DEPARTMENT OF ENERGY
+ + + + +
NATIONAL COAL COUNCIL

+ + + + +

2013 FALL FULL COUNCIL MEETING

+ + + + +

FRIDAY
NOVEMBER 1, 2013

+ + + + +

The Council met in The Washington Court Hotel, Grand Ballroom, 525 New Jersey Avenue, N.W., Washington, D.C., at 9:00 a.m., John W. Eaves, Chair, presiding.

PRESENT

JOHN W. EAVES, Chair, National Coal Council
JEFFREY L. WALLACE, Vice Chair, National Coal Council
JANET GELLICI, Executive Vice President and Chief Operating Officer, National Coal Council
FREDERICK D. PALMER, Coal Policy Committee Chair, National Coal Council
GREGORY A. WORKMAN, Finance Committee Chair, National Coal Council
DAVID F. SURBER, Communications Committee Chair, National Coal Council
HOWARD K. GRUENSPECHT, Deputy Administrator, U.S. Energy Information Administration

ROBERT BRYCE, Senior Fellow, Manhattan Institute

C. THOMAS ALLEY, JR., Vice President, Generation, Electric Power Research Institute

DIVYA REDDY, Analyst, Global Energy & Natural Resources, Eurasia Group

PETER W. DAVIDSON, Executive Director, Loan Programs Office, Department of Energy

LARRY GRIMES, Legal Counsel, National Coal Council

TABLE OF CONTENTS

P-R-O-C-E-E-D-I-N-G-S

9:01 a.m.

CHAIR EAVES: Good morning, ladies and gentlemen. My name is John Eaves and I am chairman of the National Coal Council. The Fall 2013 Meeting of the National Coal Council is hereby called to order.

This morning we're very fortunate to have a number of very special guests. We're pleased to welcome this morning Deputy Administrator of the Energy Information Administration, Howard Gruenspecht. EIA provides valuable services to the energy industry and we look forward to hearing Howard's remarks this morning related to the coal industry. Thanks for being here, Howard.

I would also like to acknowledge the agenda participation of Peter Davidson, Executive Director of DOE's Loan Program Office. We're eager to hear about the update from Peter on the Advanced Fossil Energy Project Solicitation. Thanks for your

attendance, Peter.

I'm also pleased to recognize Robert Wright, a Senior Advisor in the Department of Energy's Office of Fossil Energy, as the Federal Designated Officer. Welcome, Bob. Good to see you again.

We have other exceptional speakers on today's agenda as well. They are Robert Bryce, a Senior Fellow with The Manhattan Institute, who will provide an interesting perspective on global energy trends and how electric demand is driving coal demand;

Tom Alley, who is Vice President of Generation with EPRI, who will share with us EPRI's perspective on flexible supply generation; and finally, Divya Reddy, a Global Energy and Natural Resource Analyst with Eurasia. The group will share the lessons learned from Europe's experience in implementing CO2 emissions mandate.

We also have some Council business to attend to today, so we can see we've got a

full agenda this morning.

However, before proceeding any further, I'd like to acknowledge one of our members who recently was acknowledged for his life-long accomplishments. Last week, the Washington Coal Club presented their Lifetime Achievement Award to Dick Bajura, Director of National Research for Coal and Energy at WVU.

Dick, if you're here, would you please stand?

(Applause.)

Great job, Dick.

Okay, so now down to business. This meeting is being held in accordance with the Federal Advisory Committee Act and the regulations that govern that Act. Our meeting is open to the public and I'd like to welcome guests from the public who have joined us today. An opportunity will be provided to the guests to make comments at the end of the meeting.

Full and complete minutes of this

meeting are being made, as well as a verbatim transcript. Therefore, it's important that you use the microphone when you wish to speak and you begin by stating your name and your affiliation.

Council members have been provided a copy of the agenda for today's meeting. I appreciate having a motion for the adoption of the agenda.

(Moved.)

Can I have a second?

(Second.)

All in favor?

(Chorus of ayes.)

Thank you.

Our first speaker this morning is Deputy Administrator of the U.S. Information Administration. Over the past 35 years, he has worked on energy-related environmental issues. He's also served as Senior Staff Economist at the White House Council of Economic Advisors. He's also served as

faculty member of the Tepper School of Business, an Economic Advisor to the Chairman of the U.S. International Trade Commission. He has a Ph.D. in Economics from Yale and a B.A. from McGill University.

Please welcome Dr. Howard Gruenspecht.

(Applause.)

DR. GRUENSPECHT: The most important words John said were "verbatim transcript." To me, that translates as to be careful.

(Laughter.)

Thank you, John, for the kind introduction and good morning to everybody here. For those of you who don't know already know us, the U.S. Energy Information Administration is a statistical and analytical agency within the Department of Energy that collects, analyzes, and disseminates independent and impartial energy information. That information encompasses both data and

also as part of our mission we provide forward-looking forecasts and projections which is unusual for a federal statistical agency but it is part of our mission.

Because EIA does not take positions on policy issues and has independence with respect to the information it provides, my view should not be construed as representing those of the Department or other federal agencies. So with that a disclaimer, like I'm sure you guys have this page of disclaimers in like tiny print, you know. That's enough for me.

Let's roll forward. Next slide or maybe I can do that myself, if I was smart enough to -- there you go. Passed the first test.

So what this is about is just putting coal into the larger context of U.S. energy. Primary energy is shown on the left hand side with quantities shown on quadrillion BTU. EIA, I guess, we should have pounds and

shillings as well, whistle back in the old measures, but in rough terms one quad is 172 million barrels of oil, 50 million tons of coal or a trillion cubic feet of natural gas. The sectors that use primary energy are represented on the right hand side, again, with the quantities of primary energy used and the spaghetti, it's probably impossible to read this thing from a distance, are the source-sector links.

So the idea if you go down to nuclear, 100 percent of the nuclear energy is used in the electric power sector, so that's why there's 100 on that little line collecting nuclear energy in the electric power sector, and 21 percent of the primary energy that goes into the electric power sector comes from nuclear.

So one thing that you can see is that many energy sources, not most, are tied particularly to one demand sector. So I mean coal is of the most interest to you and so

looking at the coal box, the 19.7 quads or 20 percent of U.S. energy, if you look at the three lines running out of it, 92 percent of the coal is used in the electric power sector. And on the uses side of the slide, so tracing that link to the electric power sector, 46 percent of the primary energy used in electric power comes from coal. So many different fuels are used to provide energy to generate electric power, but coal is the largest source of energy for power generation by a significant margin in 2011. This happens to be 2011 and it's still obviously true today.

So the future of domestic coal use is inextricably linked to its use for electric power generation which led me to focus on the outlook for electric power and coal in this presentation.

It is interesting though how many of the fuels -- so coal, nuclear, and petroleum are really, it's like one dominant source sector link. And renewables and

natural gas, you have really more variety. Natural gas is used almost 30-30-30, if you will, in buildings and electric power and industrial. But coal is like many of the others in having a dominant use.

So here's a snapshot of the 2012 generation mix. Coal-fired plants are the leading provider of electricity despite the decline in share of generation provided by coal between 2007 and 2012. I mean it was up over 50 percent in 2007. It has come back a little bit in 2013. We can talk a little bit about that later. But coal is very important to electric power, despite what's going on.

The issues surrounding coal like in issues surrounding energy, in general, are often discussed at the national level everything I've done so far. But it's important to recognize that there are very significant differences in the generation mix across regions. For example, oh, this one is not. This is prices across regions. That's

the other way around. So let me go to -- here's the fuel mix for generation across regions. So this map kind of shows, I'll pick something else. I'll pick the Northwest power pool in the upper left hand corner and they've got a lot of hydro, that yellow piece is more than half of their stuff.

So if you look at coal, the top line, the blue line, and the blue in all these pies, the national average is I guess -- was 42 percent in 2011, but going by region, you know, the minimum was zero. That's pretty low. And the maximum was 80. That's pretty high. So sometimes we like talk about these things at the national level, but it's not really like where they are. You almost have to look at it a little more diverse.

Let me go back now. One of the things that drives some of these differences across regions have to do with prices and prices of coal, while natural gas prices -- natural gas prices within the United States

are fairly well converged. I mean cold snaps where transmission capacity gets stretched and you get big basis differential across locations, but other than that, which is sort of a short, shorter term kind of phenomenon, you really do find natural gas prices specifically delivered to electric power customers not that different across regions of the country. But coal prices delivered to electric generators are really different across regions within the United States. And clearly what matters to the competitiveness of coal is the economic situation and price is one part of that economic situation in the area where a particular plant operates.

And differences in the average delivered price of coal across regions often reflect the role of transportation costs. You all know this, that can account for two-thirds or more of the delivered price of western coal to generators in the East.

Of course, the actual economic

situation is even more complex because besides these huge regional differences, you also have differences across individual plants within the regions depending on exactly how they're situated and what contracts they have. And you even have within an individual plant maybe some mixture of spot coal and contract coal and those might have very different costs. So you might have a take or pay situation for some volume which essentially makes it very attractive to take that volume. You may be paying a lot for your marginal supply if your contracted amounts don't -- so it's just a very -- the problem with doing anything with energy is it always down, the devil is always in the details and there are a lot of details. So just encourage, and I'm sure you do this every day in your business, but somehow in the national discussion, we have to think more about the details because the details matter. And the average necessarily doesn't mean that much.

So let's see where we are now. This is fuel mix. We did that.

So let me turn a little bit, you know, obviously the future is yet to be written. I sound like Lawrence of Arabia. For some men, nothing is written. But I think it's useful to consider the outlook for coal-fired generation in the United States and some of the key uncertainties that surround it. The physicist, Niels Bohr, sounding like Yogi Berra, you know, observed that prediction is very hard, especially if it's about the future. So what I presented so far is kind of data and we can argue about it if we like, but it is what it is.

But in the future, you know, it isn't written and prediction is very hard.

EIA approaches that by including many alternative cases in its outlook in recognition of the uncertainties inherent in making predictions about energy markets in general and coal's future in particular. And

many of the alternative cases that we look at have important implications to the projected role of coal in future electricity generation.

I kind of want to spend the rest of the time and it's not all the time because I'm hoping that you folks will want to engage a little bit, but talking about some of those issues looking forward.

This is one last -- now that I said that, I want to look back one last time. So one critical market factor affecting the outlook of coal generation is clearly the price of natural gas. Unlike the oil market, the current market for natural gas is not very globally integrated and the way I'm trying to illustrate that is to show that since about 2008, you've really had a break, if you will in gas prices. Henry Hub in Canada, the two blue lines at the bottom and then you have your kind of Europe -- these are some of the European spot prices, actual prices in Europe are sort of a mix between spot prices and some

oil index prices. It's sort of moving more towards spot prices. It's clearly higher by a significant amount than the U.S. prices. Japan gets all its natural gas in the form of liquified natural gas. And that red line is their prices, what they've been paying. And you can see that that's a whole lot different than the U.S. and Canada.

And the top, I just put oil, Brent oil in BTU terms just as a comparator. So Japan, natural gas delivered costs about as much as oil on an energy content basis. In Europe, it's significantly less. And in the U.S., it's a lot less.

You know, I'm not sure what to say about this. Each $1 per million BTU difference in the price of natural gas translates into a $7 per megawatt hour difference in the cost of generating electricity from an efficient combined cycle plant. So like a $12 or let's say there's a $12 spread between blue lines and Japan's

line, that translates into a more than $70 per megawatt hour spread in the variable cost of operating a combined-cycle unit.

So the future development of natural gas markets and there are really two questions, one, the twin questions of the degree of future global convergence in natural gas prices, you know, and the strength of the linkages between natural gas prices and the prices of other fossil fuels.

I mean -- economists, that's what I am -- tend to think that markets work and there will be some kind of economic convergence. I think the convergence is not going to be like the oil market because of transport costs of natural gas across continents are very high because of liquefaction costs and LNG tankers are not cheap stuff. But there's some notion of an economic convergence. But there really is an open question of if there is an economic convergence what will the convergence be?

What will natural gas converge toward? Will it converge -- I mean I know the natural gas people would like it to converge more toward oil, higher natural gas prices which you might like also, but I think that many of the customers would like sort of a more gas on gas competition where natural gas prices broke away from oil prices. You may not have a vote in this, but you have an interest in it. And it's really hard to know what the timing and the nature will be. But this is just something to keep in the back of your head.

So this one like some others I'll use today sort of combine EIA's data side and its projection side so there's like a very faint vertical bar that says 2011 which you can't even see and everything to the left of that is data. And then you have the stuff beyond 2011 which is -- that looks like our reference case forecast.

So there's a dividing line between fact and projection. You can see that our

projection, certainly, we expect electricity use to grow only slowly over the next 30 years. The slowdown in electricity growth is really a long-standing trend. This is U.S. only. I know that my colleague will say more about the world and maybe the world today is a lot where the U.S. was when I was a child in the 1950s. It's kind of scary, I think, that I'm that old. But you know, our electricity growth was eight, nine, ten percent when I was a kid, a year. It slows down, it slowed down to two to three percent in the '80s and '90s and over the last decade it's been less than one percent growth per year.

The factors driving those trends includes slowing population growth, near market saturation and key electricity using appliances, improving technology of nearly all equipment and appliances in response to both market, technology opportunities, but also standards. And a shift in the economy toward less energy-intensive industry, efficiency

standards for lighting and other appliances put in place over the last few years like the light bulb thing being phased in right now will continue to put downward pressure on electricity demand growth as new equipment is added and existing stock is replaced.

Absent a very rapid introduction of some new electricity-using devices, a sharp rebound in electricity demand growth, I mean, we don't expect it. It doesn't mean it can't happen because it's the future. But I would actually argue that this might be -- there's as much downside risk, frankly, to our forward-looking view as there is upside risk.

Someone says well, what about electric cars? What about -- like, well, yeah. If you have one million electric cars like a Chevy Volt and you charge them every day, that would add five terawatt-hours a year to demand, one tenth of one percent roughly is what we project for demand. If we had ten million, it would maybe a percent. If you

have 100 million, it would be 10 percent. But I mean you've got to quantify these things. People say well, what about electric cars, that will make it go like it was in the '80s or 1950. And that's just not -- if you add it up, it's just not true.

So one very important factor affecting the competitiveness of different fuels is whether we're in what I call a new versus new setting that occurs when new generation capacity of some kind must be built to serve growing load like when I was growing up in New York City, uptown. We always had these Con Ed, I remember the little things that used to block the holes in the street. Dig We Must. Kind of sounds like Yoda, you know? That was good -- was it George Lucas who did those movies? He must have got it from Con Ed, you know?

(Laughter.)

Dig We Must. But I remember we were playing stickball and stuff, you know,

Dig We Must. You've got to think of that when your load is doubling every eight or nine years.

So in a new versus new setting, you've got to build something new to serve load and new technologies really are competing against each other. Actually, coal has a much stronger position in a new versus old setting which is kind of where we are in the United States today because load is growing so slowly the need to build new stuff isn't to serve growing load. It isn't like I have to serve growing load. I have to build something new and I have to choose which new thing to build.

Economically, we're much more in a new versus old setting where it may make sense to build something new, but economically to build that new thing, it has to be able to compete effectively stuff you've already got. The old stuff, it's capital costs which are often considerable are in the rear view mirror and really don't matter to the economics where

in a new versus new competition both capital and operating costs of all competing technologies are in play. So in a new versus old setting, you've got your coal plants or your nuclear plants or whatever it is, what you really care about are only the going-forward costs.

And on a typically delivered coal price of still $2.40 per million BTU in the United States, the average U.S. coal plant has a fuel cost of under $30 per megawatt hour in the current, and I underline the word current domestic policy environment. And it's kind of hard, you know, even if you're very optimistic about some of the new energy technologies. Beating capital and operating costs is something new, competing with $30 megawatt hour. That's pretty tough.

Now keep in mind, we just spent some time earlier talking about all the regional differences and I feel clearly we couldn't get into that or spend too much time

talking. So unless new technologies are cheap enough for their combined operating and capital costs to fall below the operating costs of existing plants which is a very tough condition to meet. Slow electricity demand growth does limit the market for new generation technologies. But there are two things that could change that and I think maybe some people outside this room are hoping for them and people maybe inside this room are hoping not for them.

One is that some of the new technology purveyors may hope for new regulatory programs that raise the cost of keeping existing generators running. Specifically, it makes existing generators face a new capital cost so there has to be a new decision as to whether I should invest that capital cost. And the other alternative is subsidies and/or incentives for new generation to force new generation into the mix.

So here's a little picture. Typical combined-cycle gas plants require about two-thirds of the BTU input per megawatt hour than a typical coal-fired steam plant. So competitive price parity roughly speaking and this is all rough stuff between natural gas and coal for dispatch purposes is defined by a ratio of about 1.5 to 1 in areas where the two plant types compete to serve load.

In other words, you can afford to buy -- if you're running a combined-cycle plant, you may be paying $3 a million BTU for gas is competitive. In some sense, we're paying $2 a million BTU for coal. So all this does in the big graph is put the ratio of the natural gas price with the steam coal price and you can see that in the -- let's say from 2000 to 2007 and the ratio was much above 1.5, got up as high as 5 in the middle of that 2005, 2006, 2007. But we all know what's happened in the natural gas industry.

We know that natural gas prices

have come down a lot. Coal prices have actually risen somewhat and as a result, this is 2012, you can see that on a national average basis, again that green line dipped below that 1.5. We all know what happened and you all know what happened, so I don't have to repeat it here.

Again, we have the facts on the lefthand side and then the projection on the righthand side. We, in our baseline projection, we do have natural gas prices rising faster than coal prices, going out into the future, again, national average. So over time we see coal at least in the dispatch level regaining some competitiveness vis-a-vis natural gas in terms of running an existing coal plant or an existing natural gas plant.

So that kind of -- drives us to our sort of view of electricity, where generation will come from. So generation does grow, but it's only about one percent a year in this projection. And natural gas and

renewables they gain market share. So in the middle there on that 2011 line I sort of show the market shares, 25 for natural gas, 13 for renewables and that includes hydro obviously, 19 for nuclear, and 42 for coal. That's down a lot from 1990 when coal was 53 and we have coal headed down to sort of in this baseline case 35 percent of generation.

Coal's generation share does remain significant. We don't see a lot of new coal plant builds. We don't see really any new coal plant builds beyond what's being built now. All of what is shown here reflects the utilization of current and imminent sort of plants, things that are under construction. I know some people are sitting in this meeting have plants under construction.

You know, we have coal generation falling in absolute terms through the middle of this decade if the max requirements result in the shutdown of coal capacity that can't economically justify investments in equipment

needed for compliance, but it rises thereafter as the utilization of the fleet that's left. We think because of the thing I showed you last time with relative price of coal and natural gas, we think running those plants would be pretty attractive if they're there.

But that's only one view of the world and the projected U.S. generation mix is very sensitive to natural gas prices. So we also in our outlook, we have what we call a high oil and gas natural resource case where natural gas prices are lower than in the reference case and in that world so our reference case, sort of generation of coal and gas, the coal is the black line, the solid line, and the natural gas is the red line. But if you go to the high oil and natural gas resource case, you see a very different picture where the gas and coal actually cross over, the dashed lines.

So at lower natural gas prices, that's a market thing. That has nothing to do

with the policy or whatever. It's just a question of how the technology and the gas resource develops and what the resource picture looks like. But coal is going to be very sensitive to that. That's one that is more policy oriented and that is the reference case projection is based on current laws and policies, but potential policy developments matter a great deal to future role of coal-fired electricity generation. So policy toward greenhouse gas emissions is particularly important.

So here what we had and again this was all in our outlook, a set of carbon fee cases that are used to represent different initial settings and ramp rates for policies that would put either an explicit or an implicit price on carbon dioxide emissions from fossil fuel generation. And again, it's not because we, EIA doesn't advocate any policies and I very much doubt that if there were a policy related to greenhouse gases, it

wouldn't actually be a carbon fee, but this is just a way of representing sort of generically different stringencies of policies.

And you can see that in all these cases, projected coal-fired generation is particularly, significantly below the reference case which is the black line and with the assumed granting of policies because these are all like a fee that starts at $10 and increases 5 percent a year or a fee that starts at $10 and increases 7.5 percent a year, a $20 fee and a $30 fee. Those are both I think 5 percent a year also, although the slide doesn't say that which it should. So I'll go back and talk to my people. But it really has a big impact of coal-fired generation.

So in addition to greenhouse gas mitigation policies, other fuel-specific regulations and some of these affecting coal, nuclear power and renewable technologies can have a profound effect on the future mix of

fuels used for generation and this illustrates and so can the rate of economic growth because that will influence the rate of electricity demand growth and higher and lower coal prices, higher and lower natural gas price we already discussed and the greenhouse gas cases, I think this is sort of a representative set of them. So this is kind of looking at how the mix of -- the level of generation is changing across these cases as well, but this is how the shares of generation, again, in several of our different cases change to 2040. And I think the results are really fairly intuitive.

And then sort of bringing it back to coal itself, how do these cases then move directly to coal consumption and the green bar on the left hand side, that's just historical, what we did in 2011 and -- that was production, not consumption. This is production data for 2011. And then the issue is what does it look like in the future. And

our reference case is somewhere buried in there. It's that brown one in the middle. And you know, we have coal production kind of not relative to the 2011 level. Certainly it doesn't get back to the 2007 level, the heyday kind of level, but it's modestly up in 2020 and 2040 relative to 2011 in our reference case. But you can see that coal costs whether they're in this high, oil and gas resource case which again tends to lead to a lot less coal consumption in the power sector; high coal cost, low coal -- your own costs matter a lot. Whether you have some of these greenhouse gas policies is illustrated in one here. Has a big impacted on projected coal production.

So I don't want to sort of steal, he's a much more entertaining speaker than I would ever be anyway, Robert Price's thunder, but I'd like to turn briefly to the global market context. And again, under our current laws and policies assumption, global coal

demand is expected to grow robustly over the next several decades. This is what's happening to all the energy sources in the world. This is world, this is not U.S.

And coal is -- it kind of tapers off a little bit toward the end, but you know, obviously, historically, if you look from 2000 to 2010, coal has been gangbusters. It's really been the big story in global energy.

The driver is growing demand for electricity in the developing world where you have rising per capita income in developing Asia. Then you have in other parts of the -- some other parts of the world don't grow as fast in terms of per capita income, but they have very high population growth like the Middle East and Africa and population growth matters, too. And so there's globally the outlook for coal is that front part of that projection is pretty --still pretty strongly upward sloping. And then this is again the U.S. part of it. The U.S. has been a net

exporter. We expect it to be a net exporter throughout the period, but we don't see the U.S. becoming a very large net exporter. And that could change.

Obviously, U.S. coal could maybe supply more of that growing demand for coal, but some of the cost issues and we do think that some of the other maybe suppliers can maybe -- including domestic supply in some places that has had some problems, some of the places where demand is growing rapidly we think can be served from the domestic resources.

So with that, I think I'm done and I guess I could end with a brief story unless you guys want to talk a lot in which case I'll skip the brief story, but first the EIA administrator was a guy by the name of Lincoln Moses. And there's no mention of God or something, but he was giving testimony at a Senate hearing where one of the Senators became very frustrated with all the caveats

and I talked about caveats and people talked about the future. And so the Senator demanded that Administrator Moses just skip the hypotheticals and give him just the facts. And Moses replied, "Sir, there are no facts about the future." And it's sort of important to keep that excellent point in mind as we contemplate our energy future and coal's future. Other than that, just look forward to

-- hopefully I have left enough time for dialogue. That was my intention. I look forward to it. So thank you very much.

(Applause.)

It's better if you don't hear it. It works for my verbatim transcript. Yes.

MR. NEWELL: Good morning. Don Newell with the Kentucky Energy Cabinet. Could you go back to Slide 10, please?

What I'm seeing here is that you're saying that electricity net generation billing kilowatt hours in 2040 projected with

no facts in the future. I understand that caveat. I use it with my wife all the time.

DR. GRUENSPECHT: I'm not going there.

MR. NEWELL: You say that total generation is going to increase slightly from today. You also stated that you don't see much, if any, new coal-fired generation.

DR. GRUENSPECHT: New plants.

MR. NEWELL: New plants, correct.

DR. GRUENSPECHT: Beyond what's already there.

MR. NEWELL: Beyond what's already there.

DR. GRUENSPECHT: And what's being built.

MR. NEWELL: Okay, so --

DR. GRUENSPECHT: I assume these guys are going to finish their opus.

MR. NEWELL: The only way that you get an increase in net generation then is through increased utilization of existing

plants.

DR. GRUENSPECHT: Right.

MR. NEWELL: In order to have that kind of capacity available, what assumptions did you make on retirements?

DR. GRUENSPECHT: I didn't make assumptions. That's a strong word. But we do collect data from utilities on their official plans for retirements. But I think it's fair to say it will vary across our different cases. That's one thing. So you're retiring more capacity in this dashed line case than you are because if people really think that gas prices are going to stay real low, they are less inclined to make those capital investments. But we're retiring about -- I don't know, I think in our reference case, we retire about 50 gigawatts, about a sixth of current capacity and I think in some of the other cases maybe is like 80, high 70s.

But one thing to keep in mind is that what's being retired, retiring a sixth,

16 percent of the capacity say does not mean that you would expect generation to drop 16 percent from coal-fired plants, because one of the things, which plants you choose to shut down are relatively speaking the dogs. I mean there are some of these plants that frankly are open that are not generating much. They're in regions of the country where load has fallen off the table. So retiring those, the notion of translating the capacity retired to the generation is, I think, you know, not the right metric.

I think you can keep generation -- again, we have coal generation, we have going from like -- I guess this thing starts in 2005, so the black line, you're going up about 2,000 billion kilowatt hours and we have it dropping down to 1,500 so that's like a serious drop. And then we have it going back up, again, the black solid line I guess what looks like 1,800 billion kilowatt hours and we think you can do that, you know, with the

plants that remain after you retire the let's say what I think is about 50 gigs in the reference case because those plants were not your heavy hitters or your high runners before they were retired. But hopefully that's responsive? I'm not trying to dodge this one. I think this one I can afford to answer.

MR. NEWELL: It's responsive, but again, if you're retiring the dogs, as you put it, the ones that are under utilized, they have the most additional utilization available, you're saving your most dispatched, your highest utilized plants and I just don't see you having the capacity factor --

DR. GRUENSPECHT: I don't have it in my head because I'm not that -- I don't have that good a memory. But you know, you will see in our projection what the capacity factor is. And it's not that -- it's -- our view is that these plants -- I mean they're not nuclear plants. We don't think they're going to be running at 90 percent or

something, but we probably let a lot of our coal -- in theory, our coal plants can run at 80 percent. And if you look at what's left and it's not -- in aggregate, it's not running at 80 percent at the end.

I mean the utilization rates have come down across the fleet because there hasn't been that much retirements and you've gone from 2000 down to 1500. I mean the capacity factors are in this. They're not on this chart, but they're there. They're public. You can read them. You can agree with them. You can disagree with them, but they're not like 105 percent. I mean -- and they're not 95 percent either. They're in the 70 to 80 range.

MR. BAJURA: Thank you for your presentation. I think it's the next slide that my question refers to in the scenarios about prices on carbon. Have you considered in your projections, if we were to ask for carbon capture in natural gas plants, and what

that would do to the projections?

DR. GRUENSPECHT: This is just the price on carbon across the -- again, we are not in the business of designing policies for the administration or anyone else. So all we wanted to do was have something that showed some kind of generic policy. This applies to everything. So this is not just to coal emissions. This is applied to natural gas emissions. And we do have, in fact, in our framework, we allow certainly one of the responses people can do is put CCS on either a coal plant or a gas plant. As it turns out, you don't get a lot of that. You get the few that are being built. You get maybe another one that's being built with some strong federal support. But economically, to us at least with the way we're carrying the costs of CCS, it doesn't seem to work economically for us. So there's not a mandate to do anything.

There's not a mandate to either do it or not do it. It's a possibility to do it.

It's available as a choice, but the choice doesn't get made. One of the issues is and we were actually talking about that this morning in the hallway, like I mean there's a value of sequestered CO2 in terms of enhanced oil recovery which is real. You know that. You're in the industry. You've got people building pipelines to move this. For a long time we were basically mining CO2 and natural CO2 and now we have people moving CO2 from -- not mostly from the power industry, more from chemical plants, hydrogen separation plants. We get a more concentrated stream. But very quickly, if you start applying CO2 on a large scale in the power center which is like a huge -- I mean, orders of magnitude, the market value of the CO2 goes to zero because you've just swamped the demand. So in the long run that doesn't help you with the economics on a large scale deployment, although some of the first movers may get some economic value out of that.

MS. GELLICI: The last question for the record was from Dick Bajura with West Virginia University.

MR. PALMER: Fred Palmer, Peabody Energy and thank you for your presentation. In the context of your future demand scenario for the United States, in terms of the 28 percent growth in electricity demand, my question is two part. Number one, what is the assumed population increase between now and 2040 implicit in that? And number two, have you done any thinking with respect to a potential industrial resurgence, particularly in the Gulf States because of oil and natural gas prices, chemicals, expanded refining activity, etcetera in your future growth scenario?

DR. GRUENSPECHT: Thank you. I think those are good questions. I'm trying to remember what the population growth is. I think the U.S. is something like -- again, we don't grow our own on this. We do get it from

Census. Mostly, they don't do forward-looking stuff. On population, they do. And we use theirs. I think it's on the order of .9 percent a year growth which is -- I think that was in the -- actually, it's going to be lower in the next projection because they've come down. I think we'll probably carry something like .7 which has implications, but they were not in the direction that I think you were leaning. Yes, it's very different.

Again, in the OECD, it's fairly quite interesting, like Western Europe is like sort of zero population growth on average. You've got your Italys and the ones that are actually declining, your Japans are declining. And then you have some that are growing a little bit. But most of the OECD, most of the developed world is sort of zero population growth. The parts that aren't developed world, E-D, not I-N-G. And the exceptions would be Canada, the United States, and Australia. Those are the three that have

population, continued population growth.

Then the industrial renaissance, I think the answer is yes and it's in there. It's one of the reasons why we have a lot of natural gas consumption. The electricity that goes along with it is in there.

So it's like the spaghetti sauce commercial. I don't know if you're of the same generation as me, little Tony running through the streets of Boston and there's something about "does it have green peppers?" It's in there. "Does it have onions?" It's in there. "Does it have basil?" It's in there. So like it's in there. It may not be right. It may be different than exactly the way you would put it in there. We thought about it. Thinking about it and being able to predict it are two different things.

MR. NARULA: My name is Ram Narula, an energy consultant. Again, I want to thank you also for the nice presentation. My question is that the price differential is

certainly a huge factor in the decision making of any utility. When other -- taking account of the potential of supply interruptions due to inclement weather, sabotage, or other untold reasons. Since this is not quantifiable, I'm assuming your projection has no way of accounting for that in the decision making. Or maybe it is. That's my question.

DR. GRUENSPECHT: You know, obviously, there's value in diversity portfolio, whatever. Of course there's a lot of coal in the mix already, so I mean I'm not saying that putting a value on diversity doesn't necessarily add to coal -- oh, we need more coal because we have to put a value on diversity. You know, we kind of try to represent it in that we don't do sort of knife edge type of optimization. We don't treat our energy projections like it was an LP where you'd have what we call penny switching where everyone runs from one thing completely to the other thing.

In fact, we have the coal -- again, the existing coal plants, I mean the people who really don't like these projects are the people who don't like coal because they kind of think like it's all going to go away. It's all going to be some new technology. It's all going to be some -- and I guess our view it's not that way, that certainly as a fuel used in existing plants under current laws and policies like it's going to be very hard to displace this stuff because it goes $30 a megawatt hour on average. What does it say on the TV commercials, "your results may differ." "Don't try this at home." Whatever. But it's pretty hard to find some new generating technology that is going to compete well with $30 a megawatt hour.

Again, the policies, if it's $30 a megawatt hour after you spend X hundred million dollars on some type of equipment and you don't know whether on top of that a few

years down the road there's going to be some kind of carbon policy then that's different again. So -- but I'm not sure that diversity argument -- it's in there. We try to kind of reflect it in some way, but in terms of dealing with it by sort of having -- taking the sharp edges out of everyone running from one thing to the other for a penny difference and stuff, but over the in terms of an explicit model of how different fuels are perceived of in terms of security, you know, I think that's probably a little too ambitious for us.

MR. NARULA: I guess what I neglected to mention was also the fact that the coal-fired power plants generally have 30 to 90 days of supply at hand to account for those times where it's needed minute by minute or hour by hour.

DR. GRUENSPECHT: I guess. It's true. I think it's -- so. That's true. Let's leave it at -- it's the truth, so let's

leave it that way.

MS. GELLICI: One last question from Sy and we'll wrap it up.

MR. ALI: Sy Ali with Clean Energy Consulting. My question pertains to nuclear. You're showing from 19 percent to 70 percent?

DR. GRUENSPECHT: Yes.

MR. ALI: Does that include the new small modular reactors, the high temperature gas reactors consideration in it?

DR. GRUENSPECHT: It is very hard to -- you know, so far at least in our framework what that technology -- again, it's very early in that technology, so how you characterize that technology is tricky. But for our framework what it gives you mostly is the ability to be small and modular. It's not like it's a lower cost per KW than the big stuff. So being small and modular is an advantage, but on the other hand like with the kind of gas price -- again, now you're in a new versus new world so if you wanted to build

something new in our framework you build gas because the gas -- the combination of the kind of gas prices that we have which are rising, but they're still -- the guy that I -- well, I like all my utility friends, but John Rowe who is like retired, I guess, CEO of Exelon, he kind of said basically if we're not talking about natural gas prices above $7, a million BTU, kind of forget about nuclear. It's just not going to hunt. The dog won't hunt. Especially without subsidies. Again, we allow, we have the subsidies that are in law now, so we have the first six gigawatts, getting the production tax credit.

We have the plants that are going to get the loan guarantees, getting the loan guarantees, but beyond that, we don't generate on our own -- we're not there to say and that will be continued and they'll throw more money at this. So it has to work just on its economic merits. And it just doesn't work against natural gas in this projection of

natural gas which some people think is actually a pretty pessimistic view of natural gas. Some people would say it could stay a lot closer to its low point in real terms. And there, again, I don't know what it's going to cost, but we don't have it as a big cost production per KW versus other technology. We have the significant advantage of the smaller, the smaller chunks.

MR. ALI: The nuclear group with DOE projects lower --

DR. GRUENSPECHT: That's great. They are a lot of my good friends. It's wonderful. As I said at the beginning, you know, my views should not be construed as representing those of the Department or other federal agencies. We can go back and look at what fossil energy had in mind about -- and I'm not saying we're right.

Let me be clear. Strong as I possibly could say we can easily be wrong, but I can tell you you can go back and look at

what the nuclear people said about Gen III+ reactors. And you can look at how many coal plants the nettle was carrying in terms of what would be built.

And again, and I'm not like I live in a glass house, so I'm not going to throw too many stones, but don't -- you know, there's a reason why EIA was set up the way it was. And we talk with our friends in fossil and in nuclear and in energy efficiency and renewable energy, you know, who have huge amounts of renewable -- and they all say these things. If you added them all up, you know, either the U.S. would be consuming six times as much electricity as we are or that's not a constraint that the programs have to deal with. So I don't want to -- they have important roles. They're developing the technologies of the future. They're developing all this stuff. But like -- you know, we talk with them. We work with them. We listen to them. We take what they say

seriously, but we certainly don't feel obligated to pencil it in. And you couldn't make a consistent projection if you did, I'll tell you that. If you took the stuff from all the programs and put it together, no way. So how do you like that? That's a little bit of the thing -- that is probably an example of something that you would rather not have in a verbatim transcript.

(Laughter.)

But with that, I better stop.

(Applause.)

CHAIR EAVES: Thank you, Howard. We certainly appreciate your comments and look forward to working with you and your staff in the future.

Next, I'd like to call up Jeff Wallace, our Vice Chair of National Coal Council to introduce our next speaker.

Jeff?

VICE CHAIR WALLACE: Thank you, John. I appreciate the opportunity to be here

this morning to introduce Robert Bryce, the Senior Fellow at The Manhattan Institute. Robert is one of America's prominent energy journalists. He's a Senior Fellow with the Center for Energy Policy and Environment at The Manhattan Institute. He's the author of four books: first book, Pipe Dreams: Greed, Ego, and the Death of Enron, was his first book. Second, The Cronies: Oil, The Bushes, and the Rise of Texas, "America's Superstate". Third was Gusher of Lies: The Dangerous Delusions of "Energy Independence". And his most recent book from 2010, Power Hungry: The Myths of "Green" Energy and the Real Fuels of the Future.

He appears regularly on media outlets ranging from BBC to CNN to Fox. He lives in Austin, Texas with his wife, Lorin, and their three children and he's an apiarist. I had to look that up this morning. That's what some of us might call a beekeeper. Thank you.

(Applause.)

MR. BRYCE: Morning. Three points to make in about 20 or 25 minutes. First, I'm going to talk about scale and I'm going to spend a lot of time talking about scale. Second, I'm going to talk about 40 years after the OPEC embargo, and then finally, coal and electric demand.

So first, pop quiz, I hope you all studied. Who can name the country which since 1985 has had the biggest percentage increase in CO2 emissions? Anyone? China is a good guess. Any others? Thailand.

Which country over that same time period has had the biggest percentage increase in electricity use? It's Vietnam.

Which country has had the biggest percentage increase in coal consumption? Indonesia.

Why do I bring these three countries up? Because to me, they go to the heart of this entire discussion that we've had

now for the last decade, in fact, more than the last decade over CO2 emissions, carbon caps, carbon taxes, etcetera. Those three countries have a combined population of 400 million people. They have an average per capita GDP of less than $6,000. Their average per capita GDP is roughly half that of the global average GDP per capita and roughly one sixth of what we have here in the United States.

Thailand, Vietnam, and Indonesia in my view go to the heart of this entire discussion. They go to the heart, in my view, of the inanity of a lot of this discussion about CO2 and carbon caps. Those three countries in my view represent exactly the views of the developing world as to why they will never, and I do mean never, accept any kind of carbon tax, carbon limits that would in their view then limit their ability to grow their economies and therefore bring their people out of the dark. Those three countries

represent, in my view, the nut of the entire argument which is if you think CO2 is bad, then what? What is your answer? Because those three countries are, in fact, turning to coal in a major way.

I'm not here to argue the science on CO2 one way or the other. I am a resolute agnostic when it comes to this issue of climate change. And yes, there's no question CO2 is a greenhouse gas, absolutely. What's the right concentration? I have no idea. We can talk about albedos, forcings, global cooling, the Maunder minimum, all these different issues, solar sunspots. We can talk about all those issues, in fact, and we have for now more than a decade.

The key question is if you think CO2 is bad and many people do, then what? What will you say in Hanoi? What will you say in Jakarta, in Bangkok, in Beijing, in Mumbai? What's the message for those people? You can't develop your economies the way we

developed ours? You can't use coal to develop your economies even though we did? That's the nut of the discussion. And yet we never hear from the green left and make no mistake, it is well represented in this administration in the United States. The green left, Greenpeace, Sierra Club, Natural Resources Defense Council, etcetera, they never want to discuss the numbers. They never want to discuss well, what's the future for these countries? What's the future for their coal-fired generation? And instead, what they've been effective in doing is putting pressure on administrative policy here in the United States and we saw it just a few months ago where the Export-Import Bank and the Overseas Private Investment Corporation announced that they would not provide financing for a new coal-fired power plant in Vietnam. Forget that it was going to help U.S. industries export some of their technology. It was coal is bad. And we don't care where it's built. And their message was,

in my view, we don't care if the Vietnamese stay in the dark. We're opposed to coal.

The problem, ladies and gentlemen, is the tyranny of big numbers, the problem is a problem about scale. But you will never hear the scale discussion from Greenpeace, Sierra Club, etcetera. By the way, a lot of those groups don't like me. That's fine.

(Laughter.)

You can't be friends with everyone. And if you were, what fun would that be?

The problem is the tyranny of big numbers. Over the past decade alone, global energy consumption has increased by 28 percent. It has increased by 53 mission barrels of oil equivalent per day. The increase is six Saudi Arabias. Since the '70s, the Saudis have been producing 8.2 million barrels of oil per day on average. So what I like to do is make these units simple.

Howard talked about quads, okay.

How many of you people understand what a quad is. Okay, that's not very many. Well, it's 172 million barrels equivalent. Well, that rolls off the tongue. A quad is roughly a trillion cubic feet of natural gas. A quad is roughly one exajoule. That's a billion billion joules.

Okay, well, the public doesn't understand that. Not a lick of it. What we use globally is 250 million barrels of oil equivalent a day from everything, coal, oil, natural gas, biomass, nuclear, hydro, etcetera. It's 30 Saudi Arabias. The public doesn't understand watt hours. They don't understand kilowatt hours, quads, joules, exajoules. They don't understand it. But they do have a feel for what oil is. They hear that price quoted more than perhaps any other commodity. And they bought oil most of them by pumping fuel into their gas tanks. So I try and normalize around oil equivalents because the public has the best grasp of that unit, the better grasp

of that unit than they do of any other.

We're using 250 million barrels of oil equivalent. That's 30 Saudi Arabias. We get ten Saudi Arabias in the form of oil, nine from coal, seven from natural gas, two from hydro, one and a half from nuclear, and one half of one Saudi Arabia from all the political darlings of the moment, solar, wind, biofuels, and biomass. So again, we can talk about CO2 being good. We can talk about it being bad. I'm bored with the tribalism. I'm bored with the arguments. I'm bored with the are you on Team Catastrophist or are you on Team Denier? Are you an Al Gore acolyte or do you work for Exxon Mobile or even worse maybe the National Coal Council?

(Laughter.)

That's the discussion now, which team are you on? That's the entirety of the discussion we're having now. What side are you on? Do you believe in CO2 being bad or do you think it's good? Do you think it makes

plants greener or do you think it leads to catastrophe? Never mind the latest IPCC report which really dialed back a lot of their projections about what they thought might happen. Not a word in there about this having, this is causing more extreme weather. No, not a word. Look at it. But again, I'm bored with the tribalism. Let's talk about the numbers. The Greenpeace, Sierra Club, the rest of them, don't talk about the numbers because they know to do so means losing the argument.

I appreciate Jeff mentioning my latest book, Power Hungry. I brought a copy. Tell your friends. Tell your neighbors. You don't have to read it. You just have to buy it.

(Laughter.)

All right. Move on. Scale, scale, scale. Over the past three decades global electric demand has increased by 450 terawatt hours a year. Four hundred 50

trillion watt hours per year has been the average in annual increase in electricity use. What does that mean? It's one Brazil of new demand roughly every year for the last 30 years. And if you look at the projections from IEA, EIA, Exxon Mobil, it's remarkable how uniform they are in projecting another Brazil per year of new demand through 2035.

Fine. Let's assume they're right. What would it take just to meet incremental demand if we were to use solar? Now these numbers are available, easily available. You can get them from the BP Statistical Review. Remember, the target is just to meet incremental demand of 450 terawatt hours per year.

Let's look at solar. Germany has invested tens of billions of dollars in photovoltaic capacity. They now have 33,000 megawatts of solar capacity. In 2012, that 33,000 megawatts, 33 gigawatts, produced 28 terawatt hours of electricity. Math is simple

then. Just to meet incremental demand, not to displace any coal or hydro or nuclear or natural gas, globally, we would have to install 16 times as much solar capacity as Germany now has just to meet incremental demand.

What about wind? Well, I'm hopeful for solar. I have solar panels on the roof of my house in Austin, Texas, 3200 watts. Just to be clear, when it comes to energy subsidies, I'm opposed to all subsidies. We should have energy competing fair field, no favor, no subsidies for anybody. So I'm opposed to subsidies unless I'm getting them.

(Laughter.)

The City of Austin paid two thirds of the cost for my solar panels, so what am I, an idiot? Yes, I took the money. Now my neighbors walk by and say love your solar panels. And I say thank you, you paid for them. I'm hopeful for solar. But solar's contribution on a global scale or even in the

U.S., it's infinitesimal. It's lost in the decimal dust. It doesn't matter.

What about wind? I'm bearish on wind because of basic physics. The power density of wind energy is one watt per square meter, basic unit in physics. What is power density? It's a measure of energy flow. It can be harnessed in a given area, volume, or mass. I talk about it a lot in Power Hungry. I talk about it a lot in my next book which will be out next May.

So the power density of one watt per square meter, what would it take to replace coal-fired capacity in the United States? Now it's roughly 300 gigawatts. How much land would it take to replace that 300 gigawatts of coal in the United States with wind? It would require 300 billion square meters, 300,000 square kilometers. It's a land area roughly the size of Italy. And because of the noise wind turbines produce, and this is real and this is a problem,

because of the noise wind turbines produce, you couldn't have any people living on that Italy-size piece of territory.

Last year, all the wind turbines on the planet provided the equivalent of 2.4 million barrels of oil equivalent per day. Last year, coal demand increased by 2.6 million barrels of oil equivalent per day. Therefore, just to match the growth in coal demand and I made this point in a piece I had in The Wall Street Journal last month, just to match the growth in global coal demand would require the duplication of the entire existing global fleet of wind turbines every year. That's roughly 285,000 megawatts. Again, the land area requirements would be again roughly a space the size of Italy. This is not going to happen. It's not going to happen because we don't have a lot of extra land and second, we hear a lot about Josh Fox and Yoko Ono here in the United States opposing natural gas. It's nothing, nothing compared to the global

backlash against the wind energy business.

The European platform against wind, you can look it up, epaw.org, more than 600 anti-wind groups in Europe. Look what's happening in Ontario, 75 municipalities in Ontario out of 400 some that they have anti-wind ordinances on their books. Here in the United States, look at what's happening in New York State. Look at what's happening in West Virginia. A recent lawsuit filed against a new wind project because again of the noise produced by these wind turbines. This is a real problem.

If you like, Google Dave Enz. I also have his statement on my website, robertbryce.com. Dave Enz, E-N-Z is his last name. He's a guy that he and his wife live near Denmark, Wisconsin. They have about a 40-acre parcel of land. I checked out his land ownership records. I checked him every way that I could. He and his wife are now living in an RV after they had a bunch of wind

turbines built -- some of them as close as 2,000 from their home. They couldn't stand the noise. He's a wind energy refugee and yet we hear over and over and over again wind energy is green. We hear over and over wind energy is green and yet this is an industry that has been exempted by the Obama administration, and the Bush administration before it, from the enforcement of two of America's oldest and strictest wildlife laws, The Eagle Protection Act and the Migratory Bird Treaty Act.

A new study just came out in September that showed that over the last several years the wind energy sector has killed more than 80 eagles and the study doesn't include the hundred or so golden eagles that are being killed every year at Altamont Pass in California. And they're killing several bald eagles.

The oil and gas industry and the electric utility industry has been routinely

prosecuted under those two laws by the Obama administration for killing eagles and the wind industry has not been prosecuted even once. This is a pernicious double standard and it sets me on fire. I've been writing about the Migratory Bird Treaty Act since the 1980s. And the U.S. Fish and Wildlife Service brought more than 200 cases against the oil and gas industry in Oklahoma, Texas, and New Mexico and rightly so. They were operating badly. They were having open oil pits. And the birds were being killed in these open oil pits and they went after them hammer and tongs.

And yet today, despite widespread evidence, despite over half a million birds being killed, despite the fact that they're killing on the order of 800,000 bats a year, the wind energy business has never faced a single prosecution. And instead, the Obama administration is writing, get this, 30-year permits that will exempt industry projects from prosecution under those laws. And the

Federal Register just in September there was an application for a five-year permit to allow eagle kills by a wind project in California.

The First Continental Congress put the bald eagle on the Great Seal of the United States in 1782 and yet we have now carved out a special class of citizens in this country which allows them to kill our national symbol. Pardon me for going all Joel Osteen on you here. But this just makes me crazy.

(Laughter.)

Now scale. Solar, wind, and biofuels cannot even keep pace with growing demand much less replace significant amounts of hydrocarbons or nuclear. CO2 has been the environmental issue of the last decade. We had Al Gore winning the Nobel Prize, the Academy Award and an Emmy. We had the hockey stick and yet what happened? Global CO2 emissions rose by 32 percent. Why? Because of Thailand, Indonesia, Vietnam and I haven't even mentioned China in that group.

CO2 emissions in the Middle East, up 57 percent; in Asia, up 44 percent; Africa, up 30; Europe, up 1 percent. And here's a fact you will hear and I do mean never from Greenpeace, Sierra Club, etcetera. Over the last decade, U.S. CO2 emissions could have gone to zero. Now remember, the U.S. is leading the world in CO2 emissions reductions largely because the natural gas business is displacing large amounts of coal. The U.S. is leading the world in CO2 emissions reductions, but over the last decade U.S. CO2 emissions could have gone to zero and yet global CO2 emissions still would have increased by about 10 percent or 2.6 gigatons, 2.6 billion tons.

Therefore, why in the world, given the fact that we're leading the world already in CO2 emissions reductions and second, that any moves that we make in the United States will have effectively no impact on CO2 emissions globally and for the wind energy business, now claiming they cut CO2 emissions

by 80 million tons in the U.S. which gives us a whopping reduction of 2/10ths of 1 percent of global CO2 emissions reductions, why would the U.S. take some dramatic move of a carbon tax, a carbon cap, etcetera to reduce its CO2 emissions? We're already leading the world. It makes no sense at all.

Okay, let me take a break now and calm down. I'm going to get all fired up here. So Howard mentions Yoda. My favorite Yoda quote is, "Do or do not, there is no try." Kind of deep.

OPEC. Forty years ago last month, OPEC announced that it was raising the price of oil by 70 percent to what was a staggering price of $5.11 a barrel. It was October 16, 1973, the following day, they announced an embargo. Well, what has that embargo meant? Well, what we have seen in U.S. energy policy is a lot of nationalism and what the embargo was for the OPEC members was symbolism. They knew that the embargo and the price hikes were

not going to be effective. They knew that from the beginning.

Further, what was happening before the embargo? U.S. gasoline stations were shutting down because of price controls imposed by the Nixon administration. You never see this. You never hear about this. It's the reality. The gas lines that we saw in the wake of the embargo were not due to a shortage of oil. They were due to price controls imposed by the Nixon administration. These are the facts. But oh, you see on the news, oh, the embargo and it's 1973 and you see invariably gasoline lines. Oh, it's those darn Arabs. They messed us up and we can't let that happen again.

So what do we have now? We have distorted energy policy. And the best example of that is the corn ethanol scam. The U.S. is now consuming 40 percent of its corn crop. That's 15 percent of all global corn production, 5 percent of all global grain in

order to produce the energy equivalent of 6/10ths of 1 percent of global oil demand. The U.S. is currently producing 550,000 barrels of oil equivalent per day in the form of primarily corn ethanol, 550,000 barrels of oil a day after nearly 40 years of subsidies for the corn ethanol scam.

Last year alone, U.S. oil production increased by 800,000 barrels per day. In one year, because of ingenuity in the upstream oil and gas industry, production increased by more than the entire contribution of all biofuels in the United States, despite the fact that the U.S. is now consuming in the terms of corn twice as much corn as is grown in the EU or almost as much corn as is produced by Brazil, Mexico, Argentina, and India combined. We are burning food to make motor fuel and I know I said I was going to calm down. This is madness. This is the kind of idiocy that meets foolishness coming the other direction. And it's largely because of

the nationalism that started after the OPEC embargo.

What has been the other part of this is energy independence. We've heard this over and over about this relentless idea that foreign oil is bad. Foreign oil, we're going to die at the hands of Hugo Chavez, rest his soul, over the Arabs or whoever else. Well, what's happened since 1973? The OPEC countries sold us their oil. They stayed poor. We got rich. Today, the OPEC members have a combined population of roughly 430 million people. Their combined GDP is $3.3 trillion, roughly a quarter of that of the United States. Their per capita GDP on average, $7800. Sixty-two percent of the global per capita GDP is less than one-sixth that of what we have here in the United States.

Since 1973, the U.S. has increased its population by about half, nearly tripled its economic output and nearly doubled its per

capita GDP and yet during that same time period our oil consumption increased by just seven percent. Energy independence, who cares? In July, EIA data shows the U.S. exported, yes, exported 3.9 million barrels of oil per day, nearly all in the form of refined product and the vast majority of that in the form of diesel fuel. In 1973, we were exporting about 211,000 barrels of oil per day.

In July, the U.S. exported oil or oil products to customers in 70 different countries. We live in an inter-dependent world in nearly everything from iPhones and fresh flowers to tennis rackets and tennis shoes. Why do we think we want energy independence when it comes to gasoline or diesel fuel? It's foolishness. It's the most hackneyed phrase in American politics and yet we hear it over and over. We've heard it from every president since Nixon and Barack Obama uses it routinely because it sounds good. Why

would the U.S., the world's second largest energy producer behind China and second largest energy consumer, behind China, want to be independent of the world's single biggest market? We're exporting oil. We may be exporting significant quantities of natural gas. We are exporting significant quantities of coal. Why would we want to be independent of the world's single biggest market place, the $5 trillion a year energy business? It makes no sense whatsoever.

The OPEC embargo is over. It was over 40 years ago. Let's bury it, put it to bed. It's not worth talking about any more. It's not relevant today. Let's move on. Okay, finally, coal and electric demand which is I know what you want to hear. We're inundated here in the U.S. about shale gale. And make no mistake, this is a game changer for the U.S. It's a game changer when it comes to energy policy in the U.S., our exports and our imports in terms of industrial

demand, what's happening in terms of investment in the United States and the industrial market. It's incredibly important. But the global growth story is coal, make no mistake. And it's been the story since 1973.

Since 1973, coal use has grown faster than any other fuel in absolute terms. Globally, oil has increased -- oil consumption has increased by 34 million barrels per day. Natural gas consumption increased by about 39 million barrels of oil equivalent per day. Meanwhile, coal use jumped by 44 million barrels of oil equivalent per day. I'm pro nuclear. I'm pro natural gas. But I'm a realist and I spend a lot of time looking at the numbers.

Today, all global nuclear production is equivalent to about 11 million barrels of oil equivalent per day. Since 1973, just the growth in the coal market has been four times the contribution of all nuclear today. Look at what the IEA, the

Paris-based agency, the International Energy Agency, said last May. They said that by 2017, global coal consumption could exceed that of global oil consumption. This is a remarkable projection. Will it happen? We don't know for certain. But the last time coal consumption exceeded that of oil consumption in the United States was 1949. I'm hopeful in terms of reducing carbon content of fuels, but the reality is that globally we are carbonizing, not decarbonizing. And why is that? Because of electric demand.

Coal use last year in the U.S. fell 12 percent. In Europe, it was up two percent. Germany, by the way, is building 11,000 megawatts of new coal-fired capacity. And in Asia, it rose nearly six percent. Why is coal demand growing? It's because of electric demand. Why is coal demand growing? Because globally the supplies are abundant. They're geographically spread out. The fuel

is cheap as Howard clearly showed. And further, it's not influenced by any OPEC-like entities. Notice I didn't say the word cartel. OPEC is over. OPEC doesn't matter any more.

By 2020, China will add about 30 gigawatts of new nuclear capacity. Great. China is adding 30 gigawatts of new coal-fired capacity every year and they will do at least through 2020. Globally, nuclear capacity will grow over the -- I'm sorry, through 2030 -- I'm sorry. On a global basis, we're now adding about 72 gigawatts of new nuclear. China is adding nearly 70 gigawatts of new coal every two years. I'm hopeful for nuclear. I want to see the costs on nuclear come down. But right now it's simply too expensive and what are countries like Vietnam doing? They're building coal-fired power plants.

China's current coal consumption is roughly equal to all U.S. oil, natural gas,

and coal consumption combined. The idea that the U.S. is going to lead the world, if only we show leadership, the rest of the world is going to follow us. Ha. I would love to see the rest of the world follow the U.S. when it comes to the natural gas market and be able to develop their shale as the U.S. has done. The rest of the world, shale is the most abundant form of sedimentary rock on the planet. Algeria, Canada, China, Australia to name just a few, huge resources of shale. But they don't have the rigs. They don't have the rednecks, and they don't have the pipes.

(Laughter.)

Therefore, their shale development is going to be very slow. Further, they don't have the mineral rights and they don't have the MOPs. I can talk about those factors at length, but I won't, but the shale gale will stay U.S.-centric for a long time to come.

We can talk about climate change until the cows come home, the reality is until

the countries of the world can find some form of electric generation that undercuts the price of coal-fired generation, coal is going to be the fuel of choice.

Electric demand. Howard talked about this briefly. We can look back and project forward. Since 1990, North American electric demand grew by 36 percent. In Europe, it grew by 17 percent. In the Middle East, it's up nearly 300 percent. In Africa, up 119 percent. In Asia, up 276 percent. If you want to look at where in my view the growth of electric demand is going to come from, yes, it's going to be in Asia, but it's also going to be in Africa. With all due to respect to the EIA and IEA, look at the Exxon Mobil energy outlook. There are outliers when it comes to forecasting and I know some of the guys at Exxon that do this work. They're outliers. Look at their projections for Africa. They are totally different from what you see from BP, EIA, IEA. They see the

demographic growth in Africa and what the markets in Africa for energy being incredibly robust in the decades ahead.

A quick point on policy. We now see in the U.S. what is clearly a war on coal. Make no mistake about it. But it's interesting if you think back historically what I think is a repeat of some bad history. In 1978, we had the industrial fuel -- Industrial Power Plant and Fuel Use Act which outlawed the use of natural gas for new electric generation with the view that we had a shortage of natural gas in the United States. We had this idea of shortage, in fact, even up until 2005 when Lee Raymond who was then the chairman of Exxon Mobil said there's no more natural gas to be found in North America. Well, that was wrong.

(Laughter.)

Much to your chagrin, I'm sure. The Powerplant and Industrial Fuel Use Act was really a law that was created to favor the

coal industry and it did. But it was a very narrow view of technology, very narrow view of markets and what happened? Well, it was repealed a few years later. And now the bias is towards natural gas and a bias against the coal-fired sector.

Look, I'm pro natural gas. I'm pro nuclear. But more importantly, I'm pro cheap, abundant, reliable. And what I fear now what we're doing in the United States is outlawing coal even though the U.S. isn't the Saudi Arabia of coal, we're the OPEC of coal. We have 900 billion barrels of oil equivalent in the form of coal resources here in the United States. The entire proved reserve base in OPEC is 1.2 trillion barrels. So now we're going to outlaw this form of energy even though we have it not just in abundance, we have it in super abundance.

The issue globally is electricity availability. What I am for is bringing people out of the dark and into the light.

Africa is called the Dark Continent. Why? Because it's dark. A billion Africans use about the same amount of electricity as 35 million Canadians. Love Bono. Love U2. Man, take some generators over there with you. The essentiality of electricity to modernity is incontrovertible. The countries that have cheap, abundant, reliable flows of electrons are the ones that flourish in the modern economy. They're the countries that have manufacturing. They can have schools that can grow their economies and literally bring their people out of the dark. That's the difference between the wealthy and the poor.

I don't use PowerPoint, but I'm going to show you one slide from Power Hungry. It will be a table showing you the top 20 countries ranked by GDP and the top 20 ranked by electric generation. The correlation is almost one to one. The goal we should have on a global basis in energy policy is to make it cheap, abundant and reliable. We're going to

reduce CO2 emissions. Not until we find something that's cheaper than coal on a megawatt hour basis. It's simply not going to happen because countries like Vietnam, Indonesia and Thailand and China, India, South Korea, you name it, are going to continue making the choices that benefit their economies. And the choices that benefit their economies are those that give them cheap, abundant, reliable flows of electrons. That's the difference between the developing world and the rich countries. Electricity is the difference. Right now, they're choosing coal and I don't blame them. And that trend, I think, is going to continue. But until we have a policy that focuses on cheap, abundant, reliable, I think the policy is going to continue to be distorted and show this favoritism toward very small niche players and some of that is a result of the OPEC embargo. And some of it is just the result of very effective rent-seeking industries, regardless

of how many birds they might be killing.

Thank you. Appreciate it.

(Applause.)

MS. GELLICI: We have time for a couple of quick questions for Robert.

MR. BRYCE: I have too many opinions to keep them all to myself.

DR. GRUENSPECHT: Remember, Robert, verbatim transcript.

MR. BRYCE: You know, it's okay, Howard. I don't have to have any disclaimers on mine. My opinions are all mine and you can have as many as you want. I've got more and if you want to meet after and argue about it, I'll meet you afterward. I'm here all day. There's no sequester for me or shutdowns or Ted Cruz. It doesn't bother me.

MR. ALI: Sy Ali. I enjoyed your presentation. Talking about wind, I'm familiar with the wind farm in northwest Indiana where a friend of mine his father gave up farming to get the subsidy that's being

provided to him, $3,000 per acre per year. He says his father couldn't make that much money farming. And the irony is the wind farms are there, they're not tied into the electrical system. They're generating -- they're just turning.

(Laughter.)

At most, you get about 20 percent, even on a windy day. I have driven by there many times. You see about 20 to 23 percent of the farm wind mills turning. I don't see the benefits for the country from all that investment and subsidies.

MR. BRYCE: Well, again, I don't know about what's happening in Indiana. I've heard about them building wind turbines and not hooking them to the grid, but the problem fundamentally and the reason I get so exercised about this is this is not about my opinion. It's not about what I feel or whether I think CO2 is good, bad, or different. It's basic physics and fundamental

math.

The problem is the power density number. That's it. Game over. We win, you lose, go home. It's one watt per square meter and I can back that number up with six different studies. I write about it in my next book, Smaller, Faster, Lighter, Denser, Cheaper. Wind energy is a loser and so is biofuels.

If we're going to progress, we have to have sensible energy policy, not religious energy policy and that's what we have now.

MR. ALI: I enjoyed your article in The Wall Street Journal a couple of weeks ago.

MR. BRYCE: Thank you.

MR. GABBARD: Rob Gabbard with PPL.

MR. BRYCE: Hi.

MR. GABBARD: Good morning to you, Robert. Give me a little color on your

feeling on like the policy of ERCOT right now. They seem to be on a dangerous edge here from a competitive -- and you, obviously, very much pro competition. The reserve margin has got everybody a little on edge as well.

MR. BRYCE: Well, it's interesting you bring that up. We talked about it a little bit last night. I was talking with Joe Craft about it. In fact, I will in Austin, and what's happened in the state now is what I see happening is very similar to what's happening in not just Texas but also in EU and in California. In the EU, the economists wrote an article, I thought a very interesting one, a couple of weeks ago now about the utilities in the European Union have lost something on the order of half a trillion dollars on market cap.

In Texas, we see similar things happening with the utilities and power generators losing money because they are being forced off line and on line at the whim of the

wind industry because they're getting this 2.2 cents were kilowatt hour production tax credit is allowing the wind industry in many cases to bid negative prices to feed their electricity into the grid, so that they then collect the subsidy. Well, if you have a power plant that you've spent $100 million or even more on and you have to idle it, or you have to only supply power during peak demand when the wind isn't blowing, well, you've reduced your ability to make money.

So now what Texas is doing and I don't remember whether -- I think it's the PUC, they're going to allow capacity payments to the power generators. Well, the EU is looking at the very same situation now. Where Eon, they built a new gas plant somewhere in Germany, if memory serves, just four or five years ago. They're already closing it down because it's uneconomic. The grid needs that plant to be available to come on line when the wind isn't blowing, right?

Even the best in Texas, ERCOT counts the nameplate capacity of wind energy at 8.7 percent of installed nameplate capacity. They count 8.7 percent as reliable. They've increased it just recently, maybe 9 or a little bit more than that now. But what we're facing now is this, a real clash, between these very capital-intensive industries, but you have one that is incredibly favored both in terms of dispatch and in subsidy and in mandate and another that is the old line hydrocarbon users who are now saying well, look, we've sunk all this capital in here and we're at a disadvantage to put it politely. So they're saying well, we're going to shut down until you provide us capacity payments. And there's a lot of screaming about it now in Texas, but I think the screaming just is getting started.

MS. GELLICI: One last question, Robert.

MR. BRYCE: Sure.

MR. CHAN: Desmond Chan with Bechtel Power. You mentioned three times in your talk about pro nuclear. What's your outlook with nuclear globally and also in the U.S.?

MR. BRYCE: Sure, thank you. Well, I think Howard hit it just right is it's all about cost. The Vogtle plant in Georgia roughly $6,000 a kilowatt. Talk about Kemper. I know it's a sore point. And a costly one. $6,000 a kilowatt.

The Prairie State plant in southern Missouri is about $3,000 a kilowatt. Natural gas, you can build for $1,000. So I'm hopeful for nuclear, but the problem is it's just too darn expensive. And in reality, for U.S.-based generators, coal is still too expensive. Prairie State is probably one of the last big plants that's going to be built and it's triple the cost, the upfront capital cost of natural gas, you know, I'm hopeful for coal in terms of having a diverse mix, but

right now it simply costs too much. And it's half the cost of nuclear.

Okay, I think I've been told to sit down. Thank you.

(Applause.)

VICE CHAIR WALLACE: Thank you, Robert. We'll now have a break and reconvene --

MR. PALMER: Before we do, this is Fred Palmer from Peabody. We are involved in Prairie State and just for the record, the full operating cost in Prairie State will be like Turk's in Arkansas which is an AEP plant. And it will be normalized by $55 a megawatt hour, super critical, pulverized coal. Absolutely works. Absolutely economical. Absolutely you'd make that choice today over any natural gas unit anywhere in the country, but for carbon. Thank you.

VICE CHAIR WALLACE: Okay, we'll take a break now and reconvene --

MS. GELLICI: Let's get back about

5 to 11. So about 15 minutes, please. Thank you.

(Whereupon, the above-entitled matter went off the record at 10:38 a.m. and resumed at 10:56 a.m.)

MS. GELLICI: I'd like to get started with the rest of our program. I'd like to call to the podium, Larry Grimes, who is a legal counsel for the National Coal Council. I neglected to give him time at the beginning of the program to talk to us about some anti-trust details. So we'll take care of that business now before we get started.

Larry?

MR. GRIMES: Thank you, Janet. In your packet, in my packet, it was the second piece of paper under the agenda. You'll find a one pager front and back. The National Coal Council General Antitrust Guidelines. This is not a topic to generate a whole lot of excitement like our last speaker, but I kind of feel like the guy in the World War II

movies had to give a VD speech to the troops to behave or die of consequences.

I want to talk about behavior and dire consequences, but I won't show pictures. To sum up, your service here which is so appreciated by the Department of Energy, by those of us in the business and who love the business, does not exempt you from the enforcement of the United States and foreign antitrust laws and state antitrust laws. We've prepared a set of guidelines. This is not specific advice to any of you and if you have questions, you should talk to your counsel, to me, or somebody who can get you into the right mode to be advised. But I'd just like to draw your attention to the bold print, second period which says, "Membership in these organizations, NCC, and NCC, Inc. confers no immunity from federal or state antitrust laws." Full stop, end of story.

Most of you have probably had counseling on antitrust laws from your own

corporate or business counsel. But those of you who do not, you simply cannot engage in certain kinds of conduct and if you'll study these guidelines and if you have questions call me. It might save you a lot of grief because there are great personal liabilities and liabilities to your affiliations from violating the antitrust laws and just because we're appointed by the Secretary of Energy here doesn't help us if we get over the line. Thank you very much.

MS. GELLICI: Thank you, Larry.

It's my pleasure this morning. It's still this morning, yes, to introduce Tom Alley, who is Vice President of Generation for the Electric Power Research Institute, EPRI. I'm very delighted that Tom is here with us this morning. We also have representative, Barbara Tyran is here from EPRI as well. We greatly appreciate it. EPRI has been a tremendous supporter of the National Coal Council and has done a lot in terms of

supporting our studies that we've done over the years. So we're very grateful for EPRI to be here.

Just briefly on Tom, he is responsible for the R&D Team which is focused on research, development, and the application of fossil technologies and that's for both existing and future generating assets. He has over 29 years of experience in the energy industry in both the fossil area and in nuclear.

Before joining EPRI, Tom worked at Duke Energy where he was responsible for the evaluation, inspection, and repair of nuclear power plant components. He has a Bachelor of Science degree in Electrical Engineering, and a Bachelor of Science degree in Materials Engineering from North Carolina State University. He is also a Registered Professional Engineer in North Carolina and South Carolina. Again, please join me in welcoming Tom Alley.

Tom?

(Applause.)

MR. ALLEY: Thanks very much. It's certainly my pleasure to be here and thanks for the invitation and opportunity to speak with you today.

What I'm going to try to accomplish is to give you some insights on the reality of where the coal fleet is today, the assets that many of our members are asking -- the demands that are being asked of those assets and the challenges those assets have in today's energy policies.

Is there a clicker up here? Here it is. Sorry.

Now one thing that Janet had heard a presentation of EPRI about the power system, the power grid future. So she said hey, can you guys talk about that? I said well, I can, but I'm sort of a PowerPoint guy, so I'm going to try to talk just a few moments about the power system of the future and also try to tie

that into power plants and we'll kind of work through some discussions. Some of the slides I have today I'll go through pretty quickly because you've seen them with regards to the energy trends, demand, those sorts of things and we'll try to get pretty quickly to some technology discussions about power plants and I will welcome any questions you may have during this.

The power system of the future is certainly changing. The power system we see today it once flowed from central generation, out through transmission, distribution networks to the end users. And what we're seeing now is a lot of two-phased power flows. So we're seeing rooftop solar. We're seeing distributed generation, demand response, energy efficiency. Most of these things are all focused on the right hand side of this chart where the heavy red arrows are. So we see power now going in all different directions across the grid and it's certainly

the trend that's going to continue in the future.

Where it ends up at the end of the day is obviously questionable. I think there are certain restrictions we're going to hit, transmission build will be one, for instance. You would love to have a lot of renewable energy out there, but when you start looking at what it takes to get wind to the end user, transmission is probably going to be one of those things, one of the barriers that's going to kind of stop this.

So where exactly this whole evolution to the system is going to end up is going to be certainly interesting for us to keep an eye on as we go out into the future.

But I'm going to talk about the left hand corner here which is the central plant, maybe, and the role of the central plant with regards to this power grid of the future, what the central plants are being asked to supply. I mentioned before I have a

number of different externalities and pressures that we see on the central plant today and I want to cover these both briefly and in some level of detail.

Fuel availability and pricing, we'll discuss that certainly a little bit. There's been a number of conversations here with regard to natural gas. I'll certainly share some conversations. It's always interesting to me that you come to a coal meeting and before you get 15 minutes into the discussion it ends up being natural gas. So I'll certainly share some comments with you with regard to natural gas and what we're seeing.

Renewables, Robert already gave us a pretty good highlight about where renewables are. We do hear a lot of discussion about the impact of renewables on the grid and the intermittent nature of renewables. I think for certain regions of the U.S. that is very true. I think it's true in California,

Hawaii, Arizona, maybe a couple other regions, Texas, where you have a lot of wind energy there. But overall, I think renewables still represents a smaller portion of the generating mix. So what we tend to see is that there is a lot of intermittent nature just based upon demand and what the grid is asked to respond to, what the plants are asked to respond to.

Right now, currently, I think a lot of this is due to fuel switching and just the everyday demand switch that we see and demands that our customers have on the grid. I think as we look out in the future, we look more to the German model and the Spain model where we see large penetration of renewables. That's certainly going to have an impact on how power plants have to respond to the intermittent nature of all that.

Market drivers are certainly out there. Capacity markets have been in the news recently and what capacity markets are doing, I heard some comments about ERCOT now and

their capacity margins and payment for capacity, so that's certainly something very interesting.

The aging assets of the coal fleet, 70 percent of the coal fleet that's remaining are certainly scheduled to be in service here going off in the future is 30 years or older. So we're dealing with older assets. We're dealing with older assets now that many people put quite a large investment in these older assets.

So we'll talk about CO2 a bit. What's the likelihood of retrofitting these assets with CO2 technology? Should that be the direction of the future? I think that would be a very hard lift for the industry.

So we'll touch on a few of these things. And also water, I think, is very important. I'll touch on that as well. I think water is in many people's mind as far as the regulatory community, environmental community, water is the next air. So we're

going to see a significant increase in activities associated with water, something that the industry is going to have to manage.

Demand, we've seen this curve already so I won't spend much time on this. What I will say it's very difficult in a low-demand period for people who gather capital dollars and actually invest in the resources that it takes to keep the plants viable. So certainly we think this is the trend that's going to move forward into the future and we've heard some other comments about that from people who are better qualified to answer that question than me. So I do think it's going to put an increased pressure on the existing assets that we have here, because I think at least from a coal plant perspective, there's not going to be many plants built in the next 10 or 15 years with the current environment that we see.

I did mention natural gas before. Three years ago, EPRI sponsored our summer

seminar. I think, Janet, you were there this year and three years ago we asked and this is a meeting that we have, kind of a think tank meeting we have with industry energy leaders and we just talk about the landscape. We talk about the future and where the energy industry is headed.

Three years ago I shared a session on natural gas and we asked everyone there, there was about 125 sea level people in the audience. And we asked them, we asked them a question. We had polling devices and we asked how many of you believe that natural gas is going to be a game changer? This is some sort of a ruse or you really just don't know?

At that time, I had about a 30 percent split on each of those answers. We went back and asked that question again, this last year, not with the voting tool, but we asked everyone in the audience with regard to natural gas and I think everyone in the room agrees it's definitely a game changer. So

we've already heard comments about nuclear. We see delayed nuclear. We see no coal build. We just see an impact in the industry significantly with regards to that.

One thing I would say is the impacts of natural gas on the fleet that we have here, the existing coal fleet is certainly being felt and I say this because the price points we area with natural gas right now and coal, we're kind of on the cusp of whether or not it's economical to fire a plant on gas or it's economical to fire a plant on coal.

Last year, we saw gas prices that were $3 less and for the first time in the history that I'm aware of, gas and coal, the non-nuclear dispatching of gas and coal were pretty much equal, about 30 percent each, each one of those generating sources. This year, we think we'll see a little more coal being dispatched. Gas, last time I checked, was around $3.80, so you start to see the

sensitivity of this $3 to $4 range that we're in now as to whether assets are being fired with coal or assets are being fired on natural gas, so it's certainly something we need to keep an eye on.

I look around the world and what I see is I see those who have gas and those who don't. And the U.S. is very fortunate. Natural gas has certainly been, I won't call it a happy accident, I think it's more design around it than that, but it's certainly been a gift to U.S. energy policy with regards to the framework we set up on carbon and coal and everything else. And gas has given us some relief from all that.

Elsewhere in the world, it's certainly not the case. So when you're visiting Europe, you visit Spain, for instance, the gas combined cycle plant capacity factor in Spain last year is nine percent. That 9 percent, 25 percent of that is pretty much by one utility in Spain. So

the other utilities in Spain have to basically compete for the scraps as far as natural gas is concerned in the combined cycle fleet. They're asking us now how do I lay the fleet up? How can I disassemble this fleet and move it elsewhere in the world? So they've just kind of given up on gas. So it's a very interesting landscape with regards to where we are with natural gas over there.

Something we hear mostly from the Northeast, but there seems to be a continuing concern about the pipeline capacity and whether or not the pipeline capacity is there to deliver the fuel where it's going to be needed when it's needed, particularly in the winter time. When you think about the Northeast has a heavy heating load with gas and there's a lot of natural gas combined cycle capacity in the Northeast, so there's a lot of concerns that what happens if that gets interrupted. What happens if we have a very high heat load and there's not a lot a coal

assets left up there. So I think there's some vulnerabilities there and certainly some concerns with regards to gas in the Northeast.

Sorry, I'm having trouble with the clicker here. We've already seen this data with regards to fuel sources. I do think that coal is going to continue to be a pretty viable source, both here in the U.S. and abroad. It seems interesting to me though that the international community certainly is watching the U.S. and the gas markets with a completely different interest than we are. They look at it with regards to export and their ability to export natural gas. They also look at natural gas' impact on coal prices here. And so as a result of that, coal prices here have been lower and they're taking advantage of that.

We did hear some comments in the previous presentation about CO2 being a global issue, not a local issue. I certainly sign on to that wholeheartedly. So what we're doing

here is we're -- certainly people here in the coal industry can answer this question better than I, but we're packing up our low sulfur hard coal bituminous high heat value coal, putting it on barges, sending it to Europe and they are loving it. They are absolutely loving it because gas prices are high. I've already mentioned that they're shutting down their combined cycle fleet and their environmental regulations are a little less stringent than what we're dealing with here. They don't have to regulate on mercury. CO2 is not on the landscape for them right now at least. And their NOx emissions limits are a little higher than they are here in the U.S.. So they're able to burn this coal and they're getting it at a preferred price.

I mentioned NOx. A great example of that is that here in the States there's many folks who are held by regulations and dissent decrees that they have to have their SER and operation whenever the plant is

operating. So one of the restrictions we have in turning down the plants to meet this flexibility in the grid is the catalyst and how the SERs operate. We can only turn them down so far before we start to destroy the catalyst.

In Europe, because the NOx limits are different, they just put a bypass in. So when they turn the units down, they just bypass the SER and go out the stack. So they're very happy over there. So again, I think until we start to approach CO2 and other pollutants on a more global scale, it's certainly going to be a two-part world.

I'm not going to go over this slide. We've already seen this. This just talks about coal fired production. I will make a couple of comments with regards to gas and I think EIA reported their state of the generation business here a couple days ago. I read that report and certainly it reinforces the fact that natural gas is being constructed

probably more so than any other energy source. I think it has more to do really with not just the price because it's certainly preferential because of the price, but natural gas is easier to site. It's easier to permit. It's faster construction which makes it cheaper. Investment capital in natural gas plants is certainly lower. I don't see a lot of demonstrations around natural gas plants.

Last coal plants I saw people chaining themselves to the earth moving equipment and other things like that. I haven't seen or witnessed that with regards to natural gas. It's low emissions. We all know that. So the CO2 footprint for natural gas is much less. There's just a preponderance of forces here that are pushing the industry down this natural gas road. The industry certainly values diversity and it's something that we keep a very close eye on.

The problem here is that I don't know that economically diversity is very

easily justified. So folks are looking at the bottom line economics and it's hard to say that I want diversity so I'm going to add 15 percent or 20 percent to the cost of this project to give me diversity. So it's very difficult to add this into the economic equations.

Another comment about the world energy outlook is that I see two worlds. And I use world in a -- I won't say global term -- but I see two worlds. There's a world of cheap gas which is pretty much confined to the U.S. You might throw Russia in there. And I see a world with expensive gas. I see a world that has a high penetration of renewables, Spain, Germany, Hawaii. And I see a world that doesn't quite have that type of penetration of renewables.

I see a world where demand is growing. China, India, we heard some of those comments before. And I see a world where environmental policy is more favorable or less

favorable to the development of different technologies. So as you look around the world, you will see technologies being developed according to those constraints and maybe many others. So if we look at China and India, the environmental policies are much more lenient there and they're building coal. Demand is on the increase.

Probably the toughest market that I'm aware of right now is probably South Africa. They're in a high regulatory environment. They're in a high demand environment. They need megawatts. Their capacity is less than one percent. Their reserve is less than one percent. And they have all these things kind of focused on them together. They're actually exporting their high rank coal and trying to burn the lower rank coal, so there's a very difficult situation for them.

This is kind of our rendition of the rec slide as far as what we're looking at

in environmental policies. I think many of these things which used to be unknown are starting to get -- we're starting to get some clarity on. Certainly, the solid waste I saw where there's some extra additional pressures on the EPA to make some sort of ruling with regards to waste products for coal combustion. We certainly have seen MATS now and the effect of MATS and we see a number of plant closures associated with that.

And we've got to look at new source performance standards. We'll talk very briefly about that because I think everybody here is pretty familiar with new source performance standards. We're still anxiously awaiting a glimpse of what existing source performance standards may look like. That can stand to impact the existing fleet quite significantly.

And I've already mentioned water. There's a number of efforts underway right now with regards to water and how we're going to

manage water.

I've just got a couple of slides on the EPA. I'm just going to move to the end of these because I think everybody here is pretty familiar with all the EPA requirements that we have right now. But a couple of things I'll add to this is many of the considerations that are given for the deployment of the technologies assume, they're going to be ready, assume that the industry is ready to deploy them and it assumes units are operating, wide open and on top of their performance curves.

In reality, the intermittent nature of the way that the grids are operating right now, these units are asked to flex, they're asked to turn down, they're asked to vary the way that they operate and certainly when you do that it affects the mission control. So this is going to be a very heavy lift with regards to the industry looking at new source and looking at existing source

standards with regards to the EPA and there's a timeline out here with regards to all this and we're certainly keeping a very close eye on it. I'm very anxious to get a glimpse, get some intelligence about the existing source performance standards. I think the new source performance standards is penalizing coal to the point that it's going to be very difficult to build traditional coal under that. And I'll add another comment to that here towards the end.

Now to talk a little bit more about research, where EPRI research is headed and what our members value in the research the way we have here is options. And what we find out is unlike other generating sources, each coal unit, maybe even each coal plant is its own entity. It burns a different coal. It has a different border design. It has a different turbine. It has different water sources, different cooling. Every plant, maybe even every unit is different. So one

solution doesn't fit everything here. So the technologies we have to develop and the technologies we're working on are around all aspects of the power plant. Everything from work force to stack emissions to monitoring to water so that we can provide our members a whole litany of options so they're able to go and pick and choose which option it can.

And the goal of our research is to keep that plant viable and make it economically dispatchable and in a few cases maybe even we can take a plant that's earmarked to be closed because of some economic concerns, beneficial economic concerns that research affords that plant, that plant now we may be able to hold it with that asset versus that asset being retired. So the big story here is every plant is different. It's going to take a number of technologies around all aspects of power plant performance and operations in order to maintain the viability of the existing fleet.

I've already said the role of the plants are changing. I heard some discussion earlier about capacity factors for coal plants. Certainly the older coal fleets are being retired. So the gigawatts we're seeing now and I think the last number I saw 61 gigawatts in the next ten years or so will be retired. Most of those units are around 500 megawatts or less. For the engineers in the crowd, most of those were designed with slide rules. So you have subcritical plants. There's lot of design margin. They're robust, they're heavy and they're the plants that we've been using over the course of history to flex according to the demands of the grid.

What's going to be left now is a super critical unit. Designed by computers so the wall thicknesses and the design margins and everything else are going to be to the .01 decimal point. There's no extra margin. These basically were designed to be your sports cars and we've also in the process hung

out on the back of the plant this huge chemical plant and I have a picture I can show you about that. We're going to ask this plant now to be flexible in the way it operates. So it's not going to come on and operate 80 percent of the time. I heard that discussion earlier where 80 percent of the plant time, the plant is on, it's going to be running, just humming along. It's going to be asked to drop load at night. It's going to be asked to come off on the weekends. It's going to be asked to shut down during spring and during the fall, may not operate at all.

You may shut it down on Monday, I mean on Friday, thinking it's going to come back on Monday and it may not come back for two months. Now from a plant operator's perspective, that's pretty serious because the way you shut the plant down on Monday, if you're going to come back on -- I mean on Friday. If you're going to come back on Monday, you're bottling energy up, you're

holding your heat, you're trying to make it so you can come back and all of a sudden, you're not being called on. When you're not being called on, now you have the drain system, the whole way you're going to shut that plant down is going to change.

So these newer plants -- newer, they're still around 30 years old, but the newer plants are certainly much more complex to operate, much more complex for our members to put them on the grid and manage those resources in the way that the grid is going to be asked to respond. So it's going to be quite a challenge for the industry to manage a grid associated with all that.

Certainly capacity. We've heard a little bit about capacity. Most of the plant closures we're seeing are along the East Coast and there does seem to be some capacity there, some margin for some of these plant closures. So the overall impact, I think other than the operational impact, should be somewhat minimal

with regards to that.

So I've already kind of mentioned increase ramp rates, the way we operate these units. They're going to be asked to respond quicker. It takes a long time to bring a unit from zero load to 100 percent load and the whole process and procedure you follow to do that. How can we cut that, make it shorter? How can we drop the load shorter? Every time you're doing this, you're dealing with temperatures. You're dealing with the whole systematic approach of the plant and we start to accumulate a lot of damage that way. We're trying to understand and quantify what that damage is. It's quite a challenge to do that because damage that you impact on a plant today, you may not see for five years. So when you start quenching systems, you drop load, and you're dropping temperatures and you start to quench systems and you accumulate damage according to the way that you quench this, you may not see this for five or ten

years. So how can we understand that better and how can we put that back into the economic models so that now it can be incorporated in how you dispatch those units and how they supply to the grid?

The other thing I would mention, here's a picture I was going to show you before. If you look at this plant and this plant was built in about 1965, '66, '67, the door -- the building with the blue door and the building with the stacks next to that was basically the plant. That's what that plant looked like 40 years ago. Now you see all that off to the right. That's all of our controls equipment and it's all a big chemistry plant and everything else has been hung on the back of this plant now to comply with all the regulations. So the industry has done quite a lot over the course of time and history to comply with the regulations in terms of capital investment and complexity in the plant. These plants are very complex.

Another point I wanted to make is that we find out, particularly with environmental controls equipment and the technologies that we're using today that anything we do in the front end of the plant can have a dramatic impact downstream. So you say oh, we're going to control mercury, so we'll use bromine. We'll treat the fuel before it goes in the combustion process with bromine. Great idea. And definitely, you look at charts of mercury and you look at bromine additions and you'll see your mercury falling down quite a bit to where you can comply with the regulation. The issue with bromine now start to corrode your air preheaters and there's corrosion in other components of the plant.

So what we're finding out is that anything we do at one end of the plant now cascades its way all the way down through the plant and it can end effects that cause a lot of difficulty with regards to the reliability

equipment and how the plant is going to be operated and the maintenance cycles that we see in the plant and the cost of operating the plant. So all these things are interdependent.

So if you hear we can control with bromine or we can control with activated carbon injection or we can have SERs, understand with the litany of requirements that you have to meet, these things all cross talk and they have cross effects with the plant. So it's quite challenging.

EPRI works with Kirk with regards to looking out into the future with regards to research needs and so I'd haul out a couple of things that we see on the horizon. First of all, more immediate flexibility, reliability, environmental compliance, so the strategy right now is to comply. The strategy is to be flexible and the strategy is to be cost effective. So a lot of focus on cost. A lot of focus on OEM cost as the fossil plants are

now asked to compete with other technologies, the answer for that is you need to drive those costs down. So we certainly see a lot with regards to that.

CO2 is on the horizon. We continue to get our members, our board, our public advisory committees and others continually tell us do not take your eye off of CO2. So we continue to work with DOE and others with regards to CO2 and trying to maintain that.

I also think that in the future as we look ahead at the future, it's going to take new technologies. To think we're going to comply with the regulations that we have today with souped up super critical coal plants probably is not going to happen. The builds that we see in place right now, the few units that are going to be left to complete here probably will be the end of what we're going to see for a while until some other technologies show up on the landscape. So we

see oxy combustion. We see chemical looping, gassification, if we can get over the cost of that, obviously. But there's other technologies out there that I think are going to be the key for the coal plants moving forward. So I would leave you with that thought and with that I'll conclude my comments. If there's any questions, if I have time --

MS. GELLICI: Thank you very much. We have time for a couple of questions. I've asked our communications chair, David Server, to kind of assist me here. If you would kindly raise your hand if you have any questions for Tom. Thank you.

MR. NARULA: Thank you. Ram Narula, energy consultant.

Tom, could you give us an idea in terms of as you call the chemical plant which the rest of the world is not using or using to a much smaller scale. How much does that add to the total cost of the power plant?

MR. ALLEY: I actually don't have that number. I can't give you that.

MR. NARULA: I've heard numbers as much as 45 percent of the cost.

MR. ALLEY: I could believe that, but I don't have a number for you. I'm sorry. I don't have that data.

MR. NARULA: Thank you.

MS. GELLICI: Any more questions? Andy.

MR. ALI: Sy Ali with Clean Energy Consulting. In your combined cycle plant, do you see any operation switching from coal to natural gas during the operation periods? They have a month of coal and half the month and natural gas in order to meet the environmental requirements and the economics.

MR. ALLEY: You're talking about a plant that can -- a bi-cycle plant is obviously a gas plant. So there are plants that have duel-fuel capability.

MR. ALI: Exactly. There are

designs that have dual-fuel capability.

MR. ALLEY: That's correct. And there's certainly strategies out there that people are exercising, taking a plant that's designed to run on coal or gas and switching that over to gas. And they'll do that if they can comply.

The problem is with the MATS, Mercury and Air Toxic Standards, that if they haven't put the investment in the plant which in some place can be half a million dollars to build scrubbers and everything else to comply, they won't be able to burn the coal. So what we see more of is not switching and blending of the coal necessarily. We see people that are taking a plant that was designed to run on both fuels and basically running on gas, 100 percent of the time.

MR. ALI: Thank you.

MS. GELLICI: One last question. Andy in the back there.

MR. PATERSON: Andy Paterson with

CCS Alliance. Can you shed some light on how much reserve capacity and natural gas turbines from the over build 1995 to 2005 that utilities still have that's maybe 10 percent capacity factor now? We some something like 400 gigawatts. It's hard to get a good number of natural gas capacity.

MR. ALLEY: Actually, there are some folks here I think can answer that question better. What I can tell you is that --

MR. PATERSON: Or capacity factor number.

MR. ALLEY: What I'm seeing is I'm seeing that many of the coal plants that are being retired, they're actually repurposing that site for gas. I kind of call it a quiet revolution. You talk to the manufacturers in the OEM as equipment, they're saying we don't see the revenue orders outside the country and that sort of thing, but yet I look at the number of coal plants that are being retired

and they go right next door to the coal plant and there's a combined cycle plant, natural gas combined cycle plant.

As far as the capacity numbers go, I think there's other people here that can answer that question. I don't have that data for you.

MS. GELLICI: Tom, thank you very much.

MR. ALLEY: Sure.

(Applause.)

MS. GELLICI: Next I'd like to call to the podium Divya Reddy. I'm sorry, Divya, I got tongue tied a little bit there. Divya is an analyst with Eurasia Group. If you're not familiar with Eurasia Group's information, I'd highly encourage you to leave a card with Divya. They're one of my go-to resources on analysis on all aspects of the energy industry, very global company, a lot of great information. So I encourage you to visit with her afterwards.

As I mentioned, Divya is an analyst with Eurasia Group's Global Energy and Natural Resources practice. She covers metals, mining, biofuels and climate change. She has a master's degree in International Development from Georgetown University and a bachelor's in Economics from Pomona.

Prior to joining Eurasia Group, she worked as a research associate at the Council on Foreign Relations. She has also previously worked as an investment banking analyst in the Natural Resources Group at Bear Stearns. She apparently started working when she was about 12, I think, with all that background. But would you please join me in welcoming Divya Reddy.

Divya?

(Applause.)

MS. REDDY: Thanks, Janet. It's good to be here. So I will be talking about the European experience with carbon pricing today. Just a little bit of background in

Eurasia Group for those of you who are not familiar which may be everyone. But basically Eurasia Group is a political research and advisory company. So we track political and regulatory developments and make forecasts as they relate to investments globally.

So talking about the EU emissions trading system, at a basic level this is a cap and trade program for GHG emissions, primarily CO2 emissions covering the power sector as well as the industrial sector. The program also phased in the aviation sector in 2012, but that's been fraught with problems so for purposes here, we'll just ignore that and focus on the other two.

The current target is to achieve a 20 percent reduction from 1990 emissions levels by 2020. And the basic mechanics are like any cap and trade program. You introduce a fixed number of allowances into the market in a given year and obligated facilities can either purchase allowances to meet their

obligation or actually mitigate emissions from their facilities.

The program has so far been broken down into three phases. The first phase was from 2005 to 2007 which was really a pilot phase. The second phase coincided with the Kyoto Protocol period from 2008 to 2012. And we're now in the current phase which runs through 2020.

So to look at each phase in a little more detail only because each one had issues that offered some important lessons learned and informed future reforms, in Phase 1 which was the pilot phase, so the allocation system, the cap was set by what are called national allocation plans. So each country would determine, based on historical emissions or their best assumptions at the time because during the start of this pilot phase there really didn't have the actual accurate emissions data. So they made their best guesses on what their missions and business as

usual trajectory would be and came up with a cap that was then submitted to the European Commission that would either accept or revise it and that would establish the sort of total cap for the program.

Nearly all allowances were given free of charge during this phase. Up to five percent could be optioned. Almost no countries actually did any auctioning. I think only one, which was Denmark, did the full five percent auction. And as you can see when the prices were relatively high, sort of free allocation did create some handy profits for companies that received them free of charge.

The noncompliance penalties is set at 40 euros per tonne and really the main issue here as I mentioned at first it was the lack of concrete reliable emissions data at the start of this that led to as accurate emissions data started to come in, there was clearly an over allocation in the program that

led to the price crashing.

And really that first crash, the first round of accurate emissions data came in April of 2006 and that's when you see that first drop. Eventually, the price dropped fully to zero euros and a large part of that was also because there was no bankability of permits between Phase 1 and the next phase. So if you didn't use it by the end of 2008 it was worthless.

So all that led to some reforms for the next phase which was the Kyoto Protocol phase of this. And the EU's overall target or commitment under Kyoto was to reduce economy-wide emissions by 8 percent from 1990 levels. Now obviously, the ETS is a portion of economy-wide emissions and so the target was that 3.3 percent of that 8 percent would come from this program.

They still use the national allocations plans to set the overall target so each country can determine its own cap,

essentially. The auction, the allowance for auctions rose from 5 percent to 10 percent, but again for sort of obvious concerns about costs and competitiveness, most countries chose to distribute free of charge.

An important addition in the section phase was the introduction of the Kyoto protocol carbon credits into this market so credits created from offset projects through the U.N.'s Clean Development Mechanism and Joint Limitation Program could be used to meet compliance obligations for entities under the EU ETS. And then they bumped up the noncompliance penalty to more than doubled it to 100 euros per ton.

As you can see, it started off at a relatively robust place. They also addressed the over allocation by cutting the overall supply targets by 6.5 percent from the 2005 level of emissions. But really in 2008, obviously, the euro's own crisis happened. Economic activity fell, emissions fell, and

that resulted in the price falling quite a bit in that 2008. And you've sort of seen it kind of consistently decline over the period. The reason that you didn't have to go fully to zero like you did in the first phase was that they didn't introduce bankability in this phase from Phase 2 into Phase 3.

So that leads to the current phase of the program which runs through 2020 and really the most significant changes were made between Phase 2 and Phase 3 and a lot of this was established in the directive from 2008. It's important to keep in mind the context that this phase was established. It was the end of 2008. It was the lead up to the big Copenhagen summit. Really the expectations around global climate change policy were quite strong and the expectations that the U.S. would implement a climate policy were also very strong in Europe. It was sort of an assumption that there would be a similar cap and trade program in Europe.

So the ambition here was sort of informed by those expectations. So there's clearly a longer compliance time frame that's in line with the Copenhagen targets that the EU had established and there's a linear kind of reduction of the cap to eventually get to that 20 percent reduction by 2020.

An important change was rather than do the national allocation plans they moved to a centralized EU cap that would then inform what the allocation is for each member state and the sort of -- they also implemented more harmonized rules for things like allocation for auctioning.

Another important move here was again in line with the desire to be more -- to kind of go further on ambition is to move away from free allocations towards auctioning. There was some pushback of the controversial move and there was pushback in particular from Eastern European member states which are further behind in economic development and

also tend to be a little more coal dependent where the economic costs for full auction would be more significant.

So the compromise agreement was that the power sector would move to 100 percent auction in 2013 with the exception of Eastern European member states that would have a more gradual phasing in so they would be allowed to give 70 percent of free allocation to their power sector in 2013. That would phase down to 20 percent by 2020.

For the industrial sector, because of concerns about costs and the fact that the industrial sector is more exposed to international competition, there's a greater sort of phase in or longer phase in of auctioning, so 80 percent would be freely allocated in 2013. That would phase down to 30 percent by 2020, eventually to zero by 2027 was the idea.

And the other sort of change here was that the international offsets, you could

use it to only meet 50 percent of the obligation under this program, so it was reduced and the other 50 percent would have to come from mitigations within the program itself. But again here, you still have the economic crisis, so you don't have any sort of meaningful recovery in price which is now prompting calls for more structural reforms to the program going forward.

So looking at some of the challenges that this program has faced, I mean one of the issues is that that this is a commodity although all commodities are exposed to price fluctuations. This is a commodity that's created by an active legislative decree and therefore it's more vulnerable to fluctuations as a result of kinks in the program, but also more susceptible to government intervention. We've already seen three phases of the program that have had different modifications that changed the price outlook which can challenge predictability and

compliance.

Another issue is carbon leakage. I mentioned before that for industrial facilities that are exposed to international competition, there is a concern that because of the higher compliance cost in Europe that they would move or relocate abroad. So there are two simplified ways to deal with this. One is to do what the EU did which is to provide free allocations and kind of offset the compliance costs by providing permits for free. The other is to impose some kind of border tariff which is also what's considered, but because of international trade challenges that was not decided to be used.

The full impact of this is yet to be felt really because you're still in a period where you have relatively high levels of free allocation, but as you move towards full auctioning this could become a bigger problem, especially as the EU more generally grapples with this issue of competitiveness to

recover their economy.

The other related issue is energy costs which have been, as you can see here, I mean this is only three data points, but you see sort of an uptick even amid a low economic growth period of electricity prices across the block. But perhaps more tellingly if you look at individuals, some of the larger economies in Europe and compare them to power prices in the U.S., you see that this is where the issue of competitiveness for European companies is coming from.

Now obviously, a lot of this has outside contributing factors, outside of the ETS, especially given that carbon prices are relatively low, but it still forms part of the debate and is a contributing factor here.

And then another issue has been the implications for the fuel mix in Europe. So clearly the low carbon price, the sort of intent of the program to begin with is to disadvantage more polluting forms of

generation including coal, but the low carbon price has meant that especially given in Europe that natural gas prices are relatively high, that that coal has still been in the game and it's sort of a near term relatively attractive market for coal fire generation.

Longer term, the original intention was to move away from fossil fuel generation entirely and to incentivize investments in cleaner forms of power, especially renewables, but the price point to do that would have to be significantly higher than where it is today. So even the kind of modifications they're talking about wouldn't get you there in the near term.

Some other challenges are politically although Europe is unique in that you do that -- generally have cross-party support for climate policy so the risk of repeal of the program is relatively low, but within the program you have a number of diverse member states who have different

opinions about how stringent the program should be. Poland, in particular, has been an outlier in pushing for weaker standards. And when you do structural reforms it does require unanimous support across countries and that can be challenging as you sort of look to build each phase of the program in the future.

There also is a drive among some member states to implement separate policies so the U.K. has a carbon price floor, so it's potentially a carbon tax. And France is also considering a carbon tax. How those programs work within the broader program is something that can create some challenges for companies that have to comply with both.

The other challenge for Europe has been that -- the hope has been a lot of other countries would move toward emissions trading and that you could create international linkages across programs that would lower compliance costs. That has not happened. Australia has been the only country that has

planned to link with the EU ETS and now Australia has a new government that is moving away from its carbon policy, so it's likely that that linkage won't come through. So that's been a challenge for Europe as well and probably will come up in debates as they look to longer-term targets and additional phases of the program.

I mentioned the Eurozone crisis has created some issues about the price, falling emissions, as a result of that that sort of not creating the right incentives that they had envisioned for lower carbon sources. The other sort of debate going on is it's unclear how much of emissions reductions has come from the program itself, rather than other factors like economic growth falling off. And that's something, it's hard to know what the counter factual would be, what would emissions have been without the ETS. But there's a debate about how much of a motivating factor this has really been.

And then finally there have also been some incidents of fraud within the system and the trading aspect of it. There was -- in 2010 a big scandal around VAT fraud. There's also been issues related to phishing scams or identity theft and registries and carbon permits being stolen from registries that have resulted in halting of the program for a few days in some cases. So those issues have come up, probably a natural sort of evolution of establishing the process, but it is something that the EU has moved to address. So they have sort of tightened up some of the requirements and oversights.

So if you see emissions in Europe, part of the sort of benefit for Europe for setting a 1990 baseline was that you naturally already have a significant drop in emissions through the 1990s, but really the second drop coincides with the euro zone crisis and the economic downturn as a result of that.

So looking forward, where we are

now is that the EU is considering both short-term and long-term reforms to the program. The short-term fix is really as a result of concerns that the carbon price is too low to sort of put in place the incentives that had originally been intended to do. So they're implementing or they're trying to implement a so-called backloading measure. It's where they withhold allowances in the near term and sell them in future years to prop up the near-term price. An initial vote on this failed in April, but they made some revisions to water it down a little bit, so the current proposal is to delay optioning of 900 million allowances through 2015 and then reintroduce them a year later. It passed European parliament in early July. The next step is to go to the European Council.

There are still a number of countries that are undecided on this. Germany was the key wild card. But now that Germany, following the election last month, it looks

like the Free Democratic Party within Germany had been very opposed to this and they did quite poorly in the election, so now it looks like most likely that Chancellor Merkel and her Christian Democratic Party will form a coalition with the Social Democrats which should provide a consensus around supporting this backloading measure. But again that's a very near-term fix and it's not that significant in terms of propping up the price to the sort of 2030 euro, dollars per ton. The expectation in the market are that it could be sort of 7 or 8 euros, but not more than that.

So that sets up the stage for debate around more structural reforms and longer-term targets. There has been some debate about changing the CAF within the current phase of the program to tighten it which would also send up prices. That's highly unlikely and you don't hear as much debate about that any more.

So the focus is on targets for the next phase of the program which would run through 2030. There have been public comments. It was open for public comments which closed in June and the target is to establish the 2030 targets by the end of next year, although there is room for delay that that gets pushed off into 2015. In 2015, you could see more motivation and sort of a renewed energy around this as you head up to the 2015 U.N. Summit in Paris, so that could be a motivating factor to boost ambition. But you are in a different period right now where because of the euro zone crisis, there is a real debate in Europe about competitiveness and the role that higher energy prices are playing in the kind of economic downturn and future loss of competitiveness in Europe. So it's going to be more challenging, I think, this round than it was back in 2008.

So just to conclude quickly with a few lessons learned. A lot of this is things

that I've already mentioned, but basically a commodity that's created by an active government decree will be susceptible to volatility around kinks in the program itself, but also to reform the modification that governments can implement around the way which can challenge predictability for compliance entities.

Shorter compliance phases that constantly have to be reformed are again challenge predictability. You had longer-term targets, 2030, 2050, that would provide more clarity for investments. Accurate emissions data were a huge problem in the early parts of this program so the key to providing a robust market, and strong oversight is also important to prevent fraud which did lead to sort of a setback in terms of trust in the program and its viability.

The free allocation, although important and essential for mitigating compliance costs did create this debate around

windfall profits for companies that some saw as unfair. And the other issue is that in many ways, the cap and trade program did exactly what it was supposed to do which is when the economy is weak, prices are low, prices fall which provides some relief for companies complying. But at the same time, it failed to incentivize the investments in emissions and cleaning technologies that the original intent of this program was for.

Another issue that came up is that some companies are better placed to manage to volatility around trading than others and particularly utilities which have existing trading desks when back in the first phase of the program when the sort of initial emissions data came out were much more sophisticated in sort of managing their compliance, whereas industrial facilities that were sort of just holding purely for compliance purposes were less able to kind of game the market.

And then finally, there is a

debate around offsets and how much they result in actual emissions reductions and therefore how much a company should be required to mitigate on its own rather than purchase offsets to meet its obligations. So I'll stop there, but happy to open up the discussion.

MS. GELLICI: Thank you, Divya. Any questions? I'll still trying to get my head around how you actually steal a credit.

(Laughter.)

Very complicated. Fred? David, Fred had the question.

MR. PALMER: Fred Palmer, Peabody Energy. That was very comprehensive and excellent recitation of nothing but negatives.

(Laughter.)

I have a very basic question. Has anybody asked themselves how people are better or worse off in the EU because of these high electricity prices in the name of carbon emissions?

MS. REDDY: I mean I think yes,

there is a debate about whether the benefits of carbon reduction, especially given that the EU has put itself out on its own on this issue justify the fact that they are losing competitiveness.

MR. PALMER: I'm talking about people.

MS. REDDY: Yes, that, too. Yes. It has come up, but I will say that public support for climate mitigation and the carbon policy is generally strong and I would say majority supported. So I think the consensus when you look at public surveys is that people support even if it comes at a cost.

That's a change, especially now that you're in the middle of a recession and trying to struggle to come out of it that that public opinion could change, but the sort of opinion has generally centered around there.

MR. PALMER: Just a follow on, last winter in the U.K., they were out of natural gas. They had to buy emergency LNG

from Qatar, two boats, very large quantities of it. People were literally at risk from freezing to death because of their inability to provide affordable electricity and natural gas. Has that entered into these discussions at all?

MS. REDDY: I would say yes, it has entered into the discussions, but not in any concrete way. So there's also concern in places like Germany where you're putting in place a carbon price, but you're moving away from nuclear, so you're really not leaving a lot of options open for yourself, especially if you move to a more robust carbon price. So there is a debate about reliability and the sort of electricity reliability under this program, but not to the point where people are considering moving away from the program. It's not at that level yet. It's just sort of reforms in it to balance out.

MS. GELLICI: Any other questions for Divya?

Thank you. You handled a very complex topic very well. Thank you.

(Applause.)

Is Peter here? Our next speaker is walking in as we speak, right on time. As he gets his presentation loaded up, I will take this opportunity to go ahead and introduce Peter Davidson who is the Executive Director of the Loan Program Office at the U.S. Department of Energy. Peter leads the Department's multi-billion dollar Federal Loan Program for both traditional and alternative energy, financing a wide range of fossil, nuclear, solar, wind, geothermal efficiency and biomass energy projects, so quite a load there.

Prior to launching the Loan Program Office, Peter was Senior Advisor for Energy and Economic Development at the Port Authority of New York and New Jersey. He served as Executive Director of New York State's economic development agency and then

prior to his government service he was an entrepreneur who founded and managed six companies in the newspaper, broadcasting, out of home advertising, and market research business, so quite a breadth and variety of experience there, Peter. He is a graduate of Stanford University and Harvard University's Graduate School of Business Administration. He's going to be talking to us today about the Advanced Fossil Energy Loan Program.

Peter, welcome. Thank you for joining us.

(Applause.)

MR. DAVIDSON: Let me see, is it afternoon or morning?

MS. GELLICI: Still morning.

MR. DAVIDSON: Good morning. Nice to be here. Great to be here. So the relatively new Executive Director of the Loan Program Office of the Department of Energy, I'm just coming up to my sixth-month anniversary. So I want to spend a little bit

of time talking about, in general, the LPO and what we've been doing, but in particular what we're very excited about which is our new advanced fossil solicitation.

By way of background, Energy Act of 2005 we were set up for $35 billion of loan authority across a number of different industries, nuclear industry, renewable industry, and advanced fossil. As some of you know, we went out with a fossil solicitation in 2008, I believe. That was for a coal gassification system. We received a number of applications. Unfortunately, most of those applications the sponsors withdrew the applications because of the time of application price of gas was $12, $13 and by the time it went through it, they were gassification projects for power supply, and by the time things came to fruition, the price of gas coming down made a number of sponsors withdraw their applications.

A couple of applications are still

live, those having to do with coal to liquids and coal to chemicals. Those are still under consideration. If those projects move forward to closing, they will be a deduct from the $8 billion new solicitation which we're going out with now.

So let me tell you a little bit about that. Am I controlling the clicker here? Okay. So overview. $8 billion new solicitation loan guarantee. We can either do direct loans from the Federal Financing Bank of the U.S. Treasury or a loan guarantee, either one. And we are providing this for fossil, the broad scope of fossil energy which we'll get into in a minute.

The terms of our financing are really the -- if there's an offtake agreement, we match the length of the offtake agreement or if it's not, it's the useful life of the asset. We have done a great deal of loans already. We have a $24 billion portfolio of energy deals. And our tenure there goes 10

years out to 30 years. So we are a long-term lender with very attractive rates.

So what is an advanced fossil energy project that will qualify? We have a number of requirements. First of all, it's a loan, right? Which you guys in this room understand, but many people approaching us do not understand. We are not a granting program. That's Department of Fossil Energy. It's other parts of the Federal Government. We are a loan-only entity. And we were set up by Congress to do a number of things. We are really the -- we are there to accelerate the commercialization of new technologies and new forms of clean energy. So we focus on the innovative part. When there's a new innovative technology, a new innovative process and that process or project is part of a fully baked project where you have your equity in place, you have the offtakes in place, if it's that type of facility, where all the permits are in place, where everything

works as a project finance project, but because it's a new technology, because it's an innovative technology, historically banks and lenders have not been willing to finance the first, second, or third deployment of a new technology until it's been proven in the field.

So our program is created just to fill that gap.

So we will go in and provide the lending for the first, second, or third project of a kind, new technology or new process to demonstrate that the technology works, the new process works, in order to give confidence to other lenders so they come in behind us. And that's -- we've demonstrated that that's how we work in the renewables which has been the majority of the loans we've provided.

So there's no question of us crowding out private sources of capital. We are truly a public-private partnership. We

will not lend to a deal unless at least 30 percent of the project cost is covered by sponsor's equity. That has to be fully in place by the time you come to us and then we will provide up to 70 percent debt that if it works it's based upon the credit of the project sponsor.

So it is really focused on innovation and the commercialization of innovation and the demonstration at utility scale of innovation. Part of that has been clean tech as we are very focused on reducing greenhouse gas emissions and the project must be located in the United States. The sponsors can be foreign companies. The supply chain can be foreign companies who do not have any of minimum content requirements, just the project needs to be in the United States.

Now very importantly, our definition of innovation by definition in the Act is any first-time deployment of a technology or a process in the United States

is by definition innovative. So someone can be working for years in Europe or in Asia or in Africa, it's the first time deploying the United States, it would qualify for us.

Okay, we put the solicitation out, the draft solicitation out for comment. We received a number of very helpful comments. We have incorporated those in. We're fine tuning those now and we plan to be issuing the final solicitation within the next few weeks. We went out with the first one in June and I think some of you in the room may have commented on that.

We'll be coming out and that will detail when the applications, but it really will be kicking into high gear early next year. That's when we start hoping to see these Part 1 applications.

So just a little bit of background and then I'll come more to specifics of it. This is what we have done so far in our portfolio Loan Program Office. We made our

first loan in 2010, so it's a relatively new government agency. At this point, our portfolio is over $32 billion of loans or loan guarantees, been responsible for 55,000 jobs. It shows you where we are throughout the United States. And the majority of loans we've done so far have been -- it's kind of technical, but it's been the 1705 loan program which was really the Stimulus Act program which had a time frame on it. Our loans had to be fully put out by September of 2011.

So in that time, we put out $16 billion of renewable loans for renewable energy, the vast majority of that in the solar industry. Eight billion for a conditional commitment for the first new nuclear plant in the United States which is about halfway constructed now.

And then we also run a program for the auto industry, Advanced Technology Vehicle Manufacturing program, which is for OEMs and suppliers, all in the process of boosting fuel

efficiency for the American fleet. So we've done electric vehicle loans and also a very significant loan to Ford which really allowed them to retrofit a majority of their factories for the SEAM Act and all the great things that have happened. So now Ford is the number one company in the United States in terms of fuel efficiency across their fleet.

So as I mentioned, our mission, we're very focused on it, is to accelerate the U.S. commercial deployment of clean energy and advanced vehicle technology. That's what we do and we do it by identifying the weakness in our capital markets which is the providing of this debt for new innovative clean technologies.

We have the 31 projects. Some of you may have heard some news out there in the media about prior certain of our earlier loans. They got a lot of press early on. If you look at the bottom chart, the losses to date of our portfolio are 2.6 percent of $32

billion in loan value. That's a numerical number of under $1 billion. When Congress established this program, we were established with the loan loss reserves or provision for losses for $10 billion. So more than 90 percent of what Congress established us or authorizes to have in loans that go bad remains. We certainly never intend to use that, but we just hope there's been a lot of missed perception in the media about the track record of this performance. So these are the real numbers, 2.6 percent and obviously our portfolio is all on the innovative side. It's the new side. You would expect a higher default rate, but any of you who are commercial lenders in the room, project finance lenders, you know that that as a number is certainly within industry norms.

Okay, so what can we finance in our new fossil solicitation? I've highlighted some of these. It's innovative technology must reduce greenhouse gases, based in the

United States, and it's a loan, so we really look at the credit quality of the sponsor. We'll either do deals as project finance deals. That's the majority of what we do, but if there's a back stop with a corporate guarantee, we can certainly look at that.

So what are the specific areas we are looking to fund in? Just as a background, the earlier 2008 solicitation was solely coal and really coal gassification. As I mentioned before, when we worked that through our system we did not have enough applications even if the two in the pipeline are fully approved to get us to the $8 billion.

So for this solicitation, we worked very closely with all the departments within DOE and across the government and outreach to industry partners and said okay, how can we make this as broad and useful as possible to the entire industry?

And so we kind of believe we can finance all along the fossil fuel spectrum and

really the way to think about it is if a project uses a fossil fuel somewhere in the system, there's probably a way we can finance it if it's also innovative and reduces greenhouse gases and you can pay it back. So obviously carbon capture, very important part. It's something Department of Energy is very focused in trying to encourage and help. So if there's a project with carbon capture and storage, something we're very interested in.

We're looking at projects, obviously, having to do with EOR is the way it kind of works now. But if a project has EOR component for CCS, certainly something we're interested in. So going back, we will look at things from the extractive part of the industry. If there's a project that has a new way of controlling methane emissions at the well head in fracking, that's certainly something we'd like to look at.

We do lifecycle greenhouse gas analysis. So if there is a technology dealing

with water recycling or better ways to deal with water in the drilling process, that reduces the lifecycle greenhouse gas of the project, that's something that we could certainly finance. So great application thinking oil and gas.

Low carbon power. This is where we're really talking about retrofits to factories, retrofits to plants, retrofits to coal plants. And we're hoping we have some type of applications in that area. We can maybe talk about that when we get to questions. But certainly the -- one of the hopes and the intentions that this can really work for existing gas and coal facilities, if there's a desire to make an investment in new technologies that boost efficiency and by boosting efficiency you're going to be reducing greenhouse gas emissions.

So plant retrofits very, very important area and that's really one of the things I'm here to communicate and hope we can

get some interest from you in this area and I really want to spend the time having you believe that we're very serious about coal retrofits really being something that we at the Department of Energy are very serious of looking at and really hope to get applications in that area.

And then efficiency improvements are things we can do closer to the consumer. Those are things like fuel cells, microgrids, very interested in combined heat and power or waste heat recovery, new technologies, new systems to capture those areas where heat is being wasted and made more valuable, certainly we're seeing that.

There's a little bit more of a summary. Privates may utilize any type of fossil fuel, coal, oil, natural gas, shale gas, methane, hydrates. We span the full range from the well head all the way to energy efficiency. Oh, and this is very important, the third point. This is new for us at the

Department of Energy. All of our solicitations prior to this were only for corporate borrowers. We have expanded it now where municipalities can apply and nonprofits. We think there's going to be significant interest in the solicitation from people trying to do micro grids, particularly on the East Coast. So we now have the ability to provide that to a network of hospitals if they're interested in doing something. If universities are interested in building out their own islanding facilities. Before, we wouldn't have been able to lend to them. Now they qualify.

And here's a little bit on the process. Some of you may have been involved before in our 1705 solicitation. It was a very cumbersome process. When we were just setting up the program, it was actually a hand-driven process by people. We made a major investment in the technology so now all the application is through an online portal,

much more efficient. It's been extensively tested pre-deployment, so we've learned our lessons and we think it will work quite well. And what we've also done is we have done a two-part application. We're very mindful of the fact that it is an expensive process to go through a DOE solicitation and we're very mindful that it is time consuming.

So we've really focused now on a two-part application. And Part 1 is simple information on the project where we can really answer those three questions. Does it reduce greenhouse gases? Is it an innovative technology? Is it in the United States? And do you seem like a credible entity standing behind it? That is the full Part 1 application. The fees for that, I don't see we have it here. We haven't released that information, but that will be a much lower fee for Part 1. And then we'll be able to get back to you quickly and this is a big focus of ours for customer service. Prior

applications, it could have taken you months to hear back from us if you're in the queue and viable.

Now once you apply through this Part 1, we expect to get back to you relatively shortly and let you know you qualify or don't. If you don't, you've only paid a small amount of fee and then you're out of the process. If you do, then you'll have much more time to submit your second part of the application. And then as you go into phase two, there's a much more significant fee.

The total fee for going through Part 1 and 2 will be $1 million. So that's the total fee of applying. Over and above that, legal fees, market fees, all those things, we have found that our applicants of our existing loan portfolio, now that's roughly a $30 billion portfolio over 31 borrowers. So the average size of our loans are $1 billion. These are very significant

loans. The average fees incurred in procuring $1 billion loan has been about $2 million. So that's just a way to bracket your expectations. If it's that size of a loan, it's going to cost you about $2 million to get through our system. That's excluding the upfront fee. We're also trying to be very clear and transparent in terms of the fee structure that we have in our system as you go through it.

Many of you are familiar with the idea of credit subsidy costs. That is the way the government, it's not a DOE issue, it's an OMB issue. This is so exciting credit subsidy. All right, I got the hook. We'll deal with credit subsidy if anybody has questions.

So that is the end of the presentation so for further information, I'll certainly be here. I want to introduce Brendan Bell in the back who works in the DOE and his name is here. He is really the

contact person for any questions that you may have on this. But we're really very excited to be doing this.

We think the coal industry is one we are hoping, one of the main appliers or applicants for loans in this, even some of the chatter about is that the administration, Department of Energy is not serious about coal. I can guarantee you we are very committed to it. The Secretary is very committed to it. And we really look forward with many of you in the room to surface applications and hopefully have this be of value to you.

Okay? So I think that is it for now.

MS. GELLICI: Thank you. I'm going to ask if there are any questions. I see one over there. Thank you.

MR. SCHOENFIELD: Jupiter Oxygen. So do I understand now because I read the original draft and talked to some folks in

DOE, but as I understand it, listening to you a project could apply for this with 30 percent equity and if it qualifies the underlying companies are not at risk beyond their 30 percent?

MR. DAVIDSON: Correct. It's just traditional project financed that way. Now that project has got to meet all its own credits statistics and be a viable entity, but the vast majority of our projects now are all project-financed projects just as you described.

MR. PALMER: Peter, thank you very much. That was really informative. What's your lending capacity from here? Are you limited by Congress and what's in the bank?

MR. DAVIDSON: We have $8 billion here. So --

MR. PALMER: That is available now.

MR. DAVIDSON: That's available right now and we come out, it's $8 billion.

There is no time constraint on it, so if it takes -- you're working on a project, but it's not a sufficient state to apply for two or three years, we'll still be open for business in two or three years. The only thing that's going to be a gate on that is if other people apply first and we're out of our $8 billion of authorization.

MR. PALMER: We may come to see you.

MR. DAVIDSON: That's what we're here for. We're open for business.

MR. PALMER: A second question that's separate. On the lifecycle greenhouse gas analysis, in what context are you doing that and do you have a protocol in DOE for performing that for any fossil project?

MR. DAVIDSON: That is a great question and before we go final with that we are spending the time internally now just to nail that down so we can be very clear. We're basically using the Nettle analysis, lifecycle

greenhouse gas analysis as done by our national lab.

MR. PALMER: And there is controversy surrounding the lifecycle shale gas for use as a fuel in combined cycle power plants. Will you have a view on that particular issue?

MR. DAVIDSON: Well, if your system of analysis is correct any of the inputs are encountered for that when you do the analysis. So that is the system we're trying to have that's very clear and we can have complete transparency on how we do that bidding analysis.

MR. PALMER: So for example, super critical pulverized coal would have a lifecycle greenhouse analysis that could be performed and combined cycle natural gas using shale gas would have its own.

MR. DAVIDSON: Correct.

MR. PALMER: And everybody has their own lifecycle gas, but you have to have

the same methodology of inputs.

MR. DAVIDSON: Right.

MR. PALMER: And there's controversy over that.

MR. DAVIDSON: Right.

MR. PALMER: But you're developing one internal for DOE is what you're saying.

MR. DAVIDSON: And you know Nettle has done a lot of work in this area and that's basically what we're going to be using.

MR. PALMER: Okay, thank you.

MS. GELLICI: And that question came from Fred Palmer at Peabody Energy. Andy, did you have a final question. Oh, same question. Thank you.

Peter, thank you so much. I really appreciate it.

MR. DAVIDSON: Thank you.

(Applause.)

MS. GELLICI: I appreciate your indulgence. I know we're running a few minutes behind, but we did have a few items of

business to take care of, Council business to take care of so at this point in the program I'd like to call to the podium Fred Palmer who is chair of our Coal Policy Committee to provide an update on NCC pending study topics.

Fred?

MR. PALMER: Thank you very much, Janet.

We have a form we're all supposed to fill out here on how Janet did today and I'm officially for the record filling mine out right now. So I think this session has been superb. I think the line up of speakers, the organization, there is lunch outside. I'm not going to hold you up, but I just say A+ across the board and a round of applause for our new leader.

(Applause.)

As chair of the Coal Policy Committee, Janet has been in communication with the Executive Committee, including myself, our chairman, John Eaves, who is doing

yeoman work in leading this organization as well. And we do have some very exciting things that we have been talking to DOE about that I know you will like that are totally relevant to today where we can answer questions for people like the State of Kentucky that appears to want to follow the Natural Resources Defense Council on greenhouse gas emission regulation as to what the existing fleet might look like in that environment or what the value of that fleet is, things of that nature. And Janet is working directly with DOE in advancing that.

I take at face value what Peter just said. I knew Secretary Moniz in his capacity at MIT when as many of us did when he was running a carbon sequestration agenda there. I know Secretary Moniz is committed to coal under the right circumstances. We might disagree over those circumstances, but there's no question of our need to continue to drive the bus on green coal along with Department of

Energy and Secretary Moniz, you have our full support in our advisory capacity to you. So that would conclude my remarks today and would turn it back over to Janet and look forward to continuing to work with all of you as we go forward.

(Applause.)

MS. GELLICI: Thank you, Fred. Now I'd like to call to the podium Greg Workman who is chair of our Finance Committee and he'll give us a few words.

MR. WORKMAN: I'll echo Fred's comments and I won't get in the way of us and lunch, but I'm Greg Workman, chair of the Finance Committee for the National Coal Council. Like other organizations in our industry, the National Coal Council has been struggling financially this year.

NCC, the National Coal Council, has a unique challenge in front of us in that our membership is voluntary and we've been faced with many members who are not paying

over recent history. So for this year we are anticipating a pretty significant shortfall in funding. We should be able to cover this shortfall with our reserve funds, although we expect at this time we will need to deplete these reserves in order to cover that shortfall.

So National Coal Council leadership has been actively working on this and working to shore up the financial situation. There's been a lot of cost-cutting efforts. We're looking at proposals for pursuing grant funding. We've been looking, as we always do, looking hard into membership expansion. So those things, as always are on the table, but for 2014, we will be proposing or we will be raising the membership dues across the board for the National Coal Council and again that's across all membership categories.

We've not had a dues increase in about five years now. So again, we're going

to ask for all levels to contribute in order to keep this organization thriving and now is a critical time as ever for coal and standing up for a very valuable natural resource in the United States. So anyhow, that concludes my remarks. Any questions?

MS. GELLICI: Any questions?

MR. WORKMAN: Thank you.

(Applause.)

MS. GELLICI: And for our last bit of business, I'd like to call to the podium David Surber who is chair of our Communications Committee for the Communications Committee Report.

David?

MR. SURBER: I plan to speak for about two minutes. The Communications Committee met yesterday at 1 p.m. Both Chairman Eaves and Janet Gellici were present. We followed an agenda which had been distributed about ten days ago. That agenda will be resent electronically so that all

members of the Council may see and read what we are planning to do.

An important item on the agenda is a one-page plan of work for the Committee in 2014 and beyond. To conserve time, suffice it to say that the plan of work is quite ambitious.

When these documents are transmitted, we will attach a summary of the discussion which took place yesterday.

I would respectfully request that more Council members take an active interest in the work plan especially and the resources that will be needed to implement the plan. The work of educating the various designated publics of the Council will not take place overnight, but over time. Speaking only for myself, I do not believe the time is on our side. So then let us all work by consensus and by following the work plan as it will be settled as soon as we receive constructive suggestions to the documents you will be

receiving. Thank you for your attention and for your time and interest.

(Applause.)

MS. GELLICI: Thank you, David. So I had a number of questions that have come up with regard to the status of our charter and membership for 2014-2015 period of time and I just wanted to reassure you that things are in process so that a new charter has been submitted and I understand it's before the general counsel at this point in time. So things are progressing.

We had a little hiccup here in Washington about a month ago. Things kind of shut down so we're a little bit delayed on that, but I wanted to reassure you and thank you for your patience. We will be getting member notices out to you as soon as we can work this through the process at DOE. But we look forward to continuing to do the good work on the Council in between now and then and continuing our operation.

A couple of housekeeping items. The presentations that we saw today will be emailed out to you. We'll get you links out to those. I would ask you to recycle your name badges. That's helpful to us and we do have evaluation forms. I would appreciate you taking a few minutes of your time. You can leave them at your desks or hand them to Pam at the back of the room and as you depart for lunch here.

A couple of thank yous to offer. I would like to first thank our sponsors, Arch and Peabody, for the reception sponsorship last night; Joy Global, for breakfast this morning; our break sponsor, CSX, Tri-State Generation & Transmission, ENN and PPL. Thank you very much and our lunch sponsor for this afternoon, Worley Parsons.

I wanted to thank Jeff Miller who just does a great effort on all of our audio and visual help and really does a quality, fine job. I wanted to thank our Program

Development Committee. This is the first time that we've actually used a Program Development Committee to put the program together and I think the quality of the program and the speakers truly reflected the benefits of that. So Sy Ali, thank you very much. Kathy Walker, if Kathy is still here, maybe not. And Debbie Schumacher with Peabody Energy, thank you very much for your help. I wanted to thank Pam, as always, for her wonderful support and back office help, a great asset to us. Thank you very much. And to John Eaves and Jeff Wallace for their support this morning, greatly appreciate it.

So would you join me in thanking these fine folks?

(Applause.)

And then finally, I wanted to thank Bob Wright. I've been on the job now for five and a half months and quite honestly don't know how I would wended my way through a lot of things at DOE without your support.

It's been invaluable to me. Thank you, Bob, very much. I appreciate it.

(Applause.)

So I think that's it. This meeting is duly authorized and publicized and is open to the public. The public can submit comments to the Department of Energy or if any individual wishes to speak they may do so at this meeting. Those who wish to speak may do so at this time. Does any member of the public wish to speak at this time?

Is there any other business at this point in time to bring before the Council?

All right, one final bit, I'm announcing that we will be hosting our next full Council meeting in the spring of 2014 here in Washington, D.C. We will be celebrating our 30th anniversary at that event, so we have some special activities that are in process, so we'd really encourage your attendance. I will let you know as soon as we

get a venue and as soon as we get some dates confirmed and with that, if there's no other business to come before the Council, we stand adjourned. Thank you. Lunch is right behind us. Pam will direct you.

Thank you again for being here.

(Applause.)

(Whereupon, at 12:27 p.m., the meeting was concluded.)

C

D

G

H

N

Q

C E R T I F I C A T E

This is to certify that the foregoing transcript

In the matter of: 2013 Fall Full Council Meeting

Before: National Coal Council

Date: 11/01/2013

Place: Washington, DC

was duly recorded and accurately transcribed under my direction; further, that said transcript is a true and accurate record of the proceedings.

Neal R Gross

Court Reporter