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ENDOWMENT FOR
INTERNATIONAL PEACE

1779 Massachusetts Avenue, NW

Washington, DC 20036

P +1 202 483 7600 **F** +1 202 483 1840

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The New Geopolitics of Energy: Challenges and Opportunities

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Moderator:

Jessica Mathews,
President,
Carnegie Endowment

Speakers:

Carlos Pascual,
State Department's Special Envoy and Coordinator for International Energy Affairs

Bruce Jones,

Senior Fellow and Director of the Project on International Order and Strategy,
Brookings Institution

Deborah Gordon,

Senior Associate and Director of Carnegie's Energy and Climate Program

Washington, D.C.

JESSICA TUCHMAN MATHEWS: Good morning. I'm Jessica Mathews, president of the Carnegie Endowment, and it's my pleasure to welcome all of you here today to hear a really important discussion on the new geopolitics of energy with the Department of State's special envoy and coordinator for international energy affairs, Ambassador Carlos Pascual.

This is a joint event sponsored by Carnegie and our neighbor next door, Brookings, and both the Project on International Order and Strategy and the Energy Security Initiative at Brookings are partnering with us in this event, and we are thrilled to do this and very pleased to have Bruce Jones, the deputy director for foreign policy at Brookings, with us this morning.

And it's a real privilege for us to be able to host the final appearance before he steps down of – from Ambassador Pascual's latest round of public service. And although I think we don't know that it's his last, we can still thank him for a long and distinguished career of service to his country in the foreign service. So it's really an honor to recognize that.

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We are at a strange moment in the history of the energy issue. Just as the world has – is coming to grips with diminishing reserves of conventional fossil fuels, there has been this massive really revolutionary development of unconventional oil and gas, particularly in the United States. And almost overnight, at least for Americans, we've gone from decades of thinking about energy in terms of shortages and energy independence and degree of dependence on imports to abundance and worrying about policies regulating exports and certainly thinking about that, about policies that would respond to that and about the international implications of it hasn't kept pace with the technological developments on the ground. How do you make policy that assures economic growth, energy security and climate stability all at the same time is one of the central challenges for government and for those of us in the – in civil society and for the private sector, and certainly one that, as I say, I don't think has kept pace with events.

We are – also, this is a central focus of the work of our Energy and Climate Program at Carnegie, which is headed by Deborah Gordon, who will be commenting this morning and taking part in the Q-and-A, and our colleagues at offices, particularly in Beijing, outside the U.S.

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So this is really the cockpit issue. Whether you're thinking about sanctions on Russia, on European oil and gas dependence, on the Iranian nuclear negotiations, on bilateral relationship with Venezuela, really, where – almost wherever you look in the world today, energy concerns are ubiquitous.

And so Ambassador Pascual's portfolio for the last three years has been central to the success of American foreign policy in his role of advising the secretary on all aspects of energy security and – of – as they – and as they relate to broader American foreign policy issues.

Before his current appointment, Ambassador Pascual was U.S. ambassador to Mexico, from 2009 to 2011, and with a little interlude as vice president for foreign policy at Brookings, before that was ambassador to Ukraine. And so he is – the threads from his experience to his current portfolio go way back.

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So I hope you'll join me in thanking him for joining us and for his long public service. We look forward to hearing from you and to a very vibrant Q-and-A discussion afterwards.

Ambassador Pascual. (Applause.)

CARLOS PASCUAL: Jessica, thank you so much. It's – I'm so appreciative of your willingness to host us here at Carnegie, and to Strobe, in absentia, for the co-sponsorship with Brookings. Bruce, Debbie, thank you for joining and being part of this discussion.

To all of you who have joined, I really appreciate the opportunity to have this chance to reflect on some of the key strategic issues on this intersection between energy, national security, our future prosperity and the sustainability of our plan.

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And that may seem like it is melodramatic in a sense of the stakes that are involved, but indeed I think that it is a little melodramatic, and the stakes are that big, and there is a reason why we have to pay so much attention to how we integrate the way that we incorporate energy into the grand challenges that we have on international security policy in the United States and around the world.

Jessica hinted at one of the issues that consistently comes up today, and this reflects what's happened in the United States: a radical change in America's energy position in the last 10 years and really the last five years. We've increased both the production of oil and gas by about 35 percent in five years. And you can see on your left the chart that shows the sharp increases that we've had in oil production, the measures that we've put in place for energy efficiency and the way that it's driven down imports in the United States -- oil imports from 60 percent to this year estimated somewhere in the mid-30s.

If you look at gas, a similar story has occurred. In 2005 shale gas accounted for 1 percent of U.S. production. It's well over 40 percent today, and it's estimated to go up over 50 percent over the next 10 years or so. By 2020 the International Energy Administration has estimated that we will actually be a net exporter of gas.

And then if you look at some of the implications for what that might mean for emissions – this is interesting. So I'm hoping that I can either talk through this mic or the other one. You can still hear me?

MR. : Yup.

MR. PASCUAL: OK. Good.

So if you look at what – these are the emissions that you see from coal, and these are the emissions that you see from gas. And so in effect one of the things that's happened is that this sharp increase in the availability of gas in the United States has allowed us to increasingly substitute gas for the use of coal. And while that has increased slightly emissions as a result of gas, the resulting impact on reduced emissions out of coal has been even sharper.

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So where does it bring us back to? Well, what we've seen is that as a result of this energy revolution that's going on in the United States, it's had a big impact on access to energy resources, the availability of those resources; on overall emissions. The challenge that we face is what still are some of the challenges – some of the issues out there that have to be addressed. What this does not address, especially on the oil sector, is price, because in the end we are operating in a global

market, and the fact that the United States is contributing to that global market does not necessarily change the fact that we are paying international prices. And I'll come back to how that plays itself out.

And if we care about sustainability, this is a great story to tell, but unless we put it back into a global context and understand how the United States fits in with a much larger international community and particularly what's happening in Asia, we can't succeed in our goals on sustainability.

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And so what I'd like to do is to take you through five different themes that I think are absolutely key to addressing our challenges on both energy security and sustainability.

And the first of these is what's happened on the structure of demand. See, if you look on the left-hand side of the page and – of the screen, and what you have here is the structure of the energy demand in the future. The OECD is in blue. The non-OECD countries are in red. Obvious trend: All of the growth in the future is occurring outside of the OECD.

What is the principal organization that we have for energy governance in the world? It's the International Energy Agency. It's made up of members of the OECD. So in effect, the principal source of demand is not part of the governance mechanisms of the world in dealing with crisis and response to emergencies.

The other thing that you get that's interesting here is where particularly is that demand occurring, and it's especially occurring in Asia and in China.

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One indicator of that are the trends that you see in investments and power. Not completely – they're not completely the same thing, but they're co-related in what's occurring. And if you look at power investments in the future, here's China, here's India, here's Southeast Asia. The EU and the United States you can see in comparison, and how much of that is actually in replacement, in retirement is stunning. So the net growth and the net trends and changes are going to be happening in Asia.

So two things to think about from this. One is that in oil markets, the price pull factor on prices in the future is likely to be China. The ability of China to satisfy its demand is going to have an impact on global prices, and that's going to have a direct impact on our economic productivity in the United States. So we are in a situation where it is out of our self-interest that we need to start caring about whether China satisfies its energy demand, but beyond that, the way that it satisfies its energy demand and how clean it is is going to have a huge impact on the sustainability for the future.

Another aspect here on the structure of demand – and I'll take you to the Middle East. So this curve represents energy demand in the Middle East. This is energy supply. This is a current point of 2014. This is historical data. So what you've seen is that over time, both energy demand and energy supply out of the Middle East have been growing. Increasingly, as that demand has grown, more and more of it has been satisfied, particularly in power and desalination, by the use of oil. And so what's happened is that oil exports have started to flatten out.

What happens into the future? So now we're in the world of the hypothetical. Demand continues to increase, and that is very firmly charted. Supply will depend on investments that are made in renewable energy and fossil fuels. But this is reflective of trends and projections that we're seeing generally. And if you continue the same rate on use of oil for the generation of electricity and for desalination, what happens to exports out of the Middle East? They plummet. And the

impact that that's going to have, if that were to occur, first of all on the countries of the Middle East and their financial viability, secondly on global markets, is absolutely huge.

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And so hence this is one of the reasons why you see Saudi Arabia coming up with programs for 40,000 megawatts of investments in solar development, why they're now going in a very aggressive way into the development of gas resources in some of these countries. And that has become a critical issue that has to be part of our dialogue with the countries of the Middle East because it's just the not the Middle East that's involved, it's actually the stability of global markets.

Let me go from there to the question of oil production and its future. One of the things that we've seen over the past three decades is that there has been a diversification of supply. We've gone from 30 producers in 1973 to 44 producers now, and we're just taking here producers over a hundred thousand barrels a day. If we went even lower, this would be way, way up here. And so we've also seen that increasingly, there's been more and more production that's been going from OPEC to non-OPEC countries.

One of the biggest sources of production has actually been in the United States. In the U.S., we've increased our production of oil by a million barrels a day in 2012, a million barrels a day in 2013, and we're well on the way to doing that again in 2014. So in other words, in the last three years, the United States will have added a Kuwait or a UAE or something which is even bigger as a result of the increases that we've had in the United States. And so today, you know, North Dakota is up there in the ranks of energy champions that we see throughout the world.

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One of the impacts that this has had is that it has brought a degree of stability in international markets at a time when there's been a lot of uncertainty. So let's look at this. These are disruptions that we're seeing in unplanned global oil supply disruptions. Unplanned is maybe a little bit fair because this one on Iran, we planned and worked really hard on, and so we'll take credit. (Laughter.) But other pieces of this, we've not – we've not necessarily planned for or hoped for or want. And traditionally, the amount of outages that you might see on global markets were somewhere in this range, 500,000 barrels a day or less. We have been in an extraordinary situation over the last two years where those outages have been increasingly at 2 (million), 2 ½ (million), and now 3.3 million barrels a day.

If we had seen that – let's just go back for reference, historical perspective – in Libya in 2011, you had 1 ½ million barrels a day for off of the market. We saw the price of oil go from about \$85 a barrel to \$130 a barrel in two weeks. Over the past year, we have barely seen any changes in the price of oil except at one point when it went up to about \$117 a barrel when there was a lot of uncertainty about what was going to happen in Iraq. And one of the big reasons for that has been the increase of supply, which has come in the global market, particularly from the multiple producers, particularly from the United States.

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But here are some of the things that we still have to think about. When you have these levels of outages, if you lose any of the big countries, you're in big trouble. So continued and sustained production from Russia, Saudi Arabia, the United States is key. And we might want to talk about the Russia piece in context of other European policy questions a little bit later.

What we also have to come back to is the importance of Saudi Arabia. So with oil, we essentially have a market which is inelastic – inelastic in supply, inelastic in demand. If you have radical changes in supply in a short period of time,

the implications are the price can go up very quickly. So the ability to be able to respond quickly in that market and inject supply is actually key to be able to maintain price stability.

There is one country in the world that has the capacity and sustains and invests in the capacity to do that on a consistent basis, and that's Saudi Arabia. The United States does not do that. There is no European country that does that. We combine together through the IEA to have additional reserves, but the ability to actually expand within 30 days and sustain it for at least 90 days, the technical definition of spare capacity – there is one country in the world, and that's Saudi Arabia.

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So what does this tell us? Well, on the one hand, it gives us a sense that there is a potential for greater stability and productivity in these markets and a greater prospect for maintaining an environment that's conducive for our economic growth, but the other side of the equation is there are an awful lot more players that we have to work with. And so this job of promoting energy stability and security is not a one-time shot. It's not just going to the big players; it's understanding how all the other players fit into this dynamic as well and how they contribute to that market.

Let me give a couple examples of this. Iraq – these are projections through 2035. And it may surprise some people here that Iraq is projected to add more oil to global markets over this period of time than any other country in the world.

For this to happen, there are certain key things that need to take place. In the south, where Iraq is producing most of its oil, what it has done up to now is essentially helped – or actually, created an environment for international companies to come in and invest in the rehabilitation of existing fields. In each of these fields, there has been an investment of, let's say 3, (billion dollars) to \$4 billion. In the next stage of production, to get from where Iraq is right now at 3.2 (million), 3.3 million barrels a day, each of these six major fields is going to need somewhere on the scale of 30 (billion dollars) to \$40 billion of investment, right? That's going to happen if you have the right kind of competitive environment, if contracts are structured in a way that will attract the investment, and Iraq's going to have to do massive things on its own administration of contracts so that each individual contractual agreement doesn't have to go through a massive bureaucratic chain to be approved, a huge challenge that has been a part of our bilateral dialogue.

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The other big issue in Iraq that everybody is following is of course what happens in Kurdistan region. Kurdistan region has a lot of oil, a lot of gas. That's a good thing. At some point, Baghdad and Erbil have to come to an understanding of how the development and the export of those resources can contribute to Iraq's overall development. And if an environment is created where Kurdistan region cannot develop those resources and they can't be exported, it will create a conflict. It has created a conflict, and that conflict will become more acute.

But the flip side of the story is that if those resources can be applied to the future growth of Iraq, they can bring benefits to both the region and the entire country. And so if we look at the future of Iraq, with a new government coming into place, in the south and how it manages its infrastructure and investment environment, in the north on how it manages the politics and the potential to continue to sustain the international investment that the Kurdistan region has already started to attract is absolutely key.

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Africa. I wanted to put this up because I could not get through this presentation without talking about the issues of energy governance and transparency and how important they are to the future. Today the amount of capital that leaves

Africa in a given year as a result of corruption is greater than the amount that is invested through foreign direct investment or through external donor assistance. If you can't change that equation, Africa is not going to succeed and develop and grow and achieve its potential.

But it goes beyond that. Take the case of Nigeria, where they had been exporting about 2.3 billion (sic) barrels a day. It's down to about 1.9 (million) right now because of issues that they've had centrally related to energy governance and the ability to invest in new contracts. And they have an energy access – electricity access rate of 48 percent. And I guarantee you, if you go to rural areas it's probably going to be in the teens. Angola, 1.8 million barrels a day. In rural areas that's actually under 10 percent.

Mozambique is coming onto the charts with the largest gas finds we've seen in the world in the last 30 years. The potential for its production is huge. I worked in Mozambique in 1989 to '91. The challenges that they face in governance still after the recovery for – the huge damage to the country that they experienced during the war are still huge. Their ability to be able to use those resources in a way that benefits the country is absolutely key, and a similar case in Tanzania. And we can repeat the story for a number of other countries.

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The reason I raise this is twofold. First of all, the ability of so many of these countries that have energy resources to develop is going to depend on their capacity to be able to ensure that those resources are captured in a transparent way to support the development of the country.

There's a second part of this: We have to recognize that at a certain stage, that as African civil society becomes stronger, as African democracy becomes stronger, there's going to be a limit to which countries are able to export \$2.3 billion of resources – 2.3 billion (sic) barrels a day of oil, which will be, what, the equivalent of – oh, boy, I can't even calculate that, let's say over \$40 billion a year in revenues. How can you do that if you can't bring power to your own people, right? And that is an equation that we have to make a foreign policy priority and concern.

Let me turn to the world of gas. To me, one of the most fascinating things in this job is actually seeing – watching and being part of, in some way, what's happening in the radical change in the nature of global gas markets. There's a lot of attention rightly focused on increased gas production in the United States, but increasingly in this market is becoming better supplied. More and more of that trade is happening in LNG, so it is literally becoming more liquid. But as a result of those increased supplies and the ability to trade it, it's also having a huge price impact around the world. It's not going to be the same as the oil market. Moving natural gas is a lot more expensive than it is to move oil, but look at the size of the changes.

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Today the operational LNG capacity that we have in the world is here and there, for the most part. There are additions – Trinidad, Tobago, some in Nigeria – but that's the bulk of it. In the next decade we are going to add three Qatars – three Qatars in terms of the amount of gas that we have in the world. I'm holding up four. Three. (Laughter.) Today in the United States these are – these are just the licenses that we have approved. It doesn't mean that those are all going to be built, but if those licenses are acted upon and actually constructed, this is what the United States would be exporting in a decade.

In Canada these are licenses that have been approved. Canada has got a bigger challenge in terms of how they develop their gas resources – too long to try to go into right now. If we just had proposed, which we have for Australia,

here in the United States, it would actually be off this chart, all right? Just to give you a sense of the scale of what's happening in terms of changes in supply.

So you ask yourself the question, all right, you've got more production. You can trade it – trade it more. What's going to happen in price? So the interesting thing here is that – what we've seen in the evolution of gas prices over time. It used to be that gas prices were almost exclusively linked to oil, and so up to about here we saw that continue to be the case. What happens here? We have Fukushima and suddenly you have a massive demand in Japan.

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And after that, with the advent of shale gas and gas prices starting to come down in the United States, the global market starts to split up into essentially three pieces: of what you have in the United States and North America, in Europe and in Asia. But even here we're starting to see more competition. These stars are what the price – what the price of gas is in each of those markets today.

Look at what's happened in Asia over the past months. Now, we're in the summer. Demand is lower. But there have been increases of supply, for example from Papua New Guinea, coming onto the global market much faster than was expected. In Europe, the price is down here at a time when you have the crisis between Russia and Ukraine and people asking, is gas going to go to Europe? The stores are full and gas has hit a low of about \$6 per million BTU. And the United States has sunk down below \$4 again.

Price is going to go up. This world is going to change. The nature of markets is changing, but to give you a sense of that, just look at this. Sort of the light-colored line represents long-term contracts that have, in the – have generally been pegged to the price of oil. These are spot market trades that are happening. More and more of that trade is happening on spot market – all of the trade in the United States. In Europe it's gone from about 80 percent or higher now to about 50 percent. In Asia it's been almost a hundred percent.

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I don't know what this market is going to look like in a decade, but I know it's going to be different and I know it's going to have huge geopolitical impacts, and it already is. So let me take that case to Europe today. The green dots here represent LNG terminals in Europe, the orange ones planned ones. The lines and arrows represent the – the big arrows represent pipeline gas coming into Europe and the blue ones represent gas coming in as LNG. So if you think back to 2009, when there was the last Russia-Ukraine gas war, gas was shut off to Europe for about 12 days. There was a huge downstream crisis throughout the continent. No one's even talking about that prospect today.

So what are some of the things that have happened? First of all, the Europeans have put in place a massive change in their own domestic policies and regulatory policies across the European continent. As part of the third energy package now, it is impossible for one company to be able to own the gas, own the transit system and own the distribution system in a country. So you can't have a monopoly all the way through the system.

They've eliminated a small thing, huge in impact: the destination clause. So it used to be if Germany bought gas from Gazprom, before re-exporting it they had to get Gazprom's permission. The EU has now made that illegal so that they can trade that gas. They have invested in regasification terminals of green that you already see around here, and today there is a capacity of – I don't have it here – about 170 BCM of import capacity through LNG. They're using, right now, about 45 to 50 of that, so a lot of capacity still to be added. There are gaps, particularly up here where “planned” has not materialized, and over here in the Adriatic, but a massive change.

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And there has been – have been huge investments in internal infrastructure so that you can now move and trade gas this way, and from south to north and from north to south, so that you can have, in effect, what have become called these reverse flows. The impact that this has had is that it has allowed all of these countries in Europe, every single one of the major Western European utilities, to be able to renegotiate their contracts with Gazprom to lower the price and change the financing terms.

So how is this relevant to the situation with Ukraine? Well, a couple of things. One of the very positive and critical things that the European Union has done to try to facilitate an end to the gas crisis because Russia-Ukraine is to host a dialogue and negotiations. And they've said from the outset is that the foundation for these negotiations has to be to extend the principles of the European gas market to Ukraine. So what does that mean? A market-determined price; that if you buy the gas, you own it, and you get to trade it; and thirdly, if you consume the gas, you pay the bills. So responsibilities for both parties.

They put on the table a proposal that had a range of prices, a schedule for repayment of debt and a number of other measures where, on June 16th, the Ukrainians took the deal, and the Russians walked out of the negotiations. Russia has said that that was principally because Ukraine did not pay debt. And indeed, if that deal had been signed, a billion dollars would have been paid the next day, and \$750 million was paid just before that as a measure of good faith.

And so I think the Europeans have told us that they think the reasons that the – the reason the Russians walked out of those negotiations is because as part of the requirement, it said that both parties would sign a mutually binding contract, where in the past, what Russia has done is it's had a contract for the sale of gas, and then it offers unilateral discounts. And the last unilateral discount that Ukraine got was on the Black Sea Fleet. And they said, we don't like these deals – (laughter) – and so the only way that we're going to do this is if we have a mutually binding contract. And if Russia accepted that, it would have forced them to have to rethink their contracts throughout Central Europe, which is their principal mode of operation.

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So the challenge that we all face right now is to bring the parties together and to get them to accept a contract which is not just on fair terms, which is on European market terms, but begins to allow both parties to be able to play a critical role in determining the future of those contract relations.

Let me just turn to the issues of power and how that links to questions of sustainability for the future. The IEA estimates that from now through 2035, there are about \$17 trillion that are going to be invested in power – generation, transmission and distribution – around the world. And this is under one of the scenarios that actually doesn't get you to a 450 parts per million in CO2 emissions, and so, you know, you would even need to go further in order to be able to achieve that.

As part of that, they predict that there'll be about \$10 trillion in investments in generation and that the amount of that will be in renewable is \$6 trillion. How this chart evolves, where those investments go, is going to be the most significant thing to our ability to address climate change.

And here's the challenge. This is on the use of coal. So this is coal use in the rest of the world, and this is where it's going in Asia. And the reason it's going is – in that direction is it's cheap, and you make a lot of money on it.

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China consumes 51 percent of the world's coal today, and if you look at the growth, the majority of it is in China. How do you change this?

So here's an interesting thing. And this is a little wonkish, but if I can't do it with Brookings and Carnegie, then I can't do it anywhere. (Laughter.) So I'm just going to go ahead and launch and do it here.

You know, we all talk about the importance of grid parity, price competitiveness, as a key factor in the attractiveness of electricity, and indeed it is, from the perspective of a consumer. And one of the things this tells you is that if you look at the levelized cost of energy, so taking into account all of those factors into what a price is, that increasingly, whether it's wind, some parts of solar, hydro, gas, coal, that you could potentially start generating electricity in many different areas at a range of 10 cents per kilowatt-hour. The reason that solar PV is up here is a big difference on whether it's on individual households or you have big fields, so that you have big fields, it gets a lot cheaper, right?

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But companies don't invest in a project because it produces a cheap price, right? The reason that you produce luxury cars is not because it's a cheap price; it's because you make money on it. So you look at the rate of return; you look at the net present value.

So let's just look at wind onshore as an example. This line here represents net present value. And one factor I'll just focus on here is load factor, the percentage of the time over the course of the year where you actually have that power available to you. So for wind, depending on the part of the world you're in, it could be 15 to 20 percent; in the United States, it might be 30 percent or higher. But what they've found – in the analysis that the IEA has done on this, they found that just the short range of the availability of that wind, going from 26 percent to 20 percent, it'll turn your project from being a positive net present value into negative. You just lost money, right? And it's that risk which is affecting the willingness of investors to go into the new forms of energy.

And so one – what do you have to do about it? Well, you got to then think about how do you take that cash flow equation, those spreadsheets, that are producing your net present value, and where are you going to change the numbers? And financing is going to be one of the most critical things, because if you think of renewable energy projects, you've got huge capital investments up front that are financed over a long period of time. And if you got to pay that financing in six years at 10 percent, then you're going to have a very significant cost and huge variability in your project. If you can do what Brazil has done and say, we're going to finance it over 18 years at 3 ½ percent, completely different equation. These are some of the kinds of things that we're going to have to do if we want to change that curve.

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And if we don't change that curve – not saying that we shouldn't be doing everything we're doing in the United States and Europe. We have to if we want to maintain leadership. But if we don't change that curve, everything we're doing in Europe and the United States is not going to let us achieve success in climate change.

All right, last thing I want to touch on is the question of energy access and energy poverty. And today in the world, we've got about 1.3 billion people who don't have access to electricity. Almost half of them are in Africa. The other biggest chunk, about 300 million, are in India. There are 2.7 billion who don't have access to clean cooking facilities.

The goal that has been set up between the U.N. and the World Bank as part of this initiative called Sustainable Energy for All is to make that zero by 2030. And the IEA has estimated that if you were going to – if we're going to do

that, the amount that you have to invest every year is \$48 billion – \$48 billion every year through the year 2030. That may seem a daunting task, and if you try to do that with development aid, you'll fail because the base right now is \$9 billion, and there's no way that you're going to get that kind of an increase in development aid throughout the world specifically on one topic.

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But if you look at it this way, that this is 3 percent of the total amount that is invested in energy globally, and ask, how do you change the incentive structures to attract it to go to developing countries, then we have a chance to succeed.

But again, I'll bring us back to another point related to finance. We can't do it unless we understand the world of finance.

And let's just look at two examples here for a second. So start out with the principle of investment funds throughout the world. And what you're trying to do is not just bring in donor capital; you're trying to get banks and pension funds and financial institutions to be willing to make the trillions of dollars that are available for investment somehow come into developing countries. And if you think about that in terms of large projects and in small projects, there are different problems that you face.

So, you know, say you're working for a financial institution, a bank, a private equity firm, and you're going to invest in a wind power plant. And you do it in Texas, and you invest in a 300-megawatt plant, and on a daily basis, they're putting an hour-by-hour record on the Web of what their power generation was, what the financial inflows were to the institution. If you have a problem, you pick up the telephone and you call somebody, you get an answer in half an hour. And if you're an investment manager, you spend half an hour a week managing your 300-megawatt investment.

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All right, put that in Nigeria. Who do you call? What answer do you get? How do you resolve your problem? How do you take it to the government? Why do it?

And that's the world that we're facing right now. Those investments – to be sure, there are investments that are going in. There are important investments that are happening. But if you look at the scale of what is required and what the potential is, it's just a tiny fraction. So you got to change that equation of risk, and the only way that you're going to do it is to be able to make sure that power purchase agreements mean something, that there's technical advice to have the right kind of policy environment, that you can get transparency in management.

But if you think that's tough, then come over here, all right? The number of people that are going to potentially get their power through off-grid investments, of the 1.3 billion that don't have access to electricity right now, some estimates are in the range of 400 (million), 500 million, all right? And if you think of the scale of those investments, they're small, 10 kilowatts – not 10 megawatts, 10 kilowatts, right? And if you're going to – if you take India, you have 300 million people that potentially need to get power through off-grid investments. You got to repeat these things hundreds of thousands of times. So how are you going to do that? To have the prospect of these funds coming down here, it's just not going to happen.

[00:40:58]

So at some point, you have to have the capacity of local intermediaries that can receive and consolidate resources, but you also have to create some degree of confidence that what you're investing in down here works, that it's not junk, that you can maintain it and that it can be sustained.

And so those are some of the challenges that we're facing right now, and when we have a foreign policy dialogue with India, and the president of India is saying, development of energy is one of my top three priorities for this country, and we want the United States involved, we're going to say, absolutely, we're going to do that. But if we can't bring it back to this level, we won't succeed.

And so the point that I'm trying to make is that until we get to the capacity to inject this type of dialogue and analysis into our ability to conduct foreign policy, we can't bring that policy to a close around issues in a way that can generate the expected results.

So what I'll leave you with is this point to think about. The U.S. energy revolution has been central to what we are seeing happening in the energy world today, there's no doubt about it. The changes that we've had in production, the possibilities for renewable energy, the reductions in emissions are absolutely key. But we have to keep thinking about that in terms of how the structure of demand is changing and where it's going, what's going to happen in the diversity of oil supply and how we work with all of those partners, how competition in gas is going to evolve and what the geopolitics of that are going to be, and we haven't even talked about Asia yet, and that's one of the biggest fields where this is going to play itself out.

[00:42:44]

From a climate perspective, what are the incentives and – for investment, and how is that going to affect the fuel mix? And then finally, how we bring this back in developing countries, because energy is going to be so critical to their future development, and that development is going to be key to their stability.

It's been a huge challenge and opportunity for me to be able to help put together this team at the Energy Resources at State to work through these issues. It's a huge challenge for all of us to continue to work on them. For those of you who are working on them, including from here in the think tank and the academic world at Carnegie and Brookings, thank you for sponsoring this talk and the ability to share these thoughts with you. (Applause.)

[00:43:31]

MR. JONES: Carlos, on behalf of all of us works, let me thank you for what was a master class in energy. You're going to leave some very large shoes to fill at the State Department when you – when you leave after having put together this team and really put energy at the heart of how State Department thinks, or trying to put energy at the heart of how State Department thinks about foreign policy.

I'm just going to very briefly add to Jessica's thanks for coming here, on behalf of Brookings. Jessica mentioned that the two programs at Brookings that are supporting are International Order and Strategy, which is the renamed version of Managing Global Security, and the Energy Security Initiative, which have the distinction of being the two projects at Brookings started by Carlos Pascual. So it's very fitting. Very fitting.

[00:44:21]

I have a lot of questions, but you can see we're at standing room only, and we don't have that much time, so I'm going to go straight to the audience, and I may interweave a couple of questions, and Deborah may as well. Do you want to have a first comment?

MR. JONES: Yeah, just a quick comment. You know, I went back and forth, because of course you're talking internationally, but a lot of the changes are U.S.-based in terms of major production, major consumption. We're the only country on earth that might be closer to closing that gap between production and consumption. And so it puts the U.S. in a very unique perspective to lead, again, in the policy wonk realm, of how we're going to make energy policy in the country. Can it be all of the above? You know, how do you do energy policy? I think the U.S. has a great role to play in leadership here. This speaks to it.

MR. PASCUAL: Absolutely.

MR. JONES: Do you want to comment briefly on that, or –

MR. PASCUAL: I think she put it well, and we'll – (laughter) – why don't we interweave that in the discussion and the comments as we go, because I think American leadership on these issues is absolutely key, but American leadership has to be interwoven with that global perspective, right, because if we look at this simply from the perspective of America has accomplished this, here we are, then we're going to – then we're going to miss out on the big picture of what's actually happening in – with the broader geopolitical impacts of what's happening in that changing energy world. We're not going to be able to solve the climate issues on our own, and so we have to make sure that that interaction occurs.

[00:45:48]

And so the challenge from what you're presenting – and I think it's absolutely right – is how do we take this changed position of the United States and use it as a position of strength in our negotiation and discussions with countries, for example, with China, where one of the things that we do have is energy, and it puts us in a position where we can potentially offer experience and commercial relationships in a way that can be complementary to their interests in combating air pollution, and how do we bring those pieces together, then, to come up and forge a policy that helps us on both stability of energy production and supply, but also addresses the climate challenge as well? Those are exactly the core questions that we're struggling with.

MR. JONES: One of the things I like about your presentation and your whole approach – you hear a lot of things in the United States about because of the rise in production and the convergence of production and consumption, that we can withdraw from sort of global energy markets, withdraw from the world in these terms. And you make precisely the opposite case and show why it's so important to continue to engage internationally.

So let's open it up. So we'll start – take two or three questions at a time, and I'll do it in blocks. I'll start at the front, and then we'll move back. So please identify yourself, and please ask a brief question.

[00:47:00]

Q: Yan Kalispi (ph). And congratulations, Carlos, on just an outstanding presentation. Quick comment on the chart. Efficiency – please add that to it. And the record on efficiency is very impressive. In this country, for example, commercially, you can get upwards of 30 percent savings in energy per project, and probably (started ?) making money on efficiency. This is the kind of thing that makes a big difference globally.

Question for you. Thinking about Europe and Ukraine, are there ways, in your mind, to go beyond what we're doing right now to incentivize the use of the Ukrainian trunk pipeline and to disincentivize the use of pipelines that are circumventing Ukraine? Obviously, Nord Stream is in business, but South Stream is very problematic, and it occurs to me that the return to the kind of proposals where the Europeans, the Russians and the Ukrainians share in the equity of a trunk pipeline with a golden share in control, staying firmly in Ukraine's hands, might be the kind of thing that, longer-term, going beyond the yelling and screaming of the week, could add the necessary strategic incentive to the kinds of sanctions and sticks that we're using. We need both carrots and sticks, (mind you ?), to get from point A to point B.

MR. JONES: OK. Let's take a couple more in the front here.

Q: Thank you, and good morning. Brian Erickson (sp) from the Independent North American Council on Kazakhstan. I have a question concerning LNG in the Ukraine. Could you comment on the potential of LNG delivery to the Ukraine? Sergey Yevtushenko of the state aid agency there commented that even after regasification, it was \$60 to \$75 cheaper than what Russia was offering. And given the difficulties of getting through the Bosphorus, what are your prospects for that?

MR. JONES: We'll take one more in this round. Gentleman in the middle there, if we can reach them.

Q: Thank you very much. My name is Miya Misuzu (ph) from – (affiliation inaudible) – and my question is actually following two previous questions.

[00:49:24]

On your very, very interesting and educative presentation, Mr. Ambassador, I noticed that on that chart presenting the pipelines in Europe, actually, South Stream is missing. I don't know is that deliberately – did you think that it is not so important? I share the opinion of the first gentleman that it is very important, maybe not just for a point of view of the energy, but of politics, because we know that that was the issue of bigger conflict between European Commission and some member states, and it remain. Government of Bulgaria almost collapsed because of that issue. So what's with that?

And secondly, following both questions previously, and something that you already made some comments, and having in mind your deep experience in that part of the world, I think that it is pretty clear that with Putin's Russia, we have actually a different approach to the energy. Energy is not just a goal by itself, and it is very important, but it is meant to achieve at least two goals that Putin is doing. One is to keep stability of his own economy, but the other that I think concerns me and most of us is also as a means to keep control, or geopolitical, but I'm afraid sometimes even territorial control, of the countries in that part of the world.

So you said – and I – maybe I misread or misinterpreting you, that you said with a certain level of optimism about possibility to put all parties together and to come to the something that it is fair deal on the energy. Do you really think that that is possible with nowadays Russia and Putin? Thank you.

MR. JONES: So unsurprisingly, the first round goes to Ukraine. So Carlos?

MR. PASCUAL: So first of all, Yan (sp), thanks for mentioning energy efficiency. You're absolutely right. We will amend that accordingly. (Laughter.) And indeed, in any analysis that you see of how do you get from a world of either 800 or 650 parts per million to 450, the biggest chunk of that is accounted for in energy efficiency, and that's also part of the financing equation of figuring out how to build that into projects in a way that becomes commercially viable and expanded on a larger scale. So thanks for mentioning that.

[00:51:44]

On Ukraine and pipelines and incentives, let's take that a piece at a time, right? So right now Russia exports about 160 billion cubic meters of gas to Europe a year. About half of that – and I'm just speaking in rough terms, but to keep the numbers simple and make it illustrative – about half of that, 80 (billion), goes through Ukraine. The amount that would go through South Stream would be an additional capacity of, let's say, plus or minus, 50 billion cubic meters. It would go – the project is designed into two different stages. Cost estimates have been – have varied, and it's – they're not very transparent, but let's say in the range of, plus or minus, \$40 billion.

[00:52:50]

Today Russia has 220 billion cubic meters worth of pipeline capacity to Europe. It's using about 160 (billion) of that. It is a flat market and a constrained market. Russia has 14 – one four – billion cubic meters of export capacity of gas to Asia, in an LNG project out of Sakhalin. It signed, as you know, a contract with Russia – with China for an additional 38 billion cubic meters, but it will build up to that over a decade, but 38 (billion). relative to the rest, is obviously small. And Asia is the fastest-growing gas market in the world.

All right, and so you then come back to the question of South Stream, and you ask the question, why is Russia doing this, and what's the purpose of the investment? It doesn't add any new gas to the European market because that gas is going to be – that demand for gas is going to affect whether or not there's additional gas coming from Russia or not. It essentially moves gas from Ukraine and brings it down south and runs it through Bulgaria and through the Balkans and into Hungary.

[00:54:10]

The current status of that is that the European Commission has said that they're not giving further consideration to South Stream at this time because South Stream does not comply with the European Union's competition requirements, and until they bring the project in line with those competition requirements, the European Commission is not going to evaluate and assess the project.

Russia is trying to change the politics of that. There have been marketing campaigns on trips at a very high level, including a presidential level, to Central Europe. There are countries and companies that have a self-interest in getting that gas, but right now that project is not moving, and indeed, it's not commercially viable because if you can't have viable intergovernmental agreements, you can't get it financed. So if it's going to be built, it's going to be built out of Gazprom's balance sheet, and whether Gazprom can afford to do this at a point in time when what it really needs to do is to put in pipeline capacity to Asia is another question. So those are the – those are the commercial issues that are at stake.

For Ukraine, a huge issue is going to be to maintain credibility that the Ukrainian gas transit system is reliable for European countries and companies to be willing to use it. The positive starting point it has is that no matter who, in the short term, finances South Stream, in the end, a consumer is going to pay for it, and nobody wants to pay those \$40 (billion) or \$50 billion. But the other side of it is that there have been gas interruptions in the past, and the current conflict creates an environment of uncertainty. And so one of the reasons why the Ukrainians have been so adamant in reinforcing and stressing that even though gas to Ukraine has been cut off, gas supplies to Europe are continuing, are to demonstrate that they are reliable – a reliable transit state.

[00:56:08]

Now, is there a prospect for a Russia, Ukrainian, European, American, whatever, joint venture for the management of the gas transit system? The politics right now, you know, are not too good for that. (Laughs.)

MR. JONES: Long-term.

MR. PASCUAL: And so in the context of Russia's annexation of Crimea, the disruptions and incursions into eastern Ukraine, Malaysian Airways yesterday, whatever happened in the downing of two warplanes, it's going to be a while before that happens.

And so one of the things that we're trying to focus attention on is how to help Ukraine improve its management of Naftogaz. The World Bank, the EBRD, the EU, the EIB are all partnering to work on doing that. There is significant gas production potential in Ukraine, and we're working on that as well, so that they had their resources that they have potential access to.

In terms of what the prospects are for reaching an agreement in the short term, it's going to be tough. I don't want to underplay how difficult it is. And it's going to be difficult on both sides because neither side wants to be seen as being in a position of compromising. And for Ukraine, it's really difficult in a situation where they feel that they have had a war that's been essentially ignited on their territory, and yet at the same time, how do they reach an agreement with a supplier of that gas? And the reality is that they need that, and that is a driving factor, and the reality is that it's actually good for Russia to have those means of access and to have access to the Ukrainian storage system.

[00:57:50]

So in a sense, what we have to be able to do is to come back to the substantive commercial issues of what makes sense for Russia, Ukraine, and a European environment, so that when the politics begin to flatten out a bit that there is a rational base that gets the parties to come back to an agreement. When that's going to be, I don't know, but the best thing that we can do is make sure that all of the parties are aware of that framework and that you create an incentive structure where all can say yes and all can see reasons for why it's in their benefit to say yes.

So that's what we're trying to do in the short term. We're trying to work as well in sustaining the reverse flow capacities that have been created. They had been about 2 billion cubic meters a year. There's a potential, by the end of the year, to increase those to 15 (billion), between Poland, Hungary and Slovakia. We continue work on that. We work on efforts to increase Ukraine's production.

But the thing I'll come back to is that what has made a huge difference in that European market is the capacity for competition and diversification. And to the extent to which you get those conditions to compete and to diversify, then that starts to create a different climate on the geopolitics. And that – I think that's the key point that we got to keep focusing on.

MR. JONES: All right. Ambassador Pascual very kindly agreed to delay a meeting that his Volt will take him back to soon, but we do have time for one more round. So Kevin, and then we'll go further back in this crowd.

[00:59:26]

Q: Thank you. Kevin Massy with Statoil. Ambassador Pascual, thank you for a great presentation and for your service over the last three years. My question goes to the broader intersection of U.S. foreign policy objectives and the U.S. onshore production revolution. There's been a lot of talk about how U.S. energy production has increased U.S. freedom of action, increased U.S. leverage in foreign affairs and foreign policy. To what extent – and my question is to what extent do

you think that is being – that the lessons of U.S. influence, based on its energy – changed energy posture, are being overlearned? And to what extent is there a risk that the U.S. sees its hand as being stronger than it is based on its recent energy transformation, particularly as you showed on the chart that OPEC will be more of a contributor to global oil markets in 20 years than they are today? So is there a risk that the U.S. makes decisions, make policy choices now based on a false confidence that its energy leverage is going to be there that they come -- that it comes to regret in the -- in the future?

MR. JONES: Lady at the back? (Inaudible.)

Q: Thank you. Thank you, Ambassador. My name is Genie Nguyen with Voice of Vietnamese Americans. You mentioned many times that the focus now is in Asia, and you say in the equation financing, capacity-building could be essential with infrastructure and -- at many different levels. Would you share with us the vision of the administration regarding the situation in the South China Sea with oil and gas and the current situation between U.S. and China? And what was on the table during a recent trip that our state -- Secretary of State Kerry in Beijing talking about the S&ED dialogue? What is the best situation for China and U.S. in Vietnam in particular? Thank you.

MR. JONES: And I'll take one more of those. Another one at the back. Gentleman here. Yeah.

[01:01:40]

Q: I'm with the program on -- (inaudible) -- consultation. And I had a question that was related to the levelized cost of energy graph that you threw up there. One of the things that you did was made a caveat about the solar voltaic, how that levelized cost was influenced by large-scale versus small-scale production of energy. And what I was wondering if there is data available on -- that separates out the large scale versus the small scale because it seems like when it comes to a lot of the renewables, the ability for a household to have some of these renewables energies is much higher. You can't have a household generate its own electricity based on coal, oil and gas, but you can have a photovoltaic display on your -- on your roof or not. And when it comes to looking at the price signals that you send to investors and financiers, the ability for the political forces to be arrayed against going a particular direction on the renewables seems much higher when you're mixing both of these large-scale and small-scale pricing mechanisms rather than in cases where you could just talk about the large scale, which is where the large investors are going to come in.

MR. JONES: And Deborah, do you want to follow up?

[01:02:57]

MS. GORDON: Yeah, and just to follow up on that in general on data -- and this is something I think for the U.S. State Department, certainly -- that if markets are going to function, we're going to need a lot more data on all of these energy revolutions that are going on, starting in the U.S. And so the availability of more data I think in general for investors, for, you know, decision-making, for policies that we're going to make, it's going to be very important to have that information. And EIA has put out comments to expand oil data collection -- (inaudible) -- the hope is that State and others will push this to be the case, there'll be more openness, transparency in data, not all locked into HIS CERA and other institutions that don't necessarily -- you know, they're profiting from data.

MR. JONES: Pretty wide range. Answer anything you want.

MR. PASCUAL: Just a couple a things. And Kevin, I -- let me also just thank you and Statoil as well for -- when many of these issues are playing on Russia and Ukraine, just, you know, Statoil has been a huge player in that European market. Indeed, in 2012 Statoil actually supplied more gas to Europe than Gazprom did. And so your understanding of

these markets and your willingness to talk about this is like -- has been a really good example of one of the things we've tried to do as a matter of course is to have a relationship with industry, with the nongovernmental world, with the environmental world because it -- you know, all of -- you're all key actors in this. And if we can't find a way to work and talk across all of those actors, you can't come up with solutions that work. And so I hope everybody continues in that spirit of openness and engagement, including the availability of data. But being able to analyze it and understand what it means is yet another thing. And having the ability to have that type of open dialogue is absolutely key.

[01:04:46]

On whether U.S. hand can be overplayed, whether the U.S. energy revolution can be misinterpreted, there is an opportunity for that every day everywhere around the world. And the question I get asked more when I travel than any other is that the United States -- does the United States still care about peace and stability in the Middle East, about security of transit lanes? Are we still going to maintain our involvement and engagement throughout the world? Bruce hinted at -- the point that our -- and I hope you got the message from this is the answer is yes. But there are those who will take this as a sort of a short-term perspective, not just in the United States but, you know, the skeptical conventional wisdom will be, huh, the United States is out of here, it doesn't care. And if you don't think about a world that is global and interconnected, you can make real serious mistakes. And I think that is one of the challenge and why it's so important to have the kinds of dialogue in the analytic and academic work that you're doing here and at Brookings to be able to really advance those -- that understanding of those global interconnections.

[01:05:56]

On China and the South China Sea and the developments in China in the future, it's obviously a hugely sensitive topic, particularly sensitive for the countries around China and influenced by these challenges in the South China Sea. So the -- let me sort of put this from one perspective of the scale of this and the importance of being able to find solutions that are founded in the international rule of law and are respected by all the parties. And that has to be a fundamental foundation to a lasting solution that can occur.

There's a book that Bruce has coming out soon with a chart that I've stolen on many occasions that demonstrates the -- what the world looks like to China in terms of energy supply. And when you look at that from a perspective of choke points, there are about two or three points in the world, particularly the Strait of Hormuz and the Strait of Malacca, that become fundamental determinants of your perception of energy security.

And so if you're looking at the world that way and you're also then presented with the prospect that you can't use as much of your domestic oil, you may be an increased importer of natural gas, that there are prospects for renewable energy - - and China is investing more in renewable energy than anybody else -- but that you may be a greater importer into the future, and how do you deal with these questions, you can come up with self-interested solutions on your energy security that puts in a direct conflict with your neighbors.

And so bringing this back to international law, regional order, regional cooperation and how to make markets work and be more efficient to give some security that supplies available and multiple places is key. I'm not answering your question directly, but one of the things I do want to you to take directly from this is that to the extent to which you have suppliers who are diversified, competition among those suppliers, and you reduce the prospects of interruption from any one individual actor, that's a good thing in the end for China; it's a good thing for the South China Sea as well.

[01:08:11]

On the question of price and households, a very good question to put on the table. And my comment isn't intended in any way to disparage or suggest that we shouldn't look at that Jeremy Rifkin future energy world where we have a disaggregated energy production, and you have rooftops that are covered with solar panels, and you have individual households that are moving power into a grid, in other cases moving it out, and those are real things that are going to happen in the future.

There are real possibilities in the short term. And in the short term, if you look at this from a perspective of, say, India, and your alternatives are either no power or power that costs you 50 cents a kilowatt-hour because you generated on diesel, and you can have a solar photovoltaic panel that at least gives you four hours of power at 25 cents a kilowatt hour, you may look at that and say it's a good deal, and you -- we should find ways to make that a real commercial prospect. So I'm not trying to suggest that those aren't commercial prospects.

[01:09:24]

But if -- what I'm just trying to get us to think about is that if you're looking at large-scale investments for on-grid, urban power generation, and if you look at the trends that we're seeing in places like China and India and Vietnam and other parts of Southeast Asia today, and then you look at that demand curve for coal, why is that happening, well, then you -- then you start to recognize, OK, one of the reasons it's happening is because not only just the cost but the returns on those projects, right? So it doesn't mean that for distributed off-grid power that we shouldn't look at the full range of possibilities and that higher cost options in some cases may be lower cost than diesel. But we also have to understand that there is another part of the market. And if we don't approach these questions with that level of sophistication, then we can't get the best overall set of outcomes that we're trying to achieve.

[01:10:22]

MR. JONES: Carlos, thank you very much. We're going to have to let you get back to your day job. So let turn to Deborah for a final word.

MS. GORDON: Yeah. I just -- on behalf of all of us, I really wanted to thank you, Ambassador Pascual, for coming by. I mean, I would leave it with, you know, your perspective, but I think your hopefulness is what really rang true to my ears, to this sell-out crowd, at least. You're popular, which is great. (Laughter.) But we're the beneficiaries of all of your years. And just so the audience knows where you're headed next, you'll be teaching at Columbia, writing a book. You -- maybe crowdsource it, you know, you -- (laughter) -- find something here -- and then moving with your family back to Mexico, which is again another hopefulness because I think it's North American energy that's really transforming, and Mexico tends to be the forgotten part of that chapter when you look at Canada and the U.S. So very best wishes, and good luck on the next chapter.

MR. PASCUAL: Thank you very much.

MR. JONES: Thanks, Carlos. (Applause.)

(END)