

CONFERENCE ON NATURAL GAS MARKETS IN EUROPE

Vienna, June 3-4

The Bureau of Intelligence and Research at the US Department of State and the National Intelligence Council organized this conference. To encourage frank discussions, the names of the participants cannot be made public. I attended and spoke on Marcellus Shale. I will send a separate report on this topic. The different presentations are numbered below. In some cases, at the end of the section the comments are from conference participants other than the presenter.

SUMMARY

Europe's economy is likely to grow slower than the US's and much more slowly than China's. This is due in part to excess regulation and a continuing failure to liberalize its energy market.

The energy industry is at the nexus of technology, geology, economics, and domestic and international politics. The mix is constantly changing. Western countries tend to think of energy as a matter of shortages and high prices. But producing countries are also part of the formula, with their own concerns, both economic and political.

Gas field exploration and pipelines require huge amounts of capital for long term investments. The financial calculus can be upset by changes in demand and risks of disruption. Most of the gas fields are in unstable parts of the world and/or have to cross unstable parts of the world to get to market, whether over land or water. Can these parts of the world be stabilized?

In contrast, newly evaluated, unconventional gas formations are found in politically stable regions or even in the market where the gas will be used. Can this gas be produced at competitive rates? Can the necessary technology be applied safely enough and with little enough surface disruption to make it acceptable? This source of energy need not substitute 100% for less stable sources to be extremely valuable. Marginal amounts change the balance of power.

Energy resources are both a blessing and a curse. High reserves and prices permit a country to put off adjusting to the time when its supplies have run out. Furthermore, national wealth, if not wisely used, may result in citizens without needed skills or purpose.

Gas is a bridge fuel, from dirty hydrocarbons like coal and oil to renewable sources, but an excess of gas, with low prices, permits users to put off developing those even cleaner renewable sources.

If gas prices are too low, the financial return will be too low to support their development.

Gas is more flexible than coal and nuclear and therefore a good supplement to less reliable wind and solar. But what is the proper premium solar and wind should pay for the support provided by gas?

European pipelines today flow only in one direction (east to west) and do not adequately serve many markets. Sourcing from a single pipeline creates a monopoly, giving the gas source significant political

leverage. But creating a second source requires major financial investment and the market served may not be sufficient to provide the necessary financial incentive. Security is not free; likewise, energy security is not free. Countries want energy security but want someone else to pay the necessary premium. Similarly, weaker EU countries want energy solidarity, meaning that other EU countries will help them when in need.

Three pipelines are being considered in Europe. While Europeans have been talking, China has built a \$7 billion pipeline from Turkmenistan. The three pipelines have quite different financial, geographic and political characteristics. Three are certainly too many.

There is no transparency in the European (probably also not in the world's) energy market.

Norway is a significant energy player. Austria is a significant niche player in the energy market. Austria was once the world's 3rd largest producer of petroleum, after the US and Russia.

The new EU members are very dependent on Russia for energy. They are not economically significant enough to justify the large financial investment needed to provide them non-Russian gas. So domestic sources are of great interest to them.

The two disputes between Russia and Ukraine have injured both of them. One of Russia's goals in its war with Georgia was to make clear to the West how vulnerable non-Russian pipelines can be.

Banks are now less likely than before the financial crisis to make the loans needed to finance the needed pipeline(s).

If unconventional gas sources such as shale are to be accessed, this must be done on a large scale, with a substantial increase in gas industry infrastructure, such as 100's of additional, modern drilling rigs, thousands of water trucks and American (Texas and Oklahoma) engineering know-how. Presently there are only 67 rigs in all of Europe and they are very old, heavy and inefficient. In the US, there are over 1,500. The profitability of European shale gas is very sensitive to higher costs, delays, etc. Exploration companies must wait 3+ years for any return. Small scale operations are too inefficient to make a profit.

The discovery of unconventional gas sources in the US and recession have reduced US needs for imports. So those non-US gas sources have to try to sell their gas elsewhere, increasing supplies there and lowering prices.

Coal and nuclear plants are still being built in Europe. Each country has its own energy policy.

European countries seem to take global warming seriously and take at least some difficult steps to try to meet their goals for the reduction of greenhouse gases. Europeans don't know that many Americans still question the reality of global warming and are certainly unwilling to make an effort to change.

The technology and logistics of pipelines and gas storage can make the difference between having heat in winter and not. Current European gas pipelines flow in only one direction. So supplies cannot be

evened out once through the line. Even if there are adequate total supplies in Europe. Destination clauses prohibit such sharing.

North African gas sources are important for Spain and Italy, not for other European countries.

Russia is a “petro-state.” Its power goes up and down with the price of gas and oil. Its petroleum is very expensive and inefficiently produced. Politics is the most rewarding business in Russia.

Gas has a reputation for being imported, while coal (imported) is viewed as being domestic.

Germany is less concerned about gas because it has a good relationship with Russia.

Unconventional gas is a double edged sword. It could permit the country where it is found to produce its own gas. But that possibility decreases the likelihood of investment to bring a more secure but non-domestic source of gas to that market. Likewise, if a pipeline can bring foreign gas to a market which has potential gas from unconventional sources, it is less likely that the unconventional gas will be developed. Both need a relatively high, secure market for their product to justify their investments.

Gas companies have an interest in getting product to the consumer by any means, to prevent additional government regulation.

The developed world’s structures need a major overhaul, beginning with the relationship between NATO and the EU. The US could start by combining its NATO and EU delegations.

DETAILS

Introduction - Fracing

Traditional oil and gas exploration looks for large, trapped pockets of oil and gas. Once found (an increasingly difficult task), they flow easily – indeed too easily in the case of the BP Gulf disaster. Unconventional gas reserves require special techniques to make them flow. The focus of the conference was on “fracturing” shale gas reserves. These can be seen as mini-reserves which need to be broken or “fractured” before they can flow. The shale layers generally run horizontally, so first a vertical well is sunk vertically and then it takes a gradual turn, to run horizontally, parallel to the shale. The shale is often over a mile deep and the horizontal portion of the well may itself be a mile long. The process requires large amounts of water pumped into the well under great pressure. The pressure is used to fracture the shale formation, permitting the trapped gas to flow. Chemicals and sand are mixed with the water at various stages, to perform different functions, all intended to permit drilling, keep the drill hole open and free of corrosion and keep the fractures open. Many of the chemicals are dangerous to health and environment. Also, the geological deposits themselves bear dangerous chemicals and are sometimes radioactive. Some of these materials and some of the fracing fluid come to the surface and have to be disposed of. How the chemicals are stored before use and how the “backwater” is stored and disposed of are important questions.

A further risk is naturally existing deposits of methane. Once disturbed, by drilling, methane may flow, either up the well or to ground water. This is the phenomenon which causes drinking water wells to explode or water from kitchen spigots to catch fire. It is a product of drilling (whether for gas or water), not of the fracing fluids. It can be controlled by isolating the deposit from the well hole with cement, but this does not always work. For a view of the results, Google “Dimock,” the name of a tiny village in northeastern Pennsylvania where drilling has had unhappy and dramatic consequences.

Finding gas bearing shale is easy. So this part of the risk of gas exploration and production is not expensive. The drilling itself is. Gas companies point out that the more regulations imposed, the less financially interesting the shale “play” is to them. Furthermore, because the gas does not flow by itself, it requires more wells per acre of surface than conventional gas deposits. A normal well pad takes several acres, along with gravel roads leading to it and gas pipelines to collect the gas. A fracing well pad will be larger, to accommodate multiple wells. The cost of fracing requires it to be done on a large scale to be economically efficient.

The interplay between environmental risks and gas benefits makes for heated discussions. This is even more so in the US, where individuals normally own the shale formations and so have a direct economic interest. In Europe, the state owns them.

Introduction – Pipelines

Generally speaking, 3 gas transmission lines are under consideration. The earliest (1997) is Nord Stream, passing directly from Russia, under the Baltic Sea, to Germany. The Nabucco pipeline was proposed in

2002 and would run through Turkey, Bulgaria, Romania and Hungary, bypassing Russia and Ukraine. In 2007 South Stream was the subject of a Memorandum of Understanding between Gazprom and the EU and would run mainly through Turkey, also avoiding Ukraine.

Europe's Economy and Energy

1 - In the 1980's we coined the term "Euro-sclerosis" to describe the European economy. Jobs declined, especially among baby boomers. The only job growth area was government. The European economies did pretty well post WWII, but once they caught up with the US, they slowed. This was also called the "Dutch Disease" - describing laws and union rules which suffocated enterprise. Since 1992 we have seen a single European economy. Opening up Eastern Europe also increased growth. Uncertain energy prices hurt the US and Japan. But again, Europe slowed in the 1st part of the 2000 decade. Now it is clear that Europe has a problem – inflexibility. The recession in Europe is twice as deep as in the US, even though overbuilding in the US was worse than in Spain and other European countries. Many homes in Arizona may never be needed. Europe did not see the overlending we experienced in the US. But Europeans invested in bad US securities. It was not just little towns in Norway that bought these bad securities. The underlying hedging was impossible to understand and weigh. No one could analyze the risk.

Greece's failure to roll over its debt could be a contagion. The speaker also worries about Portugal and Spain. (With Italy, the so-called "PIGS.") This problem is also in other parts of the world. In a similar way, the Lehman experience made investors worry about other financial houses. Greece was not the same risk as Denmark, but the two countries could borrow at the same interest rate. No more. And ALL countries pay higher interest as a result. Can Greece get its act together? Can the stronger countries save Europe? Will the European Central Bank print more money? The speaker does think the ECB can manage. Central bankers are, by nature, conservative.

The speaker thinks Spain and Portugal are relatively stable. Greece is a much bigger concern. The deficit in Greece is not so big, but it has been there unchanged since the 1980's. The Greek public sector expects to live as well as others even though it is not as productive.

The financial markets have fallen from favor. The tendency now is to punish the old rather than regulate the future. This just makes the markets less flexible.

How do we trim budgets? Fortunately protectionism is not a big problem. Europe will grow slowly for the next 5-10 years. There is 1% growth in Western Europe. The US is at 3%. China is at 10%. The Greek economy will be slower. Spain and Portugal should do better than Greece. The Euro will get weaker. Speculators think the ECB will print money. The Euro is at the lowest value in 4 years. \$1.20 is still high. Parity is at \$1.10. It could go still lower. This will help European exports. "The best estimate of value is the exchange rate today."

Slower growth will depress demand. There is an abundance of gas. It cannot be priced at parity with oil. Reduced government borrowing frees up funds for investment in gas, LNG and pipelines. The Euro is

uncertain, so the dollar strengthens. The European natural gas market is not yet unified. Energy is a drag on European economies.

Europe could become like Japan: no growth and high unemployment.

2 – Europe has a sclerotic gas market. Reliance on Russia is a political issue. Europe has access to many natural gas sources. It could become more vibrant [if these can be used thoughtfully].

It [the gas market] presents a rosy picture for consumers. This comes from several factors. The recession began in the second half of 2008, reducing demand. There has been a dramatic increase in production – from three sources: shale, tight gas and coal methane. Also the LNG capacity from Africa and the Middle East, initially intended for US markets, is now looking for a home. This extra capacity is coming in 2013. These factors push down prices.

The UK's infrastructure for accessing gas has increased. Not all European gas markets have declined.

The prospects for demand: Europe imports 45% of its gas. Russia supplies 50% [of those imports]. 30% comes from Africa. Some comes from the Middle East. Europe is seeing a decline in production. The UK offsets some of this decline by turning to Norway. Fossil fuel use overall will drop due to greenhouse gas concerns.

Other factors mentioned include the price of common credits in the European system and uncertainty as to carbon capture. The switch from coal to gas has reduced CO₂. Gas complements the intermittent nature of wind power. [Although gas producers object to the burden of making up for this weakness of wind power.] If the EU is to achieve the "20-20-20" goals, then gas will be used only for industrial purposes. Carbon capture and storage control are the future of gas. Gas has the advantage of having relatively low fixed capital costs. [I think this refers to power plant costs.]

A lot hinges on climate change policies. The 20% renewable goal is the least likely of the three goals to be achieved. Imports will increase. So it follows that it would be helpful to know more about Europe's energy policy.

Russia has the largest gas reserves in the world, but they are declining. How will Gazprom replace declining production? The Nord Stream and South Stream pipelines are both Russian and both [possibly] coming. The Yamal Peninsula gas field is a focus. Gazprom needs capital.

Europe wants access to the Caspian Sea reserves to be more independent of Russia. The Turkmenistan reserves are huge and are interesting to a lot of countries. The Nabucco pipeline is moving slowly. There has been treaty success with all the countries involved, but financing is slow.

Iran could be a transit county and a source, but it must first undergo political change.

Regarding LNG, big capacity is coming, mainly from the Middle East and Africa. LNG could take an increasing share of the European gas market.

US production of unconventional sources is growing. Shale gas production is up. Initially production was by specialists, but now the big oil and gas players are giving shale extra attention. There is a lot of unconventional gas in Europe. Coal bed methane is the largest of the three types in Europe. Here, too, the big petroleum companies are showing interest. Europe has a significant gas pipeline network. [This is inconsistent with comments by others.] Nevertheless it is difficult to make progress here. Europe does not have the needed US technology. Note that, unlike the US, mineral rights do not belong to the surface owner. Also, this type of drilling requires a bigger footprint. The speaker suggests that governments should reduce barriers to this kind of drilling.

There are big increases in flows from Africa and the Middle East, but Russia still dominates. This is not the only alternative. Algeria and Libya provide very cheap gas. Russian gas is much more expensive. So Europe has diverse sources. But Europe faces higher costs. Russia, Africa and the Middle East all need more investment.

Europe is in transition towards a freer market. This happened in the US in 1992. The EU needs to unbundle ownership in gas and transmission. The Ukraine-Russian dispute stopped the gas supply. Most European countries could cope. They drew down their stockpiles. Eastern and Central European countries had a harder time, including the failure to be able to heat their homes. But the response showed the market flexibility.

Gazprom has been forced to make concessions, including to E.ON [the big German utility], so it can take less gas at oil index prices and more at spot prices. There has been no breakdown in the Gazprom position, but it has shown some responsiveness.

The goal of all users is to get full access to many sources.

China will be using more gas because it is relatively cheap. Using it for autos [everywhere, not only in China] is a matter of distribution. In the EU, investors need policies and a framework to provide assurance that the investments can be recovered.

Among the participants there was disagreement as to whether LNG could be viewed like a utility and be a reliable investment with low, but certain rates of return, or should return a risk premium.

The UK uses more gas than other European countries. It has long used its own North Sea gas.

LNG exports to the US are very limited. So producers need to find new markets. There are more spot sales. Expected rates of return must be higher than government bonds.

Traditionally Gazprom has gotten financing based on long-term take or pay contracts tied to oil prices. The French and Germans have resisted opening up their gas transmission systems. [I think this refers to separating gas ownership from gas transmission.] But now the oil/gas price difference is very large. So concessions are being made. But indexing will continue to play a role. Take or pay deals with price risks AND volume risks. Statoil was the first company to give a price concession. So Gazprom lost market. It followed Statoil. The new contracts have 3 year terms because Gazprom thinks demand will recover.

Gazprom is out of the crisis. Gas contracts are very opaque. Companies do not disclose how much they pay for the amounts not taken.

Gazprom will be under pressure. The pipeline projects are huge. [I think this refers to both the need to capital to build pipelines AND the possible additional competition from non-Russian pipelines and LNG.]

We are going into a 5-10 year period of less bank lending. So other sources such as pension funds and insurance companies will fund the projects. Interest rates are low, so capital is cheap, but hard to find. Gazprom faces a big debt. The US market has disappeared. Some Russian gas sources are in the far north and very expensive. So there is a lot of uncertainty for Gazprom. China is a possible market for this extra gas. 2/3rds of Gazprom's sales are to its domestic market. Demand grows internally. Gazprom is very inefficient. So it has great potential to cut costs but little capacity to do so.

There is only one Russian gas exporter. The other Russian gas sources focus on the domestic market. Export prices are influenced by Russian duties – politically determined. But companies like Glaxo do the same thing with pharmaceuticals.

As the market globalizes, the EU competes with the rest of the world. Chinese demand grows. China will have to move to gas for environmental reasons. Coal will be replaced. Europe has cut emissions by its move to gas. China and India can too, if they get access.

European Gas 2010 and Key Issues Going Forward

3- Russia uses energy as a geopolitical tool. Russia takes a zero sum outlook regarding security. The energy market outlook erodes confidence. There has been a failure in the markets. The rules are up for discussion. Russia views its supplying of China also geopolitically.

Holland [home of the speaker] has taken the position, "I'm small, so I can do what I want."

Coal is still being used. Two new coal fired plants are being built in Holland.

A lot of the projected reduction in CO2 emissions in Europe is based on new efficiency. Where will that efficiency come from? The International Energy Agency ["IEA" repeatedly cited during the Conference] says gas use will peak in 2020, but it questions the reliability of the projected efficiencies. The range of possible demand is very large, making prediction and planning difficult. Is gas a problem or does it permit more use of solar and wind?

Russia has backed out of the Energy Charter Treaty, so without them what is the value of the treaty? As to treaties generally, how can something like the Copenhagen Conference, with so many participants, be expected to accomplish anything?

Oettinger, the EU Energy Commissioner, has shifted the EU view from one of an open world market to a focus on the EU's interest in accessing energy. Russia falls outside the group Oettinger is interested in protecting.

Gazprom is now based on Central Asian production.

Why is there an oversupply? Yes, there is the financial crisis and shale, but geopolitics also play a role. In 2006 and 2009 there were supply cuts. So gas from Turkmenistan shifted to the premium European market.

Unconventional gas has not yet met its environmental “reality check.”

The Ukrainian gas corridor – this is a case of blunt deal making. Russia got its 25 year lease extension on its Black Sea naval port. The payment included gas. Possibly Ukraine can become gas self-sustaining. Then it will no longer be dependent on Russia and will be only a gas corridor. Russia could also avoid shipping gas through Ukraine with the two planned gas pipelines [Nord Stream and South Stream].

The Chinese access gas from Turkmenistan. This pipeline was built in only 2 years. It is amazingly speedy. [According to Wikipedia it took 2 years of construction and cost over \$7 billion.]

Iran is gas import dependent and also gets gas from Turkmenistan.

The EU’s energy policy is to form a unified policy, a goal the speaker does not favor and calls “reinventing the square wheel.” He points out that the Lisbon treaty foresees “open energy trade” – a goal the EU is not following.

4 - Greece is a “dead man walking” and should not have been saved. South Europeans have lived the good life since the introduction of the Euro. The next 10 years will be painful for the south. Germany will experience higher inflation.

With earlier power plant technology one could substitute oil and gas without difficulty. Now they are not so easily interchangeable. Oil will be at \$100 a barrel. It is a scarce resource and finding more is not easy. Gas is abundant. But gas markets are capital intensive and investors want security. Households are not flexible (switching from oil to gas). Despite difficulties, power plants are. Coal plants have high capital costs but low fuel costs [and most are old and written off]. It is currently not profitable to insulate houses absent a government subsidy.

Today it seems that unconventional gas can be found everywhere.

Technological Hurdles to Developing European Shale Gas

5 – Interest in unconventional gas in Poland is new. Five years ago no one in Europe had any idea about it. The speaker’s company is funded by big oil, not private equity. In Europe, the gas bearing layers are found mostly in the northeast, except in the Czech Republic. Poles thought they had no gas. Now concessions for all of Poland have been taken, totaling 1 million acres. Conoco, Exxon, Chevron and Marathon are all there.

The speaker’s company is about to drill two vertical [not horizontal – as used in “fracing”] wells. Horizontal wells come next year. Both are expensive to drill. Conoco is the largest US on-shore producer.

Historically Poland has done a lot of drilling and has kept extensive drilling logs. They go back 20+ years. So the trick is to find the logs and core samples, dust them off and analyze them anew. This just takes time. The Poles cooperate. [Repeatedly the speaker noted that everything is in Polish. So finding fluent Polish speaking engineers could be a significant advantage.]

Before the current situation, the Polish oil ministry dealt only with the Polish state oil company. Now, for the first time, the ministry has to deal with 3rd parties. For example, there is no procedure for bidding. But concession fees are reasonable. They come with 6 year terms and are readable renewable if there has been drilling. There is no barrier to entry other than language. There are two state-owned seismic companies [which appear to be the only choice] but both provide good service. There are 3 state owned drilling companies. The problem is that a company needs 20-30 wells for the process to make sense. Polish drills are old and heavy. Developers want mobility, ease of transportation.

The royalty rate is 1-2%. Corporate tax is 19%. The issues are geology and then financial. The process is very cost sensitive. The speaker expects his company to invest \$200 million before any chance of a return.

Note that the state owns the mineral rights, not the surface owner. But [apparently] the gas company has to negotiate surface rights with the land owner.

6 – Europe is the 2nd largest gas market, but a great deal is imported. Poland and Germany have very significant coal use that can be reduced. Eastern Europe is very dependent on Russian gas [a constant theme at the conference]. In Germany, the rate is about 40%.

There are 1,500-1,600 drilling rigs in the US. There are 67 rigs in all of Europe. Horizontal drilling has increased their value. Marcellus Shale is the cheapest of all gas sources – with the greatest chance to breakeven or do better. Polish wells cost 3x to drill what a Marcellus well costs. The difference is the rig cost and the cost of stimulation [fracking].

Poland offers large, unbroken acreages, available from the state.

Small gas companies made the Barnett Shale (Fort Worth) work. US technology applies to Europe, but the shales are not the same. There is a huge amount of shale data available already in Europe, but plowing through it and analyzing it is the problem.

7 - Despite the lack of analysis, the land grab has occurred. Companies have taken land having no idea what is there. Schlumberger expects 2-3 years of capital expenditure without any return. Europe is more complex geologically than the US. In the analysis of geology, if you know why gas is where you find it, it is easier to find it other places. Shale gas is connected to glaciers; they introduced biological and organics [which produced the trapped gases.]

New Era of Widely Dispersed Gas Supply

8 – 20% of Austria’s gas is domestic. In 1968 Austria was the first country to import gas from the Soviet Union, in a 6” pipe. 1/3 of Russian gas goes from Russia to the rest of Europe. Austria also has sub-surface gas storage. This capacity was important when Russian gas was cut off. Bulgaria was not tied in and so didn’t have access to it. This event clearly showed Russian dominance.

The Nabucco pipeline would be ideal or at least it would provide further options, from the Middle East and the Caspian area. There are also LNG projects on the table – projects in Holland and Croatia. But certainly there is enough gas available in the market for now. We also need renewable sources, but renewables are not so reliable. There will be 9 billion people in the world in 2050. The globe has to change. Gas has a longer life than other hydrocarbons.

China has decided to go to e-mobility [electric cars] in cities of over 10 million inhabitants. There are 90 such cities. So carbon emissions will go down.

As we have heard, Poland has granted gas concessions. Austria is not as far along. This could help Austria. In Austria, the gas is at 4,500 meters depth [deeper than in Poland] but there is 2x the amount of gas in the formations. The cost and the service area are problems. There are not enough water pump trucks in Europe. The fracturing process requires lots of water. Austrians would not like so many wells. [Aerial photos of the Ft. Worth area studded with drilling pads, roads leading to them and pipeline.] The first wells will come in the next few years. This is not a revolutionary process but rather an evolutionary one.

Europe remains reliant on Russia. There is more potential for unconventional gas and this affects Russia and the issue of reliability. We are looking at a 5-10 year time period. The volumes from shale will not be so dramatic. If Nabucco is not done, then LNG will be the alternative. The gas volumes from Russia will not change dramatically.

Russian Strategies Toward Europe

9- Norway is the 2nd largest supplier of gas to the EU. Other areas of interest include the Caspian Sea region, Russia, North Africa.

As to Russia, it is a “petrol state.” Its fortunes are tied to oil and gas and go up and down dramatically. High oil prices masked its weaknesses. It still faces the bitter legacy of communism, outmoded infrastructure and massive health problems. It went through the 1998 default due to low oil prices. It has had 2 waves of response, in 1993-95 and 1998-2002.

Its foreign policy is to remain a great power. It feels the need to deal from strength. It has a zero sum view of security. When dealing with other countries, it looks at their capabilities, not their intentions. In Russia, the most profitable business to be in is politics. It is a good idea to be on good terms with the people in power.

Turning to gas, the supplies of gas in Europe are plentiful. Looking at sources of gas, the three essentials are prospective areas to search, legal framework to drill and security to transport. It takes 10-15 years to

develop an oil field. The actors need to look that far ahead. Will there be a market when the field produces? The speaker expects a gas glut until 2015. But Europe does have an appetite for energy. It takes effort just to stay in place.

The speaker is not concerned about a delay in a particular project. They even out.

By reason of the disruption in gas supply, Russia and Ukraine are discredited. The EU does not trust them. In 1980, 50% of Russian gas went to the EU. Now it is 6.5% of the EU's energy supply, but it is still a problem.

Even domestically produced natural gas could lose out because it is seen as an import and so less reliable than coal. But to move away from gas would make achieving Europe's climate goals less likely. Few Europeans promote gas as a climate solution. Developing gas is a question of how much uncertainty you can live with.

The Nord Stream and South Stream pipelines would take an investment of \$600 billion!

In the far east, there are gas reserves in eastern Siberia and the Arctic shelf. The Yamal Peninsula [far, far north] contributes 25% of the totals in Russia's projections. The Asian markets are the area of big growth. Selling more gas to Asia means Russia is less dependent on Europe.

As to unconventional gas sources, Russia does not seem very concerned. But Gazprom does talk about other sources. Gazprom does need to prepare for this possible change in the gas market. Russia needs to reduce the costs of its gas. It is very inefficient. But Russians do not change much. Russia needs to modernize its economy generally. The war with Georgia and the 2 disputes with Ukraine did not help.

Russia and Norway have recently settled a long standing dispute about a huge area of the sea. This has been going on for 40+ years. Norway wanted a 50-50 split. This was viewed as unfair by Russia, due to its size and global standing. But Russia's resource nationalists made it happen. It opens the Bering Sea. This is a source of gas AND oil. Russians mainly want the oil. The Arctic is not a zone of conflict. Russia is not an imperial power in the Arctic.

As to investments, foreigners lost interest in Russia in 2008. But Putin's recent message is that he is open to business in the Yamal Peninsula. But there has been no wholesale change in Russian laws regarding foreign investors. There have been some specific changes. Russia is concerned about foreign investors, especially regarding oil and gas.

Russia and Ukraine had three areas of discussion: 1) undo the existing deal and sign a better one [for Ukraine]; this has been done, but "there's no free lunch." Politics play a role. 2) Russia needs help with a pipeline. 3) Russians want South Stream shelved. It still supports Nord Stream.

10 – Worldwide Gazprom represents 16% of the gas production. National oil companies represent 48%. Total – the French oil company produces 2%. [The speaker is a French banker.] Gazprom is the leading gas producer. Are projects which are based in Russia financeable? Russian investment atmosphere was

hurt by “petro-arrogance.” No one will take the risk of delivery of gas in Ukraine. Gazprom doesn’t want to sell more gas in Russia. The main profits are in Europe. What does the resolution of the [Russian-Ukrainian] dispute mean? It is part of a more pragmatic approach and attempt to foster trade and investment. It opens up the Arctic shelf, a source closer to Europe. That area could produce oil. The Norway-Russia conflict mentioned before had been a mutual block on development.

As to China-Russia, this seems to be a lot of talk and no action. Russia does not want to become more dependent on China.

Who invests in Russia when gas is so hard to get to market? But the speaker still thinks Russia has changed its attitude towards the west. Russia views what was part of the old Soviet Union differently. (This shows on the weather map on Russian TV. The parts of the old Soviet Union are all in one color.) Russians have adopted German social democratic language regarding being a modernization partner.

Obama’s “resent button” has opened a door for Russia. The recent Russian change in attitude towards its Polish massacre is another significant new development. On the other hand Ukraine just is not taken seriously as a partner with respect to an investment object.

2012 brings new elections to Russia. There are two groups, Putin’s and Medvedev. The question is which one Medvedev belongs to.

When gas prices change, power shifts. When we had oil at \$147 a barrel, Russia was less cooperative.

European Views of Energy Security

11 – We tend to overlook what has been achieved in the EU. Until 2006 there were no European discussions on energy security. The process changed as a result of Russia’s action in 2006. In one year, 27 members of the EU came up with a policy. The focus shifted from climate to energy policy. Under the German presidency, the EU focused on central Asian energy.

The Russian-Georgian war also had an effect. The Russians bombed very close to the pipeline to make clear its vulnerability. In 2008 under the French presidency, the discussion shifted to mutual energy support during a crisis.

At the moment, the speaker expects mainly more paper, without implementation. The objectives are competitiveness, supply security and environmental improvements. These are summarized by Kyoto (environment), Moscow (security) and Lisbon (competitiveness).

The EU is looking for a full complement of renewable fuels by 2050.

The Gulf has 70% of proven oil reserves and 40% of gas. The world’s war zone stretches from the eastern Mediterranean to Pakistan. This is where the oil is. We rely on a very unstable region.

The sea lanes are the choke points. 20% goes through the Straits of Hormuz. The other ones are Suez, Babel-Mandab and Malacca. Pirates and the threat of war are there. Oil offers more diversity of sourcing than gas. Russia (meaning Gazprom) represents 46% of gas sourcing. [For Europe, I think.]

The source of gas in various European countries varies greatly. The speaker's institute prepares energy risk analysis on a country-by-country basis. Germany's risk goes up as it relies less and less on nuclear and coal. Germany's risk has doubled since 1978. Germany has the highest risk rate after Italy. New member states are 100% reliant on Russia. [Not sure how they can have a lower risk than Germany and Italy. Possibly Germany's rate is ranked against other non-Eastern European countries.]

Europe's increased energy interconnectedness spreads risks. The 2006 German electrical crisis had effects on other countries, including Morocco.

Russia charges between \$110 and \$280 for the same unit of gas, depending on Russia's political relationship with the buyer.

The US market for LNG from Russia has disappeared. Russia has to find new markets.

Norway is a winner in the gas crisis.

12 – The new EU member states are very dependent on Russia and their relationship with Russia. Why should Russia suspend gas transmission? Sometimes policy is a matter of Russian in-fighting.

Poland had a 15% gas shortfall recently. Gas flowed THROUGH Poland but there was no take off point. The EU had a gas surplus but Poland had a shortfall. Yes, there is a problem with the Polish internal market. And Russia plays hardball in its gas negotiations. Poland has a continuing dependency on coal.

Presently the infrastructure for gas delivery is very simple. Gas comes from Russia and runs east-west. There are not enough connection points. New pipelines will reduce the importance of Poland for transmission. Poland and other new eastern EU member states have relatively low demands, but their dependency is great. [Some discussion of possible reverse flow of gas in pipelines. Apparently they run only in one direction.]

13 – Americans think Europeans "just don't get it." Until 2005, gas was just an internal issue. Now it is a matter of energy security. The Nabucco pipeline is unusual. Normally a pipeline is a product of gas supply and gas transmission. With Nabucco, it is to be financed by the countries through which it runs. It's auctioned off. It's the first post-liberalization gas project.

Washington criticized Nabucco saying that it has "no money, no gas, no demand, and no chance." The tender for pipes alone is 3.5 billion Euros. The pipeline is also looking for gas fields. It is to be built by 2014, but this is optimistic. And it is a horrible time for such a big project. If there are further delays, some will say good, it was always a bad idea. But is it an EU energy setback? No. The EU has not been that involved in Nabucco. It gave only 200 million Euros for the project. This was part of the financial crisis stimulus, so it expires soon. The whole project is budgeted at 8 billion Euros. The Germans have

not offered much support. Each country has its own little spat. The UK says it doesn't need the pipeline now. The EU itself hasn't really taken much of a stand. It has given no real financial support. So what about energy security? New member states have a security problem. (Not so much the older one.) Russia can play the game bi-laterally. Nabucco could reduce this reliance on Russia. But there has been no market liberalization in these new member states. Nabucco could go both ways. [I think this means regarding gas flow.] It has solidarity built in. Negotiating power [vis-à-vis Russia] is created at the margins. [Not all Russian supply has to be replaced for Nabucco to be effective.]

There is lots of suspicion in the EU about Russia. More diversity in gas supply would stop this. States [and the US] should stop preaching. They should create facts on the ground.

As to the EU and Turkey, to salvage this relationship the EU has to look for ways to cooperate. Energy offers this opportunity.

So the speaker considers Nabucco to be a good idea.

A comment from the floor was that the US has no energy policy but it has 2 wars in which energy plays a role.

The EU is a regional organization, not global. Russia is the issue. Coal plays a role in this diversification mix. Germany doesn't do much with Russia because it enjoys good relations with Russia. It's the new member states that don't like their continuing dependence on Russia. But their energy demands are small. [Too small to finance big projects.] Finland is 100% dependent on Russian gas. Europe's dependency on Russian gas has dropped from 1980, but it is now going back up. Energy is the EU's second biggest issue, after the current fiscal crisis.

Finland is building more nuclear reactors, French design. German gas companies did provide gas to Bulgaria, but the needed infrastructure is missing.

Other new pipelines are under discussion, from Africa to Spain and Italy, not to the new member states. Nabucco is important for integration and for a liberalized gas market. The new members do not have enough sources for there to be a real market. Germany used to tie Nabucco support with Nord Stream. Not anymore.

But now there is too much gas. The German utilities fight the unbundling of gas and pipelines. This is an EU problem (not Russian).

There is substantial uncertainty about the need for pipelines if local sources of shale gas are coming on line. Plus LNG provides another possible source.

What happened in the 2009 energy crisis? The gas companies say the market worked. But what happened? Gas did flow, but there has been no real accounting. Gas companies claimed things worked in order to keep government regulators out. The whole process created some surprises. Some connections existed that no one expected and others they expected were not there!

There is some unbundling by German utilities. So resistance to liberalizing by the French and Germans is declining. But ownership has not changed much. Companies with long-term fixed contracts do not want to see liberalization.

The UK thinks perhaps there is too much liberalization going on. Bankers think this leads to under investment and under supply.

Security is not free. Energy security is also not free. Who pays for the added security eastern European countries want? Those countries want someone else to foot the bill.

How much infrastructure can we afford? "Governments are not good at picking winners. But losers are good at picking governments."

Europe does not need 3 new gas pipelines and LNG. It makes no sense to do both South Stream AND Nabucco. South Stream would cost substantially more. Nabucco makes more sense. The Blue Stream pipeline [trans Black Sea pipeline from Russia to Turkey] does work, but because Gazprom supports it. South Stream will not work. Gazprom is winning the PR battle. It has signed bilateral agreements. But it has made no commitments to invest in a pipeline.

For Russia, it is a strategic project. For Russians there is no division between the state and the economy. The pipeline does not make economic sense. Is gas at the same price coming from different sellers or is the price itself being affected?

One source of stability could be better relations with Ukraine. The Turkish-Israel relations are unsettling for the prospect of a pipeline across Turkey. Crime is a problem in Russia, but it is "semi-government" crime.

Europe's Future: The Energy Dimension

14 – Energy issues in Europe seem to be on a national basis. Germany is becoming more "normal." US security advisors are looking for a way to integrate NATO with the EU. We need a more uniform, western approach to security and climate change. Then we have an unforeseen event like the Gulf oil spill. In April President Obama spoke in favor of more deep water drilling. He accepted the claims of technological advances and increased safety. But now there is a moratorium. Recently in Pittsburgh, Obama gave a big push for the Marcellus Shale play. Europe is not yet aware of the impact of the Gulf disaster. It dominates US news like nothing since the Carter Iranian hostage crisis. So it is hard to see what energy policy results. It is hard to justify deep sea drilling. The current moratorium may turn into a long term ban. This will be a major subject, also for the NATO meeting in Portugal in November. Also on the table will be Madeleine Albright's report on NATO. Energy security is part of her analysis.

Russia's current strategic concerns are in the east. Russia does not have enough people to protect its border. Also Chechnya. So Russia should have more cooperation with the West. It should feel less stressed from the NATO expansion. It should become a full partner with NATO.

A war in the Middle East could disrupt energy security. An attack on Iran is still a possibility. How would it react? It could lash out at Americans, for example, in Iraq. It could attack oil tankers. It could drive oil above \$200 a barrel. Given the recent events in Israel, a conflict is not unlikely.

North Africa is influenced by demographics and immigration. There is a major solar energy source in the Sahara. 70% of the population in northern Africa is under 28. Local governments are ineffectual. Sullen young men have nothing to do. So they become Islamic extremists. The European agricultural market and import restrictions make this worse. The North Africans could export tomatoes and other vegetables in the winter.

White House Security Advisor James L. Jones does believe in the dangers of climate change. Drought and starvation in Africa are coming. Solar and wind technology in Germany have, with government help, created 300,000 new jobs. At the time when Germany is shutting down nuclear power, Obama is supporting it. In Germany, the Greens push for ending nuclear, but the CDU/FDP look at it afresh. Hans Blix is a Green, but he is for nuclear. Some Greens are for nuclear power plants, but they are very expensive to start.

The polar icecap is melting. 13% of the oil and 30% of the natural gas is in the Arctic. It is hard to manage the shipping routes, but going this route cuts 7 days from the Suez-Panama trip. Could NATO play a role policing the Arctic?

NATO and the EU have remarkably little contact with each other, despite both being based in Brussels. 22 countries are in both organizations. France is back in NATO. Cyprus is a stumbling block, but should not prevent cooperation.

The US and EU account for 80% of the world's defense spending. Governments sometimes send different and conflicting instructions to their delegations in the EU and NATO. The US could move this along by combining its delegation to NATO and the EU. We are still trying to solve new problems with post WWII structures.

Greek debt raises questions as to the EU's capacity to be a partner to the US. We have some shared values, mainly the dignity of the individual and rejection of the authoritarian model. The EU is the most successful model for regional government, even though Javier Solana refers to himself as being the "Highest Representative of the Lowest Common Denominator." The Nobel economist Paul Krugman puts the odds of Greece staying in the Euro Zone at 50-50.

The G8 has been replaced by the G20. The G8 lost its legitimacy. It was only 11% of the world's population. In the IMF, Belgium's vote is the same as China's. How do we get rid of old organizations to make way for new ones? The US outlook is more global than Europe's.