

The EU and its Eastern Partners: Energy Needs and Future Prospects

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**DIRECTORATE-GENERAL FOR EXTERNAL POLICIES
POLICY DEPARTMENT**

THE EU AND ITS EASTERN PARTNERS: ENERGY NEEDS AND FUTURE PROSPECTS

AFET

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2012



DIRECTORATE-GENERAL FOR EXTERNAL POLICIES OF THE UNION

DIRECTORATE B

POLICY DEPARTMENT

STUDY

**THE EU AND ITS EASTERN PARTNERS:
ENERGY NEEDS AND FUTURE PROSPECTS**

Abstract

This study contains an overview of the energy sectors of the countries of the Eastern Partnership (EaP) and an analysis of current and potential energy cooperation with the EU and within the region.

In order to strengthen security of supply and foster competition, the infrastructure priorities should be the completion of a network of gas and electricity interconnectors with and within the EaP region, and the extension of the Odessa-Brody oil pipeline. In parallel, one should revive the goal of achieving a binding legal framework for the secure transit of energy in the region involving all relevant parties, including Russia.

Existing horizontal areas of cooperation, in particular energy efficiency, lowering import dependence, and renewable energy, are clearly justified. Two new areas should be added, namely the production of unconventional fossil fuels, and the adoption of alternative fuels in transport.

In terms of framework conditions, convergence towards the EU Acquis faces strong challenges from both domestic and foreign interest groups in several EaP countries. The main focus should be on those measures most likely to enhance security of supply in each country. Also, the coherence between the various existing EU instruments for regional cooperation should be strengthened.

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Executive summary

It is sometimes assumed that, when it comes to energy, the EU-27 and the six Eastern Partnership (EaP) countries – Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine – share little in common. Energy cooperation is still underdeveloped; competition between these states, external pressures and limited investments in energy transportation infrastructures contribute to explaining and perpetuating this relative lack of cooperation. At the same time, the EU-27 and its Eastern Partners share some common energy trends. Electricity and natural gas will play an important role in future energy mixes while coal will stay attractive only for countries that heavily rely on imports. Oil demand should remain flat despite EU calls for cleaner energy sources. These common trends should pave the way for further cooperation between Eastern partners and the EU.

The Eastern Partnership offers a variety of options for cooperation ranging from deep integration into the single European energy market to bilateral cooperation under separate contracts. However, without being prescriptive, the EU is keen that all partner countries enshrine the implementation of legal obligations related to the EU energy market in their national legislation. Currently only Moldova and Ukraine have committed themselves to implementing the relevant directives, owing to them being signatories to the Energy Community. Armenia and Georgia, as potential members of the Energy Community, are likely to eventually do so, as is Azerbaijan, which is a special case owing to its importance as an alternative to Russia as a supplier of hydrocarbons. Energy relations between the EU and partner countries are regulated under Platform 3 of the Eastern Partnership. In November 2009, the first meeting of the group working on the Platform, which was dedicated to energy security, approved a plan for implementation by the end of 2011, with four key objectives: Enhancing framework conditions and solidarity; Support for infrastructure development, interconnection and diversification of supply; Promotion of increased energy efficiency and use of renewable resources; Regulatory framework and approximation of energy policies.

Even though all of the partner countries declare a readiness to adapt their regulatory frameworks to EU standards, their progress vary considerably. Undoubtedly, geography and geopolitics impose strong limits on the effectiveness of bilateral cooperation and the multilateral track with regard to energy. Moreover, in the post-Soviet area political systems are intertwined with the control of the energy sector. At present the formal, government-led cooperation with the EU conceals a variety of vested interests and stakes in blocking reforms by governmental and business actors. In view of the elusive interest in reforming the energy sector from the governmental level, wide-ranging, strategic and sustained EU engagement with the EaP countries to promote energy security is required. It is clear that for the ‘frontrunners’, such as Moldova and Ukraine, the participation of EaP partner countries in the Energy Community and other EU energy-related initiatives has not yet fulfilled the expectations. While cooperation has been intensive and wide-ranging, the actual effectiveness has been relatively low within the EaP.

In spite of the difficulties highlighted, several examples of successful commercial and inter-governmental cooperation can be observed in the EaP region and between the region and EU Member States. This is most visible in terms of the actual and potential shipments of both oil and gas from Azerbaijan, through Georgia, to Ukraine. Ukraine can then serve as a platform for further deliveries to Central Europe as well as to Belarus and Moldova.

What may finally be emerging, if very haltingly, is a loose region straddling Central and Eastern Europe and the South Caucasus, including both EU and non-EU countries, which are gradually developing new sources and new routes for energy supplies in a manner which does not objectively contradict the established bilateral relationships between larger Member States and the Russian Federation. While the latter continues to rely on the “Russian model” of long-term bilateral integration based on bespoke pipelines and long-term contracts, the former may flourish based on interconnection and sea-based transportation of fossil fuels (both LNG and crude oil). These are potentially very positive developments,

and analyses suggest that, ultimately, the EaP countries have far more to learn and far more to share with the New Member States than with countries further West, at least in terms of security of supply.

Recommendations:

- Support the completion of a network of gas and electricity interconnectors with and within the EaP region.
- Support the extension of the Odessa-Brody oil pipeline to Poland's Baltic Sea coast.
- Refocus support for the adoption of the Acquis in the EaP region on those elements most likely to enhance energy security in the region, in particular the unbundling of gas transmission systems and the implementation of the principle of Third Party Access.
- Pursue the existing policy areas that have been identified for multilateral cooperation with the EaP countries and that are considered well justified, i.e. greater energy efficiency, lower import dependence, the adoption of renewable energy.
- Introduce two additional areas of cooperation between the EU and its Eastern partners
 - The production of unconventional fossil fuels (in particular shale gas);
 - Transport system transformation in order to achieve lower oil dependence, i.e. support for the adoption of alternative transport fuels, in particular electric cars.
- For the energy efficiency and transport system goals, focus action on bottom-up approaches at the municipal and regional levels.
- Strengthen the coherence between existing instruments in relation to energy security in the East (EaP, BSS, ECT, INOGATE, the Baku Initiative/Process).
- Revive the long-term goal of achieving a binding legal framework for the secure transit of energy between all relevant parties in the EU and in the EaP region, and including Russia.

1. OVERVIEW OF THE CURRENT ENERGY SITUATION AND OUTLOOK ON FUTURE DEMANDS IN THE EU AND ITS EASTERN NEIGHBOURHOOD

1.1 Overview of the current energy situation

It is sometimes assumed that, when it comes to energy, the EU-27 and the six Eastern Partnership (EaP) countries – Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine – share little in common. The six Eastern neighbours have followed different paths since the demise of the Soviet Union in 1991. Despite various initiatives – INOGATE, the Energy Charter Treaty, the European Neighbourhood Policy, the Black Sea Synergy, and the Energy Community – they hardly cooperate with each other and with the EU. This is a direct legacy from the fall of the USSR.

Despite relatively well developed energy interconnections among the former Soviet Republics, they all turned to Russia once the former empire collapsed. For instance, the United Power System of Transcaucasia did not live through the early 1990s. While Armenia used to provide between 3 and 3.5 GWh to Azerbaijan and Georgia in the 1980s, it stopped right after the Soviet Union ceased to exist. In Eastern Europe and in the Caucasus, all countries rather chose to develop their ties with Russia. To a large extent this is still true today. Various initiatives from external political actors such as the EU or the United States have tried to foster energy cooperation among the former Soviet Republics. Except between Azerbaijan and Georgia, they have failed most of the time for several reasons. The two most salient ones are probably competition and rivalry between these states as well as external pressure undermining such cooperation prospects.

Limited investments in energy transportation infrastructures also contribute to explaining and perpetuating this relative lack of cooperation. The EU-27 and its Eastern partners' degree of interest in specific commodities may also differ, which makes cooperation more difficult to develop. For instance, from 2001 to 2004, the newly built Odessa-Brody pipeline, which was supposed to ship Caspian oil to Poland and Ukraine, remained empty. While it was promoted by the European Commission, Caspian producers as well as Eastern European consumers showed little interest for this pipeline. Only the disruption of hydrocarbons supply from Russia made this energy infrastructure attractive in the late 2000s.

As shown in graph 3, the size of markets varies tremendously among the six EaP states. The Ukrainian energy market is by far larger than the other ones even if the Azerbaijani and Belarusian markets are increasingly important. Because of such discrepancies, energy cooperation may prove difficult to develop between these countries. Consequently, in some parts of the EU-27 as well as in the six EaP states, transmission service operators suffer from a lack of funding and a poor access to technology. As a corollary, the lack of reliable energy transportation infrastructures makes cooperation harder.

Nonetheless, these states and the EU-27 share some common trends, which may pave the way for further cooperation.

First, natural gas is the preferential source of energy. For EaP countries, this is a direct legacy from Soviet times, when industrial and residential consumers heavily relied on gas. This commodity was - and still is to some extent - the favoured energy source for heat and power generation. In 2009, except in the EU-27¹ and in Ukraine (its share is 26% and 44% respectively), it represented more than 50% of the total consumption of energy (see annex 2.1). In Armenia and Moldova, natural gas accounted for 78% and 85% of the total energy consumption.

1 In the EU-27, natural gas also represented only 26% of the energy mix. However, it is assumed that this share will increase rapidly. It will be 33% in 2015 and 38% in 2035. Natural gas will be the major source of energy by then.

Second, except in the EU-27, the energy markets of the Eastern European countries remain largely monopolistic. State-owned companies in Azerbaijan, Armenia, Belarus, Georgia, Moldova and Ukraine are in charge of the state energy policy. Despite regular calls for privatisation, the state is still reluctant to liberalise a strategic economic sector. Such a tight state control over the energy sector makes foreign investments less easy. It also leads to a poor allocation of financial resources. In Azerbaijan, Belarus and Ukraine, state energy companies perform social duties usually devoted to the state social agencies. As a consequence, less money is available to improve the energy infrastructures or to promote energy efficiency.

Third, except in Azerbaijan, Georgia and the EU-27, Russia is the largest supplier of gas. In 2010, Belarus, Moldova and Ukraine gas imports entirely came from Russia. Moscow also supplied 76% of gas imported by Armenia. In the meantime, Russian pipelined gas represented around 28% of the EU-27 gas imports in 2010. The share of Russian gas is likely to increase, providing new fields come on stream in Russia and new export routes to Europe (such as Nord Stream and South Stream pipelines) are implemented. Moscow remains largely influential in this part of the world despite political competition from the EU or the United States. The on-going gas price negotiations between Russia and EaP countries underlines the leverage the former still enjoys over its neighbours.

Fourth, in all six EaP countries and in some EU countries energy efficiency remains low. Industry still relies heavily on hydrocarbons and has not proven energy-efficient yet. As a Soviet legacy - when energy was very cheap - residential consumption remains high as well. Whereas gas tariffs increased and awareness-raising campaigns on energy efficiency were carried out in EaP countries, most of the individual consumers still pay little attention to energy savings. Finally, transportation infrastructures are out-dated, which causes a lot of waste. While energy efficiency appears as a major objective to decrease energy dependency, it is striking to notice how little interest is given to this issue. Lack of funding, poor access to technology (for smart grids for instance) and opposite political interests may explain this situation. Energy intensity remains high (Ukraine has the largest energy intensity among the EU-27 and the other EaP countries) and undermines any energy policy initiatives.

All the countries considered here are energy producers. But, except in Azerbaijan since 2006, domestic production is not sufficient to cover their energy needs. Thus, all the other partners have to import energy resources - mostly hydrocarbons - to sustain their economic growth.

1.2 Future Energy Demand

To understand the evolution of energy demand in the EU-27 and in the six Eastern Partnership countries, we have used a methodology based on three different timeframes: 2009, 2015 and 2035. It refers to the present energy situation and outlooks in the medium term and in the long term. The year 2009 is chosen for two reasons. First, it is the latest year with the most reliable data for all the markets considered. Second, it helps to analyse how these markets react in time of economic crisis, which is important given the global economic context. The year 2015 then provides a mid-term view, considering the economy would slightly recover from the on-going crisis. Finally, the long-term analysis is based on the year 2035 in order to shed light on the evolution of the considered markets over a 20-year period. If special attention is given to hydrocarbons, the aim is still at covering the main energy commodities, i.e. oil, gas, coal, nuclear power and renewables. The latter – nuclear energy and renewables – are encompassed under a single label: electricity. Finally, in the annexes a figure per capita view was added in order to facilitate cross-country comparisons. It may also help to underline in which country energy efficiency should be promoted. While scarcity of energy resources is likely to increase, the latter is critical from a public policy perspective.

With the exception of Azerbaijan, the EU-27 and the other five Eastern partners will rely more and more on foreign energy resources. From 2015 onwards, most of the energy demand will be covered by imports.

Between 2009 and 2035, coal and oil demand should decline sharply in the EU-27 (-86% and -65% respectively, see annex 3). This should be the result of ambitious policies aiming at decreasing CO₂ emissions. As a consequence, electricity and gas demand is expected to increase (+23% and +25% respectively). Large parts of electricity consumption should come from renewable energy. Since the Fukushima accident in Japan in 2011, nuclear power has become less attractive. It is not expected that the EU-27 will promote this source of energy in the coming decade. The need for new energy supplies may result in further investments in renewable energy and increased gas imports. For modelling purposes, the EU-27 energy demand is expressed in a single graph (annexes 4 and 5).

Between 2009 and 2035, oil demand is expected to increase in Azerbaijan, Georgia and Ukraine, by 50%, 78% and 51% respectively. Various reasons are behind this trend. In Azerbaijan and Ukraine, the economy has a large industrial base, which relies heavily on hydrocarbons. This trend is not expected to change in the long term and more oil and gas will be needed to support the growth of the economy. In Azerbaijan, increasing commercial demand for oil products will drive oil demand. Baku is promoting these products in order to limit the financial outputs of the incoming oil peak, expected in 2013-2015. However, we assume that oil production should still be able to deal with this increasing demand. In Georgia, such a sharp increase reflects Azerbaijan's role as a transit country. Every day, Azerbaijani, Kazakhstani and Turkmen oil volumes are shipped through the country. Some of these volumes are expected to stay in Georgia to satisfy oil demand there (up to 1.8 million tons in 2035). In addition, domestic oil production should go over 5,000 barrels per day by 2020 onwards. In Ukraine, the decline of gas imports will drive a rising oil demand. Lastly, in Belarus, demand should stay flat (-3%).

Between 2009 and 2035, gas demand will increase everywhere, except in Belarus and Ukraine. Due to regular disputes over Russian gas purchase prices, Minsk and Kiev expressed their willingness to decrease gas imports. Such a policy should lead to 5% and 16% decline of gas demand - respectively - by 2035. In Armenia, Azerbaijan, Georgia and Moldova, gas demand will increase significantly (+55%, +57%, +41% and +26% respectively). In the two South Caucasian states, this will result in the rise of Azerbaijani gas production. The Azerbaijani industry still relies heavily on gas for power generation while some Azerbaijani gas exports are expected to stay in Georgia. In Armenia and Moldova, such an increase is aimed at supporting the development of the economy and high residential consumption. But it would also increase energy dependency over external suppliers, i.e. Iran and Russia. Despite strong expectations of successful shale oil and gas exploration in most of the EaP countries, no significant change in these forecasts is expected. Except in Azerbaijan, gas demand is very likely to be covered by imports from large producers such as Iran, Russia and perhaps Iraq.

Between 2009 and 2035, electricity demand should steadily rise by 20-30% in EaP countries. In Armenia, this increase should reach 51%. Large parts of this rise should come from renewable energy. EaP countries are expected to invest in this source of energy in order to decrease the role of natural gas in power generation. Some states, such as Belarus, have shown some interest for nuclear power but the feasibility of projects seems less likely since the Fukushima accident. Lack of investment capacity may also undermine this kind of projects. In addition, increase of domestic electricity production seems to be the most effective way to decrease dependency over hydrocarbons imports.

Coal demand is almost non-existent in Armenia, Azerbaijan, Belarus and Georgia. In these two countries, mining is likely to come to an end, which will lead to strong decrease of coal demand. In Moldova and Ukraine, it should increase by 25% and 33% respectively. In both cases, such a rise reflects energy diversification policies. Ukraine should rely on coal to face its gas imports decrease. In Moldova, coal imports from Ukraine are considered to be an effective way to decrease energy dependence on Russia.

Therefore, the EU-27 and its Eastern partners share some common energy trends. Electricity and natural gas will play an important role in future energy mixes while coal will stay attractive only for countries that heavily rely on imports. Oil demand should remain flat despite EU calls for cleaner energy sources.

1.3 Country Analysis

1.3.1 The EU-27

The Fukushima accident has put a hold to the nuclear renaissance in Europe. This energy source was somehow promoted as the miracle energy solution to sustain economic growth and reduce CO₂ emissions. However, as Germany is about to close all its nuclear plants, the EU-27 will have to look for alternative energy sources. The EU has to deal with three challenges: reducing its carbon footprint, facing depletion of indigenous hydrocarbon resources and diversifying energy imports.

Unless shale oil and gas exploration is successful, the EU will have to improve its access to energy and find clean sources of energy. In this perspective, significant investments in renewable energy are expected, especially in solar and wind energy. Important energy savings are also expected to reduce carbon footprints. In addition, energy imports should be diversified. The so-called shale gas revolution in North America has made available new LNG volumes, which should be re-routed to Europe. Nonetheless the EU still needs to look at new gas producers such as Azerbaijan, Iraq and Turkmenistan. However, while gas demand may increase slower than previously expected, the EU will have to make its energy market attractive for producers. Indeed, these are concerned with the current state of the European gas markets.

First, according to the International Energy Agency, Asian gas demand may increase by 4.9% per annum, against 0.6% per annum for the EU. While gas markets still remain mostly regional, any drop in demand may have huge consequences for producers, especially the LNG ones.

Second, some producers, such as Russia, are concerned about EU gas markets becoming more and more difficult to access in the future. Indeed, the Third Energy Package will constrain producers to separate upstream and midstream activities, which is not in the interest of companies like Gazprom.

Third, natural gas is a difficult commodity to ship in. Be it LNG or piped gas, expensive infrastructures are needed and usually take time to implement. For producers that find it difficult to attract investments such as Turkmenistan, markets closer than the EU ones may be more attractive.

Finally, the EU needs to improve its energy transportation networks to finalise the implementation of a common energy market. New routes need to be built and existing networks should be upgraded. The European Commission considers that around 210 billion Euros will be needed to upgrade or build gas pipelines and power grids by 2020. Half should be delivered by the market unaided and up to 140 billion Euros will require public sector's help to source and leverage the necessary private capital. Despite the current economic slowdown, we expect these investments to become reality. Indeed, the oil and gas industry is strongly recovering from the economic crisis and should be able to finance such investments. The development of energy routes would foster further integration of energy markets and make available new energy sources from the Caspian, the Middle East and North Africa.

1.3.2 Armenia

Armenia faces a difficult situation. Due to the blockade imposed by Azerbaijan and Turkey, it relies on Georgia and Iran for energy imports. However, while Azerbaijan is investing more and more in Georgia, the latter seems to become a less and less reliable partner for Armenia. For instance, the Armenian authorities are concerned about Georgia's intention to privatise the Georgian part of the North-South Pipeline, which supplies Russian gas to Armenia. The Azerbaijani state-owned oil company SOCAR is believed to bid for this pipeline.

In addition, Armenia suffers from the increase in Russian gas prices. In 2012, gas price might reach US\$210/mcm (against US\$180/mcm in 2011). In order to decrease its dependency on Russia, Armenia is looking at Iran to diversify its gas imports. In 2010, 23% (0.4 bcm) of Armenian gas imports came from Iran, through the Tabriz-Sardarian gas pipeline. However, due to the international blockade on Iran, the

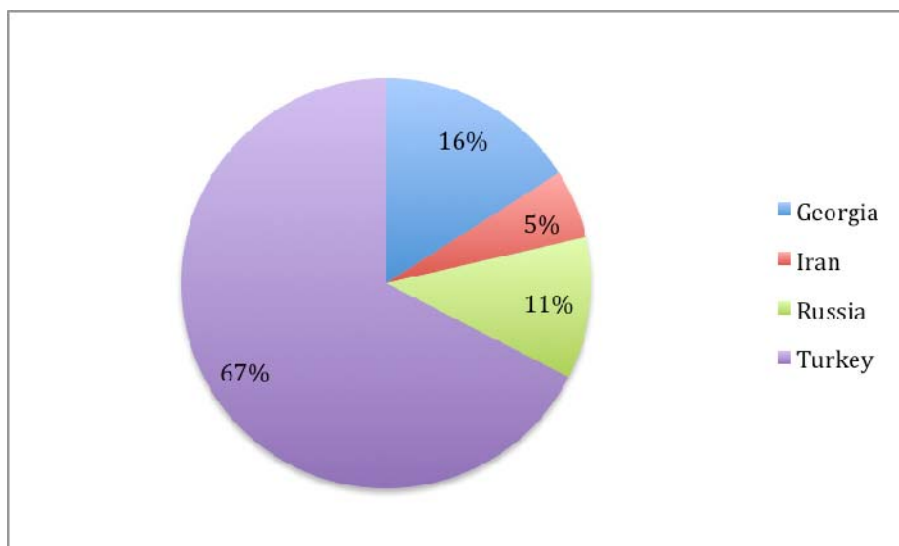
Iranian energy sector seriously lacks investment. Consequently, gas production is lower and the export potential is decreasing. Iran consumes a large part of its total gas production. In addition, high transportation costs make gas supplies to Iranian Northern neighbours less commercially viable. Most of the gas volumes delivered by Iran to Armenia and Turkey actually come from Turkmenistan to decrease transportation costs. Therefore, the growth potential for Armenian gas imports from Iran seems to be rather limited.

Armenia mostly relies on electricity production from the Metsamor nuclear plant to decrease its energy dependency. This facility was closed in 1988, following an earthquake. It was reopened in 1995 to soften the effects of the Azerbaijani-Turkish blockade. However, this nuclear plant is situated on a seismic fault and is considered as ageing and dangerous in various EU-funded and US-funded reports. The main concern is that this plant has no containment structure. Thus, the EU and the United States have called for the implementation of at least mitigation measures. After the Fukushima accident, such a facility is a threat for the whole region. Nonetheless, due to the economic blockade and increasing gas prices, Armenia has no choice but to rely on this plant to meet its energy needs. Yerevan had to delay the decommissioning of the plant further while the latter was supposed to start by 2017. To increase its energy independence, Armenia has no other choice than to build a new nuclear plant. However, the government has found it difficult to attract some \$5 billion that are needed to build such an infrastructure. Unless shale oil exploration is successful – the authorities estimated in 2005 the possible reserves to be between 17 and 18 million tons – Armenia will stay an energy-dependent country whose energy security lies on an out-dated nuclear plant.

1.3.3 Azerbaijan

Azerbaijan is in a much more comfortable situation. Despite peak oil production expected for 2013-2015, gas production should reach 54 bcm per annum by 2025. Even if local gas demand increases, most of this production will be exported to Europe. Baku can rely on safe export routes for its hydrocarbons, mostly built in the late 1990s and 2000s: the Baku-Batumi railroad, the Baku-Novorossiysk oil pipeline, the Baku-Supsa oil pipeline, the Baku-Tbilisi-Ceyhan (BTC) oil pipeline, and the South Caucasus gas Pipeline (SCP). Existing gas volumes from the giant Shah Deniz gas field are supplied to Turkey through the latter. By 2017, up to 16 bcm per annum will come on stream. In the medium term, Azerbaijan will rely on the SCP pipeline and on the Turkish network to ship these new gas volumes to new pipelines in Europe. A decision - on the chosen route - is supposed to be taken by March 2012. Four projects are now being considered: the Interconnection Turkey-Greece-Italy, the Nabucco pipeline, the South East European Pipeline and the Trans-Adriatic pipeline. In the long term, all these projects are likely to be connected to a dedicated gas pipeline through Turkey operated by Azerbaijani and Turkish state-owned companies and called Trans-Anatolian Pipeline.

In the meantime, Baku intends to diversify its gas exports. So far, it has been selling gas to Georgia, Iran (as part of a swap deal aimed at supplying the Azerbaijani exclave of Nakhchivan), to Russia and to Turkey. It now hopes to ship gas to Eastern Europe (Bulgaria and Romania) and to the Middle East (Syria). Azerbaijan is also expected to increase its role as a transit country. For the time being, it ships oil volumes from Kazakhstan and Turkmenistan to the Black and Mediterranean Seas. In the long term, Caspian gas volumes should add up to these oil exports.

Graph 1 – Azerbaijani gas exports in 2010

Despite its huge reliance on its hydrocarbon bonanza, Azerbaijan also invests in renewable energy. In spring 2011, the State Agency on Alternative and Renewable Energy Sources signed a partnership with the United Nations Development Programme to promote the development of sustainable energy. Important investments are now expected in wind energy (which has huge potential in Azerbaijan), solar energy, biomass and geothermal power.

Table 1 – Azerbaijani oil and gas exports in 2010

	Georgia	Iran	Russia	Turkey	World markets ²
Gas exports (in bcm)	1.03	0.35	0.72	4.35	
Oil exports (in million barrels per day)					0.99

1.3.4 Belarus

Like Armenia, Belarus is heavily dependent on hydrocarbon imports, mostly from Russia. This dependency is two-fold. On the one hand, Russian gas is needed as a feedstock for industry and as heat for residential consumers. On the other hand, oil products are the major export goods for Belarus. Thanks to an effective refining sector, Minsk transforms oil imports into oil products, such as gasoline for oil exports. Any disruption in its hydrocarbon imports thus has major consequences for the whole Belarusian economy.

Due to its geographic location, Belarus plays a strategic role in Russian oil and gas exports to Europe. Approximately 20% of gas sales and 30% of oil sales to European markets go through Belarus. Thanks to this strategic location, Belarus has enjoyed a relatively stable energy supply. But, like Ukraine, Minsk had to deal with continuous gas price negotiations with Russia. To solve this issue, Minsk agreed in November 2011 to transfer 100% ownership of the Belarusian gas transmission operator – Beltransgaz – to Gazprom for \$5 billion. In exchange, the Russian company reduced gas prices for Belarus from \$280 per mcm to \$165 per mcm. This deal is likely to help Minsk guarantee its gas supply from Russia. However, it also increases its dependency towards its big neighbour. In this perspective, the latter now aims at diversifying both its energy imports and sources.

The share of natural gas in the Belarusian energy mix is expected to stay flat and then to decrease slightly over the next twenty years. Upgrades of gas-fired power generations should help supporting

2 The main export markets for Azerbaijani oil are Italy, Russia and Turkey.

this political ambition. Power capacity which will be built within the next five years is expected to rely on coal and hydro. Belarus also intends to import up to 1 million ton of Azerbaijani oil in 2012 through the Odessa-Brody pipeline. Even if Russian oil supplies seem to be more stable than in previous years, this should provide more predictability to the Belarusian refining sector. As part of the Beltransgaz deal, the Belarusian authorities also expect Russia to allocate a \$10 billion credit line to the future Belarusian nuclear plant. The latter should have two reactors of about 2,300 MW and could be built by the Russian company, Rosatom. Lastly, Minsk is expected to continue investing in renewable energy, mostly biomass. In 2007, 20 million KWh was produced from biomass and waste.

1.3.5 Georgia

Georgia has very well recovered from the winter of 2006. Then, Gazprom cut gas exports to West Georgia, including Tbilisi. In order to decrease energy dependency over Russia, the Georgian authorities decided to diversify the energy mix. It heavily invested in renewable energy, mostly hydropower. Indeed, Georgia has the second largest hydroelectric resources in the world. This helped Georgia to decrease its energy dependency while exporting electricity to Eastern Europe, Turkey, and Serbia. Tbilisi plans to build three hydropower plants from 2012 onwards. These plants are expected to produce 1.5 TWh. The Georgian authorities also intend to develop wind power and are assessing the country's capacity at 2,000 MW.

In addition, Georgia plays a key role in Caspian oil and gas exports to Europe and the Mediterranean. All the major oil and gas transportation infrastructures in the South Caucasus, such as the BTC and SCP pipelines, are crossing Georgia. As part of the intergovernmental agreement on the SCP, Georgia is entitled to 5% on gas volumes being shipped through the SCP plus another 5% at a discount price. It enjoys a similar transit fee in nature for the North-South gas Pipeline, receiving 10% of the shipped gas volumes. Both transit fees cover most of Georgian gas needs.

Finally, in recent years, the Georgian authorities have subsequently liberalised the gas sector. The Azerbaijani oil company SOCAR has bought most of the assets and is now the largest player on the Georgian gas sector. It controls most of the distribution companies and has started a gasification programme of Georgian provinces. This should develop access to energy in Georgia's remote regions. One might be concerned that Georgia has shifted from energy dependency on Russia to energy dependency on Azerbaijan. However, huge investments in hydropower and energy savings campaigns make Georgia an energy model for the other EU Eastern partners.

1.3.6 Moldova

Moldova probably faces the toughest energy situation among the EU Eastern Partnership countries. Without indigenous resources and as a landlocked country, it suffers from difficult access to energy. It heavily relies on imports from Belarus, Romania, Russia and Ukraine. In addition, the most important power plant is located in the breakaway region of Transnistria. Finally, the economic crisis has prevented the Moldovan authorities from making much needed investments in the energy sector.

However, there is potential for improvement. First, in 2010, the local electricity corporation MoldlteraElectric has expressed its willingness to build a 450-megawatt gas-fired power plant in Southern Moldova. It should give independent access to power generation. Second, Moldova may benefit from its role as transit country. Indeed, the Western gas Pipeline, which supplies Russian gas to Turkey crosses its territory. Third, Moldova has been able to increase its coal imports from Ukraine. Fourth, it plans to develop in cooperation with Ukraine shale gas prospects. In statements that sound quite optimistic, the Moldovan authorities expect that this gas will come on stream by 2017.

Besides, the country may benefit from its integration into regional energy organisations. In 2009, Moldova joined the Energy Community and signed in 2011 a Plan for implementation of the *acquis* in the field of renewable energy. There is a potential in biomass, solar and energy. Being part of the Energy Community should give Chisinau access to technology and funding. In the 2020 Energy Strategy,

approved in 2007, the Moldovan authorities have put emphasis on renewable energy and energy efficiency. If Moldova is expected to continue relying on imports, this should decrease pressure on a tight energy sector.

1.3.7 Ukraine

In recent years, Ukraine has suffered from continuous gas disputes over gas prices with Russia. Despite local gas production of around 20 bcm per annum, high energy inefficiency makes gas imports critical for the industrial sector. While the latter accounts for a large base of the economy, these regular disputes have put the country's economy at risk. This systemic energy inefficiency constrains Kiev to import large volumes of energy resources, mostly coal and hydrocarbons. In addition, Ukraine suffers from an out-dated energy transportation network, which is at the detriment of both its transit role and its industrial energy supplies.

While Russia seems to be more and more likely to implement the South Stream gas pipeline, which would bypass Ukraine, Kiev may fall short of Russian gas. To face this situation, the Ukrainian authorities have passed a law aimed at decreasing the role of natural gas in the economy. As a consequence, it is assumed that gas demand will decrease over the coming decades. Ukraine may also look for alternative gas supplies. In this perspective, it expresses more and more interest to build a LNG plant on the shore of the Black Sea aimed at receiving liquefied gas volumes from Azerbaijan. Gas would be transported by pipeline to the Georgian coast on the Black Sea, then liquefied and shipped by tankers to Ukraine and Romania. While the expected start-up date – 2015 – seems to be unrealistic, the feasibility of this project has increased over the last few months. Both Georgia and Ukraine have demonstrated a strong political willingness to implement it. The difficult gas price negotiations between Kiev and Gazprom also make this project more attractive to Ukraine. Consequently, although the commercial rationale of this project is not obvious, it is more and more likely to turn into reality, given the on-going political context.

Coal and nuclear power are likely to become the main alternatives to natural gas. Nuclear- and coal-fired generation may account for more than three-quarters of energy generation over the next 20 years. Despite huge potential in renewable energy, especially, in geothermal and wind energy, this sector received less interest than fossil fuels from the Ukrainian authorities. Though, the combined installed capacity of both wind and solar power plants is rapidly increasing. Kiev hopes that, thanks to new facilities, this capacity could reach 600 MW by the end of 2012. For instance, in 2011, Ukraine initiated in the Donetsk region a wind farm pilot project with an expected capacity of 107.5 MW by late 2012. Unless shale gas exploration, likely to start in late 2012, is proven successful, increased investments in renewables seem to be critical to sustain increasing Russian gas prices.

2. OVERVIEW OF COOPERATION IN THE ENERGY SECTOR BETWEEN THE EU AND THE PARTNER COUNTRIES WITHIN THE EAP

Energy security is one of the areas of cooperation within the framework of the Eastern Partnership falling under Platform 3 Environment, Climate change, Energy security). This section of the study starts by exploring the financial support provided by the EU in the sphere of energy. This will be followed by an analysis of progress made towards each of the four core objectives outlined under Platform 3, including bilateral and multilateral tracks of relations as well as domestic and geopolitical factors which have impinged on EU's cooperation with the partner countries. This analysis will incorporate the legal and regulatory approximation which has been achieved (using mainly Ukraine as a case study).

2.1 Financial support

The six partner countries of the Eastern Partnership were allocated €600 million for 2010-2013. Out of this amount, € 175 million is to be spent on the Comprehensive Institution Building programme, €75 million for piloting regional development programs with €350 million of funds allocated for the

implementation of the EaP according to the four thematic platforms. No detailed, sector-related specifications for the financing of cooperation in energy security were provided. According to the guide for the funding of the EaP programme, it is anticipated that costs will be targeted at supporting institutional capacity building (including twinning and technical support such as TAIEX) and budget support. For example in the case of Ukraine, the National indicative programme for 2011-2013 envisages a deepening of the sectoral approach with €70 million allocated for promoting energy efficiency (divided into €63 million towards budget support and €7 million on twinning and technical assistance).

During the second summit of the EaP in Warsaw in 2011, it was decided that about €1.9 billion would be spent in bilateral and regional programmes through the European Neighbourhood and Partnership Instrument (ENPI) during 2011-13. More specifically, the EU would continue to develop energy cooperation with partner countries through the INOGATE programme³, particularly as 'energy security and diversification of supply cannot be seen in isolation and the INOGATE programme also links the EaP region to Central Asia'.⁴ (However, the linkage with Central Asia dilutes the overall amount of funding available to the EaP partners within INOGATE). At present, the EaP does not sufficiently take into account broader developments in the region, such as Ukraine's co-operation with the Visegrad group (V4) and work taking place between Moldova and Romania (see below). It was anticipated that for 2010-2011, €32 million would be available for the Regional Electricity Markets, Energy Efficiency and Renewable Energy Sources Flagship Initiative, which, amongst other things, included support for energy regulation, harmonisation of standards and legislation, activities in support of renewable energy, energy efficiency in the building sector.⁵

In 2009 the Eastern Europe Energy Efficiency and Environment Partnership Fund (E5P) was established, funded to the tune of €90 million for 2010-2013 to improve energy efficiency and extended use of renewable energy, focused on Ukraine but also extending to other partners. In addition, €63 million from the EU's Budget Support on Energy Efficiency was made available to Ukraine, the first tranche of which was €7 million for technical assistance to strengthen the institutional capacity of state agencies to implement the budget support already provided and used in 2010-2011.

In sum, it can be seen that multiple sources of financing have been made available for a number (and, in some cases overlapping) areas. While the level of funding could be improved, it is important to note that other factors equally affect the overall progress and effectiveness of cooperation.

2.2 Analysis of progress made towards the four core objectives of Platform

The EaP states are characterised by a high degree of importance for EU's energy security. For example, out of the six partner countries, there are five which are central to energy security: Azerbaijan (as a supplier of oil and potentially gas in the future, as well as being on the transit route of hydrocarbons from the Eastern Caspian), Georgia (as a transit route for Caspian oil and gas), Belarus (as a transit route of Russian oil and gas), Ukraine (as the transit route of gas and oil from Russia, Central Asia and Caspian region) and Moldova (as the transit of Russian gas to southern Europe). As Armenia is not a transit or supply country it has a minor role when it comes to cooperation with the EU in the energy sector.

³ The INOGATE programme, which includes the EU and 12 post-Soviet states, is regarded as a trailblazer for energy co-operation in this region. Launched in the 1990s, it originally aimed to promote the regional integration of pipeline systems and to facilitate oil and gas transport within the post-Soviet states and onwards to EU markets. Over the years, INOGATE's scope has been extended to cover issues in relation to electricity, renewable energy and energy efficiency. In addition, the programme encourages private investment and support from international financial institutions. INOGATE's technical secretariat is based in Kiev.

⁴ EuropeAid. Update on Eastern Partnership implementation. EaP Summit 29-30 September 2011, Warsaw. http://eeas.europa.eu/eastern/docs/2011_eap_implementation_en.pdf

⁵ Ibidem.

The importance conferred on Ukraine by the sheer volume of gas flowing from Russia to the EU, is reflected in the documentation signed between Ukraine and the EU, particularly the Memorandum of Understanding on energy cooperation signed in December 2005, the joint Ukraine - EU declaration on the modernisation of Ukraine's gas transit system, signed in March 2009 and, particularly, the communication from the Commission on security of energy supply and international cooperation entitled 'The EU Energy Policy: Engaging with Partners beyond Our Borders' adopted in September 2011.⁶

In the case of Azerbaijan, energy is by far the most important area for cooperation with the EU. Azerbaijan is an important oil exporter and its natural gas production has increased as a result of the development of the Shah Deniz offshore field. Nevertheless, the cooperation in the energy sector is hampered by Azerbaijani elites' scepticism about EU policy towards the post-Soviet space and prospects for economic integration with the EU. Moreover, within Azerbaijan, support for closer cooperation with the EU is difficult to secure because of the perceived lack of EU support for the country's territorial integrity. Therefore, the EaP is predominantly seen as a means of asserting the country's role as a major regional and international energy player and obtaining the EU's support for the development of the strategic energy infrastructure. Even though Azerbaijan has declared an interest in all objectives of Platform 3, in practice the country is highly strategic. The energy projects that are not perceived as having strong political support within the EU do not attract the Azerbaijani government's attention.⁷

The EaP offers a variety of options for cooperation ranging from deep integration into the European energy market to bilateral cooperation under separate agreements. However, without being prescriptive, the EU is keen that all partner countries enshrine the implementation of legal obligations related to the EU energy market in their national legislation. Legal approximation is regarded as a template for reforms of the energy sector and a precondition for participation in various EU initiatives and programmes, such as the Energy Community. This central role of legal approximation makes it a difficult proposition for the partner countries. Currently only Moldova and Ukraine have committed themselves to implementing the relevant directives, owing to them being signatories to the Energy Community. Armenia and Georgia, as potential members of the Energy Community, are likely to eventually do so. Azerbaijan, which is a special case owing to its importance as an alternative to Russia as a supplier of hydrocarbons, is unlikely to do so.

Energy relations between the EU and EaP states are regulated under Platform 3. The first meeting of the group working on the Platform in November 2009, approved a plan for implementation by the end of 2011, with four key objectives:

- Core objective 1: Enhancing framework conditions and solidarity.
- Core objective 2: Support for infrastructure development, interconnection and diversification of supply.
- Core objective 3: Promotion of increased energy efficiency and use of renewable resources.
- Core objective 4: Regulatory framework and approximation of energy policies.⁸

The remaining part of this section will explore the progress which has been made towards the achievement of these four objectives in the bilateral and multilateral contexts, including an analysis of the legal and regulatory approximation. However, overall the multilateral track plays a relatively minor role. Between 2009 and 2011 there were five platform meetings in the format EU27+6, in which energy relations between partner countries and the EU were discussed. However, little was achieved other than noting progress towards the achievement of key objectives.

6 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0539:FIN:EN:PDF>

7 R. Shirinov (2011) 'A Pragmatic Area for Cooperation: Azerbaijan and the EU', IPG 3/2011.

2.2.1 The first objective: Enhancing framework conditions and solidarity

As regards the first key objective, representatives of all participating countries generally perceive energy security in terms of the security of supply to their respective countries. At the same time, there has also been some willingness to discuss specific projects to integrate the work of partner countries. This, however, has failed to gain traction as there was no mechanism within the EaP which would allow the partners to work together in this way without excluding anybody. (For example, consensus was difficult to achieve as Armenia and Belarus tended to take opposing positions.)

As a result, the implementation of the first key objective was postponed indefinitely. This is despite the fact that, for example, an agreement on some sort of early warning mechanism triggering a rapid response to energy supply crises was deemed critical (see below).

2.2.2 The second objective: Infrastructure development, interconnection and diversification of supply

Under the second objective are issues related to the integration of Gas Transportation Systems (GTS) of partner countries into the planned EU integrated gas supply system, which will come into existence in 2015. However, the EU makes discussion of such proposals with the partner countries conditional upon harmonisation of their energy legislation with the relevant EU regulations. Yet, both Ukraine and Moldova have failed to implement the second energy package, not to mention the third, which is of vital importance to the EU.

In the context of the implementation of the second energy package an important task of the Moldovan government is the physical interconnection of the national gas pipeline system to the Romanian system, the interconnection Ungheni-Iasi, with the possibility of pumping natural gas in both directions. The importance of this interconnection has been discussed for over a decade. The energy crises in January 2006 and 2009 have shown the consequences of an energy shortage and reinvigorated the need to strengthen energy security of Moldova. Although the government promised at the end of 2010 that construction works would start in 2011, so far only feasibility studies have been prepared, the proper work being planned for 2012. The slow pace of construction work on the Ungheni-Iasi gas pipeline seems again to be conditioned by the fear of Gazprom losing its monopoly position on the Moldovan market. The EU allocated €7 million (€3 million to Moldova, and €4 million to Romania) out of the necessary of €20 million through the Joint Operational Programme Romania – Ukraine – Republic of Moldova.⁹

Some discussions have taken place between the EU and the Eastern partner states (Ukraine, Azerbaijan and Georgia) regarding the diversification of oil supplies to countries to Central and Eastern Europe. A basis for this already exists, as enunciated in a Communication from the Commission which stated that 'with respect to the oil sector, the implementation of the Euro-Asian Oil Transportation Corridor is of high priority and would offer a direct access to Caspian crude oil'.¹⁰

2.2.3 The third objective: Promotion of increased energy efficiency and use of renewable resources

The third objective is strongly supported by the EU but it attracts a notably lower level of interest in the partner countries, despite their overall inefficiency in use of energy and/or an interest in decreasing their energy dependency on Russia.

8 Core objectives and Work Programme 2009-2011, as adopted on 5 November 2009

9 I. Muntean, 'The first consequences of the third energy package for the Republic of Moldova', the Eastern Partnership Community (Dec 2011),

10 Communication from the Commission 'The EU Energy Policy: Engaging with Partners beyond Our Borders', COM/2011/0539 July 2011, p.6.

In Ukraine, for example, the EU is prepared to continue financing the development and implementation of the 'Law On Energy Efficiency' along with reform and improvement in the operational effectiveness of the State Agency for Energy Efficiency, regulators and other regional development initiatives related to energy efficiency and renewable energy, as outlined in the Covenant of Mayors (see below). Other initiatives include that of the Swedish presidency related to energy efficiency programs in Eastern Europe with a pilot project in Ukraine, as well as projects funded by the European Bank for Reconstruction and Development (EBRD) and other international financial institutions and donors.

However, at the municipal level in the partner countries there is a higher level of interest. The Covenant of Mayors, a European Commission initiative, is a commitment by signatory towns and cities to go beyond the objectives of EU energy policy in terms of reduction in CO2 emissions through enhanced energy efficiency and cleaner energy production and use. This has provided a very useful instrument for engagement at the sub-national level in the EaP partner countries. For example, despite a lack of support from the national government, the city of Tbilisi has been keen to promote energy efficiency benefitting from exchanges within and support from the Covenant of Mayors.

2.2.4 The fourth key objective: Regulatory framework and approximation of energy policies

The fourth objective is finding its strongest expression in work undertaken as a result of membership of the Energy Community. In general, however, progress is turgid. This reflects the high degree of politicisation of the energy sector with a number of strong domestic and regional players uninterested in changing the status quo. In Ukraine, for example, a new law 'On fundamentals of the functioning of the natural gas market', developed on the basis of the second EU Gas Directive was adopted on July 8, 2010 only under pressure from the EU, as a prerequisite for Ukraine's membership in the Energy Community. However, its implementation is being blocked by powerful domestic interests. Notwithstanding its overall interest in integration, Georgia is also being slow to adapt to European energy legislation owing to increased pressure on the government by owners of vertically integrated energy companies, who object to the prospect of their businesses being broken up and loss of control over the market. Azerbaijani SOCAR, which is a vertically integrated company, may be in a position to further delay the 'Europeanisation' of Georgia's energy sector if it ends up acquiring the 24% Georgian Oil and Gas Corporation, as it is at present aiming to.

At the same time, there is evidence of Russian efforts to impede (or be able to do so) partner countries approximating the legal and regulatory requirements of the EU. For example, 50% of the shares and management positions in Moldovagaz, the energy supplier in Moldova, are held by Gazprom representatives; furthermore, 4 of the 6 members of the Supervisory Board, and 4 of 9 Board members are from the Russian company, (whereas according to the Statute, there should be no more than 3 Gazprom representatives on the Supervisory Board and the Board respectively).¹¹ Further evidence of Russian influence is reflected in the signing of the so-called Kharkiv agreements between Ukraine and Russia and continued negotiations with Gazprom, in which discussions related to concessions in the price of gas requirements are explicitly related to demands that Ukraine renounce its membership of the Energy Community. In the case of Moldova, Russia halted the new gas contract negotiation in December 2011. As one of the conditions, the Russian government demanded that Moldova gives up its intention to implement the European Union's third energy package,¹² as it would directly impinge on Russia's interest in the energy sector in Moldova.

As has already been noted, during 2009-11 Moldova and Ukraine joined the Energy Community having satisfied the initial requirements to align national legislation with European energy legislation.

11 <http://www.moldovagaz.md/menu/ru/about-company/structure>

12 I. Muntean I., The first consequences of the third energy package for the Republic of Moldova, the Eastern Partnership Community (Dec 2011), <http://www.easternpartnership.org/>

According to the procedural rules laid down in the Treaty establishing the Energy Community in 2005, Ukraine and Moldova have twelve months to adhere to the basic principles on the internal electricity market and provide conditions for access to cross-border transmission of electricity. European legislation also requires Ukraine and Moldova to make changes to its laws, in particular, to create conditions for a competitive electricity market, to ensure a uniform approach to pricing for all categories of consumers, to ensure the price of electricity allows for necessary investment, and ensure the implementation of appropriate environmental standards in the generation of electricity. However, Ukraine's membership in the Energy Community is characterised by slow progress (see box 1). In addition to numerous domestic problems with implementation, in both countries Russia currently attempts to dissuade them from implementing the third energy package in exchange for lowering the gas price, which, as of December 2011, exceeds \$400 per 1,000sqm for Moldova and Ukraine.

Box 1. Ukraine in the Energy Community: Progress in Legal Approximation

The reforms required as part of membership of the Energy Community are only possible through strict policy of alignment of prices for all categories of consumers, the privatisation of state electricity generating companies and attracting foreign investors. While some laws have been amended, such as, for example, 'On Production Sharing Agreements, On Electricity, On Principles of Natural Gas Market Operation (17 July 2011), insufficient reform has taken place to address the points above. In particular, the issue of integrating Ukraine into a single European energy transmission system (ENTSO-E), which also requires considerable investment, remains unresolved. Financing through the EaP could support the implementation of ambitious plans to expand exports of Ukrainian electricity to the EU. However, this is only possible once Ukrainian power supplies have integrated with ENTSO-E, which in turn requires compliance with EU legislation and will be capital intensive. Environmental issues, primarily the reduction of harmful emissions and CO₂, waste recycling thermal power plants, the reduction of environmental pollution by service companies remain unaddressed.

At present, the law 'On principles of the natural gas market in Ukraine' inadequately takes into account requirements of membership of the Energy Community as regards creating a competitive market. Through political lobbying, Ukrainian oil and gas companies block an open market in gas owing to a number of factors including: contracts which preclude the re-export of Russian gas origin, regulated prices for gas domestic production besides endemic corruption.

At the same time, access for European companies to the Ukrainian market is also hindered by Gazprom, which appears to regard post-Soviet states as 'its own' territory, making European companies reluctant to enter into competition with Russian companies in the post-Soviet states.

In sum, it can be concluded that despite a promising start, and the availability of considerable EU funds, the degree of progress which has been achieved under Platform 3 in terms of energy security has been highly circumscribed. This appears to be attributable to three factors: first, the lack of political will in the partner countries, in which vested interests often have little incentive to conduct necessary reform in pursuit of approximation, as it will in many cases harm their own commercial interest; second, the EU's reluctance to delve into the geopolitics which surrounds the transportation of hydrocarbons and the subsequent prioritisation of bilateral with Russia (over the heads of the transit countries) in order to ensure those supplies, and, third, Russian commercial and political interests which in the 'shared neighbourhood' aimed at retaining levers of influence in the post-Soviet space.

2.2.5 Overview of EU-EaP cooperation to date

Even though all of the partner countries need to build their capacities to undertake the necessary structural reforms and declare a readiness to adapt their regulatory frameworks to EU standards, their readiness, aspirations and progress vary considerably, even with regard to specific aspects of cooperation on energy.

Undoubtedly, geography and geopolitics impose strong limits on the effectiveness of bilateral cooperation and the multilateral track with regard to energy. The six countries do not form a contiguous geographical area with three of them being located in Eastern Europe and a further three in the south Caucasus. This makes it, for example, difficult to agree and implement the EaP Flagship Initiatives (see above) as openly acknowledged in the Warsaw Declaration of September 2011. Therefore, even though the EaP encourages regional cooperation on energy issues by various means, progress within the multilateral framework has proved particularly arduous to achieve to the extent that it may be seen to hamper rather than facilitate progress.¹³

All the governments of the EaP countries declare the interest in cooperation with the EU on energy issues. However, one should not simply equate these declarations at a political level with a support and demand for domestic change as such. One of the features of the post-Soviet regimes is intertwining of the political systems with the control of the energy sector. It is worth noting that the ENP and EaP were launched at a considerably later stage of the post-communist transformation than in East-Central Europe. This allowed time to consolidate a range of vested interest in the status quo in their respective energy sectors. Indeed, in many countries, the energy sector has become a beacon for the current political regimes. At present the formal, government-led cooperation with the EU conceals a variety of vested interests and stakes in blocking reforms by governmental and business actors. In view of the elusive interest in systematic reforming the energy sector from the governmental level, wide-ranging, strategic and sustained engagement with the EaP countries to promote energy security is required.

It is clear that for the 'frontrunners', such as Moldova and Ukraine, the participation of EaP partner countries in the Energy Community and other EU energy-related initiatives has not yet fulfilled the expectations. The implementation of reforms in Ukraine and Moldova, required under the Energy Community, have undoubtedly been hindered by businesses engaged in non-transparent energy management who were wary of losing control and fearful of increased competition from European companies and the reaction of monopolistic suppliers (i.e. Russia). Indeed, failure to reform their internal energy market in accordance with the legal norms of the EU, in line with their obligations as members of the Energy Community threatens to undermine the whole process of energy integration which may lead to their exclusion from the Community, which may in turn impact on how energy issues are dealt with within the EaP.

Yet there are also geopolitical factors at play which put further impediments in the way of reform. The EU has chosen to largely overlook these factors. In 2007, a Communication from the Commission on energy transportation in the Black Sea region stated that 'the Commission is not intending to offer a new Black Sea strategy, since a broad EU policy towards the region has already been formulated in the pre- strategy towards Turkey, the ENP and the strategic partnership with Russia'¹⁴. This stance is being reaffirmed with the EaP: the EU does not seem intent on offering the countries in the EaP a strategy customised to their specific needs. A corollary of this is that while cooperation has been intensive and wide-ranging, the actual effectiveness has been relatively low within the EaP.

2.2.6 Progress on an Early Warning Mechanism with Russia

After the January 2009 gas crisis, the European Commission and Russia intensified their discussions on a bilateral early warning mechanism.¹⁵ A Memorandum on an Early Warning Mechanism in the Energy Sector within the Framework of the EU-Russia Energy Dialogue was signed in Moscow in November

13 K. Wolczuk (2011) '[Perceptions of, and Attitudes towards, the Eastern Partnership amongst the Partner Countries' Political Elites](#)', Eastern Partnership Review, No 5, Estonian Centre for Eastern Partnership.

14 http://ec.europa.eu/world/enp/pdf/com07_160_uk.pdf (page2)

15 http://ec.europa.eu/energy/international/security_of_supply/cooperation_en.htm. See also M.Gonchar, A.Duleba, O.Malynovsky (2011) Ukraine and Slovakia in a post-crisis architecture of European energy security. Prospects for transport of hydrocarbons and bilateral cooperation, Bratislava, pp. 103-104 .

2009. The Memorandum foresees the implementation of joint measures to prevent and respond quickly in the event of any likely situations of emergency in the energy sector, including disruptions of gas supply. According to the comments of the Minister of Energy of Russia, who signed the Memorandum from the Russian side, '[Memorandum] establishes a formalised communication technology of the Russian Federation and the European Union to notify each other about possible risks, their concerns, and launches mechanism for coordinated actions'.¹⁶ The creation of a multilateral early warning mechanism with the framework of the EaP was discussed in January 2010 by the Foreign Ministers of Ukraine and Spain (during the Spanish presidency of the EU), and later that month during the Spanish-Russian talks in Moscow. In general, Russia was constructive regarding the creation of such a mechanism on a trilateral basis (supplier - transit - consumer) as evidenced by the statements of Russian Foreign Minister Sergei Lavrov: "We are convinced that a solution must be sought, including (...) early warning on a tripartite basis with the main producer, transit and (...) main consumers. We are convinced that the solution must be sought on the basis of balancing the interests of all sides of this triangle¹⁷."

As of the time of writing, the only proposal is to create an early warning mechanism between the EU and the EaP partner countries which would coexist with the bilateral mechanism already established between the EU and Russia. However, an early warning system should be built given the potential benefits which could accrue to all parties, as outlined in the Core objectives and Work Programme 2009-2011 (namely: 'Encourage the development and implementation of mutual energy support and security mechanisms, including early warning mechanisms and joint security actions').

The energy projects that are not perceived as having strong political support within the EU do not attract the Azerbaijani government's attention.¹⁸

16 See "Russia and the EU signed a Memorandum on an Early Warning Mechanism in the Energy Sector", News of Ministry of Energy of Russia Federation, 16 Nov2009.

17 See http://www.mid.ru/brp_4.nsf/0/0A30BED7C473249DC3257655002B6F21

18 R. Shirinov (2011) 'A Pragmatic Area for Cooperation: Azerbaijan and the EU', IPG 3/2011.

3. COMMON INTERESTS AND OPPORTUNITIES FOR FURTHER COOPERATION

In this final section an overarching analysis is proposed, leading to the identification of objective current and potential areas of common interest and to the formulation of policy recommendations for cooperation with the EaP countries. The analytical framework that is proposed draws on the concept of energy vulnerability as developed in the energy security literature.

3.1 Understanding energy security

The concept of energy vulnerability is well-defined and indices have been developed to quantify it in peer-reviewed literature. Gupta (2008) and Gnansounou (2008) are notable contributions. A critical review of those approaches and a strengthening of definitions and theory are given in Christie (2009) where energy vulnerability is defined as:

“The extent to which adverse exogenous events with respect to a country’s energy supply system may detrimentally affect the welfare of the country’s population and/or the integrity of the State, its territory or its institutions.”

It is essential in this context to further distinguish between short-term and long-term challenges to energy security, and to also distinguish between risks and threats. Christie (2009) defines risks and threats as mutually exclusive categories of potential adverse events, whereby threats arise from hostile intent, whereas risks do not. This framework is summarised in Table 3.1 and is especially suited to the analysis of the security of supply of fossil fuels from the point of view of a net importer state.

Table 3.1 – Typology of short- and long-term risks and threats to energy security

	Risks	Threats
Short-term	Accidents, natural disasters affecting CI	Supply cut-off (supplier or transit state)
	Insufficient stockholdings / storage	Blockade/interdiction (rival/enemy state)
	Price spike due to demand-supply gap	Sabotage/attack on CI (e.g. non-state actor)
Long-Term	Insufficient investment production/transport	Strategic foreign takeover of energy assets
	Unsustainable demand in importer states	Foreign and security policy concessions
	Unsustainable demand in exporter states	
	Insufficient reserves in one exporter state	
	Globally insufficient reserves (e.g. "peak oil")	

Note: CI = critical energy infrastructure

Both short- and long-term threats are of particular relevance for the EaP countries, as noted in Sections 1 and 2. Supply cut-offs by the supplier have affected most EaP countries at various times, and both takeover attempts and foreign and security policy concessions have been observed, notably but not exclusively in the case of Ukraine. Long-term risks are also important. Low energy efficiency is in evidence in all EaP countries. It raises their import dependence, thus increasing both risks and threats, both short-term and long-term. In the case of Russia, high domestic consumption (roughly two thirds of Russia’s gas production is used inside Russia) eats away at the country’s export potential. Insufficient investment in infrastructure is also a general risk throughout the region – even leading to serious concerns about Russia’s future export potential a few years ago, see e.g. Riley (2006). A more recent analysis would show that Gazprom’s enormous revenues of recent years provide it with a considerable

margin of manoeuvre, thus mitigating that particular risk. On the other hand, the lack of funds for the modernisation of Ukraine's gas transmission system is a well-known and as yet unsolved problem.

In general, energy vulnerability can be assessed both quantitatively and holistically by focusing notably on ten variables that can be grouped as follows: macroscopic (e.g. overall energy intensity of the economy), diversification (long-term security), resilience (short-term security), and foreign and security policy aspects (relations with suppliers, with third parties).

1. Macro: Import dependence ratio (% of demand covered by net imports)
2. Macro: Energy intensity of the economy (per unit of GDP)
3. Macro: Share of the product (e.g. oil, gas) in the overall energy mix
4. Diversification: Diversity of import sources
5. Diversification: Diversity of transit routes
6. Resilience: Storage capacity & actual stored volume
7. Resilience: Interconnection of transmission systems
8. Resilience: Short-term substitutability (e.g. based on dual-fuel facilities)
9. Foreign and security policy: relations with supplier countries
10. Foreign and security policy: risks or threats due to third parties

While some authors attempt to develop a single index that would 'chain together' some of these variables (and more), a more flexible approach consists in creating 'score cards', separately for each main energy product (i.e. oil, gas, coal), with brief quantitative and qualitative indicators for each variable. Adequate quantitative economic models can also be used to simulate the effects of specific scenarios or events, e.g. a supply cut-off or a spike in prices of given magnitudes. (Such assessments should of course be classified.)

The score card approach also enables a bird's eye view of potential areas for public policy intervention as well as for cross-border cooperation.

3.2 Energy vulnerability assessment: natural gas

3.2.1 Ukraine, Belarus and Moldova

In line with the macroscopic and diversification variables listed in the previous section, the three EaP countries should seek to reduce their dependence on Russian supplies by raising energy efficiency, raising domestic production where feasible (e.g. shale gas), developing new sources of imports (new routes are only useful if it is for a new source), and possibly reconsidering the role that natural gas should play in the energy mix. Better interconnection would be a key measure for higher resilience to short-term threats, and diversification of import sources would be an important strategic step towards greater security. Each of these key policy areas is discussed in this sub-section.

Energy efficiency

EaP countries have shown limited interest in energy efficiency policies at the national level. However, as noted in Section 2.2.3, cooperation is stronger at the municipal level. This suggests that a shift in focus (and resources) towards the sub-national (regional and municipal) levels could perhaps yield better results on a bottom-up basis. However high-level political engagement should continue at the national level. The key element in that discussion is to look at energy prices and taxation, as clear price signals are what is ultimately required for significant shifts in energy demand, and such policies are at the national level. The case of Ukraine's stop-go reform of domestic gas prices has shown that conditionality can be useful, i.e. by creating linkages between energy price reforms and other areas of cooperation.

Domestic production

According to EIA (2011), shale gas resources are significant in some regions of Europe. Table 3.2 presents the estimated technically recoverable shale gas resources for four countries in the region, alongside their 2009 levels for production and consumption of conventional natural gas. Poland is clearly in the lead in the region, both in terms of absolute volume of shale gas resources and in terms of how many years of domestic consumption could be covered with those resources. In the case of Ukraine the resources are relatively sizeable, but they only represent around 27 years of consumption (at the level of 2009). This strengthens yet again the case for Ukraine to consider more ambitious demand-side policies if it wishes to seriously modify its current dependence patterns. These are early days though, as the discoveries are recent and production has yet to begin. Challenges remain at the administrative level, e.g. licencing rules. On the other hand, geological assessments will continue in the region, and resource estimates will be adjusted accordingly. There is still considerable uncertainty about the level of possible resources elsewhere in the region, e.g. in Romania and Moldova. Also, as Poland is emerging as a front-runner and could have substantial resources also for exports to its neighbours, it would seem most attractive to foster regional cooperation in order to share best practice in terms of geological assessments and technical know-how, and in order to foster an open and competitive business climate and an efficient regulatory framework. In that context one could consider whether a Flagship Initiative devoted specifically to unconventional gas should be created in the context of the Eastern Partnership, and what funding could be allocated to it. In that context, cooperation with the United States – which heralded the shale gas revolution a few years ago – would be essential. Poland and (perhaps) Romania should be encouraged to take the lead from the EU side.

Table 2 – Shale gas resources in selected European countries

	Production (bcm)	Consumption (bcm)	Import dependence	Technically Recoverable Shale Gas Resources (bcm)	Years of consumption (2009 level)
Poland	5.9	16.4	64%	5295.1	322.4
Turkey	0.8	35.1	98%	424.7	12.1
Ukraine	20.4	44.2	54%	1189.3	26.9
Lithuania	0.0	2.8	100%	113.3	40.0

Source: EIA (2011), author calculations

System resilience

Concerning resilience (to short-term threat supply cut-offs), the goal should be to raise the resilience of each gas transmission system by interconnecting with neighbouring transmission systems – exactly what the New Member States in Central and Eastern Europe are in the process of achieving with new interconnectors, partly thanks to EU co-financing (notably EEPR and TEN-E funds). This success story illustrates how well-chosen levels of co-financing overcome the hurdle of market fragmentation. Similar (i.e. relatively high) levels of co-financing for new interconnectors between EU and EaP countries should prove equally successful in principle, although the case of the Romania-Moldova interconnector discussed in Section 2.2.2 demonstrates how conflicts of interest arising from Gazprom shareholdings can slow down a project even though it is clearly in the national interest. An assumption is made here that one should increase the resilience of the transmission systems of the EaP countries against possible Russian supply cuts – rather than only increasing the resilience of EU transmission systems. That assumption could for instance be justified in terms of foreign policy priorities, e.g. a general willingness to support the independence and sovereignty of EaP countries.

With that assumption in mind, higher levels of EU co-financing should be made available for such projects, but this should be made conditional on the unbundling of gas transmission systems (in particular from the supplier, i.e. from Gazprom) and on an implementation of the principle of Third Party Access. Those are the crucial elements from the Acquis which should be prioritised, whilst avoiding excessively procedural approaches to non-essential elements. After all, one should not expect countries that have no clear prospect of EU membership to unilaterally adopt entire packages of legislation that were designed for existing Member States who, in the main, face rather different challenges. A more realistic course of action is to recognise that EaP countries may need to be able to pursue more 'nationalistic' policies given the on-going threat of encroachment on their sovereignty, and that money spent on decreasing the energy vulnerability of those countries represents a wise strategic investment for Member States.

Diversification

Turning now to the question of strategic diversification, the core issue is that some Member States have supported Gazprom's "transit avoidance" projects (Nord Stream and South Stream). As a result there is a direct clash of interests between a number of Member States and some of the EaP countries. This problem is further entrenched by the absence of any single actor, political or commercial, who could federate the interests at stake. There is currently little scope for the first-best policy option, which would be to regulate strategic investments in transit infrastructure at a pan-European level, i.e. EU, EaP, and Russia together, according to commonly-agreed criteria of economic efficiency, and with due regard for the energy security of all countries. This could be based, e.g., on open competitive tendering for cross-border pipeline projects, rather than on strategically selective projects that entrench win-lose solutions between stronger and weaker states.

While this type of first-best solution may seem a distant prospect in light of recent experience and existing interests, political actors at both the EU and Member State levels should consider it, e.g. as part of longer-term strategic energy policy reflections. In many ways this suggested solution is merely an extension of existing efforts to reach out to both EaP countries and Russia in the field of energy while encouraging a greater recourse to open and competitive markets.

For the near-term, it is worth noting the structural shift that has gradually unfolded thanks to liquefied natural gas. In light of greater interconnection within Central and Eastern Europe and due to more favourable relative prices, the business case for new LNG terminals is often favourable. From an energy security perspective there is a good case for public co-financing (both EU and national). System resilience (in the face of supply cuts) can change radically with the addition of new entry points for supplies. Furthermore an LNG terminal is typically a more rapid path towards achieving lower energy vulnerability, with the added economic benefit of attaining higher bargaining power with pre-existing suppliers. Moldova and Belarus are landlocked so any workable solution would have to include at least one foreign partner, Romania and (most likely) Poland, respectively. Ukraine has its own plans for an LNG terminal on the Black Sea, with Azerbaijan playing a role as a key supplier, see Section 3.2.2.

LNG and unbundling: lessons from the Baltic States

Some similarities exist between the three Baltic States and the three EaP countries of Eastern Europe. They are all entirely reliant on Russia for natural gas supplies, typically from separate cross-border pipelines, and have little or no interconnection to one another. System resilience is thus relatively low in each case, and bargaining power with respect to Gazprom is limited, and is further reduced in most cases due to direct ownership stakes of Gazprom in their main gas companies. Also, in spite of common challenges and a shared history, both the Baltic States and the three EaP countries do not collaborate easily on major energy infrastructure projects. In the case of the Baltic States, an external observer would readily support a shared LNG terminal and two interconnectors for the three countries as a collaborative and cost-effective way of boosting security of supply. Recent developments suggest that Lithuania might choose to go it alone – and thus not be dependent on the timely construction of the

necessary interconnectors and on risks of coordination problems and delays connected to a shared LNG terminal. It is also to be noted that Lithuania shall proceed with full unbundling (ownership unbundling) of its transmission system, in spite of objections from Gazprom and from E.ON which, together, have dominant stakes in the gas companies of all three Baltic States. Lithuania's LNG terminal is planned to have enough capacity to replace all of its current imports from Russia. Estonia is now considering a similar policy, with essentially the same components, i.e. unbundling and its own LNG terminal. Last but not least, secondary trading should develop in the region with Finland.

The Baltic experience reinforces the conclusion that even bilateral cooperation between good neighbours is challenging when it comes to large-scale energy infrastructure projects. More importantly it offers a blueprint for a radical shift away from traditional patterns of dependence: ownership unbundling and diversification of sources based on LNG.

3.2.2 Georgia, Armenia, and Azerbaijan

From the EU perspective the South Caucasus is mainly of interest as a corridor linking Azerbaijani resources (and perhaps one day Central Asian resources), through Georgia, and onto Turkey and the Black Sea. Energy efficiency is also an area of some interest in the region (in this case including Armenia), although progress on this issue is far less critical for EU interests than in the case of Ukraine, Belarus, or Moldova. As for production, as Georgia can source all of its needs from Azerbaijan and Azerbaijan is assumed to be a benign regional energy power, there is less urgency in supporting the development of unconventional resources than in Eastern Europe. The analysis in this section therefore focuses exclusively on the question of diversification, both from the EU perspective and from the perspective of EaP countries.

Further cooperation between EaP countries in the area of natural gas is emerging as Ukraine is planning an LNG terminal on the Black Sea which could source some of its imports from Azerbaijan (shipped from Georgian ports). The two countries announced that they would sign an agreement to form a joint venture for LNG supplies in January 2012, see NewsAz (2012). This project comes in addition to the diversification of export destinations and export routes for Azerbaijan that were highlighted in Section 1.3.3. LNG or CNG (compressed natural gas) shipments to Romania and/or Bulgaria are also under consideration, alongside piped gas exports to Turkey. All of these export options involve Georgia as a transit country, relying on Georgian ports in the case of LNG/CNG shipments. There is therefore a strong mutual interest all along the supply chain, naturally leading to multilateral cooperation between the countries involved. As the Russian Federation shows no sign of wanting to drop the South Stream project, the pattern that emerges once again is that countries that wish to diversify away from Russia are more likely to do so, and are more likely to be successful in doing so, by opting for sea-bound supplies, mainly LNG, but possibly CNG in certain cases. Larger continental European importer states as well as Russia, by contrast, mainly stick to the 'old fashioned' long-term stability of large cross-border pipeline projects.

Box 2. Shale gas and the environment: battle lines from Dimock to Sofia

The key questions from the environmental perspective are as follows: does hydraulic fracturing (the main technique used to produce shale gas) lead to contamination of drinking water; and what is the carbon footprint of shale gas production.

The first set of questions was the main focus of the 2011 amateur documentary film Gasland which rapidly became the central reference point for anti-fracking campaigners. In reality, Gasland revealed little that had not already been addressed by state authorities. Much of the US discussion has centered on Dimock, a small township in Pennsylvania. Already in November 2009 the state of Pennsylvania had found that the Cabot Oil and Gas Corporation had "caused or allowed the unpermitted discharge of natural gas" into groundwater, and that this had occurred, not due to hydraulic fracturing (which occurs deep in the ground, far below groundwater levels), but due to "insufficient or improperly cemented

casing” at several wells. This type of environmental risk is neither new (all oil and gas wells need proper casing to prevent oil or gas seeping into the ground) nor at all difficult to overcome. An agreement was reached, see Pennsylvania (2009), whereby the company would upgrade the casings of existing wells, submit the casing and cementing plans for new wells to the authorities in advance of new drilling operations, and organise and finance all necessary replacement solutions for water supply to residents. The debate at the scientific level is perhaps best encapsulated in Osborn et al. (2011). Its authors sample drinking water from 68 private water wells located close to shale gas production sites. Of those that show high levels of methane, all but one are within 1000 meters of the nearest gas well. Crucially, the authors find no evidence of contamination from the pollutants that are used for the hydraulic fracturing (fracking) process, the central worry portrayed in Gasland. However they do show that the gas detected in the water wells originates from the gas extraction process, not from other (e.g. natural) sources. Only two explanations are consistent with these observations: faulty casings along gas wells closer to the surface, as occurred in Dimock, or some of the gas released deep underground by the fracking process has seeped all the way up (hundreds of meters) to groundwater levels. As Osborn et al. (2011) note, comprehensive (and compulsory) data collection would be helpful in order to strengthen understanding. The second set of environmental questions concerns the carbon footprint of shale gas extraction. Howarth et al. (2011) generated much controversy with their early finding that the footprint of shale gas is as bad as or worse than that of coal. More recent research by Jiang et al. (2011) leads to different results: the footprint of shale gas is found to be only marginally higher than that of conventional natural gas, comparable to that of imported LNG, and much lower than that of coal.

In Europe the political debate on the environmental impacts of shale gas took a predictable turn. Shale gas represents a substantial threat to established (“incumbent”) energy interests, and it was to be expected that special interests would seek to generate political pressure to protect existing market shares. The Bulgarian case is telling. Shale gas exploration was abruptly banned by government decision on 18 January 2012, see Reuters (2012). One of Bulgaria’s leading newspapers, Trud, slammed the decision on 2 February 2012, attributing resistance to shale gas to the “Russian Residence” (i.e. the Russian intelligence service) and likening shale gas protests to “anti-American and anti-imperialist activities organized by the Party and Komsomol organizations of students and workers from the Cold War”, see Trud (2012). The article goes on to describe how entrenched domestic interests went along with this general movement and supported the ban “without arguments”, and “against the national interest”. The thesis presented in the Trud article was confirmed, if in more cautious language, by Bulgaria’s Energy Minister, Traicho Traikov on 16 February, see Novinite (2012), where he stated: “I shall not be pointing a finger at anyone, but let me say who is interested in all of this - it is the defenders of the status quo”. He further clarified that shale gas “is a precious resource for achieving Bulgaria's energy independence and if we can use it safely, I do not see why not”, and indicated that the debate on shale gas will resume.

3.3 Energy vulnerability assessment: crude oil

In the EaP countries, as in EU Member States and in most other countries in the world, the overwhelming share of demand for oil products comes from the transport sector. The transport sector is in turn almost exclusively reliant on oil products – hence the notion that oil is the strategic commodity par excellence.

Crude oil is traded on a global market, with strong possibility for arbitrage that imposes strong price convergence. As a result, security of oil supply is usually analysed very differently from security of gas supply. For countries that have access to the sea, targeted supply cut-offs have very weak effects as substitute sources are readily available (though with a premium). Global demand and supply developments ultimately drive the price, however, leading to global rather than regional price shocks as in 1973, 1979, and 2008. It is also worth mentioning that significant oil price shocks are systematically

followed by rather severe recessions, an empirical fact that was confirmed once again in 2009. While the 2009 crisis has rightly been seen mainly as a financial crisis, an often overlooked fact is that the oil price spike of 2008 almost certainly made things much worse.

Oil security is traditionally attained by ensuring sufficient upstream investment, at home if relevant, and abroad, and by making sure that supply routes are many, and are safe. Demand-side developments and policies have overwhelmingly focused on increasing efficiency, i.e. higher mileage per litre of fuel, rather than on substitution in favour of other fuels. However the nature of the discourse has changed radically in the last 2-3 years, primarily as a response to the 2008 oil shock. For the first time there are credible prospects for alternative fuels, in particular for battery-electric cars. It seems quite feasible that one could phase out conventional cars, at least in urban areas, over the next few decades. Indeed the European Commission has expressed exactly this vision in its recent Transport White Paper, see DG Move (2011).

This makes good sense. The general consensus among energy experts is that the world is running out of cheap oil. The IEA only manages to project an increased global production of liquid fuels over the next couple of decades by including gas-to-liquid technologies, unconventional oil (e.g. tar sands), and conventional production from fields that have yet to be discovered, see IEA (2012). Concretely, the world will not run out of liquid fuel, but it is running out of cheap conventional oil. Prices will therefore remain high on average, and violent price increases of the kind seen in 2007-2008 could happen again. The time for preparing a comprehensive shift away from oil has come.

On the other hand, as this transition may take a couple of decades to be achieved, the regional oil trade will continue and will be subject to somewhat similar geopolitical positioning as in the gas trade. Three of the six EaP countries are landlocked and most of them depend overwhelmingly on Russian oil, mostly delivered by pipeline. This pattern of entrenched, infrastructure-related dependence is similar to that found with natural gas. Prices are also not always in line with international prices: country-specific price discounts (as compared to the global average price) have been a component of Russia's external oil policy, as in the case of natural gas (as compared, e.g., to the German border price). A further reason to be concerned about Russian oil supplies in the region is that numerous supply cut-offs have occurred, e.g. to Belarus, but also to Member States (Lithuania, Czech Republic).

Diversification of oil supply sources

The EaP countries have shown considerably more interest in dealing with the second problem than with the first. Concerning alternative sources and routes for oil, one major development in the region was Ukraine's stop-go attempts to use the Odessa-Brody oil pipeline as a conduit for imports from new suppliers into Ukraine and further on to Belarus or Poland. The latter was the rationale for building the pipeline in the first place (it was developed by Ukraine and finalised in 2001), with a view to supplying Caspian oil to Europe without transiting through Russia. Russian oil companies exerted strong pressure to be able to use the pipeline in the other direction – as an additional export route for Russian oil delivered into Ukraine which would then be exported by sea from Odessa – and while deliveries of that nature were actually made, the pipeline was under-utilised, thus suggesting that the true motive was to systematically book capacity on the pipeline to prevent its intended use, i.e. a tactic of denial of access, see Socor (2011). The relative strength of the various actors in the region is underscored by the fact that the pipeline only recently started to be used in the intended direction – with Azerbaijani oil – after Russian oil companies had re-directed their exports to Baltic Sea ports. On the other hand the current use of the pipeline is true to the original intention and it does represent successful cooperation between EaP countries. Azerbaijan, Ukraine, Slovakia, and the Czech Republic have held talks about the possibility of shipping Azerbaijani oil through this route and onwards to Slovakia and the Czech Republic using already existing infrastructure. These developments are very positive both for cooperation between EaP countries (not only Ukraine and Azerbaijan, but also Georgia as the first transit country, and Belarus as a destination country) and for cooperation between EaP countries and EU Member States (the Czech Republic, Slovakia, and potentially Hungary, Poland, and perhaps others).

As noted in Socor (2011), these developments revive old hopes for an extension pipeline from Brody to Gdansk in Poland. Such a link between the Baltic and Black Seas would have a multiplier effect on the diversification options of the entire region.

Reducing dependence: Moving away from oil

As suggested earlier, moving away from oil is a “big idea” that is laying down roots in Western countries far more than in the EaP region. The countries of the region are of course technology followers, not technology leaders, and even in Western countries a rapid shift in favour of electric cars would take time and require substantial infrastructure adaptation. Charging pods, and possibly battery-swapping stations, are only one part of the challenge. Electric grids need to be adapted to handle more demand and, more importantly, new demand patterns. A reasonable expectation is therefore that the countries of the region would rather take a wait-and-see approach, and adopt new transport and mobility technologies and concepts once they have matured further West. That said there is no reason to delay common reflections and common work towards transforming the transport system. With the natural exception of Azerbaijan, the countries of the region have every reason to be interested notably in electric vehicles, at least in the urban context. Similarly to the discussion on energy efficiency and renewable, cooperation at the municipal level could be particularly interesting, e.g. involving front-runner cities such as Copenhagen (which has been cooperating with the company Better Place) or Paris (which is currently deploying a municipal car-sharing scheme based on a fleet of electric cars). Conversely, the deployment of vehicles running on natural gas – in a sense the response of the oil and gas industry to the challenge of electric cars – would obviously be a move in the wrong direction for the countries of the region who should mitigate their overall demand for natural gas rather than boost it by opening up new market segments.

3.4 Moving forward

In spite of the difficulties highlighted in Section 1, several examples of successful commercial and inter-governmental cooperation can be observed in the EaP region and between the region and EU Member States. This is most visible in terms of the actual and potential shipments of both oil and gas from Azerbaijan, through Georgia, to Ukraine. Ukraine can then serve as a platform for further deliveries to Central Europe as well as to Belarus and Moldova.

What may finally be emerging, if very haltingly, is a loose region straddling Central and Eastern Europe and the South Caucasus, including both EU and non-EU countries, which are gradually developing new sources and new routes for energy supplies in a manner which does not objectively contradict the established bilateral relationships between larger Member States and the Russian Federation. While the latter continues to rely on the “Russian model” of long-term bilateral integration based on bespoke pipelines and long-term contracts, the former may flourish based on interconnection and sea-based transportation of fossil fuels (both LNG and crude oil). These are potentially very positive developments, and analyses suggest that, ultimately, the EaP countries have far more to learn and far more to share with the New Member States than with countries further West, at least in terms of security of supply.

At the same time it remains in the common interest of the EU as a whole to foster greater energy efficiency, lower import dependence, the adoption of renewable energy, and transport system transformation. These are the policy objectives that everyone can in principle agree on, and this report has shown that bottom-up approaches notably at the municipal level may be a promising way forward, although price reform (e.g. using taxation) remains the most effective path for achieving changes to demand patterns.

The existing policy areas that have been identified for multilateral cooperation with the EaP countries are all justified and are all worth pursuing. Two additional areas were underscored in this report: the production of unconventional fossil fuels (in particular shale gas), and moves towards lower dependence on oil in the transport sector.

Also, a clearer recognition should perhaps be reached on the fact that some of the “hard components” of security of supply, including domestic production (including shale gas) and the development of new infrastructure (interconnectors, LNG terminals, oil pipelines) will mainly involve regional cooperation with the New Member States and will not be seen as priorities for other Member States. On the other hand, overall arrangements concerning the supply of Russian gas through traditional routes, including the need for an effective Early Warning Mechanism, need a pan-European framework that includes both Russia and the EaP countries. Some “variable geometry” is therefore necessary and justified. On the other hand, the existing instruments and processes in relation to energy security in the East (EaP, BSS, ECT, INOGATE, the Baku Initiative/Process) lack coherence in terms of what support they provide. Greater alignment and coordination is therefore essential.

Concerning relations with the Russian Federation, the fact that Russia never ratified the Energy Charter Treaty should not be taken as a definitive failure. A legal framework between all relevant parties including Russia should remain an important political goal. Such a framework, if adequately designed and implemented, could ensure that possible conflicts are dealt with on a legal, rather than on a political, basis.

REFERENCES

- Christie, E. (2009). 'Energy vulnerability and EU-Russia energy relations', *Journal of Contemporary European Research*, Vol. 5, No. 2, August 2009, pp. 274-292.
- EIA (2011). 'World Shale Gas Resources: An Initial Assessment of 14 Regions Outside the United States', Energy Information Agency of the US Department of Energy, Washington DC.
- Ghaleb, A. (2011). 'Natural gas as an instrument of Russian state power.' *Letort Papers*, October 2011.
- Gnansounou, E. (2008). "Assessing the energy vulnerability: Case of industrialised countries." *Energy Policy* 36 (10): 3734-3744.
- Greene, D. L. (2010). "Measuring energy security: Can the United States achieve oil independence?" *Energy Policy* 38 (4): 1614-1621.
- Gupta, E. (2008). "Oil vulnerability index of oil-importing countries." *Energy Policy* 36 (3): 1195-1211.
- Lussac, S. (2010). *Géopolitique du Caucase. Au carrefour énergétique de l'Europe de l'Ouest*. Paris: Technip.
- NewsAz (2012). "Azerbaijan, Ukraine to create joint LNG venture", *NewsAz*, 11 January.
- Riley, A. (2006). 'The coming of the Russian gas deficit', *CEPS Policy Brief* 116, October 2006.
- Vivoda V. (2009). 'Diversification of oil import sources and Energy security: A key strategy or an elusive objective?'. *Energy Policy*, 37 (11), pp. 4615-4623.
- Socor, V. (2011). 'Odessa-Brody Pipeline Operating On Azerbaijani Oil', *Eurasia Daily Monitor* Volume: 8 Issue: 59.

ANNEX 1. DEFINITIONS

Mt	Million ton	It is assumed that:
Mcm	Million cubic meter	1 bcm = 0.9 Mtoe
Bcm	Billion cubic meter	1 TWh = 0.08 Mtoe
TWh	Terawatt hour	
Mtoe	Million ton of oil equivalent	
MW	Megawatt	

ANNEX 2 - TABLE 1. ENERGY PRODUCTION IN 2009 (IN MTOE)

	Oil	Gas	Coal	Electricity¹⁹	Total
EU27	99.00 (15%)	154.35 (23%)	157.70 (23%)	261.55 (39%)	672.60
Armenia	0	0	0	0.50 (100%)	0.50
Azerbaijan	50.60 (77%)	13.32 (20%)	0	1.89 (3%)	65.81
Belarus	1.50 (35%)	0.18 (4%)	0	2.58 (61%)	4.26
Georgia	0	0	7.41 (91%)	0.72 (9%)	8.13
Moldova	0.01 (3%)	0	0	0.29 (97%)	0.30
Ukraine	4.20 (6%)	17.37 (23%)	38.40 (51%)	14.86 (20%)	74.83

¹⁹ As stated in the first part, electricity encompasses both nuclear energy and renewables.

ANNEX 3 -TABLE 2 . ENERGY CONSUMPTION IN 2009 (IN MTOE)

	Oil	Gas	Coal	Electricity	Total	Popula tion (in million people)	Figure per capita (Mtoe/ inhabitant)
EU27	670.20 (43%)	412.65 (16%)	259.90 (26%)	233.78 (15%)	1576.48	501	3.15
Armenia	0	1.49 (78%)	0	0.43 (22%)	1.92	2.96	0.65
Azerbaijan	3.20 (27%)	7.02 (60%)	0	1.43 (12%)	11.65	9.20	1.27
Belarus	9.30 (29%)	19.80 (61%)	0.32 (1%)	2.83 (9%)	32.25	9.64	3.35
Georgia	0.40 (15%)	1.53 (59%)	0.03 (1%)	0.65 (25%)	2.61	4.61	0.57
Moldova	0.01 (1%)	2.61 (84%)	0.18 (6%)	0.27 (9%)	3.10	3.77	0.82
Ukraine	14.18 (13%)	48.15 (44%)	35.00 (32%)	13.06 (12%)	110.39	45.70	3.15

Sources: BP, Business Monitor International, Energy Charter Secretariat, Eurostat, IHS CERA, INOGATE, International Atomic Energy Agency, US Census Bureau, US Energy Information Agency.

ANNEX 4 – TABLE 3. ENERGY DEMAND IN 2015 (IN MTOE)

	Oil	Gas	Coal	Electricity	Total	Population (in million people)	Figure per capita (Mtoe/ inhabitant)
EU27	531.44 (34%)	514.80 (33%)	259.70 (16%)	268.00 (17%)	1573.94	508.23	3.1
Armenia	0	2.25 (79%)	0	0.60 (21%)	2.85	2.98	0.96
Azerbaijan	4.85 (28%)	11.16 (64%)	0	1.46 (8%)	17.47	9.78	1.79
Belarus	7.40 (24%)	20.07 (65%)	0.20 (0%)	3.14 (10%)	30.81	9.44	3.26
Georgia	0.72 (1%)	1.53 (84%)	0.02 (6%)	0.82 (27%)	3.09	4.52	0.68
Moldova	0.04 (1%)	2.88 (84%)	0.20 (6%)	0.30 (9%)	3.42	3.54	0.97

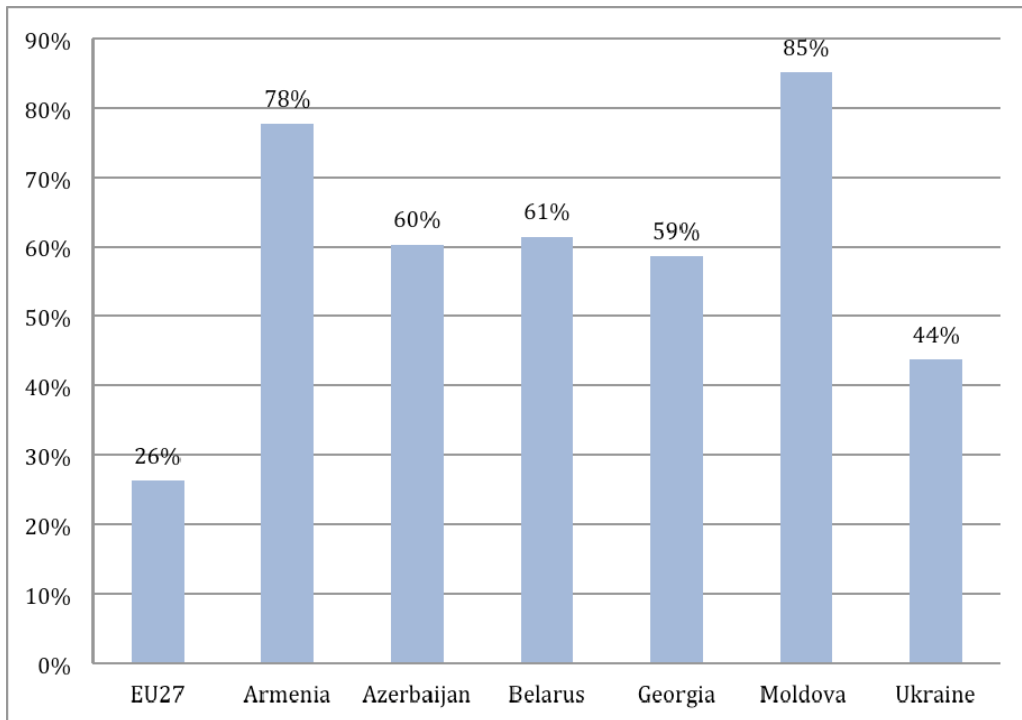
ANNEX 5 – TABLE 4. ENERGY DEMAND IN 2035 (IN MTOE)

	Oil	Gas	Coal	Electricity	Total	Population (in million people)	Figure per capita (Mtoe/inhabitant)
EU27	406.61 (29%)	547.2 (39%)	140 (10%)	303.52 (22%)	1397.33	523.54	2.67
Armenia	0	3.33 (79%)	0	0.87 (21%)	4.2	3.04	1.38
Azerbaijan	6.4 (26%)	16.29 (67%)	0	1.8 (7%)	24.49	10.97	2.23
Belarus	9 (28%)	18.81 (60%)	0.1 (0%)	43 (12%)	31.61	8.55	3.7
Georgia	1.8 (34%)	2.61 (49%)	0.02 (0%) 0.9 (17%)	5.33	4.11	1.3	
Moldova	0.04 (2%)	3.51 (83%)	0.24 (6%) 0.38 (9%)	4.23	2.79	1.52	
Ukraine	29.07 (21%)	41.49 (30%)	52.6 (37%) 17.37 (12%)	140.53	37.98	3.7	

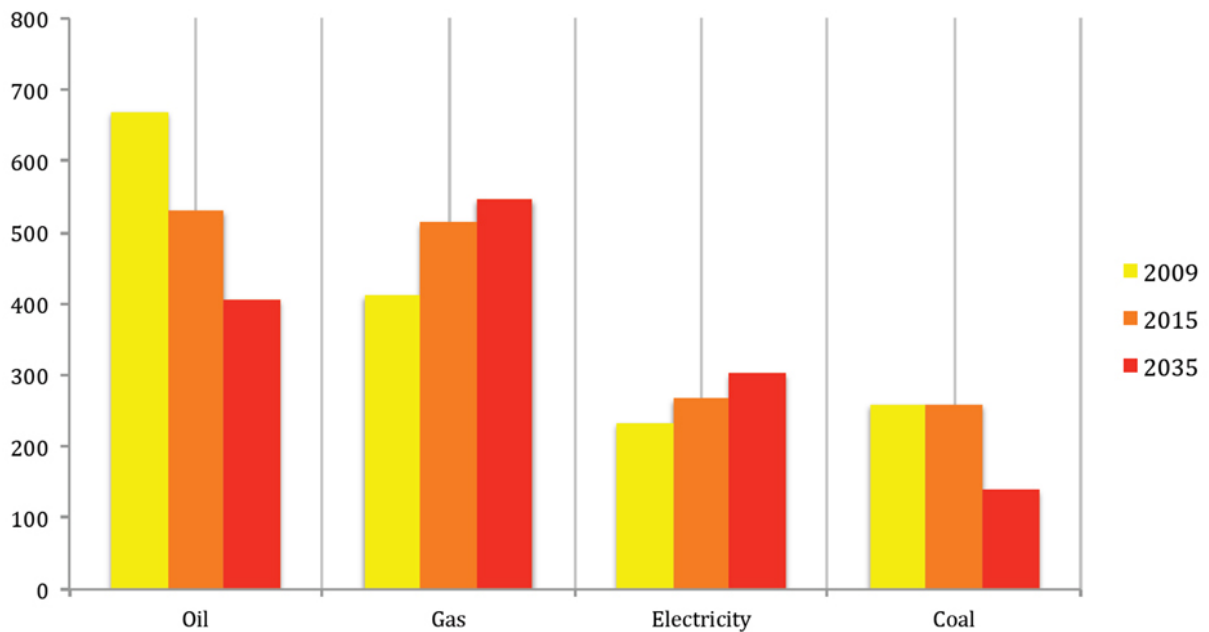
Sources: BP, Business Monitor International, Energy Charter Secretariat, Eurostat, IHS CERA, INOGATE, International Atomic Energy Agency, US Census Bureau, US Energy Information Agency, own estimates.

ANNEX 6 – DIAGRAMS

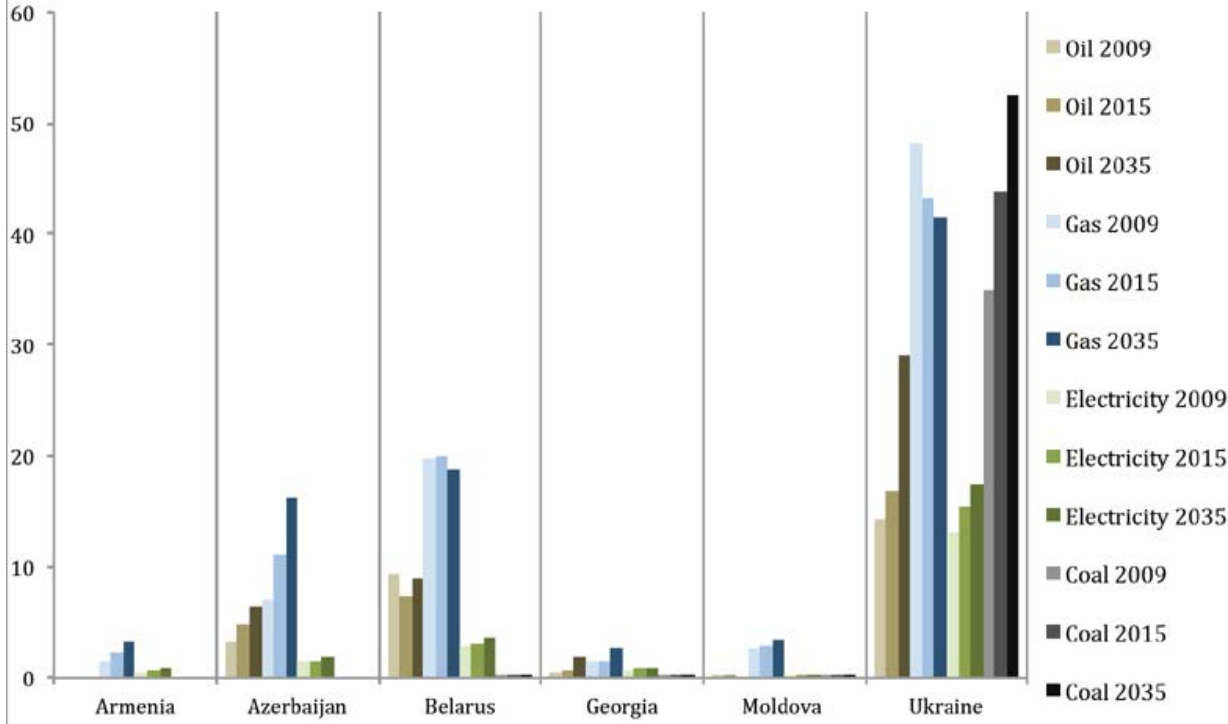
Graph 1 Share of Natural Gas in Energy Demand in 2009



Graph 2 Growth of Energy Demand in EU-27 (in Mtoe)



Graph 3 Growth of Energy Demand in the six Eastern Partners (in Mtoe)



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