
Eurasian Natural Gas Pipelines: The Political Economy of Network Interdependence

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Abstract: A noted American economist and specialist on the economies of the former Soviet Union presents the results of his research on the Eurasian network of natural gas pipelines. While the focus is on the political economy of network interdependence, the author covers in considerable detail the political significance of Russia's substantial market power and its efforts to enhance that power in 2007 and 2008. More specifically, he highlights Gazprom's role both as a supplier of natural gas to Europe and as the core of a monopoly controlling exports of natural gas from Russia and Central Asia by expropriating and/or blocking foreign ownership of natural gas reserves as well as production and transportation facilities in Russia. *Journal of Economic Literature*, Classification Numbers: F100, F230, L950, P330, Q400. 11 figures, 1 table, 51 references. Key words: Russia, China, Central Asia, European Union, Middle East, natural gas, liquified natural gas, oil, pipelines, Gazprom, natural gas monopoly, natural gas monopsony.

INTRODUCTION

Energy security predicated on guaranteed access to adequate supplies of energy carriers is a universally proclaimed national objective. It is best obtained through numerous, competing, individually adequate sources of supply. Yet sources of energy supply are increasingly limited, rendering energy users dependent on a few, and sometimes a sole, supplier of a substantial carrier of energy. This dependence gives leverage to the supplier(s), which may spill over into the political, as well as economic, arena. Thus in an interdependent world, energy security, and political dependence are inexorably intertwined, particularly when the political preferences, understandings, and objectives of the users and suppliers differ substantially. This is arguably the situation with respect to growing European reliance on that most significant source of "green" energy, namely natural gas (gas).

This paper explores the sources and implications of European energy dependence on Russian supplied Eurasian natural gas. It focuses on this increasingly important, if not yet dominant, aspect of the overall European energy equation, and not on Europe's general energy (or even natural gas), situation. Rather, it addresses the specific relations arising from, and issues raised by, the Soviet natural gas export pipeline system and Gazprom's recent extensions thereof. Because of the peculiar technological and economic characteristics of acquisition and use of natural gas as an energy carrier, and in particular its infrastructure requirements, gas "markets" are highly inflexible and political. These characteristics mean

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that purely commercial and/or economic considerations often take second place to political issues, even when they are used as a pretext for actions or negotiating positions. Thus the nature of the commodity gives suppliers critical leverage that may imply, or lead to, buyers' political dependence.

The heart of the problem lies in the difficulty of transporting natural gas from its sources to where it can be economically used, and in the high costs of its storage. As a gas, natural gas carries far less energy per unit volume, making road and rail transport, even when it is compressed, uneconomical for industrial use.² It can be liquefied for transport, using rather complex and expensive technology, but even so transport over long distances, except by sea, remains quite expensive per unit of energy supplied. The lowest cost way to transport natural gas over the long distances from source to use is in compressed, but still gaseous, form, through a large-diameter pipeline, once a pipeline system is in place. Yet such a system is extremely expensive to establish, making it both difficult and uneconomical to duplicate. It indeed creates a true "natural monopoly," based on astronomical up-front investment costs,³ allowing the provision of transport service at an extremely low variable (marginal) cost per unit energy transported. Hence the development of such a system generally requires longterm (typically 25-year) commitments from buyers/users of the gas to purchase enough to justify the development cost. But once the pipeline system is in place, with development costs sunk, natural gas can be supplied at a unit cost far below what any competitor would require to set up a competing supply system. The capability to do so allows the first such system in place to maintain its monopoly and thus charge a sufficient price, albeit it one still competitive with competing energy carriers such as oil and coal, to recoup the necessary up-front investment, those "set-up costs," in a reasonable time frame. This ties suppliers and users together in a long-term contractual relationship which is substantially insulated from outside competitive pressures.

Thus, in contrast to oil and coal, natural gas is typically supplied through singular gas pipeline networks, without competition, rendering a true "gas market," and hence "market price," virtually impossible, unless a competing pipeline or sufficient liquified natural gas supply is available. Gas is rather priced through buyer-seller negotiations, where buyers may be many and the seller, for the technological reason noted above, has an effective monopoly. This gives the supplier tremendous market power, only limited by the capability of users to switch to alternative energy carriers or develop cost effective alternative technologies. Neither is easily or readily done, leaving individual buyers at the mercy of the monopolist unless they can unite to activate a "countervailing market power." That indeed is what lies behind the "state-to-state" negotiations over natural gas supplies and prices, and even those over the development/investment decisions resulting in the singular supply network. Such negotiations are the basis for the typical oil-price based "netback market value" formula used in gas supply contracts in Western Europe (Stern, 2007, p. 3). Such pricing applies elsewhere to

²A high pressure NG pipeline can move only about one-fifth the amount of energy (BTUs) per day as an oil pipeline, despite traveling at a much higher rate (Chaudhary, 2001, p. 13).

³These include right-of-way acquisition and preparation, the large-diameter pipe, pumping stations and storage facilities equipment, and construction costs. The cost is around \$5 billion per 1000 kilometers of pipeline over land, and substantially more for undersea pipelines. Indeed, Gazprom's proposed 900 km South Stream Black Sea pipeline is estimated to cost some \$6.5 billion over five years of construction (*Eurasia Daily Monitor (EDM)*, 3 [volume], 128 [issue number], July 3, 2006). Similarly, North Stream is estimated to cost over \$12.5 billion for 1200 km, most under the North Sea (*EDM*, 3, 146, July 28, 2006).

both compressed and liquified natural gas, except where there are competing suppliers and pipelines, as in North America and the UK, that create nearer competitive market conditions.

This pricing mechanism, which has largely generated lagged price increases, will now be tested by the world financial crisis and recession (fall 2008). Given the dramatic drop in oil prices from over \$145/bbl in July 2008 to around \$50/bbl in November, we might expect European natural gas prices to fall dramatically in 2009, perhaps by more than half, as pricing contracts are rewritten to reflect new “netback market value.” This will generate extensive negotiations between Gazprom/Russia and the buyers of their natural gas, a process that has already begun between Ukraine and Russia (Smith, 2008).

THE STRUCTURE OF EURASIAN INTERDEPENDENCE

Background

Russia has been supplying Europe, itself, and much of Central Asia through an elaborate pipeline system largely created in the 1960s, 1970s, and early 1980s (Fig. 1).⁴ Based on the discovery of vast, accessible reserves in western Siberia, the Ministry of Gas Industry, now Gazprom, developed an extensive network of domestic pipelines connecting those sources with the major industrial centers of the Soviet Union. This network also drew the other existing natural gas sources, all controlled by the Ministry, in the Caucasus and Central Asian regions of the Soviet Union into the unified system of gas transportation and supply (Fig. 2).

While the Soviet Union, with its centralized planning and management of the development, provision, and use of energy resources, continued to exist, this unified network provided an effective, and perhaps efficient, means to meet energy needs throughout the Soviet Union. It was also to provide the complete “upstream” operation for the supply of natural gas, whatever its Soviet source, to Europe, which in the 1970s began seriously seeking alternative energy supplies to lessen its dependence on increasingly expensive and politically influenced OPEC oil (Maxie, 2006).

By the 1970s, the Soviet Union was facing continuing agricultural crises requiring vast imports of food stuffs. It was also facing a deterioration in economic performance, and launched numerous modernization and development programs demanding further massive imports of technology. Thus the export of gas appeared to the Soviet Union an obvious way to generate the necessary hard currency to pay for those imports (JEC, 1982). The problem of supplying the readily available (particularly in Siberia) natural gas to foreign markets had to be resolved through extending its existing system and building a pipeline network of unprecedented size and complexity. With the support of European governments, three kinds of “gas for pipe” deals were entered with Soviet state entities providing European pipes, equipment, and loans in return for gas delivery contracts.⁵ Thus, despite strenuous U.S. opposition, this task was accomplished through a combination of European technology imports and financing and the priority commitment of Soviet domestic capacities and resources (Hewett, 1988, pp. 168–170).

⁴The Unified Gas Supply (UGS) System of Russia includes 155,000 km gas mains and branch pipelines, 268 compressor stations and gas-pumping units with a total power of 44.8 mln kW of gas pumping units, 6 gas processing and gas condensate complexes, and 24 UGS facilities (see <<http://www.gazprom.com/eng/articles/article20157.shtml>>).

⁵This arrangement was desirable for Europe both the secure an alternative energy source and to stimulate production in the depressed European market of the early 1980s (see Stern, 2006a).

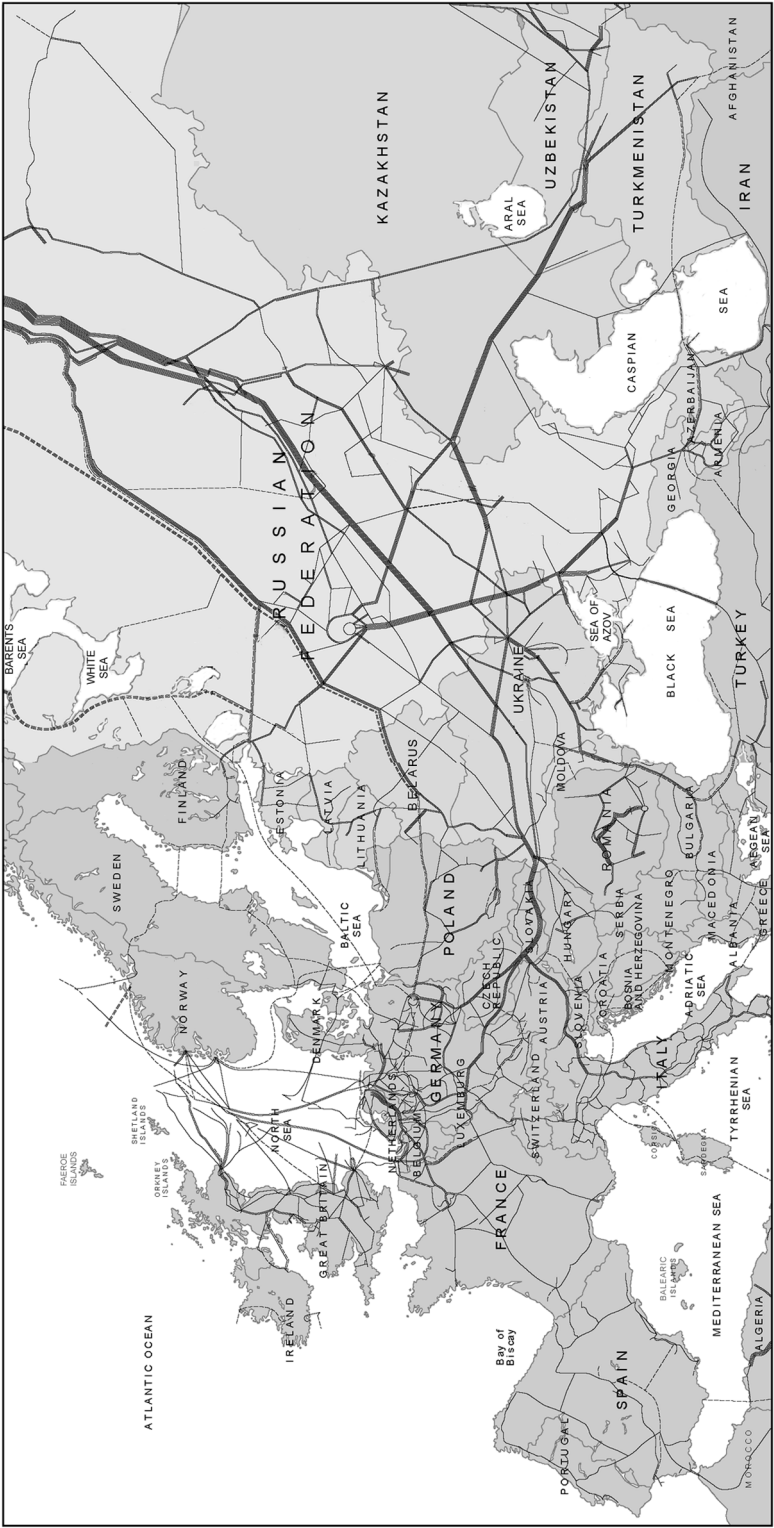


Fig. 1. Gazprom's existing and proposed pipelines, with relative flows in 2006.



Fig. 2. Existing Central Asian pipelines, with relative flows in 2006.

The Soviet Union, and some European countries seeking an alternative to Middle East energy supplies, therefore bore the development costs of putting this elaborate export network into place. Russia and other states of the former Soviet Union inherited this network with all development costs already sunk, giving them the ability to supply cheap natural gas to the world's largest user, the countries of the European Union. While the breakup of the Soviet Union created a number of different, new stakeholders in pieces of that supply system, and indeed a number of formally independent producing states, almost all export pipelines still ran through Russia and were controlled by Gazprom, at least to Russia's western border. In particular, almost all Central Asian and Caucasian natural gas (and oil) had to initially pass through the Russian pipeline network to reach foreign customers.⁶ Thus Russia, through Gazprom, remained the monopoly supplier of Eurasian gas to Europe.

The Current Situation

This situation remained essentially unchanged until the Russian financial collapse of 1998, and the subsequent economic recovery driven by a dramatic rise in oil, and other energy, prices. That crisis brought a change in the government of Russia, and ushered in a new era of rising energy demand and prices, driven to a large extent by economic development and growth in Asia. Vladimir Putin, whose dissertation (see Olcott, 2004; Balzer, 2005) had extolled the virtues of state development and control over energy resources as a key to national power, became the second President of post-Soviet Russia, and moved to consolidate political and economic power in the hands of the Russian state and its leader. And that

⁶There were some minor exceptions along the southern Soviet border, with Turkmenistan and Azerbaijan able to provide limited natural gas supplies to Iran and Turkey (EIA, 2002), largely by sea (Caspian and Black, respectively).

consolidation focused first and foremost on reasserting control over energy resources, in particular oil and natural gas. The Russian state, through pseudo-autonomous “national champions,” tightened its control over oil and natural gas supplies to the rest of the world, reinforcing its monopoly over oil (Transneft’) and gas (Gazprom) export pipelines.⁷ This was accompanied by a growing international assertiveness, including an apparent willingness to use the (threat of) cut off of energy supplies to achieve political objectives, raising anew the issue of European energy security.⁸

In the light of these developments, the European Union has initiated efforts to form a common energy policy and seek ways to diversify energy—and in particular natural gas—supplies.⁹ And Russia, whose natural gas supply to Western Europe must pass through no longer subservient East European and former Soviet states, began looking to develop alternate export routes to lucrative European markets, to build pipelines that bypass those new states.¹⁰

Thus a complex and changing, albeit slowly, structure of interdependence has arisen. European net demand for imports is expected to grow by over 40 percent beyond 2010, and by as much as 80 percent by 2020, and consumption is expected to grow by 1.4 percent per year.¹¹ The EU depends on Russian/Eurasian supply for about 30 percent of its natural gas (about 130.5 bcm in 2006/7), and over 40 percent of its overall energy use, while another 15 percent of European demand is met by other imports from Africa and the Middle East, some in the form of liquified natural gas (LNG). About 65 percent of its gas imports come from Gazprom, which indeed produces some 17 percent of world output. Gazprom has proven gas reserves of 47.6 tcm, which will support over 78 years of production at current rates.¹² European dependence on natural gas supply through the Gazprom network has been growing steadily as domestic production has stagnated and begun to decline, while gas use continues to grow strongly (Fig. 3). Further, Gazprom provides Europe not only its own product, but also gas exports from Central Asia, which now largely lack alternative routes to the world market.¹³ Thus Gazprom is the sole supplier of Eurasian natural gas to Europe, selling about 165 bcm/yr. in Europe and providing almost two-thirds of Turkey’s consumption, 36 percent of Germany’s, 25 of Italy’s, and 20 percent of France’s domestic natural gas consumption (Table 1).

That supply, however, must pass through independent states even more dependent on Russian supplies, that have the capability to block trans-shipment, to “siphon off” natural gas for their own use if there is a shortage (see Fig. 4 for the main routes.) Furthermore, as its economy and energy use grow, Russia faces potential supply shortages at home, and the

⁷A colorful and detailed description of the process is contained in Chapters 5 and 6 of Goldman (2008).

⁸This energy leverage has so far been exercised openly only against former Soviet Republics, for example Moldova, Georgia, and Ukraine in January 2006, and Belarus in January 2007 (e.g., *Wall Street Journal*, December 23, 2006, and January 3, 2007). Europe’s muted reaction toward these action, however, may also reflect it.

⁹These are seen in the development of the EU energy strategy (EU, 2006), the Energy Charter, and the 2006 Green Paper (see Stern, 2006b).

¹⁰This has been emphasized by Gazprom as a means to enhance European “energy security” through enhanced reliability of its (near monopoly) supply. See the opening quote on Gazprom’s website (www.gazprom.ru/eng).

¹¹Stern (2006b) and OECD/EIA (2008). A portion of this demand is also being met by Azerbaijan through the new (2005) BTE pipeline shipping Shah Deniz natural gas to Erzurum in Turkey (see *EDM*, 5, 91, May 13, 2008).

¹²Here and below we use the standard metric measures of gas volume: mcm—10³ cubic meters; mmcm—10⁶ cubic meters; bcm—10⁹ cubic meters; tcm—10¹² cubic meters. These can be converted to cubic feet at 35.315 ft³/m³.

¹³Central Asian natural gas contributed a further 6.5 percent of European supply in 2006-7. Thus Gazprom, and hence the Russian state, controls some 20 percent of world output, a larger share than OPEC in the oil market (see OECD/IEA, 2008; OECD/EIA, 2008).

Table 1. Gazprom Export Sales, 2006–2007

Country	2006	2007	Percent of domestic gas use in 2006
Europe			
Germany	34.4	39.0	36
Turkey	19.9	23.4	64
Italy	22.1	21.0	25
France	10.0	9.8	20
Hungary	8.8	7.4	79
Czech Rep.	7.4	7.0	47
Poland	7.7	7.0	54
United Kingdom	8.7	n.a.	n.a.
Baltic States	4.9	6.9	78
Slovakia	7.0	6.3	100
Austria	6.6	5.4	74
Netherlands	4.7	n.a.	n.a.
Finland	4.9	4.7	100
Romania	5.5	3.9	28
Belgium	3.2	n.a.	n.a.
Bulgaria	2.7	3.4	82
Greece	2.7	3.2	96
Serbia	2.1	2.1	87
Croatia	1.1	1.1	37
Slovenia	0.7	0.5	64
Switzerland	0.4	0.3	12
Bosnia	0.4	n.a.	n.a.
Macedonia	0.1	0.1	100
CIS states			
Ukraine	59.0	63.4	66
Belarus	20.5	21.6	98
Georgia	1.9	1.0	35
Azerbaijan	4.0	0.0	100
Other sales	0.4	n.a.	n.a.

Sources: Compiled by author from EIA, 2007 (2007 sales data and 2006 domestic shares) and Gazprom's website (www.gazprom.ru; 2006 sales data).

possible inability to fulfill supply contracts to Europe.¹⁴ Gazprom anticipates 561 bcm of natural gas output in 2008 vs. 556 in 2006 and 550 bcm in 2007, and plans to increase

¹⁴On July 4, 2008, Gazprom President Alexei Miller announced that Russian gas output will remain essentially constant through 2009 at around 560 bcm per year (*EDM*, 5, 136, July 17, 2008).

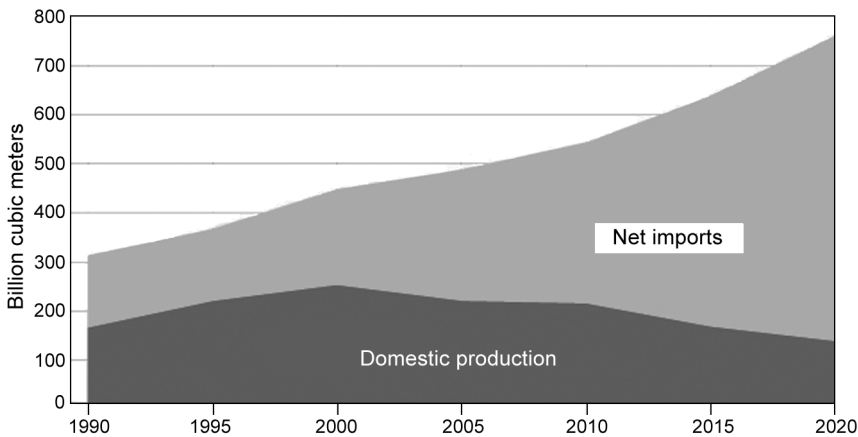


Fig. 3. European natural gas demand.

production to 560 bcm by 2010, and 580–590 by 2020. And OECD/EIA (2008) anticipates overall Russian production (much consumed internally) to grow from 830 bcm (29.3 tcf) to 1022 bcm (36.1 tcf) per year from 2005 to 2015. But the Russian Energy Strategy (Energeticheskaya, 2003) foresees exports only rising from 194 bcm in 2000 to 250–60 in 2010 to 273–81 bcm in 2020. This is indeed a very moderate increase given anticipated European demand.¹⁵ This Russian supply is, however, enhanced by control over most of the exported supplies of natural gas and oil produced by the former Soviet Republics in Central Asia, although they too are looking for alternate export routes. Uzbekistan, Turkmenistan, and Kazakhstan have proven reserves of about 4.3 percent of the world volume (7.5 tcm), and produce some 145 bcm of NG and export about 88 bcm to/through Russia; the rest is used in Central Asia.¹⁶ Until alternate routes are effectively established these supplies will continue to be available to meet Russian export commitments.

On the other hand, Russia, and indeed all the producers in this region, find themselves substantially financially dependent on Europe, on the revenues generated by their export of oil and natural gas. Gazprom receives about 65 percent of its revenues from Europe, and directly generated 8 percent of Russian GDP in 2005. Indeed, over 40 percent of the Russian budget, most of the Russian Stabilization Fund, and almost 25 percent of Russian GDP depend, directly or indirectly, on the export of energy (World Bank, 2004, 2008).¹⁷ Until new export routes and buyers are established, these states are financially dependent on their European, and transit state, buyers. So the disruption of supply would carry quite severe consequences for both sides of this interdependent relationship. The EU and eastern Europe would face breakdown of production and sharp decline in living standards from the absence of needed energy, while Russia and other former Soviet suppliers would encounter severe

¹⁵See report of Jeremy Maxie (2006), and the discussion in Stern (2005, Chapter 5).

¹⁶Turkmenistan has recently allowed an international audit of its reserves, which have vastly increased estimates. The South Yolotan-Osman field is now estimated to hold 4–14 tcm (140.6–494.41 tcf), two to five times existing known reserves (Chazan, 2008b).

¹⁷On May 27, 2008, Dmitriy Medvedev noted at the Gazprom Board Meeting that 20 percent of the Russian budget is formed with revenues from Gazprom (*Vedomosti*, May 27, 2008).

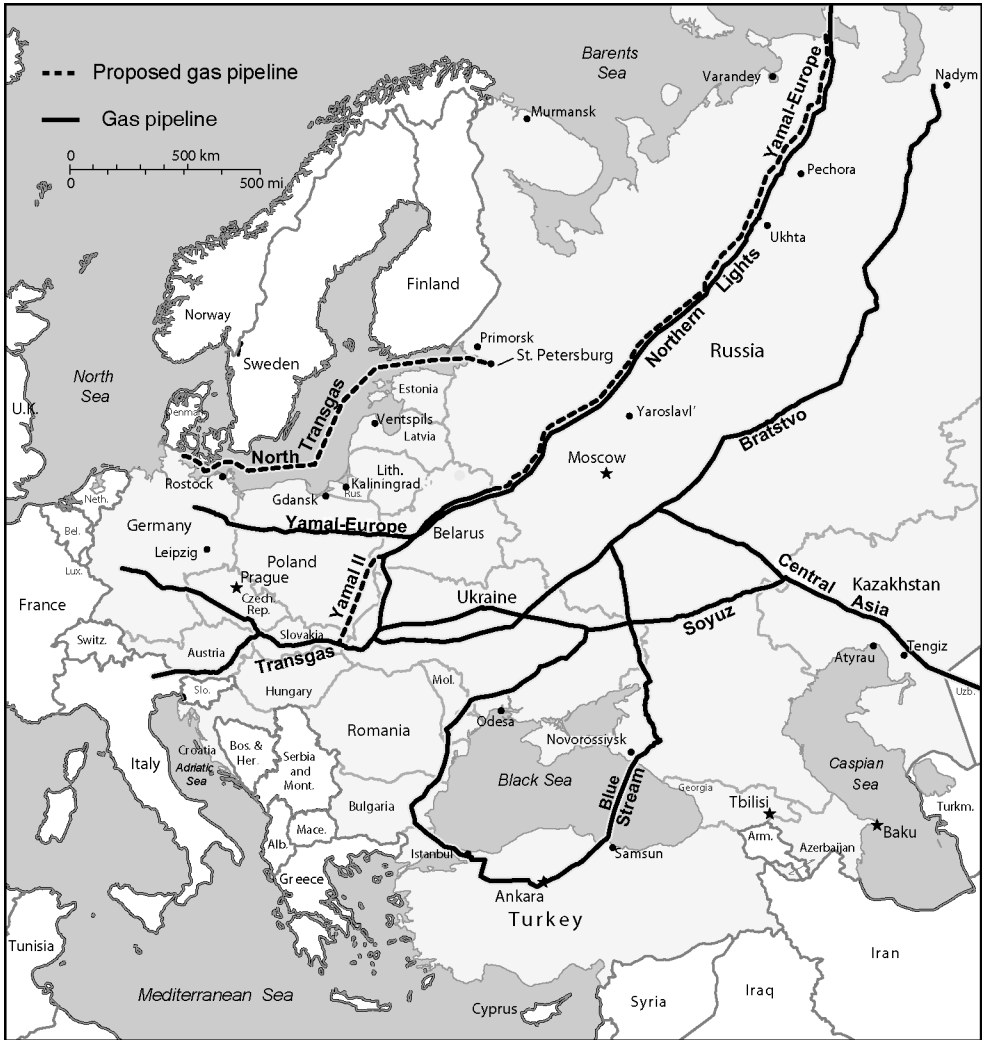


Fig. 4. Current natural gas export routes to Europe.

financial difficulties, disrupting government transfers and investment and import plans, should the disruption last. A mutual dependence, with political overtones, exists, raising “security issues” for both sides of this tied “market.” Thus, both sides have built reserves, of natural gas and cash respectively, to weather a crisis, and all are seeking ways to “diversify” away from their vulnerability.¹⁸

¹⁸There are only four storage facilities in Europe due to high costs of storage: Latvia, Schoenkirchen in Austria, Reden in Germany, and Humbly Grove in England (Gazprom, 2008). Ukraine also has 35 bcm storage capability along its transit route. Russia has built up a “stabilization fund,” now divided into “welfare” and “reserve” funds, of over \$450 billion by early 2008. The former can temporarily buffer against supply disruptions, while the latter protects against a fall in energy prices, as well as payment stoppages due to supply disruption.

STRATEGIC IMPLICATIONS

Nature of Pipeline Dependence

Pipelines create a unique channel from supplier to user, even if with multiple sellers and buyers serially arranged along it. Given a cost structure involving minimal variable (unit) costs, and extraordinarily high fixed (set-up) costs involved in turning to any alternative, pipelines inevitable generate a natural monopoly on the supply side. By their physical structure, they also open up the possibility of monopsony demand, if the relatively few buyers cooperate in dealing with the monopolist. Thus pipeline networks impose a “lock-in” relationship, where the deep dependence without alternatives imposes non-market bargaining and allows the potential for political leverage to play a decisive role in the high-stakes game of dividing the large surplus generated by supplying high-value demand for clean energy.¹⁹ This is seen in both the “terms of supply,” and the price paid, allowing both political leverage and “rent extraction.” The latter is exercised through price, which is bounded below by unit costs of production plus the low marginal cost of pipeline transport, and from above by the (relatively much higher) costs to the users of retooling to use alternative fuels. The absence of competitive pressures in pricing has led to “political” prices, reflecting more interstate relations than costs and benefits (e.g. between Russia and its newly independent neighbors), and the balance of market power when stronger states interact. The latter has led to a negotiated pricing formula (“netback market value”)²⁰ for delivery of natural gas to Europe based on the market price of a primary potential fuel substitute, oil.²¹ Given this highly advantageous price to the seller, Russia has put considerable effort into convincing Europe that it is an unquestionably reliable supplier, which can be trusted to meet a substantial and growing part of Europe’s energy needs with both its oil and natural gas.²² As noted above, Gazprom’s dependence on European purchases also makes it vulnerable to negative impacts of gas supply disruption, although it has substantial direct control over whether that occurs.

With respect to East European countries and states of the former Soviet Union, Russia is in a stronger position, albeit with one substantial vulnerability. Those countries are far more dependent on Russian natural gas than Western Europe, due to ties imposed in both the Soviet Union and the “Socialist Commonwealth” (COMECON or CMEA).²³ The states of the former Soviet Union, and in particular those remaining in the CIS, are especially

¹⁹This situation holds not only with respect to the Russian-European pipeline network, but looms large in the negotiations over all new pipelines that cross several international borders. In particular TAPI, intended to bring Turkmen gas through Afghanistan to Pakistan and India, and IPI, to bring Iranian gas to Pakistan and India, are subject to the same political concerns deriving from India’s relations with Pakistan, an essential transit state, and the reliability/intentions of the ultimate suppliers, Iran and Turkmenistan. See, for example, the discussions in Pandian (2005) and Verma (2007).

²⁰See the discussion in Stern (April 2007, pp. 1-4).

²¹This has led European natural gas import prices to rise from below \$70/mcm in 1998 to an expected price of over \$400/mcm in 2008 (see Stern, 2005, p. 178 and Gazprom, 2008). The collapse of oil prices in the fall of 2008 may reduce gas prices in Europe back to around \$200/mcm by the end of 2009.

²²This is a primary theme on the Gazprom website (www.gazprom.ru/eng/), and one repeatedly emphasized in speeches by its head, Alexei Miller.

²³In 2006–2007, the Baltic states received 78 percent of domestic gas consumption from Gazprom, Belarus—98 percent, Ukraine—66, Georgia—100 percent, and even Azerbaijan over 35. Among former CMEA countries, the Czech Republic received 79 percent, Hungary—54, Poland—47, Moldova, Slovakia, and Macedonia—100 percent, Bulgaria—96, Serbia—87, Slovenia—64, Croatia—37, and Romania—26 percent. Finland is also 100 percent dependent on Russian natural gas supply. See EIA (2007) and Finon and Locatelli (2008).

vulnerable due to the structure of production and technologies inherited from the Soviet Union.²⁴ For almost 15 years that structure has been supported, in part, by heavily subsidized natural gas from Russia, initially at essentially the same level as Russian domestic prices, leaving these countries particularly vulnerable, both physically and financially, to supply disruption and/or price increases. This greatly enhances network dependence and hence the leverage Russia has for pursuit of both economic and political objectives. The one “counter-vailing power” that a number of these countries have, however, is that they control sections of the pipeline system needed to export to Europe, the ‘deep pocket’ of final demand for energy in general and Russian/Eurasian natural gas in particular. Almost 80 percent of Russian gas exports pass through the Ukraine, with 11 percent further transiting Moldova, and the remaining 20 going through Belarus and then Poland (see Fig. 4). Thus Ukraine and Belarus have some leverage over Russia, and indeed Europe, through their ability to independently disrupt Russian natural gas supply to Europe.

Thus European vulnerability is exacerbated by the fact the Europe not only faces the ultimate monopoly supplier, but also must deal with uncertainties introduced by relations between that supplier and a number of ‘transit’ states, who are even more dependent than Europe on the Russian and Eurasian supply of natural gas to meet their energy needs. The transit states are indeed hit on both sides, physical and financial, by disruptions in the network flow, both as necessary users and as recipients of income from “transit tariffs.” As the events of January 2006 (Ukrainian and Moldovan gas cutoff) and January 2007 (Belarus oil cutoff) indicated, European supplies of natural gas are subject to disruption from political difficulties between Russia and the former western republics of the Soviet Union, despite the costs to the latter (see *Wall Street Journal*, January 3, 2006 and January 3, 2007).²⁵ Steady and secure supply requires that all countries along the pipeline cooperate in maintaining that supply, and find it in their interest to do so. Transit countries, of course, have a similar, if lesser, financial interest in maintaining steady supply as do the ultimate suppliers Russia and the states of Central Asia due to the transit fees they can charge. But that interest can be trumped, as we have seen, by more direct perceived threats to their economy, sovereignty, or security. And that creates an energy security problem further downstream for European customers, as well as potential revenue problems for the producing states.

While both types of losses can be partially buffered against, using (very expensive) natural gas storage facilities and financial reserves respectively, that only provides a temporary solution, negotiating time, before the “buffers” are exhausted. And then the physical lack of the energy input becomes a far more serious problem, directly impacting people’s lives and production activity; financial difficulties can always be addressed on world credit markets, unless comprehensive international sanctions (near war conditions) are in place.²⁶ Each of these impacts has in turn further ‘domino’ effects, disrupting production, distribution, investment, consumption, etc., activities farther downstream which depend on either the output or

²⁴These countries, and indeed Russia, were, and remain, far less efficient in the use of energy than any other developed or newly industrialized, non-socialist, countries in the world. See IEA (2007) measures of energy efficiency.

²⁵Russia also threatened in January 2008 to reduce gas supplies to Ukraine due to lack of payment, but held off, perhaps due to earlier European reaction to the 2006 cutoff; EDM, 15 February 2008. Turkmenistan has used similar leverage in a price dispute with Iran, cutting supply in January 2008. Iran then cut supplies to Turkey which intercepted Azeri exports to Greece, and beyond (*World Gas Intelligence Report*, January 19, 2008).

²⁶Of course, a global financial crisis, as in September–November 2008, may also prevent turning to (collapsed) credit markets for financing. But under such conditions, financial default becomes an easier option, while lack of energy inputs becomes even more critical.

revenues from the initially supply-disruption impacted activities. Indeed, despite “buffering,” prudence dictates that, even with only a partial disruption, some diminution in supply (on the one side) and revenues to ultimate users (on the other) must take place to hedge against a longer period of disruption.

Asymmetric Interdependence

The last 30 years has thus seen the development of an asymmetric structure of interdependence, i.e. mutual dependence on the continual pipeline flow of natural gas, outlined above. It is asymmetric, for at least two reasons: (1) disruption imposes very different costs on the various actors within the gas production-transportation-distribution system, allowing some to manage those costs far more easily than others; and (2) actors have very different control levers, abilities to influence the flow and its impact on others.

Users, including transit states, are particularly vulnerable, and lack levers other than nonpayment or “self denial” of natural gas, individually or, at best, collectively. The physical lack of natural gas has a very direct impact in reduced production, particularly of electric energy and hence on the output of industrial and commercial users thereof, and in the welfare of people, particularly in winter, due to the lack of heating and cooking fuel, as well as electricity as a substitute power. These are immediate costs, affecting physical activity and well-being that cannot be borne for too long without threatening economic breakdown and political and social instability. Thus, users must try to protect themselves, against even short disruption, through physical stockpiling (expensive storage), developing alternative sources for any disruptable supply, and perhaps maintaining flexible technologies that allow effective use of alternate energy carriers.²⁷ But these costs are so serious that a situation of supply disruption cannot last—at least minimal physical supply must be maintained at almost any cost. Individually users are unable to impose significant costs of any sort on suppliers, even in the long run. Collectively, however, they can generate the primary cost of gas supply disruption for suppliers—denial of income. This is, however, a threat that can only bite in the longer run.

Suppliers and trans-shippers (as such) have direct control over the flow of natural gas to users, control which is only limited by the availability of alternate gas (namely, LNG) supplies or by-pass pipelines, and their willingness to bear the financial consequences of their decisions. If they exercise their ability to interrupt the flow of gas, then they suffer a financial opportunity cost; they do not receive the income that is expected and committed to necessary expenditures, e.g. supporting government activity, social objectives and incomes, investment in both the gas industry and other sectors, and incomes of a perhaps significant (politically, if not in numbers) portion of the workforce. These are largely longer-term costs which do not immediately impact overall economic activity, except in a broader financial-economic crisis, as they can always be compensated for through fiscal and monetary policy borrowing and emission to finance what is truly immediately necessary. There are, of course, some immediate gas industry costs of cutting back on the continuous flow of natural gas production, and the storage or diversion of now unsold gas, but these are minor compared to those of the general disruption of economic activity in using countries. The long-term financial costs can, however, eventually become as binding and devastating as the physical loss of gas supply, if

²⁷For example, oil and coal based electric power generation. It is, however, quite costly to maintain such backup capabilities, leading to their gradual reduction in Europe over the past two decades (see Stern, 2007).

the pipeline disruption and hence lack of substantial income is sustained long enough, exhausting financial reserves, straining the willingness of international markets to continue providing credit, and perhaps triggering serious inflation due to excess monetary emission as a substitute for natural gas revenues.

This dependence “threat-asymmetry” is only amplified when the supplier of the physically necessary input has substantial ‘market power’. That is indeed the case with any pipeline supply of natural gas to an individual company, which inevitably faces a (natural) monopolist in the company controlling the single attached pipeline. This “monopoly power” can be met with a countervailing “monopsony power” if using firms collectively organize for purchasing, but even this can be ineffective when facing a sole supplier whose pipelines go to many different countries, allowing it to play off one against the other. The nature of such asymmetry in market power (beyond the ‘threat asymmetry’ discussed above) has led to the intervention of national governments into the negotiations over terms and amounts of supply of “dry” natural gas throughout the world, an effective “nationalization” of these commercial relations. But in the face of a trans-national supplier, operating as a “national champion” for a near monopoly supplying nation, even these state-level negotiations remain ineffective in softening the asymmetry. And that has spurred the countries of the European Union to begin considering a coordinated European negotiating position and response, the creation of a true monopsony buyer, to respond to the market power of the monopoly supplier, Gazprom and the Russian Federation.²⁸ It is also a spur to the search for, and development of, alternate sources of gas supply, and more broadly, alternate sources of energy forms/carriers.

Russia as Energy “Superpower”

Thus the structure of pipeline interdependence has given Russia substantial leverage, both economic and political, with respect to Europe. This potentially allows it to extract not just (or only) financial benefit, but also to exercise influence and stimulate outcomes in other areas of interest to the Russian state.

Russian exercise of pure market power is costly, but not devastating, to European economic performance and growth, merely extracting rents and raising the costs of economic activity. Further, a purely economically monopolistic Russia has a strong stake in avoiding any disruption, least it lose its substantial profits. To the extent that Europe can organize to apply countervailing monopsony power, there is a mutually beneficial negotiated outcome, a situation which has arguably prevailed for the past 30 years. In such accommodation, Gazprom (Russia) has a clear upper hand in determining the price at which dry gas will be provided to each European country, in large part due to the asymmetry of costs, discussed above, that arise from any breakdown of the gas supply regime; breakdown imposes the far more serious costs of disruption of supply also discussed above. Finally, excessive exercise of market power is ultimately self defeating, as it undercuts that market power, stimulating the development of alternatives which it renders cost effective.

Since Putin’s reelection in 2004, however, it has become increasingly clear that Russia intends to exercise that market power, and the implicit threat that stands behind it, to achieve far more than merely economic objectives. Indeed, Putin has made it clear that Russia views

²⁸This is a large part of the logic behind the European Energy Charter Treaty and Transit Protocol, first activated in 1998, and by 2004 signed by 51 European and Asian countries, with only 5 failing to ratify—Russia, Belarus, Australia, Iceland, and Norway. The United States and Canada are not signatories, and Russia is resisting ratification (see Stern, 2005, pp. 135–139).

its position, as critical supplier, as a key to restoring Russian influence in the world, and in particular in its own neighborhood, the “near abroad” consisting of the newly independent states of the former Soviet Union.²⁹ This substantially raises the stakes for all participants locked into the asymmetric network, as not only economic prosperity, but core political values and interests come into contention and under risk. For Europe, the cost of securing sufficient energy has become acquiescence in arbitrary Russian action with respect to its neighbors, and substantial compromise with situations and positions it finds distasteful, in order to avoid jeopardizing access to substantial Russian energy supply, including currently irreplaceable natural gas.³⁰

The political significance of this substantial Russian market power is further revealed by the substantial Russian efforts to enhance that power/leverage in the past several years. Those efforts have come in seven different directions: (1) exploiting its monopsony position vis-à-vis Central Asian suppliers, contractually locking in supplies, and taking ownership shares in producers and processing; (2) obstructing efforts of Central Asian suppliers to bypass the Gazprom export pipeline system, both directly (e.g. through raising environmental concerns) and indirectly by providing alternative routes/pipelines that render new pipelines unprofitable; (3) constructing new pipelines, bypassing transit states and hence undercutting their hold-up power, increasing supply capacity and flexibility and hence European dependence on Russian supply; (4) buying into (i.e., securing equity) European users’ distribution systems, tying them more tightly to Russian (Gazprom) supplies and reducing their support for alternative sources; (5) maintaining Gazprom’s monopoly over Russian (and Central Asian) gas exports by expropriating and/or blocking foreign ownership of gas reserves and gas production and transportation operations in Russia; (6) encouraging diversion of uncontrolled supply (e.g., Qatar and Iran) away from Europe; and (7) taking equity stakes in foreign suppliers to influence their sales of natural gas (e.g., Algeria to Europe). Most recently, Russia has raised to prospect of creating an international cartel, similar to OPEC, to “stabilize the market” for natural gas.³¹ Each of these activities works to maintain and/or enhance the market power of Russia (Gazprom) as a supplier to Europe, and hence increase the ‘rents’ it can extract from Europe, both financial and political. And each is a response to some European proposals/initiatives to manage asymmetric dependence and enhance its energy security.

MANAGING ASYMMETRIC INTERDEPENDENCE

The “Competitive” Solution: Maintaining Alternatives

This mutual, if asymmetric, dependence between Russia and Europe arises largely from the natural “lock-in” imposed by the pipeline system. This gives Russia monopoly power

²⁹Putin’s dissertation, statements in Europe, at Valdai, and his national call-in programs for Russian citizens. See Balzer (2005), Goldman (2008), and the Russian President’s website (www.kremlin.ru/, 2006–2008), where a complete listing, and access to full texts, is available.

³⁰This European “hesitation” was most recently evident in the German position and statements at the EU summit called to discuss and respond to the Russian invasion of Georgia in August 2008 (*EDM*, 5, 162, August 25, 2008, and 5, 184), September 25, 2008; see also the debates of the European Parliament, reported in *RFE/RL Russia Report*, October 24, 2008, containing articles from October 22, 2008).

³¹The issue was raised earlier by Putin in 2002, but had lain dormant until now. Representatives from Russia, Qatar, and Iran, the top three holders of proven natural gas reserves with 60 percent of the world total, met October 21 in Tehran to discuss forming a gas exporting cartel (see *RFE/RL Russia Report*, October 22, 2008, and the AP report published in the *Wall Street Journal*, October 22, 2008).

with respect to European, and non-producing former Soviet, users, and monopsony power with respect to Central Asian suppliers. Thus Russia has a predominance of bargaining power in the inevitably political state-to-state negotiations that determine natural gas trade quantities and prices,³² as any disruption imposes particularly serious costs on those with a direct physical dependence on the network.

Such a situation, once recognized, calls for mitigation. One obvious way to mitigate the consequences of an essential network tie in is to make that network less essential, to reduce the monopoly/monopsony power of the dominant agent in the network, by providing viable, if perhaps somewhat more costly, alternatives.³³ Thus users must seek to develop alternative supplies, new pipelines and liquified natural gas capabilities, to introduce competition in both sources and means of transmission, making it much more difficult, if not impossible, for suppliers to “hold-up” users for bargaining concessions. Similarly, those financially dependent on network generated revenues (producing and transit states) can mitigate their dependence by developing alternative outlets for their supply, adding pipelines from the same sources to new users. While introducing competition typically raises total economic costs, due to the large investments required, it reduces moral hazard, hold-up opportunities, and rent extraction by those with market power, and hence the direct costs to end-users.

This is recognized by all the parties involved, and has led each to begin exploring alternatives to the particular dependency that they face. The Eastern European transit countries (Belarus, Moldova, Ukraine) have apparently the fewest alternatives; they do not have the resources to develop alternative suppliers or users, and only Ukraine has a location amenable to alternative sources of supply. Indeed, any lessening of dependence of suppliers or users on the existing network only weakens their bargaining position, their ability to impose costs on those on whom they are dependent for both energy and revenue. The Central Asian states, as primary suppliers of gas and indeed, in some estimates, essential to Russian ability to meet its contractual obligations, are looking to diversify export routes to China, to South Asia, and across the Caspian to the West. Kazakhstan has begun to develop a major natural gas pipeline to China, with substantial financial help from that country (see Fig. 5). A 1338 km joint pipeline, with 40 bcm capacity, is expected to be completed at the end of 2009, and will connect from the Uzbek border to Khorgos in China, carrying both Uzbek and Kazakh gas (*EDM*, 4, 237, December 21, 2007).³⁴ It has also been exploring, with European and American encouragement, the possibility of a trans-Caspian natural gas pipeline for export of gas from its massive, but slowly developing, Kashagan field in the north Caspian. Currently 8 of the 27 bcm of natural gas produced by Kazakhstan is exported through Russia, but that production is expected to rise to 60 bcm by 2015, most of which will be available for export (*EDM*, 4, 97, May 17, 2004).³⁵ Pushed by Azerbaijan since 2006, the trans-Caspian pipeline would have a 30 bcm/yr capacity, feeding both Kazakh and Turkmen gas through Azerbaijan and Georgia through Turkey to Europe (*EDM*, 3, 62, March 30, 2006 and 4, 220, November 28, 2007).

³²When first establishing the export pipeline system in the 1980s, bargaining power was of course much more evenly distributed, as Europe did not yet have a direct physical dependence on Russian gas, and Russia did not yet have any revenues to lose from not supplying Europe. The strong asymmetries discussed above arose only after network establishment, and the economic adjustment, particularly in Europe, to the opportunities it presented, created the dependencies we see today.

³³Even without political considerations, there is a trade-off to be made between the “rents” paid to market power and the costs of reducing/avoiding those rents.

³⁴The initial, all-Kazakh portion of the pipeline is to have a capacity of 10 bcm/yr from 2014 (see *EDM*, 5, 149, August 5, 2008).

³⁵See also www.eia.doe.gov/emeu/cabs/Kazakhstan/Natural Gas.htm.



Fig. 5. The proposed Kazakhstan–China pipeline.

Turkmenistan and Uzbekistan have also been in discussions with China; Turkmenistan signed an agreement with China in April 2006 to develop a major (30 bcm capacity) natural gas export line to the east, and signed a development agreement with the Chinese National Petroleum Company on July 17, 2007. Uzbekistan also signed, in April 2007, an agreement with China for a 530 km, 30 bcm capacity, gas pipeline to China (see *EDM*, 4, 51, March 14, 2007 and 4, 141, July 20, 2007).³⁶ Turkmenistan has further long been in discussions with Western energy companies over the development of a 33 bcm capacity export pipeline through Afghanistan to Pakistan and India (TAPI—see Fig. 11 below and *EDM*, 5, 83, May 1, 2008).³⁷ Having such alternatives both reduces Russian leverage (monopsony power), and increases the bargaining power of these states in the negotiation over supply to/through Russia, as can be seen in the substantial price increases they have been able to recently negotiate.³⁸ Azerbaijan is similarly working on developing gas export capabilities to the West through Georgia and Turkey, as discussed below.

Europe, as the major provider of revenue to the network and the primary consumer of network natural gas, has also been discussing, and sporadically working toward, diversifying its sources of natural gas. This has involved the extensive discussion of, and some steps toward

³⁶Progress on the joint Kazakh-Uzbek-Chinese project is reported in *EDM* (5, 149, August 5, 2008). A report by *Eurasianet.org* (May 11, 2007) outlines Uzbek efforts to establish a route to China.

³⁷This followed up on a December 2002 agreement to sell 20 bcm/yr. to Pakistan through a TAP pipeline (*EDM*, 5, 51, March 18, 2008).

³⁸See Blagov (2006b) on the 40 percent Turkmen increase in price paid by Gazprom (see also *EDM*, 5, 50, March 17, 2008). These prices will undoubtedly be subject to renegotiation in 2009, as effective demand falls in Europe with the ongoing recession, reducing what Europe, and hence Gazprom, is willing to pay for transshipped Central Asian gas.

developing, new supply pipelines that are not subject to Russian (Gazprom) control. Of particular importance to this effort is the opening of new pipeline access to Central Asian supply, which requires a pipeline crossing the Caspian Sea and passage through Turkey. Such a pipeline might also allow a connection in Turkey to Middle Eastern gas supplies from the Gulf, once the political situation stabilizes in that region. Europe has also been trying, through legal and regulatory means, to prevent further monopolization of the supply network particularly within Europe. The latter has involved resisting Gazprom efforts to acquire substantial equity stakes in European distribution and storage systems, unless and until Gazprom allows European equity stakes in its production and transmission systems in Russia and Eastern Europe.³⁹

Russia and Gazprom have even been more active in seeking to mitigate their (in particular financial) vulnerability to network disruption. They too are looking to develop export opportunities outside this Eurasian network, in particular to East Asia. But their primary approach has been to strengthen their lock on network supply by taking measures that undercut the non-network alternatives of others, alternatives which might counter Russia's lock-in advantage. The thrust of Russian initiatives in this area, the pursuit of the seven types of policies outlined above, has thus been to strengthen her leverage over the other participants in the pipeline system by blocking, to the extent possible, the development of competition in gas supply.

European Initiatives and Russian Response

European initiatives to deal with this situation of asymmetric dependence have been weak and inconsistently pursued, not the least because Europe is not a coherent political unit, but a collection of states aspiring to coordination in policy. Russia, on the other hand, has been able to effectively block, undercut, or counter virtually every proposal that the EU has considered pursuing. Let us look here at a number of the major proposals, and the Russian/Gazprom response.

European Energy Charter Treaty (ECT) and Transit Protocol. The ECT and its Transit Protocol comprise an integral part of European energy security policy. They constitute an international agreement that was "... to provide greater certainty to both participants and investors in gas commerce" (Stern, 2005, p. 137). Its importance to European energy security was reemphasized in the March 2006 EU Green Paper, strongly influenced by the impact on Europe the January cutoff of gas to Ukraine.⁴⁰ Signed in 1994, it became active in 1998, and by 2004 had been signed by 51 EU, Asian, and other European countries, with only 5 failing to ratify. Russia, however, was not a signatory, and has become increasingly vociferous in its refusal to join the convention.⁴¹ Gazprom has strongly opposed allowing automatic third-party access to its pipelines, which would reduce its gas export monopoly by allowing other producers (Russian and Central Asian) to use the network for their own sales rather than having to sell to the Gazprom monopsony in order to export to Europe. Russia has also opposed treating the EU (as the Treaty requires) as a single entity, as it prefers to negotiate from a position of strength with each EU member individually. In negotiations, Russia

³⁹This is a major objective of the ECT and Transit Protocol discussed below. It also lies behind the EU anti-trust proposal to ban ownership of transportation infrastructure by producers (see *EDM*, 3, 79, April 24, 2006, and EU Pipeline, 2007).

⁴⁰See the analysis in Socor (2006a).

⁴¹Belarus, Australia, Iceland, Norway, the United States, and Canada also are not signatories. The natural gas supply of Belarus is effectively subject to Russian control, Norway is the primary European supplier and an alternative to the Eurasian network, and the others are not directly involved in Eurasian gas commerce.

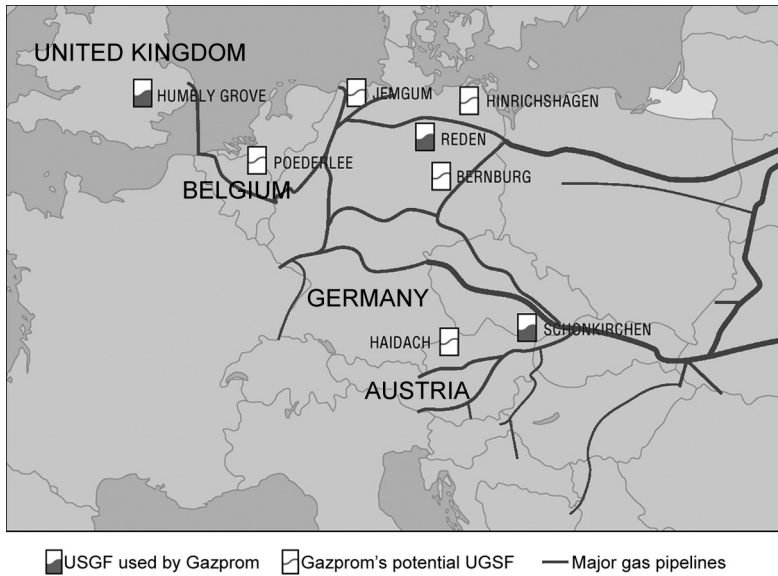


Fig. 6. Gazprom's European distribution plan.

has demanded a “right of first refusal” for existing transit shippers (i.e. Gazprom), allowing them to extend terminating transit contracts before the capacity could be offered to other shippers, thus supporting its ability to deny capacity to other suppliers. And Russia has objected to the suggested methodology for setting transit tariffs, preferring freedom to exercise its monopsony power. These and numerous other issues were folded into the negotiations on WTO entry in 2004, where they remain largely unresolved, with Russia effectively blocking the implementation of ECT in this most important area of pipeline-delivered gas from Eurasia.⁴²

Meanwhile, Gazprom has moved aggressively to acquire stakes, and in some cases control, over natural gas distribution systems in various European nations. It has been particularly successful in southeastern Europe, Germany and the Netherlands, and is actively seeking to enter into other national gas distribution systems, including that of Great Britain (see Fig. 6).⁴³

⁴²Some of the key relevant issues in WTO negotiations in 2003–2004 were: 30 percent Russian export tariffs; Russian industry gas subsidies; demonopolization of Russian exports (allowing Russian and Western companies to independently export Russian natural gas); the lifting of transit restrictions on central Asian supply; non-discrimination in transit tariffs between domestic and export markets; the right of foreign investors to export gas through Gazprom pipelines and build their own transit pipelines. See Stern (2005, pp. 135–239); see also Åslund (2007) and Tarr (2007).

⁴³By the end of 2006, Gazprom had struck deals with 11 national gas distributors allowing it direct access to consumers, and was in serious negotiations with three more (*Financial Times*, December 21, 2006). These include buying into Gaz de France, Wingas in Germany, Central Energy Italian Gas (with ENI) in Italy, and Pennine Natural Gas in Great Britain. In 2007, Gazprom directly entered the Austrian retail market through subsidiaries GHW and Centrex Europe Energy and Gas, and gained direct pipeline access to Great Britain when the Netherlands (Gasunie) joined the North European Gas Pipeline project described in greater detail below (see EDM, 3, 55, March 24, 2006; 4, 104, May 29, 2007; and 4, 209, November 9, 2007, respectively). On Gazprom's inroads into the U.K., see Chazan (2008a).

This has led to the European Commission proposing anti-trust legislation that would prohibit NG producers from owning distribution systems, as a means of checking the market power of suppliers and fostering competition. Needless to say, Gazprom and Russian government officials have strenuously objected to this effort to limit market power, correctly perceived as aimed at their best interests.⁴⁴ Despite its potential value in limiting Gazprom/Russian leverage, the implementation of this proposal remains unlikely as it would also force some European state energy enterprises to divest.

Natural Gas Source Diversification. Alternative sources for gas energy that might introduce competition and hence reduce dependence on Russian natural gas include Algerian gas through a Mediterranean pipeline, African (Nigerian, Libyan) and Middle Eastern (Oman, Qatar) liquified natural gas, and gas by (alternate) pipeline from the Caspian region (Central Asia and Azerbaijan) and the Middle East. In most cases, Turkey becomes an essential gas pipeline corridor, while liquified natural gas generally requires coastal facilities. Liquified natural gas remains, and is expected to remain, a quite small share of European gas usage for the next couple of decades (to 2030), due to the large investments required not only by users but by producers in order to put gas into that more readily transportable form (OECD/EIA, 2008). Each pipeline alternative, however, also requires substantial investment, and a long term commitment of supplies, to be commercially viable, but can provide substantial energy flows within a couple of years, if the commitment is made. But that commitment has yet to be fully made, although some contracts have been signed and begun to be implemented.

There are four pipelines of interest here. The most basic, and yet to make any progress, is a trans-Caspian pipeline that could bring Central Asian natural gas from Kazakhstan (Kashagan Field) and Turkmenistan (Yolotan-Osman), as well as Uzbekistan, to the developing pipelines in the Caucasus and then across Turkey (or the Black Sea) (e.g., see Cutler, 2003). The development of this pipeline has been strenuously opposed by Russia, which has applied political pressure on the region's governments, raised environmental concerns about the Caspian seabed, and tied up available and future supplies of Central Asian gas in long-term Gazprom contracts.⁴⁵ As long as the gas is sold to Gazprom, Russia guarantees acceptable financial returns to these states for all the gas they can produce, without the expense and risk of attempting to develop alternate export routes.⁴⁶

On the European side of the Caspian, there is the Baku-Tbilisi-Erzurum gas pipeline, running alongside the Baku-Tbilisi-Ceyhan (BTC) oil pipeline, to Erzurum, which brings some Azeri (Shah-Deniz field) natural gas into Turkey. This, when completed, will allow connection for Caspian natural gas to two major pipeline projects, whose current status is still up in the air, NABUCCO and the TGI (Turkey-Greece-Italy) Interconnector Pipeline. An agreement on July 26, 2007 was signed, initiating development of the latter, with a capacity of 11.2 bcm/yr. by 2012.⁴⁷ However, NABUCCO (Fig. 7), initially designed by Austria to carry Iranian natural gas to Europe, remains at the stage of preliminary investigation (planning and

⁴⁴For a concise summary, see European (2007). Gazprom responded by threatening to divert gas elsewhere, substantially raising prices in Europe (*Wall Street Journal*, November 21, 2007; *Vedomosti*, November 24, 2007).

⁴⁵Russian opposition is outlined in Blagov (2006a) and in EDM (4, 174, September 20, 2007).

⁴⁶The price they could directly secure from Europe would undoubtedly be higher, but there is a risk that the project might not ever be fully completed or that the costs would swallow up more of the extra revenue so generated.

⁴⁷Turkey will take 15 percent of this, leaving about 9.4 bcm for European use. This is only 7.2 percent of current European imports from Russia/Eurasia, and so will have only a limited impact on the gas supply situation. It could however become far more significant if trans-Caspian gas were to become available (EDM, 4, 151, August 3, 2007).



Fig. 7. Route of the proposed NABUCCO pipeline.

feasibility studies), with the first phase of construction only expected to begin in 2010. It will be partially operational in 2013–2014 (8 bcm capacity), but not fully ready to function at 31 bcm capacity until 2019.⁴⁸ Its viability, however, remains somewhat in the air, awaiting sufficient commitment from suppliers and users to make it a commercially feasible operation. It is possible that Azerbaijan’s new Shah Deniz field, and other untapped reserves offshore, will be sufficient to fill both NABUCCO and TGI, with its 1.2 tcm of proven reserves (e.g., see Socor, 2007a, 2007c). Without the addition of trans-Caspian gas, the long-run commercial viability of these alternative pipelines may be questionable, although sufficient political and financial commitment by the EU (and US) might render both, as well as the trans-Caspian pipelines, feasible. That political will, however, appears to be only very slowly developing.⁴⁹

Finally, there is a recently proposed new by-pass possibility for Caspian (and potentially Central Asian) natural gas, the so called “White Stream” pipeline. It was first proposed by Ukrainian officials in 2007 at a Vienna energy conference, and again on January 28, 2008, when Prime Minister of Ukraine Yulia Tymoshenko asked the European Union to consider participating in it. The pipeline would start from the South Caucasus Pipeline near Tbilisi and through western Georgia to Supsa on the Black Sea. It would then continue under the Black Sea to Crimea near Feodosia in Ukraine, linking to the Ukrainian domestic pipeline system, and/or continue offshore to Romania. It will have an initial capacity of 8 bcm, and the potential, if trans-Caspian gas is available, of 24 to 32 bcm annually (see Socor, 2006b, 2007b, 2007d, 2008). For Ukraine, this could provide a substantial alternative to the Russian monopoly gas supply, and up to 40 percent of its current imports at the higher capacity.

⁴⁸See the consortium’s webpage (<http://www.nabucco-pipeline.com/>). Over the past 18 months, its estimated cost has risen from \$5.8 billion to over \$7.4 billion (*EDM*, 5, 31, February 19, 2008).

⁴⁹See *EDM* (3, 127, June 30, 2006; 4, 176, September 24, 2007; 5, 25, February 8, 2008; 5, 31, February 19, 2008) for growing evidence of support by both users and suppliers. The BTC pipeline faced a similar initial problem, only overcome with sustained Western political commitment, in particular by the U.S. government. The dramatic rise in energy prices has rendered this initially commercially questionable infrastructure project a commercial, as well as political, success. See Shaffer (2005) on its origins.

As with European competition policy initiatives, Russia has acted vigorously to undermine these alternatives, as well as to protect itself from “hold-up” by the major transit countries.⁵⁰ This involves four major thrusts, each of which reinforces the (advantageous for Russia) asymmetry of the interdependent network relationship. The first involves bypassing the transit states with new natural gas (and indeed oil) pipelines, thus increasing supply capacity to match anticipated European demand. This in principle removes the need for new supply sources for Europe, while reducing the uncertainties in gas supply from “irresponsible” actions by transit states, hence providing Russian-guaranteed “energy security.” Of course, it begs the question of whether Russia will produce enough to be able to fill those pipelines—a level of production that requires the development of substantial new fields (Energeticheskaya, 2003; Stern, 2005, Chapter 5; Maxie, 2006).⁵¹ If not, meeting the promise of the new pipelines to Europe, and indeed maintaining current commitments, must rely on attracting ever increasing volumes of natural gas from Central Asian suppliers. Thus, the second thrust contains policies and actions to prevent, or at least seriously delay, the establishment of the alternative pipelines from Central Asia to Europe, by blocking proposed alternative routes and preempting (through long-term contracts and acquisition of producer equity stakes) the Central Asian natural gas supply in order to sell it through Russian-controlled pipelines. Third, Russia is encouraging South Asian infrastructure development that will divert alternative gas supplies from the Middle East away from Europe. And finally, Russia is working to develop infrastructure that will allow it to diversify its markets, reducing the country’s financial dependence on European sales.

Enhancing Asymmetric Dependence

Russian Bypass Pipelines. The most significant new Russian-controlled gas pipeline is the North European Gas Pipeline (NEGP), or North Stream (*Severnnyy potok*) Consortium project of Gazprom, which is to run for 1200 km under the Baltic Sea from Portovaya, Russia to Greifswald, Germany (Fig. 8). Its development was launched on September 8, 2005, as a joint German-Russian project to eventually bring 55 bcm annually directly into Western Europe, one-third of its total current supply, without the complications of dealing with any transit states.⁵² The North European Gas Pipeline was to come on line in two phases, each bringing a capacity of 27.5 bcm/yr., beginning in 2010 and 2012 respectively, and to provide 55 bcm for 25 years to Western Europe. The project, however, currently faces serious delays,

⁵⁰This kind of behavior is evident with respect to oil supply as well, where Russia is reinforcing its control over producers, squeezing out foreign-controlled operations, and the pipelines out of Central Asia, such as the majority non-Russian-owned Caspian Pipeline Consortium. It is also working to block “hold-up” by the same transit countries with a new Baltic Pipeline System, and prevent an alternative oil supply route to eastern Europe through Ukraine by filling the Odessa–Brody pipeline in the reverse direction (exporting Russian oil to the Black Sea), among many others. It is also working to weaken dependence on European oil sales by developing the East Siberian–Pacific Ocean (ESPO) pipeline to China and/or Japan. But that is a topic for a different, if related, discussion.

⁵¹Gazprom (2008) projects the rather slow development of these fields, a less ambitious view than two years earlier.

⁵²Initially the agreement was signed between Gazprom, BASF, and E.ON AG, with 51 percent ownership by Gazprom (www.nord-stream.com/en/). Since then Gasunie (Netherlands) has signed on, taking a 9 percent stake, leaving E.ON Ruhrgas and BASF/Wintershall both at 20 percent, with Gazprom still at its 51 percent controlling share. This also gives Gazprom a North Sea undersea link to England (9 percent share of pipeline; see EDM, 4, 209, November 9, 2007).



Fig. 8. North Stream pipeline.

despite strong German and Russian official backing, for both technical and political reasons. Finland, Sweden, Denmark, and Estonia have all raised technical and environmental concerns, and Estonia is refusing to allow Russian study of the Baltic seabed in its maritime economic zone waters.⁵³ Concerns have also been raised about Russia's ability to fill the new pipeline, to increase net supply to Europe (*EDM*, 4, 69, April 23, 2007 and 5, 136, July 17, 2008). The announced sources for new gas, the Tyumen' Yuzhno-Rossiyskoye and the Barents Sea Shtokman fields, remain largely undeveloped and even unexplored, and the estimated supply from the more developed former deposit is only 25 bcm/yr, less than half of the promised capacity (www.nord-stream.com/en/). Thus NEGP appears most useful as a lever against the transit states, and not as a source of additional supply to meet European energy needs.

Gazprom similarly touts two new southern pipelines as "aimed at strengthening European energy security," Blue Stream and South Stream (Fig. 9).⁵⁴ The former, commissioned in 2002 and activated in 2005, is over 1200 km long, 900 km of it under sea at depths reaching over 2200 meters, and has an annual capacity potential of 16 bcm by 2010. It connects to the Turkish natural gas pipeline system, where currently 8 bcm are under supply contract.

Blue Stream thus provides a direct feed into NABUCCO, should it be completed, of sufficient natural gas to preempt any trans-Caspian supply, rendering such an independent outlet for Central Asian gas economically infeasible. It has an additional advantage for Russia of bypassing the Ukrainian pipeline system, thereby undercutting Ukrainian leverage in the network. Further, Gazprom and the Russian government have pushed vigorously to acquire control of capacity along the NABUCCO route with purchases of equity in national distribution systems and storage facilities, in particular in Bulgaria, Hungary, and Austria. For example, on January 25, 2008, Gazprom acquired a 50 percent share in the Baumgarten distribution node (near Vienna) from the state-dominated Austrian energy company OMV, creating the

⁵³These issues were given voice at an international energy forum in Tallinn in mid-May 2007 (*EDM*, 4, 98, May 22, 2007). Also see *EDM* (4, 22, January 31, 2007; 4, 69, April 23, 2007; 5, 99, May 23, 2008).

⁵⁴See the distribution link on Gazprom's web page: www.gazprom.com/eng/articles/article20160. See also Energy Race (2008).



Fig. 9. Blue Stream and (proposed) South Stream pipelines.

Central European Gas Hub now solely supplied by Gazprom (*EDM*, 5, 17, January 29, 2008). The Hungarian government also has supported bringing Gazprom into NABUCCO as a partner, with Blue Stream as the primary source of supply (*EDM*, 4, 106, May 31, 2007).

NABUCCO, however, still survives, as a European project that might undercut Russia's monopoly position. Hence Gazprom has initiated a substantially more expensive Black Sea pipeline, named South Stream (*Yuzhnyy potok*).⁵⁵ It will run from the Beregovaya Compression Station of Blue Stream for 900 km under the Black sea to Bulgaria, where it will connect to existing pipelines, including those intended for NABUCCO, and have a finished capacity of over 30 bcm/yr. This pipeline again bypasses the Ukrainian system, strengthening Russia in the asymmetric relationship with both Europe and Ukraine. In addition, Gazprom has launched a major diplomatic offensive, actively courting southeast European countries for contracts supporting South Stream, generating initial commitments in Bulgaria, Greece, Hungary, Serbia, and Slovenia (*EDM*, 5, 42, March 5, 2008; President's, 2008).⁵⁶ The Austrian government and energy company OMV have also agreed to join the South Stream project, further undercutting NABUCCO's economic viability should its construction be completed (*EDM*, 5, 110, June 10, 2008). Thus, by cutting off alternative sources with a ready supply of gas, Gazprom aims to solidify its position as monopoly supplier of compressed natural gas to Europe.

A major political obstacle remaining to Gazprom's South Stream is the problem of transit rights through Black Sea coastal countries' economic zones. The natural path for the pipeline passes through Ukrainian and Romanian waters, requiring their consent to be built (www.gazprom.ru/eng/articles/article27150.shtml).⁵⁷ Romania, however, has recently

⁵⁵The opening announcement for this \$12.8 billion project was on June 23, 2007, in Rome where ENI head Paolo Scaroni and Gazprom VP Aleksandr Medvedev signed a memorandum of understanding to build the pipeline (*EDM*, 4, 123, June 25, 2007; see also Gazprom, 2008). In July 2008, the cost estimate was raised to \$20 billion (*EDM*, 5, 146, July 31, 2008).

⁵⁶Gazprom also is actively courting Romania (*EDM*, 5, 225, October 24, 2008).

⁵⁷Italy is also actively supporting South Stream, as the energy company ENI is a prime contractor in constructing the undersea pipeline, as it was for Blue Stream (see *EDM*, 5, 14, January 24, 2008; 5, 16, January 28, 2008; 5, 42, March 5, 2008; and 5, 110, June 10, 2008).

affirmed a commitment to NABUCCO (October 31, 2008), despite Russian pressure, and has raised questions about South Stream's passage through her Black Sea economic zone. Ukraine also has a natural interest in objecting to the passage of this bypass through its waters (*EDM*, 5, 203, October 21, 2008; 204, October 24, 2008; 209, October 31, 2008; and 210, November 3, 2008).

Other Russian Strategies. Russia is also moving to protect and enhance its asymmetric advantage in the Eurasian natural gas network by tying up Central Asian supply. In 2007 long term contracts for gas supply were signed with each of the Central Asian suppliers, guaranteeing passage through Gazprom pipelines, tying up virtually all current production capacity. Most of this supply is intended, by Gazprom, to meet growing Russian domestic demand and that of Ukraine, Belarus, and Moldova, preserving its own gas for lucrative export to Europe (e.g., see *EDM*, 3, 129, July 5, 2006; 3, 185, October 6, 2006; 4, 97, May 17, 2007; and 5, 146, July 31, 2008). Gazprom has also taken equity positions in the major gas field development projects in Kazakhstan (Kashagan) and Turkmenistan, giving it a say in the distribution of that product.⁵⁸ Further, Russia is actively discouraging the development of a trans-Caspian pipeline that would divert natural gas from its existing network, supplying Europe through NABUCCO and other non-Russian routes. A major success in this effort was achieved on May 12, 2007, when Putin signed an agreement with Presidents Nazarbayev (Kazakhstan) and Berdymukhammedov (Turkmenistan) to build a Caspian-shore gas pipeline from Turkmenistan through Kazakhstan with capacity of 20 bcm by 2012 (*New York Times*, May 13, 2007; Eurasianet.org, May 14 and 16, 2007; *EDM*, 4, 96, May 16, 2007). This would provide a much lower cost exit for both Turkmen and Kazakh natural gas exports than building a new trans-Caspian pipeline, capturing future Central Asian gas for the Russian system and undercutting European bypass route hopes. Thus Russia is evidently working to continue to monopolize Central Asian supply of natural gas to Europe by maintaining its monopsony position as buyer of Central Asian gas.

Through Gazprom, Russia also has been seeking to control the main natural gas pipelines through the transit states, Ukraine and Belarus, by acquiring equity control. Gazprom has repeatedly offered to forgive energy debts and hold down (for a period) future natural gas prices to the transit countries, if they would surrender control over their pipelines.⁵⁹ Ukraine has (so far) successfully resisted, despite two recent cutoffs over pricing and payment issues, but Belarus has been unable to resist.⁶⁰ On May 18, 2007, the Russian and Belarus governments agreed that Gazprom would get a 50 percent stake in Beltransgaz over four years in return for continuing subsidization of the 22 bcm that Belarus consumes each year.⁶¹ Thus Russia will protect the 46.7 bcm it exported through Belarus in 2007, by adding control of the 20 bcm capacity Beltransgaz pipe to the 33 bcm capacity Yamal pipeline it already owns.

Two further strategies that Russia has been pursuing in its effort to maintain dominance in the asymmetric network relationship are the development of new outlets for its dry natural

⁵⁸Announcements of agreements are posted on the Gazprom's web site (see the "News" link www.gazprom.com/eng/news.shtml).

⁵⁹This was a key part of the Russian negotiating position in the pricing dispute with, and gas cutoff to, Ukraine in January 2006 (see White, 2005; *EDM*, 3, 4, January 6, 2006; and Gazprom Vnov, 2006).

⁶⁰Belarus is in a far weaker position due to its limited "marketizing" (structural) reforms and lack of serious industrial restructuring, making its economic activity more dependent on cheap Russian energy, and hence more vulnerable to economic pressure.

⁶¹Thus Belarus will pay \$100/mcm (up from \$46.68) instead of \$140 or \$200, as threatened by Gazprom (see *EDM*, 4, 99, May 21, 2007).

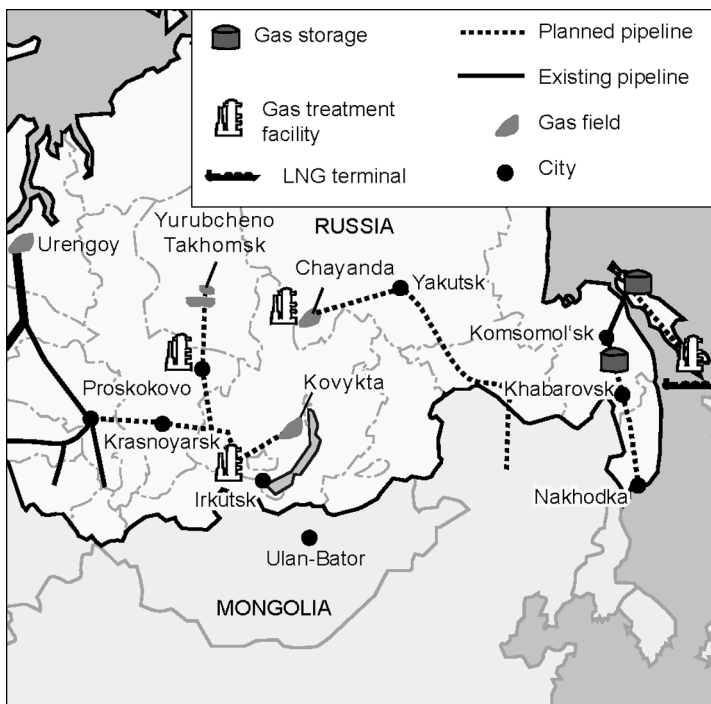


Fig. 10. Potential pipelines to Northeast Asia (modified from Sagers (2007)).

gas,⁶² and political “encouragement” of pipelines that divert new natural gas supply sources away from Europe. The former basically involves extending pipelines to northeast Asia, with Japan and China as intended potential users (Fig. 10). Such pipelines would be largely supplied by new (developing) East Siberian fields, rather than those currently supplying, or being developed to supply, Europe, although that “western” gas could be channeled to Asia through the existing system once a new pipeline to the east is in place. The main strategic advantage of such new pipelines would be in the protection of revenues lost from a disruption of European supply, lessening Russian dependence on revenues from European sales. Russia has now been in negotiations with China for several years, with several preliminary agreements signed, but pricing disagreements have prevented serious development from beginning.⁶³ The second strategy here aims to maintain strong European dependence on Russian, and Russian-supplied, Central Asian gas. The primary threat here is from Qatari and Iranian gas that might be piped through Turkey (NABUCCO) in sufficient volume to

⁶²Gazprom is also actively developing new LNG capabilities, but those will remain a very small portion of export capacity for at least several decades (Gazprom, 2008).

⁶³Russia has no particular *ex ante* bargaining leverage in these negotiations; that only appears after investment/development costs have been sunk by both sides (*EDM*, 3, 158, August 15, 2006; 3, 204, November 29, 2006; 4, 30, February 12, 2007). A recent discussion of the pricing dispute can be found in *Kommersant* (July 3, 2008, www.kommersant.com). As this paper goes to press, the Russian side announced it had suspended talks with China on construction of a spur of the ESPO pipeline to that country (Watkins, 2008); the extent to which this is a negotiating ploy is not clear.

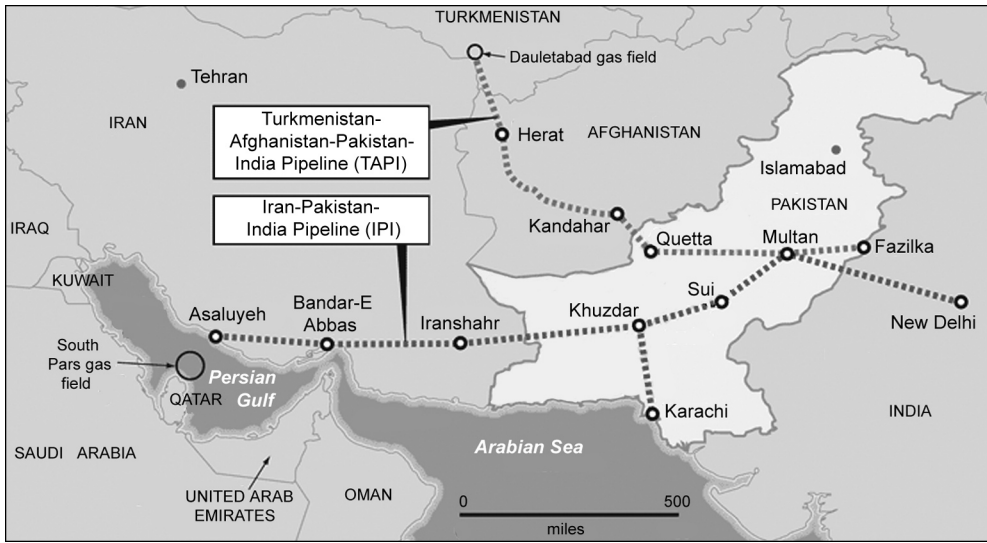


Fig. 11. The TAPI and IPI proposed natural gas pipelines.

significantly reduce any Russian “hold-up” threat.⁶⁴ Qatar and Iran share the world’s second largest known reserves of natural gas, the South Pars field, which could potentially provide over 60 bcm of natural gas annually.⁶⁵

Thus, in addition to the efforts to pre-empt NABUCCO (discussed above), Russia is encouraging the direction of these gas resources to the east, to South Asia, through either a pipeline under the Indian Ocean or, more economically, overland to and through Pakistan to India. The Iran-Pakistan-India (IPI) pipeline (Fig. 11), now under active consideration despite U.S. opposition, together with any Qatar-(Pakistan-)India pipeline, would greatly reduce the incentive for Iran and Qatar to seek outlets to the west, maintaining the Russian hold over natural gas supply to Europe. This would also partially reduce the need for (and slow down) the development of liquified natural gas export capabilities, slowing the development of the far more competitive LNG market that could provide a ready substitute for pipeline gas. Similarly, Russia is looking to counter Turkmen efforts to diversify their gas exports by not only contractually locking up Turkmen gas, but also by (largely tacitly) encouraging southward and eastward exports. Turkmenistan has signed agreements with both China and India on developing natural gas export pipelines. China will finance a pipeline connecting to the new Kazakh-China export pipeline, while India on April 5, 2008, formally signed on to the TAPI (Turkmenistan-Afghanistan-Pakistan-India) pipeline system, first proposed as TAP by Chevron in the 1980s (*EDM*, 5, 83, May 1, 2008). This is strongly

⁶⁴In a world with tightening energy supplies, this could never fully compensate for a near total cutoff, but it would substantially limit the damage that could impose. Any disruption would remain costly, but the cost would be more symmetrically borne, eliminating any particular leverage of one side.

⁶⁵Their collective reserves are estimated to be 53.6 tcm with 27.6 in the Iranian South Pars field (IEA, 2007; Verma, 2007).

preferred by Russia to allowing trans-Caspian supply of Turkmen gas to Europe from the perspective of maintaining dominance in the asymmetric network relationship with Europe.

Finally, Gazprom and the Russian state have been systematically moving to eliminate any Western, hence uncontrolled by the Russian state, equity in Russian gas reserves, eliminating the possibility of competition based on Russian reserves. Exxon-Mobil, Shell and its Japanese partners, and BP have all been squeezed from any control over natural gas reserves in the past two years, as Gazprom has acquired effective control over Sakhalin-I, Sakhalin-II, and Kovytkha fields, and has blocked the winners of the 1993 auction (Exxon, Mobil, and Texaco) from beginning work on Sakhalin-III.⁶⁶

CONSEQUENCES AND CONCLUSION

Russia has now substantial, apparently quite effective, political leverage over EU foreign policy, at least as it relates to former Soviet, and currently proclaimed Russian, spheres of influence. Europe hesitates to admit Ukraine and Georgia, gives Russia a free hand in regulating “frozen conflicts” in the former Soviet Union, and has abandoned Moldovan and Georgian territorial integrity. It pays only lip service to protection of the Baltic states, has abandoned the support of democracy in Central Asia, and refuses to support seriously sanctioning Iran or North Korea for violating numerous agreements and UN resolutions, apparently largely in the interest of “maintaining relations” with a resurgent Russia. And the issue of energy dependence is never far from the surface, explicitly emerging in any (near) crisis situation, whenever relations between EU and Russia are discussed. Moreover, it is even more salient in the proclamations and policies of the leading continental powers, Germany, France, and Italy.⁶⁷

This situation is naturally creating pressures, and some collective discussion and even activity, to undertake moves to reduce the effectiveness of this leverage, to enhance energy security, through diversification of supply, developing alternatives to Russian/Eurasian natural gas. The effort is complicated by the fact that most substantial non-LNG alternatives either involve substantial greenhouse gas emissions, or nuclear safety and waste disposal issues.⁶⁸ Thus, in its White and Green papers the EU has proposed developing bypasses for Eurasian natural gas, increasing imports of African gas and LNG, and generally expanding LNG facilities and trading toward the development of a true world natural gas market. But realizing any of these alternatives will take time, particularly in the face of active Russian efforts to block them. Thus there will be a period of effective Russian monopoly over the natural gas margin of European energy availability. Russia appears to be trying to use this market power to restore hegemony over the former Soviet/Imperial territory, and bolster its position as a viable counter to U.S. political influence (“hegemony”) in the world. This

⁶⁶The Russian Ministry of Natural Resources and Environment has played a key role here, threatening major penalties for environmental damage. The threats disappeared once Gazprom acquired the fields/assets. In several cases, the threat of revoking licenses due to insufficient production has been used, where production was limited by Gazprom’s refusal to allow export of the private gas through its (monopoly) system, while local demand was far too limited to absorb the required production. See *EDM* (5, 65, April 7, 2008 and 5, 105, June 3, 2008) on Gazprom’s squeezing TNK-BP out of the giant Kovytkha field (3 tcm) in Irkutsk Oblast. Also see Sakhalinskiy (2007) and *EDM* (4, 2, January 3, 2007 and 4, 16, January 23, 2007).

⁶⁷See the European debates over the Russian invasion of Georgia and the effective seizure of Abkhazia and South Ossetia (EU Leaders, 2008; Russia Neutering, 2008; and Values, 2008).

⁶⁸Truly “green” alternatives such as solar, wind, and geo-thermal energy are still far from capable of providing sufficient energy to noticeably reduce hydrocarbon based sources (OECD/EIA, 2008).

means carefully exploiting this leverage, not challenging European core national interests while unfailingly supplying Europe with (relatively) high priced natural gas energy.⁶⁹ Still, we can expect the effectiveness of this leverage to fade over time, as new gas sources are accessed (if only for purely economic reasons), new technologies for both providing and using energy are developed, and environmental policies and constraints make those alternatives cost effective.

Russia can, however, prolong the effectiveness of its control over this margin of European energy use, by wise exploitation of this market (and derivative political) power. To do so, the leverage must be used lightly and wisely, avoiding extracting maximal possible gains in either profit or policy influence. It can be most effectively used where a core Russian interest (e.g., tightly tying Moldova, or other states of the former USSR, both politically and economically to the Russian Federation; blocking NATO advance into the former Soviet Union) faces a peripheral European interest (e.g., preserving democracy in, and autonomy of, Moldova; Russian democracy; expanding NATO), making European opposition to Kremlin objectives “not worth the (potential) cost.”

If however, Russia threatens to use, or indeed exercises, its control over the flow of gas to punish or reward political behavior too openly or frequently, it will surely generate a reaction, countermeasures (however costly) to render further use of that lever ineffective. Indeed, (threatened) use of the “shutdown lever” might even bring violent confrontation, most likely with those near Russia’s borders who most strongly resent Russia’s influence. On the other hand, acting on a purely “commercial basis,” exploiting market power, on both the buying (from Central Asia) and selling (to Europe) sides, to extract the major share of the economic surplus that the use of natural gas energy produces in any economy, can prolong that power; Russia will be a reliable long-term partner. That, while continuing to extend control over other sources of natural gas (Arctic, Central Asia, Africa, Latin America, GPEC,⁷⁰ etc.) and over distribution (both local and long-distance) networks (pipelines, storage and processing facilities), can build this power against future need, and make it all the more effective once seriously used to influence the outcome of a truly critical issue. But even this preserved leverage must inevitably fade, even if only slowly. And once substantially used to force significant concessions, or damage the economies of recalcitrant European countries, it will become largely useless for the future, as those European nations take whatever actions are then necessary to render that margin of Russian energy supply irrelevant.

Europe, however, can minimize that possibility by recognizing the implicit danger and sinking economic and political resources into seriously diversifying their energy sources. Russia will inevitably be a big part of the European energy economy, but it cannot remain an irreplaceable part, as it currently seeks to become, if Europe is to maintain any sense of true energy security. By virtue of geography, and the infrastructure in place (if appropriately maintained), Russia will always be a leading, and potentially low-cost, supplier, even if Europe creates a “monopolistically competitive market” with competing pipelines, a major liquified natural gas component, and alternate energy substitutes for gas, should their availability become insufficient. That would be a true “market solution” in which political issues are as far divorced from economic energy supply as possible (albeit never completely),

⁶⁹Of course, natural gas prices must remain reasonable related to the cost of alternative energy carriers. In the weak demand environment of late 2008, with oil prices off 62 percent from their July 2008 peak, we should expect Russia to accept a lower gas price to maintain its share of, and control over, the European natural gas “market.”

⁷⁰The (Organization of) Gas Producing and Exporting Countries, proposed by Putin in 2002 and resurrected in 2008 (see note 31).

providing mutual economic benefit/profit for all participants. And it is, I believe, the best outcome for which we can hope.

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