THE BROOKINGS INSTITUTION

TRANSATLANTIC ENERGY STRATEGIES AND RESOURCES NATIONALISM: THE NEW EUROPEAN ENERGY LANDSCAPE

Washington, D.C.
Thursday, October 21, 2010

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P R O C E E D I N G S

MR. EBINGER: Good afternoon, ladies and gentlemen. We are delighted to have you at Brookings this afternoon for what should be a very exciting kickoff to our activities over the next several days. I want to take particular thanks that this is a program that has been organized by our Center for European Studies here at Brookings and also the program that I direct, which is the Energy Security Initiative. And we're always quite pleased when we have abilities to have issues that cross several Brookings programs.

I think the issue that we are discussing today of European Energy Security is certain front and center on the international agenda. Clearly, events such as the discovery of truly massive shale gas resources both in the United States and Canada potentially as we look forward transform the North American energy market. I was at a conference of Citibank just a day or two ago in New York and some people were actually predicting that we could double the share of natural gas in the total U.S. energy mix and keep it there for 150 to 200 years based on the Canadian and U.S. shale gas reserves. This in turn, of course, has momentous implications for the overall international energy market since clearly it was only a few years ago that we were projecting here in the United States that 40 percent of our natural gas would have to be met by LNG imports in just a few years and now with that prognosis put off perhaps as many as several or more decades we now see the specter of LNG flooding into the European market, potentially into the Far Eastern market. With the shale gas reserves in our neighbor to the north and the prospects of so much shale gas in the United States, there is now talk of new export projects from Canada to the Far East and perhaps European markets.

This will, of course, have rippling effects since most of this gas that will be coming in as LNG is not under long-term contracts, such as some of the contracts that exist

in Europe linking crude prices to natural gas prices, so potentially creating much greater competition in the European market.

But it has other implications obviously as we again look at rippling effects. Clearly, LNG will have probably the effect of backing off at least the timetable and perhaps the economics for some period of time of developing some of the high arctic Russian gas resources and the Norwegian shared resources with Russia up in the Bering and other northern seas across the top of Russia.

In turn, with the volatility of gas prices and the uncertainty of oil prices in the future I think we see the very strong prospect of some of the pipeline proposals from Central Asia and the Middle East. New market entrants potentially such as Iraq into the international market. The overall question has to become where does all the gas go, and how does the gas compete both directly as gas against gas, gas and electricity generation. And potentially perhaps most of all in the Far Eastern market do we see the specter of gas backing out, oil usage putting downward pressure on international demand and so forth and so forth.

So those are just some of the themes we see. I think it's interesting that as we kick off this session today that energy security is clearly on the agenda once again in France as we see refineries and electricity power stations being assailed by beleaguered people who don't want to retire even when they're my age. But that's France, after all.

So without further adieu let me introduce our speakers. Our format will be that I will introduce each speaker prior to their remarks and after they finish I will then introduce the next speaker and so forth. And please bear with me in reading my notes since I am coming off double retina detachments and it's all kind of a little blurry here today. But we're delighted to have you.

Our first speaker is Piotr Szymanski, who is director of the nuclear

safeguards at the European Commission in Luxembourg. He comes from Warsaw, Poland. He studied physics at Warsaw University and went on to complete a Ph.D. in experimental particular physics at the Institute for Nuclear Studies in Swierk, Poland. He worked as a research associate at the Rutherford Appleton Laboratory in the United Kingdom and at other facilities in Germany and elsewhere in the Particle Physics Center CERN in Geneva, Switzerland. He holds a habilitation -- is that right? -- in physics and is the author and co-author of more than 200 scientific papers in various fields of particle physics. That alone scares me to death. He was also head of the Department for Interdiscipline Applications of Physics at the Institute for Nuclear Science in Swierk, Poland. He is currently director, as I mentioned, of nuclear safeguards at the Commission in Luxembourg where he is responsible for the verification and inspection of the nondiversion of nuclear materials at all civil installations across the European Union. We're delighted to welcome him today.

Thank you.

(Applause.)

MR. SZYMANSKI: Thanks very much, Charles. Good afternoon, ladies and gentlemen. It's a great pleasure to be here today. I will not speak about particle physics, Charlie. Just a few words about developments in European energy policy.

The European energy policy debate has heated up recently. Jacque Delor and North Europe put forward the proposal for a genuine European energy community. This was also endorsed by Jerzy Buzek, who is the president of European Parliament and this started the debate in the Parliament.

The Clingendael Smart E.U. Energy Policy Report also is in favor of more centralized energy decision-making for the European Union. Henry Bell Foundation put proposals for the European community for renewable energy. All of these initiatives

contribute to the common thread that E.U. needs to have a common energy policy strongly based in law with clear (inaudible)for commission, European Parliament, on the basis of the Lisbon Treaty. The Commission fully agrees that the E.U. needs a common energy policy and single integrated energy market. The Europe 2020 Strategy which has been put forward by the European Commission reaffirms the importance of common energy goals and targets to sustainable economic growth and prosperity. Since 2007, we have a common energy policy which is based on (inaudible) treaty. The Lisbon Treaty gives an extra boost to the legal framework.

FERT energy package creates in Europe a genuine internal energy market. At the moment, the European Union is at a staging post. We have almost completed the first energy action plan which has been put forward in 2007. Today we have a new commission, new treaty, and very different economic and monetary climate, different from three years ago.

The European Union has already achieved a lot in a short time, but now the question is where to go from here. We can look at the positive developments for the European Union, like making 2020 binding renewable energy sources and greenhouse gas emission targets in place. The 2020 energy efficiency target is also considered as very important.

20/20/20 as we call it is now part of the Europe 2020 Strategy and has a very significant role on its economic part. The Lisbon Treaty confirms the importance of energy policy goals, such as security of supply and solidarity, competitiveness, and internal market, sustainability and energy diversity. But there are also less positive developments. Renewable energy sources and low carbon technologies like bio fuels of short range are not taking off as quickly as we would like them to do. The energy demand trend continues

upwards. Recent falls are due to economic crisis, not to the structural changes. The internal energy market is still not fully interconnected. Investments slow down as a result of the recession. Technology budgets are also at risk of the cuts in private and public sectors due to recession. Consumers seem either unaware of their rights under European Union legislation or not motivated to take advantage of opportunities this legislation creates.

On the broader horizon, the global (inaudible) market is in a state of unprecedented turbulence. The International Energy Agency reports that global reallocation of energy resources is taking place with non-ECG countries (inaudible) standard of living which depends on an infinite amount of almost free energy or very cheap. We heard a disappointment in Copenhagen. The economic crisis has overtaken the climate crisis in perception of urgency. The global gas market is changing fast. This is leading to changes in the way gas is traded, also including in Europe.

Therefore, what we have to do is to consolidate, implement, and enforce what we already have in our legal framework. We have to strengthen the link between the energy policy goals and economic social ambitions which we are doing in the Europe 2020 Strategy. We have to communicate with and convince citizens. We have to ensure the coherence between local, European, national, and international strategies. We have to tackle weaknesses which we identified to date in the field of energy efficiency, in moving away from national energy markets to a truly European market, and including new interconnections in integration of renewable into the electricity grids, in greater diversity of import networks, and in more effective E.U. external profile and influence, solidarity. Doing this we have to also anticipate future challenges but we have to bear in mind the scale for the energy projects. If we want to prepare for a bigger (inaudible) economy by 2050, we have to invest today in new networks, technologies, and practices.

What are the next steps? We had a debate on the future of European energy policy; the stock taking document has been discussed before stakeholders in Europe. The Commission has a substantial work program for 2010-2011 and a new energy strategy work program should be ready for early November. In the meanwhile, we also give priority to implementation of our FERT package and strategic energy technology plan.

To conclude, the new strategy is not starting from scratch but will address weaknesses and train for what the E.U. does best with an aim to secure political will to take forward European energy policy objectives and ensure delivery of 2020 goals to build up coherence, solidarity, and consistency at the various levels of decision-making -- the European Union, national, local, etcetera. And also in motivating and giving incentives to individuals. We also aim to create an investment climate which will stimulate the investments, marketing, and purchases which will help to deliver our political goals.

Thank you very much for your attention.

(Applause.)

MR. EBINGER: Thank you very much for kicking us off with a very interesting presentation.

Our next speaker, I am delighted to be able to introduce David Goldwyn, an old friend of mine personally, who is a State Department special envoy for International Energy Affairs and since the end of August this year he has also carried the title of special envoy and coordinator for International Energy Affairs. Prior to his appointment, this most recent appointment to government, Mr. Goldwyn was president of Goldwyn International Strategies, an international energy consulting firm that he started and ran from 2001 to 2009.

Dr. Goldwyn's firm was the leading advisor on the extractive industry transparency initiative which has received wide acclaim throughout the world. In addition to

his private sector appointment there is perhaps no one who has served the U.S. government in energy in so many diverse ways. He has served the U.S. government as assistant secretary for energy for international affairs from 1999 to 2001; as national security deputy to the U.S. ambassador to the United Nations, Bill Richardson; as chief of staff to the undersecretary of state for political affairs; and as an attorney and advisor in the Office of the Legal Advisor in the State Department.

Mr. Goldwyn has authored a series of works on energy issues, including a co-edited book on international energy security entitled Energy and Security Towards a New Foreign Policy Strategy. He holds a B.A. degree in government from Georgetown University and a Master's in Public Policy from the Woodrow Wilson School of Public and International Affairs at Princeton, and a Juris Doctorate from New York University School of Law.

David.

(Applause.)

MR. GOLDWYN: Thanks, Charlie. You're making me feel old.

Well, it's a pleasure to be here and thanks to you for this program and to Fiona Hill for organizing such a terrific program today as well. And it's really a privilege to be on the panel with such distinguished panelists and Pierre and Piotr.

This whole panel and indeed this program is about the transatlantic relationship. And so you can't be a U.S. government official and stand up in front of an audience without saying that this is one of our most important and deep and abiding relationships. And we care deeply about European energy security. We have for decades and we will for decades to come. And it remains a critical issue.

We invest an awful lot of time and diplomatic capital in this issue. We have my esteemed colleague, Ambassador Richard Morningstar, who normally has this brief but

he's away this week. He's the special envoy for Eurasian energy affairs. And we've had a special envoy for Europe for probably 15 years. We have the U.S.-E.U. Council. We have our investment with the European Union, and we have a string of bilateral relationships, you know, all over Europe -- New Europe, Old Europe, Europe in the middle -- where we deal with energy issues. And so this is important to us and we can talk about the E.U. Council later.

The topic of this is whether there is a new European energy landscape. And I think my own view is that there have been major changes in the global energy market, particularly in the global gas market mostly having to deal, as Charlie explained, with shale gas and how it's impacted the global LNG market. But a lot of Europe's energy landscape is the same, and a lot of the challenges are the same and a lot of the political challenges are the same. So some things are new, some things are different. And I'm going to talk about three pieces of it -- demand, supply, and infrastructure.

The first place you have to begin is demand because this isn't a problem if there's enough gas. And while we've seen a short-term lull in European energy demand, this comes to us from our friends at PIRA Energy. Most forecasts are for significantly increasing gas demand over time. And the slope of that curve is going to depend on a lot of things -- whether 20/20/20 comes to reality, how much efficiency gains that there are, what is the tradeoff between gas renewables and gas and coal, and how fast do economies grow. So nobody knows what this really looks like but three takeaways are you're going to need more, you still need to worry about supply, and because the biggest demand growth comes from the Western European countries really, and the incremental demand may be significant in other countries but it's not large in volume, the takeaway is that changes in infrastructure, even small changes in infrastructure, can make a big difference in energy security for those

countries that are now insecure because they are dependent on one particular supplier. So you can get a lot for a little when it comes to demand.

Now we'll talk about supply. This is from Eurogas, but the main takeaway here is that EU-27 indigenous production for now seems to be declining. Norwegian volumes are large. Norway is here but declining over the long run. Contracted gas that's pipeline and contracted by LNG is also going to rise a bit but looks to slope. And then the big difference is -- and sorry this is blurry -- you know, is really whether additional supplies come in from -- whether they come in from LNG and other sources or whether or not you have what they call the environmental scenario, basically where policy changes require a big shift of gas, in which case you're going to need a little bit more.

So the energy security significance here is that extra gas has to come from someplace other than where it's coming from right now. And I think here it's important to take note of the progress that Europe has made -- I'm going to go back for a second before I get to that point -- on energy security. Because the big change that needed to happen was interconnection, was the ability to move gas around Europe. Because it's not like there wasn't enough gas in Europe. There wasn't enough gas that could get to the markets that were underserved or were vulnerable to interruption. So the European investment, $4 billion Euro of the European Recovery Act, an interconnection in reverse flow projects, that's critical. Not only a critical element, it could be one of the most important critical elements. And that project is not yet done. And that flexibility to move gas back and forth is both important to the security of these countries, but it's not a bad factor to have when people decide how much stake they want to take in interrupting commercial contracts at large.

So that's going to remain an important project. The question is where the incremental supply will come from. New pipes, old pipes, LNG or indigenous production

from other sources? And this is where the U.S. story really comes into play. We have had this phenomenon as Charlie described in gas shale production where we have had a tremendous increase, exponential in our supply. And even at $4 in mmBTU, people are still investing in shale gas here, particularly in places that are rich with liquids.

So we've got a lot of gas and it looks like it's going to be coming for a while, so much so that there are companies thinking, like Shaneer, which are thinking about shale gas for export to other markets and the European market would probably be the likeliest one to go to. So you've had this impact that our shale gas as Charlie described reduces the U.S. need for LNG. This is the EIA's annual energy outlook in 2005 expecting U.S. LNG demand. This is where they are this year. We've got a lot more. We don't need it. All that cuttery gas has to go someplace. It's going to Europe. It's eroding the oil gas linkages. It's causing contracts to be renegotiated and it's probably or hopefully increasing the appetite for spot prices and for spot purchases in the European system of acquiring gas. So that's a big deal. And that's going to be a big deal for a while to come.

The other fact that we're looking at is really a huge increase in LNG liquefaction, something like 50 percent increase between 2009 and 2013. You've got mega-trains coming online. A lot of the liquefaction production is coming on graduated over time but in 2010 there's a lot of actual production coming on. So you're looking at, you know, what people think is a sustained glut in energy and gas markets but it depends on how the demand shifts. And in the U.S. the real big news for us on climate is that gas is now cost competitive with coal. We don't need subsidy. And if we're looking at a time where we're going to at least regulate in a way that's going to impact the implicit price for coal, you're going to have economic choices moving to gas. So we're going to have some appetite for this gas.

So what's the impact on Europe? Well, I think one impact is that LNG should be more attractive as a source of supply. It's already 10 percent of European supply in recent years. And here's where you sort of need to look at the map and you've got a lot of the infrastructure I'm going to talk about in the middle but all those stars over there are existing LNG terminals and, you know, sort of the white stars are potential. But these pipelines don't have arrows and some of them are just going all in the same direction. And so I think a question for Europe is what about moving LNG west to east because you're not needing huge volumes, you have great potential for cost competitive supply, so maybe that needs to be one of the additional infrastructure steps that need to take place. Existing pipelines obviously will continue to provide supply, and we spend a lot of time working on the southern corridor. It's important to note there's been important diplomatic progress on the southern corridor, the Turkey-Azerbaijan Agreement on June 7th on gas supply and transit was important. There are three options for the southern corridor. There's Nabucco, there's ITGI, there's TAP. The market will decide where the volumes are, what the price is, where to make the investments. As with Bakujahan, the U.S. government, other governments, you know, exhort, encourage, support, but the market decides. But that's going to be one additional option.

The big question is shale. And one part of my program at the State Department is a global shale gas initiative where we are trying to reach out to other governments to tell them what governments need to know to develop shale gas. And there isn't much question that in Europe if you look at the geology, that there are technically recoverable resources in Europe. But that's not the question. The question is whether or not there are economically recoverable resources in Europe, whether or not you can make money at it and whether or not you have the system to produce it. And so the factors that

are going to make a difference as to whether or not shale gas gets produced in Europe will be things like the price of gas. There are places in Europe, many of them gas dependent, which have conventional gas and they don't produce them because they don't have a cost recoverable price for gas. So nobody wants to invest in it, nobody wants to produce it, so they import it.

Can they change that system for unconventional gas in a way that they cannot for conventional gas remains to be seen. It may be easier to do something in a new regime than here. But the things the governments need to worry about are do you have a price for gas? Do you have the drilling infrastructure? Do you have the transportation infrastructure? Do you have an investment framework? And a lot of our message government to government is do you have the regulatory framework? In this country we have had for years a network of laws on things like safe drinking water at the federal level and at the state level that regulate things like can you drill near an aquifer, how far away, what sort of drilling infrastructure do you use? What kind of casing do you use? What kind of cementing are you supposed to do? Bad things can happen. That's pretty obvious. But we do have a system and there is accountability and there is regulation and there is experience.

Do the governments that want to produce shale gas have this experience? And this is really what our program is. We've sort of invited all-comers to come to us so that we can put our state and federal regulators at a table with them and talk to them about what we know and what's applicable to them. In some cases though it's mostly China, India, Jordan, Chile, places like that. We're actually helping countries do resource assessments to figure out whether they have economically recoverable resources. We don't need to do that in Europe because Europe is too wealthy, which is good for them, but the question about

whether this is going to be viable is going to depend on all of these policy determinations. So we're going to have a government-to-government dialogue on those issues. The E.U. is engaged on this. Individual states are engaged on this. The European Agency for Regulators I gather is also involved in this.

So how do you wrap all this together in terms of the landscape for European energy security? The trends are positive. They're positive on efficiency. They're positive on infrastructure. They're positive on the availability of resources. They're positive on the policy goals for efficiency, and I think if there is a science-based assessment of the availability of unconventional gas, shale-type gas, coal bed methane, then that's a strong possibility as well. I think our message from the U.S. government to Europe is kind of the same as it has always been. We care about your security whatever path you choose. Whichever of these paths that you take, we will be there to support you.

Thank you.

(Applause.)

MR. EBINGER: Thank you, David. Our next panelist is Pierre Noel, who is a political economist with Electricity Policy Research Group at the University of Cambridge. He is also director there of an exchange platform between Cambridge academics, the energy industry, and leading policymakers. Dr. Noel works in the political economy of European energy markets and policy with special emphasis on natural gas. Since 2006, he has worked on gas supply security in Europe, focusing particularly on the situation and policies of the most Russian-dependent member states of the European Union. He also works on the changing dynamics of European gas supply and the accelerated -- excuse me -- indigenous use of gas and in world LNG market, as well as the restructuring of the E.U.-Russian gas relationship.

Before working on European gas, Dr. Noel worked for several years on the interaction between oil market dynamics, energy policies, and international security, specializing in the United States' international energy policy and the role of the Middle East in the world oil market. In November 2008, he published a widely read paper on the E.U.-Russian gas relationship arguing that market-based approach to Russian dependence was the way to go. And that paper is frequently quoted throughout the world.

Before moving to Cambridge in 2006, Dr. Noel was a research fellow at the French Institute of International Relations, IFRI in Paris. Excuse me. He holds a B.A. in politics and an M.A. in energy studies and a Ph.D. in political science from the University of Grenoble.

Pierre.

(Applause.)

MR. NOEL: Thank you, Charles. You should never agree to supply a one-page biography. Ten lines is enough.

Okay. I have a feeling that it's going to be a slightly boring presentation, but before I start I want to extend a very big thank you to Fiona. It's very good to be here at Brookings -- to be back to Brookings, where I've had very good friends for a number of years. Justin Vaisse. I don't know if Justin is around but you call him Justin, I think. I call him Justan, I'm sorry, of course, and many others. It's good to be here. Thank you very much.

I've been asked to link, you know, the gas issue in Europe to wider European energy policy challenges. And I think the most interesting way to do so is to link gas security and the decarburization agenda. And this is what I'm going to try to do in roughly 10 minutes.

So the European Energy Policy has three pillars as they say in Brussels -- sustainability, security of supply, and competitiveness. But the three objectives are left largely undefined, which is very convenient, of course, when member states disagree because they can all agree on the three terms. They, of course, largely disagree on what they mean. The British government has a slightly more precise version of this same policy I believe. And they use these words. They want a low carbon energy system, they want secure energy, and they want affordable energy. And I think number one and number three are fairly clear in what they mean. Number two is still undefined.

But because this is a more precise definition it allows the tradeoffs between those three dimensions to emerge. And I think that's where the real interest is because you can pick two of those three objectives but you can't have the three at the same time. Clean and secure energy is very expensive. You can have affordable energy but it's going to be dirty, potentially unsecure, etcetera. You can go on and on. There are tradeoffs and public policy I suppose is all about how you manage the tradeoffs.

The messages of this presentation are the following: Europe's two main policy instruments in the field of energy and climate, which is the European trading scheme by which we put a price on carbon on the one hand and the renewable subsidies on the other hand are incompatible with each other. And this is obvious to all public policy, energy policy specialists in Europe. I'm not completely certain that it's obvious to the European Commission. But it's fairly -- it's extremely easy to understand. The total amount of carbon of the power sector, power generating sector, is capped at the European level. Okay? This is the principle of a cap-and-trade system. If you push renewables into the system you depress the carbon price so the coal-fired poplins produce more at the expenses of the gas-fired poplins. So emissions are moved around in Europe but they are not reduced.

This is extremely simple. This is the basics of a cap-and-trade system. So those two policies, the renewables directive on the other hand -- on the one hand and the ETS on the other hand are at war with each other. And I think one of the obvious challenges is to solve this problem as quickly as possible.

The second message is that large scale intermittent renewable creates unmanageable uncertainty at a very high cost. So there's a lot of debate in Europe about what happens if we don't miss the 20 percent renewable targets. I think the real problem is if we do meet it, you know, or if we try very hard. That's when the serious problems emerge. More about that later.

The third one, and it's in red for a reason, is that abundant gas, you know, sort of structure change that David described in the international gas markets and in the way Europe is in search into the international gas markets, offers a relatively cheap decarburization option by displacing coal. What is true for the U.S. is true for Europe. There's a lot of coal that goes into power and heat generation in Europe. On average it's less than the U.S., but in a country like the U.K., it's roughly 40 percent and it's 50 percent in the U.S. if I'm correct.

So what we need is to make Russian gas contestable in Central Europe. It's already contestable in Western Europe. We need to put a rising floor under the carbon price. And we'll go back to that. And we need to target the subsidies to the learning potential on renewable throwing a gigantic amount of money at, you know, 10, 12, 20, 30 gigawatts of wind is not what we should do. We should target learning, and when the learning is not here we should just stop subsidizing them.

The carbon price is too low and too volatile. It's way below what investors would need to invest today in things like nuclear power plants or onshore wind. If you

remove the specific subsidies to wind there is less onshore wind that is cost competitive today in the windy places of Europe but you need a carbon price that is roughly double what has been on average since the beginning of the ETS. But also the most worrying factor is what happened at the end of the first period of the ETS which is that the price collapses to zero because we suddenly realize that we've over-allocated. Again, that's the pitfall of a cap-and-trade. I know in the U.S. there are lots of people who are learning from Europe's mistakes so that when you have a cap-and-trade it's better designed than us.

But this is a way of pricing carbon that doesn't deliver. And in Europe you have five years. The allocation is for five years. In the U.S. SO2 and NOx market the allocation is for 30 years. The investors need long-term visibility. And so we need to fix the way we price carbon and we need to at least put a floor under the carbon price, and if possible a rising floor.

Last, carbon renewables increase and potentially increase drastically the volatility in the electricity markets. This is simulation work that was done in my research group on the U.K. market. So 8,760 hours is the number of hours in a year and that's the load duration curve of the power prices. And basically, the message is when you start pushing a lot of renewables in the system and this is basically the move from 25, which is the current amount of renewables to what we need to put in place or what they need to put in place in the U.K. to meet the 2020 target. And what it does is for a lot of hours in the year you have zero, you know, free electricity and potentially negative prices in the electricity market.

And on the other hand, for a significant amount of hours in the year you have astronomically high prices which are way above the top of this chart. So the high prices are potentially politically unacceptable. In most of the U.S. the regulated market there

is a cap on prices. They are politically unacceptable because politicians jump, you know, when those prices arise they jump and they say, oh, that's windfall profits. You know, you can't charge that on consumers. But the people who will build the picking plants that will balance the wind, if you don't let them get the windfall, you know, the high prices when they're here, they're not going to invest. At the same time, the zero prices when the wind blows is terrible for investment in anything that is, you know, any base load, even corn, becomes unmanageable. So large scale intermittent generation is a nightmare for laborized electricity markets.

Gas. Gas is abundant. I'm not going to repeat what David said. There is a structured change going on and we've not seen the end of it. Europe is heavily impacted, indirectly, of course, but heavily impacted by what's happened in North America. The fact that the U.S. exited the LNG market has deep implications for Europe at a time when LNG supply, including spot priced energy supply is booming.

This is a picture for the U.K. again where you see that the dash for gas -- what they called the dash for gas there in the 1990s was a key element of the decline in the carbon intensity of electricity. It not only displaced coal but it had to compensate for declining share of nuclear power. Of late, the decline -- the relative decline of nuclear has been too steep for gas to catch up so the displacement of coal has stopped. And even as gas continues to increase, as a result the decarburizing of the U.K. power sector has leveled off. Gas is less than half the carbon intensity of coal. There's a huge potential here in the current context for cost effective affordable decarburization.

Oh, my god. This is difficult to read. Yeah, it's because of the colors.

The horizontal axis is the heat and electricity generation in gigawatt hours of all the 27 member states and the vertical axis is the carbon intensity of the heat and

electricity sectors of the member states. And basically CCGTs are 260 in terms of intensity, but most countries have also zero carbon power, like large scale old hydropower and nuclear. So but even if you reached, let's say 300, you have some of the largest markets in Europe, like Germany, Italy, Spain, the U.K., Poland, the Czech Republic. The decreasing emission that you would achieve is the multiplication of that by the reduction here. So, you know, you can draw the squares. These are a huge amount -- we're talking a huge amount of carbon that can be reduced today by letting gas displace coal in Europe.

So in the U.K., in Germany, but especially in the U.K., you just have to let the market work. Politicians have to overcome their obsessions with gas security. The U.K. as an extremely secure, gas secure country. It has a liquid deep market that attracts LNG. Germany has a much less liquid market but is also a very diversified market with huge storage. So the way they provide security is different, but Germany is also a very secure market. They have to overcome their obsessions and let gas -- let gas come in and displace coal.

In Central and Eastern Europe the story is different. So here the horizontal axis is Russian gas as a percentage of primary gas supply and the vertical is Russian gas as a percentage of energy supply. And these are the 13 most E.U. -- most Russia-dependent countries in the E.U. And the map shows them in their geographical context. It's very interesting. It's sort of the eastern edge of Europe. And among those countries you have a number of very carbon-intensive countries in heat and electricity. And of course, for those countries the fear is about the sort of problems associated with more gas are not completely irrational. Some of those countries have serious effective gas security issues. And again, I don't want to repeat what David said. The E.U. is certainly going in the right direction but the abilities of Brussels to deliver an integrated gas market has been somewhat disappointing.

And that's here -- bringing gas security to this region of Europe is key to decarburizing that power in the electricity sector.

So in conclusion, we need to refocus the energy policy on decarburization. The very strong focus that has been put on subsidizing renewable I think is misplaced. It's been done because essentially politicians in Germany have the feeling that it's good for Germany in the long term they're going to be, you know, a leader in green technologies. I don't think it's going to happen. I think, you know, when you look at the solar market in Germany, increasingly German subsidies for solar panels turn into more imports from China because they can produce solar panels and very soon wind turbines at a fraction of the cost that Germany manufacturers can, which is not surprising to me. So green jobs, I think, is a highly debatable concept.

Gas is our friend. It allows an opportunity for short-term affordable decarburization. Of course, people would say nuclear, nuclear, nuclear, including the country I come from. And most countries in Central and Eastern Europe, and I see some friends from the Czech Republic in the audience; they are very pro-nuclear. But, I mean, let's be realistic. The ability to deliver large scale nuclear programs is -- remains to be tested. And if they can't build a nuclear power plant on time and on budget in Finland, I really doubt they can do it in Lithuania.

So we need to make Russian gas contestable in Central Europe. We need a rising floor under the carbon price. Otherwise, in 10, 15 years time when the price of gas goes up again if it does, or in 20 years time, this decarburization will be reversed, coal will be back, so we need a carbon price now that is rising so that investors not only displace coal with gas but also start building the nuclear power plants and the affordable -- the part of wind that is affordable that we will need in 20 years time. And we need to target the subsidies on

those renewable that offer the greatest potential for learning. Those for which the cost doesn't fall rapidly enough we should remove the subsidies and then we should let the market work.

And I'm done. Thank you very much.

(Applause.)

MR. EBINGER: Our format is going to be that I'm going to ask each of the panelists a question or two. I'll try to limit it to one each, maybe multifaceted. And then we want to open it as rapidly as possible to the floor. So let's begin in the order we had our speakers.

Piotr, what would you say are the most critical policies affecting energy security in the E.U.? And is there a diverse opinion between the Commission and any of the major member states on what should be the primary components of European energy security?

MR. SZYMANSKI: This is a very interesting question.

As I told you, we are working now on the next stage of strategies. And the way we work in the E.U. is very close cooperation with all the stakeholders, not only member states but also NGOs and international partners trying to find out for optimal strategy. So in that sense it's a question which is difficult to answer due to the fact that this is a process in which based on experience we are reaching a sometimes not fully appreciated compromise and future approaches.

MR. EBINGER: David, given the potential role of shale gas in the United States' economy to drastically change our energy mix, as well as some recent reports from resources of the future which say that we could theoretically reduce our diesel demand in long distance trucks with LNG imports between now and 2030 by three million barrels a day,

do you see any possibility that if the U.S. became more energy independent than we have been historically, that this creates any kind of transatlantic difficulties with Europe still heavily dependent on imports of various fuels and the United States less so?

MR. GOLDWYN: No, I don't think so. I think while our energy economy may transform and we may become more independent and self-sufficient fuels, I don't think we ever reach -- in gas we can reach relative independence. In oil I don't think that's ever possible.

Even as our economy changes, our stake in Europe, our stake frankly in other parts of the world will remain huge. And to the extent other countries are vulnerable because of their energy mix; we're going to have a national security interest in helping them address it. So I don't think our interests will be any less. I don't think our technical cooperation will be any less. I think we will, for commercial reasons and policy reasons, want to propagate our success in other places, and that's what a lot of the U.S.-E.U. Energy Council is all about right now. But I don't see a distancing or a disconnect or a growing disinterest because of a change in our mix.

MR. EBINGER: Okay. Thank you.

Pierre, what role does European gas security play in the wider context of European energy policy and markets? And what obstacles are the U.S. and the E.U. likely to experience in realizing their energy policy goals?

MR. NOEL: Well, I've tried to answer aspects of this question in my presentation. You know, I think the problem in Europe, let's face it, on energy, our national politicians, our national governments find it relatively easy to agree on very general objectives. But behind those objectives there's a lot of considerable disagreement and I think Piotr will not disagree with me. The renewables policy that we have, the 20 percent

renewable target, was a bizarre compromise and it's the reason essentially of a German preference that for political reasons at the time they managed to sell to France and the U.K. but there's considerable acknowledgement that this is not a sensible policy. We could probably do more on carbon but we -- but the renewables target is full of perverse effect and is to lead us to the most expensive way to decarburize -- and by the way, doesn't decarburize because we have this conflict between the renewable directive and the ETS.

So I think to -- not to repeat what I've said, the main problem that Europe has to overcome on energy is that we have, you know, our energy systems grew out of national peace treaties that used to be completely separate from one another. And when you bring that together, I mean, you need a century to create a common culture, a common, you know, a truly shared vision of what, for example, what energy security means. In the U.K., energy security, at least until I came to the U.K., I would say, I mean, it used to mean let the market work. In France and Germany, energy security used to mean it is gradually changing, but it used to mean don't leave that to the markets. You know, so when you give yourself the goal of creating Pan-Europe competitive energy markets, which of course is the right direction, you face very, very significant political barriers. And the new thing, or relatively new thing, is the enlargement of the E.U. after -- in 2004 and 2007, is that we brought into the E.U. countries that have very different energy systems than Western Europe, that are very highly dependent on Russia and at the same time, and for obvious reasons, have a very sort of sensitive political relationship with Russian, which directly conflicts with the political narrative of countries like Germany, France, and Russia vis-à-vis Russia. So you're sort of -- as if the energy problem was not difficult enough to solve, it becomes now mixed into a geopolitical problem and creates, you know, a huge new difficulties in the E.U. when we try to address these issues.

MR. EBINGER: Thank you. Well, we have a very knowledgeable audience here today so I think we'll open it to the floor. I think we have a roving mic. If you would, please identify yourself before asking your question we'd appreciate it.

Yes, sir. Right here on the aisle.

MR. ROBERTS: John Roberts with Platts. I've got a question for Pierre Noel.

Pierre, I mean, you were very, very emphatic about your emphasis on reliance on markets. Do you think it's sufficient when dealing with a nonmarket supplier, such as Russia, that the European Union can simply send signals saying it would like to see gas play a greater role in the European energy mix? Or do you think something much less market-oriented is required, such as reliance on long-term contracts for at least a degree of the imports that Europe is likely to get? After all, the question from the Russian perspective is that if they don't get clear signals and they don't have what they would like, which is long-term contracts, why should they invest upstream? And if they don't invest upstream, what are the consequences for the price that Europe would have to pay for relying on free markets down the road?

MR. NOEL: Okay. I don't see the -- I don't know what a nonmarket supplier is. I mean, Russian gas competes against gas from elsewhere and gas competes against other forms of energy, you know, if they don't, you know, the reality today is that Russian gas is moving back to Siberia in Europe. You know, that's the reality. There is so much competition against Russian gas. They are forced into renegotiating their contract for now at the margin but gas (inaudible) is in complete denial about the fundamental change of the European gas market.

And it's their problem. If they want to compete, let them compete. If they

don't want to compete, you know, perhaps then over time the price of gas will go up again. You know, we should not really bother about what Russia thinks about Europe. You know, if they think it's in their interest to export gas to Europe and for now that's what they've chosen to do, fine. But the idea that they will essentially hold Europe hostage of their gas is proven wrong in front of us. And the share of Russian gas in European EU-27 gas imports, the current EU-27, was 85 percent in 1970 and it's 35 percent today. And it's declining by the year.

MR. GOLDWYN: I mean it's probably worth noting, Russia has other choices. They can spread their risk by allowing private operators to risk their money, who maybe are more trustful. The spot market. They've had pretty good success trading oil on the spot market. They can compete on price. They can have more flexible contracts that may adjust to benchmarks and not be tied as closely to oil as they are maybe to something which is more relevant for Europe. So they have market choices but they can't have it, nor can any other seller of gas have it both ways to try and lock in that price and kind of defy the competitive market.

MR. ROBERTS: Would you see any utility of the Russians using the gas for power generation inside Russia and then exporting electricity? Would that be a more competitive market?

MR. NOEL: Well, the transmission loss is much higher on electricity, so I don't know. They're talking about building a nuclear power plant in Kaliningrad to export -- potentially export to the European market. I mean, they're not going to consume it in Kaliningrad. I don't know. I don't think we should even talk about it but if they want to do it, let them do it. But it's not our problem. I don't think it's our problem.

MR. EBINGER: Another question? Is there one back in the corner?

Where did I see a hand? I thought -- did you have --

SPEAKER: Thank you very much. Thanks much for very inspiring presentations.

I have a question that goes to Pierre. Really about the point that you can decarburizes to a certain extent, at least, through gas. Excuse me. And, of course, gas has a way more favorable carbon intensity than coal. But at the very end it's just 50 percent less is not zero. So basically the question is, and that's why gas has been termed bridge fuel and not a solution, so the question is how do you want to make sure in public policy terms that it remains a bridge and does not lock us in in a carbon world which we eventually want to leave?

MR. NOEL: Well, you know, I think the problem is not to lock us in gas because, I mean, you come from Germany and Germany is locked in coal. You know, it's not locked in gas in terms of power generation. Germany is extremely carbon intensive and is also an extremely large market. So the problem is not that. The problem is that the relative economics of gas and coal is favorable to gas now but who knows what it's going to be in 10, 15 years time? So what you don't want to see is coal coming back in 10, 15, 20 years time.

So I think the solution is the one I've alluded to. You need to have a credible carbon price that gives sufficient certainty to the people who are prepared to invest in zero carbon electricity now knowing that for some of these generation capacity is going to come online. If you're talking nuclear power plants in big markets in Europe, they're going to come online at the end of the 2010s, early 2020s. And people have to have the certainty that when those plans come online the carbon price will remunerate there the fact that they're producing zero carbon.

So you have to see it dynamically. And I think the way to bridge today with the sort of mid long term is through a credible carbon price. How you put in place a credible carbon price is an entirely separate question. Some people in my group have very original ideas that come from finance theory and finance practice. Governments could sign contracts for differences with nuclear investors on the carbon price so that, you know, in 2020, the U.K. government, you know, you are an investor; I'm the U.K. government. I sign a CFD with you. If in 2020 the carbon price is lower than 50, let's say Euros or pounds, I pay you. If it's more, you pay me. And so you sort of -- you put back in the world of commercial contracts something that is essentially a public policy or even a constitutional problem, which is how you bind -- how you bind democratically elected governments that can undo what they've done. I mean, how to bring certainty to the carbon price is a tricky issue, but that's what we have to do is the answer to your question I think.

SPEAKER: I am Antonio Costa Silva from PARTEX, Portugal. This is a question for David.

David, you rightly pointed out the role of gas with the discovery of shale gas and the complete exchanges that we are witnessing in the market. And my point is the following: If you look at the Atlantic Basin, there is a desindexation of the gas price from the oil price. And we know from the past that the gas market worked on the basis of long-term contracts. Now we are witnessing a very active role of the spot markets. So in terms of gas maintaining the competitiveness, it is necessary that these spot markets evolve in the future. What is your vision about the role of the spot markets and these mechanisms of these indexation of the gas price from the oil price?

MR. GOLDWYN: Well, that disconnect between oil and gas prices works in the U.S. because we have a lot of independent gas production and it's close to market. And

so it can be priced in a different way. We don't yet have a global gas market. I think our hope is that as LNG supply increases as importing capability increases, as pipeline infrastructure increases, the predictability of gas to meet international markets through LNG will increase and that will provide a reliable benchmark for gas to be priced closer to gas production and farther away from oil production. It was the original coincidence, I think, of in part of the production of gas and the production of oil that probably led to that connection. And it's a credible connection in a lot of places. But I think as the global market increases and infrastructure keeps up with demand and the predictability of demand in a lot of these markets increases, I think I would see that spot market growing. I would hope we would see a greater flexibility in contracts that would allow for a greater role for the spot market. And I think we'll see that spread. But it will probably spread regionally depending upon how the supply network works.

SPEAKER: I'd like to ask Piotr a question. The recent winning of the reactor contractor in the United Emirates by the Koreans clearly shocked the historic nuclear suppliers, such as AREVA and our own General Electric and others. And in the wake of that event it appears that the Japanese are now calling for a much greater Japanese government role in helping them compete in the international market because they saw the very dynamic role that the South Korean government played in helping with that win in the Emirates.

Do you think this portends that if Europe and particularly some of your historic vendors, like Siemens and AREVA are going to need more governmental support to compete in third world emerging markets for the sale of nuclear power plants?

MR. SZYMANSKI: This is -- one has to remember one thing. The European Commission is neutral as far as the decision of -- this is with regard to the member state -- is using or not using nuclear power. Of course, it has nothing to do with

Emirates. But the point is once such a decision is taking by a member state -- I will come to Emirates in a second -- at most priority, political priority, is their safety. Safety seen in a broad sense. Safety of a nuclear installation, security of a nuclear facilitation, and appropriate safeguarding of a nuclear material.

In that aspect, we -- in fact, if I touch on the safeguards, we just came in Europe into the system of integrated safeguards together with International Atomic Energy Agency in Vienna, which consists of comprehensive safeguards agreement and additional projects. This is technical detail not related much to gas. But this is very important because this is the standard of safeguards in that aspect. To be propagated, all countries -- we encourage all countries during the Washington Summit during the NP2 Review Conference, during the Paris Summit, to apply the highest verification standouts as I applied in the European Union.

The next element, the safety of nuclear installation, again the E.U. is in the forefront. In 2009, we adopted the nuclear safety directive with the uniform support of all member states. As you see, there are cases in which member states have very well defined opinions, and with a large majority of European Parliament because you also should remember we have democratically elected Parliament in the system of lawmaking. This directive gives the binding legal force to the basic safety standards as established by International Atomic Energy Agency together with worldwide experts, U.S. experts, E.U. experts, all countries with advanced technologies.

So from the Commission point of view, the key element is the safety of nuclear installations, be it installations on the territory of European Unions, be it installations of the proximity of the European Union as already mentioned, be it elsewhere in the world because we know very well that unsafe installation can influence many other countries. So

this, from the Commission point of view, this is the key element. Now, therefore, it's more important -- is it a generation free plus reactor than by whom it is provided because we have market roles in Europe and the Commission as such does not influence this. What government or different governments do, this is a different story but I cannot speak for them.

MR. EBINGER: Yes. Question at the side here. Then we'll get one in the back I saw.

SPEAKER: (Inaudible), Ukraine. My question is to Mr. Szymanski and Mr. Noel.

What is your opinion about the role of European -- in European energy landscape, your Ukraine and Belarus, now and in the future?

MR. SZYMANSKI: Well, there are two dimensions to it. The first dimension is the role of Ukraine and to some extent Belarus or Ukraine and Belarus as transit countries for Russian gas into Europe. And the other dimension is the relationship between those countries and Russia and the link between political choices and gas or energy dynamics.

On the first part, I think we are just about to see major structural changes with the building of north streams, so the Ukrainian monopoly of a transit of Russian gas is about to be broken by gas (inaudible) and their partners. This is going to be a fundamental change in European gas. Whether they are going to completely bypass Ukraine by building also south stream, we'll see. I think it will depend to a large extent on what they can extract from the Ukraine from the building of north stream if they have all they wanted to have there is gas (inaudible) the Russians, they're not going to build south stream but they will make south stream as credible as possible for the sake of the negotiation with the Ukraine. But the Ukraine is a monopoly of the, you know, dominant position -- dominant position which

have been abused more than once over the recent, the past 15 years. This dominance is about to be broken, whether we like it or not.

The other dimension is, and I'm much less, you know, knowledgeable about it, is the dynamics between the Ukraine and Russia. And what is of interest to me as an observer of the gas market, I'm not a specialist of the Ukraine politically, is that the Ukrainian gas market has been completely transformed over the past five, six years. The price has gone up very, very significantly, almost for industrial consumers, almost to European parody. And as a consequence, the Ukraine has become an extremely lucrative market for Gazprom which it was not 10 years ago.

So now the problem for Gazprom is to maintain the monopoly position in the Ukraine and to prevent those high prices in a big market for attracting non-Russian gas, which it will do if. So to me, again, the next step in the sort of negotiation or interaction between Russia and the Ukraine on gas is whether Gazprom will be able to completely solidify the monopoly there or whether after having succeeded in raising the price they will start seeing competition against Russian gas in the Ukraine.

MR. EBINGER: I think there was one in the back on that.

MR. NOEL: I just wanted to -- I will be very brief. The relations with Ukraine and Belarus are extremely important for the European Union. So this is the crucial part of our energy equation. We welcome these relations very hard and we think they will develop in that spirit.

MR. EBINGER: On the back on the aisle.

MR. HILL: Ned Hill with the Center for Clean Air Policy. I have a question for Pierre.

I agree with you on your argument about gas having the potential

economically to displace coal, but I'm curious how you see the politics. Because if I look back to the post non period when the E.U. was doing its last major climate policy both Germany and Poland were able to get special exceptions for state aid to protect their coal plants and the whole allocation battle. And I guess my question to you is what do you see as the change here that would allow us to see back out of coal in either Poland or Germany, the major coal opportunities? And from where I sit I can see it maybe in the U.K. where you've got some coal plants that are about to retire that are at, you know, useful lives but it's hard to see how the politics have changed. And I'd be interested in your perspective on that.

MR. NOEL: Well, well, I mean, I don't know how the politics is going to play. I don't know if we're going to be able to seize this opportunity for displacing, you know, at least some coal with some gas. Perhaps we won't be able to do it because of the politics. I don't know.

But something that strikes me is, you know, if the German government, German society is serious about climate change and, you know, leading Europe which itself, you know, perceives itself as a leader in the world, perhaps they should try and maximize the amount of decarburization that they get for the Euros they put in this policy. And they are throwing a very serious amount of money at renewable subsidies but, I mean, a very serious amount of money. And perhaps there's a political case. I mean, perhaps there's a political argument to be made for having more emission reductions for less Euros. I don't know. I don't know if that's something that can be sold in the current political context.

Poland is probably different. Poland is where the U.K. was before Mrs. Thatcher. There was this huge coal industry and decarburizing the Polish heat and electricity sector would mean basically putting, you know, lots of coal workers and redundancy and, I mean, the politics of that is going to be tricky. You're right.

But then it also, you know, if a -- sorry, if a CO2 target is really enforced on them and, you know, as far as I know it will be, they will have to find a way to meet it at an affordable cost. And again, I can't see many, many ways to do that.

MR. EBINGER: If I may come back to the subject of transit, you were talking about Ukraine and Belarus. But if we believe the numbers that are beginning to be bandied about, future Iraq oil production as well as the potential for perhaps very large natural gas exports as well but concentrating on oil, this changes the GLO political importance of Turkey I would argue by an order of magnitude since that would be a very likely export route, at least for a sizeable portion of the Iraqi oil. And the ongoing dispute between Europe bringing Turkey in or out of the community, do you see this being a geopolitical event of such magnitude that that would perhaps tilt the balance to bringing Turkey inside?

MR. SZYMANSKI: This is a very interesting question. But discussions --

MR. NOEL: Don't ask that to a representative from the Commission. (Laughter.) It's the worst question you can ask.

MR. SZYMANSKI: -- the negotiations with Turkey are ongoing. (Laughter.)

MR. EBINGER: They are, indeed. David, what about from a U.S. security position and Turkey emerging as a major transit route for Iraqi oil?

MR. GOLDWYN: Well, I think you're making a couple of assumptions about Iraqi oil which I think remain to be tested. One is the pace of Iraqi production, which we hope will be as fast as practical but there are issues to be dealt with on export infrastructure -- water, power. We'll see how those go. Iraq will, I think, Shoshone has said in the Iraqi government we'll see where the market price is and production will likely be tailored accordingly. So we've got an order of magnitude. And I think Iraq is looking at

export infrastructure, which is through multiple routes and not only through Turkey. There will be diversity of supply routes which I think will be a factor also.

And with respect to the gas, a lot remains to be seen about whether Iraqi production of gas will be used for domestic purposes, what the reconciliation with the IRG will be and how quickly that will be available. So I think this is not an urgent problem.

MR. NOEL: Sorry, just a factual thing. Iraq has been exporting a significant share of its oil through Turkey since the last '60s or early '70s.

MR. GOLDWYN: Right.

MR. NOEL: Through the port of Cheyan. So I think it's disconnected from the issue of Europe, you know, the relationship between Turkey and Europe.

MR. EBINGER: Anybody from the -- yes.

SPEAKER: Adenoma Tonser from Carnegie Endowment. My question is actually for both Mr. Szymanski and Mr. Noel.

You talked about, Mr. Noel, you talked about diversifying of gas imports in Central and Eastern Europe as a means for changing their perception about energy security and basically helping them decarburizes. And during the presentations it was also mentioned several of the pipeline projects were mentioned. My question is about what are the prospects of diversifying gas imports there through LNG? And how competitive is that? And is there any game plan in the European Union Commission at this point on that?

MR. SZYMANSKI: I should start this time?

MR. EBINGER: If you want to, yes.

MR. SZYMANSKI: This is a very technical question. You've seen the map of LNG terminals in Europe. You've seen the map of plant LNG terminals. Infrastructure for LNG is one of six priority elements of the European infrastructure package. So the answer

is yes, it's one of the ways to diversify supply routes and suppliers.

MR. NOEL: I think there's -- LNG reclassification capacity has risen dramatically in Europe but it's mostly as you would expect in the Atlantic coast of Europe because that's where the big markets are. And the real issue, you know, is to bring this diversity, to make it accessible to Central and -- especially Central European markets. And there's a lot that could be done at constant existing infrastructure. But if you take Poland, for example, they are currently in the middle of a very difficult negotiation for the renewal of the long-term contract with Gazprom but there is a huge pipeline that carries Russian gas to Western Europe through Poland. This pipeline is governed by an intergovernmental agreement between Poland, Germany, and Russia that was signed prior to the Polish succession to the E.U. is inconsistent with the E.U. regulation and as a consequence, it's impossible for Russia to structure back whole transactions to access gas in Germany or even in France or the Netherlands or Belgium, which technically could perfectly be done and contracts -- and I can tell you that Gas DuFrance, Gillief Suaz, E.ON, (inaudible) are awash in non-Russian gas. They would do these transactions today but they can't because this pipeline, which is an existing pipeline is inaccessible to trading.

So there's a lot that could be done on the regulatory and legal side to make the existing infrastructure more conducive to gas moving west to east. And perhaps we should concentrate on those because, of course, it doesn't involve huge capital expenditure on things.

MR. GOLDWYN: (Inaudible.)

MR. EBINGER: Did you want to -- ?

MR. GOLDWYN: No. I was just agreeing.

MR. BLAKEY: Thank you. Will you allow me to give an answer to that

question LNG rather than put a question?

MR. EBINGER: Fine.

MR. BLAKEY: Simon Blakey from Eurogas.

First of all, Pierre's answer was extremely good with respect to Poland. Adenoma, I think you're a specialist on the Bulgarian market on gas. Is that correct? Or you were once upon a time? Well, I think it's worth pointing out that in the 2009 January supply crisis the only country that was significantly affected in terms of customers being cutoff for a couple of weeks was Bulgaria. And the solution to that problem was in fact with LNG with existing terminals because the Greek LNG terminal took a cargo of LNG and simply degasifying south of Athens allowed the gas to flow across the border into Bulgaria at 70 bar, at full pipeline pressure, under a stored supply to Bulgaria before the Ukrainian-Russian problem was solved. And there were a couple of other LNG cargos in the Mediterranean waiting to carry on delivery.

So there are contractual solutions which Pierre has correctly pointed out which will enable the north of Europe, the northeastern part of Europe to be supplied from LNG. And in the south, the exiting physical infrastructure, first of all, has already done the job; and secondly, would certainly be able to do it much more quickly if the same sort of energy security supply problem happened again because the Bulgarians and the Greeks spent a couple of weeks arguing about the commercial terms which there is now a protocol in place that they wouldn't need to do that anymore. So the kind of solution that you are referring to really is already in place.

MR. EBINGER: Thank you. I think we have time for one or two more questions. Any from the floor?

I would like to ask a question given my long-standing interest in the Arctic.

We all know a few years ago when the Russians very dramatically planted their flag on the seabed floor and claimed large swass of the Arctic that this was at least publicized very much as a major geopolitical event even though it probably doesn't mean much in the near term. But it does appear as if there is a sharp difference of opinion on how the Arctic should, assuming it does open for major resource development, it does appear that there is a fairly sharp difference between the Commission and some of the member states. And of course, some of the literal states adjacent to the Arctic. And I was wondering if you could just bring us up-to-date on where that kind of inter-European debate goes on how we -- who gets access to the Arctic down the road?

MR. SZYMANSKI: I would rather -- it goes a bit beyond my field.

MR. EBINGER: Pierre, do you have any thoughts on that?

MR. NOEL: No. I don't follow that.

MR. EBINGER: Okay. David?

MR. GOLDWYN: I think it's -- the Arctic Council is talking over those issues, but as you alluded to in the Russia -- I think you were talking about the Russian-Norway agreement, I think we're a ways off for a couple of reasons. One is the gas glut. Another is other available sources. A third I think now is the safety issues, which are significant and which I think all the literal states really want to think about. They're talking about some in the G20 context, some in other contexts. If you're, you know, off in remote areas and it's oil production, how do you want to address that? So I think there's a lot of thinking and talking that's going to get done before we see significant investment and exploration and production in the Arctic.

MR. EBINGER: Well, I want to thank all the panelists and the audience. I think this has been a very good session and thank you very much for coming this afternoon.

(Applause.)

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I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

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