THE BROOKINGS INSTITUTION

CHINA'S LOW-CARBON DEVELOPMENT

Washington, D.C.
Tuesday, May 31, 2011

PARTICIPANTS:

Moderator:

KENNETH LIEBERTHAL
Senior Fellow and Director
John L. Thornton China Center
The Brookings Institution

Panelists:

QI YE
Director, The Climate Policy Initiative
Tsinghua University

TREVOR HOUSER
Partner
The Rhodium Group

* * * * *

P R O C E E D I N G S

MR. LIEBERTHAL: Good morning. Welcome to Brookings. I'm Ken Lieberthal. I'm director of the John L. Thornton China Center. It's really a pleasure to welcome you here today for this program on "China's Low-Carbon Development." We have two terrific speakers -- one speaker, one commentator, but each will be giving substantial, substantive remarks.

The first is Dr. Qi Ye. Dr. Qi was co-author of the Climate Policy Initiative's recent report, which is a review of low-carbon development in China 2010, and he'll be reporting on that report and its implications.

You all have received his bio. I'm not going to read the whole thing; it would take a long time. Let me just mention a couple highlights. He is currently the -- I think it's pronounced Cheung Kong -- is that correct, Professor? -- Cheung Kong professor of environmental policy at Tsinghua University School of Public Policy and Management. He is also director of the Climate Policy Initiative at Tsinghua. This is an initiative that now employs 27 people, which is, since it only started a year or two ago, is absolutely startling. He has his Ph.D. in environmental science in 1994 from the State University of New York. Taught in California at Berkeley in the late '90s; has been at Tsinghua for a number of years now. For a year ran the Energy Fund, Beijing office -- Energy Foundation, I'm sorry, Beijing office. He is a prolific author and especially publishes on climate change science and environmental policy and how the Chinese system affects environmental outcomes in China. Absolutely fascinating stuff.

So, he will spend about 30 minutes laying out the key essentials of the report that they have done and what the implications are. We'll then have Trevor Houser come up to the podium. Trevor is director of the Energy and Climate Practice at the

Rhodium Group in New York where he is a partner of the Rhodium Group. He also is a visiting fellow at the Peterson Institute right across the street here. He worked for well over a year, but short of two years -- is that right? -- with Todd Stern. Oh, under a year. Under a year. It just seemed like -- anyway, he worked very closely with Todd Stern on global climate issues for the U.S. Mr. Stern is our special ambassador, as I recall, for global climate change. Right? Yeah. And Trevor has written a number of fascinating papers and reports including "Copenhagen: The Accord and the Way Forward," in 2010.

So, we'll first have Qi up for 30 minutes presenting his report and overview. Trevor will then present comments for about 20 minutes. Afterwards we'll have a discussion and moderated Q&A until 12:00. Okay?

Without my taking anymore time, Qi Ye, please come up. (Applause)

MR. QI: Thank you, Ken. It's truly a great honor to be here at Brookings and present this analysis and evaluation of the low-carbon -- we call it low-carbon development policy in China. With me here today is my colleague Kathy and Pat from San Francisco office of Climate Policy Initiative and Kathy is the director of the U.S. programs, and also my daughter, for the first time together with me, she is sitting somewhere in the back.

I would like, today, to report to you this analysis and evaluation of some of the achievements and challenges of China and its endeavor towards this low-carbon green economy. It's a very fashionable terms and I'm going to present today, is quite mixed picture and I will start with something really optimistic and you will think I'm doing the propaganda here and I will -- with a less optimistic tone. So, what I'm going to go is first I'll go over -- give an overview of this low-carbon development in China and some key results in different sectors -- six sectors all together here, and summarize this and

also I would look into the future, the future, I mean, for the next Five-Year Plan, which started earlier this year.

So, whenever we talk about China nowadays, what we think we know is that China is the largest carbon emitter in the world. China exceeded the U.S. in 2007 and became the largest CO2 emitter or the greenhouse gas emitter. And we also know China is the largest energy consumer, started last year in 2010. And the government didn't like this initially then, but later I think, you know, it's more or less the case.

3.2 billion tons of coal-equivalent energy consumption, that's a lot -- a lot of coal -- I mean, that's a lot of energy, and that's just roughly just about 7 billion tons of carbon dioxide, so that is -- which is, when you look at the energy intensity, the energy intensity is just about 5 times of Japan and 3 times of the U.S. The U.S. is not the most efficient economy in terms of energy consumption, but still China is five times of the U.S. Then we may ask -- well, the conclusion naturally comes, is China an inefficient economy in energy terms or in carbon terms? Not necessarily. You know, the picture is a little bit complicated when we dig into the details.

First of all, if we look at the -- in fiscal terms, you know, what does this mean, when you look at the energy or coal use for generating 1 kilowatt hour of electricity? And the bottom line over here, this is being the world -- the best practice in Japan and the top line, that's China, then you can see the gap between the energy consumption for generating 1 unit of power has been shrinking, shrinking very, very fast to 10 years ago. Right now as compared to 10 years ago is more than half of that is cut, that gap. Then the power generation sector has become a lot more efficient as before.

We can also look at the consumption sector, looking at the buildings, for example. If you look at the buildings, the upper part is for per capita and the lower part is

for per unit -- per square meter of energy consumption or CO2 emission, whatever you want to use it. If you look at the per square meter, Chinese here, 28 kilograms of carbon dioxide is released per square meter per year and compare that to, say, the U.S., 87 kilograms per year. So, that's a big gap and compared to, say, Canada, even Japan, Korea, China is a much lower number. This is even more true for the per capita carbon dioxide emission. China's number is 849 kilograms of carbon dioxide per person per year and compare that to the United States, is just about -- almost 10 times, 7,500, and Australia is 6,500 and the world average is 1,326. So, even the world average is just about two times of the number of China.

So, if you look at base consumption sector you will conclude otherwise, China is a very efficient -- energy efficient in those sectors. And we can also look at the transportation, look at the fuel economy standards, China certainly has a higher standard than that of the United States and even higher than that of California.

So, there are a number of factors that, you know, everybody here knows very well is -- one is, China is a very coal-intensive economy for -- the blue part of this is just the coal consumption per year, so natural gas, hydro, petroleum, that is -- that takes a smaller share. And there is a good reason for that and when you look at the energy endowment, the reserve, and China -- the 97 percent of that is coal and the other 3 percent being split almost equally between oil and natural gas. So, the natural resource endowment is very, very different in China.

A lot of people compare the U.S. and China or the left most panel over there. The blue bar, that's the U.S. carbon emission, and the red bar is China, the carbon emission in 2007 when China exceeded the U.S. And the middle one, that's the cumulative emission, of course, the U.S. being much bigger than China, and the per

capita emission, China still is about a -- a few times that of China.

So, the -- but the problem is, the CO2 emission in China has been going up really, really fast. When you look at that red line on the bottom, that's China starting in 1950s and all the way to almost now, then the green line, in the middle, that's the global average, so in the last decade we see this number, the carbon emission in China, has been going up really, really fast. I think that's really the key of the issue. You know, why a lot of people are talking about the problems now. The problem is the world simply cannot afford that rate of growth for carbon emission.

But there has been good news. The good news is, ever since 1980, China has implemented a very -- pretty strong energy policy, energy conservation policy, that's resulted in just about 5 percent per year declining -- declination in energy intensity. That goes all the way from 1980 to the year 2002. However, when -- after that the problem comes. The trend was reversed because of this heavy industry and because of the growth of the energy-intensive industry. So, that is why in 2005, the Chinese government decided to have a very, very strong policy to reverse this trend, to reduce the energy intensity by 20 percent during the 11th Five-Year Plan.

So, how did that policy go? Well, if we put all these figures together and to see this is 2002, all right, and there is upward trend in the last five years, 2006, '07, '08, '09, '10, and the trend has been reversed. I can amplify that trend so you can see the 2005 was very high already, 1.23 tons of energy -- tons of coal equivalent. And as compared to 2009, for example, that's just above 1, 1.10. So, the 20 percent target -- 20 percent cut target, is almost met. Right? By the end of the day is just about a little bit more than 19 percent.

So, the target was met for that part, but when we look at different

sectors, we see very different patterns. The power sector and manufacturing sector, they share a similar trend. For power sector, if you look at the overall emission and that is -- that's shown in brown, then the overall emission has gone up and pretty fast, but when you look at the concentration, the energy intensity and the carbon intensity, that has been declining also quite rapidly, quite rapidly. You see -- this is a result of a number of key policies, renewable energy law, the large -- you know, a lot of the new power plant, much bigger, large-scale power plants, and many -- closures of many smaller power plants.

So, when you compare those numbers, for example, the power industry, the CO2 emissions intensity, so that has been declining from 766 in 2005; 2008 that number is the 716. And you can also compare that for the thermal power generator, so that is even more significant.

So, I can give you this data. I don't want to read all this to you. Basically what happened is renewable energy -- hydro and wind in particular -- have been going up very, very fast. Wind is just about 130 percent increase per year for the installation capacity, and the generation capacity right now is just about 19 percent of the power is generated using renewable energy. So, there has been very, very fast increase. And a major policy is closure of the small and inefficient power plant. During those 5 years, 72 gigawatts of capacity, small and inefficient, that was closed down. Seventy-two, just to give us an idea, that is 20 percent more than the total capacity, total power generation capacity for the entire nation of UK. All right? So, that was removed. Replaced them with larger and more efficient power plants.

This is a figure for the wind power installation. You can see -- the wind installation has been going up exponentially. And manufacturing industry had a similar trend. Basically, the overall carbon emission has been going up very, very fast. The

energy and carbon intensity has been declining also at a pretty fast rate.

And China was very effective in implanting the top 1,000, the most energy-consuming industries, enterprises, and closed a lot of the smaller factories. Last year, in particular, and there are like 2,000 of them were closed, this was at that point generated a lot of problems and generated a lot of dissatisfaction from the business world. And the 10 key energy conservation products was also -- contributed to this overall trend.

We can also measure this by looking at the energy intensity per unit of industrial value added, the same thing, and we gave a number. The National Development Reform Commission, where the Climate Change Department is, they also provided a number. In the 5 years, their number is 680 million tons of coal equivalent saved in that -- during the 11th Five-Year Plan, and that converted to almost 1.5 billion tons of carbon dioxide saved as compared to the frozen technology case.

So, 1.5 million tons of carbon dioxide -- I mean, billion tons of carbon dioxide, that is 5 times as much as the entire Europe -- EU commitment under the Kyoto Protocol. That's a lot of carbon saved, but we have to be very careful. Compared to, you know, what we think as a business, as a Euro, the overall carbon emission is still going up. Otherwise, it will save this.

So, we calculated a similar number using a bottom up approach, so basically that's just confirming their data, you know, for the three categories of policy and for different -- three categories of policy and we give a -- trying to allocate like 27 percent contributed by the top 1,000 program, and 29 percent, the 10 key products, and 22 percent from the small plant closure program. That's for the manufacturing.

For buildings, the buildings and transportation, these two consumption

sectors are quite different than those two production sectors. We see the overall emission, this top figure, is going up very, very fast and -- but efficiency improvement has been very modest. That means -- this is of big concern, right? China is putting in a lot of new buildings. A lot of people say in the next 20 years China is going to build just another USA, I mean, in terms of building volume. So, therefore, the building efficiency, even though per square meter it's not that high, but the volume increase is very, very big factor driving the overall carbon emission from the building sector.

There are some good news. For example, in the district heating, because it was reformed, the efficiency of district heating has improved very significantly and that also helped to save a lot of energy for this sector. And building codes, China has pretty good building codes, and according to the government, 90 percent of the buildings, the new buildings, actually comply. The compliance level has been very high, more than 90 percent, but the problem is there are some problems in the design of the building code. So even though if you comply 100 percent, because the design is not so good, then that can generate a big problem. Right?

For the buildings, if we split the energy consumption savings into different parts, so building codes, 40 percent, and that district heating, 30 percent, and the rest of that being the renewable energy and appliances standard and so on and so forth.

The transportation sector has a similar pattern, so if you're looking at the transportation sector, also the Chinese society now is learning from you guys, from the United States. Everyone wants to have their own car. Then the energy consumption and the carbon emission is going up very, very fast, but the efficiency -- efficiency in the last 11th Five-Year Plan has not been improving very quickly enough. So another sign that's

worrisome, a lot of people want to take more flights, and they want to drive cars rather than to take the public transportation, rather than to take the trains, so this transportation mode, more energy consuming mode, is shown in that five years.

The good news is really in the agriculture sector. Agriculture, it's by far the only sector in China that has an absolute reduction in energy use and CO2 emission. And also when we look at the other greenhouse gas species, the N2O and methane and stayed more or less the same with a little bit decline in that period, but more or less stable. So, agriculture is really the sector we see some good news.

The forestry is another sector that is very interesting. Forestry, due to this large scale reforestation programs in China that was enacted in the late 1990s for other purposes, for purposes other than climate change, but now we see the impact. In these 5 years, from 2006 and 2010, each year sees just about 450 million tons of carbon dioxide to be absorbed by the trees, so that is a really, really good news.

Agriculture we look at not just CO2, but also some other gas species as well as the indirect, the embodied carbon in machinery, in fertilizer. So, still, putting all this together, we see the agriculture and forestry are very good.

Now, some key takeaways. The first one we see, the carbon emission intensity has fallen, has been decreasing, but has been decreasing as a result of the energy intensity decreases, so it's not as a result of the energy mix, not really, even though we see very significant increase of renewable energy in the five years, but that did not contribute significantly to this carbon emission reduction.

Now, it also implies for the 12th Five-Year Plan and the 13th Five-Year Plan, there is huge potential for looking at those renewable energy, non fossil fuel energy options.

Secondly, the most effective policies for China were top down administrative measures. These measures, such as the target responsibility system -- let me just explain that a little bit, whether you know all of this -- there is a national target and that target was a disaggregated amount, so all provinces and major enterprises, and the province provincial leaders are told, you have to get this down. Right? In 5 years, 20 percent, otherwise you lose your job. I'm exaggerating a little bit, but basically that is what it is. The administrative measures -- these administrative measures are -- most times, are not cost effective, right, they are very expensive and also what is different for the last five years is, these mandates were actually pretty well funded by the central government. In the past, this was not the case. The central government does have the mandates, but no funding, but in the last 5 years, that's a different story. So, totally, there are about 200 billion yuan, you know, was invested from the central government, and almost 2 trillion spent nationwide. So, a lot of funding for this.

And because of this, the other parts, the other instruments, particularly the market-based instruments and the legal instruments, the social, participatory, those kind of instruments were not important at all for the 11th Five-Year Plan, and that is a problem for, you know, having this, very high cost. So, therefore, we may say in one word or one phrase, that the policies in the 11th Five-Year Plan were effective but not efficient.

Now, also looking back we see most -- well, many, of the low hanging fruits are gone and looking ahead is going to be extremely challenging for being a new target. The new target is lower, 16 percent for energy, 17 percent for carbon, but still it's going to be really, really hard for China to achieve. And now -- looking ahead for the 12th Five-Year Plan, and we have heard in the news and meetings, it's a low-carbon, green

economy, it's very much emphasized by the national leaders. It sounds pretty much like a national consensus, but we'll have to wait to see -- this is not necessarily the case for the provincial leaders or municipal leaders. I will get back to this in just a little bit. China is trying hard to restructure the economy. However, the success rate of this has been remaining questionable. Emission reduction is emphasized for the 12th Five-Year Plan for the first time, not just energy efficiency, which is good news, it's great news, and also for the 12th Five-Year Plan we're looking at the consumption side management and not just production. But we have to understand that just about two-thirds of all the energy consumed in China is on the production side, right? Another one-third is consumption. In the U.S., just about the opposite, two-thirds on consumption and one-third on production.

China is now looking at some other instruments, policy instruments, emission, trade system, the cap and trade, is -- the pilots are just beginning this year and we'll hear some specific design later this year. The energy performance contracting and being a major instrument used -- promoted by the central government and also carbon taxes is being looked at very seriously. So, it is possible that in the next year or two we'll see some sort of a carbon tax being implemented as well as these ETS pilots.

And in certain provinces in the regions, the government is considering an absolute cap for coal consumption, so this is quite significant because the -- I'll explain the reason. The reason is this, when looking at the 12th Five-Year Plan, the 12th Five-Year Plan specified not only that 16 percent cut in energy intensity and 17 percent cut in carbon intensity, but also it specified the GDP growth rate as 7 percent, right? Remember, 7.5 percent for the 11th Five-Year Plan and do you know what happened in the end of the 11th Five-Year Plan? It's 11 percent, right? And it is almost always the

case.

The 7 percent for the 12th, then right now when you compare the provincial plans you can get very, very much, much higher than 7 percent. It does not really add up to that 7 percent.

The problem, then, is just looking at the GDP growth is specify the intensity target for energy and carbon, but the GDP is going way beyond what has been planned and specified, then that is a major challenge. Because of that challenge, several places -- several provinces in the regions are considering to have absolute cap rather than just the relative terms.

Another challenge is the structure. The Chinese economy is driven mostly by two very important factors -- export, a lot of exports come to the United States; and urbanization. Urbanization has been going up really, really fast. Thirty years ago it was only 17 percent of the entire population living in the cities; now it is just about one-half of the population living in the cities, and it's going up very, very fast rate, just about 1 percent a year. One percent, that means every year will see 13 million people moving from the farm countryside into the cities.

So, these two factors are driving the economy, therefore for any kind of change in the structure is going to be really, really tough. With all that change in the structure and the -- it's really hard to control the growth rate of the CO2 emissions and the Professor Lieberthal can tell you more and better about this.

Technology, international technology transfer is still a hot topic. It was a very hot topic before, but the domestic R&D and deployment is probably even more of a problem for now than that provides another challenge. Financing for low-carbon development and how you can ensure that the money can be channeled into that

direction is a pretty tough challenge for policymaking.

Finally, the market instrument has been talked about and has -- faces huge challenges in implementation, so the -- finally, I would like to end my talk with a few comments about this implication for the U.S., probably more of implications for U.S. and China cooperation.

First is when we look at the size and the rate of growth of carbon emission for both U.S. and China, we are the two largest emitters. It doesn't really make that much difference say who's the first and who's the second, but we are the largest, two largest ones and we bear the same kind of responsibility and the blames, so I think this is why this issue has been -- has to be addressed.

Then the second one is the (inaudible) accomplishment into success that the 11th Five-Year Plan, you can say, really comes from this strong leadership and commitment to address this issue. Before 2007, probably very few in the leadership cared that much, but afterward there has been a really, really big issue in the top leadership. I think that really also needs to be addressed here, you know, in this city, the political will and the leadership.

Restructuring the economy and to a higher value, lower emission industry, that will -- is very important for the -- in terms of carbon emission reduction, and is also going to be extremely relevant for our two countries. Therefore, some overarching top level design of the policies is really important and really important for the two countries to look at this, you know, in more of a concerted way. And for the consumption sector, consumption side carbon emissions is a key problem here in this country. Nobody wants to actually deal with it in the political world, and it is really a growing concern in China. This is not going to be popular. Nobody, no political leader wants to

really intervene the lifestyle of the people, and I know that.

The opportunities, finally, for best practice sharing in energy and in energy efficiency and carbon mission reduction, I think, is very, very -- are very, very important and that is what's going on between U.S. and China on clean energy cooperation and many of you here have participated and helped design that program.

Right now I think it's going well, but we hope to have a larger scale for that collaboration. I want to end with this optimistic than pessimistic tone, then I look forward to the discussion later on. Thank you very much for your attention. (Applause)

MR. HOUSER: Great. Thanks very much. Thanks, Ken, for asking me to come down and it's a pleasure to respond to your report, Qi Ye.

You know, in this town conversations about China's energy policy or action or inaction on climate change generally happens in fairly cartoonish ways driven by people's domestic political priorities, so if you are interested in having the U.S. pass climate change legislation or deploy clean energy, then China is winning the race in clean energy and is about to wipe the U.S. off the map and we're seeing our economic future vanish in front of us. And if you are not interested in seeing the U.S. pass climate change legislation, then it's all smoke and mirrors in China. They're doing nothing but building 100 gigawatts a year of coal-fired power plants and all those wind farms people talk about aren't plugged into the grid.

Of course, neither of those extremes are correct. The truth lies somewhere in between. For China, like any other country, there's a broad mix of policy motivators behind energy efficiency or clean energy deployment, be it energy security, economic development, local air pollution or climate change. And like other countries, China's figuring out in this kind of new area of policy what works and what doesn't. And

so I commend Professor Qi and the folks at CPI for instead of trying to throw one more study on the pile of what's China doing, what aren't they doing. They focus in their study on looking at which policies have been the most effective and the lowest cost. And ultimately, that's what leadership in Beijing is going to need going forward is good, independent analysis of what works and what doesn't in meeting policy objectives. So, I commend you on the study and it's worth picking up and reading.

I think what I'll do with my time today is maybe add a little color on areas of the 11th Five-Year Plan that didn't get as much attention in Professor Qi's remarks. I'm going to talk a little bit about parts of the 12th Five-Year Plan and the energy space, and how they impact the U.S.

So, this is a kind of another version of a chart that Professor Qi showed you, so this is energy intensity of the Chinese economy going back to 1954 and as the professor noted, over the past three decades there's been this dramatic decline in the energy intensity of the Chinese economy. Now, they differ from Professor Qi a little bit here in that he ascribed most of that to active government efficiency policy. I think that was primarily the result of Beijing letting go of the economy, getting out of the way a little bit. That, you know, up until 1979, Mao Zedong was taking a country full of farmers and trying to make everybody make steel, like the Soviet Union, which had dramatic consequences for the energy intensity of the Chinese economy while the rest of East Asia got rich doing light manufacturing, labor intense manufacturing, the stuff that we know China for today.

Starting in 1978, Beijing, in the reform period, began to give firms and households more freedom to choose what they wanted to do for work. They gave state-owned enterprises profit incentive for the first time and started liberalizing energy prices,

and so what we saw from 1978 to 2002 was a dramatic decline in energy intensity of the Chinese economy because people went from making steel with no concern about energy costs, because prices weren't liberalized and they didn't have a profit incentive, to making Barbie dolls and DVD players. And that requires a lot less energy than making steel does, but as Professor Qi noticed, in 2002 that reversed.

Now, unless you think that this little blip right here is (inaudible) what's this? When we look in this whole history, this doesn't seem like a terribly significant blip. What's all the fuss about this little blip? In Chinese energy intensity, if you look at the implications of that blip going forward, just that change, that little change between the relationship between energy demand and economic growth, it caused us to fundamentally realize our expectations about where China's going in the world. Right? So, we go back to 2002, folks in Paris at the International Energy Agency or here in D.C. and planners in Beijing, thought that maybe China would pass the U.S. some time post 2030 in terms of total energy demand. Well, we moved that out by a couple decades.

Today the IEA's forecast for Chinese energy demand in 2030 is about 80 percent higher than it was just 5, 6 years ago. So, that's two Indias of today or an India of 2030 is our kind of margin of error when we think about Chinese forecasting. That had significant implications for international energy markets. It put China on the map in global climate change talks in a way that they hadn't been before, and it focused leadership attention like a laser beam, like Professor Qi said, on bending that curve back down, because this, right here, that type of line, is catastrophic for China. There is no way the country meets its economic development goals with that type of resource intensity. There's just not enough resource availability in the world, price pressures would be too large, et cetera, and so we saw the 11th Five-Year Plan focus, as Professor Qi said,

considerably on trying to bend that back down, improve the energy intensity of the Chinese economy, and they were largely successful in meeting the 20 percent target.

They did that almost entirely through technical efficiency. There's a couple of different ways that you can reduce the energy intensity of your economy. You can do the same set of things, you can continue to make steel, aluminum and cement, you can just do it more efficiently, or you can change the mixture of things, right? It was that change in mixture that increased Chinese energy intensity from 2002 to 2006, and that's what this chart shows here. So this is industry as a share of the economy in China, which, you know, has been largely stable at kind of 45 to 50 percent since 1978, but within industry, the mix of industry that China does has changed dramatically, right? So, from 1978 until 2002, China moved from heavy industry -- steel, cement, aluminum, flat glass, and the light industry -- and then starting in 2002 they switched back into heavy industry, particularly what I call the E-5, the five most energy-insensitive industries, which is iron and steel, aluminum, cement and glass, refining, and basic chemicals. Those 5 industries combined account for about 45, 50 percent of total Chinese energy demand in China. They are the energy story in China today and there was this surge in production in those industries that gave us that big upside surprise in Chinese energy demand.

So, as you can see from this chart here, you know, since 2005, since the beginning of the 11th Five-Year Plan, Beijing has not been very successful in rebalancing the economy away from those energy intensive industries. They are still at about 24, 25 percent of GDP today and that's a problem.

It does mean that there is significant opportunity going forward to deliver big improvements in energy intensity if that rebalancing story finally comes true.

In 2007, we started to see this line change a little bit and there were folks

in the kind of China watching community here in D.C. that were optimistic that Beijing might finally be rebalancing the economy, the Renminbi was starting to appreciate, there was a lot of talk from leadership about increasing service sector activity and decreasing the amount of investment and exports in the economy, and then the financial crisis hit and Beijing doubled down on an investment-led economic growth strategy to get through the crisis, opened up bank lending taps to infrastructure projects, which created lots of demand for steel, aluminum, and cement, the same sectors that increased energy intensity up until 2005, 2006.

So, the imperative to rebalance the economy, the Chinese economy, goes beyond just resource conservation. I mean, it is true that if China wants to develop its economy without straining its own and global resources, it will have to move away from heavy industry towards services, but that's not going to come at the expense of economic growth, that's actually what leadership needs to do to boost economic growth as well. So, what I've done for you here is mapped out about 41 Chinese industries between the service sector as a single industry, based on $1 million…1 million renminbi of investment. On the X-axis is how much energy demand that million renminbi of investment creates, and on the Y-axis is how many jobs it creates, right? So, it's the energy intensity of industries versus the labor intensity of industries. And the size of the bubble is how much energy they consumed 2007 through 2009, right?

So, if I'm a bank and I had a choice between investing a million renminbi in the iron and steel sector or investing a million renminbi in the service sector, if I invest a million renminbi on services, I create three times more jobs than in the iron and steel sector, and that investment will only create 2 percent of the energy demand than investment in the steel sector did. So, if I take these, the E-5 together, they together

create about 14 million jobs a year, that's total employment, in 5 industries that account for 45 to 50 percent of the country's energy bill. And as Professor Qi said, for a country that's needing to create 15 to 20 million new jobs each year to deal with world urban migration, that's a bad strategy. If you're resource-constrained and desperate for new jobs, being that world steel mill is a losing strategy in a wide variety of ways, and that's apparent to leadership. It's less apparent to provincial officials, but it is the reason for the focus on rebalancing on the current plan. To make this a little bit clearer, I've changed the bubble size here to employment instead of energy demand, right, so the service sector is bout 250 to 260 million jobs as opposed to the 14 million of all of those energy intensive industries combined

So, that's where the jobs are. Now, it's not, you know, restaurants and hairdressing and investment bankers and lawyers, it's not necessarily as sexy as, you know, making steel, but that's really what an engine of job creation in a modern economy is. No offense to Jeff. I mean, creating a -- digging iron ore and making steel is good economic activity, too.

All right, so if we think about the energy intensity target for the next Five-Year Plan, 16 percent, compared to the 20 percent, I would agree with Professor Qi that most of the really low-hanging fruit, the really outdated backward power plants, the really outdated steel mills, stuff that's been hanging around, you know, it's basically guys with like open fire pits and ladles making steel. That stuff's been backed out in China, right, and that resulted in a significant energy intensity improvement, so you don't get that anymore because that fruit's been picked, right? But keep in mind that China got that 19.1 percent without doing any structural adjustment in the economy, right, just through technical efficiency, through some GDP revisions and a handful of other measures.

So, you know, people ask me, is 16 percent, is that an easy target or a hard target? Well, it depends entirely, right? If Beijing is successful in achieving their rebalancing goals for this next Five-Year Plan, which is increasing service sector share of the economy and then within industry reducing heavy versus light, they will achieve that 16 percent with no improvement in technical efficiency at all. Right? It would be very easy to do. But if rebalancing gets pushed off for another 5 years, it will be extremely difficult to hit that 16 percent. So, basically it's too hard to tell and that's why reports like Professor Qi's that focus on the specific policies, what are you doing in energy efficiency, matter much more than focusing on, is the headline target met or not, because that will largely be a consequence of macroeconomic trends that -- some of which are in Beijing's control and some of which are not, and most of which are not being driven primarily for energy reasons.

The other significant energy related target that was in President Hu's speech at the U.N. General Assembly in 2009 and has been embodied in the 12th Five-Year Plan is to obtain 15 percent of all energy from non-fossil sources by 2020, and so the 12th Five-Year Plan has the kind of first installment of that, 11.4 percent of energy from non-fossil sources. So, you know, what I did here is kind of give you some context of what that could look like assuming China meets its 16 percent energy intensity improvement, for both this plan and then the next plan, and if GDP grows anywhere from 7 percent, which is the official target. And as Professor Qi said, you know, China watchers in the states, you know, we used to take the kind of official target and say, okay, well, 8 percent, what matters is if it was 8.5 percent in the previous plan and it's 8 percent now, then the most information we get from that is it signifies leadership intention to

decelerate the economy.

The ability of leadership to actually make GDP be what they want it to be is, of course, as limited in China as it is anywhere else, but it's useful signaling information. So, you know, there's kind of clearly an intent to decelerate growth in the current Five-Year Plan from the previous Five-Year Plan. I would be shocked if GDP actually came in at 7 percent for the next 5 years, so taking that as the lower bound and then taking the past 5 years where we saw 10 percent average annual growth as the upper bound, and using as many of the publicly announced renewable targets in terms of capacity as I could find, kind of mapped out how much non-fossil energy capacity China would need to build to meet those targets of the next decade versus what the U.S. is currently projected to build by the energy information administration under business as usual. And then we get a model of a kind of notional cap and trade program and saw how much the U.S. would build under that, right?

So, and the headline is, at 7 percent growth to meet a 15 percent carbon -- non-fossil target, China would need to add 320 gigawatts of non-fossil energy capacity to the grid in the next decade. At 10 percent growth they need to add 480 gigawatts. The U.S. is going to add 40 to 40 gigawatts under business as usual and maybe 70 gigawatts if we actually pass comprehensive climate legislation. Right? So, between a third and a half of all non-fossil energy capacity would get built in China over the next decade if they were successful in actually meeting those targets, and here's some of the breakdown by technology.

I'm not going to go into a lot of the challenges for reaching those targets, there are many, we can discuss them in the Q&A about specific technologies if people have an interest. I think -- I would be very surprised if Beijing was successful in meeting

the kind of upper bound of this. It's just a dramatic expansion of capacity in a very short period of time, but even if they get halfway there, this will transform, fundamentally, the global market for clean energy technology, to be sure. It will change its price points. It will change the relative economics of low-carbon technology versus high carbon technology, and not just in China, but other places. And you don't have to look at things like the China price on Barbie dolls or DVD players to see how that could happen, and solar panels and windmills. You can look at what happened in coal-fired power plants and other energy technologies.

So, you know, between 2004 and 2010, China added, on average, 60 to 70 gigawatts of coal-fired power per year to the grid, a UK size of coal-fired power, and in the process of doing that dropped the price of a coal-fired power plant from $2,000 for installed kilowatt to $500 per installed kilowatt. Right?

If you see anything like that price trend happen in non-carbon, low-carbon technology, then that will significantly change the economics. But what's really interesting about China is that while they're adding 320 to 480 gigawatts of low-carbon technology, they'll also be adding 400 to 500 gigawatts of coal-fired power capacity. Right? China's very unique in its ability to be the price setter of both of those technologies at exactly the same time.

This is an IEA forecast, the kind of rosy, new policy scenario, IEA forecast if we all kind of joined together and addressed climate change and enact all our policy ambitions, and even there, you know, China's adding about a U.S. worth of coal-fired power capacity over the next decade.

So, since finishing my one-year stint in D.C. that felt like a two-year stint in D.C., and returning to New York where I deal with firms and the financial sector trying

to understand how's China's energy sector evolution going to impact energy prices in the U.S., the value of companies in U.S. and Europe, this is the largest question right now, I would say, about China's energy future, is, what exactly that coal mix looks like. And that's going to be driven in large part by what happens to those non-fossil targets as well as what happens to growth. And this is why it matters. Everybody knows the China import oil story, right? 1993: China becomes a large net importer of oil. And then by 2004, 2005, we have this surge in Chinese demand that drives up prices in the international oil markets and oil watchers around the world start paying very close attention to what's happening in China.

We're starting to see that happen in coal, too. Never really considered to be a globally traded commodity in the way oil was, but is increasingly becoming so in large part because of China. In 2009, China became a net importer of coal for the first time in its history in a real way. Now, net imports still only account for about 4 to 5 percent of Chinese coal consumption, but 4 to 5 percent of 50 percent of the world's coal consumption is a pretty big number in absolute terms, as shown on the inset here. So China's imports in 2010 of coal, 166 tons, is about the same as what Japan imports or EU imports. But if you look at the swing, China's net export position in 2005 to net import position in 2010, that's 260-, 270 million tons, which is like taking out all of Australia's coal exports or Indonesia's coal exports. It has left a gigantic hole in the Asian coal market that's fed through into the European coal market and into the U.S. coal market, and that's impacted prices for coal in the U.S. here in the same way that China's impacted prices for oil. So this is a U.S. price index and we have natural gas, which has seen this dramatic decline in price because of shale, gas is the most localized fossil fuel in the U.S. now, versus oil and coal, which are increasingly globalized.

And so this is, you know, you can kind of imagine these prices continuing under the fairly rosy picture of subdued Chinese coal demand because China's successful in actually meeting its non-fossil energy targets. The problem is, if you think about the different GDP growth forecasts for the next 10 years and you couple that with prospects of China meeting its non-fossil energy target, then you get, in 2020, about a -- this is in million tons of coal -- million tons of oil equivalents divided by .7 -- this would be about 1 billion tons of coal is the swing here, in 2020, of demand. Now, that's -- the bounds are China grows at 7 percent and only meets a 10 percent non-fossil target. China grows at 10 percent, only meets a 10 percent non-fossil target. Sorry, this is 15 percent non-fossil, that's 10 percent non-fossil, right? So, the difference between those two is a billon tons of coal demand, right. That's a massive, massive amount of uncertainty just a decade out.

These projects take a long time. Maybe Jeff can tell us how long it takes to kind of plan a large coal infrastructure project, but to have a billion tons of global coal demand uncertainty a decade out is a big issue. It's a big issue, and it will impact the price of power here in the U.S. because people can't adequately plan capacity. And my concern is -- and I'd be interested, Professor Qi, if you have any thoughts on this in the Q&A -- is that, you know, like I said with the GDP targets, we always assume nobody in China really takes them seriously, right. It's sentiment. But when you look at the non-fossil targets, they are -- when you look at the capacity announcements for 2020, they are assuming 7 percent GDP growth, right? So, my question is, if I'm in Beijing, if I'm at the NDRC, am I only approving coal mines and coal-fired power plants based on an assumption of 7 percent growth and an assumption that I'm actually going to be meet that 15 percent non-fossil target? Because if that's true, then we're looking at a gigantic push

in the import markets for coal from China in the next 5 to 10 years with some pretty significant impacts for prices in the U.S.

So, with that, lots of work for CPI in the years ahead. Glad you'll be doing it. Keep us updated what you learn. We'll be very eager to know what our power price in Ohio is going to be. (Applause)

MR. LIEBERTHAL: We're waiting for the mic to be turned on, which should be momentarily.

First of all, thank you very much for enormously rich presentations. As you all can imagine, being able to sit there and really go through these slides in detail would be extremely informative. I'm delighted to say that both of our presenters have agreed that we can post their slides on our website, so we will have them up within a day or so and they will be available to you.

I want to open it up for Q&A in just a moment. When I do, let me ask that you raise your hand, when you're identified, please say your name, what your affiliation is, and please ask a question. You know it's a question because it ends in a question mark, and so please be short and clear and make it a question. We'll have roving mics and wait until the mic comes to you before you ask your question.

I wanted to ask just one question before we open it up and that is as follows: Trevor stressed that the savings, 16 percent target for the 12th Five-Year Plan, will be relatively easy to reach if the anticipated rebalancing, structural rebalancing in the economy occurs, it's going to be very tough if it does not occur. A question for Qi Ye is is it going to occur? And especially, what is your thinking behind your bottom line answer?

MR. QI: Well, let me first say I think the rebalancing of the economy, which is really the key right now for the entire 12th Five-Year Plan is going to be a really,

really challenging job. When you just look at the opening year this year for the 12th Five-Year Plan, almost every trend we see now is telling us the opposite. So, I think if that is indeed the case, and combined with Trevor's argument, then we'll see that 16 percent is going to be really, really challenging to answer that question.

I think the -- just like what we saw last year for meeting the target, the 20 percent target, the last -- the May 2010 and the central government realized there is a huge challenge to achieve a 20 percent target, and they acted very quickly and very forcefully. So I would like to see that kind of determination. However, I see there has to be a better way than that kind of campaign style measures to reduce it.

So, I want to -- you know, since we still have 4-1/2 years to go, 90 percent of the time, so I would like to remain optimistic.

MR. HOUSER: Okay. In principle.

MR. QI: In principle.

MR. LIEBERTHAL: Core to this, I think, correct me if I'm wrong, is that the operational incentives for territorial leaders, from the province on down -- province, city, county, township -- remain to maximize GDP growth year after year. And that generally is most easily done by capital intensive investments which generate jobs. I mean, there are just all kinds of good things to them if you look at it from the perspective of that territorial leader, but that runs in -- directly in the face of rebalancing. So unless you can change those incentives in a really significant way, you don't change the operational behavior, but especially during a period of political succession, it's extremely hard to spend a lot of political capital changing those incentives. So you're probably waiting until 2014 or so after the new leadership has come in and been in place for a year or so to kind of get consolidated before you can anticipate measure measures in that

regard. Is that right?

MR. QI: I totally agree with you. I think the incentives are really the key for -- the incentives for provincial and local government officials and local governments in general is really the key here. However, I do want to note that the incentive structure changed considerably. I liked your overall description, you know, of what's going on. I think the 11th Five-Year Plan was the five years when we saw considerable change in that the mix of the incentives, the structure of the incentives. Take the environment, for example, right, the -- well, not only see the weighting factors for performance evaluation in the central government, the rules, but also there are a number of other changes in -- for the pollution reduction, not really in this energy saving, but for the pollution reduction part, that really changed quite considerably.

I also agree with you that for the last five years, it's probably easier to change because, you know, with this -- the political -- the administration, you know, no change -- no major changes in the administration, but for this Five-Year Plan, it may pose a much bigger challenge including the incentive structure.

MR. LIEBERTHAL: Thank you. Let me open the floor. Yes, sir. Back here. The first gentleman with his hand up.

SPEAKER: Stan (inaudible) from OCA (inaudible) D.C. chapter. My question to Professor Qi is we know in here we always talk about government control or market driven. Which way is the effective way? And I see that you talk about everything about a policy from the government. I'd like to know if energy prices change in recent years, and also in China, if China's energy price change a lot is it possible to drive, you know, the energy consumption efficiency better? Thank you

MR. QI: Well, thank you for -- that's a great question. Actually, for any

kind of study policy effective analysis, that's one of the fundamental challenges that we face, is it's really hard to sort which is more fundamental than the other one. And for the case of 11th Five-Year Plan, we believe the -- and from our analysis, we believe it's the policy, this top down administrative measures, were really the key to drive this energy consumption. However, I want to note, in some different sectors, the sectors related to the consumption side, for example, which often -- which -- some sectors are more sensitive to the price changes, that can attribute to the market forces, but, unfortunately, we didn't give a quantification, which part contributes how much, we didn't really do that.

But adding that to my comments, it's because of this top down administrative measures, so that makes the whole thing very expensive. So we would hope for the next Five-Year Plan and later and beyond, and we have more of a role played by the market.

MR. HOUSER: Sure. I mean, I think that one of the most useful findings from Professor Qi's study is that, you know, the things that worked in the last plan aren't going to work so much going forward, and I think electricity pricing is key to that. So if you look at the renewable energy deployment targets, for example, adding wind capacity, the way that wind has been incentivized in China is that there's a feed-in tariff, so if you generate wind and you do it to spec, the grid has to buy it, and they have to buy it at a premium, right? Now, because of concerns about inflation NDRC has not increased residential or industrial power prices, specifically to compensate those renewable energy producers.

Now, if you're talking about wind being 1 percent of generation, then the state grid will take the hit to be a good corporate citizen, it's not a big issue. If you're talking about renewables being, you know, 20 percent, 30 percent of power generation in

some provinces, there's no way you can successfully incentivize that deployment and get full cost recovery both to the producers and to the grid without fundamentally rethinking electricity pricing. And that's a challenging structural issue in China that they were able to kind of dodge the past five years and I think they're going to have tackle head on if the failing lofty ambitions in the next plan are going to be met.

MR. LIEBERTHAL: If I could just add to that, the price of coal has gotten high enough that a lot of power plants are no longer producing at full capacity because they're losing money with every kilowatt hour that they generate. So, again, the authorities are kind of caught between, do you contribute to inflation by raising electricity prices to consumers of electricity, or if you aren't willing to do that, how do you make this a profitable operation for power generators? And so, you know, these things are just -- there are no simple solutions to any of this.

Yes, right back here.

MS. RAND: I'm Sally Rand. I'm with the U.S. Environmental Protection Agency. We do a lot of work in the non-CO2 greenhouse gas area and sharing with best practices with China. I was wondering if Dr. Qi or Trevor could expand on either work that you've done or knowledge that you expect through the next Five-Year Plan that will focus on the non-CO2 gases.

MR. QI: Well, actually one of the recent studies we are doing is to work with the Ministry of Environmental Protection to review the pollution reduction policy for the 11th Five-Year Plan. And I think that's -- well, unfortunately, these two are divided into two agencies, one in Ministry of the Environment and the other one is the NDRC, which they are treated in one agency, also. EPA has a great collaboration with MEP in China on this. So, basically I see the MEP, the pollution reduction policy were better

implemented and achieved more in terms of achieving its target. So, I see for the 12th Five-Year Plan it's now -- we have two more pollutants added to that and it's going to be a lot more challenging. No major new policy innovations so far ever since 2007 on that. I think it's going to be very challenging for the next five years.

MR. LIEBERTHAL: I've decided to stand up so the people can see who I'm pointing to to be recognized. Right over here, this gentleman.

MR. MacDONALD: Lawrence MacDonald, Center for Global Development. Thanks for terrific presentations, and thanks, Dr. Lieberthal, for organizing this. My question has to do -- Dr. Qi, you mentioned the importance of leadership and as you know in the United States now we have one of our major parties basically where climate denial has become the new ideology, and I'm wondering about the interaction between that climate denial and the highly politicized nature of the climate debate in the United States in Chinese policy. Is China going to pursue these policies for its own reason regardless of the U.S. position? Or is there some sort of a feedback between policies pursued in the United States and those in China? Thanks very much.

DR. QI: Well, that's a great question. We actually looked at that question a couple of years back and like we look at all these achievements that China has achieved in the last five or so years, it's really driven by domestic concerns rather than by this global climate change. We can all (inaudible) that into climate change response, but really it's driven by domestic concerns. Therefore, looking ahead for this coming five years, still I think the domestic concern, the driver, will play the major role. Therefore, I think, you know, what's going on inside China is going to continue to drive, therefore, the climate policy in the next five years.

However, we do -- I mean, as an independent scholar, we would like to

see leadership all over the world, particularly here in the U.S., right, but I think the Chinese response is from the domestic factors.

MR. HOUSER: Yeah, I mean, I guess I would add, I think that's generally true and 90 percent, let's say, 95 percent of the impetus is domestic concerns, climate change being least on the list, right, so energy security, local environmental pollution, supply diversification, et cetera. That said, I mean, nobody likes being the biggest emitter in the world. We've been the biggest emitter in the world for a long time and we're happy to pass that mantel onto someone else. And, you know, I think the past couple of years has been a little bit of a wakeup call for Chinese leadership in terms of what type of reputational risk there is internationally in this space.

So, you know, how China's viewed, are they being responsible participant or not, matters at the margin particularly if it looks tough to meet some of these domestic policies, raising the cost of failure so that there's not just a domestic cost to failure, but there's an international reputational cost to failure. That cost to failure is completely nonexistent without any action from the U.S. I mean, it's just -- you know, the paralytic state of U.S. energy policy is a Christmas gift for Chinese leadership in terms of international pressure on climate change.

MR. LIEBERTHAL: We've now got the banner headline from this presentation: The Paralytic State. Yes, ma'am, right back here.

MS. JOHNSON: Hi, I'm Laurie Johnson from the Natural Resources Defense Council. Just two quick questions. I would like to see what the speakers have to say about the scramble for competition for jobs in the clean energy race, and so forth. And then the other, Trevor, if you could say a little more about increases in coal prices, I think that's what you were getting at, from globalization, and what impact that might have

in energy markets in the U.S.

MR. QI: I actually -- I liked very much Trevor presented that the perspective, you know, looking at the restructuring of the Chinese economy considering the urbanization as an opportunity or as a pressure for creating jobs. That -- I very much like that perspective.

I think the -- and also I liked from Trevor's presentation is it distinguishes between the national central government leaders and provincial and local government leaders. They treat that quite differently.

So, in both job creation and energy saving and climate change response, I think that this would be -- this is one of the top priorities for the national government, not necessarily the -- as the same kind of priority for the provincial leaders.

So, as Ken just talked about, if you rank the job creation, GDP creation, you know, other things, this probably does not really come to the very top for the local leaders, but it is very serious challenge for the national leaders. I don't know if I answered your question.

MR. HOUSER: Yeah, I think that, look, I mean, to be frank, the narrative that we're going to create enough local demand in the U.S. relative to global scale to get first mover advantage, create manufacturing ecosystems here so we can dominate in clean energy, is like five years too late. I mean, it's just -- it's very difficult, even under an ambitious domestic policy scenario; it's difficult seeing that type of manufacturing eco-structure across the low-carbon spectrum showing up here.

That's not to say that we aren't going to be competitive in parts of that value chain. In particularly IP-intensive, capital-intensive parts of the clean energy value chain; I think we can be competitive in domestic policy. It's certainly going to help

increase that competitiveness, but the market for this stuff is going to be in China and other places, even if we get our act together here.

What's interesting about that is, you know, if you imagine a decline in non-fossil technology prices, anything like we've seen in coal-fired power in China or in light manufactured goods, MPV and wind and biofuels in the years ahead, coupled with what will continue to be very constructive Chinese demand pressures on coal prices. I think the relative economics of low-carbon versus high carbon energy in the U.S. are going to change significantly relative to what we're thinking of them being today. And the interesting thing about that is that actually gets -- the more successful China is in achieving its targets, the greater that gets. Right? I mean, the more successful China is in meeting non-fossil targets, the more likely it is that those prices are going to be competitive here in the U.S.

The faster the Chinese economy grows, that means more non-fossil technology and more coal demand, which then further kind of pushes those divides. And I don't think that's -- you know, when those of us in the kind of modeling community, when we do technology cost curves, when we kind of look at energy system transformation, we're looking at kind of Western experience, not Chinese economies of scale China price experience. And I think once you start factoring that in it can change things in pretty significant ways.

SPEAKER: (inaudible) natural gas (inaudible)?

MR. HOUSER: Well, in the U.S. -- I mean, what will happen first, of course, as China drives up coal prices is a gigantic switch to natural gas, right, just because the timing is not right for low-carbon. In China, there is -- I mean, there are very -- folks generally focus on the energy efficiency targets and on the non-fossil energy

targets. The natural gas targets in the Five-Year Plan are very ambitious as well going from 4 percent to 8 percent, I think, of primary supply. There is a lot of conventional gas in China, onshore China. There is the prospect of a lot of shale gas, maybe 2015 and beyond. For the next decade that gas is primarily going to go to residential, industrial, and commercial use where the tariff is higher and where it's competing against LPG and other oil derivatives that are very expensive. So we're not going to see a large role for gas in the power sector, I think, in the next decade, but post 2020 that could definitely change. You could see large-scale coal gas switching after 2020.

MR. LIEBERTHAL: Well, we're generating a lot of hands here now. Please keep it very short because we've only got five minutes left.

MR. NIAS: Doug Nias from the University of Maryland. As an economist, your reference to carbon tax, of course, appeals to economists, but not so much to the bureaucratic capitalists in Beijing. What role do you see in the next Five-Year Plan for carbon taxes, which could be used to compensate consumers in households for increased electricity costs and so on?

MR. LIEBERTHAL: Carbon tax in the 12th Five-Year Plan? You mentioned that in passing.

MR. QI: I mentioned that, yes. The carbon tax is a vague term. It can include a number of different things. We don't have a carbon tax right now, but there is a discussion about implementing a carbon tax in the next year or two, but there are things that can be classified, categorized, as carbon tax, fuel tax, for example, can be. So, that is already there. Then for the 12th Five-Year Plan I do not really see the carbon tax, per se, you know, the narrowly defined, is going to play a major role in bringing down the energy intensity and carbon intensity, but because it's only at the experimenting phase.

But if the carbon tax is in place for the next year or two, then the next Five-Year -- the 13th should play a very important role, and they are actually -- the carbon tax and the cap and trade, as economists you know this well, are going to target very different things, right, you know, one probably primarily on the production side, and the other one on some other category. But I -- to state it simply, I don't think it's going to play a major role in the 12th Five-Year Plan.

MR. LIEBERTHAL: Yes?

SPEAKER: Kevin (inaudible) with the Carnegie Endowment for International Peace. When we talk about energy intensity in China, we're talking about two indicators: energy and GDPs. (inaudible) China's energy or GDP as a provincial (inaudible) that are both much higher than the national figures. So, if I am a head of a provincial government, I can simply under report energy consumption and over report the GDP figures to meet the government target for the 12th Five-Year Plan, which is actually very difficult to avoid on China's statistical connection system. So, how to avoid that, how to verify, the energy intensity reduction (inaudible) in the future? Thank you.

MR. LIEBERTHAL: Okay. So, the issue is verification of reporting. Right.

MR. QI: Thank you, Kevin. The GDP reporting is -- there is a disincentive for reporting GDP and higher GDP simply because that is related directly to the pollution reduction. The pollution reduction is -- the target, is calculated on your GDP. The amount of pollution is just a factor -- multiply factor in the GDP, so there is a disincentive there. If we're reporting that one, you can achieve the energy target, but you're going to lose the pollutant -- pollution target.

That being said, November 2007, there was a -- it was a national policy

implemented, it was for data collection, monitoring, and performance evaluation for GDP -- I mean, for energy intensity. That has been implemented for the last couple of years and is being revised to fix the possible loopholes on that. I think in general the provincial-wide -- that is that should not be a problem because the calculation is pretty easy to do. For municipal level or county level is going to be a problem, it's going to be a problem, it's not that easy to get the number right.

MR. HOUSER: Yeah, and I think there's all the reasons internally why China needs to come up with a robust verification system if provincial performance and governor review is going to be based on success.

Externally, I am less concerned about our ability to verify whether a 16 percent carbon intensity target is hit or not, for a couple reasons. GDP is a soft statistic everywhere. It's particularly soft in China, in a statistical system that was production-based, right. I mean, it was used to kind of counting things that state-owned enterprises did, which means by definition it undercounted the service sector, right? And so we're seeing series of statistical revisions that are starting to get a better hold on service sector activity and that's going to continue -- GDP is going to continue to get revised. It's not a robust statistic at an absolute level.

What matters more, I think, is some of what Professor Qi focused on in his report, is looking specifically at policy effectiveness, right, so how much is the technical efficiency in steel mills improving, because that's more concrete to assess. How much is building efficiency improving? How much of that is attributable to policy? Those are the things as an outside observer that I want to look to to see is China actually taking action, in large part because if China rebalances its economy in the ways that I mentioned, it will help reduce energy demand in China. It will increase energy demand in

other places because that steel mill or cement kiln is going to get built somewhere to meet Chinese demand. It might get built in the U.S. South with cheap power from the Tennessee Valley Authority. It might get built in Brazil next to iron ore mines. So from a global climate standpoint, it doesn't tell you that much about how much closer you are to the prize.

MR. LIEBERTHAL: Unfortunately, our time is up. I do have one question to wrap up that could probably have a two-word answer to it, so let me ask it, which is, we've been told repeatedly that a hard criterion for evaluation of provincial level leaders is how they perform, how they performed on the energy efficiency targets in the 11th Five-Year Plan. Is there any provincial leader who has verifiably lost his job because of poor performance on energy?

MR. QI: Not as I know, Ken, but you are really -- you know, the world expert on this issue is provincial leaders are more of political leaders. Right? Their promotion or their use on the job is evaluated in many different ways, more political than the lower level government officials.

MR. LIEBERTHAL: Right. So, but my concern is that when it's described as a hard target, but somehow never becomes hard enough to cost a job, it's a different kind of --

MR. QI: I look at it differently, Ken. I -- that requirement should be there, right, and then the provincial leaders can pass that pressure to the lower level, which they can hold them accountable -- the mayors accountable. I mean, if the mayors can achieve that, the target, normally they have a higher target, then it will make easier for the political leaders to achieve their job. It's -- it feels different, but I think need to be there.

MR. LIEBERTHAL: Thank you very much. This is an enormously rich

topic we could spend a long time on it. I want to remind you that these slide sets will be available on our website. They contain just a tremendous amount of information. I want to thank both Trevor Houser and Professor Qi Ye for coming and joining us this morning.

(Applause)

* * * * *

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

Notary Public in and for the Commonwealth of Virginia

Commission No. 351998

Expires: November 30, 2012