

4th Transatlantic Energy Security Dialogue

Governing the Emerging Global Market for Gas

Trends, Challenges and Policy
Implications for the Transatlantic
Alliance

Conference Report

E.ON AG Representation, Berlin, 4 – 5 September 2008



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1. Introduction

On 4 – 5 September 2008, the Global Public Policy Institute (GPPI) convened the fourth “Transatlantic Energy Security Dialogue” entitled “*Governing the Emerging Global Market for Gas: Trends, Challenges and Policy Implications for the Transatlantic Alliance*” at the E.ON AG Representation in Berlin. The conference was organized in collaboration with E.ON AG and E.ON Ruhrgas AG with additional support from the European Commission, the Dräger Foundation and the German Marshall Fund of the United States.

The conference brought together more than 35 decision-makers and professionals from governments, NGOs, business, the media, think tanks and universities from both sides of the Atlantic for a strategic debate on some of the key trends contributing to (or hindering) the development of a global market for natural gas. As part of GPPI’s ongoing research work on Global Energy Governance, this dialogue session addressed not only geopolitical factors, but also the underlying institutional “rules of the game” that shape the development and institutional structures of the global gas market. Furthermore, the conference addressed some of the key interlocking trends currently challenging the framework conditions for global energy governance that require us to rethink the suitability and effectiveness of current arrangements and potential transatlantic policy responses. These trends include:

1. The rise of new consumers
2. The increasing role of state players on oil and gas markets
3. The elevation of climate protection and resource governance to “high energy politics”.

The dialogue session was also designed to complement our research program on global energy governance and served as an important forum for both presenting GPPI’s ideas and receiving feedback. More information on GPPI’s global energy governance research can be found at www.globaleenergygovernance.net.

Starting with an opening speech addressing the developing global gas market and the resulting implications, the conference proceeded to examine three main issue areas: (i) financing exploration and production; (ii) political implications; and (iii) short-term supply management. Two panel discussions addressed these main issues followed by the formation of small working groups to discuss some of the specific challenges and questions with respect to the development of the global gas market. A final panel discussion was then held to solicit additional input on transatlantic policy options. Lastly, the conference featured a public evening event to discuss the implications of Caspian Sea resources with respect to European energy security.

The following report is based entirely upon conference proceedings and is divided into the following sections: chapter 2 provides introductory material on the current state of the emerging, not yet “global” gas market; chapter 3 addresses the financing of exploration and production of gas resources; chapter 4 focuses on the potential geopolitical implications of a global gas market; chapter 5 discusses security of gas supply, including potential means of diversification as well as short-term supply disruption responses. Lastly, chapter 6 summarizes final conclusions. The annexes include additional information about the conference, the Global Public Policy Institute, our partners, and the acknowledgments.

2. An Emerging Global Market for Natural Gas?

The overall demand for energy from fossil fuels is expected to more than double during the next fifty years. At the same time, the composition of the energy mix is about to dramatically change. Many observers now expect the world to consume more gas than oil by 2030. Between 2005 and 2010, overall global demand for gas is projected to increase from 2.8 TCM to approximately 3.2 TCM.

So far, as a result of the difficulty and cost of transport, natural gas has very much remained a regionally traded commodity, with trade by and large restricted to the Atlantic Basin (including Europe) and Asia-Pacific region. However, in recent years we have begun to witness a global market for gas in the making, driven primarily by the expanding role of Liquefied Natural Gas (LNG). Falling indigenous supply of natural gas from maturing fields in Europe and the United States combined with falling costs and enhanced technologies for the liquefaction of gas are turning LNG into an increasingly attractive and in fact necessary alternative source of energy. As such, for consumers, LNG is promising because it helps to diversify sources of supply (thereby fostering energy security), it provides flexibility and good mobility, and contributes to price competition in gas markets (since price arbitrage is possible across different, previously disconnected regions). Based on recent trends, the International Energy Agency (IEA) projects that LNG will serve up to 20% of gas demand by 2010 in the OECD world.

A truly global market for gas does not currently exist and will take time to develop. However, increasing demand and the changing structure of the global gas business are raising a number of critical political and economic challenges that require careful attention, not the least by the Atlantic alliance. For example, much like the oil business, gas resources are increasingly controlled by state-owned enterprises, raising concerns about the inadequacy of investment and resulting supply gaps. In addition, the rise of new consumers (in particular China and India) is raising the specter of a race for upstream acquisitions, with sometimes significant political ramifications. Somewhat related, the expansion of the LNG business further increases security concerns over existing transport “chokepoints” such as the Strait of Malacca while increasing demand and sometimes even competition for access alters the politics of pipeline construction. Finally, while natural gas is frequently hailed as a clean source of energy, practical environmental concerns cannot be discounted as natural gas constitutes a fossil fuel and contributes to climate change.

As such, gas is a politically charged commodity and it is not surprising that gas markets do not operate in a political vacuum. Reliable access to gas at a reasonable cost has been, and will continue to be, of prime strategic value. This applies not the least to the

transatlantic alliance, as both the EU and the US are and will remain heavily dependent on fossil fuels to power their post-industrial economies.

2.1 The Current State of the Natural Gas Market

A truly global natural gas market does not exist at present. Furthermore, while the tendency to compare the developing global gas market with the global market for oil has its merits, it is unrealistic to expect that such a global gas market would resemble that of oil. Cost structures in the two industries are fundamentally different and, as of yet, there has not been a convergence of worldwide gas prices despite the significant growth in liquefied natural gas that can serve to connect regional markets. Thus, to date, the “global” market for natural gas is actually split into three main regional markets in North America, Europe and Asia, all of which have very different characteristics that render the globalization of the gas market difficult.

These different regional market structures represent a “hierarchy” in the gas market that reflects both the willingness and the ability to pay for natural gas imports. At the top (in descending order of willingness to pay higher prices for imports) are Japan, Korea and Taiwan who will pay the highest prices, followed by China and India, Europe and lastly the United States. This "hierarchy" can, however, change overnight if a specific country is facing a short-term security of supply issue; this country will then outbid any others. Additional regional differences also exist regarding how the markets are set up.

North America, with United States and Canada representing major consumers, is largely self-sufficient with Canada supplying the vast majority of imports to the US. However, while the US does have significant LNG import capacities, the US is now tapping a number of unconventional gas sources (i.e. gas shales), which is possible because increased oil and gas prices make this process affordable and the trade-offs inherent and justifiable. Many predict that a decrease in North American LNG demand is forthcoming due to this increased focus on unconventional sources. With regards to the overall market, North America has a functioning market where prices reflect supply and demand, and the infrastructure is both relatively extensive and open to competition.

Europe, with limited fossil fuels and a relatively aggressive environmental agenda, is wedded to gas and demand is increasing. In 2006, EU gas demand was roughly 516 BCM but is projected to rise to 750 BCM by 2030, the main driver of which is power generation. While some indigenous production does exist (mainly Norway), Europe relies on imports for roughly 40 percent of its supply. As opposed to the market structure in North America, European gas prices are not set by supply and demand, but are rather pegged to the price of oil.

The traditional major consumers in East Asia, namely Japan, Korea and Taiwan, have no indigenous supply and are extremely limited with regards to energy alternatives.

Therefore, demand for natural gas is entirely dependent on LNG imports (“LNG or Bust”) and represents a significant difference between the markets of both the US and Europe. In this respect, emphasis is placed on long-term contracts in order to “lock-in” supply, as seen primarily in the case of Japan. While China and India also have limited indigenous supply, their proximity to producing regions allows for pipeline transit as opposed to LNG. Furthermore, the potential for increased gas production in Australia should provide more LNG into the Asian market; however, high costs have thus far delayed these prospects.

While regional and long-term transactions will certainly remain, there are a number of drivers pushing towards the development of a global gas market, with the potential for enhanced price competition. A number of main drivers mentioned during the conference include:

- **Increased spot trading:** A secondary market (diversion) is developing which includes spot markets and short-term sales of LNG, representing roughly 20 percent of all LNG sales in 2007. While LNG currently represents 7 percent of global gas sales, this number is expected to increase as more projects emerge and increasing flexibility in trades and multiple routes enable a wider exchange of gas. Furthermore, a high amount of unclaimed LNG is available, however, a lack of available and accurate information leads to uncertainty about how much there is and where it is going.
- **The increasing number of market players:** The Middle East is becoming the largest supplier of LNG with Qatar, Oman and Abu Dhabi playing key roles. Furthermore, Dubai and Kuwait are emerging as LNG consumers. Other LNG markets are also emerging in Latin America (Argentina, Brazil and Chile), in Southeast Asia (Singapore, Thailand, Indonesia) as well as China and India.
- **The development of “global” projects:** The Sakhalin, Yemen and Tangguh projects rest upon finding various customers in both the East and West.
- **Higher prices:** As the price for LNG increases, the high up-front costs for exploration and production become more justifiable.

A number of significant barriers still exist, however. The costs of liquefaction, transport and regasification will remain significant despite technological advances; and in contrast to oil, gas deteriorates over time, rendering storage difficult. There is also a significant delay in the completion of LNG projects and a serious shortage of human resources and expertise. There are also, at present, more re-gasification than liquefaction facilities. As seen by the example in the UK, more regasification facilities does not necessarily mean more supply availability.

3. Financing Exploration and Production in Gas: The Changing Global Energy Landscape

Being a capital-intensive industry, all gas businesses rely heavily on financial markets to facilitate exploration and production projects. Unlike other investment projects, however, the energy sector often also entails considerable political risks. It thus depends on the ability of financial markets to mitigate or hedge these risks, i.e. its underlying “rules of the game” should determine which investment projects attract financing and which do not.

3.1 State-owned Gas Companies and Underinvestment

A large percentage of known global gas reserves are controlled by state-owned companies and this share is set to increase significantly over the coming years. Hence, state-owned companies play a pivotal role in exploration projects. However, in virtually all cases, state-owned gas companies are lacking sufficient investment to meet increasing demand. Concerns have been voiced in particular about levels of investment in Russian gas supplies.

While underinvestment in the gas industry is conventional wisdom, it is difficult to find empirical evidence of this due to the overall lack of accurate and available market information. It is clear, however, that the nationalization of energy companies is a significant trend in the global market for energy and it is fundamentally changing the “rules of the game” with regards to the financing of energy projects. This nationalization process for the purpose of satisfying national interests instead of being in the best commercial interest not only leads to significant underinvestment, but also to a delay in existing projects. Moreover, project delays at Yamal, Shtokman, Nord Stream and Nabucco as well as a moratorium on investment in Qatar are contributing to fears of tight future supply.

Projects under development should take the industry through to 2013. However, long lead times for exploration, production and constructing the means to transport new resources means that the next generation of pipeline and LNG projects need to be signed soon in order to see growth in the next few decades. If this does not happen, the outlook for gas in international trade after 2014 will become highly uncertain.

3.2 Liquefied Natural Gas

Liquefied Natural Gas (LNG) is natural gas moved into ships at extremely low temperatures in liquid form. This method of transporting natural gas provides cost reductions over long distances as it gives optionality of import either through pipelines or

ships. As a much more flexible means of delivery than pipeline gas, an increase in the availability of LNG would prove to be a key catalyst in connecting the three main regional gas markets into a global market.

Some have characterized the LNG market as operating in distinct price cycles. For example, during the next few years, a significant amount of capacity will be added to the LNG mix and it will quickly be directed to different markets. From 2009 onwards, there will be a recession on demand and around 2014 the cycle could turn again due to expiring contracts.

Japan, Korea and Taiwan rely almost completely on LNG to fill their gas demand and thus long-term contracts represent the primary means of locking up supply. Europe, while wedded primarily to pipeline gas, will increase its share of LNG imports in the coming years with Spain being the primary importer. US demand, on the other hand, is expected to decrease in the coming years due to increasing investment in the production of indigenous, unconventional gas resources such as gas shales. This decrease in US demand should free up additional LNG to be traded on the market and further drive the development of a global market.

3.3 Challenges and Policy Recommendations

While a global market for gas does not currently exist, connecting the existing regional markets to create a global gas market through the expansion would allow for more diversification of gas supplies. While the emergence of a global gas market would not be a panacea for energy security, it would help in alleviating some dependency.

While financial institutions place more emphasis on the efficiency of international energy companies, the current trend of nationalization of energy companies makes it clear that cooperation between state-run energy companies and international energy companies is necessary in order to develop reserves. The Shtokman field, for example, is unlikely to be ready in the foreseeable future due to a lack of Gazprom expertise needed to develop the field on its own. In this respect, it is imperative to foster collaboration.

It is also necessary to further invest in new LNG capacity. While new LNG will be coming onto the market soon, these trends of nationalization and underinvestment make it necessary to ensure that, when these supplies run out (estimated by 2014-2015), there should be new supply to keep pace with demand. At present, the only viable supply source to fill this gap is Australia. Due to a small domestic market, resources have not been developed in Australia as fast as in other OECD countries; Australia is the only producing area that is in a position to drive LNG growth from 2015 onwards and, in fact, must provide the extra gas needed by Asian markets. In this respect, competition is starting in Australia between all major LNG players. Moreover, Australia should also develop unconventional gas in order to fill the gaps, much like in the US.

Consuming countries should also work to establish a level playing field regarding trade and investment rules with producers. It is important to push countries which limit both foreign investment in their energy resources and their exports in order to influence markets to agree to these specific rules in order to set into motion efficient processes for bringing new supplies online.

Lastly, in order to bring new projects online as well as push forward with delayed projects, it is essential to shore up the training of engineers, without whom we can expect additional delays in new construction projects.

4. The Geopolitics of Natural Gas

The vast majority of gas reserves, with the notable exceptions of North America, Australia and the North Sea, are controlled by governments and national companies in Russia, Iran and Qatar. In addition, like oil the transportation of gas is also politicized by the need for transit routes both through transit countries (pipelines) as well as safe passage through the world's shipping chokepoints (LNG). Furthermore, gas prices have a larger effect than oil on consumers as gas represents the primary method of heating in homes and businesses.

In recent years we have seen Russia, for example, utilize its gas resources as political leverage, the political upheaval surrounding Bolivia's natural gas nationalization and the emerging "grand game" in the Caspian region. In addition, we are beginning to see a new "Arctic scramble" as the effects of climate change produce new political challenges. We are also still confronted with a difficult political situation in Iran. As previously considered "regional" supplies are developed, we will increasingly see global demand for these resources.

Moreover, the issue of transit countries (as seen in the cases of Ukraine, Belarus and Georgia) and vulnerable shipping chokepoints in the Straits of Malacca and Hormuz represent serious concerns for security of supply. While the US currently provides navy assistance at chokepoints, questions remain over whether it will carry on providing this service beyond its European allies and Japan, i.e. to China.

4.2 Regional Suppliers and Competing Consumers

There is increasing global demand, and thus a growing amount of global competition, for access to natural gas. As new upstream gas operations have developed, we have observed that global demand for gas transcends the traditional regional system and the interests of different consumers clash, for example in Central Asia where both the EU and China are eager for gas access. Furthermore, increasing interdependencies will result in these regional markets eventually breaking up and giving way to a market for gas more closely resembling a global market.

4.2.1 Russia

Gazprom undoubtedly wants to become the leading global energy company and is well-positioned to do so. Russia will dominate the gas market over the next decade and quite possibly for the next thirty years based upon the limited capacity of other potential suppliers. Furthermore, as demand for gas in China increases, it would certainly be in the interest of Russia and Gazprom to also "Go East" with their gas. China is a major competitor for Russian gas and will pay for it. Some participants even emphasized that the EU would not stand a chance at getting Russian gas if it not for Soviet built

pipelines. They also emphasized that without this existing infrastructure we would be looking at a very different present day gas market. In this respect, history has helped create the current regional market structure and not so much the market.

Lastly, some participants highlighted that the internal politics within Gazprom could change the current relationship and perception of the company. Currently, there are younger perspectives, which are more educated and comfortable with Western markets that are competing with the “older” executives with little experience abroad and whose perspectives are tied to the politics of gas rather than the market.

4.2.2 North Africa and the Middle East

It is certainly in the best interest for Europe to diversify its supply and accessing new markets in Iran, Iraq, Egypt Libya and others is certainly not unreasonable. However, the political situation in these countries and the resulting strategic response by consuming countries (i.e. sanctions, regime change, etc.) represents a serious setback for gas supply diversification. In addition, it is also necessary to not only examine the total availability of natural gas resources, but also to account for the domestic demand in these potential supply countries in order to more accurately quantify export capacity. In the face of domestic supply needs, there is no guarantee that the potentially available export capacity will be sent to the Far East or to Europe. Moreover, Chinese competition does not have the moral concerns of the West and, in this respect, politics does not affect whether or not China will invest or buy gas. China will also pay higher prices. This generates a number of concerns not only for availability of supply, but also good governance.

4.3 Transit Countries

In light of the recent Russia-Ukraine/Belarus gas disputes, much attention has been paid to the role of transit countries in reliably delivering gas to the European market. It has become clear that to ensure security of gas supply, it is of great importance to have multiple suppliers and multiple transit routes. However, diversification of supply has numerous implications on foreign policy, international law, economics and infrastructure construction.

The legal framework on transit in the EU is provided by GATT article V on freedom of transit, Article 7 of the Energy Charter Treaty, and the Draft Transit Protocol.

Article 7 of the Energy Charter Treaty specifies GATT V for energy materials, products and grid-bound energies and is meant to facilitate transit via energy transport facilities. Furthermore, this is meant to promote non-discriminatory use of existing capacity, non-interruption of existing flows; non-discrimination as to origin, destination, ownership and pricing; and the expectation of no unreasonable delays, restrictions or charges. In addition, in the event of a dispute, there should also be no interruption of transit flows.

The Draft Transit Protocol includes definitions for available capacity; sets non-discriminatory and transparent access to capacity; has objective, non-discriminatory, transparent and cost-reflective transit tariffs; includes no unauthorized taking of energy; as well as sets standards (technical, environmental, health, safety, social, accounting).

Long-term transit arrangements are important for long-term planning and for making investment decisions. With increased trade in natural gas, it is assumed that more transit options are necessary. Discussions at the conference focused on a number of different issues regarding transit in the EU, for example, transit tariffs and fees, influence on price of gas, implications of pricing principles as well as geopolitical issues including the disputes between Russia and Ukraine, Belarus and Georgia.

Regarding transit tariffs and fees, and the question of why transit countries get a rent for their geographic position, some participants argued that, while an amenable argument, geographical position is not a valid reason for charging rents. Fees should correspond to taxes and to what countries have contributed to building and maintaining the pipeline.

4.4 Challenges and Policy Recommendations

While increasing EU dependence upon Russian natural gas causes a number of political concerns, many conference participants pointed out that Europe does not have a supply problem. The EU is relatively well-located geographically to take advantage of a growing gas market. Through its proximity to Algeria, other North African countries, Russia and the Caspian Sea, as well as the potential for LNG imports, the EU has a number of options for diversification. What Europe does have, many participants agreed, is a market problem. The European Union, with its roughly 495 million people, still does not possess a liquid, deep and large-scale market for energy.

Europe needs more pipelines to promote a more integrated gas market. Furthermore, Europe requires an expansion in the number of storage facilities, more LNG imports to supplement pipeline supply, an expansion in the production of biogas and an intensification of external energy relations where the EU needs to speak with one voice. Moreover, time is a significant factor here. The EU must develop new supplies and build the appropriate infrastructure soon.

Russia will dominate the gas market over the next decade and quite possibly for the next thirty years based upon the limited capacity of other potential suppliers. As a result of this reality, a number of conference participants emphasized that we cannot demonize Russia as all other diversification targets will, relative to Russia, be minor components of the overall gas supply mix. In this respect, the EU should work to engage, not alienate, Russia and continue to push Russia to sign the Draft Transit Protocol. Moreover, some participants emphasized that it would be wise for Gazprom to hire a Western company to front its downstream operations to alleviate consumer concern. Participants also

stressed that Gazprom must contribute to investments in additional pipeline infrastructure and not merely be in the business of buying up other companies. Recipient countries cannot be expected to back all of these necessary infrastructure investments.

New supply countries must continue to generate their internal needs, assess them and then look at global demand and determine their export potential and capacity. We must take a practical, long-term view on Iraq, Iran, Libya and Nigeria and work to develop there. Without access to these supplies, security of supply in the long-term will remain elusive.

Obtaining a long-term security of supply is a process and will take time, however, achieving diversification of supplies, transport routes and cooperation between producers and consumers is nevertheless key.

5. Security of Supply in a Global Gas Market

The emergence of a global gas market provides an opportunity as well as a need for market rules and mechanisms in order to ensure security of gas supply in both the EU and the US. However, issues such as import dependency, transport dependency, as well as associated environmental and social responsibilities loom as major challenges to achieving security of supply. In addition, there exists no comprehensive institutional framework that can both structure and promote transparency in a global gas market.

5.1 Diversification of Supply Sources

Europe is currently serviced by three main transit corridors for natural gas: Russia, Norway and Algeria. While Russia is often demonized as an unreliable supply source, many participants argued that Russia has been a very reliable supplier to Europe for 40 years, that mutual dependence is equally important to Russia (security of demand) and that Gazprom has largely acted rationally in its decisions.

Russia, Norway and Algeria cannot be substituted and will be counted on to reliably supply natural gas to Europe well into the future. With regards to further diversification, two options exist for Europe, LNG and the Caspian Region – the so-called “fourth corridor”.

5.1.1 Caspian Region

There are currently a number of projects planned or in development to bring natural gas supplies from the Caspian region to Europe.

The Nabucco pipeline would connect with the Tabriz-Erzurum pipeline near Erzurum, Turkey, and would connect with the South Caucasus Pipeline, via the planned Trans-Caspian Gas Pipeline. There are a number of sponsors for this project, including but not limited to OMV in Austria, MOL in Hungary, Transgaz in Romania, and a number of others. The project is supported by both the EU and the US.

The problem with Nabucco, as a number of participants stressed, is that it transits through many countries and thus creates difficult geopolitical issues. Furthermore, some argued that Nabucco would lack the total supply needs in order to guarantee the economies of scale the project requires to be economically feasible.

Alternatively, the IGI pipeline (developed by Edison and DEPA in cooperation with Botas) is supported by the Italian, Greek and Turkish governments and is set to start operations by the end of 2012 with a capacity of 8 BCM per year. However, there are still some existing transit issues involving Turkey, particularly with regard to the transit fees that the Turkish Government intends to charge.

At the public evening event entitled “A New Silk Road? The Caspian Sea and European Energy Security”, participants emphasized a number of different issues which cast some doubt on the overall viability the “fourth corridor”. First, Russia, China and Iran are gas importers, leaving Europe as the fourth importer, which in relation to the first three importers is geographically distant. Second, although Turkmenistan holds hopes in terms of its reserves, it remains uncertain as to the extent of these reserves and, whatever does exist, cannot be translated into production instantaneously. Third, the gap between demand and available supply may, in fact, render pipeline projects economically infeasible. For example, Nabucco is a 30 BCM pipeline, but (at least based on known reserves) Central Asia has only 15 BCM per year. In this respect, the smaller pipelines (ICI, TAS, South Stream) may be more practical as they are 10 BCM pipelines. Fourth, Turkey poses transit issues and is also a competitor for Caspian gas.

5.1.2 Biogas

Venture capitalists are currently very active in the renewables sector; however, very few companies are working on biogas. Biogas is a relatively clean burning renewable energy produced from the decomposition of organic waste materials, mainly in the form of methane. In addition, as methane is a greenhouse gas with greater global warming risks than carbon dioxide, the potential benefits of harvesting these gases can play a significant role in mitigating climate change while contributing to energy security.

Some have talked about the prospects of biofuels (particularly biomass) as a development incentive, however, some participants argued that this would be on a very local level only and that biofuel “markets” are regional. People burn what they have around them and there would be no real market for shipping “waste” to other areas of countries or regions which have their own “waste”. In addition, the risk of biofuels, more specifically ethanol, is the debate between food versus fuel where potential food scarcity (in addition to other environmental problems) due to increased use of agricultural land for biofuel purposes would exacerbate already pressing security and development concerns.

Furthermore, incentive structures for investment require additional work. For example, US incentives push corn when it is not the most viable option for renewable energy. If political priorities shift, the demand structure can and will likely shift. Consequently, the long run, consumer behaviour will also shift.

The future, some participants argued, lies in second generation biofuels which, instead of using the food products directly, involves breaking down the residual, non-food parts of crops such as the leaves, stems and husks of food products to produce energy. The US Department of Defense has signed onto this route contracting a number of military vehicles be fuelled with second generation biofuels.

Most participants agreed that much more work needs to be done to understand the manifold economic, social and environmental effects of increased biofuels usage.

5.1.3 Gas-to-Liquid (GTL)

Gas to Liquid (GTL) production has been hailed as a way to both reduce transportation emissions and lower the cost of transporting natural gas. Some of the benefits of GTL include being relatively clean and environmental friendly; it encourages technology and intellectual transfer to developing countries and could increase local employment; it values up gas for other markets, including base oils, diesels and chemical products and can be used as a gas blend.

A number of governments are looking into the potential of GTL and the big industrial players (i.e. BP, Shell, Sasol, Chevron) have significant research projects looking into this process. The US government has also signed production contracts to fuel air force fighter planes with GTL and is looking to expand their contracts, which is also a promising sign.

However, while Sasol, Chevron and Shell were big in selling the benefits of GTL it became clear after some added probing that there are some significant hurdles to be overcome before a number of the above listed benefits can be realized. First, GTL plants are extremely capital intensive to build and are also difficult to run. Furthermore, engineer and materials supply limitations have hindered the expansion of GTL in some areas. Third, there are serious questions about the actual environmentally friendliness of GTL as there is a lot lost in the transfer. Last, and perhaps most important, the cost of getting GTL off the ground and building up the infrastructure to actually utilize the product prove to be major limitations.

5.2 Disruptions and Short-term Supply Management

As we become increasingly dependent on natural gas to satisfy our energy needs, it becomes more crucial to have short-term supply (risk) management mechanisms to hedge potential risks.

5.2.1 Disruptions

A number of possibilities exist that threaten disruption of gas supply to the market, for example, natural disasters, political weapons (i.e. the cases of Russia and Bolivia) and terrorism. In addition, the dependency of Europe on Russia and the US on Canada poses additional consequences. While the expansion of the LNG market could help mitigate some risk, it is essential for consumers to develop mechanisms to hedge against short-term threats to the gas market.

The Council of the European Union defines a major supply disruption as a situation where the Community would risk losing more than 20 percent of its gas supply from third countries and the situation at Community level is not likely to be adequately managed with national measures. However, the lack of a common stance by members of the European Union with respect to both security and energy market liberalization is

hampering these efforts at achieving security of supply. Furthermore, high up-front costs for short-term response mechanisms, i.e. storage, as well as an overall lack of gas market transparency and access to information renders an effective short-term response to disruptions in any form difficult.

5.2.2 Strategic Stocks

To ensure security of gas supply, many argue that, like oil, the existence of strategic stocks is as essential as an insurance policy. However, due to the high costs for storage and developing the necessary infrastructure, as well as decreasing domestic production, investment incentives and a solid regulatory framework are required to increase capacity.

There are two different types of storage – operational and strategic. Operational storage is utilized on a seasonal basis due to inelastic demand –daily peak usage must also be met in winter. Strategic storage, on the other hand, is needed due to risk of disruptions such as weather, political (transit), or terrorism. Either way, the value of storage is the ability to combat volatility.

However, a number of issues complicate the debate on storage. First, it is costly and it is difficult to quantify how much is necessary to successfully hedge against risks. Second, gas deteriorates over time and renders storage difficult. Third, while operational storage should be quantifiable (we know the weather patterns), the decline in indigenous production causes uncertainty. Fourth, regulatory uncertainty (what changes may or may not occur) creates additional risks with regards to investment. Fifth, the current hybrid liberalization in the European market complicates any EU strategy for strategic storage.

There is no European storage market and therefore remains a regional subject. At present, only a handful of European countries have significant strategic storage and the amount they do have is generally correlated with how much imported gas makes up their total gas consumption. Italy has roughly 5.1 BCM, Hungary has 1.2 BCM (with more planned) and Ukraine has roughly 7 BCM.

Another key issue is market transparency. While Gas Infrastructure Europe's (GIE) storage arm Gas Storage Europe seeks to provide transparency to the European storage sites, full transparency has not been achieved across all member states.

Some conference participants stressed that there is availability for storage in Lviv, Ukraine as Gazprom is no longer filling this facility. However, participants counter-argued that since Gazprom would probably never pump this gas knowing it was going to be used for strategic purposes, this would never fly. However, Gazprom Germania is, in fact, looking at a potential storage facility in Hinrichshagen, Germany to store roughly 10 BCM of natural gas in case of disruptions with Nordstream.

5.3 Challenges and Policy Recommendations

Security of supply with increased global competition for gas is shaped by diversification of supply sources (commercial security), diversification of transport routes (physical security) and cooperation between partners and consumers (political security).

With respect to Europe, there is no one silver bullet for achieving energy security. Europe must foster mutual interdependence between producer and consumer through all upstream, midstream and downstream operations. Russia has been reliably delivering natural gas to Europe for over 40 years and any solution to European energy security must inevitably involve Russia. It would be in the best interest to open up producer-consumer dialogue (especially between Europe and Russia) to allay concerns over security of supply and demand.

While much has been said regarding the potential for Caspian gas resources to contribute to achieving European security of supply, this also needs to be put into perspective. Deliveries from Azerbaijan commenced only last year and additional projects require huge investment costs and take over 15 years to build. Furthermore, the economic feasibility of the large pipeline projects such as Nabucco is questionable as the amount of available supply coming from the Caspian region is yet unknown. It may turn out that smaller pipeline projects may make more economic sense.

As the cost of LNG rises, it will become more equitable to finance the high, up-front costs required to build new LNG infrastructure and ships, which should allow for additional diversification and flexibility of supply. However, as the market for LNG grows, questions remain as to whether or not the US Navy will continue to carry the burden of providing security at shipping chokepoints such as in the Straits of Malacca and Hormuz. As China increases its share of LNG from the Middle East, it is possible that US will no longer offer this service and alternatives for burden sharing will need to be found.

With respect to diversification through renewables, at present, we have sufficient ideas to develop renewable energies such as biogas, however we need to make these options more visible by testing, building, marketing and moving forward with these technologies and infrastructure preparations now. Otherwise, the major goal of moving to renewables in the first place, namely climate change mitigation, will be long past. As more biogas and GTL products actually become available, it should be easier to market these products. However, many questions remain on how to integrate biomass and GTL into the current energy mix and what the overall effect on security of supply and the environment would be.

The development of a global gas market would be a good collective mechanism to deal with a number of disruptions. However, in order to develop effective and lasting mechanisms, the EU needs to continue with the liberalization process in order to build a

common, transparent and functioning EU-wide market for natural gas. Furthermore, in a fully liberalized market, gas storage would have added value and efforts should be made to develop functioning strategic gas storage facilities.

One proposed solution to the strategic storage debate is, utilize storage facilities in Lviv, Ukraine. In order to make this more palatable to Russia and Gazprom, one suggestion was to slowly increase the amount of storage in this facility by small increments in order to build up the storage capacity while also demonstrating common security of supply/demand objectives.

6. Conclusion

Are we moving toward a global gas market fast enough?

The world faces extreme uncertainty both in regards to future demand and supply for energy. Gas is not the silver bullet or transition fuel of choice as many have suggested. However, by default, gas may indeed become this transition fuel because the market for alternative fuels is uncertain due in part to delays in large-scale investment.

The European Union must complete internal markets in order to construct a coordinated block of consumers for leveraging against producers and hedging against potential disruptions. Moreover, participants argued that the EU must focus on the third market package (likely to be approved in spring of 2009) in order to improve competitive access to markets. However, participants also stressed that wholesale liberalization may be at odds with energy security.

Furthermore, much can be done to make the European Commission's 2004 security of gas supply directive more constructive by making it more timely, to include transparency and to improve effective responses to potential supply crises. In addition, Europe also needs an EU-wide transparency model that includes data sharing and reporting, transparency in trading transactions and home state market data. Some participants also suggested that a 90 day storage requirement could help combat some security concerns.

The European Union must engage and work with Russia as any solution to EU gas demand must include Russia. Economically, European security of supply concerns is matched by Russian security of demand concerns. However, it is also necessary to develop a much more comprehensive and sophisticated assessment of what the EU could do to prevent or manage a supply or political crisis with Russia.

While a lot of gas will be coming onto the market, by 2015 all of these supplies will be used and we will be back to a security of supply crisis again. As a result of the complications and difficulty in finding gas, diversification is absolutely necessary in order to hedge against the risk of overheating the LNG market and driving prices up.

The US has a robust gas market with indigenous gas supplies increasing, especially due to increased production of unconventional gas. While the Europeans need to respond to Russia's recent behaviour, a US response may not only be unnecessary, but may also be unwelcome. At any rate, The US should wait until a new administration before it considers reopening new energy dialogues.

It is necessary to unite and collaborate with other producers and consumers, i.e. China and India, in order to establish better channels of communication and information sharing. This would serve the purpose of not only leveraging against producers, but also to support global energy markets. However, there are significant limitations in this

regard. The International Energy Agency does not include India and China and it would make sense to work out a protocol for either full integration or some form of inclusion in order to strengthen consumer cooperation.

Annex I: Conference Program

D A Y 1

12:00pm **Arrival and Registration**

12:30pm **Lunch Buffet**

02:00pm **Welcome**

- *Joachim Lang, Director of Berlin Representation, E.ON AG*
- *Jan Martin Witte, Associate Director, Global Public Policy Institute*

02:15pm **OPENING PANEL DISCUSSION**
Towards a global market for gas? Current trends, expectations and implications for governance

Trade in natural gas is mainly restricted to regional blocs and hence there exists no established framework for governing what many see as a developing global gas market. Demand for natural gas is growing and for a functioning market to exist, rules and governance mechanisms must be in place in order to provide the necessary regulatory framework for promoting investment, competition and risk management. What are the drivers behind the emergence of a global market for gas? What are the hurdles? Will a global market for gas resemble the global oil market, and if not, why? What rules and mechanisms would need to exist for a global gas market to function?

Panelists:

- *Jochen Weise, Member of the Executive Board, Gas Supply & Trading, E.ON Ruhrgas AG*
- *Ben Hollins, Head of European Gas and Power Consulting, Wood Mackenzie*
- *Pieter Boot, Director, Long-Term Co-Operation and Policy Analysis, International Energy Agency*

Moderated by Andreas Goldthau, Central European University

03:45pm **Coffee Break**

04:15pm **WORKING GROUP SESSION (I)**
Financing exploration and production in gas: The changing global energy landscape

Being a capital intensive industry, all gas businesses heavily rely on financial markets to facilitate exploration and production (E&P) projects.

Unlike other investment projects, however, the energy sector often also entails considerable political risks. It thus depends on the ability of financial markets to mitigate or hedge these risks, i.e. its underlying “rules of the game” determine which investment projects attract financing – and which do not. The workings groups in this session provide an impetus to discuss some of the main challenges of financing the future of gas exploration and production in a politically and environmentally sustainable manner.

- WORKING GROUP A

Increased demand, lagging supply: State-owned gas companies and the problem of underinvestment

Today, a large percentage of known global gas reserves are controlled by state-owned companies and this share is set to increase significantly over the coming years. Hence, state-owned companies play a pivotal role in exploration projects. However, in virtually all cases, state-owned gas companies are lacking sufficient investment to meet increasing demand. Concerns have been voiced in particular about levels of investment in Russian gas supplies. Does the trend towards increasing nationalization of gas resources have an effect on re-channeling investments? To what extent are these companies negatively affected by political functions, for example, in Russia or Iran?

Introductory speaker: *Joerg Doerler, Principal, the Boston Consulting Group*

- WORKING GROUP B

The economics of LNG: Investing in liquefied natural gas

LNG is capital intensive industry requiring a relatively long period of time from the initial investment to construct terminals, ships and pipelines, establish a supply chain and begin generating returns. Furthermore, political, environmental and social issues can also hinder investment. To what extent is current worldwide investment in LNG enough to satisfy future demand? What economic and regulatory barriers exist that hinder LNG investment? What incentives can be offered to increase investment?

Introductory speaker: *Thierry Bros, Senior Gas Equity Analyst, Societe Generale*

- **WORKING GROUP C**

- Investing in clean gas: Gas to liquid and gas hydrates*

Gas to liquid production has been hailed as a way to both reduce transportation emissions and lower the cost of transporting natural gas. In addition, during the past few decades, gas hydrates have been identified as having a massive reserve potential, however, energy companies have been reluctant to invest due to a relative lack of research and knowledge of potential geological and environmental dangers. Where do we currently stand with these two technologies? What are the potential benefits and pitfalls? To what extent can they fulfill overall energy demand?

Introductory speaker: *James Vaughan, Manager, Technology and Environment, Sasol Chevron*

05:30pm Dinner Buffet

07:00pm EVENING PANEL DISCUSSION

A New Silk Road? The Caspian Sea and European Energy Security

Panelists:

- *Jochen Weise, Member of the Executive Board, Gas Supply & Trading, E.ON Ruhrgas AG*
- *Jonathan Stern, Director of Gas Research, Oxford Institute for Energy Studies*
- *Christof van Agt, Advisor to the IEA on the Caspian Sea and Central Asia*
- *Edward Chow, Senior Fellow, Center for Strategic and International Studies*

Moderated by Petra Pinzler, DIE ZEIT

09:00pm Reception

DAY 2

09:00am PANEL DISCUSSION II

The politicization of gas: Implications for security of supply and the development of a global gas market

Like oil, gas is a politically charged commodity. In recent years we have seen, for example, Russia utilize its gas resources as political leverage, the political upheaval surrounding Bolivia's natural gas nationalization and the emerging "grand game" in the Caspian region. In addition, we are beginning to see a new "Arctic scramble" as the effects of climate change produce new political challenges. Not the least, we are still confronted with a difficult political situation in Iran. To what extent can the

development of a functioning global gas market (as opposed to regional markets) lessen political motivations? Would a global gas market provide security of supply through greater opportunities for diversification? What steps can be taken to deter the use of an “energy weapon” or potential leverage strategies by transit countries?

Panelists:

- *Daniel Simmons, Former Principal Natural Gas Expert, International Energy Agency*
- *Edward Chow, Senior Fellow, Center for Strategic and International Studies*
- *Joachim Pfeiffer, Member of the German Parliament and Coordinator of Energy Matters, CDU-CSU*

Moderated by Wade Hoxtell, GPPi

Q&A

10:30am Coffee break

**10:45am WORKING GROUP SESSION (II)
Supply, demand and the politics of gas**

This working group session will analyze the different political implications of the emerging global gas market. The first working group will address the geopolitical issues associated with the transport of LNG, while the second group will examine the role of transit countries in delivery of gas through pipelines. The final working group will focus on different regional suppliers, consumer demand and the potential for consumer clashes.

- **WORKING GROUP A**
Geopolitical implications of liquefied natural gas (LNG)

As the trade and transit of LNG become increasingly prevalent, concerns about security arise with respect to the same “chokepoints” that affect the oil market, most significantly the Straits of Hormuz and Malacca. What maritime threats currently exist in these major chokepoints? What geopolitical difficulties exist regarding international cooperation in securing the straits and what challenges exist in responding to transit disruptions? What security implications will result as China and India become increasingly dependent on secure delivery of both gas and oil?

Introductory speaker: *Thierry Bros, Senior Gas Equity Analyst, Societe Generale*

- WORKING GROUP B

From producer to consumer: The role of transit countries

In light of the recent Russia-Ukraine/Belarus gas dispute, much attention has been paid to the role of transit countries in reliably delivering gas to the European market. It has become clear that to ensure security of gas supply, it is of great importance to have multiple suppliers and multiple transit routes. However, this requirement has numerous implications on foreign policy, international law, economics and infrastructure construction. What regulatory barriers exist and what multilateral framework is required to manage these transit corridors? What policies need to be in place to ensure consistent, fair and secure delivery? How can political stability be promoted in transit countries?

Introductory speaker: *Ralf Dickel, Director for Trade, Transit and Relations with Non-signatories States, Energy Charter Secretariat*

WORKING GROUP C

At the intersection of demand: Regional suppliers and competing consumers

As new upstream gas operations have developed, we have observed that global demand for gas transcends the traditional regional system and the interests of different consumers clash, for example in Central Asia where both the EU and China are eager for gas access. How do demand needs in different regions correlate to the estimated supply capacity? What producing regions may lead to a clash of consumers? What types of mechanisms are necessary to avert potential conflicts?

Introductory speaker: *Uwe Fip, Senior Vice-President, Gas Supply Division East, E.ON Ruhrgas*

12:00pm Lunch

01:30pm WORKING GROUP SESSION (III)

Short-term supply management in a global gas market

As we become increasingly dependent on natural gas to satisfy our energy needs, it becomes more crucial to have short-term supply (risk) management mechanisms to hedge potential risks. The first group in this session will examine potential disruptions in the gas supply and ways to mitigate these threats. The second group will focus on different ways the EU and the US can diversify their gas supply. Lastly, the third group will analyze gas storage capacity and the role of strategic gas stocks.

- **WORKING GROUP A**

- ***Disruption drivers and methods of mitigation***

A number of possibilities exist that threaten disruption of gas supply to the market, for example, natural disasters, political weapons (i.e. the cases of Russia and Bolivia), and terrorism. In addition, the dependency of Europe on Russia and of the US on Canada poses additional consequences. While the expansion of the LNG market could help mitigate some risk, what other options exist? How can consumers mitigate these short-term threats to gas markets? What framework exists or should be created to hedge these risks? What role can the International Energy Agency or other established institutions play?

Introductory speaker: *Jens Hobohm, Research Fellow, German Institute for International and Security Affairs*

- **WORKING GROUP B**

- ***A new source for diversification? The potential and limits of biogas***

Biogas is relatively clean burning renewable energy produced from the decomposition of organic waste materials, mainly in the form of methane. In addition, as methane is a greenhouse gas with greater global warming potential than carbon dioxide, the potential benefits of harvesting these gases can play a significant role in mitigating climate change while contributing to energy security. Where do we stand regarding biogas technology? To what extent can biogas play a significant role in diversification efforts? What political and environmental challenges exist; how should challenges be addressed?

Introductory speaker: *Birte Holst Jørgensen, Managing Director, Nordic Energy Research*

- **WORKING GROUP C**

- ***Storage capacity and strategic gas stocks***

To ensure security of gas supply, many argue that, like oil, the existence of strategic stocks is essential. However, due to high costs for storage and developing the necessary infrastructure, as well as decreasing domestic production, investment incentives and a solid regulatory framework are required to increase capacity. To what extent can strategic gas stocks represent an effective policy response to supply disruptions? What challenges exist within gas delivery infrastructures, especially in with respect to Europe's national grids, concerning their ability to deliver gas supplies when and where they

are needed following a disruption? What incentives are needed to promote appropriate investment into storage capacities? What has been the experience in the US?

Introductory speaker: *Ben Hollins, Head of European Gas and Power Consulting, Wood Mackenzie*

02:45 pm **Coffee Break**

03:00pm P A N E L D I S C U S S I O N I I I

Diversification and security of supply in a global gas market: The transatlantic agenda

The emergence of a global gas market provides an opportunity as well as a need for market rules and mechanisms in order to ensure security of gas supply in both the EU and US. However, issues such as import dependency, transit dependency, as well as associated environmental and social responsibilities loom as major challenges to achieving security of gas supply. In addition, there exists no comprehensive institutional framework that can both structure and promote transparency in a global gas market. What can the US and the EU do to mitigate these dependencies? What institutional framework must be built for consumer cooperation and transparency in a global gas market?

Panelists:

- *Dick de Jong, Senior Fellow, Clingendael International Energy Programme*
- *Alan Hegburg, Deputy Assistant Secretary for International Energy Policy Office of Policy and International Affairs, U.S. Department of Energy*
- *Paul Saunders, Executive Director, The Nixon Center*
- *Heinrich Hick, Policy Officer, The European Commission, DG TREN*

Moderated by Jan Martin Witte, GPPi

Q&A

04:30pm C O N C L U D I N G D I S C U S S I O N A N D
F A R E W E L L

The transatlantic agenda: Where do we go from here?

Moderated by Andreas Goldthau, Central European University

04:45pm **Farewell**

Annex II: List of Participants

Dr. Eltje ADERHOLD

Scientific Coordinator, Working Committee International Policy and Human Rights, Parliamentary Group Alliance 90/the Greens, Berlin

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Assistant Professor, Environmental Policy Research Centre, Free University of Berlin

Dr. Markus BAUMANN

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Mr. Alexander ZAFIRIOU

Economic and Public Affairs, Power & Gas II - Security of Supply, Nuclear, E.ON AG

Annex III: Organizer Information

The Global Public Policy Institute

The Global Public Policy Institute (GPPi) is an independent think tank based in Berlin and Geneva. Our mission is to develop innovative strategies for effective and accountable governance and to achieve lasting impact at the interface of the public sector, business and civil society through research, consulting and debate.

Our approach:

- **We are an independent and non-profit institute.** We receive project funding from foundations as well as our project partners and clients from the public and private sectors. We re-invest profits from consulting activities into our research work.
- **We build bridges between research and practice.** Our international team combines research and public policy expertise with management consulting skills. We foster the exchange of knowledge and experience between researchers and practitioners.
- **We promote policy entrepreneurship.** Our work strengthens strategic communities around pressing policy challenges by bringing together the public sector, civil society and business.

E.ON AG and E.ON Ruhrgas AG

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European Commission

The European Commission supports the Global Public Policy Institute’s research project “Changing Rules of the Game: Global Energy Governance in the 21st Century” as well as the TESD conference series through a generous “EU-US Policy Research and Debate” grant. More information on the European Commission can be found at http://ec.europa.eu/index_en.htm.

The Dräger Foundation

The Dräger Foundation, founded in 1974, is a non-profit institution committed to the promotion of science and research, especially in the field of national and international economic and social order. By encouraging the intensive exchange of experience and ideas regarding issues which are of importance for our future, the Dräger Foundation endeavors - within the bounds of its capabilities - to make a contribution towards improved international relations. More information can be found at <http://www.draegerstiftung.de/>.

The German Marshall Fund of the United States

The German Marshall Fund of the United States (GMF) is a nonpartisan American public policy and grantmaking institution dedicated to promoting greater cooperation and understanding between the United States and Europe.

GMF does this by supporting individuals and institutions working on transatlantic issues, by convening leaders to discuss the most pressing transatlantic themes, and by examining ways in which transatlantic cooperation can address a variety of global policy challenges. In addition, GMF supports a number of initiatives to strengthen democracies.

Founded in 1972 through a gift from Germany as a permanent memorial to Marshall Plan assistance, GMF maintains a strong presence on both sides of the Atlantic. In addition to its headquarters in Washington, DC, GMF has six offices in Europe: Berlin, Bratislava, Paris, Brussels, Belgrade, and Ankara.

For more information, please visit <http://www.gmfus.org>.

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