The EU needs a Common Energy Policy - not Separate Solutions by its Member States - (Part I)

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Abstract

The present article aims to emphasize the reasons that led to the conclusion that European Union needs a common energy policy, in order to face the challenges of the present. In the first part of the article is being debated the problem of building the Nord Stream pipeline. Also, the first part of the article is developing 3 of the main reasons that make the common energy policy a necessity within European states.

The second part of the article emphasizes another two strong reasons and also draws a conclusion regarding the same stringent necessity.

Keywords: *energy, policy, European Union, Russia, pipeline*

JEL classification: P28, Q41, Q48

Introduction: to construct Nord Stream or not?

The arguments concerning Nord Stream vary greatly between the EU member states, existing transit countries (Belarus and Ukraine), Russia, and the countries not directly involved in the pipeline (particularly Norway, Central Asian states and countries involved in the plans related to South Stream and Nabucco). There are no commonly accepted arguments either in favour or against Nord Stream.

Despite such an embedded ground, one can name at least the following arguments which have been presented in favour of the pipeline. To begin with, the EU's gas consumption is estimated to grow in the future, and therefore, it seems logical to import more gas from Russia, which possesses a quarter of the world's

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natural gas reserves. Following this line of thought, should the natural gas volumes from Russia to the EU grow, new pipelines need to be constructed, since the existing pipelines are not enough for all planned gas and liquefied natural gas (LNG) is not a serious option, at least for time being[2]. In addition, the reliability of the transit countries, particularly Belarus and Ukraine, has been questioned, implying that pipelines bypassing transit countries would be a more secure alternative for gas shipments than pipelines going through ex-Soviet transit countries. Thirdly, it has been suggested that the direct pipelines from Russia to the EU integrate Russia towards the EU, since they strengthen the interdependence between the parties. Fourthly, it has been claimed that undersea pipelines are less easy to be sabotaged than those built on the ground, referring especially to those pipelines which are planned to go through the Caucasus or the Middle East.

Correspondingly, the following arguments have been used against the pipeline. The direct pipes do not support European integration since they neglect the interest of the countries-in-between. It has been said that the direct pipelines divide the EU, as the large EU countries involved would neglect the Union as a foreign policy actor and start to strengthen their bilateral relations with Russia. In fact, Nord Stream has even been compared to the gas version of the Molotov-Ribbentrop Pact or another iron curtain (Watson, 2008; Argus, 2009b). Furthermore, it has been argued that the undersea pipelines would be more expensive to be erected than ground pipelines[3]. In addition, it has been stated that the corrosion of the pipeline on the bottom of the sea would be faster and its possible repair would be more difficult to handle than on the ground. Environmental issues have also been presented against the pipeline, implying that the construction of the pipeline would release toxic waste, and dislodge underwater explosives and chemical weapons dropped to the bottom of the sea after WWII. Military issues have also appeared in the arguments against the pipeline, indicating that the Russian Navy would become more active in the region[4], thus disrupting the military balance of the Baltic Sea region. It has also been argued that the pipeline and its maintenance would facilitate espionage. Last but not least, some experts

[2] In mid-February 2009, Russia opened its first LNG plant in Sakhalin (IHT, 2009a). When the plant reaches its full capacity in 2030, it will chill and ship around 5 % of the world's LNG supply i.e. 90 million tonnes of LNG. Now, the installed capacity is some 10 million tonnes (EIU, 2009). According to IEA (2008b), Russia's LNG capacity is expected to remain rather insignificant, i.e. just 13 bcm in 2015. In this context, one should not neglect the plans of Siemens to become Gazprom's strategic partners in LNG sphere, particularly in the Shtokman field (Itar-Tass, 2009a).

[3] "*Considering the length of Nord Stream (roughly 750 miles) and the difficulties of the Black Sea (most of South Stream would lie in water more than 1 mile deep), these projects, if completed, would be among the most expensive pieces of petroleum transport infrastructure in the world. But Gazprom is not interested in these projects because they are sound, cost-effective investments (they clearly are not), but because of the political leverage the lines would create. Pipelines that bypass existing transit states such as Poland and Belarus would allow Russia to supply core Europe directly, granting Russia the ability to turn off supplies to individual states - most notably Germany and Ukraine - without endangering supplies to other states.*" (Stratfor, 2007).

[4] Österlund (2009) aptly writes that "*the frequency of sailing of Russian Navy surface vessels and certainly also submarines will increase in the Exclusive Economic Zone of Finland in connection with the protection of the pipeline.*"

have started to suggest that the interdependence between the EU and Russia is a myth, which would not hold if the EU-Russia relations start to cool down.

Almost any criteria presented, either in favour or against the pipeline, can be challenged, and hence, one should not evaluate the situation by looking through a pipe but should have a broader perspective on the issue. In order to find an answer whether or not to construct Nord Stream, this article tries to develop the EU's external supply security with five interconnected actions: (1) save energy = = improve energy efficiency; (2) increase own energy production = decrease import dependency; (3) diversify external energy sources = lower dependency on any external gas supplier; (4) store and share = prepare for non-delivery; and (5) develop sustainable relations with the largest external energy supplier = create a reliable partnership with Russia. In the following the aforementioned issues will be discussed in greater detail.

Save energy = improve energy efficiency

Without decisive pro-nuclear energy measures the EU's own energy production declines, which means that we are forced to import more energy (to become more dependent on external sources), unless we are able to reduce our own energy consumption. Energy saving does not necessarily result in lower economic wellbeing, if we are able to rationalise our energy consumption. The majority of the EU member states are able to reduce their energy consumption with relatively reasonable investments. I believe that the best return on energy savings investment can be achieved in Eastern and Southern Europe and changing the energy consumption patterns of households everywhere in the EU.

The EU would require an executable energy saving programme in order not to become overwhelmingly dependent on imported energy. The programme should not only be based on increasing the awareness of EU citizens (i.e. Intelligent Energy - Europe Programme), but on substantial rewards and sanctions for households and enterprises. However, before that is possible the EU needs a common energy policy.

The EU's net energy imports have grown significantly since the year 1990 and now stand at 51 % of total primary energy supply. The EU's net import share is clearly higher than in the OECD in general (31 %). If the current trend continues, the EU's import dependency jumps by 2030. Therefore, one may ask, is it safe to build the future of 500 million EU citizens on an external energy supply (IEA, 2008a)[5].

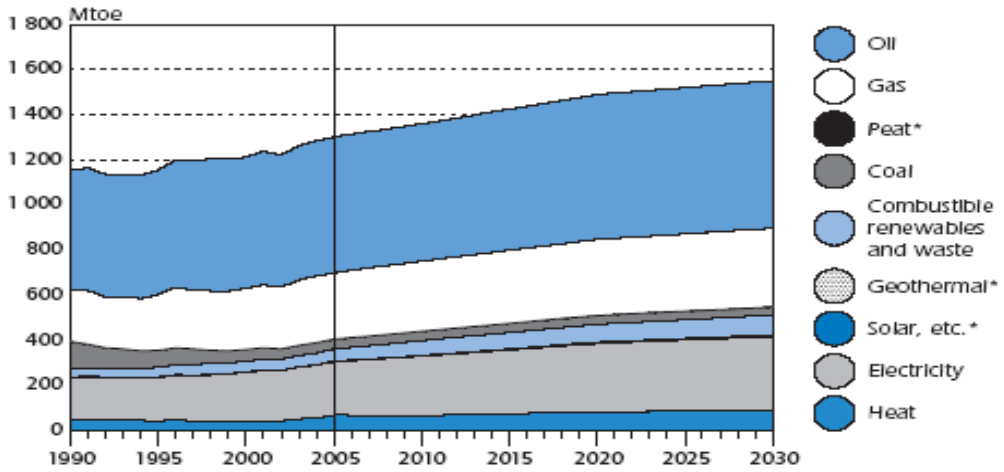
Even if the EU aims at saving energy, the current trend suggests that the Union's energy consumption increases by more than 10 % during the period 2005-2030 (Table 1). Though the consequences of the international financial crisis reduce the growth pressures in the medium-term, in the longer run the EU cannot escape from the vicious circle of external dependency, unless it starts a serious

[5] I believe that the Russian Government would not accept that Russia would be as highly dependent on external energy supplies as the EU is.

energy saving programme and starts to invest more in its own energy production.

The total energy consumption of the EU, 1990-2030

Table 1



* negligible.

Sources: *Energy Balances of OECD Countries*, IEA/OECD Paris, 2007 and EU submission.

Source: IEA, 2008a

Increase own energy production = decrease import dependency

While the EU's energy consumption is predicted to increase by clearly over 10 % by 2030, the Union's energy production will decrease by approximately 20 % during the same period (IEA, 2008a). Even if energy production with wind, solar, and combustible renewables is to multiply, the aforementioned energy sources cannot compensate for the production fall of the four energy pillars of the EU i.e. the drop of nuclear energy by 12 %, coal by 36 %, gas by 55 %, and oil by 69 % during the following two decades. In this context, one should keep in mind that the aforementioned four energy pillars account for some 85 % of the EU's current energy production and over 90 % of our primary energy consumption (Appendix 1 and 2).

Since the EU does not have significant hydrocarbon resources and we are forced to reduce the consumption of coal to meet the goals of the Kyoto Protocol, we have only one domestic pillar left, i.e. nuclear power. I argue that the EU should increase nuclear energy production significantly, if it does not want to become too dependent on imported energy. The energy supply security of the EU can be achieved only when nuclear power would cover more than natural gas in the EU's primary energy consumption. Currently, nuclear power accounts for some 14 % of the Union's primary energy consumption, whereas natural gas is 25 %. The current trend does not promise too bright a future for the next generation, who will be forced to become an international energy beggar, unless we start to take serious

actions now (Appendix 1).

The number of nuclear power stations should multiply, if the EU does not want to be led by external energy providers[6]. This means that the energy policy of the EU's large member states should become more favourable towards nuclear energy. At the moment, the share of nuclear energy in primary energy consumption is 39% in France, 10 % in Germany, 0 % in Italy, and 7 % in the United Kingdom. It seems that unless the aforementioned countries make their energy consumption more dependent on nuclear power than on natural gas i.e. the share of gas in the primary energy consumption is 15 % in France, 24 % in Germany, 39 % in Italy, and 38 % in the United Kingdom. As only the United Kingdom has any independent gas production worth mentioning among the aforementioned group of countries, it is obvious that a relatively insignificant role of nuclear energy in the German energy policy and the total absence in the Italian policy increases the EU's dependency on imported gas (Appendix 1 and 8).

Although the United Kingdom is a significant producer of natural gas within the EU, one should not be lulled by an illusion that it has significant natural gas reserves. The proven natural gas reserves will last only about six years at the current production rate. As the EU possesses only a couple of percent of the world's natural gas reserves while consuming a fifth of the global natural gas production, it is clear that building our energy policy on natural gas means giving our future into foreign hands.

To conclude, one should not forget that the EU's own natural gas production will inevitably drop significantly in the following two decades. Today, the EU is able to cover 43 % of our natural gas consumption. In 2030, the share is just 16 %. The situation with oil is much worse (Appendix 3).

Diversify external energy sources = lower dependency on any external gas supplier

Nowadays, Russia covers 24 % of the Union's natural gas consumption, being clearly the most important external gas source. Russia's share is equivalent to the combined stake of two next largest external gas suppliers, namely Norway and Algeria. Should the EU member states build their future on natural gas, it seems evident that the role of Russia in the Union's gas supply will increase, since Russia's gas reserves are by far the largest on the earth, around a quarter. It is wise to keep in mind that Russia's gas reserves are comparable to two next largest reserve holders, Iran and Qatar, together (Appendix 3, 4, 5, and 8).

Higher gas consumption in Europe means more gas transport to Europe i.e.

[6] Although the EU would erect a significant number of new nuclear power stations, it cannot totally avoid any external dependency, since the Union is almost completely dependent on imported uranium. The EU can produce only 2 % of the uranium it consumes. Four countries, namely Canada (24 %), Russia (19 %), Niger (16 %), and Australia (14 %), take care of nearly three quarters of the EU's uranium supply (IEA, 2008a). On the other hand, their uranium import dependency is less risky than hydrocarbon dependency since the EU can store the uranium to meet its needs for several years, whereas the storage capacity for oil and natural gas is rather insignificant.

more pipeline deliveries or LNG shipments. The EU's total pipeline entry capacity is about 310 bcm. In addition to the pipelines, the EU has 14 LNG terminals in operation or under construction with a total capacity of around 115 bcm. Only small additions in LNG capacity, apart from those already under construction or approved, are expected in the EU27 by 2015, when the capacity is expected to be around 120 bcm[7]. All in all, gross import capacity is thus above 420 bcm, with most of the unused capacity on the lines from Russia (IEA, 2008a).

Russian and Norwegian gas is imported through pipelines into central Europe, and into the United Kingdom and the Benelux countries, respectively. LNG imports account for only about 13 % of the EU's gas imports, with the major suppliers being Algeria, Libya, Qatar, and Nigeria. Naturally, one way to deliver the gas is to combine the pipeline and LNG transportation, for instance, by transporting gas from the Barents Sea / the Yamal Peninsula into the Russian harbour on the Gulf of Finland, and thereafter, ship it in LNG form to the West (Argus, 2008b). The price might increase, but this alternative would save the Baltic Sea as toxic substances would not be released from the sea bed. On the other hand, LNG shipments would increase the maritime traffic in the Gulf of Finland[8], and hence, increase the possibility of a LNG tanker collision with an oil tanker, a possibility which has skyrocketed during this decade (Liuhto, 2003).

When analysing the necessity of new pipelines, it needs to be remembered that the gas pipelines going through Belarus and Ukraine are not used to their full capacity. Secondly, one should not forget that the Blue Stream pipeline with a capacity of 16 bcm distributes only around 10 bcm from Russia to Turkey (Argus, 2009i). Building Nabucco with a capacity of 30 bcm and using the full capacity of the pipelines going through Belarus and Ukraine[9], one could easily forget the building of South Stream with a planned capacity of 31-47 bcm (Appendix 6

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[7] Centre for European Policy Studies (2009, 6) estimates a much bigger role for LNG. "*In 2020, 30% of gas supply may be in the form of LNG.*" Such a share seems highly optimistic since that would mean that the annual LNG shipments should exceed 200 bcm.

[8] It has been calculated that shipping 55 bcm of natural gas would require 650 LNG tanker shipments annually i.e. 1300 voyages back and forth the Gulf of Finland (Österlund, 2009).

[9] It is interesting to note that Belarus has recently indicated its readiness to increase gas transit capacity from Russia to the EU (Trend, 2009). Also Ukraine has informed about its readiness to modernise and extent its pipeline network with the help of the EU (IHT, 2009b). "*The European Union has pledged to help upgrade Ukraine's network of natural gas pipelines in exchange for a stake in the country's energy management. The European Union has long said it would help Ukraine modernize its 40-year-old grid of natural gas pipelines - a network that is approximately a decade past its life expectancy. ... If Europe buys a seat not just at that table but any negotiations when the word 'energy' is involved, the dynamics change, and the Russian tool will be weakened. Brussels would be a part of the negotiations in which the crisis between Russia and Ukraine is created. This will also enable the Europeans to counter (or at least be aware of) any growing rift well before it happens. Europe would be able to step into the actual negotiations for the first time, instead of sitting on the sidelines watching their lights go out. But such a scheme is riddled with problems.*" (Stratfor, 2009b). Ukraine has suggested expanding the annual pipeline capacity by 60 bcm. The current operational capacity is 120 bcm (Argus, 2009e; Joint Declaration, 2009).

and 7)[10].

Although Nabucco does not solve the diversification problem of the EU[11] and it is everything but an easy project, it is an absolute necessity for the Union in its attempts to diversify its energy sources. If the EU fails in its diversification plans, and correspondingly, if Russia manages to build direct gas pipes and a more organised form of co-operation between the main gas producers[12], this would mean an end to attempts to create a common energy policy for the EU[13].

Nabucco's main problems are linked with four issues: (1) where to find enough gas to fill the pipeline; (2) how to convince all the necessary parties needed (gas producers in Central Asia and the Middle East, transit countries, organisations financing and building the pipe, and consumers in the EU); (3) how to secure the pipeline from terrorist attacks; and (4) how to ensure that Turkey does not to use its strengthening role as a strategic transit hub to press the Union to accept its membership before both the parties are ready for deeper integration (Socor, 2009)[14].

Gas from Azerbaijan does not suffice to fill Nabucco, as Azerbaijan's gas

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Correspondingly, the European Commission stresses with the words of Commissioner Ferrero-Waldner (2009) that "*the provisions of the joint declaration will help Ukraine integrate its gas sector into the EU's internal energy market. I hope they will also clear the way for some of you here today to invest in Ukraine's infrastructure. The Commission will play is part by providing Ukraine with the technical assistance it has requested to support its commitments.*" Not surprisingly, "*Prime Minister Vladimir Putin called the plan 'unprofessional' and threatened to review ties if the EU continued to ignore Russian concerns ... 'If this is a small technical breakdown in complex, three-way relations between Russia, Ukraine, and the European Union, then it's nothing', said Putin. 'But if it's the start of attempts to ignore the interests of the Russian Federation, then of course it's bad*" (Reuters, 2009). RIA Novosti (2009a) writes: "*If the EU Ukraine and Russia negotiate the problem and sign a trilateral gas treaty, this will greatly change the EU's energy policy.*" "*The harsh tone of Russia's reaction, and especially the content of the official statement issued by the Ministry for Foreign Affairs, clearly demonstrate that Russia does not recognise Ukraine as a fully sovereign state with a right to shape freely its co-operation with external partners*" (EW, 2009a, 4).

[10] Nabucco and South Stream projects are rivals and it is evident that both the pipelines cannot be served with gas. It seems that that the question is not only about the gas but also the future of Central Asia. Russia seems to be very unwilling to let any Western countries balance Russia's political dominance in the region (Norling, 2007). Russia aims at torpedoing the EU's diversification attempts by buying gas supplies of other gas producing countries, such as the gas supply of Turkmenistan, Azerbaijan and Nigeria (Blank, 2009; MT, 2009b).

[11] The EU's total gas imports are close to 380 bcm, while the Nabucco's planned capacity is some 30 bcm (Arinc, 2007) i.e. less than 10 % of the EU's total gas imports (Appendix 11).

[12] Russia, Iran and Qatar possess together over 50 % of the global gas reserves (Appendix 8).

[13] "*Member States are not obliged to adopt a foreign policy towards energy-producing countries common to all members of the European Union*" (Haghighi 2008, 165).

[14] Watson (2009) writes "*prime minister, Recep Tayyip Erdogan, told reporters during a visit to Brussels in January that his government might pull its support for Nabucco if the EU blocks discussions on the energy chapter of the country's stalled membership bid for the bloc, 'If we are faced with a situation where the energy chapter is blocked, we would of course review our position [on Nabucco],' Erdogan said, referring to reports that Cyprus is blocking the opening of Turkey's energy chapter negotiations over a dispute with Turkey over oil and gas exploration in the Mediterranean Sea.*"

export capability will remain below 8 bcm at least until 2012, and Russia may buy a large part of this gas (Argus, 2009h). Therefore, Nabucco needs gas from Central Asia and/or the Middle East[15]. In order to gain access to these resources, the Trans-Caspian Pipeline and/or new pipes in Iran should be erected. In this context, one should not forget that the pipeline between Northern Iran and Turkey operates far below full capacity[16] and does not link with the main producing fields in Southern Iran. Moreover, one should keep in mind that though Iran has the second largest energy reserves in the world, but it nevertheless is a net importer of natural gas (Norling, 2008). In addition, Iran needs to build working political relations with the USA and the EU before the Union can realistically rely on the Iranian energy supply[17]. Current and potential instability in the Caucasus region and the Middle East emphasise a need to find a sustainable political solution, since without the political solution there will not be reliable pipelines in the region (Yakobashvili, 2008).

Nord Stream, if it will come alive, is a colossal distribution channel as its planned capacity may reach 55 bcm. In order to fill Nord Stream in full, Russia should open new giant gas fields beneath the Barents Sea (the Shtokman field) and/ or in the Yamal Peninsula (the Bovanenkovskoe field)[18]. The opening of these new fields is not problem-free either technically or financially. In this context, one should not forget that the exploitation of the Arctic Ocean reserves requires special technology and the transportation of the required material to the Yamal Peninsula is a challenging task, since due to global warming the permafrost in the Russian North is melting, and hence, the road network in the Russian North is even less reliable than the Russian road system in general. Furthermore, it has been argued that the opening of the Shtokman field is not economically viable if the price of an oil barrel is below USD 50-60[19]. The price of the Russian Urals blend has fluctuated between USD 40-50 in the first quarter of 2009 (Argus, 2008d).

"*The final investment decision on the Shtokman project has been delayed until next*

[15] Still only 1 % of Europe's gas imports originate in the Middle East and the South Caspian Sea (Norling, 2008).

[16] "*The 20 bcm Tabriz-Erzurum pipeline operates far below full capacity and is currently only delivering around 7 bcm per year*" (Norling, 2008, 133).

[17] Baev (2009, 8) correctly states that "*Iran's gas fields, in particular the giant South Pars, are far more accessible than the offshore Shtokman field in the Barents Sea or remote Bovanenkovskoe field in the permanently frozen Yamal Peninsula. ... If Iranian gas starts getting pumped into new pipelines, the whole picture of global gas balance would change, and Europe stands to benefit from that. ... This perspective, however, remains blocked by a huge obstacle: Iran's nuclear program.*"

[18] Gas production in the Bovanenkovskoe field may reach up to 115-140 bcm per annum, but on the other hand, the investment needs are considerable. Just an example, close to 2500 km of new pipes should be constructed before the gas can travel to the West (Solanko & Ollus, 2008). In other words, the new pipeline needed is longer than the distance from Berlin to Istanbul (2320 km) or from Brussels to Lisbon (2100 km).

[19] Troika Dialog (2009b) writes in mid-March as follows: "*Deputy Prime Minister [Russia] Igor Sechin has said that offshore development should not be a priority in the short term, because capital investments required are not justifiable in the current pricing environment*".

year. ... The Russian company [Gazprom] says the 3.8 trillion m3 Barents Sea field is still on track to enter production in 2013. But SDC [Shtokman Development Company] chief executive Yuri Komarov warned last year that development could be delayed by a prolonged period of lower crude prices" (Argus, 2009c, 1).

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Appendix 1

Primary energy consumption of selected countries in 2007

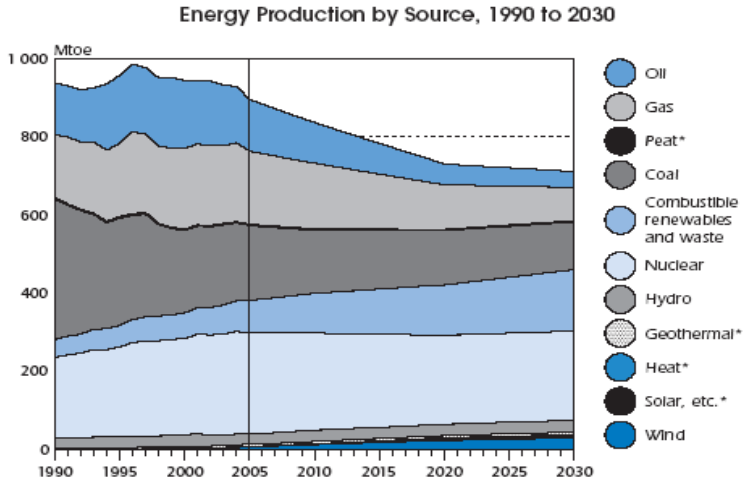
	Oil	Natural gas	Coal	Nuclear	Hydro
USA	40 %	25 %	24 %	8 %	2 %
Azerbaijan	36 %	60 %	0 %	0 %	4 %
Finland	39 %	13 %	17 %	20 %	12 %
France	36 %	15 %	5 %	39 %	6 %
Germany	36 %	24 %	28 %	10 %	2 %
Italy	46 %	39 %	10 %	0 %	5 %
Kazakhstan	18 %	30 %	50 %	0 %	3 %
Norway	22 %	8 %	1 %	0 %	68 %
Poland	26 %	13 %	60 %	0 %	1 %
Russia	18 %	57 %	14 %	5 %	6 %
Turkmenistan	19 %	81 %	0 %	0 %	0 %
Ukraine	11 %	43 %	29 %	15 %	2 %
United Kingdom	36 %	38 %	18 %	7 %	1 %
Iran	42 %	55 %	1 %	0 %	2 %
Qatar	18 %	82 %	0 %	0 %	0 %
Algeria	34 %	63 %	2 %	0 %	0 %
Egypt	48 %	46 %	1 %	0 %	5 %
China	20 %	3 %	70 %	1 %	6 %
Japan	44 %	16 %	24 %	12 %	4 %
EU27 (2005)	37 %	25 %	18 %	14 %	7 % *

* The share includes all renewable energy sources.

Sources: BP, 2008; European Environment Agency, 2008

Appendix 2

The EU's energy production until 2030



* negligible.

Sources: *Energy Balances of OECD Countries*, IEA/OECD Paris, 2007 and EU submission.

Energy Production by Fuel in the EU27, 2005 to 2030

	2005	*2010*	*2020*	*2030*	*Share 2005*	*Share 2030*	*Change Share 2030/2005*	*Production 2020/2005*	*Production 2030/2005*
	Mtoe				%				
Coal	192	162	138	123	21	19	-10	-28	-36
Peat	3	3	3	3	0	0	5	-2	-2
Oil	132	105	53	41	15	12	-15	-60	-69
Gas	188	168	115	85	21	20	-4	-39	-55
Combustible renewables & waste[1]	82	102	129	158	9	12	33	57	92
Nuclear[2]	260	249	228	229	29	30	3	-12	-12
Hydro	26	29	29	30	3	3	18	11	16
Wind	6	12	23	29	1	1	120	285	386
Geothermal	5	6	6	6	1	1	16	12	20
Solar/Other	2	2	6	9	0	0	46	297	451
Total	898	838	732	713	100	100	-	-18	-21

1. Note that data on imported combustible renewables are not available for many countries. The figures are therefore overstating the EU internal resource.

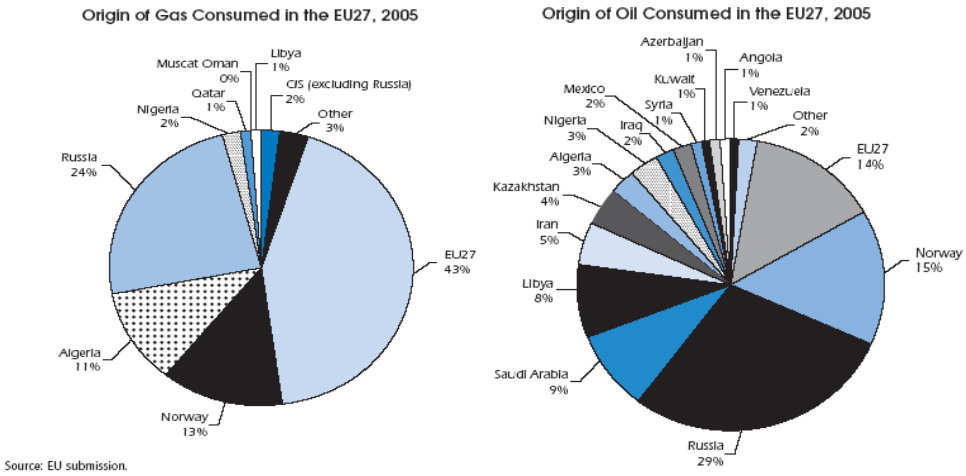
2. Note that while uranium is imported into the EU, nuclear is considered to be a domestic source of energy. The uranium loaded into EU25 reactors in 2006 equals 210 to 336 Mtoe – owing to different statistical treatment, this figure cannot be compared with the 260 Mtoe supply contribution from uranium in 2005.

Sources: *Energy Balances of OECD Countries*, IEA/OECD Paris, 2007 and EU submission.

Source: IEA, 2008a

Appendix 3

The origin of the EU's gas and oil consumption

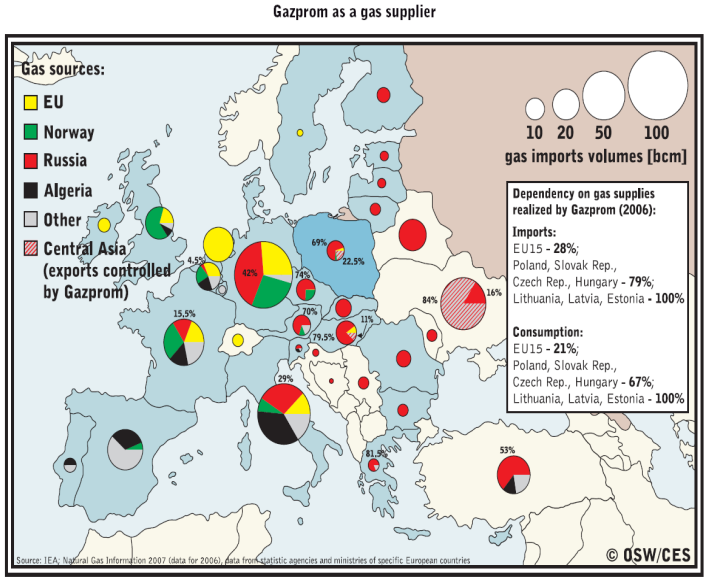


Source: EU submission.

Source: IEA, 2008a

Appendix 4

The sources of the EU member states' gas consumption



Source: Loskot-Strachota & Pelczynska-Nalecz, 2008

Appendix 5

EU member states' gas imports and Russia's share

	Imports from Russia (in bcm)	Percentage of total gas imports
Bulgaria	2.7	100
Estonia	0.7	100
Finland	4.9	100
Slovakia	7.0	100
Latvia	1.4	100
Lithuania	2.8	100
Romania	5.5	87.3
Greece	2.7	84.4
Hungary	8.8	80.0
Czech Republic	7.4	77.9
Austria	6.6	75.9
Poland	7.7	72.6
Slovenia	0.7	63.6
UKa	8.7	41.2
Germany	34.4	37.9
Italy	22.1	28.6
The Netherlandsa	4.7	25.4
France	10.0	20.2
Belgium	3.2	14.1

Note: a) The Netherlands and the UK are still large gas producers on their own; their dependency level on Russian gas is therefore rather misleading.

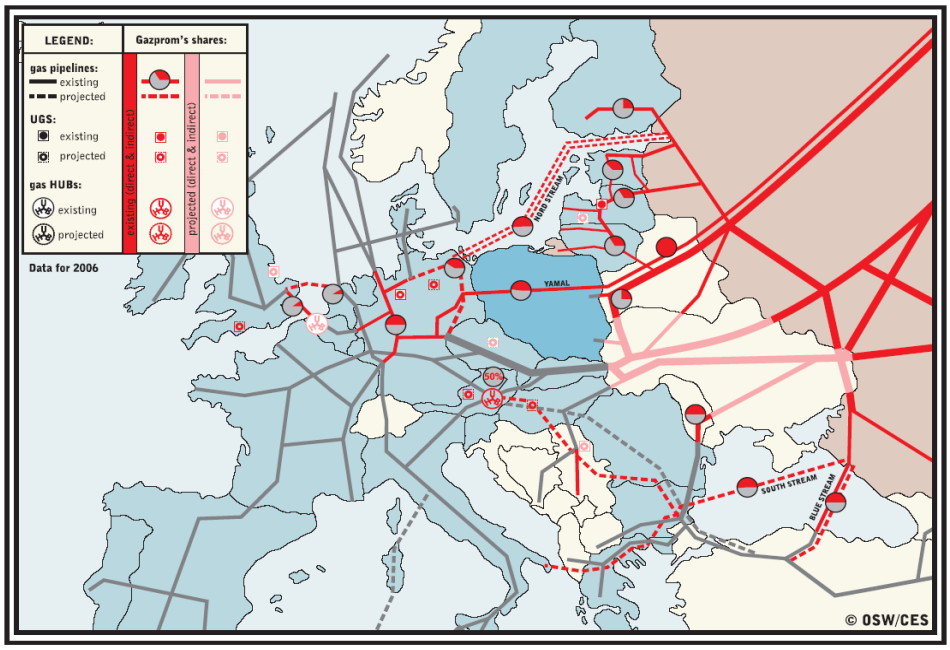
Source: Gazprom (2007) Annual Report 2006. Moscow: Gazprom, pp. 49-50 BP Statistical Review of World Energy June 2007, p. 30; own calculations.

Source: Russian Analytical Digest 34, 2008

Appendix 6

The eastern gas pipelines towards the EU

Gazprom's major investments in gas infrastructure in Europe, existing and planned



Pipeline	Route	Capacity 2005	Capacity 2010
Brotherhood/Union (Soviet network)	Russia – Ukraine – Central Europe	130 bn. cbm	130 bn. cbm
Polar Lights (Soviet network)	Russia – Belarus – Ukraine – Central Europe	25 bn. cbm	25 bn. cbm
Transbalkan (Soviet network)	Russia – Ukraine – Balkans	20 bn. cbm	20 bn. cbm
Finland Connector (Soviet network, extended 1999)	Russia – Finland	20 bn. cbm	20 bn. cbm
Yamal (since 1999)	Russia – Belarus – Poland – Western Europe	28 bn. cbm	28 bn. cbm
Blue Stream (since 2002)	Russia – Black Sea – Turkey	16 bn. cbm	16 bn. cbm
Baltic Sea (NEGP, probably from 2010)	Russia – Baltic Sea – Germany	–	28 bn. cbm
Total		*239 bn. cbm*	*267 bn. cbm*

Source: Research Centre for East European Studies, Bremen – author's compilation.

Sources: Loskot-Strachota & Pelczynska-Nalecz, 2008; Russian Analytical Digest 41, 2008

The EU's gas supply via transit countries

Gas transported via Ukraine (billion cubic meters)

Year	Total	To Europe	To CIS
2000	123.6	109.3	11.3
2001	124.4	105.3	19.1
2002	121.6	106.1	15.1
2003	129.2	112.4	16.8
2004	137.1	120.3	16.8
2005	136.4	121.5	14.9
2006	128.5	113.8	14.7
2007	115.2	112.1	3.1

Note: Excludes volumes for domestic use

Note: the main explanation for the drop in transit volumes to the CIS in 2007 is that Russian gas formerly transported through eastern Ukraine back into southern Russia is now taken by a different route via Russian territory

Source: Naftogaz Ukrainy

Supply potential of the via Turkey

Country	Volume	Transit country	Potential by 2015	Existing system
Iran	10 bcm	Turkey	20-30 bcm	3-10 bcm
Turkmenistan	13 bcm	Iran/Turkey	30 bcm	13 bcm
Turkmenistan	16 bcm	Aze.Geo/Turkey	30 bcm	None
Saudi Arabia	10-20 bcm	Jordan/Syria/Turkey	20 bcm	None
Azerbaijan	8 bcm	Turkey	20 bcm	8 bcm
Iraq	10 bcm	Turkey	10 bcm	None
Egypt	4 bcm	Jordan/Syria	10 bcm	Link to Syria

Sources: Özdemir, 2008; Bekker, 2009; Russian Analytical Digest 53, 2009

Appendix 8

Global gas reserves and production

	Reserves (R)	Production (P)	R/P ratio
North America	**4.5 %**	**26.6 %**	**10.3**
USA	3.4 %	18.8 %	10.9
Canada	0.9 %	6.2 %	8.9
Mexico	0.2 %	1.6 %	8.0
S. & Central America	**4.4 %**	**5.1 %**	**51.2**
Europe & Eurasia	**33.5 %**	**36.5 %**	**55.2**
Azerbaijan	0.7 %	0.3 %	Over 100
Denmark	0.1 %	0.3 %	12.6
Germany	0.1 %	0.5 %	9.6
Italy	0.1 %	0.3 %	10.0
Kazakhstan	1.1 %	0.9 %	69.8
Netherlands	0.7 %	2.2 %	19.4
Norway	1.7 %	3.0 %	33.0
Poland	0.1 %	0.1 %	26.4
Romania	0.4 %	0.4 %	54.4
Russia	25.2 %	20.6 %	73.5
Turkmenistan	1.5 %	2.3 %	39.6
Ukraine	0.6 %	0.6 %	54.0
United Kingdom	0.2 %	2.5 %	5.7
Uzbekistan	1.0 %	2.0 %	29.8
Others	0.2 %	0.4 %	39.4
Middle East	**41.3 %**	**12.1 %**	**Over 100**
Bahrain	Less than 0.05%	0.4 %	7.4
Iran	15.7 %	3.8 %	Over 100
Iraq	1.8 %	n.d.	Over 100
Kuwait	1.0 %	0.4 %	Over 100
Oman	0.4 %	0.8 %	28.6
Qatar	14.4 %	2.0 %	Over 100
Saudi Arabia	4.0 %	2.6 %	94.4
Syria	0.2 %	0.2 %	54.7
United Arab Emirates	3.4 %	1.7 %	Over 100
Yemen	0.3 %	n.d.	Over 100
Others	Less than 0.05%	0.2 %	18.5
Africa	**8.2 %**	**6.5 %**	**76.6**
Algeria	2.5 %	2.8 %	54.4
Egypt	1.2 %	1.6 %	44.3
Libya	0.8 %	0.5 %	98.4
Nigeria	3.0 %	1.2 %	Over 100
Others	0.7 %	0.4 %	Over 100
Asia Pacific	**8.2 %**	**13.3 %**	**36.9**

Source: BP, 2008