power. Thus, for Russia, sway over Ukraine’s economy and politics, or at least sidelining Euro-Atlantic influence there, is crucial.

Ukraine’s 2010 election that brought President Victor Yanukovich to power definitively ended the country’s half-decade experiment in overtly pro-Western leadership. It is still impossible to predict whether a pro-Russian outlook will overcome Ukrainian politics, or whether in twenty years Ukraine will be considered more a part of Europe than today. But given Ukraine’s expansive energy pipeline network and its geography bordering Europe and Russia, energy developments in that country will ripple through the continent.

Estimated Shale Gas Reserves in Ukraine are Substantial

Ukraine presently has 34.7tcf of conventional proven gas reserves.¹² At 2009 production rates, that would give Ukraine about 50 years of natural gas supply. If the current production rate doubles over time, as planned by the Ukrainian government, Ukraine will still import a significant amount of gas (though down from 60% today) while further depleting its reserves.¹³

Improved energy intensity of local industry would slow this (Ukraine’s energy intensity is 2.5 times that of Europe), but reserve growth will still be important in the longer term.¹⁴ This is where shale reserves can play an important role.

Exploration of shale in the Ukraine is yet to be undertaken, so finding accurate reserve estimations is difficult. The following estimations by Stig-Arne Kristoffersen provide an idea of Ukraine’s shale potential. Natural gas reserves are predominantly found in Ukraine’s eastern Donbas region (Figure 1), where there is a 22,500km² potential source rock area.¹⁵ In comparison, the Barnett Shale in Texas, believed to contain America’s largest shale producible reserves, is 13,000km².¹⁶

Not all of the sub-basins in the Dnieper-Donets are optimal for shale production, but Kristoffersen estimates gas in place is between 12.5 to 1,813.5tcf. At a recovery factor of 20% (based on U.S. shale production), recoverable gas resource potential is 2.5 to 363tcf.¹⁷ This, of course, is



Figure 1
Dnieper-Donets Basin

an extraordinary range, the higher end being more than ten times Ukraine's current proven conventional gas reserves.

Kristoffersen has also estimated that 31,027 wells would be required for the nine most promising sub-basins, the majority (75%) horizontal. His cost estimates for wells for Ukraine, based on American shale production, are between US\$3.2 million to \$465 billion. In terms of gas revenue, using Ukraine's gas purchasing rate from Russia (US\$4.46/MBTU mid-2010) as a benchmark, the market value of Ukraine's shale would be considerably higher: between US\$10.3 billion and \$1.5 trillion. Again, the size of Kristoffersen's range makes it hard to estimate reliably. However, taking into account Ukraine's current gas purchases from Russia (US\$8.5 billion in 2010), producing only 1-5% of Ukraine's shale potential would "create an added value for Ukraine in the range of US\$500 million to \$750 million per year in freed capital".¹⁸

It is not possible yet to verify Kristoffersen's estimates. However, significant interest by major oil and gas companies in Ukraine's shale potential indicates widespread anticipation of substantial shale resources. Moreover, TNK-BP and Shell have already made inroads there.

Geopolitical Implications of Ukrainian Shale Gas

The geopolitical implications of Ukrainian shale gas production would spread across Ukraine, Russia and the EU. According to Kristoffersen, shale gas production could annually free up US\$500 to \$750 million in Ukraine from reduced Russian gas imports. But it would not take shale gas production to free Ukraine from Russian natural gas import dependence. If Ukraine were to halve its energy consumption relative to GDP, as Poland and Slovakia have, Ukraine would not need to import any natural gas.¹⁹ This in itself would be a major coup for Ukraine, as its reliance on continued Russian supply opens it to political manipulation.

Instead, the primary shale gas value would derive from it being an export commodity to Europe. By the time shale is producible in significant quantities (let's say 2025), today's contracts between European buyers and Gazprom would be on the point of expiry. Then on, increased export revenue could flow into Ukraine's national budget. A stronger national budget, all things equal, could improve social spending, reduce deficit financing or boost savings or investment in the best scenarios. As an export industry is built, the country could attract billions of dollars of inward investment, boosting job creation and tax revenues. A happy corollary would be to reduce Russia's prolific influence in the Ukrainian energy sector.

Shale gas resources - if exploration proves them viable - will attract investment from the major oil companies. As U.S. companies predominantly have the expertise in shale development, their involvement would be necessary for Ukrainian production. This might break open the monopolistic arrangement presently stifling Ukraine's energy sector. Indeed, ExxonMobil and ConocoPhillips are already prospecting in Poland and Germany, and Shell has expressed interest. These companies operate under more transparent business practices than Ukrainian state-owned enterprises, and would be less likely to be directly complicit in overt corruption. Moreover, these oil companies would insist on stable taxation arrangements, the broad establishment of which would attract smaller foreign energy companies' interest in Ukraine, resulting in added direct investment. In the United States, a number of smaller companies are already playing significant roles in shale production, breaking open a sector previously dominated by the majors. Why couldn't this be the story elsewhere?

With Russian influence in Ukraine curtailed by Ukraine's gas independence, Russia's energy leverage over the EU would be weakened. Increased European investment and trade with Ukraine, not only in gas, would build ties between the EU and Ukraine while loosening them with Russia. As Ukraine gained in strategic and economic importance to the EU, European policy would have to become focused on anchoring Ukraine away from Russia. This could be achieved in the medium term by acceleration into the Schengen-zone, concluding the prospective free trade agreement, or even breakthroughs on the EU's Eastern Partnership agenda.²⁰

How much this is achievable though is questionable. Russia will likely remain a significant global power thanks to ample revenues flowing from oil and gas contracts to an energy-hungry Asia.²¹ It is likely to remain extremely wary of a Ukraine that is edging definitively into Europe. And at any rate, Ukraine will not lose its historic, cultural or linguistic ties to Russia any time soon. Ukraine also has poor demographics (an ageing and unhealthy population) so does not present the same commercial opportunities to the EU as, say, Turkey. The EU, even if unencumbered by Russia's energy politicking, would still share strong commercial ties with Russia. The German-Russian bilateral relationship is also robust and the Russian-German Nord Stream Pipeline gives Russia a new gas route into Europe that bypasses Ukraine while allowing Germany to sell the gas onward to Eastern Europe. But if Ukrainian shale gas

becomes a critical non-Russian pillar of European energy diversification, a deepening of the EU-Ukraine relationship is to be expected.

A further avenue to be explored is whether a new domestic resources industry would divert Ukraine down the path of the feared 'resource curse.' This is a concept exposing how poor economic performance, unbalanced growth, impoverished populations, weak states and authoritarian regimes often emerge as negative consequences of mineral or commodity abundance in developing countries.²² As Paul Collier describes it, "resource-rich countries need good government decisions even more than other societies. But those riches make it more difficult to build the needed institutions."²³ Could a new resource industry direct Ukraine away from economic reforms?

Even before significant shale gas reserves are proven, Ukraine already suffers from inefficient and corrupt national institutions, an ineffective regulatory system, stifling bureaucracy, under-capacity economic growth, low GDP per capita, and a history of authoritarian leadership.²⁴ Ukraine ranks 146th out of 180 countries in Transparency International's 2009 Corruption Perception Index and 142nd out of 183 countries in the World Bank's Doing Business Index. Ukraine's energy sector in particular is poorly functioning, being a confluence of competing domestic and international public and private interests. There is a distinct lack of transparency and efficient business practice.

Naftogaz, Ukraine's state-owned energy corporation, has been running at a loss for several years and owes several billion dollars in outstanding debt to domestic and international creditors. It is unlikely that the current structure of government proprietorship within the energy industry could effectively manage new resource revenues from domestic shale gas exploration. Thus the potential economic benefits of shale gas could be more harmful than beneficial – the prediction of the resource curse framework.

On the other hand, perhaps it comes down to whether or not Ukraine were to allow international companies to operate in shale gas exploration and production. That in itself could define the country's ability to capably absorb gas revenues. Because foreign expertise at the early stages is crucial to shale gas production, Ukraine would probably be unable to manage the whole process with state-controlled entities. Judging by Ukraine's preliminary agreement with TNK-BP, the country looks likely to allow foreign players to take a role. But whether Ukraine would be able to develop clear tax protocols and reduce opportunity for graft and corruption remains to be seen. "Lousy domestic policy remains the single greatest impediment to gas investments in Ukraine," believes Ed Chow, of the Center for Strategic and International Studies (CSIS).²⁵ Thus there is much riding on the decisions and negotiations between Ukraine's government and exploration companies.

The Path Less Travelled By...

Ukraine is a long way from shale production, even if preliminary exploration proves viable. Conventional gas production, indeed even offshore production in the Black Sea, offers a more feasible opportunity at this stage than shale gas. But the positives of shale may, as time proceeds, render it desirable for Ukraine and for Europe.

It would be naïve to think that Ukraine's energy industry, or its entire economy, would somehow be able to swiftly reform based on shale gas production. Rather, it seems likely that economic reform would have to precede significant shale gas investment. There are also a plethora of other factors that will be important to the role of shale in Ukraine, such as developments in alternative energy technologies, progress on new pipeline construction, even shale developments within the EU itself.

Nonetheless, considering the future energy needs of Europe and Asia, the potential for Ukrainian shale gas production must be seriously considered by Europe. The EU must prepare for game changers in the energy environment (that stretch beyond pipeline accidents), and nurture those that could be positively transformational such as Ukrainian shale. It can do this by continuing to press for Ukrainian energy industry reform, and by supporting shale gas exploration within Ukraine through financial support to the big oil and gas companies, and lobbying on their behalf. Poland will be an important leader – it already has substantial investment in Ukraine, is exploring shale gas domestically, and would thus stand to benefit from expanding energy investments into Ukraine. If Ukraine does turn out to have sizeable producible shale reserves, the EU will be thankful in the future for improved engagement and planning for it today.

Footnotes

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⁶ See also: Robert Manning. Shale Gas Could Transform Energy Geopolitics. Atlantic Council. 7th Dec 2009. http://www.acus.org/new_atlanticist/shale-gas-could-transform-energy-geopolitics

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⁹ Details presented here are only a brief overview – for deeper insight see: Paul Stevens. The Shale Gas Revolution: Hype and Reality. London: Chatham House, 2010.

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¹² BP. BP Statistical Review of World Energy 2010. London: BP, 2010. P22. (Conventional reserves exclude shale).

¹³ On June 11th 2010, Deputy Prime Minister Andrey Klyuyev announced that the Ukrainian government planned to double domestic gas production over the next 10 years to 40 bcm annually.

¹⁴ Kirsten Westphal. Op Cit. P12

¹⁵ Stig-Arne Kristoffersen. Gas Shale Potential in Ukraine: An Assessment of a Large Opportunity. Kentucky: Lulu.com. 2010. P17

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¹⁷ Stig-Arne Kristoffersen. Op Cit. P18

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¹⁹ Anders Aslund & Paskhaver, Oleksander. Proposals for Ukraine 2010 – Time for Reforms. Independent International Experts Commission. 2010. P45

²⁰ For an overview of the partnership, see: <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1858>

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