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CUBA'S ENERGY FUTURE:

STRATEGIC APPROACHES TO COOPERATION

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P R O C E E D I N G S

MR. PICCONE: Good morning, everyone. Thanks for coming out on Friday morning. I think we'll be getting more people coming in, but we're going to get started on time. So -- because we've got a lot of interesting material to cover. I'm Ted Piccone. I'm a Senior Fellow and Deputy Director for Foreign Policy here at Brookings and I'm very happy to be here today, in particular, because this is a culmination of a lot of work that's been happening here at Brookings and with our colleagues on Cuba. And looking at various facets of U.S. policy toward Cuba and as things change in both countries, slowly as that may be, what are the pros and cons of various strategies of normalization, of engagement and how would that proceed. So we began a project over two years ago that was run by Carlos Pascual, who was then the Director for Foreign Policy here -- he is now our U.S. Ambassador in Mexico -- and Vicki Huddleston, who had run the U.S. Interests Section in Cuba and is now a senior official at the Pentagon, to look very intensively at U.S.-Cuba relations and looking at it from different vantage points. We did a series of simulations to get a new way of looking at the different dynamics going on on the island and what might happen in the future. And we came to -- the group came to some consensus on a set of recommendations for short, medium and long-term steps that the new administration -- whoever that might be -- could take to normalize relations.

We were, in that process, accompanied by a group of experts and Jorge Piñon was one of those experts who participated in those simulations and I'm happy to have him back here today. Along the way, there were some conversations about the importance of energy in this equation and Jonathan Benjamin-Alvarado approached Carlos and Vicki and suggested that this would be a good area to work on together with Brookings. And that work evolved into a book, which you saw when you came in, *Cuba's Energy Future: Strategic Approaches to Cooperation*, which we're very happy to be launching today in this discussion.

As you all know, because of your interest in Cuba for being here, this is a particularly interesting moment to be talking about this subject. You know, energy demand is an important security issue for all countries, but it's proceeding in interesting ways in Cuba in particular. And as they proceed with further exploratory drilling off their coastline and in the wake of the Gulf oil spill that we saw happen earlier this summer on the BP well, we know that there are some very scary scenarios out there of what might happen as this project proceeds. And so we're going to be talking about that as well today. Let me quickly introduce our panelists and then we'll proceed with a series of presentations and open it up for questions and answers from the audience. As I mentioned, Dr. Jonathan Benjamin-Alvarado is here as the Editor of the book. He's an Associate Professor of Political Science at

the University of Nebraska-Omaha and a Senior Research Associate with the University of Georgia, Center for International Trade and Security. He specializes on Latin-American economic development and security affairs and has done some in-depth research on Cuba's energy situation including its capability on nuclear energy. He's also been very involved in the American Political Science Association as a Past-President of the Latino Caucus with APSA. We're then going to hear from Jorge Piñon, who is Visiting Research Fellow with Florida International University's Latin-America and Caribbean Center and its Cuban Research Institute. Jorge was born in Cuba and has had a long career in the energy sector in the Americas as an executive with Shell Oil Company, with Amoco Corporation and including as President of Amoco Oil de México and President of Amoco Oil Latin America. We are then going to hear from Juan Belt. Juan Belt is a Director at Chemonics International and recently retired from USAID where he held senior economist and manager positions for more than 20 years. His last posting was Director of the Infrastructure and Engineering Office at USAID, so he had responsibility for a big portfolio including energy, as well as information and communications technology. He spent several years as Principal Economist of the Finance and Infrastructure Office at the Inter-American Development Bank, so has seen issues of infrastructure and financial sector reforms throughout the region and at AID he also focused, in

particular, on Panama, Costa Rica, El Salvador, Haiti, Guatemala. We have a great expert with us with great regional expertise. And then we're going to hear from Dan Whittle and I'm very happy that Dan and the Environmental Defense Fund is here today as a co-sponsor of the event. Dan is the Director of the Cuba Program at Environmental Defense Fund and a Senior Attorney there with deep experience in environmental and natural resources law and policy, conservation of ecosystems, marine fisheries, water quality, etc. Notably, Dan has been working directly with Cuban scientists, lawyers and policymakers to develop and promote environmental conservation and protection strategies for marine ecosystems and he's the author or co-author of several publications on Cuba. So, thank you for joining us and I'm going to turn the podium over to Jonathan.

MR. ALVARADO: Alright, thank you, Dean. I'm going to just remain -- I mean, Ted. I'm going to remain sitting.

MR. PICCONE: Sure.

MR. ALVARADO: This book came about out of conversations that began about six years ago at the Association for the Study of the Cuban Economy meetings down in Miami, where myself and the co-authors of this book were put on a panel. And I think the questions that we had were relevant then. They're relevant now. And so just let me launch into kind of what the premise of the book is. First and foremost, what we thought and

sought to do was to assess and to evaluate, you know, the extent to which, you know, these off-shore oil reserves might have for change in Cuba -- both in terms of its economic well-being, but also in terms of the political implications of what that might garner for the Cuban government. And in looking at it from the perspective of what Brookings wanted as well, we were concerned very much with the United States energy security issues and concerns and as well as Cuba's energy future and thus the title. The relevant questions that we had coming from that discussion was that would the United States be willing to sit on the sidelines if Cuba were indeed able to tap into their reserve and begin to actually produce oil? And how would that fit into a more comprehensive regional energy security strategy -- not only for the United States, but also for Cuba? And one of my colleagues will talk a little bit to that in a few minutes. So some of the questions that we had animating that discussion also focused on if indeed there is oil in Cuba, if there is an opportunity for the United States, what could that kind of cooperation look like? What could we hope to gain from engaging Cuba in this particular area? You know, knowing the history between the United States and Cuba, obviously any kind of confidence-building measures between the two countries would be a good first step. But also we wanted to look at it from the extent to which Cuba might be able to also more successfully exploit its incredible human capital potential and capability as a

consequence of drilling oil. Specific to Cuba, what we wanted to know was what would oil bring to Cuba? Could it provide it with energy sustainability being it had been chronically, you know, dependent upon oil imports going all the way back to the cold war period? You know, would it be dependent on what type of government Cuba has in order for it to effectively and efficiently develop these resources should it come to that? And, if the Cuban record is any indication of perhaps their ability to develop it, would past be prologue in the same way that that the stop and -- stop and start nature of its nuclear ventures and other types of energy development schemes that have been unveiled in the island over the course of the past 50 years or so? Specific to the United States, what we were concerned with and what we wanted to look at -- could Cuba become part of a strategic energy policy for the United States? And I'll just kind of begin with a little bit of a scenario, you know. Hurricane Rita hit the Houston ship channel in 2005. It wasn't a direct hit. It merely glanced it. But it took a few oil refineries off-line and anybody living in the southeastern United States at that time understood full well what a disruption in energy supply to the United States -- even at that small scale -- would bring in terms of prices and supply to the market. What if it would have been a direct hit? What would have been the implications? And so we wanted to explore the possibility that Cuba might indeed be able to kind of take up some of that slack in terms of a diversification of energy

resources within the region. Not just in Cuba. Not just in the United States. We are also concerned when this would all take place. You know, the -- we're optimistically thinking that any time between three and five years after, you know, there is a verified oil find in the Gulf that Cuba would have actually this on-line and be able to produce and put it into the market. Would it be done under the auspices of the Castro government or would it be some successor regime? Would it be before or after an embargo with Cuba is lifted? And so these were all very relevant considerations as we went through. Some of the assumptions that we make, and my colleagues will speak to them, are what are the specific elements that we're talking about? What is the actual supply? What does Cuba have available to it in the market? One of my other colleagues will explore what alternatives of scenarios might there be for developments in the infrastructure. I will just state that the infrastructure in Cuba, across the board, is anywhere between 30 and 80 years old. It needs to be replaced in all particular sectors of the economy, but in this particular instance, in the energy sector. What would be the future demand curves in Cuba if indeed it brings oil on-line and we began to see some economic growth in that particular direction? What we did at the end of the book was with this evidence, we put together a set of recommendations specifically targeting the area in terms of confidence-building measures, the ability of Cuba to exploit human capital, the extent to

which there can be technology transfer to assist Cuba in its endeavor here, whether or not we could also transfer project management capacity to Cuba. I mean, my experience in looking at the nuclear project was one of the major failings of this -- was the lack of project management capacity on the part of the Cubans in order to effectively move the projects forward. What would be the levels -- requisite levels -- of investment needed in Cuba in order to make this become a reality? What kind of diversification in terms of regional energy sources could be garnered as a consequence of engagement with Cuba in this particular area? And we end with the possibility that Cuba might become an energy *entrepôt* -- a weigh station of sorts -- where Cuba could successfully be a point of transshipment storage and refinement of oil resources in the region. And so with that, I'll turn it over to my colleague, Juan -- I mean Jorge Piñon. Yeah. You have to unhook yourself.

MR. PIÑON: Disconnected myself.

SPEAKER: We need the screen for the top of the slide show.

SPEAKER: Yeah. I got it.

MR. PIÑON: You know, the problem with writing a book is that as soon as you send it to the publisher, the world in front of you and all the facts change. So, right away, we're ready for a second edition of *Cuba's Energy Future* since things are changing so fast. What I would like to do, really, I would like to go over five facts or five issues that have come to light

in the last few months and I don't think that we can have a debate and a conversation if we really don't have the five -- the facts and happenings in front of us to be as transparent as we can. So, the first question that I have faced in the last few months is, is there oil in Cuba? I mean a very simply question. All that I can share with you is that according to the U.S., yes. And that is the only hard geological data that we have in the public domain. According to the USGS, there is somewhere around five billion barrels of undiscovered liquid reserves in Cuba's North Belt Thrust. Now, that is the area just around the Florida Straits and along the north coast of western Cuba. The USGS does not address any oil in the deep waters Gulf of Mexico and in the Eastern Gap, which as you know Cuba eventually will have a piece of the Eastern Gap. So, again, the numbers that the USGS puts forward -- the five billion barrels of undiscovered liquid reserves, is only in the North Belt Thrust of Cuba. When we talked to our Cuban counterparts and they add the deep waters -- the real deep waters of the Gulf of Mexico including the Eastern Gap -- their number then increases by about 10 to 12 billion barrels. But, again, I think right now, the only number that we have to rely in front of us is the USGS number. There's a couple of other facts that are very important. And that is that, as you remember, Repsol did drill a well back in July of 2004. And even though they did not hit the reservoir, the core sample of that well was very positive. Positive enough that Statoil

Norsk Hydro, which as you know is Norway's most important oil company, bought 30 percent of that concession. Also, Repsol has stayed in Cuba. I mean, Repsol has spent easily over $100 million in Cuba today, including the drilling of the Yamagua Well in July of '04. As a former oil man, I'll tell you that we just don't hang around a country because we happen to like that country. We hang around a country because there is economic potential for some benefit there. So, the fact that the USGS -- the USGS number has certain validity. The fact that major oil companies are still in Cuba today, what we consider for actual business and economic reasons -- not for political reasons. And the fact that now they are about to drill another well -- actually seven prospects on the island indicate to us that the potential for hydrocarbo in Cuba is over P50. In other words, there is a probability of more than 50 percent for us to find oil in Cuba. You're going to find folks that will say, well, that's heavy oil. Trust me, in today's market, whether it's heavy or light oil is good news. So, yes. I personally think that there is a very high probability that we are going to find considerable oil reserves in Cuba. By the way, countries like Argentina and Columbia, their proven reserves are somewhere in the neighborhood of between four and five billion barrels. The second discussion that we hear, particularly here in Washington, is Cuba's right to drill in its own EEC. I mean, I'm sorry, but Cuba is a sovereign country and Cuba has every right to drill with its

economic exclusive some. The issue at hand is the demarcation line. As you know, the Cuban Maritime Border Agreement was reached during the Carter Administration in 1977. But it was never ratified by the Senate. So there are folks in Washington that say well, we ought to rescind that agreement. Fine. All that that agreement does is the demarcation line. So that means that within that demarcation line, Cuba, again, as a sovereign country, has the right under the United Nation's law of the sea exploit its natural resources. The issue then comes is the argument that Cuba should not be -- should be drilling, then I believe that those that said that ought to apply also their position to Mexico. They should also apply their position to the Bahamas, who is about to drill in their waters. They ought to apply that position to the Canadians who are drilling off Sable Island off the coast of Maine. So I think we have to be very careful when we go around saying that Cuba doesn't have any right to drill in their own waters when other countries around us are doing so, and when we, in the United States, are doing so in the Gulf Coast putting actually in jeopardy also the environmental and the ecological arena of our neighbor countries. A third topic is Cupet's experience. Well, you know, the Cubans don't know how to drill in deep waters. Well, that is true. Cuba doesn't have any technical and operational experience in deep water drilling. But the Cubans are not the ones -- Cupet is not the one going to do the drilling. It's going to be Repsol and Norsk

Hydro and those type of companies that do have the expertise to drill in deep waters. The Cubans, over the last 10 years, have gained vast amount of expertise, particularly in horizontal drilling, and because of their heavy oil reservoirs of the north coast. So the Cubans do have expertise. Do they have expertise in deep water drilling? No, they do not. But, again, that's going to be an area that is going to be covered by companies like Repsol and Statoil Norsk Hydro. Repsol, by the way as you know, is very active in the U.S. Gulf of Mexico. Late last year, Repsol just finished the Buckskin Project about 180 miles south of Houston and that project was a 28,000 feet depth project. So, Repsol and, of course, the Norwegians have the expertise to drill. The fourth fact that I want to clarify is the talk about the Scarabeo 9 that we have all heard recently. The Scarabeo 9 is a semisubmersible that is on its way to Cuba. It's actually now on its way from China to Singapore to finish some electronic work and then eventually from Singapore, it will move into Cuban waters we hope sometime in the first quarter. The Scarabeo 9 is a six generation rig. The Scarabeo 9 is Norwegian design -- is owned now by Saipem, who is a division of Eni, the Italian oil company. She can drill at about 12,000 feet of water -- total water depth. I mean total reservoir depth of about 30,000 feet. She can withstand winds of over 100 knots. This semisubmersible -- and I'm not an engineer, but it gets me excited because it's a semisubmersible that has DP3, which is

a positioning device that when she's anchored, there's no anchor to this semisubmersible. This semisubmersible is actually guided by satellites and she has a number of engines and propellers underneath and that keeps her right on top of that reservoir. So it's an unbelievable piece of equipment. Also from the environmental and risk point of view, in the case of a hurricane, it's very easily for the Scarabeo 9 to move out of the way, let the hurricane go by and then come back to its position. Scarabeo 9 has room for 200 people -- 200 experts on her. It's regrettably that there won't be American oil workers on that. There will be mostly workers from the UK and Norway operating on the Scarabeo 9. But, again, no problem with the Scarabeo 9. Two last point -- Cuba's economic benefit. I mean, do we hear a lot of discussions of Cuba's energy independence and the impact -- the political impact, the political ramifications that it could have? I believe that every country has the right to be energy independent. Just like we do, there's no reason why Cuba cannot become energy independent. In fact, I will argue -- and I'm not a political scientist -- but I will argue that for a country to be politically mature, it cannot have any type of economic dependency on a third party. We know the Cuban experience during the period of the Soviet Union and the collapse of the Soviet Union in 1991 when they were relying on Soviet oil. Certainly, we do not want that for Cuba again. So I think that energy independent -- not only from the

economic point of view, but also from the political point of view -- is extremely important for Cuba. Remember that these agreements are a 60/40 agreement. Cuba's production sharing contract agreements are 60/40. In other words, 60 percent goes to the state, 40 percent goes to the partner. They do have the option of right of first refusal. In other words, the partner has the right to export his 40 percent equity oil, but first Cuba has the right to buy that 40 percent from the partner if it wishes to do so. So, the timeline that I'm running on this is that it will take anywhere for Cuba between three to five years to fully develop all of its North Cuba Belt Thrust. And Cuba will have to be producing in excess of 200,000 barrels a day in order for get -- in order for it to get the same economic benefit that it gets today from the 93,000 barrels a day that it gets from Venezuela. So in other words, there won't be an economic bonanza for Cuba because all that it will be doing is will be replacing one barrel at a time that it gets from Venezuela. Ron is not here today with us -- Ron Solego from the University of Rice that wrote another chapter on this book. But also let me tell you that Rice University has run scenarios that in the future, under a different economic system than Cuba has today, Cuba's demand -- which today is about 150,000 barrels a day -- could double to 300,000 a day. So those of you that -- or those of us that believe that Cuba has the potential to be a net exporter of oil, if Cuba's economy rebounds, and Cuba economy becomes a

real economic engine in the Caribbean basin, Cuba's oil demand could certainly double to 300,000 barrels a day. And last is the environmental issue. Again, I'm an oil man. So, I am one of those that over the 32 years that I spent in the industry, learned early on that my business is inherently a high risk business. Whether it is drilling, whether it is refining -- we know about Texas City. Whether it is transshipment -- we know about the Exxon Valdez. Whether it is moving gasoline form Port Everglades to Miami service station -- we know about the accident that happened there about four years ago when a gasoline truck overturned and a family of four were killed. So I am the first one to recognize and bring before you that the oil industry -- whether we like it or not -- is inherently a high risk enterprise. And what I learned over my 32 year career is that while we have to do -- I guess not necessarily the CEO of the oil companies, but every single employee that works for an oil company -- is to have a conscious of an environmental concern and a conscious in which we have to act responsible at every level of the corporation. We need to establish with Cuba today an agreement similar to the one that we have with Mexico, which is the MEXUS Program, which is a set of protocols between the two countries of what to do in the case of a national emergency, in the case of a major catastrophic oil spill. Dan is going to talk and address more of that issue, but I want to tell you that it is imperative for the government of Cuba and for the government of the

United States to have that set of rules of what to do -- particularly now after the deep water horizon. The lessons that we have learned out of the deep water horizons are lessons that we need to be transferring actually to our MEXUS Program, which is with Mexico -- between the United States and Mexico -- and with Cuba. Last, the issue of a general license. Every single piece of equipment that goes to Cuba cannot be of American made. If tomorrow there is an emergency in Cuba, international oil companies operating in Cuba do not have access to any type of equipment from the U.S. They cannot pick up the phone and call Houston and ask for whatever help they need in order to manage an oil spill. Our friends at the State Department, which by the way are working on these issues, will say, well -- and the Treasury Department -- will say you can apply for a license. Trust me, in the case of an emergency, that particular piece of equipment that is needed -- we don't know where it's going to be, we don't know who's inventory it's going to be, we don't know in what warehouse it's going to be. And what if that particular company did not apply for a license a year ago? So I think that it is very important on the environmental arena two things -- that the United States and Cuba sit down for a set of protocols of how to behave and how to cooperate in the case of an emergency. And I think that it is very important for the United States to issue a general license only in the case of a major catastrophic spill so that the international oil companies

operating in Cuba can access the technology that eventually is going to protect not only Cuban waters that is important, but that it is also going to protect South Florida. Thank you.

MR. PICCONE: Juan.

MR. BELT: Thank you very much. I will talk about the electricity sector or the electric power sector of Cuba. It's related because, of course, the main input into the electricity sector is actually oil. Cuba relies on liquid fuels. It's among the two or three countries in the world that produces a higher proportion of electricity using liquid fuels. I will talk about first a disclaimer coming from our legal department. These are not the opinions of my present employer, Chemonics, or of USAID. And I wrote this paper when I was still a U.S. government employee. I will talk basically about four or five subjects. One I will talk about data, which was a problem in this paper, because data for the electric power company of Cuba is not readily available. I will talk about a mythological issue, the issue of the exchange rate, how to convert dollars into Pecos or vice versa. I will talk about the results of the financial analysis I did using data from many sources. I will talk about the results of a modeling exercise using a model called Markel-Times, which is like the standard for doing this type of work. And then I will talk about the future -- how could the electric power sector of Cuba become more efficient? And, finally, I will talk about some possible

areas of cooperation between Cuba and the U.S. And when I say the U.S. government is not responsible for these opinions, when I wrote the paper, it was really not so much U.S. policy to cooperate with Cuba, but I think things are changing now -- hopefully. In terms of data, there's not sort of readily available data on the balance sheet or the income statement of the power company of Cuba or PDVSA, the company in Venezuela which is the main provider of oil to Cuba. So the two big parts of the puzzle were not available. So basically I used data -- official data -- then there's a Cuban engineer called Manuel Cereijo, who has done a lot of work on the Cuban electricity sector, and he had access to about 10 Cuban-American engineers who work for Florida Power and Light. So he -- they had left Cuba within the last 10 years. And then I have been in many panels with Jorge and Jonathan and Ron Solego, so this is a project that has been going on for years. So a lot of my data also comes from Jorge. But the thing I know we know about the seven big plants in Cuba and then the engineering relationships -- if you put oil, you get so many kilowatts out -- are sort of fairly fixed. So I tried to do work on Cuba on the fiscal area and I really could get nowhere. But in this case, because I checked this data from different sides, I believe that I have as good a set of data as possible without having the balance sheets of the two key companies. Now there's a huge mythological issue is how to covert Pecos to dollars or dollars to Pecos, because as you

know the official exchange rate is roughly one to one. And then there's a parallel rate of 23 to one. And it really bothers me when I hear people say Cuban doctors make $15 because they divide their salary by 23. It's really not possible for people to live. If we were to use that 23 exchange rate and convert Cuba's GDP into dollars, it will mean Cuba will be the poorest country in the world. Poorer than Congo -- than Congo -- or it's income will be half of Liberia, a country I know very well and I know the income of Cuba is not half the income of Liberia because I have been to both places. So, so then because I cannot really know -- I know it's not one. I know it's not 23. In my analysis, I sort of use one. I use one point 25. I go up to two, which I believe is the limit of what it would be comparing real income in Cuba and real income in another place. So when I -- basically the way this works is a type of barter. The whole system, in a sense, if you think about the old things we used to study about rum and molasses and colonial U.S., it's a little bit the same. Cuba sends doctors and teachers to Venezuela. Venezuela, in turn, sends oil to Cuba and then Cuba gets this oil, which is roughly -- well, he said it's roughly, let's say, 100,000 barrels a day -- 35 million barrels per year. And about half of that goes to the oil sector and about half of that goes to the transport and the industrial sector. So the part that goes into the -- into the Cuban electricity sector, it gets converted into kilowatts and sold to people. And, basically, if I -- if I were to apply a price, I

know the workers in Cuba -- I know a lot about the -- about the system. So if I were to put international prices on the oil, the Cuban power company would have a negative cash flow. So it would not be able to be -- not only not pay for capital, but it would not meet its cash flow. But if I put a price of zero to this oil, which is what a lot of people say, there's some controversy whether Cuba actually pays Venezuela 60 percent and 40 percent is a loan or it's 50/50. That's what is in the official agreements. But what a lot of people believe is that Cuba doesn't really pay Venezuela. So once you do all this trading of people, doctors and then oil comes in. It gets converted into kilowatt hours. If they don't pay anything, actually Cuba gets $2.5 billion a year out of this deal. And that's the way Cuba monetizes its oil. So that's how these exchanges of people for oil and so on -- that's how they come into dollars. So -- and because there's so much uncertainty with the data, I do a lot of sensitivity analysis and, of course, I -- the two most important variables that effect my results are the price of oil -- so I have the results as a function obviously if oil is $60, $70, $80, $100. But the other very important factor is what is the exchange rate? And if the exchange rate is one, it's one result. If it's two, it's worse. And it's worse because Cuba -- some of the sales to the Cuban electricity company are in dollars because to foreign companies require them to pay in dollars. But that's a very small proportion of its income. But if you look at the cost side, about 50 percent is

really oil. So anything that makes oil more expensive, makes the company significantly worse. So, then I decided to see -- at one point, I was in AID -- head of this infrastructure office and trying to think about how to help countries develop low emission strategies (inaudible). And so I tried to look at different models that were out there and eventually I identified the one called Markel-Times. This is a very well accepted model. It started at Brookhaven National Labs and it started after the oil crisis in the '70s. It started initially as an accounting model to do the energy balance of a particular country. But now it's an optimization model. It allows you to look -- I only look -- used a partial part of the model because this model essentially you look at primary sources of energy like oil, gas, uranium. Then look how it gets transformed by refineries, power plants. And then you look at the final uses by consumers in their households, the transport sector, the electricity sector and the industrial sector. Allows you to make sure that you did the accounting right, but also allows you to say, okay, if we want to reduce emissions, how should you do it? It shouldn't be in the transport sector. It should be in the power sector. So it's used quite a bit in the U.S. to evaluate issues of the climate bill and so on. So we ran this model for Cuba using -- I work with some very competent modelers. In fact, one of them, Gary Goldstein, was the one who developed the model or one of the developers of the model at Brookhaven. And so we ran the model and the model came

with a solution saying Cuba -- if Cuba were paying international prices for its oil, it should convert the seven huge dinosaur plants that came from the Soviet Block into gas, fire combined cycle plants. And then I got worried because I've been a modeler at different times in my life and when you get such an extreme solution, you always worry. And when I had done back of the envelope calculations, I thought maybe coal would be a better option. Not cleaner, but maybe cheaper. But, in fact, it's gas what predominates and the people have looked at the model, have been presented at the annual conference where all the people who do this modeling and also has been published by a magazine -- a journal that is sort of energy polices quite tied to the people who do the modeling. So it's -- I think the results of the model are pretty robust. And then what made me happy about this is I have a friend from -- in a Canadian engineering company and told me the Cuban government had approached them to design a regasification facility for the borders in Cienfuegos. So it does seem the Cuban modelers using Markel, using whatever model were also thinking that the solution is really to reconvert to a gas system. But this, of course, will cost about $2.5 billion. So when we do the modeling, we constrain because we know Cuba, in present circumstances or even future circumstances, it is very difficult to get $2.5 billion. So we do this sort of more slowly than you would do if you have the money. And so, obviously, to do that it's something that should be done

with foreign direct investment and to get foreign direct investment, you have to have good set of rules, good laws to give people confidence to make these long term investments. Now there's a lot of experience. I have worked on power sector reform in many countries and if you do things right, actually investors do come and invest. Cuba, by the way, has had a lot of private investment in infrastructure and then I think of the American Society in New York a few months ago I said that -- they misinterpreted me because I said Cuba has more private participation in infrastructure than Costa Rica and then somebody quoted me saying the investment climate in Cuba is better than in Costa Rica. That's not what I said at all, so don't say -- please don't tell anyone I said that. But the fact is that Cuba has a privately owned or mostly privately owned telephone company. It has independent power producers selling electricity to the state-owned company. And finally has -- I was in Barcelona and I was in Valencia helping manage a concession in Havana, but also Cuba already -- even though it's, you know, very much of a socialist country, has allowed private participation in infrastructure. But it has been very murky. I mean we don't know exactly the terms of the sale, although the phone company, first it went to a Mexican group and then now it's in the hands of Italians. I had worked a lot when I was in Barcelona in the past in different projects and I was unable to get the contract from them even though I know them personally. And other people -- the person who

works for me has worked with them even more and he was unable to get the contract. So, obviously, if you really want to get $2.5 billion in investment, you really need to have a more transparent system to promote it and I hope I'm within time.

MR. PICCONE: Yeah. Thank you very much. Thank you. Dan.

MR. WHITTLE: Thank you. The question I would like to pose today -- I'll take a somewhat different tack here and would like to ask whether energy development in Cuba is a door opener to U.S.-Cuba cooperation on the environment. Now I should mention that in April, 2009, Brookings hosted a panel on U.S.-Cuba Cooperation on Marine and Coastal Ecosystems and since then the Environmental Defense Fund has been working with both the U.S. and Cuba side to facilitate greater dialog, greater scientific exchange and we hope ultimately cooperation between the governments on environmental protection. Now the BP oil spill suddenly changed the playing field and -- in several ways, but the sort of positive side of that is it underscored the importance of working together on the environment. So, today I'd like to speak on the environmental issues -- some of the environmental issues -- associated with energy development, the benefits of dialog and cooperation, mechanisms for cooperation and a few next steps perhaps. So starting with environmental issues, you know, I

first would like to say that Cuba has had an energy crisis for the last 20 years and over the last five or six years has engaged in what they call the Energy Revolution. The cornerstone of that revolution is energy efficiency. I've been in Havana many times and have seen trucks haul away these 1950s refrigerators and replace them with much more energy efficient Chinese models. So they've had a really remarkable success in reducing energy demand through conservation. But they've also been making good progress on wind, solar, biomass, biofuels, biogas and even geothermal. One area that I think Cuba has the potential to excel in is ocean energy. Cuba is ocean energy rich and not just on oil and gas, but also on current energy and OTEC -- ocean thermal energy conversion. In 2008, Environmental Defense Fund participated in an international ocean energy conference in Matanzas and the potential is quite -- quite big. One of the principal questions I have is whether off-shore oil and gas success in Cuba will prompt the country to move away from its efforts to develop clean and green energy. And hopefully it will not. Cuba clearly needs the oil. It's important to their short-term economic strategy. A lasting energy strategy, I think, will depend upon a commitment to a diverse energy portfolio and a commitment to clean energy. Exploration and development, as Jorge mentioned, is inherently risky. Cuba's northwest coast -- you can see it up there -- is extremely rich in biodiversity, is home to very important but

vulnerable coral reefs, sea grass beds and mangroves that are extremely important nursery areas for fish and other marine life. So siting will be extremely important -- to get it right, to make sure that these facilities, both off-shore and on-shore, are put in the right place. So even before we start talking about spills, it's important to make sure development is done correctly. Cuba has a good NEPA law, meaning they have a law that requires environmental impact statements be done. The Ministry of Environment is currently as we speak revising its environmental rules with respect to off-shore oil and gas. I have not seen them, but I've been told that they are trying to learn a few lessons from our experience this summer. Cuba's northwest coast was threatened this summer. Early on there were indications from the model that the current would pull the oil directly to the northwest coast, which is again extremely important from the biodiversity point of view. They were also concerned with their tourism beaches in the sort of central part of the country as well. So the economic and environmental impacts potentially could have been very big. Cuba took the threat seriously. They had a national task force headed up by the Ministry of Civil Defense. Many of my colleagues with the Ministry of Environment were involved in doing modeling and they also invited the U.N., the International Marine Maritime Organization to come and do an assessment of their response capability. So they -- they were prepared and quite relieved when

the BP oil spill did not hit Cuban shores. If Cuba has a spill, then it will most likely threaten its own resources -- the same resources we just talked about -- as well as Florida. Any way you look at it the Gulf current will pull Cuban oil up to the Florida Keys. The Florida Keys National Marine Sanctuary is home to perhaps the most important coral reef in the United States. That would be directly in its path. There's also a newly discovered deep water coral reef ecosystem smack dab in the middle of the Florida Straits. I believe that Cuba has the incentive to get it right. Its economic future is at stake. It clearly has some significant environmental interests at stake. I should also mention that most of that coastline there on the north is chalk full of national parks, wildlife refuges and other marine protected areas. So they're taking seriously the, you know, the challenge to protect what they've got. Oil and gas poses threats that they've never experienced before. And I also believe, in talking to my Cuban colleagues, that they want to avoid the political ramifications that would come with any accident. So they are extremely eager to do it right and to learn from our mistakes and to cooperate with the United States. At its core, the BP oil spill was a dramatic failure of policy and the lessons learned from BP can be extremely important to policymakers in Cuba. So I believe dialog and cooperation is possible and clearly in the best interest of both countries. As a previous speaker said, it's like energy cooperation. It's a way to develop confidence-building

measures and engagement. I like to call it a bridge to improved relations in the long run. The Foundation is there. NOAA has been working the Cuban's for almost 50 years on hurricane preparation and natural disasters. Over the last three years, there has been a tri-national -- U.S., Mexico and Cuba -- initiative on marine conservation in the Gulf of Mexico and western Caribbean and numerous efforts by Environmental Defense Fund and other scientific and conservation organizations to work directly with Cuban scientists and policymakers on environmental protection. If framed as an environmental issue, initially, I think we can approach this in a way that's less complex and less political. It's clearly in our benefit to -- in our interest to protect the resources of south Florida. Cuban oil could even head up to North Carolina, where I am. So, clearly it's in our environmental and economic interest to protect our environment. That could, again, build the bridge to a more serious discussion on true energy cooperation. You know, I commend the State Department for taking a pragmatic approach during the BP disaster. They sent a diplomatic note to the Cuban Foreign Ministry offering information and assistance. OFAC also issued a license to the Drilling Contractors Association to make an initial trip to Cuba to begin exploring avenues for cooperation. I also know that there's extreme interest within the federal agencies, the resource agencies, to work with Cuban partners. It's a pent-up interest that's been there for years and there's hope

that they can finally act upon it. And then finally the U.S. Coast Guard has signaled recently that, you know, they would -- they would like to have a bilateral agreement like they have with Mexico -- MEXUS -- which addresses response to oil spills. There are several international mechanisms that exist. The Cartagena Convention -- both Cuba and the U.S. are members. The United Nations Environmental Program is very eager to facilitate dialog between the U.S. and Cuba on this issue -- not just our two countries, but the Bahamas and Mexico as well. So, let me just jump to next steps. We also, I should add, that Environmental Defense Fund has been promoting scientific exchange. And one way we've done that is to -- is to encourage the State Department to issue visas to Cuban scientists and environmental officials -- something that just simply wasn't done before 2009, or at least for the last six or seven years. And I commend the State Department for bending over backwards to issue visas. Two weeks ago, we had 17 Cubans visit south Florida for a workshop on the Gulf of Mexico and Western Caribbean. And we just simply couldn't do that before. So that's also -- that scientific exchange, you know, also helps build the bridge for greater dialog and cooperation. So, next steps. You know, I think it's imperative that the U.S. and Cuba government agencies get together to discuss lessons learned. Again, BP was a policy failure. Cuba can benefit from learning lessons from that to make sure they have a sufficient regulatory framework

in place and to fill in gaps they have with contingency planning and response capability, etc. Ultimately, I'd like to see a region-wide environmental assessment done. If they do develop oil and gas in Cuba, it would be good to know upfront what the potential impacts would be downstream. Also, the Brookings Institution published a report in May with a series of recommendations on how to improve licensing to facilitate U.S. participation in helping Cubans respond to an oil spill. And ultimately I would love to see U.S. policy that results in cooperation on green energy -- brings the two countries together so that the Cuban and the U.S. could work together on wind, ocean energy, etc. Great. Thank you.

MR. PICCONE: Thank you very much. Thank you, Dan, and to all of our panelists. And we'll do a round of questions and I just wanted to take the prerogative of the chair to pose something that tries to integrate some of the points that were made. It seems to me that, you know, the United States has been at a real disadvantage in this -- in this situation. We have a hard time getting data. We're just now beginning discussions with Cuban scientists after many, many years of lack of information and dialog. It's, you know, you talked about the pent-up demand within U.S. agencies for this kind of cooperation. On the micro-level, there are some steps happening in the right direction. But, unfortunately, on the macro-level, it seems that we're going nowhere, frankly, in terms of U.S. policy approach.

The President just recently, in this past week, again reiterated that Cuba -- we're looking for more from Cuba. We're looking for more serious steps than what they have done in the past several months -- even though several people thought this was really a great opportunity in light of their release of political prisoners, the announcements on economic reforms -- but still not enough. So, one of my questions as it relates to the energy situation is particularly as we see the kinds of companies, the kinds of countries that are involved in that exploration -- from India, Norway, Brazil, around the world -- has the U.S. just lost the game? Are we no longer able to gain -- to catch up to where other countries in their energy relations with Cuba? And then related to that, any thoughts on a little more on the relationship between Cuba and Venezuela? Given how advantageous it is for Havana to maintain that kind of relationship with Caracas, and as long as President Chavez is able to control the levers of power in Venezuela, what incentive does Cuba have really to change that relationship -- at least obviously in the short term? So, I just wanted to open that up and we can come through and if you all have any other comments along the way.

MR. PIÑON: I'll let you talk about Cuba and Venezuela. Do you want to pick that one up or?

MR. ALVARADO: Well, let me just begin by making a statement. One of the things that has been apparent over the past 10 years

in talking with Cuban officials -- and both Jorge and I have had extensive opportunities to speak directly with planning officials, officials within the ministry of basic industry and the Cupet leadership -- is that their preferred partner is the United States. Their preferred access to technology is, you know, is top-shelf U.S., deep water exploration technologies. That being stated, you know, it's very frustrating for them and it certainly increased the cost of their operations by having to triangulate and, you know, to get replacement parts from places like France or Great Britain as opposed to, you know, one phone call away and overnight shipping from Houston for some of the replacement parts for things that are essential to that particular industry. And I think that should be, you know, said up front. Now, the relationship with Venezuela is very interesting. And one of the things I think we have to balance this with is that, yes, Cuba receives a lion's share of its fossil fuels in terms for transportation and for energy generation. What they produce themselves, it's about 50 -- 60,000 barrels a day is primarily for industrial uses. So their life blood is still contingent upon a relationship with Venezuela. I believe that the Cubans would prefer that it not be that way. I think that they are looking for a more stable source. I think that they understand full well, you know, the volatility that when it comes to dealing with the Chavez government in Venezuela -- and one thing that I would like to remind people of is that the energy infrastructure in Venezuela itself is

crumbling. They have not maintained it to a standard that would, you know, create confidence in a lot of people. If you want to have a stable energy supply, you need to have, you know, your bases covered with the appropriate infrastructure. Both Mexico and Venezuela have been suffering extensively from a lack of attention to their energy infrastructure and it poses problems not only for Cuba, but for the United States as well. So I think that should be stated up front. In terms of what Cuba could garner from a more, you know, cooperative type of stance from the United States, I think Ted's right. At the micro-level, we will probably continue to see, you know, incremental, very small movements, but nothing of the radical types of steps taken in order to ensure that the Cuban dreams can be fulfilled. I mean I attended a meeting in Mexico City in 2006 where, you know, U.S. oil companies were sitting down at the table with Cuban officials and they were ready to start cutting deals right there on the spot. Well obviously that never came to pass, but the fact of the matter is there is intense interest in both sides on that area.

MR. PICCONE: Juan, do you want to comment on that?

MR. BELT: Yeah. I think on the Venezuela-Cuban relationship there's a good paper from -- by an economist from the IMF called Rafael Romeu and he does sort of an econometric analysis and so on. And basically all the growth of Cuba in the past four or five years is due

to the sale of these doctors and teachers to Venezuela. So if you were to take that out, Cuba would not have grown -- (inaudible) income would have declined. And then there's the oil. So in a way, Cuba depends so much -- let's say if I look at the electricity sector of Cuba, it depends on oil. Cuba should be praying for lower oil prices. But if prices fall too much, that means Venezuela gets hit. So in a way -- I also work a lot in Central America, and they are also dependent on imported hydrocarbons. For them, it's very good if the oil price falls. In the case of Cuba, it may not be so good if that fall damages are made. So I think Cuba had all its eggs in sort of the Soviet basket at one time. Now it has it all -- quite a bit -- in the Venezuelan basket. For one has to think that this restructuring that is taking place right now, I would say -- I'm not a political, you know, political analyst -- but it seems to me it has to be tied to some concern about Venezuela not being able to continue. Something which we don't really know, but it may be between three and $5 billion of support, which approximates what Cuba used to get from the Soviet Union so.

MR. PICCONE: Jorge.

MR. PIÑON: Yeah. I want to stay away Cuba-Venezuela politics, but as a business man, I want to tell you that you never put strategically all of your eggs in one basket. So that's why my emphasis on Cuba's energy independence -- it's not the matter of whether it's Venezuela,

Angola or Algeria or the Soviet Union. Strategically, long-term it is wrong for any country or any business to put all of its eggs in one particular basket. Where is Plan B for Cuba if something happens in Venezuela tomorrow? And I think that's why it's so important politically and economically for Cuba to develop alternative energy sources. I do want to make two -- as far as the U.S. losses, the gain the answer is no. I think long-term, remember the oil industry is a long-term strategic industry. You still have refining. Cuba is about to build two new refineries -- one in Matanzas and really the expansion of Cienfuegos. Those are heavy oil refining. Strategically, Benjamin brought it up. If Cuba is able to build the new 300,000 barrels a day of heavy oil cracking capacity that they want to build, that's going to be huge for Cuba's future even if Cuba doesn't find oil. One of the things that we've been discussing privately, but it's open now, is the interest that China now has in Cuba. If you look at all the Chinese deals that have taken place in Latin America, China is going to start pulling out somewhere between 250 and 300,000 barrels a day of oil out of the western hemisphere within the next five years. With expansion of the Panama Canal, it makes strategic sense for China to have energy capacity in the Caribbean. Basing, in fact, we know because of public data that they have talked to Valero about buying the refinery in Aruba. So the two refineries in Cuba, the two new heavy oil cracking refineries in Cuba -- remember, that's why Venezuela

through Citgo sends its oil to the U.S. because we have that type of technology. So for the future of Cuba, if Cuba is able to build those two new 300,000 barrels a day of heavy oil cracking capacity -- even if Cuba doesn't find oil, it'll be a very big potential deal. I want to briefly just talk about energy for a minute. I hope it's not an accident that an oil guy is sitting next to the environmental guy, but within the fossil fuels, there is no question that natural gas is the least contaminated -- even though we want to get above fossil fuels. I understand that. But within the fossil fuels, natural gas is the fuel of the future. And Cuba's program is a two million ton a year train in Cienfuegos. Part of that is going to be to produce hydrogen for the hydrocrackers of the new refinery, some petrochemical projects and then natural gas for the Carlos Manuel de Cespedes plant in Cienfuegos. If we can convert Cuba's thermoelectric capacity today to LNG, it's going to be fantastic -- especially from air contamination and air pollution. Remember that the fuel that Cuba is burning today is three percent high sulfur fuel. So from an environmental point of view, turning Cuba's electric sector to LNG will be fantastic. Plenty of energy in Trinidad and Tobago. Plenty of energy is going to be coming out of Venezuela. Plus, by the way, if Cuba finds oil, that would allow Cuba then to export more oil because that oil that would have gone to the power sector is oil that now they can export because it's going to be replaced by LNG. Last comment. You talk about black gold.

This conference is about the black gold. We haven't talked about Cuba's green gold, which is sugar cane. I am amazed. I am amazed that Cuba hasn't done anything to address the issue of their sugar industry, particularly with the friendliness that they have had with President Lula for the past two years. And I know what all the plans are. We have done study -- Juan and I and a few others have run study that Cuba's recapitalized energy industry can produce about 3.5, $4 billion of revenue a year. If you look at today's sugar mills -- if you look today at the aggregate industry conglomerates of Brazil, in which you have the sugar mill, you have the distillery and then you have the new cogeneration facility that run all by gas.

MR. PICCONE: Suggesting biofuels you're saying.

MR. PIÑON: Suggesting -- suggesting the production of ethanol. In other words, Cuba's automobile -- if I was Cuba, I would put a no ex -- the only cars that could come into Cuba are the Brazilian models that can run on 100 percent ethanol or, you know, have that possibility to switch. Cuba could produce 70,000 barrels a day of ethanol. With 60 million hectors, Cuba can be producing 70,000 barrels a day of ethanol. So the whole Cuba fleet in the future could be running on ethanol. And that would produce enough by gas to produce about 15,000 kilowatt hours of electricity. I am amazed that --

MR. PICCONE: Why has it not happened? I mean is it

decline in the infrastructure and --

MR. PIÑON: Because, because -- no. I think it's political. The Brazilians are there. The Brazilians are ready to put the money. Cuba has just approved their new investment law that you can now own land -- that you can lease land for 99 years. You already have the precedent of the oil industry and the mining industry, in which Cuba has given foreign companies concessions for the mineral rights. So all they have to do is give a 25, 30, 40, 50 year concession of land to Brazilian companies to come in. They'll put 100 percent of the money. Cuba still gets a 60/40 -- I mean it's a quote-unquote -- I'm sorry. I get excited about ethanol. It's a no-brainer.

MR. PICCONE: No brainer.

MR. PIÑON: But I think that Fidel Castro, back in 2002, made a very strong position that sugar was never going to be again the colonial arm of Cuba, and so on. But I am amazed -- and, by the way, we believe the employment generation in a revamped Cuba sugar sector could be somewhere about 125,000 to 130,000 people that could be put back to work in the sugar sector.

MR. PICCONE: Thank you, Jorge. Very interesting. And there is a chapter in the book on this question by Ron Solego and his colleague at -- from Rice University. Dan, any comments?

MR. WHITTLE: Just real quick, just to echo that in all my

conversations, Cuba has indicated that they want U.S. participation on oil and gas development. From an environmental perspective, it's better to work with companies experienced in the Gulf with deep water drilling. It also gives the U.S. more leverage over how that development is done. I would say on the green gold on the sugar cane ethanol that I think Cuba is prepared. In my conversations in 2007, there's a lot of eagerness to develop that industry and because of political concerns over food security, which was a big issue back in 2007, there have been delays in moving that forward. I think they're ready to so. They've got the capacity to do so and the interest and I think it just depends on the political priority.

MR. PICCONE: Okay. Well, why don't we take the next 20 minutes or so to take questions and answers from the audience. And if you could identify yourself and I see a hand in the middle and then we'll kind of move it forward from there. Yes?

SPEAKER: Yes. Ramon (inaudible) with the (inaudible) Group here in Washington. I see a conversation from experts -- experts in policy, energy policy, engineering experts, Cuba-U.S. relation experts, environmental experts. I haven't heard the mention of citizens. We can only speculate what Cuban citizens feel about all this, but we can certainly prove what American citizens would feel about issues which I think are very relevant to public life in this country in terms of energy, security,

environmental policy, international competitiveness and foreign policy -- including, of course, China among others. Where are citizens in this conversation? I haven't heard even the word mentioned.

MR. PICCONE: Okay. Let's take a couple of additional comments. Here in the front.

SPEAKER: I want to return briefly to the subject of Venezuela. There was some discussion about not putting your eggs all in one basket and it depends on the production levels of (inaudible). But I also was remembered of how in the coup in 2002, one of the organizers of the coup stated immediately afterwards that Venezuela is cutting all its oil shipments to Venezuela and the risk of another coup in Venezuela is always there. So, what are the options for Cuba in case there is another coup and the organizers cut all shipments of oil to Cuba from Venezuela in case there is a coup in Venezuela? Thank you.

MR. PICCONE: And right there in the middle.

SPEAKER: Yes. I'm Earl McClaren. I'm an attorney here in Washington. What is the expectation from the Obama Administration with regards to (inaudible) any other restrictions with trade with Cuba as far as, you know, permitting these areas of cooperation between -- in the energy sector?

MR. PICCONE: What are the prospects for further U.S.

liberalization or on trade?

SPEAKER: Yes. (Inaudible) and any other restriction on trade with Cuba that would facilitate this kind of cooperation that you were discussing.

MR. PICCONE: Okay. So we can come back to the panel. On the citizens question, is there someone in particular that wants to handle that? Dan?

MR. WHITTLE: I'll give it a shot. It's an excellent question and to date I think the citizens of both countries have not had much of a voice -- at least not a high profile voice. We are on the verge of actually doing a survey on this very issue in the U.S. on public attitudes toward Cuba oil and gas development. So stay tuned on that. In Cuba, I know that their principal environmental organization -- the Foundation for Antonio Núñez Jiménez -- which is a very impressive outfit. They tracked the oil spill very closely this summer. They have an expert staff and they are influential with the Cuban government. So I think at least to some extent, you have the nongovernmental sector involved in Cuba. I don't know the extent to which the BP issue was publicized in Cuba. I don't think extensively this summer. And I'm not aware how much the average Cuban knows about Repsol's plans next spring. I will say that the environmental impact assessment log does allow for and require citizen participation in projects of this magnitude.

I'm not aware if an EIA has been completed or what the plans for doing that are. Great question.

MR. ALVARADO: There was some data that was generated by a public opinion poll that was taken by the Gallup organization in Cuba in 2006 and it's a poll primarily measuring well-being. And one of the major concerns of -- that we could indicate from the polling data was that Cubans were very concerned about environmental issues, especially in light of this poll was taken in Santiago and in (inaudible) and the question is relevant because of the high levels of asthma, airborne, you know, generated ailments that really plague the Cuban population. This is something that has been present since the 1970s and it is -- it is a serious health concern in the country and so I would imagine that by and large, while they're not actively, you know, solicited for their opinions on this, it is something that is very much on the mind of Cubans in terms -- especially in terms of their general, you know, health and well-being. And so -- but they have -- you know -- they're not regularly consulted. Now there were some discussions that were held through the, you know, local committees there a couple years back when Raul first came in -- into office about where this was going to go and there was lots of excitement about what, you know, the possibilities might be in terms of economic benefits from oil. But really that other dimension of it, you know, and direct impact on citizens is not something that has been

widely discussed in Cuba.

SPEAKER: How about in this country?

MR. ALVARADO: Even less I would imagine.

MR. PICCONE: Juan.

MR. BELT: Yeah, on the Cuba -- I mean I think that's too drastic a scenario -- cutting off the oil from one day to the other. But if that were to happen, it would be a total disaster for the electricity sector because as somebody mentioned, the 50,000 barrels of (inaudible) Cuba produces goes to the industrial sector. But most of the oil going and diesel going to these new small gen sets, it's all coming from Venezuela. So you'll be -- Cuba, I believe has like -- I think at one time we -- you helped me find this information, Jorge. But Cuba had like reserves to run the system for 17 days or 21 days or -- in a way, this drastic scenario, no oil coming from Cuba, they can run the lights at the level they are for weeks. I mean if they cut down for a couple of months. So, obviously, they would have to buy and then, you know, it's really where do they get the resources to buy, you know, to sort of meet a bill that is like three billion a year.

MR. ALVARADO: And it's 1993 all over again.

MR. BELT: Sorry, it's even probably worse I would guess. It may be worse.

MR. PICCONE: So highly vulnerable. Do you have any more

to add, Jorge?

MR. PIÑON: Yeah. They just finished. They are now in the process of finishing 1.2 million barrels of new storage in Matanzas. There are four tanks -- four 300,000 barrel tanks. They'll be finished in the next six months. So that will help them in the inventory level. Also in Cienfuegos, they have just built an additional about 300,000 barrels of storage. So the original one -- 17 days. It looks now -- we'll run some numbers here soon, but it looks better than that. But the issue of Venezuela, again, I want to stay away from Venezuela because then we get into a political discussion. I think the issue for Cuba is I don't care if it is Venezuela or any other country. Cuba cannot continue to depend on 100 percent of its import energy needs on one single source. I mean it just -- it just doesn't work that way. So that's where I'm coming from. I want to stay away from the discussion of well, Venezuela, Chavez and so on. I want to stay away from that. So that's my issue and that's a concern that I have. The concern that I have is the scenario that this gentlemen put forward.

SPEAKER: Yeah.

MR. PIÑON: And we ran -- if you remember those scenarios at Brookings here. In other words, in the event that tomorrow this supply fails, what is that Cuba going to look within the next 10 to 15 days after that event? And those are the scenarios that, certainly at Brookings, it did give

us a lot of concerns of the political and economic ramifications that that scenario could have.

MR. PICCONE: Well, since I'm more of a political analyst, I could say something on a couple of these questions. I mean I think just on Venezuela -- I really think the prospects of a coup are very small. And I think, as we saw in 2002, the hemisphere would react very strongly against a coup, even if it unseated Chavez. We saw that before and I think it would happen again. The rule against coups is very strong in this hemisphere. And so the U.S. and other countries would be in a position to come out against a military coup, even if it unseated someone that we didn't like very much. So, I would really discount that scenario. In terms of citizens and maybe connecting that to the other question about prospects for change in the United States, you know, we have a deficit of information in about how Cuban citizens feel about these kinds of issues because of the regime in Cuba. But we also have a minority and very, I think, very vocal minority of citizens in the United States who have their own position on Cuba, which is really controlling the policy right now. I think we can see that over and over again and the polling backs this up. That not only the general American population, but Cuban-Americans themselves are in favor of much more normal relations with Cuba. And yet, the policy is in a different direction. And it has been stuck in that place for over 50 years and I don't see it

changing in the short term. There's a lot of hope. There was a lot of optimism that President Obama, who had struck this note of, you know, engaging our friends and enemies in a dialog hasn't happened with Cuba. Why? Why has it not happened? I mean the goal posts keep getting moved every time there is some opportunity for this dialog to happen. And I think, frankly, it is strictly a question of politics in this country that you have strong voices in both parties. Even though it leans more toward Republicans, there are very strong voices among Democrats who are in favor of the status quo, who do not want to see change until there is regime change in Cuba. And I think that that policy is going to really interfere with our ability to have any kind of, you know, normal process of engagement with Cuba for some time. I don't think it's just going to be once we get passed the mid-term elections, then the environment will change. I think the President, this past week, has made it very difficult to see change and then the hope is maybe Congress will force his hand. We saw some action on the House. We have a bill pending to lift the travel ban so that would allow a tremendous amount more of citizen-to-citizen engagement, which I think would be so important. But, I think the prospects of that legislation are very small. Even if it got out of the House, it would have to get through the Senate. I don't see it happening. So I think -- I think we're stuck is my own personal view on that.

MR. ALVARADO: I want to just go back to the Venezuela

scenario really quickly. If there was a significant loss of energy supply to Cuba, I had -- well, I got to witness what happened in 1993 when the Russians cut their supply to Cuba. It's hard to imagine being in a city of two million people where there are no street lights. There is no electricity. There is no air conditioning. There are no cars on the road. I mean there was a couple of beacons and they were primarily tourist hotels where there was, you know, generation sets that you poured the -- that they were using to keep the lights on. But, Cuba would have -- knows how to go to that scenario already. They've experienced something that most of us would be horrified to have to endure in this particular country, yet I don't think they relish the prospect of having to go back there. And so I think part of what we're seeing on the part of Cuba is an attempt to, you know, minimize that possibility, you know. And one thing I would like to bring to light here is the incredible amount of investment that has gone on over the course of the last five years primarily in terms of port facilities -- you have the bi-ports world, making a deep water port in Mariel. There is port -- the Brazilians and the Chinese have been working along with the Venezuelans in improving port facilities, refineries, across the island -- Santiago, Cienfuegos, Matanzas, the oil pipeline from Cienfuegos to Matanzas. All the basic elements of an energy infrastructure that would be able to, you know, go -- come completely on-line if indeed oil is found, will change the picture dramatically. But there

is that window of vulnerability that still exists in Cuba today in case something like this were to occur. You know one of the other things that Jorge and I talk about a lot is the refining capacity in the region as a whole. If the hurricanes, being what they are, you know, and the patterns are nilly-willy, you know, and they don't always appear when they're supposed to be there. But I brought in that scenario about the Houston ship channel first. But if it happens in Aruba, or one of the other major refining stations in the Caribbean, we will still have a similar impact on our own energy supply in this country as well. And so it's something to -- to take into consideration. It isn't just between Cuba and Venezuela alone, because oil is traded as a global commodity. It doesn't know borders. It doesn't care about ideologies. And we need to understand it like that.

MR. PICCONE: I see one more hand and maybe we just have time for that comment and then we'll need to wrap it up.

SPEAKER: Thank you very much. Jorge Fernandez, founder of Hope for Cuba Foundation, Philadelphia. Dan and Jorge, I applaud you especially for the work you are doing with the marine and the environmental and Jorge, representing J.R. Ewing and the oil business sector. You are perfect to go into Congress together. I'm going to take you when I go on my dog and pony show. But I wanted to add, if I may, that regarding the citizens voice -- I have a residence in Longboat Key, Florida, outside of Sarasota.

And I'm close with Congressman Vern Buchanan. And he does these polls. And he did a poll on this subject with the citizens of Florida -- would they approve allowing Cuba to deep drill in their sector of the Gulf knowing that China is exploring with them and they couched the question very intimidating. So the results -- it's very good. The instant poll came back and it's something like 75 percent said no, we don't want the Cubans to be drilling. But I contacted their office and as a matter of ignorance, I think, and they would embrace -- that number would change tremendously I'm told if the United States was leading the exploration in Cuba. So I wanted to share that and as far as citizen's reactions, contact Congressman Buchanan's office. He's got at least that data. And the other regarding -- I've been back and forth. I was born in Havana, as Jorge knows. I've been back and forth about 24 times since 1998. But regarding when the ethanol boom came -- I'm sharing my experience. In my meetings at the highest levels in Cuba and here, at the time about when President Bush's Administration, the Cuban government relayed to me that they wanted to preserve the Cuba sugars for the consumption and production of rum, but also the fact that -- and Jorge, I know you've talked about this -- is the condition of the sugar refineries are so poor condition that -- again, and I know there's investors in the United States who would love to get in there and if you could update all the refineries, then I agree. It's a green gold in Cuba. So I just want to

share that and applaud Brookings for continuing the dialog in pursuing the route to engagement --

MR. PICCONE: Great.

SPEAKER: -- with Cuba.

MR. PICCONE: Thank you. Thank you very much. I'm sorry we've run out of time, but please join me in thanking the panelists and maybe they'll stick around for some more questions. Thank you.

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CERTIFICATE OF NOTARY PUBLIC

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.

/s/Carleton J. Anderson, III

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