

Weekly Report

Baltic Sea Pipeline: The Profits Will Be Distributed Differently

In late 2005, the German energy companies E.ON and Wintershall and Russian Gazprom reached an agreement to build a new huge pipeline Nord Stream through the Baltic Sea. This pipeline will provide Russia for the first time ever with the direct access to its Western European customers. This pipeline will contribute to the security of the Western Europe's energy supply through creating an alternative supply opportunity for the case when conflicts with the current transit states lead to disruptions in supply. The realization of the project will also shift the bargaining power from the transit states to the benefit of both Russia and the Western European natural gas importers. Particularly, White Russia as well as the Ukraine will have to accept lower transit fees in the future and have fewer means left to enforce special conditions for their own natural gas imports. The decision to construct the pipeline can be viewed as a consequence of institutional and political weaknesses in the transit states.

Natural gas accounts for about a quarter of the primary energy consumption in the European Union. It can be expected that its importance in the energy supply will continue to grow because, among others, natural gas is considered to be an environment friendly source of energy. Since internal production in the European Union is sinking and Norway is not likely to substantially increase production, imports from other regions will increase.¹ There are just a few alternatives to the natural gas supplies from Russia. While the deliveries of liquefied gas from Africa, especially from Nigeria, as well as the Middle East will increase, it will certainly be necessary to construct and expand the plants required to regasify the liquefied gas. Additional gas pipelines from areas other than Russia are being discussed, such as from Algeria and the Caspian Sea region and Iran (the Nabucco pipeline).²

Over the last few years about a quarter of the EU's natural gas consumption has been covered by imports from Russia. For some countries this figure is clearly higher. In this way Germany covered 43 percent of its 2007 demand with natural gas from

¹ The EU Commission assumes in one scenario that the imports of natural gas to the EU will almost double between 2005 and 2030, with more than half of this increase required to compensate for declines in the EU's own production. See Directorate General for Energy and Transport: European Energy and Transport. Trends to 2030—Update 2007. Brussels 2008.

² In both of these cases the underlying political conditions are by no means favourable. Furthermore, these regions are primarily suitable for supplying southern and south-east Europe. For information on the long-term perspectives of natural gas supply to Europe, see also Engerer, H., Horn, M.: Europäische Erdgasversorgung erfordert Diversifizierung und Ausbau der Infrastruktur./The European Natural Gas Supply Requires Diversification and the Expansion of the Infrastructure. Wochenbericht des DIW Berlin No. 42/2006.

Franz Hubert
hubert@wiwi.hu-berlin.de

Irina Suleymanova
isuleymanova@diw.de

JEL Classification:
L95, L14, C71

Keywords:
Multilateral bargaining, Hold-up,
Irreversible investment, Collusion

Russian fields; in Italy the share amounted to 31 percent and in Austria to 63 percent.³ The construction of additional pipelines from Russia is often associated with a growing dependence on the part of Europe. Already during the Soviet Union time, the USA issued warnings about Western Europe's dependence on imports and exerted massive political pressure, which did ultimately prove in vain, to prevent the construction of the first pipelines through the Ukraine and Czechoslovakia in the 1970s and '80s. Even today about four-fifths of the Russian exports to Europe are flowing through the pipeline system built at that time. After the disintegration of the Soviet Union, at first Russia was completely dependent on the transit route through the Ukraine for its gas exports. It was only with the completion of a pipeline through White Russia and Poland in 1998 that a second export corridor was created in the north-west region of Europe. It has a capacity of 28 billion cubic metres of gas per year and is named „Yamal“ after a gas field in western Siberia which however still does not supply any gas to it (map).⁴ A second leg of the pipeline for which the sections at the major river courses have already been laid should have doubled the capacity of the pipeline in one go. However the plans for *Yamal II* soon ground to a halt and apparently they were finally abandoned when in late 2005 the German energy companies E.ON and Wintershall together with Russian Gazprom decided to construct the *Nord Stream* pipeline through the Baltic Sea.⁵ When construction is complete, the Baltic Sea pipeline should consist of two pipelines with a planned transport capacity of 60 billion cubic metres per year and will provide direct connection from Vyborg in Russia to Lubmin near Greifswald in Germany.

Nord Stream Baltic Sea Gas Pipeline: A Controversial Project

The decision in favour of *Nord Stream* has triggered off fierce discussions.⁶ The critics have produced an

³ BP Statistical Review of World Energy 2008.

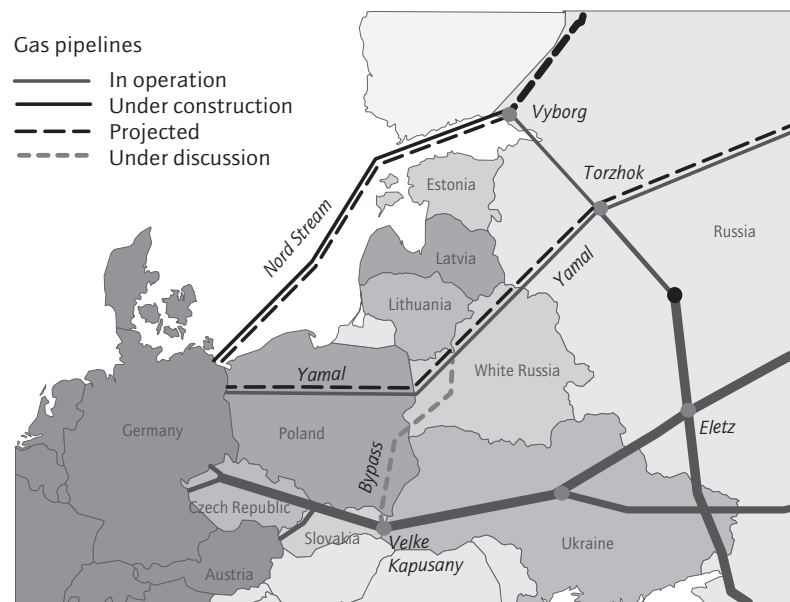
⁴ This study is mainly concentrated on the north-west European region to which the gas is delivered through the Ukraine with the transit points in Germany and Austria. About 70 billion cubic metres of gas per year can be delivered through these transit points. It is only for this supply that Yamal and Nord Stream represent alternative supply routes. The pipelines in the Ukraine also deliver natural gas to east and south-east Europe. These are not marked on the map. In total approximately 120 billion cubic metres of gas flow through the Ukraine each year as transit supplies. The maximum export capacity is estimated to be around 140 billion cubic metres of gas per year. For south-east Europe, the „Blue Stream“ and „South Stream“ pipeline projects in the Black Sea have a similar strategic importance to that of Nord Stream for the north-west Europe.

⁵ Subsequently the Dutch-based Gasunie supplier took a stake in the project, so that the company's shares are distributed as follows: 51 percent is held by Gazprom, 20 percent each by E.ON and Wintershall/BASF and 9 percent by Gasunie.

⁶ On the Russian side, the connection of the new pipeline to the gas system is already under construction. In Germany and the other neighbour-

Map

Northern Transit Routes



Source: Hubert, F., Ikonnikova, S.: Investment Options and Bargaining Power in the Eurasian Supply Chain for Natural Gas. Discussion Paper 2007.

DIW Berlin 2009

array of arguments against the project: On the one hand renewed warnings have been made about the growing dependence on Russian gas imports. With *Nord Stream*, Russia would be able to increase its export capacity to north-west Europe by about 60 percent. In the event that these volumes are indeed additionally supplied, Russia would be able to further strengthen its position of the dominant supplier. At the same time there is some doubt whether the transport capacities will be used on this scale in the foreseeable future. Russia is behind schedule in developing new gas fields which could fill the pipeline with the necessary gas. And it still has to be clarified where the gas should come from for such a massive increase in exports.⁷ Likewise there are still no firm buyers for such volumes. It is conceivable that part of the gas flowing through northern Germany will be transported further to England. However these plans seem to be too vague as a way to justify the

ring states, the required permit procedures and environmental impact assessments are ongoing.

⁷ At the current pace of development, gas from the new fields on the Yamal peninsula will first be available when production from the old fields tapers off. The gas from the Barents Sea (Stockman Field), once it is actually available, will probably be liquefied and not fed into the pipeline system as originally planned. Despite having major reserves, the opportunities to increase the exports of Russian gas are limited due to the high development costs. See also Stern, J.: The Future of Russian Gas and Gazprom. Oxford 2005; Engerer, H., Horn M., a.a.O.; Engerer, H., Kemfert, C.: Russland: Energieeffizienz und Klimaschutz kommen zu kurz./Russia: Energy Efficiency and Climate Protection Miss Out. Wochenbericht des DIW Berlin No. 49/2007.

significant investment costs. Finally the argument has been raised that *Nord Stream* is by far and away the most expensive of all the options to expand the transport capacities for Russian gas. It would be a great deal cheaper to renovate the Ukraine transit system or lay the second leg of the pipeline along the *Yamal* route through White Russia and Poland. Even new pipelines through the Baltic states and Poland recently suggested under the name „Amber“ would amount to less than half of the *Nord Stream* costs.⁸

The security of the energy supply has played an important role in the discussions. It is also a central aim of Europe's energy policy. However like with many other policy objectives, on closer examination the concept proves to be fuzzy. Depending on the intention, it is understood to be the geological and technical availability of energy sources and transport routes, the contractual guarantee of access, the provision of either stable or the lowest possible purchase prices, the diversification of the supply sources or independence from imports. Correspondingly, the energy security argument is advanced both for and against the Baltic Sea pipeline.

Pipeline Creating Mutual Dependencies

First, it has to be noted that Western Europe's dependence on Russian imports will grow only in case that *Nord Stream* supplies additional natural gas from Russia and not just redirects gas from other transit routes. However such a pipeline would create, in fact, mutual dependence. In the same way that an importer makes himself dependent on a certain region for gas supply, the producer also commits himself to permanently supply his natural gas to a specific region at the other end of the pipeline. And with natural gas this reciprocity is true to a unique extent, because natural gas cannot be transported as a liquefied gas to a destination different from the one of the given pipeline. In other words, the growth in Russia's exports to Western Europe will lead to the increase of its dependence on it. This mutual dependence motivates the common necessity for long-term balance of interests. In the past this balance was found through supply contracts with terms of more than 30 years. The proponents of the pipeline argue that *Nord Stream* offers the opportunity to secure long-term contractual access to gas fields in western Siberia that still have to be developed. In this sense, the project contributes to the security of the energy supply.

However two questions still remain open: Why is it that *Nord Stream*, the most expensive of all the pipeline options, has been chosen? And why is it that the capacity is targeted that seems to be excessive in view of the demand and the supply options? Apparently the reasons can be found in the transit problematic. Since the collapse of the Soviet Union, no stable arrangements between Russia, Ukraine and White Russia were found for gas exports and transit fees.⁹

Repeated Conflicts Along the Transit Routes

Russia's energy relations with the Ukraine have been marked from the very beginning with disputes about unpaid bills and unauthorised extractions from the gas system by the Ukraine. In a series of high level political negotiations, the partners have trudged from one short-term solution to the next. After a principle agreement achieved in 2002/2003 was aborted again in its implementation, the conflict escalated between December 2005 and January 2006. At that point in time the Ukraine was paying only about a third of the usual international prices for its gas imports. Russia then insisted that significantly higher prices were to be built into new supply contracts, which the Ukraine rejected. When they had still failed to reach agreement on 31st December 2005 for the 2006 deliveries, with no supply contracts at place Russia reduced the volume of gas being fed into the system on 1st January 2006 by the quantity destined for the Ukraine. However as the Ukraine did not reduce its own consumption, corresponding disruptions in supply occurred further to the west. Right after that Russia buckled under the massive pressure exerted by the Western Europe importers and increased its gas deliveries again. In the end it did not want to endanger its reputation of a reliable supplier gained during the previous decades.

The hope that Western Europe could remain undamaged from the conflict about the gas transportation was shattered in January 2009. After the negotiations in the autumn and winter of 2008 collapsed several times just before agreement was to be reached, the parties became so entrenched that Russia stopped the supplies completely in order to prevent the Ukraine from using the gas supplies destined for Western Europe to make up for its own reduction in supply. Nevertheless, since the Ukraine also had access to the storage facilities along the pipeline system, the cessation of deliveries affected primarily the south-

⁸ For the differing costs of the various pipeline options see Hubert, F., Ikonnikova, S.: Investment Options and Bargaining Power in the Eurasian Supply Chain for Natural Gas. Discussion Paper 2007.

⁹ For further details see Stern, J.: The Russian Ukrainian Gas Crisis of January 2006. Oxford Institute for Energy Studies, 2006; Yafimava, K., Stern, J.: The 2007 Russia-White Russia Gas Agreement. Oxford Institute for Energy Studies, 2007; Hubert, F., Ikonnikova S., in the passage cited.

east European countries which have no alternative supply routes available to them. It was only after two weeks of tough negotiations that a compromise could be found that delivered a solution to the acute supply crisis.

The impact of the conflict on the northern countries was less pronounced because, among others, they receive a share of their gas imports from the *Yamal* pipeline through White Russia and Poland. However this route is also by no means secure. After the completion of the *Yamal* pipeline, relations between Russia and White Russia chilled considerably. Like the Ukraine, White Russia has also resisted any adjustment of its import prices up to the international level. When White Russia diverted gas from transit pipelines in February 2004, Russia reacted again by completely stopping the supplies. In this way any access White Russia had to Russian gas was effectively blocked, but also the recipients located further to the west—and especially Poland, Germany and the Russian enclave of Kaliningrad—were cut off accordingly. However at that time it proved possible to resolve the conflict so quickly that no supply problems arose.

Both transit states, the Ukraine and White Russia, have abused their strategic position in the transport system in order to get significant concessions with regard to their own gas imports. According to the current estimates, the transit fees and the value of the cut-rate gas supplies based on the contracts concluded between Russia and the two transit states in the period from 2001 to 2003 amounted for the Ukraine to a share of 17 to 22 percent of the export profits. For White Russia the figure amounted to approximately 6 percent. Hence more than a quarter of the gas export profits have flown in the past as rents to the transit countries due to their strategic position in the existing transport system.

Such a burden on the transit system has reduced the willingness to invest in the development of new gas fields and is also shared in the long term by the consumers in Europe in the form of higher prices for Russian gas. Furthermore, the latest events are a clear indication that an acute threat to the European gas supply can also arise from the unresolved transit conflicts.

Strategic Aim: Greater Independence from the Transit States

Incurring the financial and technical risks associated with the *Nord Stream* project, the companies involved are pursuing the strategic aim of having greater independence from the transit states. This

hypothesis is confirmed by the results of the quantitative game theory analyses carried out in a range of studies.¹⁰ In these studies, collaboration between the members of the Eurasian transport system is modelled as a cooperative game in which the countries involved share the profit from the Russian natural gas exports to Western Europe based on the countries' respective bargaining power.¹¹ The model is calibrated based on the assumptions about the demand for gas as well as production and transport costs. The optimal investments, supply volumes, profits and their allocation are calculated for different scenarios. Two variants—„status quo“ and „expansion options“—have been considered:

Status quo: With this variant it is assumed that the bargaining power of a player is only determined by the respective transport capacities that are already available. This variant corresponds to a very short-term view in which the potential threat of the transit countries with respect to the use of the existing transport capacities is in the foreground. Russia's gas exports to north-west Europe are currently obliged to rely up to about 70 percent on their transit through the Ukraine and up to 30 percent through White Russia.¹² The possibilities to play the two countries off against each other are limited. According to the model's results, Russia could claim for itself just 60 percent of the total profit. A good 30 percent has to be granted to the Ukraine in the form of transit fees or price reductions and 10 percent is allotted to White Russia.

The Baltic Sea pipeline will dramatically alter the status quo and hence the short-term balance of power. In light of the total capacities planned to be installed following the completion of the project, even a complete breakdown of supply through the Ukraine would have barely any consequences on the supply to north-west Europe. In this new status quo, transport capacities in *Nord Stream* and *Yamal* together would be sufficient to cover the predominant share of today's demand. And the event of supply disruption in White Russia alone would be

¹⁰ See Hubert, F., Ikonnikova, S., in the passage cited.; Hubert, F., Ikonnikova, S.: Hold-Up, Multilateral Bargaining, and Strategic Investment: The Eurasian Supply Chain for Natural Gas. Discussion Paper 2004; Hubert, F., Suleymanova, I.: Strategic Investment in International Gas-Transport Systems: A Dynamic Analysis of the Hold-Up Problem. Discussion Paper of the DIW Berlin No. 846/2008.

¹¹ The relative power of the countries in the transport system is determined based on the „Shapley value“. The „Shapley value“ together with the „core“ are the best known solution concepts for cooperative games. Shapley value assigns to each player a share of the total profit which is dependent on how large is the player's contribution to the cooperative profit of all the possible coalitions. For simplification purposes, the Western European importers were not modelled as strategic players so that the distribution of the profits takes place only between Russia and transit states.

¹² With regard to the south-east European countries, the Ukraine's position is even stronger. However this region was excluded from the analysis.

of no significance. Accordingly, the share of the two transit countries in the gas export profits would drop from 40 percent to about 12 percent even in the short-term. Meanwhile Russia's share of the profits from the exports to north-east Europe would increase by 28 percentage points.¹³

Expansion options: However these considerations still do not explain why *Nord Stream* is actually being constructed. It would be quite conceivable that Russia can strengthen its position in the negotiations solely by pointing out to the possibility to invest in alternative pipelines. This view corresponds more to a long-term perspective. When all of the possibilities to expand the transport system by creating additional capacities are included in the analysis, the situation clearly changes. According to the model's results, Russia can increase its share to about 80 percent, while the shares of the transit countries are halved. This is due to the fact that the mere possibility alone that additional pipelines can be built weakens the position of the established transit countries. The relative shares are based both on the geography of the network as well as the differing investment costs of creating additional transport capacities. In the expansion options variant, the bargaining power of the current transit states results from the cost savings that the usage of the available capacities permits compared to the creation of the new capacities.

Institutional Weaknesses in White Russia and the Ukraine

In principle it would be quite conceivable that the parties involved agree to an expansion of the transport system that minimises the investment costs and share the profits according to their long-term bargaining power. After all, expenses running into the billions could be saved by constructing more cost efficient pipelines.¹⁴ Such a solution can be guaranteed through explicit long-term contracts. It could also be achieved through repeated informal cooperation.

A contractual solution requires that the transit countries are able to make a credible and long-term commitment to rules of access to the pipelines and transit fees. However the institutional and political

conditions for such a commitment are not likely in either the Ukraine or White Russia. In both states the separation between the politics and the jurisdiction is not sufficient and hence the protection of property rights is not guaranteed. In countries with weak legal systems which are furthermore not effectively bound by international agreements, there is always the danger that once investments are made they will abuse their strategic position in the transport system to their own benefit.¹⁵

It is primarily these institutional shortcomings, which make any credible commitment impossible, that lead to the incentive described in the status quo scenario to invest in pipelines that weaken the future bargaining position of the transit states. This can lead to overinvestment in expensive pipelines, but also to underinvestment in cost efficient pipelines depending on how the different pipelines change the bargaining position of the transit states. In this way all attempts have failed to raise the resources for the modernization of the pipeline system in the Ukraine. By contrast, from a Russian perspective it is worth installing significant overcapacities on a secure connection *Nord Stream*. As calculations demonstrate, additional capacities on a scale of 60 to 80 billion cubic metres of gas at *Nord Stream* are justifiable even with moderate assumptions about the future demand. The investment costs are compensated by a clear increase in the bargaining power vis-à-vis the old transit states. In other words, substantial benefits from the Baltic Sea pipeline will arise from the more favourable transit conditions for the already existing pipelines and through the higher gas prices for the Ukrainian and White Russia imports. The reason why the project can fulfil this function is its being oversized compared to the actual demand for additional transport capacity what creates a real alternative to the existing routes.

Cooperation Without Binding Contracts?

The last possibility to avoid costly overinvestment is delivered by dynamic strategies. With these strategies the threat of investment in expensive pipelines like *Nord Stream* is repeatedly postponed as long as the transit states cooperate. i.e., forgo the gains of short-term rents resulting from their current bargaining power and instead are satisfied with the transit fees and the gas prices corresponding to their long-

¹³ As the status quo analysis tends to overestimate the power of the transit countries, the strategic value of the construction of *Nord Stream* is also somewhat overestimated. If you take the mentioned above empirically derived value of approximately 75 percent for Russia as a basis, the result would be an increase of 13 percentage points.

¹⁴ Such attempts have been repeatedly undertaken. For instance in the contracts between Russia and the Ukraine in 2001/2002, plans for alternative pipelines were discarded and serious discussions were held on investing in an extensive modernisation of the network in the Ukraine. However the implementation of the plan failed as did similar attempts in the 1990s due to the Ukraine's refusal to give up its control over the Ukrainian pipeline system.

¹⁵ Of course such a danger is not valid for all transit countries. The investments in Poland for instance are extensively safeguarded against politically motivated interventions. In this country Gazprom has already won court investigations against an increase in the transit fees for the Yamal pipeline. In Slovakia and the Czech Republic the transit pipelines have been sold to western importers and the transport through them is also guaranteed.

term position in the system. The success of this dynamic strategy is not dependent on the ability of the transit states to make lasting commitments as cooperation is supported instead by the threat to invest in the expensive pipeline Nord Stream once the transit states deviate from cooperative agreement. This strategy has been used in the past—with only moderate success however. At the end of the 1990s for instance, a pipeline was planned from White Russia through Poland to Slovakia, the only purpose of which would have been to bypass the Ukraine. The threat of this bypass reinforced the Russian position in the negotiations without it ever becoming a reality. In the event that *Nord Stream* really does get constructed at the planned capacity of 60 billion cubic metres of gas per year, the conclusion can be made that the countries involved have not managed to fully use dynamic strategies to support cooperation.

While it is true that investment can be postponed, once it has been made it can no longer be unmade. For this reason it is difficult in the context of dynamic strategies to support investments in cost efficient pipelines which permanently strengthen the bargaining power of the transit states. This is true both for the modernisation of the pipeline system in the Ukraine as it is for the second *Yamal* pipeline. Even viewed over the mid-term, both of these would create sufficient capacity for a realistic increase in Russian exports. However at the same time they would make investment in *Nord Stream* less attractive and hence weaken the credibility of the threat of investing in it in case the transit states deviate from cooperation. And thus, without a fundamental change in the underlying institutional conditions, there is almost no chance for these most cost efficient options for the expansion of the Eastern European gas transport system to be ever realised.

Conclusion: *Nord Stream* Baltic Sea Pipeline Secures the Supply of Natural Gas by Diversifying the Transit Routes

The *Nord Stream* Baltic Sea pipeline will be constructed for strategic reasons although it is the most expensive of all the transport system expansion options for north-west Europe. However its capacity will not be fully used in the foreseeable future. Over the short- and mid-term the project will increase the security of supply to Western Europe because it will create a bypass option in the event of future conflicts with the transit states, White Russia and the Ukraine. Once it has achieved a capacity of 60 billion cubic metres of gas per year when construction is complete, *Nord Stream* could guarantee the supply to the northern regions of Western Europe even in the event of a breakdown in supplies through the Ukraine. The pipeline will permanently weaken the bargaining position of the transit states and hence it will clearly curtail the rents they gain at present due to their strategic position in the transport system. Over the long-term, lower fees for the gas transit and an improved supply security will also increase the willingness to pay the high development costs of new gas fields.

DIW Berlin
Mohrenstraße 58
10117 Berlin

Tel. +49-30-897 89-0
Fax +49-30-897 89-200

ISSN 1860-3343
Price: Euro 10.–
www.diw.de/english/produkte/publikationen/weeklyreport
Translated from the German.
All articles are protected by copyright.