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THE U.S. UNCONVENTIONAL HYDROCARBON RENAISSANCE AND IMPACT ON JAPAN

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P R O C E E D I N G S

MR. EBINGER: Good afternoon, ladies and gentlemen. I'm Charlie Ebinger, the Director of the Energy Security Initiative here at Brookings and we are particularly delighted today to have such a distinguished panel with us to talk about the implications of the U.S. unconventional hydrocarbon renaissance and potential impact on Japan, of course a vital ally. All of us would, of course, like to the degree possible, if we had control, to make sure that our hydrocarbon revolution helps the Japanese, but of course, these are determined by market issues and private sector concerns.

But we're here with a very distinguished panel. I'm only going to introduce them very briefly because you have their bios, I believe, in your packets. Is that right? Everybody has bios? But truly we have a tremendous array of expertise represented on the stage today.

We're going to commence with Mike Herberg, who is, of course, research director of the National Bureau of Research's Energy Security Program, who has many, many years dealing with Asian energy issues and many years in successively important positions at ARCO, which, of course, going back to some of the early interests in Alaskan Energy for Japan, I know Mike was deeply involved in those.

He is a frequent correspondent in a number of journals and

newspapers and is quoted extensively throughout the energy trade press always on energy issues.

He's going to be followed by Jim Jensen, who, of course, is one of the leading energy economists particularly given his well known expertise on liquefied natural gas issues, not only in Asia where he is indeed an expert, but also the rest of the world.

As I always say, since Mr. Jensen was particularly nice to me when I was a budding young scholar -- I don't want to tell you how many years ago that was -- but he is well known, participates in many activities at the Oxford Energy Institute and throughout the world, and as I always like to say, Mr. Jensen has forgotten more about LNG than most of us have ever known and has particularly insightful views on what's going on in Japan.

He will be followed in turn by Mr. Muramatsu, who is the general manager of the Washington Office of the Japan Oil, Gas, and Metals National Corporation or JOGMC, and that was, of course, formed in 2004 with the merging of the former Japan National Oil Companies with the former Metal Mining Agency of Japan. He has served as counselor of Japan's permanent mission to the European Union and as director of the European division at the Trade and Policy Bureau for METI and he is extremely well known in not only, obviously, Japan, but throughout the

United States and major oil and gas producing regions.

And finally we will turn to Shoichi Itoh, who is the manager and senior analyst at the Institute for Energy Economics. Shoichi is a longstanding friend of the Brookings Institution having served a stint here with us and also at our sister institution, the Center for Strategic and International Studies.

Prior to joining IEEJ, he has served in a number of important positions in the Japanese government and is well known on energy forums relating to Japan throughout the world. And is also, I should mention since I share his view, a sterling believer that Alaska needs to play a much more important role in our bilateral relations going down the road.

The forum will be that each speaker will try to limit to 15 minutes, hopefully, so we have plenty of time for questions. I will then ask just one or two questions to get the discussion going, and we want to hear from the floor at that point.

So, Mike, you want to go first?

MR. HERBERG: Thank you, Charlie, for that kind introduction. Some of us, if we hang around long enough, even I can become respectable -- if you hang around long enough. There's a more colorful saying like that, but I won't use that with this distinguished

audience.

Thank you for inviting me to speak to such an interesting group and on such a very distinguished panel.

Charlie asked if I would confine myself really to the oil side of the equation of the unconventional boom and what it means for Asia and Japan. So, I'll try to stay in my lane and leave the LNG issues to Jim.

I think the broad statement would be that in the oil side, in a very indirect and in some ways direct way, the U.S. oil production boom has been enormously beneficial for Asia, broadly Asia's energy security and obviously, specifically, for Japan's energy security. It's a bit indirect, as we all know, the U.S. doesn't export crude, we export product, but we can't export crude, so there's no direct flows of crude oil towards Asia or towards Japan.

But in indirect ways, in terms of a global market for oil, this enormous binge of production from the U.S. oil side has been broadly beneficial for Japan and Asia, I think, in terms of energy security.

It's worthwhile to think of three groups of countries in Asia when you think about this, the deep importers that import virtually all their oil and gas, and to some extent, coal, that's Japan, South Korea, Taiwan. Obviously, they're going to benefit enormously from anything that adds oil supplies to the marketplace and keeps oil prices from rising too high. So,

those are the most direct beneficiaries.

Then you've got the producer/importer side, and that would include obviously China and to some extent India. China, of course, benefits on the oil side as well. It may benefit on the gas and LNG side as well. We'll have to wait and see on that, but I think China benefits on the oil side. They're the biggest oil importer from the Middle East. I think now they're the largest oil importer in the world according to some of the latest statistics, surpassing the U.S. So, anything that adds supplies to that global oil marketplace and keeps prices down is beneficial to the Chinese.

The other side I'll leave to Jim, but the gas/LNG exporters in the Asia region -- Russia, Australia, Southeast Asia -- you know, it's a different picture for them, all this potential LNG coming out of the U.S., but as I said, I'll leave that to Jim.

I think the oil market benefits show up pretty early, in other words, we're seeing the benefits for Asia and Japan already. On the shale gas side I think the benefits are a little further down the road. We have some immediate benefits; we're exporting cheap gas to Europe in the form of coal, cheap coal already, so the molecules are going, they're just a lot dirtier.

So, I think there are immediate benefits, but I think the shale benefits for Asia tend to take a while to show up.

So, let's talk specifically about the oil side. Japan, South Korea, all heavily oil import-dependent, and when you look at the incremental production in the U.S., the numbers are truly staggering, the incremental addition to the global market.

U.S. incremental oil production has risen 3.5 million barrels a day since 2008. This year it's risen by a million barrels a day according to the latest EIE data, they're expecting another million barrels a day increase next year. And another 700,000 or 800,000 barrels a day increase in production in 2015.

But even as we speak, 2008 to 2013, 3.5 million barrels a day of incremental crude supply in the marketplace. So, that has offset an enormous set of problems with production from a whole set of other countries. I mean, you've added the equivalent of Iraq or Iran to global production, the second largest producers within OPEC incremental production. So, I mean, that's a huge incremental addition to the marketplace.

That's helping offset very low growth in non-OPEC oil supplies over the last five years outside of North America, very disappointing results in terms of increases on non-OPEC supply. It's helping offset production problems in a whole series of places. Within OPEC, obviously, you've got reduced exports from Iran of about a million

barrels a day because of the sanctions, you have security problems and conflicts, Iraq, Nigeria, Libya. You go down the list, there's a couple million barrels a day nearly of OPEC production that's not online because of these various conflicts.

You look over the non-OPEC side, you've got a whole set of production problems in another set of countries -- Sudan, Syria, Egypt, Yemen, production offline. When you add all that offline production you've got about three million barrels a day of supplies that aren't in the marketplace and you wash that up against the incremental 3.5 million barrels a day that you've seen come out of the U.S. in the last several years. If the U.S. had not added that 3.5 million barrels a day to the marketplace, essentially the whole 92 million barrel a day world oil system would have to be running flat out to meet consumption.

SO, that incremental U.S. supply has been the difference between a tight market and an absolutely taut market, where the price would have been, I'd be willing to be, significantly higher than $100 to $110 a barrel.

So, in that indirect way, Japan, in particular, has benefitted, but all the big oil importers in Asia have benefitted. If you go out over time, look at the spare capacity in the OPEC producing countries, spare capacity today stands at about 3 million barrels a day. Again, if you hadn't

had that 3.5 incremental production from the U.S., the market simply would not be at $110 a barrel or $100 a barrel, it would be much, much higher.

And I think if you look out over the long-term, as this U.S. production continues to come online for the next several years, at least in current forecasts, trailing off as you head past 2015, the increase is trailing off, this is going to put a cap on demand for OPEC oil as we go forward. The quota is sitting at 30 million barrels a day, OPEC will probably have to cut production a little bit this year to sustain that price level that they're looking for, and if you go further out, you know, this extra U.S. oil production is really putting a cap on OPEC's market share and the incremental call on OPEC oil and helping keep a lid on prices over the next several years, and I think this is one of the key reasons the U.S. oil production -- would be one of the key reasons why most analysts, I think, are expecting there to be -- you know, disregarding security issues in a variety of places -- the pressure on oil prices tend to be somewhat downward.

So, I would argue, for Japan, this has been an enormous benefit. When the Fukushima loss of the nuclear power capacity, Japan's oil imports have risen by about 150,000 barrels a day. When you look at the incremental cost of that, and if you added a premium onto oil prices

that we would have had without this incremental U.S. production, you can think about the excruciating costs of that.

So, I think, broadly speaking, it's pretty good for Japan and pretty good for Asia, adding all this oil to this big global market.

Let me make one final comment on another side of the issue that may not be quite so bright, and that is if you imagine that this gradual trend towards U.S. quasi-self-sufficiency in oil, natural gas exports -- and I say quasi-self-sufficiently, it's a perception issue -- and you add that to strategic kind of security considerations suggests that it will be more and more difficult for the U.S. to sustain its deep level and costly level of engagement in the Middle East and Persian Gulf. And the perception domestically that, well, we're pretty well supplied, maybe we don't have to necessarily carry that heavy load of protecting the Persian Gulf oil producers, the Arab oil producers, the sea lanes, maybe we shouldn't necessarily be carrying that heavy a load, essentially the sole role in enhancing the security of that flow of oil, which essentially all goes to Asia now.

If that were to lead the U.S. to draw back a bit on its engagement in the Middle East, what does this mean for Asia? What does this mean for Japan, whose lifeline of energy supply is coming from the Middle East to Asia and Japan, 90, 95 percent of Japan's oil supplies

coming from Gulf suppliers? What does this mean for Asia's energy security? And how do we think about the future in which maybe Japan and the rest of the big Asian importers need to think about carrying something more of that load of ensuring the flow of oil from the Persian Gulf to Asia? How do we craft that kind of a set of arrangements given the overlay of strategic mistrust in the region?

So, I think this is a part of that production boom that may not necessarily be quite as beneficial or benign for Asia as the production effects of all that extra oil supply coming out of the U.S.

So, with that, let me finish and let Jim talk about the LNG side, the really fun part of this.

MR. EBINGER: While Jim is making his way to the podium, I neglected to mention two things. I apologize. One is that this -- for those of you that are on Twitter, this is being -- you can follow this at #JapanEnergy, and I also was remiss in not noting that we are very pleased and honored to have Mr. Nobuo Tanaka, former director of the International Energy Agency with us today.

MR. JENSEN: Okay. Charlie, thank you for the very kind introduction. I'm going to pitch in on the gas side, and really security of supply in gas really is about price, so you're going to hear me talking very much about price.

Since the 2009 recession, Japan has been increasingly forced to face severe challenges to its energy and environmental policies. The Fukushima disaster in March 2011 placed the future of nuclear power under a cloud and has led to a policy, which in theory, is going to call for the phase-out of all nuclear plants over a period of time.

Then after years of debate about the carbon issue, in October 2012, Japan finally addressed the carbon emissions issue by introducing a phased-in carbon tax. Thus, those two policies hit at what were the bases of power generation in Japan, base load coal and nuclear, and essentially they were base load LNG up to that point because of its higher cost, had been used for intermediate firing.

While these policies may not survive the recent change in government, they imply greater reliance on LNG-fired power generation and advanced coal technology. LNG had accounted for only 28 percent of generation in 2009. Non-hydro renewables were only 3 percent.

Because of its higher cost, LNG has historically been relegated to intermediate firing. Pre-Fukushima, its market share had never exceeded 28 percent. Gas had an even lower industrial share, 9 percent to coal's 30 percent, but just as Japan is attempting to place greater emphasis on more expensive gas, LNG costs have been rising substantially; import prices in 2012 were at an all time high. Thus the

appeal of importing LNG from the U.S. where the development of shale gas has driven gas prices to levels not seen since the 1990s.

The post-Fukushima shutdown of nuclear generation forced a large increase in LNG imports, while a decline in total required generation and increases in oil firing partially offset the loss between 2009 and 2012, gas fired generation still accounted for 44 percent of the total replacement.

This led to a 36 percent increase in Japanese LNG imports; nearly 90 percent of it was the responsibility of the electric side, not the gas utilities.

Japan also had to cope with declining availability from Indonesia, which has supply problems. While increases in long-term contracts with Australia, Qatar, and Sakhalin helped, the demand uncertainties forced Japan to utilize short-term imports accounting for 62 percent of the increase. And here simply shows the balance of difference in generation stated in gas equivalents between 2009 and 2012, and as you can see, the increase in LNG imports was a substantial part of that.

And this simply shows you the makeup of the supply, the loss of the Indonesian volumes, the increase in the contracts with the reliance on spot imports, both from those who have contracts with Japan and from countries that don't, for example, Africa -- all over the world,

we're shipping to Japan.

The 2009/2010 gas market surplus set off regional gas price competition and forced a possibly permanent restructuring of the international gas pricing system. For some time, it's been common among energy analysts to speculate that growing LNG trade would finally create a world gas market by linking previously isolated regional markets.

The LNG surplus of 2009/2010 finally made it happen, but the result bears very little resemblance to the relatively uniform regional price structure of the world oil market. As a result of the surplus, international gas prices are experiencing unprecedented divergence.

The restructuring puts great stress on finding ways to reduce the cost of imported Asian LNG in order to maintain industrial competitiveness. Much of the interest in U.S. LNG exports is based on the huge disequilibrium between U.S. commodity prices and the European and Asian contract prices, which have been oil linked.

It's been possible to talk of world oil prices because the costs of marine transportation are relatively low. Same is true for coal. But one cannot talk about world gas prices because gas, like those legendary local French wines, does not travel well. Thus, LNG importing countries will always have higher prices than exporting countries, and this simply shows you an example of transportation cost as a function of

distance, LNG & pipelines, LNG you have to pay to liquefy it and regassify it regardless of the distance it goes. Once you put it on a tanker, it can go a long distance. Pipelines are pretty costly for moving any distance, and economies of scale are very important in pipeline economics.

Prices have been driven by different forces in each of the four markets. The full effect of the U.S. shale gas surplus began to make itself felt in the mid-2008 and Henry Hub prices fell. But the oil-linked continental and Asian contract prices were driven by oil prices, first rising, and then briefly falling, and then rising again.

Europe has now partially adapted to commodity competition. Traditionally, the typical Japanese formula provided a higher price level for a given level of oil prices than the European one. For a time, this Asian premium was partly offset by price capping clauses called S-curves, but many of these have now been eliminated in the tight market.

Dutch TTF, which represents continental pricing, was first influenced by weak LNG prices, but later as the market tightened, it was influenced by continental oil link prices.

And this simply shows the way the price structure of four different things, Henry Hub, the TTF, the Dutch price, which is half commodity and half contract, the German and the Russian prices -- or the Japanese and the Russian prices to the Germans, and you can see

they've blown apart because of what has been happening.

A legitimate question: what might a theoretical world commodity gas market look like? People who like to do world gas models assume that supply, demand, and price will set commodity prices, but this isn't quite the same thing. One can devise an equilibrium set of price differentials based between markets assuming that transportation alone sets the regional price differences for the commodity.

Alone among the major LNG trading partners, North America has a truly gas-to-gas competitive commodity market, while the UK also has a competitive commodity market, it tends to be influenced by continental oil linkage when LNG markets are tight.

Thus, this equilibrium theoretical pricing system might be based on Henry Hub pricing, and although it lacks the liquidity and transparency of Henry Hub, Qatar plays a similar hub role in LNG since it can arbitrage Atlantic and Pacific basin prices.

In such a theoretical system, the European gas value might be based on U.S. prices plus the cost of transportation from the U.S. Gulf Coast to Europe. Then these prices might be netted back to Qatar where they would in turn establish equilibrium Asian prices. The following figure is just such an estimate: the equilibrium transportation differential between the U.S. and Europe for 2012 is $5.21 and between the U.S. and Japan

it's $3.97. Remember that the Japanese prices are quoted as liquid before regassification where prices elsewhere are always as gas, so they're a different kind of measure.

And this simply shows you you start out in the left and you look at the Henry Hub price, you build it up with liquefaction, transportation, regassification, and in theory, a $2.74 price at Henry Hub is in equilibrium with $7.95 in Rotterdam. The actual price was only a bit higher.

Now, if you take it back to Qatar, the interesting thing is the transportation distance between Rotterdam and Tokyo are almost the same from Qatar, so it ought to be -- the liquid value ought to be the same thing in Japan that it is in Rotterdam. It's much higher. In Japan, the actual price ex-ship was $16.66, the Asian premium, which is the thing that is vulnerable to attack, was $7 of that difference.

The typical Japanese pricing clause is based on a very simple formula. It is linked to the Japanese customs cleared price for crude oil, JCC, commonly known as the Japanese Crude Cocktail. It is in the form of P, price in dollars per million BTUs, is equal to a constant C, expressed in dollars per million BTUs, plus a coefficient known as a slope, multiplied by the Japanese crude price.

Now, the discounting is often done in competition by

changing the slope or changing the constant, but because the formula is simple and uniform, what you get is various competitors sitting around and trying to figure out what their competitors slope is to the fourth decimal place, very little ability to introduce commodity competition into that formulation.

Northwest Europe has benefitted from the price competition that was unleashed by the LNG surge in 2009/2010. There, LNG arbitrage, together with North Sea commodity competition, exported weak North American prices to the continent through the open access EU pipeline system and it undermined oil linkage. No similar price competition has been possible in Asia because there's no access to commodity gas.

Monopoly companies, long-term contracts for pipeline or LNG, you do not have the commodity competition of the North Sea or North America.

And so, essentially, Asia has not been able to take advantage as Europe has -- am I running too long, Charlie? MR. EBINGER: No, you're fine.

MR. JENSEN: Give me a little bit more. Okay. Most common type of a contract is what's called the delivery ex-ship in which the seller has a destination, he figures out what the pricing and price

clause in a destination ex ship contract is essentially the market pricing. And essentially, if you're going to Japan, you worry about JCC.

There are also FOB contracts in which you figure out what the value is in Japan and you may deduct the transportation cost. The North American contract, the U.S. contracts, are all unique in that they are FOB contracts but they're priced at origin, not at destination, which introduces a totally different dimension into the contracting structure and that's their appeal to the oil linked contract bars, and this simply says -- this takes the 2012 spread and shows you the economic rent between what the costs would be and what the price would be, and if you had a traditional contract, the rent and the price risk goes to the seller, if you have a U.S. contract, the rent and the price risk goes to the buyer.

Projects destined for Japan require export authorization from the DoE and a certificate from FERC, five Japanese contracts represent 19 percent of the DoE approved capacity, but none of that capacity, as of the end of last year, has a FERC certificate, although almost all of it is in a Freeport contract project that is about to be offered a certificate. So, most of it is secure.

The IEA has not been optimistic about long-term gas demand. In world energy outlook 2013, it sees a slight decrease to 2020, followed by limited growth to 2025, thus the opportunity for further U.S.

imports depends on expiration of current contracts. This is expected to occur significantly in 2019, 2021.

The gradual emergence of a buyer's market in Japan should give it better bargaining position for contract renewals and for new supplies, and this simply shows the array of projects -- 22 projects with all that potential capacity, the projects that have been contracted for, projects that have been approved by the DoE, projects that -- so forth, and here are the destination of the contracts.

Much of the contracts that have been made are portfolio supply in which a company like Shell, a company like Total, BG, buys the stuff itself and can take it anywhere it wants to as the market dictates.

And this is simply an outline of Japanese LNG commitments out to 2025 showing the possible contracts from the U.S., the history shows where the stuff has come from, and you can see how Fukushima forced Japan heavily into the spot market, but is now building up contract commitments underneath that, and so essentially the U.S. stuff begins to phase in and there is very little room for a period of time for additional supply before the contract expirations open up and you've got a more competitive market.

In conclusion, Japan faces serious energy cost challenges as it attempts to deemphasize coal and nuclear in favor of expensive

imported LNG, imports of low-cost U.S. shale gas does have a powerful appeal, and while the present price spread between U.S. and Japanese prices may be unrealistically large, some spread will remain, thus a major appeal of U.S. imports is the ability to introduce commodity price competition into the high priced and structurally rigid traditional oil link pricing formula. Thank you.

(Applause.)

MR. MURAMATSU: Thank you very much. My name is Hidehiro Muramatsu. I'm the general manager of the Washington, D.C. office of JOGMEC, Japan Oil, Gas, and Metals National Corporation. Today it is my great honor and pleasure to speak here in the prestigious Brookings Institution and in the presence of the Mr. Tanaka, former Secretary General to International Energy Agency.

Before I touch up on the energy situation in Japan, I would like to introduce a little bit about our organization. What is JOGMEC? JOGMEC is Japan Oil, Gas and Metals National Corporation and it was established in 2004 after the merger between Japan National Oil Corporation and the Metal Mining Agency of Japan, which both are government organization.

Now we are called an incorporated administrative agency. Both are under the authority of the Ministry of the Economy, Trade, and

Industry, and 100 percent financed by the Ministry of Finance, and the capital (inaudible) of 502 billion yen, almost equivalent to $5 billion U.S. and our mission is to ensure or secure a stable supply of natural gas, oil, coal, mineral resources, including real metals and rare earth, and geothermal energy.

And today I especially emphasize oil and gas upstream investment in research and development. So, this map indicates the current project going on throughout the world supported by JOGMEC. JOGMEC provides equity capital, in total, 41 projects, and also provides the liability guaranty to 13 projects throughout the world.

Four projects are in Canada and three projects in Australia. Since 1967, when Japan National Oil Corporation was established, JOGMEC or JNOC provided equity capital to 336 projects all over the world. So, maybe this slide is very familiar with you -- this slide is -- I cite from the IEA website, Japan is highly dependent on the import of natural resources.

In the future, there is no move from the upper side of this picture. Crude oil, we imported almost 100 percent, precisely speaking, 99.6 percent we imported from the -- mainly from the Middle East, and the LPG, 75.8 percent. LPG is also essential energy for our economy because almost half of the households, approximately 225 million

households are dependent on LPG for cooking and heating, and also rare metals, almost 100 percent dependent on overseas supply.

This map indicates our main supplier of LNG. Number one supplier is Australia. They export 262 billion cubic feet, representing 18.2 percent of Japanese import in 2012. And the second supplier is Qatar, from Middle East, it exported 252 billion cubic feet, representing 17.9 percent, and the third supplier is Malaysia, it exported 202 billion cubic feet representing 16.8 percent, and fourth is Russia, Russian Federation, exporting 399 billion cubic feet representing 9.4 percent, and the number five, Indonesia, 297 billion cubic feet, representing 7.1 percent.

So, these are the traditional and conventional sources of LNG suppliers to Japan.

This picture is already mentioned by James. In order to avoid misunderstandings, Japan's import LNG price, including almost $3 of freight and transportation cost and $3 of refraction cost, so if the U.S. Henry Hub price is hovering around $3.2 to $4, there is $6 dollars added to the U.S. natural gas prices.

So, the Japanese imported natural gas price is linked to the number of crude oil exported from the Middle East, so we call it the Japan Crude Cocktail and we also call it Japan Premium.

So, this bar chart represents our LNG import. As everybody

mentioned, after Fukushima Daiichi nuclear disaster in 2011, we observed a sharp surge of LNG import. In 2010, around 70 million tons of import, but in 2012, almost 87 million tons of LNG was exported to Japan, and the important thing is that on the right hand side, currently, in 2012, we imported our LNG (inaudible) value amounted to the $62 billion U.S., and in 2012, our trade deficit amounted to $78 billion U.S. Maybe almost 80 percent was occupied by the LNG exports.

So, currently, as for the nuclear power plant, there are 50 nuclear power reactors in Japan, which provide approximately 50 gigawatts of power generation and represent 30 percent of total energy supply, and by the end of this last year, seven electricity companies filed the application for the resumption of the nuclear power reactors, for nine sites and totaling 16 nuclear power reactors, but as I mentioned, there are 50 nuclear power reactors, but only 16 nuclear power reactors filed for the resumption -- for the application -- and out of 16, two filed last December, so it will take more time.

And the current Nuclear Regulation Authority is reviewing these applications, but toward the end of this March, but I think they will still need more time to entirely review this resumption application.

And last week, January 10th, Japanese cabinet secretary, Mr. Suga announced that they postponed of the review of the current

energy policy framework, the government of Japan, especially the Agency of Natural Resources and Energy, is reviewing current energy policy framework, but still there is a huge discussion about how to treat the nuclear power plant's future. So, it will take more time, maybe toward the end of this February.

So, this is a new opportunity for LNG export from U.S. and Canada and in Russian Federation from eastern Siberia, Sakhalin we already imported from the Sakhalin Islands the LNG, and East Africa, especially Mozambique, they were the new source of LNG to Japan.

Finally, I'll briefly touch on our new resource or new source of energy, a (inaudible) of production test. JOGMEC has succeeded in production with the methane hydrate in the (inaudible) trough of the Pacific Ocean; we conducted the first test of six days and producing 120,000 cubic meters. And we are now seeking for the opportunity to collaborate and cooperate with the DoE and we were planning to conduct onshore methane hydrate production tests in the state of Alaska. Maybe the time has expired, so this is my presentation today. Thank you very much for listening.

(Applause.)

MR. ITOH: Well, my name is Shoichi. I'm a senior analyst at the Institute of Energy Economics, Japan, IEE, and I'm so glad and

honored to be back at my old home, the Brookings. Thank you very much, Charlie and (inaudible), who invited me to join this very (inaudible) and, well, I've been asked to talk as the last panelist of the four, and it's quite easy to say that, well, everything is just discussed, but I have to say something else.

But I've got to say that I get the opportunity to talk more about geopolitics of the energy security, and actually I'm teaching a course on energy security in Tokyo, and I'm always teaching my students -- telling my students that energy security is such a concept that (inaudible) manageable. You know, everyone talks about different aspects of energy security. It's such a big jigsaw puzzle. You can have as many pieces as you want in the package and we tend to forget about, you know, what we (inaudible) are talking about in the security, some people are talking about security of, okay, energy availability, the stability of markets, et cetera, et cetera, et cetera.

For somebody else, it means energy plus security. So, this is (inaudible) dimension, but both dimensions are intertwined. We have to know both dimensions, and I think what is happening in terms of (inaudible) against the backdrop of shared (inaudible), there is a perfect example of what we mean by energy security.

Well, I think today we have three specific (inaudible) drivers

to strengthen, the (inaudible) alliance against the backdrop of shared (inaudible). One, it's increasing new opportunities for hydrocarbon trades. I'm saying, (inaudible) hydrocarbons. Well, it's (inaudible) by now.

Mike talked about oil and Jim talked about LNG, and I'll talk a little bit about coal as well. And, well, second, we should also focus upon the importance of the gradual shift of the gravity of (inaudible) where (inaudible) but let me address the point a little more.

And thirdly, I'd like to shed light on the increasing importance of Alaska.

Well, Mr. Muramatsu already talked about what is happening in Japanese energy market in the aftermath of the Fukushima disaster, so I won't go into details, but just a brief review of that. You know, the LNG imports for Japan became all the more important with the redaction of nuclear power in the energy mix. In the age when gas demand is beginning to skyrocket in Asia, specifically by China, and to be followed by India in the decade to come, well, then Japanese companies have already signed up for a total amount of the approximately 15 million (inaudible) import from the lower 48, although this project must first go through FERC's approval.

But if these projects come online as scheduled, as planned, it means a lot because this amount is already the equivalent of 17 percent

of the total import of 2012.

Look, we will elaborate the question of Alaska later on. Until 2012, the share of America with LNG coming from Alaska was only 0.3, but we're expecting that the share of the states will go up to at least 17 percent or hopefully more in a matter of time.

And, you know, Jim already elaborated the pricing dimension of this issue, so I won't go into details, but one thing I'd like to say is that most people, including energy experts, tend to pay exclusive, almost exclusive attention for the future of the gas pricing mechanism. But as I already noted, this particular geographic shift of gas flow to Japan means a lot.

Well, why is it the case, does (inaudible) know what is happening at Capitol Hill at this moment? The House Committee on Foreign Relations is holding a hearing on South and East China Seas, just this moment. Well, we don't even know what may happen to, you know, the -- all sorts of (inaudible) geopolitically sensitive (inaudible) communication, starting from the Strait of Hormuz, cutting across the Strait of Malacca, going through South and Eastern Seas -- well, at first LNG import from the states, our concerns they are basically free from supply disruption. It means a lot.

Well, next, oil demand is also surging led by China mainly

and as my colleagues already noted more than once, Japan depends on the Middle East for approximately 90 percent of its imports. Well, today here in Washington, people are starting to debate about the future possible lift of a ban on the crude oil exports. We don't know the results, but still, as Mike noted, U.S. is increasing the amount of oil products. So, what is happening is actually contributing to the stability of our Asian market and at first the U.S. is ready to export more, Asian market are there.

Next, coal. Well, as far as coal is concerned, many people actually have a kind of stereotyped image of coal as something dirty. Well, it depends how you use it. We tend to forget about the (inaudible) we have clean coal technologies against the backdrop of (inaudible) relation in the United States, U.S. gets a bunch of coal (inaudible) and actually Japan and China are two of the biggest beneficiaries along with Germany in Europe, and well, Washington trying to find the way to build multilateral (inaudible) in Asia, including ASEAN countries, (inaudible) countries, in terms of projecting or re-projecting U.S. presence in that region.

And, well, I think Asia can be of the (inaudible) and then we shouldn't forget about the importance of coal. Unlike oil and gas, coal reserves are located (inaudible) in many countries, in many regions,

without using effectively the coal they have in Asia or including India, China, and Israel, the future energy markets of Asia will face lots of problems.

Then U.S. and Japan should be proud of having clean coal technologies. We are the leaders, including Japanese makers, like Toshiba, (inaudible) and Mitsubishi. They have very good -- very much advanced clean coal technologies.

I think it is high time to make a good combination, and they can be applied in the U.S. as well. However cheap gas prices have become, coal still accounts for a considerable share of U.S. power mix. We shouldn't forget about it so we can develop coal cooperation, both inside and outside the United States of America.

Well, let me start to talk about the importance of Alaska. Well, actually, Alaska was the first place, which began to export LNG to Japan back in 1969. People tend to forget about it. But as you already saw the slide -- a couple slides behind, Alaska today accounts for only 0.3 percent of Japan's LNG imports.

Well, Alaska has massive amount of oil and gas reserves. They have recently lost -- well, they are starting to lose, correctly speaking, domestic market in the lower 48 because of the (inaudible) relation here, but what is happening in that part of the world, in the north

Pacific west, Russia is trying to project its influence along the Arctic Sea. China just sent an icebreaker to (inaudible). I'm not saying -- I'd like to be careful -- I'm not saying something serious will happen, I don't think it will be the case, so easy, but one thing I can say is, uncertainties are increasing.

Then the question is, Alaska is located at the bridgehead of U.S.-Asian policy. They think it's a good idea to leave the development to Alaska untouched for the decades to come. I don't think so.

Well, this slide shows what's already mentioned, actually, and I think Alaska can be a great example and place where Japan can find new investment opportunities, you know, we can diversify, (inaudible) imports, both of crude oil and LNG (inaudible).

Well, I just got the (inaudible) from the latest version of AEO 2014 and I just (inaudible). Well, since time is limited, I should be brief. What I'd like to say is that, well, I think this is really a sweet spot. Japan-U.S. can do something together. I get the message from this slide that at first (inaudible) the Alaska -- Alaskan hydrocarbon development, business as usual. Private sector has no reason to hurry up because they can make better deals in the lower 48. They have many other places. Alaska, to develop Alaska, you have to overcome tremendous difficulties, environmental questions, they have to find reserves under (inaudible).

How do you get (inaudible). I know that I actually lived in Russia Siberia for three years and (inaudible) Washington, D.C. last Monday and everyone asked me whether, you know, how (inaudible). Well, I just told them, I used to live in a place temperature was much colder than last Monday and Tuesday. I survived.

Well, anyhow, it costs a lot, so someone must make the investment to (inaudible) the development of Alaskan oil and gas potential.

Let me conclude with this slide. Well, I'd like to reemphasize the importance of energy security as a vehicle to improve Japan's energy security condition in terms of redaction of market volatility, diversification of a hydrocarbon supply route, et cetera, and second, once again, when we talk about what is happening in the Pacific dimension against the backdrop of shared (inaudible), we should also talk about security implications of energy cooperation, a project, whatever you call it.

And, lastly, and once again, I think what we are discussing today here is such a good leverage or method to think about what you -- how the U.S. can project or establish its influence in the Asia Pacific meanwhile people are starting to talk about increasing opportunities of energy independence and they're rebalancing to Asia and it is a real (inaudible) for both Washington and Tokyo how we could ever (inaudible) the bilateral tie. We shouldn't forget about that.

No other single alliance has persisted as long as U.S.-Japan alliance (inaudible) speaking, and we have to keep strengthening it for many decades to come. Thank you very much for your attention.

(Applause.)

MR. EBINGER: I want to thank all the panelists for what I thought was an engaging presentation by all of them, but I must say, Shoichi, I think your geopolitical view if the U.S. wishes to pivot to Asia, which supposedly we're already doing, I don't think we've begun to see the opportunities for energy cooperation that you highlighted and you kind of reminded me of Jim Schlesinger many years ago, who I think also had a strategic vision somewhere along the lines you're advocating.

In the interest of saving as much time for the audience as possible, I'm not going to address four points that I have for people to answer, but perhaps some of these issues may come up in the questions answered from the floor.

Mike, I think your presentation was extremely interesting, but it raised in my own mind a vexing question, if it's the U.S. production that has been responsible for keeping oil prices relatively stable, what happens to the unconventional oil and gas revolution if all of the sudden by a wave of the wand or some miraculous event we actually had Iran reenter the family of nations and got western technology in there, somehow we got

Iraq stabilized and the other countries you mentioned, what are the prospects that we could actually see energy prices fall down to a level where they might actually hurt some of the high cost of unconventional oil and gas investments?

And Mr. Muramatsu, you had a very interesting chart on where LNG was coming. I notice that you had a very bullish view of the Canadian situation, which obviously Shoichi would like to see come to fruition as well, but we all know the reality of the Canadian situation is unfortunately still somewhat mired in domestic politics in British Columbia, and I just was wondering, during the questions from the floor, if you might be able to work in some remarks on what you see needs to be done to galvanize Canada.

And Jim, you raised the vexing question of how the international gas market was changing, but I was also wondering if in your view, do you see the Northern Sea route as being a viable opportunity to dramatically cut costs from the European market to the Asian market and might that bring about some narrowing of the overall international gas price, which you tend to be, I think, somewhat skeptical?

And finally, Shoichi, in your remarks, particularly those related to security of supply, I'm always puzzled when Japan talks about security of supply from LNG and you certainly are talking about security of

supply for oil also, and yet with 80 percent of Japan's energy coming from the -- or oil coming from the Middle East and a substantial portion of gas, is it really a diversification of energy sources that Japan is most interested in or is it more a diversification of the location of those supplies?

I was glad to hear you talking about lifting the ban on crude oil from the United States, because clearly that, I think, would be in the great interest, but most importantly, I think, this idea you put forward, and particularly, again, with the changing conditions in the Arctic, the idea that we could well see a Japan-United States-Canadian relationship centered on Alaska and northwestern Canada is an idea, who we may say, whose time has not yet come, but it may not be far away.

So, with those few remarks, let me turn to the floor and we'll take questions. If you would identify yourself and address your question to a particular panelist, that would be appreciated. Any questions from the floor? Surely after those stimulating presentations, we have some questions. Yes, sir. We have a mic coming up.

SPEAKER: Thank you very much. My name is Shinichi Suba with CSS Japan Chair, originally from the Japanese government organization called JETRO. I think this question goes to the speakers from the United States.

Is there any possibility that the law restricting the (inaudible)

LNG export to non-FTA country be repealed or modified in the near future? Because as Mr. Itoh mentioned, some lawmakers are even starting the argument of lifting the ban of U.S. crude oil exports. So, I thought there might be some chance of this argument. Thank you.

MR. JENSEN: Obviously there is a conflict or a debate in the U.S. over whether to permit exports all together, and an industrial group, largely led by Dow Chemical, is saying, let's keep our advantages at home, let's not export. They gradually conceded a level that they could probably live with. We're probably at that level right now, which basically says that maybe we ought to put the lid on the thing after all.

So, the debate has heated up again, no question about that. I know that.

My view is that the DoE is not going to determine how many exports are made from the United States, the market will do it, and my view of the market is that we are pretty close to saturation of what can be bought from the U.S. out to 2025 and so my view is, let it rip, it won't hurt, but that point of view -- there are those who don't agree with that and so obviously it's a source of debate.

I was over at the Department of Energy this morning and that's exactly what they're talking about, so, you know, you can't rule it out, but I would say one other thing, there is another hurtle that has to be

passed, and that's the Federal Energy Regulatory Commission with certificate authority. That's a very complicated adversarial process, can be very time consuming, and you really have to justify you have a serious project to survive. DoE may say yes, FERC may not say yes, and so I think there are limits -- there are natural limits to how fast it will grow.

MR. EBINGER: Mike, do you want to add anything there?

MR. HERBERG: Well, were you talking about the removal of the FTA wrinkle in this? I don't know. I haven't heard any appetite for that discussion. I think -- most of the fire power, I think, is going to go into the discussion about crude oil exports, is the next hot button, I think, and I think it will make the LNG discussion look easy when we start talking about crude oil exports.

MR. EBINGER: If I could follow up on that. Is it your understanding that if the Trans-Pacific Partnership Trade Agreement is implemented that LNG would be included in that, and so de facto we would be lifting the ban with anyone who's part of that agreement?

MR. HERBERG: You know, I'm not a trade lawyer. So, lawyers can make anything look different, but what I was told by somebody was that that's written into the TPA or the agreement, arrangements that would make that a moot point in terms of the LNG.

You know, sharp lawyers can make it sound like it's not an

FTA and we've got more than our share of sharp lawyers, but I think there's something written in this agreement that would actually make that a moot point.

MR. EBINGER: Yes, ma'am, in the middle. Can we get her a mic, please?

MS. CARVOUTH: My name is Reva Carvouth from Georgetown University. I have a two-part question, the first part is for our two distinguished panelists from the U.S. and the second part is for our distinguished panelists from Japan. Okay, the first part, Mexico announced the deregulation of Pemex a couple of weeks ago and at the Atlantic Council the issue of the movement towards a North American energy system was heavily discussed by the American and Mexican panelists.

So, I would like to know how you see the evolution of not just a U.S.-Canadian framework, but a truly North American framework with a lot of opportunity for expanded market growth and supply and how you see that playing out in terms of what's evolving now in the Pacific region, but also globally?

The second part is for our distinguished panelists from Japan. The EU and the U.S. have an energy council, which is very quietly and rapidly working on the evolution of a global market for energy, with

rules, with regulatory standards, and looking to the future when maybe everyone is not cooperative in terms of how markets should be working, you know, how this anarchy in an international system can play out relative to energy and oil and gas. So, I'd like to get your view on how Japan is watching this evolution and where you think this should go. Thank you.

MR. EBINGER: Anybody want to start?

MR. HERBERG: I think the answer on the Mexico-U.S. side is, we already do have a U.S.-Mexico continental marketplace. We export oil products, we export natural gas, we import Mexican crude. The only disconnect there is the investment side. The U.S. -- you know, foreign companies cannot invest, up until now, and we'll wait and see what the rules are for that because there's still a lot to be done.

We can't invest there, they can invest here, so that's the one big barrier. But otherwise, in terms of trade, we essentially have a continental market all the way from Alaska down to, you know, Central America.

MR. JENSEN: I would make a comment that, I mean, it's harder for the international community to invest in Mexico than it is to invest in China or Russia. Essentially Mexico is probably the most retrograde place for foreign investment in oil and gas.

They're in a position right now, watching north of the border, some of the same geology, we are talking about exports, their crude production is going down the tubes very fast and they're importing a lot of natural gas. And finally that is beginning to percolate through and the idea of liberalizing it and taking advantage of international capital and know-how is coming forth.

I think Mexico is going to reverse its bad decline, but it won't be a big exporter, but it will take some of the burden off the import system.

MR. EBINGER: One of you want to start on the Japan question?

MR. MURAMATSU: As for the Trans-Atlantic dialogue on energy between the United States and the European Union, I was once director general of the Moscow office of Japan National Oil Corporation and since that I see the situation in how the European market and the Russian Federation, maybe you know that there is a huge dispute of natural gas export through the pipeline from Russia through the European Union. There is this disruption in the (inaudible).

So, Russian Federation is now looking for the opportunity to export their natural gas as a form of LNG to the Asian-Pacific market, and also the European Union looking for the opportunity to import fossil fuel outside Russia or Middle East. And maybe you know that United States

coalminers are seeking for the opportunity to export cooking coal and thermal coal to the European market. And the LNG exporter (inaudible), they are now planning to export the LNG to British gas and also Freeport LNG is looking for the opportunity to export the LNG to the BP.

So, the energy tie between the U.S. and Europe will contribute to the stability and the security of the European energy situation, so that is a very good idea.

And also now we, the Japanese government, is looking for the dialogue vis-à-vis the Department of Energy. Now the scope of discussion is limited to renewable energy, but I think in the future we will have to discuss some LNG export and the LPG export and also the crude oil export, as they mentioned, and also the nuclear technology, nonproliferation, and other things. I think it's a good idea for the future.

MR. EBINGER: Shoichi, anything to add?

MR. ITOH: Well, actually, (inaudible), so, just a brief point. I think you raise a very important point. I think it's very timely and it's not quite easy to establish some kind of new institution but this is something we have to have (inaudible) and we have some (inaudible). Yeah.

MR. EBINGER: If I may just add, there is a potential downside. If we lifted the ban on crude oil exports because of the configuration of our refineries, you might well see that some of the

Mexican crude that currently comes in the United States would lose a market, and whether that would potential create any rancor in our bilateral relations is at least something to keep in mind.

We've got a question up front if we could have a mic.

MS. MANDEL: Thank you. Jenny Mandel with Energy Wire. I have a question mainly for the Japanese presenters about the LNG buyer's club. So, periodically we hear updates that there are some countries that are working together in Asia to try and increase the market force of the Asian buyer, so I wonder if you could give an update on that and also a bit of a sense of how the competitive pressures between those countries play out versus the collaborative interest in working together on this issue, and what kind of timeline there could be for that group to make a difference in the Asian pricing schemes. Thank you.

MR. MURAMATSU: I'm not familiar with the pricing scheme of the LNG at this moment, but of course maybe now that the Japanese LNG importers are trying to (inaudible) of LNG price formula detached from the Japan Crude Cocktail. As you know, the (inaudible) has already fixed the LNG export price at 50 percent plus of the Henry Hub prices. I think the Japanese buyers are trying to seek this kind of new formula.

But in the future, I think there is a convergence of the price differentials between the LNG linked to the Japan Crude Cocktail and the

LNG price linked to the Henry Hub prices, but we will see.

MR. ITOH: Yes, I come across the same question, you know, (inaudible) is what you call buyer's club has attracted so much attention globally and first it is true that our major LNG consumers, including Japan, ROK, China, India, even Taiwan, you know, sharing the interest in common, to buy cheaper LNG because they are basically buying crude oil (inaudible) LNG, as Jim elaborated already.

And second, having said that, though, it's not easy to come up with something very, very tangible. They have the same goal aim regardless of the fact that, as everyone knows, China, Japan, Korea are facing lots of political tensions, historical problems, et cetera, et cetera, et cetera, when they each come to the specific question of buying cheaper LNG by way of bringing about a change in gas pricing mechanism. They have the same goal, no problem at all to collaborate.

But it's easy to say so, but it's just too early to say when and how we can (inaudible). I think this is the most I can tell this morning.

MR. EBINGER: Jim, did you want to add anything on it? No. We have a question in the back.

MS. BENEDETTO: Hi, Alex Benedatto with SNL Energy. This question, I guess, is more for James. In the U.S., the industry has been generally focused more on East Coast/Gulf Coast LNG export

projects and some say the West Coast LNG export projects have taken a bit of a back seat. But given the global LNG market is going to be driven from Asia, what are your thoughts on the future of these U.S. West Coast LNG export projects?

MR. JENSEN: They're very different. The traditional LNG project is based on stranded gas. Essentially, it is a gas field, wherever found, that does not have a market unless you invest in field development, you invest in the transportation to get it to the coast, the liquefaction plant, the tankers. That's why you have a long-term contract because you're not going to invest in the chain unless you basically know that you've got a market and you've got a reliable price.

As I have indicated, essentially the Gulf Coast projects are very different. All you're investing in, your contract, really is a tolling agreement. Since the gas is going to be there, you don't worry about it. I mean, you don't want the price to go up, but you don't worry about supply, it's a commodity, and so you're investing in a much smaller part of the thing.

Now, when you go to British Columbia, and I'll start there, there is a small pipeline link up to the Montney and the Horn River shales, far too small to support a pipeline down to Kitimat in British Columbia. So, essentially the British Columbia projects are essentially traditional projects

in which you're trying to put enough to justify investment in the field, the pipeline, and everything together, and so they're not going to be very comfortable with the kind of commodity competition I'm talking about.

Now, when you talk about Jordan Cove or LNG or Oregon LNG, you're kind of neither fish nor fowl, you don't have a commodity in Washington and Oregon, you don't have a pipeline linked to the Montney and you may be able to build a pipeline to the Rocky Mountains for some surplus gas, but if that's the case, again, it's a stranded gas project.

So, they're a very different beast and, I mean, I freely confess I'm skeptical about them, but I've been proved wrong on a lot of these judgments and I may be, but remember, they're different.

MR. HERBERG: If you've ever been involved trying to get a big industrial energy project built on the California, Oregon, Washington coast? I have. You know, I mean, I worked trying to get re-gas terminals built a little more than a decade ago. You cannot get something like that permitted, built on the West Coast, or at least it seems almost impossible.

So, whether or not a stranded gas, all these other issues, I don't care what kind of gas you've got, I could go through chapter and verse of different places trying to do this --

MR. EBINGER: I promised Mr. Jensen we'd be out of here at 3:30 since he has a flight, so I think we have time for one more question

perhaps. Right here. From the Russians.

SPEAKER: Well, thank you for your very detailed presentations. My name is (inaudible). I'm from the Russian embassy. And the question, I believe, is mainly for Mr. Herberg. In your presentation you mentioned that quasi-energy self-sufficiency of the United States, and if so, if the United States is enabled to meet its energy demand in the near future, wouldn't that hinder the substantial supplies for potential buyers of energy resources, including Japan? Thank you.

MR. HERBERG: I think what we're talking about is we export light crude, which we have increasingly in surplus, and that we import the heavier grades, which the whole Gulf Coast refining system has spent the last 20 years investing in because that was supposedly the balance of global crude was going to become heavier. So, in any event, we will be a net importer in the U.S. out to 2020 plus, but it's more about allowing the natural trade to operate and has various price effects on products and other things that would actually be very beneficial for U.S. consumers.

But we'll remain a net crude importer for quite a while, but that doesn't negate the value of actually allowing crude exports.

MR. JENSEN: Charlie, you asked one question about the Northern Sea Route.

MR. EBINGER: Yes.

MR. JENSEN: Let me answer that. I've been very interested in trying to figure out the economics of that and I'll tell you, the information is very sparse. But I can tell you, in September you would save 25 cents going the Northern Sea Route from the Yamal Peninsula to Japan versus going through Suez. Having watched a Russian research vessel trapped in Antarctic ice, I don't know what it would cost in January.

MR. EBINGER: Good answer. I want you to join me in thanking all the panelists for --

(Applause.)

MR. EBINGER: And I'd also like to thank Alisa Shackman on my staff because she put a lot of effort getting our speakers here and organizing the program, and all the other Brookings people who have helped with the arrangements. Thank you.

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