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Quadrennial Energy Review Public Meeting 07-21-2014

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QUADRENNIAL ENERGY REVIEW

PUBLIC MEETING #6

MONDAY, JULY 21, 2014

HELD AT:

RASHID AUDITORIUM-HILLMAN CENTER  
CARNEGIE MELLON UNIVERSITY  
4902 FORBES AVENUE  
PITTSBURGH, PENNSYLVANIA

EPSA STAFF:

MELLANIE KENDERDINE  
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MATT MCGOVERN  
JOHN RICHARDS  
KATE MARKS

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CHRIS KELLEY-FACILITATOR  
ROB KOROSHETZ-NOTE TAKER  
NATALIE KEMPKEY-NOTE TAKER

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1 PANEL 1: NATURAL GAS INFRASTRUCTURE: HISTORICAL  
2 OVERVIEW AND CURRENT STATUS  
3 THOMAS MURPHY, CO-DIRECTOR, PENN STATE MARCELLUS  
4 CENTER FOR OUTREACH AND RESEARCH  
5 PETER TERRANOVA, VICE PRESIDENT, MIDSTREAM ASSETS  
6 AND SERVICES, UGI ENERGY SERVICES  
7 JOSH NORDQUIST, DIRECTOR OF BUSINESS DEVELOPMENT,  
8 ORMAT TECHNOLOGIES  
9 PIOTR GALITZINE, CHAIRMAN, TMK IPSCO  
10 THOMAS MINNEY, DIRECTOR-CENTRAL APPALACHIANS  
11 PROGRAM, THE NATURE CONSERVANCY  
12 HAYLEY BOOK, DIRECTOR OF POLICY, PENNSYLVANIA  
13 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
14 PANEL 2: HOW PRUDENT INFRASTRUCTURE INVESTMENT CAN  
15 HELP MAXIMIZE RESOURCE POTENTIAL  
16 SHELLEY CORMAN, EXECUTIVE VICE PRESIDENT -  
17 INTERSTATE PIPELINES, ENERGY TRANSFER PARTNERS  
18 RORY MILLER, SENIOR VICE PRESIDENT, ATLANTIC-GULF,  
19 WILLIAMS  
20 MAY VA LOR, LEAD RESEARCH ANALYST, LABORERS '  
21 INTERNATIONAL UNION OF NORTH AMERICA (LIUNA)  
22 KRIS EVANTO, MANAGER-DEVELOPMENT, ACCESS MIDSTREAM

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1 PARTNERS  
2 JIM SULLIVAN, MEMBER-PUBLIC GAS POLICY COUNCIL,  
3 AMERICAN PUBLIC GAS ASSOCIATION  
4 PANEL 3: HOW PUBLIC-PRIVATE PARTNERSHIPS CAN  
5 PRODUCE SUSTAINABLE ECONOMIC DEVELOPMENT OUT TO  
6 2030 AND BEYOND  
7 DAVID PEEBLES, VICE PRESIDENT, ASCENT AND SENIOR  
8 DIRECTOR, THE ODEBRECHT GROUP  
9 TOM CONWAY, INTERNATIONAL VICE PRESIDENT, THE  
10 UNITED STEELWORKERS  
11 DR. ANDREW GELLMAN, LORD PROFESSOR OF CHEMICAL  
12 ENGINEERING AND CO-DIRECTOR, W.E. SCOTT INSTITUTE  
13 FOR ENERGY INNOVATION, CARNEGIE MELLON UNIVERSITY  
14 JEFF HERHOLDT, DIRECTOR, WEST VIRGINIA DIVISION OF  
15 ENERGY  
16 JO SEXTON, DIRECTOR, CAMBRIDGE (OH) AREA CHAMBER  
17 OF COMMERCE  
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1 P R O C E E D I N G S

2 10:08 a.m.

3 MODERATOR KELLEY: Well good morning  
4 everyone. Good morning. I'd like to welcome  
5 those of you in the room to the Quadrennial Energy  
6 Review Public Meeting here in Pittsburgh,  
7 Pennsylvania, at the Carnegie-Mellon University.  
8 I'd also like to welcome those of you who are  
9 joining us by live streaming on the web.

10 My name is Chris Kelley. I'm with  
11 Energetics. We're providing support for the  
12 Department of Energy for this QER effort, and I  
13 have the distinct honor of being a facilitator for  
14 today's meeting. We'll be hearing from a number  
15 of speakers today, but before we get started, I  
16 just have some housekeeping notes.

17 First, the QER Task Force welcomes  
18 comments from the public. If you wish to make a  
19 comment and have not yet signed up, please do so  
20 at the front. For those who are joining us by  
21 live streaming, please email your comments to  
22 qercomments@hq.doe.gov. We have an outstanding

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1 set of speakers here today. Their comments and  
2 presentations can be found after today's session  
3 at [www.energy.gov/qer](http://www.energy.gov/qer).

4 Before we get started, I'd like to read  
5 a short statement about the purpose of today's  
6 meeting. Pursuant to the Federal Advisory  
7 Committee Act, the purpose of today's meeting is  
8 to ask for your individual input or your  
9 organization's input regarding natural gas  
10 transmission, storage and distribution, and  
11 provide a forum to exchange information.

12 To that end, it would be most helpful to  
13 us for you to provide these recommendations and  
14 information based on your personal experience,  
15 your individual advice, information or facts  
16 regarding this topic. The object of this session  
17 is not to obtain any group position or consensus;  
18 rather, the U.S. Department of Energy is seeking  
19 as many recommendations as possible from all  
20 individuals at this meeting.

21 So with that, allow me to introduce Jim  
22 Garrett, the Dean of the College of Engineering

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1 here at Carnegie-Mellon University. Mr. Garrett.

2 DEAN GARRETT: Good morning. On behalf  
3 of the entire Carnegie-Mellon community, I am  
4 honored to welcome you to this regional public  
5 forum for the Quadrennial Energy Review. I'm  
6 particularly honored to welcome two of America's  
7 energy policy leaders to this forum.

8 Energy Secretary Ernest Moniz is leading  
9 the development of this Quadrennial Review on  
10 behalf of the President, and brings to this task a  
11 career march from accomplishment from the lab to  
12 the highest levels of American government.

13 Congressman Tim Murphy, Carnegie-  
14 Mellon's good friend and partner, and chairman of  
15 the Oversight Investigations Subcommittee of the  
16 House Energy and Commerce Committee is with us  
17 today. Chairman Murphy has been a champion in  
18 ensuring that this region emerges as a national  
19 energy center for focusing on entrepreneurship,  
20 innovation and getting shale development right.

21 CMU is pleased to be the site for this  
22 important discussion, and we are particularly

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1 pleased to have the event hosted by our Wilton E.  
2 Scott Institute for Energy Innovation. The Scott  
3 Institute reflects the very best of the spirit of  
4 CMU that Andrew Carnegie instilled in this  
5 institution when he launched it as a technical  
6 trade schools for the sons and daughters of steel  
7 workers.

8           The Scott Institute is focused on  
9 bringing to bear cutting edge research in the  
10 sciences, engineering and public policy to advance  
11 practical solutions to real world problems. We  
12 launched the Scott Institute to be a resource for  
13 engaging the very kinds of challenges and  
14 opportunities this forum will address today.

15           It's also worth noting that where we are  
16 gathered for this important discussion, the  
17 Hillman Center for Future Generation Technology,  
18 we are just a few yards from the spot where the  
19 institution that would become the National Energy  
20 Technology Laboratory was born.

21           NETL played the pivotal role in  
22 advancing the technologies that would make shale



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1 gas development possible, providing a great  
2 example of the power of collaboration among  
3 federally supported basic science research,  
4 academia and industry.

5           We bring that same spirit of innovation  
6 to today's dialogue, which is centered on the  
7 question of how we will most safely and  
8 effectively realize the full potential of shale  
9 resources for America's energy security,  
10 sustainability and industrial competitiveness.

11           Secretary Moniz and Chairman Murphy  
12 welcome, and thank you for both for bringing your  
13 leadership to this important forum. I'm now  
14 honored to introduce Mellanie Kenderdine, the  
15 Director of the Office of Energy Policy and  
16 Systems Analysis, and energy counselor to the  
17 Secretary.

18           Mellanie joined the Secretary's team in  
19 May 2013, after serving as the executive director  
20 and associate director of the MIT Energy  
21 Initiative. Before joining MIT, Ms. Kenderdine  
22 served as the vice president of Washington

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1 Operations for the Gas Technology Institute. From  
2 1993 to 2001, she served as a political appointee  
3 in President Bill Clinton's administration in  
4 several key posts at the DOE.

5           Prior to joining the Clinton  
6 Administration, Ms. Kenderdine was chief of staff  
7 and legislative director for New Mexico  
8 Congressman Bill Richardson, who later was named  
9 U.S. Secretary of Energy. Please join me in  
10 welcoming Mellanie Kenderdine.

11           (Applause.)

12           MS. KENDERDINE: Thank you, Dean  
13 Garrett, and thank you all for coming today. This  
14 is our seventh stakeholder outreaching meeting to  
15 inform the Quadrennial Energy Review. We have a  
16 total of 15 such meetings scheduled around the  
17 country. They are designed to be both  
18 geographically and topically diverse.

19           Secretary Moniz is going to say a little  
20 bit more about the QER in a moment. I just note  
21 that the office I run at DOE, Energy Policy and  
22 Systems Analysis, is leading the analysis and

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1 outreach efforts for this White House-led  
2 initiative, and I want to extend special thanks to  
3 my deputy, Karen Wayland and her staff here. They  
4 are putting all of these outreach meetings  
5 together.

6           They do outstanding work to ensure that  
7 your views are integrated into the larger effort  
8 that we're all working on.

9           First, I want to introduce you to Dr.  
10 Tim Murphy, the Congressman from Pennsylvania's  
11 18th District in the U.S. House of  
12 Representatives. Several things struck me about  
13 Congressman Murphy's file. He has a Ph.D., which  
14 is pretty rare in Congress. I know (name) has  
15 one. He's retiring. I don't know of others.

16           He's a psychologist. I will resist the  
17 temptation to tell Congressman psychologist jokes,  
18 and instead note that my sister is also a Ph.D.  
19 psychologist, and she has given me a strong  
20 appreciation for this profession.

21           I also Mr. Murphy's commitment to mental  
22 health issues. My family and I'm sure many other

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1 families have been deeply impacted by such issues,  
2 and I applaud his work in Congress and his  
3 ongoing commitment to those issues.

4           Congressman Murphy is a member of the  
5 House Energy and Commerce Committee, the committee  
6 that gave me my start on energy policy almost 30  
7 years ago, when I was chief of staff and  
8 legislative director for Congressman Richardson  
9 then.

10           I'm sure you all know the Energy and  
11 Commerce Committee has broad jurisdiction over  
12 energy issues, and Congressman Murphy has been a  
13 strong supporter and advocate on that committee  
14 for things such as energy research and support of  
15 carbon capture and storage.

16           Finally, Congressman Murphy founded the  
17 Congressional Gas Caucus, is focused on  
18 responsible development of shale gas. I have a  
19 long professional history working with natural gas  
20 issues, as has Secretary Moniz. When we were at  
21 MIT together, we both worked for several years as  
22 researchers on the MIT Future of Natural Gas

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1 study, where we analyze the many impacts of  
2 unconventional gas development on U.S. energy  
3 markets and global markets.

4 We look forward to hearing from Mr.  
5 Murphy and his insights on this topic. Ladies and  
6 gentlemen, Congressman Murphy.

7 (Applause.)

8 Congressman Tim Murphy

9 CONGRESSMAN MURPHY: Thank you. Good  
10 morning, it's great to be with you for this topic,  
11 which Pittsburgh is the ideal location to discuss  
12 anything from energy, and a special welcome to  
13 Secretary Moniz. Thank you for being here again.  
14 You're always welcome back in the energy capital  
15 of the world.

16 (Laughter.)

17 CONGRESSMAN MURPHY: I say that because  
18 every square inch below us has got some coal, some  
19 natural gas, and of course nuclear energy began  
20 here and it was not too far from here that the oil  
21 drilling first started. When I talk to my  
22 colleagues from Texas and they start telling me

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1 about it, I say wait a minute. We taught you how  
2 to do that, so just back off.

3           This shale revolution that we are in the  
4 beginnings of continues to have global impact, and  
5 I want to talk about where this is leading us  
6 here, and how we are faced with several major  
7 challenges regionally, nationally and worldwide,  
8 and how energy is going to be an important part of  
9 that answer.

10           Remember that polar vortex we had a few  
11 months ago, and it was cold, but there was a huge  
12 impact that that had, particularly in the New  
13 England area. That is as there's been a push to  
14 reduce the amount of coal-produced energy, which  
15 will be perhaps a 60 gigawatt loss in the next  
16 couple of years, there continues to be a higher  
17 demand for electricity.

18           But when the temperature in New York  
19 City bottomed out at seven degrees in January, the  
20 price to deliver natural gas in the City spiked to  
21 a record \$120 per million Btus in the spot market.  
22 That's about 30 times higher than the equivalent

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1 natural gas a hundred miles away in the Marcellus  
2 shale region.

3 Utilities had to also fire up gas plants  
4 using jet fuel, and a New England paper mill had  
5 to shut down. These prices weren't caused by  
6 speculation. It was a capacity issue based upon  
7 production and pipelines delivering that to the  
8 region.

9 Now the governors of the region  
10 requested a pipeline big enough to deliver a  
11 maximum of 600 million cubic feet per day, which  
12 would add less than ten percent to that capacity,  
13 and as we face this problem of building more  
14 pipelines, having that achieved is going to be  
15 critically important.

16 Pipeline permitting delays of more than  
17 90 days have risen 28 percent since 2005. Now  
18 when the House passed the bipartisan Energy and  
19 Commerce bill, the Natural Gas Pipeline Permitting  
20 Reform Act, was to eliminate those barriers. We  
21 still hopes the Senate moves forward on this,  
22 because we need it.

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1           But the major areas that we natural gas  
2 in particular is for exports, manufacturing,  
3 thermal electricity and energy production and  
4 transportation. First let me talk about exports.  
5 As we know, gas is less than about \$4 per unit in  
6 the United States, but in Europe it's over ten,  
7 Japan about 15-1/2 dollars, China about 15 and a  
8 quarter, India about 13.75.

9           But there's an impact upon this, which  
10 of course is in the news every day in the last few  
11 months. Last summer when I had some members of  
12 the Ukraine Parliament come here to the Pittsburgh  
13 region, at that time they voiced their deep  
14 concerns of what Russia and Gazprom were going to  
15 do to them and continue to threaten them, and now  
16 we see those things have to come to fruition, as  
17 it continues to be a military issues and a  
18 substantial issue for the people of Ukraine.

19           Similar is an issue for Poland. When I  
20 visited there about six weeks ago, they described  
21 their grave concern in Poland and throughout the  
22 Balkan states. Poland has a natural gas contract



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1 with Russian Gazprom going to 2022, and a large  
2 percent there and so much of the EU natural gas is  
3 dependent upon buying it from Russia.

4           Russia, of course, wishing to protect  
5 its monopoly, will use whatever force is within  
6 its quiver to make sure that happens, that recent  
7 issues that have taken place with the downing of a  
8 Malaysian jet airliner by Russian separatists,  
9 which the president says pretty clearly has been  
10 with Russian-made weapons, Russian training and  
11 Russian backing, the pressure needs to be exerted  
12 to fight back against that.

13           But when we put American ships out in  
14 the sea, it is clear that Russia understands were  
15 not going to fly sorties over the former Soviet  
16 block countries. We are not going to launch  
17 missiles from our cruisers and our frigates or  
18 submarines.

19           So whereas I see that Putin will not be  
20 afraid of any military force assembled by the  
21 United States in Eastern Europe, the Balkan states  
22 or in the seas surrounding, what would send a

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1 shockwave throughout Gazprom would be to see a  
2 fleet of LNG ships headed that way.

3           As Poland and Germany have built their  
4 LNG terminals, that is important. As they see  
5 those things coming forward, and also noting that  
6 many of the officials I talked in Poland and in  
7 the Balkan states.

8           They said we recognize Russia is  
9 fearless on this, but we have to meet with the  
10 same sort of fearlessness, and understand that  
11 despite their attempts to basically eliminate us  
12 several times, we cannot let that happen again.

13           Now we have this massive resource of  
14 natural gas in the United States. What we have  
15 here, the U.S. used about 25 trillion cubic feet  
16 of natural gas in 2012. We have 3,850,000,000  
17 cubic feet altogether, and Pennsylvania is now the  
18 largest, second largest natural gas producer.

19           Shale gas 25 percent of domestic  
20 production, and a decade ago it was only one  
21 percent of this. In the next two years, Marcellus  
22 will supply almost one-fifth of the country's gas

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1 supply, and growth and production is dependent  
2 upon a profitable spot price.

3           If it falls too quickly, production will  
4 fall as well, but if it rises too quickly, usage  
5 will become a problem and the demand will drop.  
6 In that area is manufacturing. The greater  
7 production of natural gas means higher demand for  
8 locally-made oil and piping tube. Steel  
9 production in the U.S. energy markets accounts for  
10 about ten percent of domestic steel production,  
11 nearly 8,000 American jobs in more than 22 states.

12           U.S. producers invested hundreds of  
13 millions of dollars to take advantage of this,  
14 including nearby in McKeesport in the U.S. Steel  
15 plant. But what has happened here is we're also  
16 fighting the dumping of oil country tubular good  
17 products, particularly from China, Korea, Turkey,  
18 India and other countries.

19           We're pleased that the Department of  
20 Commerce announced a reversal of their decision  
21 and saying they do see this as a dumping issue.  
22 When a country like Korea imports grew by 1,000

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1 percent and they don't even use their OCTG pipes,  
2 and we're waiting now for a decision from other  
3 divisions to determine if we're going to have  
4 tariffs on this.

5           But we shouldn't be dependent upon this.  
6 If we really are using more of the pipe and  
7 building more of the pipelines that we need, this  
8 helps increase demand. But we also have to make  
9 sure there's fair trade with other nations that  
10 are dumping.

11           The third area, the thermal area, is an  
12 area we have to understand, that natural gas  
13 cannot replace nuclear and it cannot replace coal.  
14 Where we have been moving forward is more clean  
15 coal technology. I applaud the research efforts  
16 of NETL, in continuing to find areas for this, and  
17 the Department of Energy's continued support for  
18 clean coal technology. What we have to make sure  
19 is we're understanding that we have advanced quite  
20 a distance in cleaner coal production. We have  
21 reduced the emissions massively over the last two  
22 decades, and what we also need to improve this

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1 further.

2 I'd like to challenge students in saying  
3 if you are the one that comes up with a way of  
4 increasing the amount of energy we get out of a  
5 lump of coal, instead of it being about 35 to 40  
6 percent if you can get 70 to 80 percent and reduce  
7 emissions even more, not only will you probably  
8 win the Nobel Prize, but you may become the  
9 world's first trillionaire. So good luck on that  
10 process.

11 But the U.S., having the most  
12 recoverable coal in the world, and has enough to  
13 meet about 294 years' worth of demand, we need to  
14 continue that, rather than see this drop in the  
15 use of this.

16 Finally, let me say that it is this  
17 partnership, working forward with all these areas  
18 of energy, nuclear, coal and natural gas, which  
19 this region depends upon. But it is that balance  
20 with also recognizing the global impact. I would  
21 much rather be spending the money on pipelines and  
22 on exploration of natural gas and on advancing

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1 these LNG terminals for exports, than saying that  
2 we are going to continue to find ways to deal with  
3 this global military threat instead.

4           That is what we should be doing, and  
5 recognizing the energy use will continue to grow  
6 here in the United States, even though it dropped  
7 to second place as the world's biggest  
8 manufacturer behind China. We can gain that back,  
9 and we have this incredible advantage because of  
10 the amount of domestic energy we have here.

11           The idea is to move forward on sound  
12 science, to remove the shackles from this, and to  
13 this extent I applaud the Department of Energy in  
14 their efforts to make sure that America continues  
15 to be the global leader in energy production, and  
16 doing this in a sound and scientific fashion.

17 Thank you very much.

18           (Applause.)

19           MS. KENDERDINE: Thank you, Congressman  
20 Murphy. Now I would like to introduce you to  
21 Ernest Moniz, the nation's 13th Secretary of  
22 Energy. I'm going to tell you why that's a lucky

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1 13. Fifteen years ago, then Undersecretary Moniz  
2 and I flew to Morgantown, West Virginia and  
3 Pittsburgh to discuss the possibility of turning  
4 what was then the Federal Energy Technology Center  
5 into a national lab.

6           Our work culminated in the establishment  
7 of the National Energy Technology Lab, NETL. I  
8 think its DOE's -- it's still DOE's newest  
9 national laboratory, and we flew up to Morgantown,  
10 West Virginia with Senator Byrd and Secretary  
11 Richardson at the time, and NETL became a national  
12 lab. It was through no small part it was now-  
13 Secretary Moniz's efforts to get that done.

14           Our efforts in this regard underscore  
15 Secretary Moniz's long-held commitment to an all  
16 of the above energy strategy, albeit one that  
17 comes with a strong caveat. All of the above must  
18 be pursued in the context of a carbon-constrained  
19 world.

20           This approach guides President Obama's  
21 energy policy today. Again, Secretary Moniz's  
22 commitment to this approach is long-standing. Not

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1 only did we do the future of natural gas study at  
2 MIT, we did the future of coal, future of nuclear,  
3 future of the nuclear fuel cycle, the future of  
4 the electric grid and the future of solar, which I  
5 hear they will finally complete this year. It's  
6 been a study that is a long time coming.

7 All of these studies have been done over  
8 the course of many, many years and nine years or  
9 so, all in the context of carbon constraints.  
10 Before becoming Energy Secretary, where he is  
11 following through on the President's commitment to  
12 all of the above, Secretary Moniz was a Physics  
13 professor at MIT for 40 years, and was also the  
14 director of the MIT Energy Initiative.

15 He was a member of the President's  
16 Council of Advisors on Science and Technology, and  
17 was DOE's undersecretary in the Clinton  
18 Administration, where I first had the pleasure of  
19 working with him. Ladies and gentlemen, U.S.  
20 Secretary of Energy Ernest Moniz.

21 (Applause.)

22 Secretary Ernest Moniz



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1           SECRETARY MONIZ: Well thank you,  
2 Mellanie, and also thanks to our hosts here at  
3 Carnegie-Mellon, the Dean of Engineering and I  
4 think where I used to come from, we agree that  
5 this is the second best school of engineering in  
6 the world. It really is great to be here. I  
7 appreciate the hospitality.

8           I also see my old friend, Jerry Cohen, I  
9 guess former president of maybe 16 years, Ivy  
10 League, and president Cohen just on Friday, he's  
11 co-chairing a new commission set up by the --  
12 asked for by the Congress at the Department of  
13 Energy, the Commission on the Future of Our  
14 National Laboratories. So we also thank Jerry for  
15 his continuing service to the country and to DOE  
16 specifically in this context.

17           I know your current president, Subra  
18 Suresh is out of the country at this moment. But  
19 just to say that he's also a very long-standing  
20 old colleague from MIT. Congressman Murphy, thank  
21 you for being here. I was in Pittsburgh last in  
22 October, and we seem to always do these gigs

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1 together, since we were together with a little  
2 business roundtable back then.

3 Mellanie already mentioned you as being  
4 a founder and chair of the Congressional Natural  
5 Gas Caucus. His audacious statement about the  
6 energy capital of the world, of being here. I  
7 think there's some argument there.

8 CONGRESSMAN MURPHY: We can be  
9 audacious.

10 SECRETARY MUNIZ: That's right, and in  
11 fact I'll say that, as he said, it's not only with  
12 the current shale gas revolution, and I might say  
13 some wet shale gas as well, which is a very  
14 important part of the story, but also nuclear  
15 power.

16 I was just in China a week and half ago  
17 for the annual Teaching in Economic Dialogue, and  
18 the enormous program between Westinghouse and its  
19 new, new generation reactor, the AP-1000 with the  
20 Chinese is a very, very big story and in fact a  
21 story that we'll also be pursuing here today.

22 Even beyond that, just to mention one

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1 other thing, that on the demand side, energy  
2 efficiency. Pittsburgh is a city, member of our  
3 better buildings challenge, which talks about  
4 getting 20 percent better efficiency out of  
5 buildings by 2020. We have more than three  
6 billion square feet across the country committed  
7 to this. Pittsburgh is in the middle of that, and  
8 in fact later today, I'm going to have a chance to  
9 go to the PNC Plaza and see their new I think it's  
10 800,000 square foot building, which will open in  
11 about a year.

12           It has a whole bunch of novel  
13 technologies, and they're looking for 30 percent  
14 energy efficiency gains, I believe, and probably  
15 exceed Leed Platinum. So a lot of energy stuff  
16 going on here indeed, and I'll also mention that  
17 our NETL Pittsburgh branch is also in the district  
18 of Congressman Murphy, and we appreciate his  
19 support.

20           I'll just give a very brief callout to  
21 Congressman Doyle, who couldn't be here, because  
22 our Bettis Laboratory is in his district I was

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1 informed today, and he's also like Congressman,  
2 like Chairman Murphy, a member of the Energy and  
3 Commerce Committee. So these are two people that  
4 we love to deal with on energy issues.

5           Maybe I'll just mention one other thing.  
6 When I was here in October, you may recall I  
7 expressed my hope then that the Red Sox and the  
8 Pirates would be in the World Series. We held up  
9 our end of the bargain.

10           (Laughter.)

11           SECRETARY MUNIZ: We did give you some  
12 revenge over the Cardinals, but unfortunately I  
13 think I can't make the same promise this year, at  
14 least for the Red Sox, who are currently in last  
15 place. But okay, moving on.

16           So let me say a few words about the  
17 Quadrennial Energy Review, just to frame it, those  
18 of you not familiar with it, and then of course go  
19 and say something more specifically about the  
20 topic of today, shale gas, its production and also  
21 associated issues of infrastructure.

22           So the Quadrennial Energy Review is

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1 something that was put forward in President  
2 Obama's Climate Action Plan last June, following  
3 the recommendation made by his advisory group on  
4 science and technology. The idea is that while we  
5 are the Department of Energy, the fact is energy  
6 issues are very important to almost every  
7 organization, almost every department, every  
8 agency in the government.

9           You just think about the important  
10 energy entities across the government. So the  
11 Quadrennial Energy Review is an attempt, it's a  
12 charge, but I think we're making terrific  
13 progress. It's an attempt to put together a  
14 policy development process that brings together  
15 all those threads, whether it's the Department of  
16 Energy obviously, but Department of Defense,  
17 Department of State, Department of Commerce,  
18 Agriculture, you can just go on and on and on, to  
19 do so using the convening power of the White  
20 House.

21           So co-chairs from the Council on  
22 Environmental Quality and Office of Science and

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1 Technology Policy, but the Department of Energy  
2 forming the executive secretariat, providing the  
3 capacity for deep analysis, etcetera, to move this  
4 forward.

5           That's what the office under Mellanie's  
6 director, Energy Policy and Systems Analysis, is  
7 really the point of that spear, in weaving  
8 together this rather complex story on setting, on  
9 developing actionable energy policy. Now given  
10 that it is a rather large task to stand up this  
11 kind of a process, and execute it over a four year  
12 horizon, the decision was made to start out by  
13 taking a one year chunk at the beginning, and to  
14 focus it exclusively on energy infrastructure, the  
15 transmission, storage and distribution of energy.

16           That was declared last summer in the  
17 Climate Action Plan, and I think the wisdom of  
18 choosing that as an initial focus has only come  
19 more sharply into focus since then, as we have  
20 seen a number of infrastructure challenges.

21           Congressman Murphy mentioned, for  
22 example, the polar vortex. There we saw, as he

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1 said, tremendous increases in natural gas prices  
2 in New York, New England. New England a major  
3 part of lack of energy infrastructure, in  
4 particular getting gas from here to there. Polar  
5 vortex, propane, upper Midwest, huge problem,  
6 infrastructure problem.

7           How do you know? The price differential  
8 between the two big hubs in Texas and Kansas not  
9 used, because you couldn't move it easily north.  
10 Oil by rail. We all know we've seen that, trying  
11 to get oil out of the Bakken shale without the  
12 infrastructure, without a commensurate level of  
13 development.

14           In fact, one of the major stories, and  
15 this is why I will again reinforce something  
16 Congressman Murphy said. This is really a  
17 terrific place to have this meeting focus on  
18 natural gas, and by the way, in a few weeks, we'll  
19 be having one in Bismarck, North Dakota, which  
20 will -- of course that's where the big shale oil  
21 production is booming.

22           But the point is North Dakota and

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1 Pennsylvania really highlight one of the very  
2 important features of this shale, gas and oil  
3 revolution. Namely, we are seeing booming  
4 production in areas that, at least not in the  
5 recent past, have been major centers of  
6 production.

7           With that comes infrastructure  
8 challenges that have to kind of catch up with a  
9 whole bunch of issues about these gas and oil  
10 flowing in very different directions, from source  
11 to market. So really here this is a tremendously  
12 important area to discuss that, and indeed there  
13 are many questions to be pursued, and those will  
14 be spelled out in a few minutes.

15           I'll also mention that another challenge  
16 to the infrastructure comes, and again certainly  
17 in parts of the Marcellus, we see a lot of natural  
18 gas liquid production. So the Marcellus, in terms  
19 of dry gas so-called, has gone from like two to  
20 roughly 20 percent of the nation's natural gas in  
21 a period of like seven years. This is  
22 unprecedented, really, in this kind of a business.



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1           But in addition, we are seeing enormous  
2 amounts of natural gas liquids production,  
3 propane, butane, ethane, other anes, and these are  
4 tremendously important. They are tremendously  
5 important to the economic equation.

6           They are tremendously important as  
7 feedstock to industry. They are tremendously  
8 important for heating many parts of our country.  
9 Our homes are heating with propane for example,  
10 and that's another challenge to our  
11 infrastructure.

12           How do you move it, how do you process  
13 it, etcetera. So this is another very important  
14 question to be addressed here today. I might say  
15 again, following a little bit on that, that the  
16 shale gas revolution certainly is impacting so  
17 many major sectors in our society.

18           For example, electricity. In New  
19 England, again to use New England as an example,  
20 we are seeing electricity supply more than 50  
21 percent natural gas. This is raising issues, both  
22 of infrastructure and fuel diversity. So how are

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1 we as a country going to address this issue of  
2 fuel diversity, even as we have this abundance of  
3 moderately-priced natural gas?

4           The two things I mentioned earlier,  
5 nuclear and efficiency may be, of course,  
6 important parts of that equation. As I said  
7 already, industry. We're seeing a huge  
8 manufacturing renaissance. The numbers are a bit  
9 hard to pin down, but we could see as much as \$200  
10 billion invested in new manufacturing capacity,  
11 pretty much directly because of the shale gas  
12 revolution. It's enormous.

13           We see the impact at the consumer level,  
14 home heating bills for example. Certainly again  
15 where I come from in New England, lots and lots of  
16 gas heating as well. We're seeing it there. So  
17 this is really permeating throughout our society.

18           Now having said that -- oh, I'm sorry.  
19 The last point I'll make is Mellanie mentioned our  
20 critical push towards lowering carbon emissions.  
21 The United States is roughly halfway to President  
22 Obama's goal of a 17 percent reduction by 2020,

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1 and about half of that has been accomplished  
2 because of natural gas.

3           So natural gas, even as it has  
4 stimulated the economy in so many ways, has also  
5 been contributing to lower CO2 emissions. Now of  
6 course having said all of that, we also know that  
7 it has to be produced responsibly, and we have  
8 challenges. We have said consistently, and I  
9 certainly will continue to say that the  
10 environmental footprint issues in shale  
11 production, oil or gas, they are challenging, but  
12 they are manageable, but we must manage them. We  
13 must manage them all the time.

14           Now I believe there is -- we can see  
15 significant progress being made in a number of  
16 issues, more consistently well completion,  
17 etcetera, better management of flow back water to  
18 the surface. But we still have to keep pushing  
19 down on this, and we can do better.

20           Another issue that has just come up is  
21 methane emissions. Again, I think we're making  
22 progress, but we have to look at methane emissions

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1 end to end. It's not only in the production side,  
2 but it is in the infrastructure of delivery of  
3 natural gas to the consumer.

4           Again my home town Boston, we have lots  
5 and lots of the very old cast iron pipe. We've  
6 got to work on renewing our infrastructure and  
7 doing so, capturing the opportunity to lower  
8 things like methane emissions, which as you know  
9 is also a greenhouse gas.

10           So there's lots of opportunity here.  
11 We're seeing the results of that opportunity. But  
12 we still have challenges that we have to meet, and  
13 certainly President Obama continues to advocate  
14 for expansion of this production, for the impacts  
15 on our economy, but also the call for us to work  
16 in all the ways we can, at the federal level, at  
17 the state level, working with companies, to reduce  
18 all aspects of the environmental footprint.

19           The last thing I'll say in terms of an  
20 issue that we must deal with as we look at the oil  
21 and gas revolution in the United States, is there  
22 and in other parts of our energy industry the need

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1 for more trained people? Part of it is age  
2 demographic. There's going to be -- there is a  
3 lot of turnover in here, but also expanding  
4 opportunity.

5           The President often uses the phrase  
6 "ladders of opportunity to the middle class." I  
7 think one can certainly argue that the energy  
8 industry has been a premier provider of those  
9 ladders of opportunity over these last years.  
10 That will continue. We need to make sure we have  
11 the trained manpower, and that that manpower and  
12 woman power really takes advantage of all of the  
13 elements in our society.

14           I'll just close by saying that's, if  
15 anything, another good reason for having today's  
16 event here at the University, which is at least  
17 one major part of that training, the training  
18 programs that we need so desperately. So thank  
19 you again for your hospitality, and we're going to  
20 look forward to getting the results of today's  
21 discussions. Thank you.

22           (Applause.)

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1 Q&A

2 MODERATOR KELLEY: So my distinguished  
3 speakers have agreed to take a few questions.  
4 Does anyone have any questions? Yes, in the back.  
5 If you could step up to the microphone and just  
6 state your name and ask your question?

7 MS. DEMARCO: My name's Patricia  
8 Demarco. I am visiting research fellow in the  
9 Green Sciences Institute at Carnegie-Mellon  
10 University. I have been in the energy industry  
11 since 1975, and I note that we are in a mode where  
12 the market is managing the policy direction  
13 primarily since 1992.

14 But the market signals are extremely  
15 distorted from a long accumulation of both  
16 subsidies, incentives and policies that favor  
17 fossil fuels over green sustainable fuels. If we  
18 are doing Marcellus shale as a bridge fuel, as a  
19 transition fuel, I would like to ask a focus on  
20 what the other pillar is, and how we take  
21 deliberate steps in building an infrastructure to  
22 actually get to a renewable and sustainable future

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1 forever.

2 My concern is that we continue to build  
3 and solidify infrastructure on a fossil fuel base,  
4 without making adequate arrangements for an active  
5 transition to a renewable future.

6 I wonder if instead of exempting the  
7 fossil -- the shale development from the Clean Air  
8 Act and the Safe Drinking Water Act, we have  
9 instead adopted a theming tariff to unleash the  
10 innovation and creativity of this country on  
11 putting renewable systems in place, and focus on  
12 the infrastructure for doing that. So that's my  
13 challenge to you.

14 SECRETARY MONIZ: Should I start?

15 MODERATOR KELLEY: You can start, go  
16 ahead.

17 SECRETARY MONIZ: Okay. May I ask where  
18 you're visiting from?

19 MS. DEMARCO: I am semi-retired and have  
20 been the director of (name) Institute at Chatham  
21 and I've retired. I have been a commissioner of  
22 the regulated utilities in Alaska for five years,

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1 and I was working for a utility cooperative in  
2 Connecticut for seven or eight years.

3           SECRETARY MONIZ: Okay, very good. So  
4 getting to your question. First of all, I think  
5 that we are doing obviously a fair amount to try  
6 to build that infrastructure for a very low  
7 carbon, photcarbon future. I'll make a few  
8 points.

9           Certainly, the President has not only  
10 domestically but internationally been pushing very  
11 hard on the issue of fossil subsidies. Indeed in  
12 some other countries, extreme consumer fossil  
13 subsidies have highly distorted the amount and  
14 even the international flows of energy.

15           But if I focus on renewables, for  
16 example, the first -- of course we are doing, I  
17 think, quite a lot to advance renewable  
18 technologies, lower their costs. One program I'll  
19 mention, for example, in our Low (ph) program, the  
20 Department of Energy provided some guarantees for  
21 the first five utility scale photovoltaic plants  
22 in the country.



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1           They're all doing fine, and there are  
2 ten more now being supported entirely through  
3 private resources, which is the kind of thing we  
4 want to do to get something started and then have  
5 the private sector pick it up. Now and I can go  
6 on with a number of other examples.

7           But let me say, and this is going to be  
8 handout to my friend here, obviously there are  
9 some things that we can do administratively.  
10 There's a lot that requires statutory change.  
11 With the President's Climate Action Plan, with the  
12 statement that we can't wait, the Climate Action  
13 Plan has us pursuing what we can do  
14 administratively, while still hoping that we will  
15 be able to work with the Congress in terms of some  
16 statutory change.

17           One other issue that I will -- that I  
18 should have mentioned earlier, but I'll go back to  
19 now, is in the -- on the electricity side, there  
20 are now many, many developments that we will be --  
21 that we are looking at, as we have proposals for  
22 major transmission lines that will connect major

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1 renewables at some distance to market.

2           That's both domestically, Oklahoma Winds  
3 to the southeast, for example, and also for  
4 example Canadian Hydro to New England is another,  
5 and upstate New York, etcetera, is a major option.  
6 So certainly these issues of the infrastructure  
7 needs for a future very low carbon economy are  
8 very much in the forefront, and today's meeting of  
9 the QER is focused on shale gas.

10           But as Mellanie mentioned earlier, there  
11 are many, many different topics, and meetings in  
12 Portland, which have already occurred, and another  
13 one in New Jersey will focus specifically on some  
14 of these electricity infrastructure issues.

15           MS. DEMARCO: Thank you.

16           CONGRESSMAN MURPHY: Yeah, let me try  
17 and take a crack at that too. So I represent  
18 705,000 constituents, and a fair number of them  
19 live in coal country, in Greene and Washington  
20 County, who are very concerned as coal mines are  
21 shutting down and coal-fired power plants are  
22 shutting down.

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1 I'm not a believer that you simply tax  
2 for one group to their demise, and of course the  
3 other ones. I believe in an all-above energy  
4 policy which includes ways of improving clean coal  
5 technology as part of that. The idea of  
6 incentives to favor renewables I think right now  
7 they do, in terms of a per kilowatt basis or wind  
8 and solar have greater incentives there in terms  
9 of subsidies.

10 But we also have to recognize is the  
11 toll this has taken on America's families, in  
12 increasing gasoline costs over the last few years.  
13 It has been 2,500 to 3,000 dollars a year;  
14 increasing electricity costs that perhaps will go  
15 towards a doubling. At the time when other wages  
16 have flattened out.

17 I look upon these and it's something I  
18 have to be paying attention to with my  
19 constituents. The war on poverty, which was  
20 initiated with very dramatics walks from  
21 Appalachia from Bob Kennedy and from Lyndon  
22 Johnson, pointed out the phenomenal levels of

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1 poverty there. We now have those areas continuing  
2 on in eastern Kentucky, parts of West Virginia and  
3 emerging in parts of Pennsylvania.

4           If it wasn't for Greene County, that  
5 county would see a full return of this. What I  
6 see we have to do is not just have increased  
7 dependency on renewables, which are dependent upon  
8 the weather, wind, that's dependent on wind and  
9 sun, solar energy has to depend on sunshine, and  
10 we shouldn't be cutting one over the other but pay  
11 attention to this in a broader perspective.

12           So I believe we still have to invest a  
13 great deal into research to advance more efficient  
14 ways of solar production, make them more cost-  
15 efficient, same with wind and other renewable  
16 sources there. But I don't want to get a circular  
17 firing squad where everybody says I just want to  
18 shoot the other person and make sure that my  
19 energy source continues to grow.

20           It can't be that way. I think we need  
21 to emerge, continue to push these forward, and  
22 have a plan of action, an overall plan of action

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1 of energy policy which advances them all. But I  
2 will continue to pay attention to the needs of  
3 those who are losing their jobs in the steel pipe  
4 industry, the steel industry, the coal industry,  
5 railroads, etcetera, because they're real families  
6 too with real concerns.

7           When you're facing poverty, you don't  
8 really care about the environment anymore, and  
9 that's a serious problem. We want to make sure  
10 that these are families that are not just offered  
11 unemployment when they lose their jobs, and they  
12 can't eat we give them Food Stamps, when they  
13 don't have a house we give them housing, and then  
14 when they don't have all of those, I'm not sure  
15 what we have to offer them anymore.

16           We have to continue to find ways.  
17 Because America is so energy wealthy, we should  
18 continue to advance these things together.

19           SECRETARY MONIZ: May I just add a  
20 couple of comments. One thing on this all of the  
21 above approach, I might just emphasize that when  
22 we look at the future of any low carbon solutions,

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1 my expectation certainly is that they will look  
2 different in different parts of our country and  
3 certainly different countries of the world.

4           That's why we are committed to advancing  
5 technology and advancing the cost direction across  
6 the full spectrum of fuels and demand side as  
7 well. The issue of jobs I couldn't agree more.  
8 It's critical, and that's where the changes that  
9 we are seeing in our energy landscape, and as we  
10 drive towards lower carbon, tremendous needs, as I  
11 said, for infrastructure, and that's a whole bunch  
12 of real jobs that we need to push on.

13           Indeed, economic estimates of the annual  
14 kind of capital outlay globally for the kind of  
15 infrastructure I'm talking about is like a  
16 trillion dollars a year. So not only is there need  
17 domestically; there's also tremendous opportunity  
18 globally, if we can stay ahead of the curve in  
19 terms of technology.

20           Finally, the last point I'll make,  
21 because this was clearly more central that  
22 Congressman Murphy said, is that another important

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1 part of this QER process is looking at  
2 interdependencies in our infrastructure. So for  
3 example, the natural gas renewable interdependency  
4 is a very important one for us to examine.

5 MS. KENDERDINE: I just want to say that  
6 as the Secretary said, we are focusing this year  
7 on transmission storage and distribution  
8 infrastructure, and we are focusing on that  
9 because we view it as the limiting factor for both  
10 modernizing our energy systems and moving to a low  
11 carbon future.

12 Year 2, we are going to be focusing on  
13 generation and end use infrastructure, supply and  
14 end use. So in Year 2, we will get much more into  
15 renewable generation, efficiency end use,  
16 distributed generation, etcetera, etcetera.

17 So as the Secretary also said, we're  
18 taking this in discrete bites, and next year we'll  
19 have a much greater focus on renewable  
20 technologies and efficiency technologies.

21 MODERATOR KELLEY: Thank you. Another  
22 question? Yes. Grab your handle.

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1 MR. CLEMENSICK: Let me just adjust this  
2 up a little bit.

3 MODERATOR KELLEY: Squeeze the handle on  
4 the very top. There you go.

5 MR. CLEMENSICK: Okay. My name is Paul  
6 Clemensick. I graduated from Carnegie-Mellon  
7 here. I worked in the oil industry for 15 years,  
8 one of the majors, and walked under the banner of  
9 former company (inaudible). I worked in the gas  
10 fields in Louisiana, Rocky Mountains and Upper  
11 California (inaudible). Left the company quite  
12 some time ago. Last couple of years I've been  
13 working on green energy sources.

14 Okay. I just want to follow up on the  
15 prior question, which was the energy markets  
16 themselves. You started off gangbusters by saying  
17 there's problems in the energy markets, and there  
18 clearly must be. If you oil, and the price of oil  
19 in terms of an energy contract, you're finding oil  
20 valued at around \$16 per million Btus. Natural  
21 gas is around two to three, four dollars.

22 This price discrepancy between oil and



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1 natural gas is historically way outside of the  
2 normal bounds. What we've seen over the last oh  
3 eight years have been wild swings in prices from  
4 both energy sources, and it seems as though these  
5 wild swings are causing problems with  
6 substitution, with development, with  
7 infrastructure, the whole nine yards.

8 I would really encourage you to look at  
9 the energy markets and start from that, and I  
10 disagree with your policy of all of the above.  
11 You should have a customer-focused based energy  
12 market. By customers, I mean all stakeholders.

13 I own land here in Pennsylvania. I have  
14 a Marcellus lease on my land. I have shale  
15 development. I live next to a Consolidated Coal  
16 Company mine that was shut down and is now the --  
17 and I've got lots of problems with all of that.

18 I understand that we as land owners, we  
19 have to put up with that. But formerly working in  
20 the energy industry, I also know (inaudible). The  
21 problem is the markets are not effective, and  
22 there doesn't seem to be anybody in charge of

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1 this. There really isn't, and I'm sorry to say I  
2 don't even think the government necessarily could  
3 do it. We need to look at way of managing those  
4 transitions, and there's nobody in charge.

5           Just I'm sorry, Mellanie. You said that  
6 next year you're going to get to looking at some  
7 of the generation of (inaudible) and so forth.  
8 Well I encourage you. I mean these markets are  
9 intricately intertwined by experience, oil and  
10 natural gas, coal, electricity generation even.

11           I can see they're intricately  
12 intertwined. I really recommend that you look at  
13 a paper, a wonderful paper from your Department of  
14 Energy. Actually, it was done by the Oak Ridge  
15 National Lab, Paul Leiby, L-E-I-B-Y, entitled  
16 "Estimating the National Security Benefits and Use  
17 of U.S. Oil Imports."

18           Read that paper. It was done using oil  
19 prices or OPEC might not have curtailed  
20 production. The data has to be updated. Nobody's  
21 done that, and there's a wonderful paper here at  
22 Carnegie-Mellon written by Dr. Mahalik (ph), about

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1 the use of substitute vehicles, electric vehicles  
2 and (inaudible) electrical vehicles for  
3 substitution in the vehicle fleet. It's based on  
4 the work which was done by Dr. Leiby, and that  
5 needs to be updated.

6 If you look at that and you look at the  
7 energy markets, you will find that the current  
8 energy market is entirely dysfunctional, and the  
9 environmental (inaudible). This is a huge, huge  
10 problem.

11 MODERATOR KELLEY: Sir, did you want to  
12 wrap up your question.

13 MR. CLEMENSICK: My question is I'm  
14 urging you to look into markets and look at the  
15 papers I just quoted to you, and she started off  
16 great by saying oh, there's subsidies in there.  
17 The money's going to the wrong industries for the  
18 wrong things.

19 MODERATOR KELLEY: Thank you. Anyone  
20 care to comment?

21 CONGRESSMAN MURPHY: Yeah, I'll comment.  
22 Look, it's not an open marketplace, because

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1 there's huge restrictions on supply. When we  
2 basically blocked the exploration of oil and  
3 natural gas off of federal lands in the coastal  
4 areas, we're trying to breathe out of a cocktail  
5 straw there.

6           As long as we maintain, I'm looking  
7 forward to reading this paper by one of the Oak  
8 Ridge Boys, I guess, that looks at reducing our  
9 dependency on OPEC. That is so extremely  
10 important. We have about a trillion point three  
11 trade deficit with OPEC countries over the last  
12 decade.

13           If you add to that the cost of the wars,  
14 four to six trillion, fighting an enemy that is  
15 funded by OPEC through Iran and Saudis to Al-Qaeda  
16 and Taliban etcetera, whether with direct weaponry  
17 or costs.

18           It's something we absolutely need to  
19 change. So I say that look, we're going to need  
20 oil and natural gas and coal and nuclear and wind  
21 and solar, and I believe we need all these. But  
22 the marketplace that tries to squeeze them out is

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1 not an open marketplace.

2           We want clean land, we want clean air,  
3 we want clean water. But I also don't want blood  
4 anymore on the sands of the Middle East, of our  
5 blood and treasure going there, and somehow  
6 pretending we don't need these things now. So I  
7 say we continue to advance these. We have an open  
8 marketplace. We have the government watching to  
9 make sure that people are playing fair in this  
10 space.

11           I want to see us continue to use our  
12 renewables and to expand their use. But we can't  
13 talk about an open marketplace as long as we're  
14 still constrained.

15           SECRETARY MONIZ: And we certainly can't  
16 talk about the government controlling the  
17 marketplace. As much as I agree with that, which  
18 I don't. I don't agree with that concept, but  
19 that's fine.

20           MODERATOR KELLEY: We have time for one  
21 more question. Yes sir.

22           MR. BUJURA: Good morning. I'm Dick

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1 Bujura with West Virginia University. I've been  
2 doing some reading lately and found information  
3 about our grid. For example the United States,  
4 the status of our grid is much lower than that of  
5 other nations. We've learned that solar energy  
6 reached a level of two-tenths of a percent of the  
7 total electricity generation in the United States  
8 just recently.

9           We know that if we want to use natural  
10 gas, we're going to build a lot of pipeline.  
11 These are significant investments. They will take  
12 a lot of time for us to put these technologies in  
13 place, just to put the infrastructure in.

14           The other aspect we have seen is that  
15 developing technologies and making them  
16 economically viable takes a long time for  
17 transition. As we look to the future, I would ask  
18 that in the Quadrennial  
19 Energy Review, we make note of the fact that  
20 fossil energy is going to be 70 percent of United  
21 States electricity generation in the future. It's  
22 probably going to even be greater than that in the

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1 world, and I think we in the United States have to  
2 show some leadership in the use of fossil fuels.

3 Looking at natural gas, the kind of  
4 technologies that we use there to capture CO2,  
5 (inaudible) coal as well. We now have an existing  
6 infrastructure for coal and it's viable.

7 I would recommend that as you look to  
8 future developments in the Quadrennial Energy  
9 Review, you include a role for coal, at least in  
10 the near term, for us to make sure that we can  
11 provide the electricity that our nation needs.

12 MODERATOR KELLEY: Thank you. Care to  
13 comment?

14 SECRETARY MONIZ: One comment, by the  
15 way, is that an interesting factoid. I want to  
16 correct that solar is about 0.2 percent nationally  
17 in terms of electricity. In May, in the CAL ISO  
18 region, it was six percent, which is quite  
19 stunning actually, and things are changing fast.

20 But again, that also reinforces point  
21 that when I said earlier that low carbon solutions  
22 are going to be different in different regions of

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1 the country. We're going to see different mixes.  
2 In terms of coal, and the Congressman kind of  
3 alluded to this, we are continuing to make, as you  
4 well know, very, very major investments in trying  
5 to advance coal with carbon capture utilization  
6 and sequestration.

7 I mean eight big projects, and in  
8 addition, this \$8 billion active loan guarantee  
9 program for any fossil technology that lowers  
10 emissions. So again, inherent in all of the above  
11 is the idea that fossil fuels can and will be part  
12 of low carbon solutions.

13 As with many of the low carbon  
14 alternatives, we face cost reduction challenges,  
15 and that's what these programs are about, driving  
16 costs down.

17 CONGRESSMAN MURPHY: I might add to that  
18 too, something you mentioned about the grid.  
19 Probably one of the most important things that we  
20 can do that does not involve any energy production  
21 is energy reduction, it's conservation. We're an  
22 antiquated grid which wastes massive amounts of



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1 electricity.

2           Just our buildings, it's nice to see  
3 more and more things. I'm glad you can go see the  
4 PNC Tower. I think it's a certified building.  
5 But the amount of money and energy we waste, every  
6 homeowner, every person in this country. It's  
7 probably going to be one of the prime things we  
8 can move forward and an area we need to continue  
9 to develop.

10           SECRETARY MUNIZ: I'll just add -- I'll  
11 give maybe a weak defense of the grid at the  
12 moment, that you know, look. The grid has a lot  
13 of challenges, but it's also true that we do still  
14 maintain, you know, 409's reliability.

15           I think at least my view is that the  
16 real challenge is we don't have the grid of the  
17 future that we need to allow, for example, the  
18 integration of renewables over long distances, to  
19 integrate more distributed generation, to  
20 integrate with more intelligence to in the end  
21 provide more consumer services, which the utility  
22 of the future, whatever it looks like, is going to

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1 have to do.

2           So I think, you know, I mean look. We  
3 have challenges. But the real issue is how do we  
4 evolve the grid in a quick enough time, so that it  
5 doesn't become a bottleneck, at things like  
6 introducing long-scale renewables over large  
7 distances.

8           MODERATOR KELLEY: Thank you. Well  
9 please join me in thanking our distinguished  
10 speakers here today.

11           (Applause.)

12           MODERATOR KELLEY: So I ask our first  
13 panelists to join me up here. We'll be getting  
14 your name tags set up.

15           (Pause.)

16 Panel 1

17           MODERATOR KELLEY: Okay. So while we're  
18 getting set up here, just a few reminders for  
19 folks. If you plan on providing your comments at  
20 the end of our session here today, please make  
21 sure you indicate that on the sign-in sheet at the  
22 entrance. For those again who are joining us by

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1 live streaming, please do provide your comments.  
2 DOE and the federal government in general do want  
3 to hear from you. So please provide those  
4 comments by email to qercomments@hq.doe.gov.

5           So we have a tremendous group of  
6 speakers here today, panelists to join us for this  
7 first panel. The first panel has been asked to  
8 address "Natural Gas Infrastructure: Historical  
9 Overview and Current Status." Each speaker will  
10 be providing some comments. Some have  
11 presentations, some do not, and they'll be given  
12 five minutes each.

13           For the panelists' benefit, we have a  
14 series of lights here indicating when your time is  
15 up, and I may bring out the hook if I have to.  
16 But I think you guys will stay on target on time.  
17 Then finally, I just want to mention that the  
18 views expressed by the panelists here are their  
19 own views, and not the views of the Department of  
20 Energy.

21           So our first panel is made up of Thomas  
22 Murphy, Co-Director of Penn State Marcellus Center

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1 for Outreach and Research; Peter Terranova, Vice  
2 President, Midstream Assets and Services, UGI  
3 Energy Services; Josh Nordquist, Director of  
4 Business Development at Ormat Technologies; Piotr  
5 Galitzine, Chairman, TMK IPSCO; Thomas Minney,  
6 Director, Central Appalachians Program, the Nature  
7 Conservancy; and Hayley Book, Director of Policy,  
8 Pennsylvania Department of Environmental  
9 Protection. Mr. Murphy, do you want to get us  
10 started?

11 MR. MURPHY: Okay, good morning.  
12 Appreciate the change to be here today. I plan to  
13 be talking for the five minutes about some of the  
14 things that we see relative to some of the  
15 opportunities that are certainly manifesting  
16 themselves in shale development across the United  
17 States.

18 Certainly, some of the things that we're  
19 seeing here in the Marcellus in particular, on a  
20 multi-state basis. Also talk about some of the  
21 challenges and maybe a little bit about the path  
22 as we see it going forward.

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1           That said, we think about some of the  
2 opportunities maybe, and I think a number of these  
3 were talked about with the previous speakers, and  
4 certainly in some of the exchange for the  
5 questions, we see the amount of natural gas that's  
6 being produced, some of the estimates we're seeing  
7 from the federal government at this point, BIA,  
8 looking at numbers and shale gas.

9           When you look out to 2024, likely  
10 somewhere in the vicinity of about 50 percent of  
11 the U.S. dry gas supply. Commercial estimates  
12 looking maybe a little bit more than that. So we  
13 think about what that might mean over the course  
14 of time, and we think about this historic moment  
15 that's occurring with shale energy, and again we  
16 think about shale energy. We think beyond gas.  
17 We think about oil as well, though our focus here  
18 today is certainly gas.

19           What does that do from a country  
20 perspective? We think about this from the  
21 domestic side. We think about the energy  
22 security. I think we heard several comments about

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1 that. We can certainly expound on some of those  
2 maybe during the Q and A. But also we think about  
3 this on a global perspective. We'll make several  
4 comments about that as we go forward.

5           The geopolitical piece and Congressman  
6 Murphy, as he was talking about the Ukrainian  
7 moment, and certainly we're reading about that in  
8 the press almost on a daily basis. But we see  
9 that in a variety of other countries around the  
10 world, certainly far beyond Ukraine as well.

11           Comments were made as well about the  
12 workforce. We see this certainly from the  
13 industry side, but we look beyond that. We think  
14 about workforce development going into  
15 manufacturing and certainly some of the other  
16 industries that would be aligned around this.

17           If you look at just the EMP side, we see  
18 about 150 different vocations or job titles that  
19 would be assigned from the research that we've  
20 done, when you think about the development of gas.  
21 But again, looking beyond that, there's certainly  
22 a lot of other potential going forward.

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1           We also, as was mentioned previously, we  
2 think about the environmental aspect of this, some  
3 of the research that I know we've been involved  
4 in, certainly some that DOE is funding, looking at  
5 things like the greenhouse gas side of this, not  
6 just from the CO2 aspect, but as there was a  
7 reference made earlier, looking at methane, due to  
8 the methane issues, and some of the emissions  
9 coming from different aspects of the  
10 infrastructure, making sure that a new  
11 infrastructure is built from the wellhead right to  
12 the end user.

13           So all the way through the system,  
14 including distribution, that we make sure that we  
15 resolve some of the issues that have been pointed  
16 out, certainly some of the issues that the  
17 Secretary was illustrating when you think about a  
18 city like Boston and some other cities as well.

19           We also think about balance of trade,  
20 the value-add in those locations, and we think  
21 about the commercial opportunity and the  
22 environmental opportunities that are being found,

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1 and the need for mitigating some of the challenges  
2 and some of the risk in those locations as well.

3 As you'll see very quickly in this map  
4 as it animates here in the few moments that I  
5 have, you can see a lot of development that has  
6 occurred in Pennsylvania since we think as a  
7 foundational piece. A number of my colleagues  
8 will be talking about some of the components as we  
9 go forward here, the need for an infrastructure as  
10 it's going forward, not just --

11 Yeah, you can see how quickly this is  
12 ramped up. So we talk about the tens of billions  
13 of dollars that are being spent to build  
14 infrastructure, in this case gathering a lot of  
15 transmission line, and all the other constituents  
16 that are up. It's going to very important as we  
17 think about again, the pace of that development.

18 And again, as you look at the number of  
19 wells that have been drilled there, we also think  
20 about the fact that a significant number of the  
21 wells, maybe roughly a third by some recent  
22 estimates, are not even on the -- on pipe at this



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1 point. So again, a lot of infrastructure, and  
2 again a lot of other comments will be made about  
3 that as we go forward.

4           We also look at Pennsylvania. We look  
5 at Marcellus development. We think about shale  
6 development. Again, you can see the amount of  
7 ramp up that's been done and the value of that  
8 over the course of time, going from millions of  
9 units to hundreds of millions of units to billions  
10 of units to now trillions of units of gas that are  
11 coming from Pennsylvania.

12           I also want to mention here quickly, and  
13 we think about the global aspect, and the number  
14 of comments that were made earlier about that.  
15 But we're exchanging a lot of people, a lot of  
16 technology, certainly a lot of capital and a lot  
17 of good ideas going forward, and that's going to  
18 be a very important point for us going into the  
19 near future.

20           We look at this as well about some of  
21 the other shale targets, not just the Marcellus  
22 when you think about the Northeast, but certainly

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1 some of the other shales, and the infrastructure  
2 as we think about liquids development, we think  
3 about the NGL components of that.

4           Lastly I also want to mention, again a  
5 lot of material in maybe just a few moments. But  
6 as you read through some of the comments that are  
7 here, we think about some of the constraints that  
8 are there, think about some of the challenges as  
9 development goes forward, as we think about  
10 infrastructure needs, you also have to think about  
11 a variety of things that might not be hard assets,  
12 might not be pipe and capital but other issues as  
13 well.

14           Some of the things that we mention on  
15 there, even down to aspects like social license  
16 and pushback from communities and broader  
17 education, so that a very broad sweep of the  
18 public understands what energy will look like and  
19 including some of the comments that we've heard  
20 earlier in the Q and A. We think about the whole  
21 spectrum and what that will look like over the  
22 course of time.

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1           So again, a number of issues, and I  
2 think you can read through and see what they look  
3 like.

4           MODERATOR KELLEY: Thank you, Thomas.  
5 Peter.

6           MR. TERRANOVA: Thank you and good  
7 morning. I'm not good enough to sit with my back  
8 to the slides and know that I'm on the right one  
9 when I'm talking about it. So I'm going to skip  
10 through some of these in the interest of time.  
11 They will be in the packet, but I wanted to go  
12 directly to this slide first, and talk a little  
13 bit about, or emphasize maybe and show pictorially  
14 some of the things that you just heard about from  
15 the Secretary and the Congressman.

16           This is a graph that is -- compares  
17 prices to NYNEX. NYNEX would be -- that would be  
18 the posted price for natural gas. That's  
19 everything that kind of spins off NYNEX. So the  
20 zero as you see up here is NYNEX flat.

21           This goes back a year or so, and what  
22 you'll see as we got into last winter is that the

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1 yellow and blue lines on the bottom, which were  
2 the prices that were being offered to producers in  
3 constrained areas in Pennsylvania, were well below  
4 NYNEX.

5           The prices that were being paid by the  
6 market, that's the orange and green lines on the  
7 top, were well above market. So this demonstrates  
8 that there are infrastructure constraints in  
9 Northeastern Pennsylvania and in Pennsylvania and  
10 in the Marcellus, that are causing gas there to be  
11 trapped.

12           Prices are very low. At the same time  
13 consumers, who are in many cases 60 to 100 miles  
14 away, are paying significantly higher prices  
15 because the gas can't get from where it's trapped  
16 to where the market is. One -- let me give you  
17 one example of how we've addressed this. This is  
18 northeastern Pennsylvania. The blue dot right  
19 here in the center, right there, is the largest  
20 Procter and Gamble manufacturing plant in the U.S.

21           That plant sits right on top of  
22 Marcellus. It's a significant beneficiary of

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1 Marcellus gas. In fact, it was a plant that was  
2 slated for closing. It's now running double in  
3 size prospectively. We also, having served our  
4 plant through our utility, we built a line to  
5 bring additional Marcellus gas down into the  
6 Scranton-Wilkes Barre area.

7           So today, those areas of our utility are  
8 served entirely by gas that's being produced 30 to  
9 40 miles away. Again, I think that's a great  
10 story, and that's an investment on our part to  
11 bring local gas to the local consumers. The  
12 alternative for those consumers would be to  
13 continue to pay for pipeline systems that were  
14 built to bring natural gas from the Gulf of  
15 Mexico, from Wyoming to these areas.

16           Going forward, this is our next -- our  
17 next thought is that southeastern Pennsylvania  
18 also suffered from very high gas prices during  
19 these periods when producer gas up in the area,  
20 all those little green dots or wells. While that  
21 producer gas is being sold well below market, the  
22 folks down in New Jersey and southeastern

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1 Pennsylvania and into Maryland and Virginia were  
2 paying prices that were well above market.

3           The only solution to this is to build,  
4 and building means maybe 120-130 mile pipeline  
5 system that can get gas from those areas down into  
6 -- from the production area down into the area  
7 where people demand natural gas, people use  
8 natural gas.

9           So while the Marcellus resulted in  
10 significant savings, shale gas generally has  
11 resulted in significant savings to consumers, both  
12 in their electricity bills and their gas bills.  
13 In the case of our utility, anywhere from 1,200 to  
14 2,000 dollars a year. It has caused oil, which  
15 has a strong foothold in this area, heating oil,  
16 to be replaced by natural gas.

17           There's still much work left to be done,  
18 and the goal is to take advantage of this locally  
19 produced resource. Thank you.

20           MODERATOR KELLEY: Thank you. Josh.

21           MR. NORDQUIST: Thank you. Thanks for  
22 the opportunity to describe our experience, a

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1 strategy that we're employing to use our nation's  
2 gas pipeline infrastructure more effectively. My  
3 company, Ormat Technologies, based in Reno,  
4 Nevada, offers a unique waste recovery technology  
5 that allows pipeline compressor stations to  
6 generate fuel-free electricity from local grids.

7           This technology is an important tool for  
8 reducing the life cycle or environmental impact of  
9 the natural gas supply chain, and improving  
10 electrical grid reliability. In the early 1970's,  
11 we commercialized the organic waste heat recovery  
12 technology which now generates electricity from  
13 low to moderate heat sources for the geothermal  
14 industry.

15           Fifteen years ago, we adapted this  
16 technology into an application we called Recovered  
17 Energy Generation or REG. We installed our first  
18 REG power plant on a gas compressor station in  
19 Alberta, and have continued to increase  
20 installations since. The U.S. gas transmission  
21 infrastructure continues to grow and we see a  
22 tremendous opportunity for ways to the natural gas

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1 industry to succeed together.

2           There are over 220,000 miles of  
3 interstate natural gas pipelines in the U.S.  
4 today. On larger pipelines, a gas compressor  
5 station is installed about every 100 miles. These  
6 compressors are driven by gas turbines, the  
7 equivalent of a jet engine, and they're needed to  
8 compress and move the gas through the pipeline.

9           Because of the natural gas and the fuel  
10 use, the exhaust here is about 900 degrees  
11 Fahrenheit. The reg units convert the heat to  
12 electricity in a simple process, proven over time.  
13 A heat exchanger picks up the heat from the  
14 exhaust stack and concentrates it and moves it to  
15 a power plant.

16           In that power plant, the heat is used to  
17 essentially drive a turbine and electrical  
18 generator, and to export power to the local grid.  
19 REG is now applied today successfully on 19  
20 natural gas compressor stations in North America.  
21 Each REG unit, which generates between 4-1/2 to 6-  
22 1/2 megawatts of power, together combine about 100



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1 megawatts of power, the equivalent of about  
2 100,000 homes.

3           In all cases, this electricity is  
4 supplied to the local grids under standard power  
5 purchase agreements. The business arrangement  
6 between a REG and a pipeline owner is a symbiotic  
7 one. The typical REG plant includes an agreement  
8 between them and a pipeline owner, in which the  
9 pipeline owner receives a royalty for the waste  
10 heat that they supply, heat which otherwise has  
11 literally no value to them.

12           The operations and safety at compressor  
13 stations are unimpacted by the REG facility. In  
14 some cases, the pipeline owners have even retained  
15 ownership of these power plants and the energy  
16 they produce. The benefits of these REG units are  
17 many. They require no fuel to operate. Each  
18 megawatt hour offsets generally approximately one  
19 ton of CO<sub>2</sub>. On an annual basis, a six megawatt  
20 power plant will save 48,000 tons of CO<sub>2</sub>, 66 tons  
21 of NO<sub>x</sub>, and 240 tons of SO<sub>2</sub>, versus --  
22 comparatively versus that same power being

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1 generated by a coal-based facility.

2           The REG units are available up to 99  
3 percent of the time, better than the U.S. average  
4 coal, gas and nuclear fleet. The REG is operable  
5 in almost every environment imaginable. From the  
6 winters in North Dakota to the summers of Nevada,  
7 the units have been running for years now, and  
8 proven their resilience.

9           The power is dispatchable. It's  
10 available upon demand can operate in automode,  
11 which is very difficult for some of our existing  
12 power plants to do today. The process is closed-  
13 looped and emission-free, and air-cooled. It  
14 doesn't require water to operate. It doesn't  
15 require expensive maintenance, such as turbine  
16 refurbishment or boiler operator certification,  
17 and today Ormat operates these REG facilities  
18 remotely.

19           On average, a single facility can  
20 generate up to 84 construction jobs, six operation  
21 jobs and over \$8 million in local revenues. So  
22 what's next? There's already over 1,400

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1 compressor stations on the gas pipelines in the  
2 U.S. today.

3           Most of these stations are candidates  
4 for waste heat recovery such as REG. With the  
5 recent production booms in the areas such as here  
6 in Pennsylvania, new gas pipelines will be built,  
7 and compressor stations will be brought along with  
8 them.

9           Each station has the potential to  
10 generate clean fuel free electricity and  
11 compounding its economic and environmental value.  
12 That's basically it. Thank you, and we look  
13 forward to any questions.

14           MODERATOR KELLEY: Thank you, Josh.  
15 Piotr.

16           MR. NORDQUIST: Thank you very much.

17           MR. GALITZINE: Do I just keep clicking?

18           MODERATOR KELLEY: He's going to get it  
19 set up for you

20           MR. GALITZINE: Thanks. While that's  
21 being set up, I wanted to reiterate that  
22 Congressman Murphy has indeed been extremely

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1 supportive of the steel pipe industry. Of the  
2 figure of 8,000 jobs that he mentioned, it's  
3 actually just union workers. If you look at the  
4 entire industry in the United States, it's closer  
5 to 50,000, and we've just gotten a satisfactory  
6 result from a finding from the Commerce  
7 Department, which we hope will help attain a flood  
8 of imported pipe, especially as the United States  
9 is building out its infrastructure.

10           Shortly to our company, TMK is the  
11 largest pipemaker in the world. So we are  
12 extremely interested in all this construction of  
13 gas and oil drilling and production and transport.  
14 We have 28 facilities around the world. Our  
15 largest divisions are in Russia and the United  
16 States, but we are also in the Middle East and are  
17 continually expanding.

18           We have assets not far from here. We  
19 have one steel mill and one pipe mill and one  
20 thread shop, the first two in Pennsylvania just  
21 northwest of here, about an hour, and the last one  
22 just over the border to Ohio. Our pipe and

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1 especially our premium connections is what made  
2 the bend underground and the drilling with  
3 hermetic conditions of the pipe possible.

4           First on gas, where everybody learned  
5 how to do that and then on oil. So we are very  
6 much a force in the gas and oil in horizontal  
7 drilling as well as vertical, although horizontal  
8 is already 78 percent of all drilling in this  
9 country. In terms of just a small advertisement,  
10 we are ten percent of the world's OCTG, that's oil  
11 country tubular goods. So every tenth pipe is  
12 ours.

13           In Russia, we're over 60 percent in  
14 seamless OCTG; in the United States over 16  
15 percent and climbing. We are talking a lot about  
16 infrastructure here. I wanted to give you a look  
17 at one of the biggest infrastructure projects in  
18 the world.

19           Gazprom just signed a contract with  
20 China CMPC, which is going to be two and a half --  
21 for a pipeline two and a half thousand miles long,  
22 requiring two and a half million metric tons of

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1 large diameter pipe, and this is large. This is  
2 56 inch, and over a million tons of oil country  
3 tubular goods to gas fields in the Far East there,  
4 and we hope to be part of that project.

5           In terms of what's happening here, we  
6 quite clearly see that there are going to be two  
7 pipe corridors. One of them, primarily a gas  
8 corridor, is going to go from the Marcellus where  
9 we are today down to the Gulf, and the other one  
10 we see as primarily an oil corridor, will go from  
11 North Dakota and the famous Bakken field down to  
12 Midcontinent and over to the Eagle Ford, which is  
13 -- continues to grow apace.

14           This is a fantastic development. In the  
15 70's and the 80's, all the big EMP companies went  
16 into the Gulf of Mexico, because the word on the  
17 street was that the U.S. had no more oil, and  
18 today the U.S. the third largest producer of oil  
19 in the world, and already since 2011 the largest  
20 producer of gas.

21           So in terms of what the government's  
22 doing, we think that's going on in LNG exports or

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1 is about to happen in LNG exports is great, and  
2 the Department of Energy under Secretary Moniz has  
3 done a wonderful job. When he arrived in that  
4 job, there was one LNG export project that had  
5 received all the permits. Now there are seven,  
6 totaling some just under 11 billion cubic feet per  
7 day.

8           On the oil exports, there is a small  
9 beginning. Two companies, Pioneer and Enterprise,  
10 have started to ship a very light condensate, and  
11 on the infrastructure, we've talked a lot about  
12 that. There's a lot to be done there, because the  
13 infrastructure in the United States for oil and  
14 gas pipelines is -- 55 percent of that  
15 infrastructure is over 45 years old, so a lot to  
16 be done there.

17           What's interesting is that gas is to be  
18 used in a variety of ways. It's being used in  
19 feedstock and we'll talk about that, electricity.  
20 That's been mentioned. Transportation. One of  
21 the large players in this business told me that it  
22 will be used for transportation, compressed

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1 natural gas for light vehicles, LNG for trucks and  
2 of course LNG exports.

3 In terms of feedstock, we are now  
4 looking at over \$120 billion that is about to be  
5 invested in over 100 projects in the United  
6 States. So you can really talk about the  
7 renaissance of American manufacturing and industry  
8 once again, and gas from the shales is a big part  
9 of it. Thank you.

10 MODERATOR KELLEY: Thank you, Piotr.  
11 Thomas.

12 MR. MINNEY: Sure. Good morning. I'm  
13 Thomas Minney. Thank you for allowing me to be  
14 part of the dialogue today. I wanted to introduce  
15 into the dialogue a topic that's often overlooked.  
16 We talk about surface drinking water, the quality;  
17 we talk about impacts to surface waters.

18 But the Nature Conservancy would also  
19 like to introduce the discussion of habitat  
20 fragmentation and surface impacts from shale gas  
21 development. So I'd like to start by just  
22 illustrating a few things about the importance of



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1 the Central Appalachians. It's a global center  
2 for forest and fresh water diversity.

3           There we go. So it's a global center  
4 for forest and fresh water diversity, and it  
5 represents some of the best remaining examples of  
6 temper-connected impact forest, providing  
7 resiliency that's intrinsically linked to people's  
8 well-being in the Pittsburgh and the Washington,  
9 D.C. areas, providing clean water and recreation.

10           While we have abundant nature here in  
11 the Central Appalachians, as the Congressman  
12 alluded to earlier, we're also a center of  
13 abundant energy supplies. This overlap in the  
14 Appalachians illustrates that one of the most  
15 formidable conservation challenges in contemporary  
16 society.

17           This is just one example, but this plays  
18 out across the U.S., across multiple plays. TNT  
19 believes that we can work with industry and  
20 partners to meet the energy needs, while ensuring  
21 our lands and water remain diverse, connected,  
22 resilient and provide continuous benefit to nature

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1 and people.

2 I'd just like to talk a little bit about  
3 the scope and scale of impact that we're talking  
4 about, and using the Appalachians as an  
5 illustration. The technologies have led to pad  
6 densities becoming less and less across the  
7 landscape, and that's a very positive thing that's  
8 happening.

9 But associated infrastructure is still  
10 large. A study done here in Pennsylvania by the  
11 Nature Conservancy found that for each three acre  
12 pad, 25 acres of associated impacts from other  
13 infrastructures, such as roads and gathering  
14 pipelines, is still present.

15 So if you look across the 50,000  
16 estimated shale plants already developed in the  
17 United States over the past several years, that's  
18 1.4 million acres of impact. And if you look at  
19 the rate for 2013 development of approximately  
20 shale wells, that's impacting about 566,000 acres.

21 If that rate continues, and there are  
22 many factors which could make that go up or down,

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1 11 million acres over the next two decades could  
2 be impacted. And while that doesn't sound like a  
3 large number of acres across the United States, it  
4 represents some of the most important places in  
5 the United States for diversity and ecological  
6 services, where that overlaps in shale  
7 development.

8           If we look through the Central  
9 Appalachians lens here, in the Central  
10 Appalachians, we've predicted that up to 1.5  
11 million acres of impervious cover increase could  
12 occur. That can lead to a 22 percent decline in  
13 watershed lands classified in their best  
14 conditions, and up to one million acres of forest  
15 habitat is at risk of development, much of that  
16 overlap in important natural areas.

17           This leads to forest loss and  
18 fragmentation, sedimentation change in surface  
19 hydrology, and converging from intact forest to  
20 edge forest. This impact will play out on  
21 interior forest species and rare species habitat,  
22 where it overlaps with shale development. Species

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1 such as brook trout can see up to 80 percent  
2 overlap in development.

3           Though this challenge is formidable,  
4 there are steps we can take with industry,  
5 government and others to find solutions to reduce  
6 risks, and avoid or mitigate these impacts through  
7 sound science, and we can look out at the future  
8 projections to reduce how they play out across the  
9 landscape, based on this science and tools that we  
10 can put together.

11           The Nature Conservancy looks to policy  
12 and through improving voluntary practices as one  
13 means and methods for being able to do that,  
14 looking to expand voluntary mitigation frameworks  
15 and state and federal frameworks to avoid or  
16 minimize those impacts, and also what can't be  
17 avoided, and to look at cumulative impacts in the  
18 (inaudible) process to include landscape impacts  
19 from multiple developments, and provide incentives  
20 and where required, co-location of infrastructure  
21 to reduce those impacts across the land.

22           So there are solutions out there that we

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1 can be working on together. It's not just a story  
2 of impacts. There are tools in development now  
3 that the Nature Conservancy is working on with  
4 industry and academics and others, you know.  
5 Industry was able to develop sophisticated tools  
6 for underground exploration and drilling, and we  
7 need some of those same sophisticated tools to  
8 work on surface impact planning.

9           The Nature Conservancy is currently  
10 working on a low impact shale infrastructure  
11 planning tool, to look at how to develop multiple  
12 development layouts to assess development costs,  
13 and give an ecological impact scores to each, so  
14 we can work with industry and others to find the  
15 least impactful and financially sound alternatives  
16 for shale development.

17           We're also developing recommended  
18 conservation practices that we'll release in the  
19 fall of 2014, to avoid or reduce these impacts  
20 through landscape planning, habitat buffer  
21 planning, stream crossing, road and pipeline  
22 construction and noise reduction.

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1           So I thank you for the opportunity to  
2 introduce this topic today. The importance of the  
3 region and the challenge before us, and some of  
4 the effective solutions that we'd like to see  
5 working forward, to reduce the cumulative impacts  
6 to our lands and waters. Thank you.

7           MODERATOR KELLEY: Thank you, Thomas.  
8 Hayley.

9           MS. BOOK: Good morning. Thank you very  
10 much for the opportunity to be here today. In the  
11 role as policy director at the Department, my job  
12 is twofold. I oversee the policy and regulatory  
13 development of environmental regulations and  
14 policies, and also work closely with the  
15 governor's energy executive, Pat Henderson, on  
16 energy initiatives within the Department.

17           So I'll be speaking sort of from both  
18 perspectives this morning, from that of Patrick  
19 Henderson and also of our Secretary, Christopher  
20 Ambruzzo. So as Congressman Murphy alluded to  
21 this morning, energy production is not new to  
22 Pennsylvania, and in fact the first commercial oil

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1 well was built in Pennsylvania in 1859.

2           At that point, Pennsylvania provided 58  
3 percent of the energy specifically from oil needed  
4 by the nation. Moving forward, natural gas was  
5 often encountered by these early producers, and it  
6 was seen as more of a nuisance than a benefit.

7           So as technology has advanced, and the  
8 modern natural gas industry emerged in  
9 Pennsylvania, we've now shifted from being  
10 importing more than 75 percent of our natural gas  
11 to actually being an exporter.

12           We are certainly in the midst of shale  
13 revolution, and we are now the second largest  
14 natural gas-producing state in the nation. In  
15 2004, the first unconventional well was developed  
16 in Pennsylvania, and over the next few years, a  
17 renaissance in natural gas was evident.

18           In January of this year, Governor  
19 Corbett published Pennsylvania's first state  
20 energy plan, which is aptly entitled "Energy  
21 Equals Jobs." It's straightforward. It reflects  
22 our diverse energy portfolio. Pennsylvania is

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1 home to abundant natural resources such as oil,  
2 natural gas, coal, nuclear, hydropower, wind and  
3 other renewables, and we're a national leader in  
4 both energy and energy diversity.

5           So this array of resources paired with  
6 our competitive energy markets means that we have  
7 affordable and abundant power that we're able to  
8 deliver and a way to meet business needs. We're  
9 modernizing our infrastructure, and we need to  
10 make sure that we have a reliable grid, so we can  
11 efficiently harness all of our resources to drive  
12 our economy forward.

13           Shale gas underlies more than two-thirds  
14 of the Commonwealth, with development activities  
15 in nearly 40 of our 67 counties, and production  
16 has surpassed expectations. From 2010 to 2013,  
17 gas production is more than six times that of the  
18 2010 levels. Pennsylvania DEP provides an  
19 important and vital role in the comprehensive  
20 oversight and regulation of the natural gas  
21 industry, and specifically of infrastructure  
22 development as well.



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1           Though there are some federal statutes  
2 that oversee the development of oil and gas, most  
3 laws and regulations lie at the state level, and  
4 DEP is the primary agency for oversight of those.  
5 In 2013, DEP issued approximately 3,000 well  
6 permits for the construction of unconventional  
7 wells. Of the 3,000, 1,200 of those was drilled.

8           Currently, we have 7,000 unconventional  
9 wells drills in Pennsylvania, with approximately  
10 70 percent of them actually producing natural gas.  
11 So the remaining 30 percent of those wells are not  
12 producing gas for a variety of reasons, one of  
13 which is because they're waiting for the remaining  
14 infrastructure to be able to deliver that gas to  
15 market.

16           Because of our history as an oil and gas  
17 producer, Pennsylvania has a significant existing  
18 network of intrastate and interstate pipelines.  
19 According to the U.S. Energy Information  
20 Administration, at the end of 2008, there were  
21 approximately 8,700 miles of intrastate and  
22 interstate pipelines in Pennsylvania.

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1           Since then, more than 600 miles have  
2 been finished, and there are more projects in  
3 varying stages of completion. The most dynamic  
4 activity in Pennsylvania that we feel is going to  
5 have on the pipeline infrastructure is going to be  
6 gathering, the establishment of new gathering  
7 lines necessary to connect the new drilling sites  
8 with the larger pipelines.

9           A recent study by the Nature Conservancy  
10 estimated that 1.6 miles of gathering pipelines  
11 were going to be required for each new drilling  
12 site, to get this gas to market. In 2013, the  
13 highest-producing counties in Pennsylvania were  
14 mostly rural counties, thereby heightening, I  
15 guess, and providing an example of the needs for  
16 these smaller gathering lines, to get the gas from  
17 these rural areas to market.

18           Through an extensive network of state  
19 laws and implementing regulations, pipelines are  
20 being developed responsibly across Pennsylvania.  
21 State government has been able to respond quickly  
22 to the challenges and the general changes in the

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1 energy landscape in Pennsylvania.

2           In response to the permitting and  
3 inspection responsibilities, our oil and gas  
4 management from 2008 has increased from a size of  
5 88 employees to more than 200 today, and a recent  
6 increase in some of our permitting fees is going  
7 to allow us to add additional staff for the  
8 permitting and inspection, specifically of  
9 pipeline development projects.

10           Marcellus shale may be the most familiar  
11 shale-producing formation, but now operators are  
12 targeting the Burkett, Rhinestreet and also the  
13 Utica formations. So now with advanced  
14 technology, it's possible to extract more from one  
15 well pad. So again, these leaps in technology are  
16 going to lead to an increase in production and  
17 increased need for infrastructure.

18           We're fortunate enough in Pennsylvania  
19 to have these diverse and abundant energy  
20 supplies, and as the governor outlined in his  
21 energy plan, we'll use these resources to move  
22 Pennsylvania forward. We'll create jobs, raise

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1 the standards of living, foster a business climate  
2 that rewards innovation, advance our energy  
3 independence and, importantly, enhance our  
4 environment.

5 But none of this going to be possible  
6 without a strong and reliable infrastructure, and  
7 as a Commonwealth, we feel we're strongly  
8 positioned to build on those current successes.  
9 Thank you.

10 MODERATOR KELLEY: Thank you, Hayley.  
11 So with that, before we turn to the discussion, I  
12 just want to remind everyone that the  
13 presentations that you've seen here today will be  
14 available on the web at [energy.gov/ger](http://energy.gov/ger). You can  
15 just look up today's meeting and you'll find all  
16 the presentations and the public comments.

17 My first question for the panel, and  
18 what we'll do is I'll start here on this end, if  
19 you don't mind Thomas, is we heard from several of  
20 you about constraints associated with the  
21 infrastructure. Lots of great projects going on.  
22 Piotr, I think you touched on these constraints

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1 causing some pricing concerns, over, you know,  
2 long distances between the resources and the point  
3 of consumption.

4           So my question to the panel is you have  
5 the QER Task Force here. Is there a federal role  
6 in helping to improve upon these infrastructure  
7 constraints? Thomas.

8           MR. MURPHY: A couple of comments that I  
9 would make real quick. First, I obviously come  
10 from an educational institution. We do a lot of  
11 outreach-type work. One of the things that we see  
12 is we can have great regulation, we can have great  
13 technology, we can have all kinds of capital. But  
14 if we can't have access to right-of-ways to put  
15 pipe in the ground, then infrastructure won't be  
16 built in the end.

17           So I think an educational process,  
18 including at the federal level, with some federal  
19 direction, to show what all the above would  
20 include relative to this side of it as well, in  
21 terms of the build or the need for infrastructure.  
22 I think it's easy to illustrate, and the

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1 illustration, I think, was made by Congressman  
2 Murphy a little bit earlier, about the dynamic of  
3 pricing with the polar vortex this past winter,  
4 and what that showed with the constraints in the  
5 system and the need for more pipeline, certainly  
6 going north.

7           So I think there's a lot of pieces  
8 there. But if you look at the demand even in that  
9 area right now, to put more pipe in the ground,  
10 some of that is being stopped by the fact that the  
11 access for right-of-way through landowners and the  
12 understanding of what the components of that look  
13 like going forward actually are. So I think  
14 theirs is an educational piece.

15           MODERATOR KELLEY: Thank you. Piotr?

16           MR. TERRANOVA: Yeah, I would agree with  
17 much of what Tom said. I think the issue is  
18 construction in -- to get gas to market generally  
19 goes through places that are -- where they're  
20 remote from where the gas is being produced. I  
21 think one thing that would be helpful from a  
22 federal and state standpoint would be perhaps some

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1 more comprehensive educational effort for  
2 consumers, that would help them understand how  
3 important this infrastructure is.

4 I think we've all seen, and maybe a  
5 reminder that we've all seen the significant  
6 benefits of Marcellus shale gas in this area, in  
7 terms of lower, far lower bills for energy in  
8 their homes. We have, as I mentioned before, we  
9 have a huge amount of oil being consumed in places  
10 that you wouldn't expect oil to be consumed. This  
11 would be southeastern Pennsylvania, this would be  
12 New England.

13 We have an opportunity to substitute  
14 natural gas for oil, which is great from an  
15 environmental standpoint. It's also great from a  
16 cost standpoint. Also I think -- so I guess if I  
17 had to put it in a nutshell it would be I can't  
18 point to any particular rule or regulation that  
19 might help, but I think maybe making this a more  
20 comprehensive -- maybe making this a more visible  
21 initiative by the government may help put the  
22 people, consumers put this in perspective.

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1 MODERATOR KELLEY: Thank you, Josh?

2 MR. NORDQUIST: Thank you Chris. I  
3 would start with -- for us at FERC today, actually  
4 with both new pipelines and repermitting old  
5 pipelines requires that they consider or analyze  
6 wasted recovery from their operations. However,  
7 that's where it stops. It stops at evaluation,  
8 and I think some federal support to incentivize  
9 these projects to strongly consider the benefits  
10 of wasted recovery, either through the use of  
11 public lands or the permitting process that's  
12 required, because I think it has a nice symbiotic  
13 approach with both landowners and the transmission  
14 company.

15 The other side of it is on the energy  
16 side, I think for us, wasted recovery particularly  
17 doesn't get many of the incentives that other  
18 alternative energy production gets, and doesn't  
19 value some of the benefits that this type of  
20 technology provides, such as island loading and on  
21 demand energy, along with that energy security  
22 potential of, you know, for example, powering our



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1 military bases with their own power plants

2 essentially.

3 MODERATOR KELLEY: Thanks, Josh. Piotr?

4 MR. GALITZINE: Thank you very much.

5 Three thoughts very shortly. The first one is

6 that the invisible hand of the market seems to be

7 doing a great job, all these problems

8 notwithstanding. The U.S. is now producing 70

9 billion cubic feet of gas a day, and 8-1/2 million  
10 barrels of oil a day.

11 As regards to regulations, I would think

12 that the loudest example of what not to do is

13 probably the Keystone XL. As a result of that

14 project not going forward, Canada has decided to

15 send that pipeline to the west and to Asian

16 markets, which is a shame and a real problem for

17 the 37 refineries on the Mexican Gulf Coast,

18 because they run on heavy oil and you can't just

19 flip a refinery from one type of oil to another.

20 On what -- on a third thought, there is

21 a lot of discussion about whether frack water

22 regulation should be happening at the state level,

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1 or whether they should be EPA mandated. There is  
2 many states, I think 28 states already have  
3 requirements to reveal what's in the frack water,  
4 and I think this only make sense because everybody  
5 wants to know what's going down whole and going  
6 anywhere near their drinking water.

7 But I would encourage that process,  
8 whether it be state or national, to happen a  
9 little quicker because there's a lot of  
10 uncertainty among the major players to what to do  
11 next. Thank you.

12 MODERATOR KELLEY: Thank you. Thomas,  
13 care to comment?

14 MR. MINNEY: And sir, I won't comment on  
15 market on anything like that. But I would say I'd  
16 just reiterate my points earlier. You know, as we  
17 look at how those pipelines are going to be placed  
18 on the landscape and the transmission placed on  
19 the landscape, the Nature Conservancy and other  
20 groups have been looking at critical habitats,  
21 particularly here in the Central Appalachians, and  
22 ways that we can do planning to be able to reduce

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1 those impacts to those critical places. We are  
2 happy to begin working with industry and  
3 policymakers and others to look at that.

4 MODERATOR KELLEY: Thank you. Hayley.

5 MS. BOOK: Sure, and we are one of those  
6 partners that the Nature Conservancy is working  
7 with right now on critical habitat. We have  
8 several proposed regulations regarding well  
9 development and infrastructure development in  
10 Pennsylvania. So we're trying to keep the  
11 regulatory framework current with what's happening  
12 in the field.

13 Certainly, one of those items that we're  
14 debating and discussing right now with industry  
15 and environmental groups and the like are  
16 certainly impacts on the surface and impacts to  
17 threatened and endangered species and species of  
18 special concern. So it's an interesting process.  
19 The federal government is involved to a certain  
20 extent, and in some of the permitting, mostly with  
21 the pipeline permitting. But the remainder of the  
22 permitting really falls on the state level.

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1           MODERATOR KELLEY: Thank you. So with  
2 that, let me turn to technology. So Josh, you  
3 mentioned your heat recovery technologies that you  
4 have in place. Piotr, you talked about some  
5 advanced pipeline technologies. So it sounds like  
6 lots of great progress there.

7           But are there other technologies or  
8 considerations that the federal government, for  
9 instance, should take into account in the future,  
10 as it relates to addressing infrastructure  
11 constraints? So I'll open it up to whoever would  
12 like to take the question to start with, on the  
13 federal government role in technology.

14           MR. GALITZINE: Sure. One thought would  
15 be to make a concerted effort to tap the nation's  
16 geothermal sources. California has done a great  
17 job leading the way as always. Basically all the  
18 electricity north of San Francisco is generated  
19 from geothermal, where (inaudible) are also used,  
20 and there's a lot of candidates for further  
21 development.

22           MR. NORDQUIST: As a large geothermal

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1 developer, I would support that.

2 (Laughter.)

3 MODERATOR KELLEY: Did you have a  
4 comment?

5 MR. MURPHY: I'd make a comment as well.  
6 We think about some of the comments that have been  
7 made here today, one of the aspects or one of the  
8 challenges that's been pointed out was about  
9 future of methane emissions. I think federal  
10 government funding for additional research to  
11 solve some of those issues as they've been  
12 illustrated, I think, would be well-placed.

13 MODERATOR KELLEY: Anyone else care to  
14 comment?

15 MR. TERRANOVA: Yes. Working for a  
16 company that also distributes national gas to  
17 utility customers, I think there's been kind of an  
18 on-again, off-again effort by the federal  
19 government to fund end use technologies that would  
20 lead to greater efficiencies, and I think that  
21 that is something that should be on again if it's  
22 not.

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1 I think, you know, in terms of  
2 infrastructure, clearly the processes by which  
3 pipelines are built today are much more -- much  
4 less intrusive than they were in the past. So I  
5 don't know that there's much for the federal  
6 government to do there, but I do know that other  
7 industry groups, such as GTI, are working  
8 diligently and in some cases getting federal  
9 funding, I think DOG funding, for some of their  
10 initiatives.

11 Then finally, as I said before, you  
12 know, it's not so much technological change, but  
13 let me back up. The technology improvements that  
14 need to be made to make natural gas a motor fuel  
15 more accessible to large fleets, the so-called  
16 Pickens plan, I think, has a lot of potential to  
17 reduce this nation's dependence on oil.

18 That would be liquefied natural gas  
19 technology, which has improved greatly, but I'm  
20 sure it can improve to an even greater extent.

21 MODERATOR KELLEY: Thank you. Any other  
22 comments? No. So Hayley, you talked about the

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1 role of the state of Pennsylvania and the  
2 involvement of regulators at the state level. I'm  
3 curious, I guess, for the rest of the panel. Are  
4 you seeing any complex as it relates to  
5 regulations at the federal, state or local level,  
6 and if so, what actions would you recommend? Any  
7 thoughts on that.

8 MS. BOOK: Sure. So as I mentioned, the  
9 majority of the regulations are at the state  
10 level. But the federal government certainly plays  
11 a role, specifically the Army Corps of Engineers,  
12 in terms of permitting for erosion and  
13 sedimentation control for the development of  
14 pipelines.

15 Pennsylvania has a little bit of a  
16 different permit. It's what's called the State  
17 Programmatic General Permit, and it's a joint  
18 federal and state permit. So instead of having a  
19 company be required to get a state permit, and  
20 then in turn receive a similar federal permit, we  
21 have a joint permit, which is supposed to help  
22 streamline the permitting process for pipelines.

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1           Some groups are debating whether or not  
2 that has streamlined the process. We're having  
3 ongoing conversations with industry and the Army  
4 Corps of Engineers to kind of advance, advance  
5 that permit, to make it a little bit easier to  
6 apply for. Equally as protective, but streamline  
7 that process a little bit.

8           Then recently, the Commonwealth has  
9 passed in 2012 Act 13, to revamp, for the first  
10 time in more than 30 years, the Oil and Gas Act in  
11 Pennsylvania. We've encountered a little bit of  
12 difficulty in some of the court systems, in  
13 regards to some provisions of that Act. But we'll  
14 continue to move forward and ultimately the  
15 court's decision was that some of the decisions  
16 about local zoning, about placement of wells and  
17 pipelines and such, would remain at the local  
18 level.

19           So there's still some discussions that  
20 are ongoing about that. But for the most part, we  
21 feel at the state level, the regulatory framework  
22 is pretty strong.



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1           MODERATOR KELLEY: Great. Anyone else  
2 care to comment? Yes.

3           MR. MURPHY: Yeah, I would make a  
4 comment too. One of the things that Hayley had  
5 talked about earlier was a number of fuel-based  
6 inspectors that have been hired in Pennsylvania.  
7 We see that in a variety of other states around  
8 the nation.

9           Certainly, a program in place that would  
10 increase the credibility of those same inspectors,  
11 sort of a certification process that could be done  
12 at the federal level, to certify across all the  
13 states where natural gas is being developed, we  
14 think would be a real asset and certainly would go  
15 a lot further again in the credibility aspect of  
16 the programs out in the field.

17           MODERATOR KELLEY: Great. Anyone else?  
18 Okay. Well, let's do one more question. You have  
19 the QER Task Force before you, and my question is  
20 simply this. They want to hear from you. You're  
21 given the opportunity to provide one final comment  
22 here, and if you had one comment or suggestion to

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1 make to the federal government, to this QER Task  
2 Force, what would it be? We'll start here with  
3 you again Thomas.

4 MR. MURPHY: Actually, I'm going to  
5 circle back where I started in one of the comments  
6 that I made, and that was about the educational  
7 process. I just feel very passionately about  
8 that, and we see that not only here within the  
9 state of Pennsylvania or North America as a whole,  
10 you know, thinking about certainly the U.S. as the  
11 big part of this focus, but on a global basis.

12 So it really is a big part of the  
13 dialogue that we see out there. It is one of the  
14 bigger constraints. As I mentioned before, a  
15 number of the constraints or a number of the  
16 challenges. A lot of those go back to some of the  
17 softer side of those conversations and the soft  
18 science side of this, and to make sure that we get  
19 that part right, and we get that -- we put a sense  
20 of urgency in that process on a collective basis  
21 and on a national basis.

22 MODERATOR KELLEY: Thank you. Peter.

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1 MR. TERRANOVA: Yes. I tend to believe  
2 that the Department of Energy is uniquely  
3 positioned within the government to bring some  
4 rationality and some fact-based discussion to this  
5 whole issue of energy, energy use, energy  
6 development in certainly the country. That to me  
7 is sorely needed. I think there are a number of  
8 voices out there who are, you know, making  
9 statements about energy development that hurt us  
10 all, because they're inaccurate and they're built,  
11 they're made in order to scare people.

12 But once again, I think if we as an  
13 industry knew that there was a part of the  
14 government whose function is to be fair and to be  
15 fact-based, and to be the keeper of the truth, if  
16 that's a phrase to be used, I think that would  
17 stand us all in good stead.

18 MODERATOR KELLEY: Thanks, Peter. Josh.

19 MR. NORDQUIST: I guess I would say that  
20 we need to stay focused on what we're trying to do  
21 here, is figure out how to use our own resources  
22 effectively, and those resources being a whole

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1 multitude from our renewable resources, from  
2 geothermal wind and solar to our non-renewable,  
3 because it's all -- they will all be needed in the  
4 future, whether or not they're used here or used  
5 worldwide.

6           So I continue to stress that our own  
7 resources need to be used as effectively as we can  
8 here, and we still have a lot of room to grow.

9           MODERATOR KELLEY: Thanks. Piotr.

10           MR. GALITZINE: Thank you. Until we get  
11 to an alternative energy-fueled future, which is  
12 going to happen when we have network scale  
13 batteries, which by the way, the Japanese are  
14 making some considerable progress on, we are going  
15 to be combusting hydrocarbons. My wish would be  
16 that the United States revisit the 1975 law  
17 forbidding exports of oil, and open that up to the  
18 market's hand.

19           MODERATOR KELLEY: Thank you. Thomas.

20           MR. MINNEY: So I would just emphasize  
21 again that this focus on landscape fragmentation  
22 and habitat impacts be brought into the dialogue,

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1 but also emphasize that we do have the science and  
2 tools to look out into the future and predict  
3 where those overlaps would happen and be proactive  
4 about what planning and tools we put into place to  
5 ameliorate those impacts, or to avoid or mitigate  
6 those impacts.

7 We do have already science and solution  
8 in the work, to look at planning tools that will  
9 help produce those impacts. I would just  
10 encourage the continued look at the science and  
11 impact planning.

12 MODERATOR KELLEY: Excellent, thank you.  
13 Hayley.

14 MS. BOOK: Sure. I guess my one request  
15 of the Department of Energy would just be to  
16 continue the public discussion, and make sure that  
17 as they move forward with the national energy  
18 policy, they're well-informed and they've plenty  
19 of stakeholder input, which certainly they will  
20 get through this process.

21 So while it's important to have a  
22 national state energy policy -- national energy

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1 policy, excuse me, we're just thankful that DOE  
2 looks to their states and their individual needs  
3 and individual resources as they move forward with  
4 planning.

5           MODERATOR KELLEY: Great, thank you.  
6 Well I know I've learned a lot here with this  
7 first panel. So I thank you very much for joining  
8 me up here, and please all of you join me in a  
9 round of applause for our panelists.

10           (Applause.)

11           MODERATOR KELLEY: We're ready for the  
12 second panel. So if you're speaking on the second  
13 panel, please join us up in the front.

14           (Pause.)

15 Panel 2

16           MODERATOR KELLEY: So once as we're  
17 getting settled, for those of you in the audience,  
18 if you'd care to comment at the end of this  
19 session, please do make sure you indicate that on  
20 the sign-in sheet at the front, and for those who  
21 are joining us by live streaming, do send in your  
22 comments to qercomments@hq.doe.gov.

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1           And once again a reminder as we get  
2 started here with our second panel, that the  
3 comments by the panelists are those of their own,  
4 and do not represent the sentiments of the  
5 Department of Energy.

6           So the second panel here is focused on  
7 How Prudent Infrastructure Investment Could Help  
8 Maximize Resource Potential, and joining me here  
9 at the front are Shelley Corman, Executive Vice  
10 President, Interstate Pipelines Energy Transfer  
11 Partners; Rory Miller, Senior Vice President,  
12 Atlantic-Gulf Williams; May Va Lor, Lead Research  
13 Analyst, Laborers' International Union of North  
14 America (LIUNA); Kris Evanto, Manager of  
15 Development, Access Midstream; and Jim Sullivan,  
16 Member-Public Gas Policy Council, American Public  
17 Gas Association.

18           So once again we will go ahead and just  
19 start here with you, Shelley, with your comments.

20           MS. CORMAN: If I can stand up, because  
21 I've got a map.

22           MODERATOR KELLEY: Do we have the

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1 clicker for you?

2 MS. CORMAN: Thank you very much. I'm  
3 speaking today as a representative of Energy  
4 Transfer, one of the largest and most diversified  
5 investment grade master limited partnerships in  
6 the United States. We have a couple of slides  
7 through maps. Pipeliners like their maps.

8 On a consolidated basis, our partnership  
9 owns and operates more than 72,000 miles of  
10 natural gas, natural gas liquids, refined products  
11 and crude oil pipelines. Personally, I've worked  
12 in the Interstate Pipeline Division of Energy  
13 Transfer. Our legacy pipeline systems shown on  
14 this map include pipelines in some of the  
15 traditional basins of the United States, not too  
16 much of what we've been talking about this  
17 morning, the Gulf Coast, the Midcontinent, San  
18 Juan and the Permian Basin.

19 Those pipelines have operated safely and  
20 reliably for many years, but now have challenges  
21 with some of the gas/oil pattern changes that  
22 we've been discussing this morning. Starting in



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1 the mid-2000's, the sorts of new gas supply from  
2 shell formations has exposed the need for changes  
3 in our natural gas pipeline structure.

4 Many of the producers in the nation  
5 suffer when their shale supplies cannot  
6 economically reach markets. Companies like Energy  
7 Transfer have grown and developed pipeline  
8 projects to help those supplies reach new markets,  
9 to reach liquid spots where the producers can sell  
10 their gas.

11 So for example, a couple of the  
12 pipelines on this map are pipeline projects that  
13 we have put in service in response to the shale  
14 play. Energy Transfer first grew up -- slide back  
15 here a second -- with the rise in the shale  
16 supplies in the Barnett shale, one of the first  
17 shale regions in the United States.

18 But then, I think you can see it more  
19 easily on this map, some of our other pipeline  
20 projects were the Tiger pipeline system, which  
21 allowed the Haynesville shale to reach markets,  
22 the Fayetteville Express Pipeline, a joint venture

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1 with Kinder Morgan, that allowed us to transfer  
2 Fayetteville shale gas out of Arkansas, and the  
3 Midcontinent Express pipeline, which was also  
4 built to serve the Burnett and the Midcontinent  
5 gas producers.

6           Each of these pipeline systems is  
7 supported by long-term transportation contracts.  
8 It's not possible to build the scale of pipeline  
9 project and to make the billions of dollars of  
10 investment without contracts and without  
11 predictability in the rules and regulations that  
12 we face.

13           In the Haynesville shale, for example,  
14 production in the region grew by 70 percent in the  
15 year after the Tiger pipeline project went into  
16 service.

17           Although new pipeline infrastructure has  
18 allowed producers in specific areas to enjoy  
19 better market access, there are enormous shale  
20 plays out there that still require development,  
21 and there are a number of changes. I'm not going  
22 to rehash the changes that other folks have

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1 already described.

2           Some of those market conditions in  
3 summary are just that low gas prices have really  
4 shifted development in the United States towards  
5 the natural gas liquids area and the development  
6 of the basins where there are the most liquids,  
7 and also into the Marcellus and Utica area.

8           We've talked some this morning about the  
9 other phenomenon industry, the demand phenomena.  
10 Those have quite frankly not kept pace with supply  
11 development. Some of the low prices are causing  
12 resurgence in our gas intensive industry such as  
13 steel and petrochemicals, and in power generation  
14 as well. Also, increasing exports to Mexico and  
15 in the LNG export arena as well.

16           So what is a pipeline company to do with  
17 all of those types of changes? Well, I thought  
18 what I would do with my couple of minutes of  
19 remarks is just talk about in my company. I think  
20 it's much the same in other pipeline companies  
21 across the United States, is how those dynamics  
22 that we've discussed are directly impacting what

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1 pipeline companies are working on.

2           For example in energy transfer, we have  
3 undertaken an extensive build out of midstream and  
4 natural gas liquids infrastructure in the Eagle  
5 Ford shale area. We've spent \$3 billion in that  
6 area since 2010. We're also working on pipeline  
7 projects to export gas to Mexico.

8           We're in the middle of building an  
9 export facility in Lake Charles, a trunk line LNG  
10 site. We currently have a facility there to  
11 import LNG, but the market conditions today  
12 dictate a completely new export facility be built  
13 in that same area.

14           We're making modifications to our  
15 pipeline systems, such as reversing the flow of  
16 portions of our system or abandoning systems, to  
17 convert them to other uses. For example, one of  
18 the lines of our trunk line gas system is  
19 currently being abandoned and put into crude oil  
20 service.

21           And then, most relevant to the area that  
22 we're talking about today, is the huge resource

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1 base in the Marcellus and Utica area, and the need  
2 for producers to have new infrastructure out of  
3 this region. Energy Transfer is developing a new  
4 pipeline system called the rover pipeline, that  
5 will provide access from the Marcellus and Utica  
6 gas production areas for our producers,  
7 transporting gas westward to the Midcontinent,  
8 where it has market access, and in Michigan, up to  
9 the Canadian border and also connect in the  
10 Midwest to pipes that go to the Gulf Coast for  
11 some of the demand growth that we've discussed  
12 there.

13 We already have gap commitments to the  
14 project, 2.6 Bcf a day, and the pipeline project  
15 we believe will be sized around 3.2 Bcf a day.  
16 We're running an open season right now to finalize  
17 our commitments and the sizing of the project, and  
18 it's a project we hope to bring in service in the  
19 fourth quarter of 2016.

20 We're in the midst of the stakeholder  
21 processes. I think that's relevant to the  
22 conversations about what can be done to facilitate

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1 infrastructure, and participation by all the  
2 stakeholders early in the process is really what  
3 makes these projects a success, and helps us deal  
4 with landowners and other issues that you  
5 encounter in building pipeline projects.

6           So in quick summary, I agree with the  
7 comments of the panelists before about the changes  
8 in the industry and all of the great opportunities  
9 in natural gas, and hopefully this is an example  
10 of what one pipeline company is doing to meet  
11 those.

12           MODERATOR KELLEY: Thank you, Shelley.  
13 Rory.

14           MR. MILLER: Good afternoon. Looks like  
15 we're just past the lunch hour. My name is Rory  
16 Miller. I'm the Senior Vice President for  
17 Williams, handling our eastern interstate pipeline  
18 systems, as well as our Gulf of Mexico, midstream  
19 and deepwater assets.

20           I'm going to focus on some of the  
21 challenges facing the construction of new  
22 interstate pipeline projects. I want to use a few

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1 examples as I go through that. There we go. I'll  
2 see that. I'll try to limit the commercials as I  
3 go along, maybe just provide a little bit of  
4 context of how Williams operates and serves 24  
5 states and Canada.

6           We've got 4.8 billion dollars' worth of  
7 projects that are in some stage of the regulatory  
8 process today, and we -- I've got a rough  
9 calculation. We believe that over the course of  
10 the time frame that the QER applies to, that we'll  
11 be investing upwards of \$30 billion.

12           So making some progress on this front is  
13 of utmost importance to us at Williams. A lot of  
14 things have already been covered. I think Shelley  
15 mentioned some of that too, and so I'll try not to  
16 be too repetitive. We're in a very fortunate  
17 supply situation right now, with all the new shale  
18 gas, and we're seeing very strong demand for clean  
19 energy. We're certainly taking advantage or  
20 trying to take advantage of that.

21           The polar vortex provided, I think, a  
22 snap shot of where some of the constraints are and

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1 some of the bottlenecks are, and I've got a slide  
2 similar to the one that was shown earlier, and  
3 I'll just touch on that for a moment. Then I'm  
4 going to cover a little bit about our Rockaway and  
5 Constitution projects.

6 But at the end of the day, what we're  
7 really after is regulatory certainty. If you  
8 don't have that, if you miss an environmental  
9 window by a month or two, the results and the in-  
10 service of the pipeline is easily 9 to 12 months.  
11 So meeting these deadlines and sticking to the  
12 schedule is of utmost importance.

13 This graph shows the price differential  
14 on our Leidy system, and just real quickly, you  
15 can see the spikes there. Congressman Murphy  
16 mentioned that \$120 price. That was the New York  
17 City gate price, and that red line there is what  
18 the price the producers are receiving just a  
19 couple of hundred miles away from the city gate.

20 You can see that price differential of  
21 about \$117. Now the pipeline doesn't get that.  
22 Our rates are all regulated. So we get the same,



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1 regardless of what the price is. But the  
2 consumers are the ones that pay that bill. Not  
3 all the gas is bought on the spot, but the gas  
4 that is bought on the spot is paying a pretty  
5 heavy toll.

6 I mentioned talking about the Rockaway  
7 project just a bit. Let me just set the stage for  
8 you. This is less than four miles of pipe, and it  
9 serves the national grid system, mainly the gas  
10 would be going into Queens and Brooklyn.

11 The siting for the landing point, even  
12 though most of it's offshore, is International  
13 Park. It's the gateway National Recreation Area.  
14 This project actually took an act of Congress to  
15 move forward, and the process has taken almost  
16 seven years.

17 In-service date, since we're  
18 constructing right now, will probably be by the  
19 end of the year. Total construction time, maybe  
20 seven-eight months. You know, we've been at this  
21 a while. So the question I ask here was the seven  
22 years required to get this project built, was that

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1 really in the best general interest of the public?  
2 Again, I think this is just maybe just a tell-tale  
3 sign that we don't have the process quite right.

4           So what's a typical FERC timeline look  
5 like? Just really quickly, the two big -- the  
6 green bar there, the orange bar, you can see the  
7 average months, and on those little bubbles it  
8 shows what the timeline has been for Rockaway and  
9 Constitution. So as opposed to seven months, they  
10 were 9 and 15 months, and as opposed to 10.7  
11 months in the Seven Sea Island application, we're  
12 looking at 16 and 18 months.

13           At the end of the day, what we need, we  
14 need better communication between agencies. We  
15 need stronger working relationships between  
16 agencies, and we need consequences when the  
17 agencies don't meet deadlines. I know the FERC is  
18 really burdened right now, because they've got so  
19 much more activity than they normally do, and  
20 they're trying to proceed in a workman-like  
21 manner.

22           But there's a lot of cooperating

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1 agencies, and there's a lot that's been delegated  
2 to the state, and those things really get bogged  
3 down. Again as I mentioned, if you miss a window,  
4 a key window, one or two months, it delays you a  
5 year.

6 Talking about the Constitution project,  
7 this has been a little bigger problem here, and  
8 I'll wrap up right here. This is a project to  
9 take gas out of northeastern Pennsylvania, up to  
10 Iroquois and Tennessee. This project has been  
11 attacked, I would say, by narrow interest groups,  
12 and also we've been bogged down in the state here.

13 We've already been delayed one year on  
14 this project, and if we don't get cooperation, it  
15 could potentially be delayed another year. So  
16 again, we need a process that has accountability  
17 in the time lines, and it would be nice if there  
18 was one lead agency that really had the power to  
19 make the other agencies and the states abide by  
20 that time line.

21 So I'm going to finish up right there.  
22 Final statement. We got the hard part solved

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1 here. We've got very ample supply. We've got a  
2 lot of clean energy markets. We just don't have a  
3 practical and efficient process in place to get  
4 this infrastructure built. Thank you.

5 MODERATOR KELLEY: Thank you, Rory. May  
6 Va?

7 MS. LOR: Good afternoon. My name is  
8 May Va Lor. I am energy analyst for the Laborers  
9 International Union of North America. So let me  
10 tell you just briefly a little bit about the  
11 Laborers, and why they care about energy  
12 infrastructure. The Laborers represent half a  
13 million workers, primarily in the construction  
14 industry throughout the United States and Canada.  
15 Our members have been working on some of the  
16 pipelines that have been talked about here.

17 Our union is the leader is the leader in  
18 advocating for more infrastructure investments,  
19 from the (inaudible) to the Keystone XL pipeline.  
20 Our members construct and maintain nearly type of  
21 energy facility, solar facility, as well as  
22 nuclear facilities, as well as transmission

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1 pipelines.

2           Additionally, through our pension plans,  
3 we invest in companies and equity funds that  
4 directly finance energy infrastructure. Through  
5 our labor-management training funds, thousands of  
6 members are trained annually in construction jobs  
7 in the energy industry. But most importantly,  
8 through our local hiring halls, we focus on  
9 including and placing local folks for construction  
10 jobs in the energy industry.

11           On behalf of our half a million members  
12 and our general president, I want to thank you for  
13 giving us the opportunity to participate on this  
14 panel, and to offer our thoughts on this important  
15 topic. So as many of you know, the construction  
16 industry was hit hard by the economic recession in  
17 2010. Unemployment rates in the industry were  
18 above 27 percent.

19           But the one bright spot for our union  
20 was energy jobs related to Marcellus shale gas  
21 extraction in this region. Infrastructure  
22 investment, you know, folks have talked about how

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1 it's unleashed the resource potential of the  
2 Marcellus shale. But it also unleashed the labor  
3 resource potential in this region. Members got  
4 off the bench and back to work, back to the work  
5 of supporting their families, feeding their  
6 families and paying for their mortgages, etcetera.

7           From 2010 to 2013, our members worked on  
8 -- worked over 15 million hours on building  
9 transmission pipelines in this region alone, and  
10 in Pennsylvania, we've completed about 900  
11 pipeline jobs since 2011. We're starting now to  
12 see comparable growth in Ohio as well. Last year,  
13 pipeline hours increased seven times compared to  
14 the prior year.

15           So for our members, energy  
16 infrastructure investments are a lifeline to good  
17 union jobs, the good pay that supports families,  
18 and all the health care and retirement benefits.  
19 For many, you know, Secretary Moniz was talking  
20 about opportunity ladders, career ladders.

21           For many, it's been exactly that. It's  
22 been a path of harmony. So we've been very

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1 privileged to work with a number of leading energy  
2 companies, who value a well-trained local  
3 workforce, and who value using local tradesmen and  
4 tradeswomen who will spend their earnings here, to  
5 boost and support their communities.

6           So as part of the QER process, we'd ask  
7 you to consider a couple of issues that are  
8 important to our members. The first is that we  
9 don't believe energy infrastructure is a partisan  
10 issue. It's expected that everyone wants energy,  
11 but no one wants a pipeline in their backyard.

12           These dynamics make it even more  
13 difficult -- I'm sorry, even more important that  
14 pipelines and other energy facilities be judged  
15 based on their individual merits, using objective,  
16 consistent and transparent standards. Recent  
17 cross-border permit applications show how uneven  
18 the process has become.

19           That is why we supported House Bill  
20 3301, the North American Energy Infrastructure  
21 Act. This bill is not perfect, although it does  
22 provide a framework for timely review. We also

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1 believe that cross-border permit applications  
2 should increase their focus and have an explicit  
3 focus on meaningful job creation, because we  
4 believe that supporting American workers and their  
5 families is in the nation's best interest.

6           The second area of interest is  
7 identifying opportunities to improve the quality  
8 and efficiency of pipeline construction through  
9 skilled workforce development. So we know that  
10 there is a tightening of skilled labor in the oil  
11 and gas industry. But it's important that we not  
12 take shortcuts in training.

13           So we believe that the use of a highly  
14 trained local workforce, in conjunction with  
15 reputable contractors, is the best way to meet our  
16 nation's needs. So our members have built some of  
17 the biggest pipelines and most of them are well-  
18 trained. So we believe that experience positions  
19 us to be effective advocates for skilled workforce  
20 development.

21           So the DOE has the opportunity or the  
22 QER has the opportunity to initiate a



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1 collaboration on this issue, and we'd like to be a  
2 part of that discussion.

3 Another area that we'd like sort to be  
4 investigated is just greater public disclosure on  
5 gathering pipelines. So we believe that, you  
6 know, it's true that pipelines are the safest way  
7 to transport natural gas and hazardous liquids,  
8 and gathering pipelines in themselves carry low  
9 risk.

10 However, there is growing concern about  
11 the expense of unregulated gathering pipelines.  
12 So some states like North Dakota are exploring  
13 novel ways to track construction problems. So  
14 it's our belief that greater transparency helps  
15 build public confidence, and has the potential to  
16 raise construction standards. Therefore, we would  
17 encourage the QER to review how greater disclosure  
18 could be achieved.

19 I think I'll just close my comments. I  
20 believe I'm running out of time. So in closing,  
21 LIUNA members live and work in every corner of the  
22 U.S., and we've represented workers in the

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1 construction industry for over 100 years. We've  
2 built pipelines for over half a century.

3           So to us, these are not temporary jobs,  
4 but families supporting careers. We are invested  
5 in the success of this industry, because domestic  
6 energy development supports both working families,  
7 in terms of lower energy costs and in terms of  
8 jobs. But development must not come at any cost.

9           So we hope the QER sparks a discussion  
10 that improves safety standards for all pipeline  
11 workers, increases collaboration on workforce  
12 development and training needs, and promotes the  
13 overall quality and security of our vital energy  
14 assets. Thank you.

15           MODERATOR KELLEY: Thank you May Va.  
16 Chris.

17           MR. EVANTO: Thanks. Access Midstream  
18 operates over 5,600 miles of gathering pipeline,  
19 deploying over five billion cubic feet in natural  
20 gas per day. We have a significant midstream  
21 infrastructure in most active shale plays across  
22 the country, including the Burnett, the

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1 Haynesville, the Permian, Eagle Ford, Niobrara and  
2 locally here in the Marcellus and the Utica.

3 Industry has installed significant  
4 amounts of pipe and compression, of which Access  
5 Midstream has contributed 1,238 miles of pipe,  
6 214,000 horsepower of compression, and 1,192 wells  
7 to drive 3.4 billion cubic feet of production per  
8 day here in the Appalachian Basin.

9 Similar to gathering and compression,  
10 significant cryogenic processing of fractionation  
11 investments have occurred here in the region, of  
12 which Access has contributed 700 million cubic  
13 feet per day of processing, and 135,000 barrels  
14 per day of fractionation. We're a little unique.  
15 We are focused on the upstream side of the  
16 midstream sector, if you will.

17 So we depend on interconnectivity  
18 through pipeline, rail, storage and other  
19 downstream midstream folks such as Williams and  
20 Energy Transfer. I can get the gas to market. We  
21 do have existing interconnects to interstate and  
22 local markets through Kinder Morgan, Dominion

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1 Transmission and Dominion East Ohio.

2           Some of the new pipeline projects that  
3 will give us access to get the product to market  
4 are the Energy Transfer's Rover project. We do  
5 have a receive point, a plan for that our  
6 Leesville cryogenic plant, which is located in  
7 Ohio.

8           Currently, we do have access or excuse  
9 me a tap on the Atex ethane pipeline. So we can  
10 deliver ethane to market in the Gulf through  
11 there. Proposed propane/butane, mixed butane  
12 pipelines that are supposed to come on line 2016  
13 and give us access to markets in the south as  
14 well.

15           Long-term constraints that we see, like  
16 I said, we're sort of in the upstream part of the  
17 midstream business. So some of the constraints or  
18 risks to us would be residue gas takeaway. So  
19 some of the larger projects that were spoken about  
20 for making sure that those projects do come to  
21 fruition to give us access to those markets.

22           NGL takeaway is obviously something that

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1 we're watching as well, whether the pipeline or  
2 local consumption. I definitely agree with that  
3 Mr. Miller had to say as far as permitting  
4 regulations. That can have a huge effect on the  
5 amount of capital that we spend, and the amount of  
6 time associated with the project.

7           We've seen permits taking 13 to 18  
8 months to get approved, which again can have  
9 significant effects to our ability to serve our  
10 customers in the upstream markets. It would be  
11 great to have some clear guidance and consistency.  
12 You know, we operate in Ohio, West Virginia and  
13 Pennsylvania, but even within those states,  
14 depending on which district or region you're in,  
15 there can be considerable difference in how the  
16 local folks interpret the regulations or what they  
17 demand in the permitting packages and what-not.

18           Again, just related to the involvement  
19 of, you know, state, local or federal governments,  
20 we do have a lot of issue too with Townships that  
21 require much more significant, you know, demands  
22 when it comes to road crossings, things like that,

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1 going beyond what the state or federal regulations  
2 require.

3           So it would be nice to see some  
4 consistency across that band, not necessarily, you  
5 know, one way or the other, but just some  
6 predictability would be appreciated. That way we  
7 can spend the capital as efficiently as possible.  
8 Thank you.

9           MODERATOR KELLEY: Thank you, Kris.  
10 Jim.

11           MR. SULLIVAN: My name is Jim Sullivan,  
12 and I'm the chairman of the board of Norwich,  
13 Connecticut Public Utilities Commissioners.  
14 Norwich, Connecticut is a town of about 42,000  
15 people located in eastern Connecticut, and we  
16 operate a four service utility in electric, gas,  
17 water and sewer, and we're the only municipal gas  
18 company in the state of Connecticut, and one of  
19 the very few in New England.

20           In addition, I serve as the chairman of  
21 the board of the Connecticut Municipal Electric  
22 Energy Cooperative, which is a consortium of six

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1 municipalities and an Indian tribe that buys  
2 energy at the wholesale level and distributes that  
3 to our member communities.

4 I'm here today as a representative of  
5 the American Public Gas Association. Our entire  
6 organization is at our annual conference in Lake  
7 Tahoe, Nevada, and I was the closest one to  
8 Pittsburgh, Pennsylvania, so I got this assignment  
9 today.

10 APGA is the national association for  
11 publicly-owned natural gas distribution systems.  
12 There are currently approximately 1,000 public gas  
13 systems located in 37 states. Publicly-owned gas  
14 systems are not-for-profit retail distribution  
15 entities owned by and accountable to the citizens  
16 that they seek to serve.

17 Public Gas Systems' primary focus is on  
18 providing safe, reliable and affordable service to  
19 their customers. The APGA represents the  
20 homeowners and small businesses that rely on  
21 affordable natural gas to heat their homes, cook  
22 their meals, power their restaurants, operate

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1 small manufacturing entities and service  
2 businesses.

3 APGA has long maintained that natural  
4 gas, and in particular the direct use of natural  
5 gas, can play a critical role in meeting our  
6 energy needs, reducing greenhouse gas emissions  
7 and increasing overall efficiency.

8 It is APGA's position that national  
9 policy should facilitate the use of natural gas  
10 instead of other more carbon-intensive fuels where  
11 appropriate. For example, using gas-fired water  
12 heaters for homes instead of electric resistance  
13 water heaters ultimately reduces greenhouse gas  
14 emissions by one to two-thirds. Simply put,  
15 increasing the direct use of natural gas is the  
16 surest, quickest and most cost effective avenue,  
17 in our view, to achieve significant reductions in  
18 greenhouse gases.

19 In terms of infrastructure issues, there  
20 are two items that I would like to briefly  
21 address. The first is the issue of tax exempt  
22 financing. The primary way in which municipal



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1 local distribution companies raise capital is by  
2 issuing tax exempt municipal bonds. APGA strongly  
3 supports the continued tax exempt status of  
4 municipal bonds, as they are an efficient, stable  
5 and effective means of building new public gas  
6 system infrastructure.

7           However today, we see that some members  
8 of Congress, as well as the administration, have  
9 proposed altering or eliminating all together the  
10 tax-exempt status of these bonds, and APGA  
11 adamantly opposes such alteration.

12           Beyond tax-exempt financing, public gas  
13 systems can raise capital by requesting that local  
14 officials raise natural gas rates for customers,  
15 or requesting that local elected officials raise  
16 taxes or cut other services to pay for upgrades,  
17 and we think that those alternatives are not  
18 acceptable.

19           The second infrastructure issue is  
20 related to just and reasonable rates. Under the  
21 Natural Gas Act, the charge for transporting  
22 energy across state lines is required to be just

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1 and reasonable.

2           However, current law does not provide  
3 the Federal Energy Regulatory Commission the  
4 authority to protect natural gas consumers from  
5 paying unjust and unreasonable rates to pipelines,  
6 in contrast to the manner in which just and  
7 reasonable rates are maintained by FERC under the  
8 Federal Power Act for consumers of electricity.

9           Under current law, if a customer files a  
10 complaint at FERC to address excessive rates, and  
11 if at the completion of the proceeding the  
12 customer has been found to have been charged an  
13 unjust and unreasonable rate, FERC can only adjust  
14 the rate downwards prospectively.

15           That is to say, FERC can only change the  
16 rates going forward from the completion of the  
17 complaint proceeding, and cannot provide refunds  
18 to overcharged customers. This lack of refund  
19 authority stands in contrast to the standing of  
20 electric customers, who do have FERC protection  
21 that includes refund authority under the Federal  
22 Power Act, Section 206.

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1           If electric customers are found to have  
2 been overcharged, FERC can require interstate  
3 electric transmission companies to provide a  
4 refund back to the date of the filing of the  
5 complaint at FERC, known as the refund effective  
6 date, as well as the charging of rates  
7 prospectively.

8           This refund authority removes the  
9 incentive for interstate electric transmission  
10 companies to charge unjust and unreasonable rates,  
11 and to delay the complaint proceedings, as delay  
12 simply means enhanced refund obligations to  
13 customers resulting from rates that are found to  
14 be unjust and unreasonable.

15           This is an important issue for public  
16 gas systems, since 95 percent of them are captive  
17 to one interstate pipeline. I again thank you for  
18 the opportunity to participate in this panel, and  
19 look forward to the upcoming conversation.

20           MODERATOR KELLEY: Thank you, Jim. So  
21 with that, let's turn right to our discussion. I  
22 just wanted to touch on some of the points that I

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1 heard in your opening comments here. So I've  
2 heard quite a few of you mention the need for  
3 regulatory improvements, process improvements.  
4 But at the same time, I also heard folks talk  
5 about safety and security, which is sometimes  
6 manifested through regulation.

7           So do you see that -- do you see those  
8 two concepts at odds, and if so, how would you  
9 recommend improving the regulatory process? Rory,  
10 actually you started this, started us off with  
11 that conversation. So why don't you start?

12           MR. MILLER: Sure, yeah. Well, when you  
13 start one of these large infrastructure projects,  
14 part of the challenge is to get out with the  
15 stakeholders, and there are a lot of stakeholders,  
16 and you want to get out early and you want to get  
17 out often. Typically, we have a series of open  
18 houses, and we're trying to extract out of the  
19 community, very much on the front end, what those  
20 issues are.

21           What are the areas that we need to  
22 avoid? What are the sensitive areas, and in fact

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1 I loved hearing from Thomas with the Nature  
2 Conservancy about some of the tools that they're  
3 building, which again I think could be useful. If  
4 people are bringing issues forward, either  
5 individual concerns or bringing environmental  
6 issues forward and they're truly looking for  
7 solutions.

8           That's very productive. Those are  
9 things that we want to hear about, and we want to  
10 incorporate those into our project, because then  
11 we're more likely to get through the process  
12 quickly, and that has huge economic benefits, and  
13 it means we won't miss another heating season  
14 without additional gas in the northeast, for  
15 instance.

16           So that's important. On the safety side  
17 though, there's a lot of regulation that governs  
18 how we manage physical risk, and we have all of  
19 those regulations kind of inculcated in our own  
20 internal processes as well. So I don't  
21 necessarily put kind of the safety and integrity  
22 issues in the same boat with the permitting

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1 process, although it's part of it.

2 I think that's all synched up fairly  
3 well, and we're very knowledgeable about what we  
4 need to do and we want to do that, and I could  
5 tell you if you're in this business for the long  
6 haul, the last thing you want to do is build  
7 anything that's not in full compliance and meets  
8 the highest safety standards that are out there.

9 So I really -- I think some of the  
10 environmental issues are big issues, and those can  
11 be kind of inflection points on a large project.  
12 I think there's also a lot of -- maybe for lack of  
13 a better term "not in my backyard issues." Those  
14 are always big, and I understand those.

15 But at the end of the day, if you're  
16 really targeted something that's for the greater  
17 good, it's got to be in somebody's backyard, and  
18 so trying to find the least bad path is the  
19 exercise, and that can be a bit of a juggling act.  
20 So anyway, I'll stop there and let somebody else  
21 comment as well.

22 MODERATOR KELLEY: Shelley, I skipped

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1 you. Did you care to comment?

2 MS. CORMAN: Well, I agree. I have made  
3 some notes along those same lines. I think that  
4 there's not really anything wrong with the FERC  
5 certificate process. There's a lot of  
6 opportunities for early stakeholder participation  
7 and for early comments. I think it's really just  
8 continuing to focus on how to make those things  
9 more productive.

10 You know, whether it's landowners,  
11 whether it's state agencies. The more information  
12 the pipeline company has early in the process, the  
13 better, the more successful the process, the  
14 happier all the stakeholders. So we really need  
15 to -- you know, pipelines already have those  
16 activities, and we really need to focus on what  
17 gets that information brought into the process  
18 early.

19 I do think there's a bias now for people  
20 that have an agenda against the infrastructure, to  
21 kind of sit back in the weeds and throw zingers  
22 into the process later on, and we need to figure

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1 how to really reward the participants, whether  
2 it's someone with environmental issues, landowner  
3 concerns that come forward early, early when you  
4 still have the time to reroute the project early,  
5 when you can make accommodations.

6           The processes, the FERC process requires  
7 you to consider alternative routes. That's a more  
8 effective part of the process early in the  
9 stakeholder, and I think that going forward, this  
10 is a more of a concern with social media, with  
11 blogs, with other things that create folks that  
12 don't want to help have productive infrastructure  
13 stakeholder processes.

14           You know, it's really -- it behooves  
15 everyone in the industry to figure out how to give  
16 the voice to the folks that meaningfully want to  
17 participate.

18           MODERATOR KELLEY: Thank you.

19           MR. MILLER: And maybe another comment.  
20 One last thing to build on Shelley's comments  
21 there, and I mentioned this in my overview. But  
22 it's an extremely complex process, and we just --



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1 we absolutely need to have those kind of rules of  
2 thumb, kind of the FERC issue some rules of thumb  
3 on projects.

4           When they don't really call the shots,  
5 it's hard to keep everybody on that time line.  
6 The current time lines that we have, those rules  
7 of thumb, those are fine. If people are coming  
8 forward early, we can get the right work done  
9 within those time frames, and then these projects  
10 can get done.

11           Really, it's an issue of -- from a  
12 consumer standpoint, it's an issue of missing  
13 heating seasons, and there's been a huge outcry  
14 about hey, we need more infrastructure in the  
15 Northeast. But we have billions of dollars of  
16 projects, not just the one that I showed you here.  
17 We've got a long list of projects that we're  
18 pursuing, to address those very issues.

19           But we don't have everybody playing from  
20 the same rule book. So I know the FERC has their  
21 hands full, but I think that if there's a lead  
22 agency that's got rules of thumb, and there's some

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1 accountability for the other parties to live up to  
2 the time line, then I think this whole thing  
3 works.

4           Then it's easier -- it's easy to  
5 explain, like I just did. It's really hard to  
6 implement it. So I'm not saying it's simple but -  
7 -

8           MODERATOR KELLEY: Thank you. May Va,  
9 did you have a comment?

10           MS. LOR: Just one. The partnering  
11 process that we were talking about and that I was  
12 talking about specifically is the cross-border  
13 permitting process, and we know that it has taken  
14 a very long time. Not as long as Rockaway. I  
15 didn't know that that took five years, but we may  
16 actually go past, keep them maybe past that time  
17 line.

18           So I think that we think that it just  
19 makes sense. It's good, it's prudent (inaudible),  
20 it's prudent policy and that it makes sense to  
21 (inaudible) when that process is transparent, when  
22 it's consistent, when it's equitably applied. So

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1 that's -- we believe that path is one that can be  
2 improved, should be improved immediately.

3           Secondly, I don't think that having a  
4 clear process and a transparent process is at odds  
5 with safety at all, because the more transparent  
6 the process is, the more -- first the more likely  
7 you are to have some public, you know, input.  
8 You're more likely to build public confidence, and  
9 you're more likely to troubleshoot from the issues  
10 that you may not have known about prior to  
11 permitting.

12           So and it seems like the pre-filing  
13 process and the FERC process has actually helped  
14 facilitate that. So we would just urge greater  
15 transparency in all sort of permitting and siting  
16 applications.

17           MODERATOR KELLEY: Thank you. Kris.

18           MR. EVANTO: Yeah. I don't really see a  
19 big connect between safety and permitting per se.  
20 Safety is our number one concern, but we generally  
21 operate in an unregulated sector. I mean our --  
22 I'd say less than four percent of our pipe across

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1 the U.S. is regulated, and as a proven operator in  
2 this country we decided that we're going design  
3 and construct all of our facilities, you know, to  
4 meet DOT standards.

5           With regards to permitting, again being  
6 an unregulated by FERC, jobs are something we deal  
7 with. It's more of the state permit, you know,  
8 related to (inaudible) sediment control and then,  
9 you know, federal permits related to crossings.  
10 So you know, again time line commitments would be  
11 great for us. Again, it's the unpredictableness  
12 behind, you know, when you file, when you're going  
13 to get it back that really affects us.

14           And then just some other things too.  
15 You know, when you look at endangered species and  
16 there's guidance, but they're not requirements.  
17 When those come out in say in the middle of a  
18 year, that makes it very difficult to -- you know,  
19 we've made commitments for, you know, 2014 and  
20 2015, and then some recommendations come out.

21           It makes it difficult to, you know,  
22 manage those expectations, you know. We want to

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1 do the right thing and follow those. But when  
2 they come out, like I said, sort of mid-year  
3 recommendations and then you may or may not have  
4 to do this towards the end of the year, that  
5 uncertainty makes it difficult for us to plan our  
6 development.

7 MODERATOR KELLEY: Thanks Kris. Jim.

8 MR. SULLIVAN: So you know, no one here  
9 wants to sacrifice safety, but you know, as just a  
10 little consumer with a little company in New  
11 England, and there's been so much conversation  
12 here this morning, let me just add a little bit of  
13 a fine point to it, and why someone like me wants  
14 to see the process sped up with regard to  
15 regulation, and whether that's an initiative of  
16 the administration, the FERC, the Department of  
17 Energy, the Congress, the idea of the polar  
18 vortex, and it's been discussed here this morning  
19 three times.

20 It's that date you had up on the slide  
21 there, \$120 gas. I think that was somewhere  
22 between January 21st and January 27th of this

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1 year, and that led to market prices on a megawatt  
2 hour for energy in New England were over \$400. At  
3 some points, they reached \$800 a megawatt hour.  
4 That same kind of thing happened on July 2nd. Gas  
5 was at an elevated level, and energy was about  
6 \$375 a megawatt hour.

7           This year, the peak on the Algonquin  
8 system in New England was not in January; it was  
9 in March, and yet in our little distribution  
10 company in Norwich, Connecticut, there were no  
11 curtailments that we experienced at any point in  
12 those times.

13           What's being lost there is a whole lot  
14 of economic activity, because the adverse economic  
15 impact in New England over the last two years has  
16 approached \$10 billion. You can put a lot of pipe  
17 in the ground for \$10 billion, and that money is  
18 going out the window in terms of increased gas  
19 prices and increased electric costs, and none of  
20 us can explain it, other than to the extent that  
21 we're trying to deliver gas in New England in a  
22 garden hose, and we need to speed up the process

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1 to get more infrastructure in the ground.

2           MODERATOR KELLEY: Thank you. So in the  
3 last panel, I asked a similar question. I'll ask  
4 this one. Kris, I think you touched on this, that  
5 the differences between state, local and federal  
6 government regulations and I'm curious to know.  
7 Do you have specific recommendations for the  
8 federal government here, relative to this  
9 particular challenge?

10           MR. EVANTO: I don't know if it would be  
11 a recommendation, I mean just -- you know, just  
12 the knowledge or the awareness that it happens,  
13 you know. I might, you know, in one county in  
14 Ohio, you know, cross 13 or 14 townships, of which  
15 each require something different.

16           A lot of those meetings, you know, they  
17 only meet monthly and if not, if that advisor sets  
18 something and they cancel. So it may be two or  
19 three months before you can even get your  
20 opportunity to speak. So again, it's really to me  
21 the predictableness of this situation.

22           MODERATOR KELLEY: So being aware of the

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1 challenges?

2 MR. EVANTO: Yeah.

3 MODERATOR KELLEY: Anyone else care to  
4 comment about the role of the federal government  
5 relative to those disparities in regulation?

6 (No response.)

7 MODERATOR KELLEY: No. So I'm curious.  
8 In previous QER discussions, we've dealt with the  
9 electric grid, and one of the topics relative to  
10 security is cybersecurity specifically. I'm  
11 curious on the natural gas infrastructure.

12 Is that something that's being  
13 addressed? Do you see it as a challenge, and do  
14 you see again a role for the federal government,  
15 as it pertains to cybersecurity for the gas  
16 infrastructure? Shelley, you want to start us  
17 off?

18 MS. CORMAN: Not my area of expertise,  
19 but certainly within our trade association, we  
20 have a group of folks that's very focused on  
21 cybersecurity, and yes, it is very much a concern  
22 in our industry as well. Whether it's our control



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1 system, securing our control systems; whether it's  
2 access to our compressor facilities and equipment  
3 there, either remotely or even on a physical  
4 level.

5 I mean we face those same challenges and  
6 attacks, and know, you know, our pipeline  
7 companies across the industry are in communication  
8 of the kinds of challenges that they're facing.  
9 So yes, it's an area of focus, but I don't have a  
10 specific recommendation.

11 MODERATOR KELLEY: Sure. Rory, any  
12 thoughts? I see you nodding.

13 MR. MILLER: Yeah, I agree with what  
14 Shelley said. But I will tell you, that is a deep  
15 subject, and if you're not extremely well-versed  
16 in the minutiae of it. As Shelley said, and I was  
17 at the INGA (ph) board meeting last week, and  
18 there was a joint meeting with the NGSAs as well,  
19 and it was a big topic.

20 Each of our member companies have got  
21 our kind of subject matter expert teams plugged  
22 in. We're trying to share across member

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1 companies, and really take the benefits of the  
2 lessons learned and spread them around to all of  
3 the companies. I know that the attacks come  
4 daily, but we've got really good shields and the  
5 statistics are a little daunting if you actually  
6 start to look at them.

7           But if you have good defenses, I don't  
8 know of any penetrations we've had. But there are  
9 a lot of things that are pinging on your system  
10 every day, that --

11           MODERATOR KELLEY: So but do you see the  
12 federal government as having a role in some way?

13           MR. MILLER: I don't know. It seems to  
14 me to being address fairly well. Almost related  
15 to the last question, what could -- and the last  
16 question, what could the federal government or the  
17 FERC be doing? Right now there's a lot of focus  
18 on the gas day issue, and it seems to be, you  
19 know, we've got a little bit of a cold in the  
20 Northeast on the gas day issue, and we're going to  
21 give penicillin to the entire country.

22           That's sucking up a lot of time and

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1 resource right now. I don't know that that's  
2 going to really drive a huge change for our  
3 industry. If you look at something like the  
4 permitting issue and siting issues and how do we  
5 handle getting gas to people when they need this,  
6 this call for more, particularly in the Northeast  
7 for more infrastructure, that would be a lot more  
8 fruitful thing to be spending the FERC's time on  
9 right now.

10           Some other people would disagree. Maybe  
11 some of the ISOs and things think that that's a  
12 really important topic, and I know there's some  
13 legitimate issues there. But it's a localized  
14 issue and we're trying to solve it, I think, with  
15 a nationwide answer.

16           MODERATOR KELLEY: Thank you.

17           MR. MILLER: Sorry for dodging that  
18 question and answering another one.

19           MODERATOR KELLEY: May Va, did you have  
20 any comments on this one?

21           MS. LOR: Again, I don't have an area of  
22 expertise in this particular area. But one thing

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1 that I did want to address is security of existing  
2 pipelines, and for those, we know that damage by  
3 third parties is the single largest cost of  
4 pipelines today. So I think, you know, perhaps  
5 there could be more of that, just in terms of  
6 public education, in terms of maybe promoting  
7 (inaudible), or promoting efforts to ensure that  
8 all pipelines, including those that are  
9 unregulated, are encouraged to (inaudible) with  
10 those services.

11

12

13

14 So I think that that helps build, again  
15 public confidence about the security and safety of  
16 pipeline infrastructure.

17 MODERATOR KELLEY: Thank you. Kris.

18 You're going to pass on this one. Jim.

19 MR. SULLIVAN: It was my understanding  
20 that the Department is engaged in a pretty  
21 extensive effort with regard to cybersecurity, and  
22 far be it from me to make any suggestions beyond

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1 those that are developed in the process.

2           MODERATOR KELLEY: Thank you. So we'll  
3 go ahead and wrap it up with one last question.  
4 Again, I'll use the same ones we used last time.  
5 Again, you have the QER task force before you, an  
6 opportunity to give one final suggestion, and  
7 we'll start back with you again Jim at the end  
8 there.

9           MR. SULLIVAN: Probably some urgency to  
10 the effort, at least for those of us in New  
11 England. What you're doing is important. I'm  
12 amazed at times at the lack of outrage, especially  
13 on the part of some of the elected officials that  
14 I see throughout my region of the country, because  
15 at the end of the day, we can sit here and talk  
16 about reliability and safety and good business  
17 practice.

18           There are Americans that need access to  
19 cheap energy to fuel their lives, in every  
20 component of it, all across this country. We need  
21 to figure out a way to deliver this bountiful  
22 resource to those people, so that economic

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1 activity in this country is enhanced.

2 MODERATOR KELLEY: Thank you. Kris.

3 MR. EVANTO: Yeah, I'll just go back to  
4 my original point, you know, the predictability.  
5 You know, we're willing to do whatever we have to  
6 do to safely build these assets and put in this  
7 infrastructure. It would just go a long way if we  
8 had some clear guidance on how to go about that.

9 MODERATOR KELLEY: Thank you. May Va?

10 MS. LOR: I don't want to sound like a  
11 broken record, but I would really encourage the  
12 administration to pass and expedite the process of  
13 approving of the Keystone XL pipeline, and I think  
14 that sends a message to both construction unions  
15 and (inaudible) that there is an appetite to build  
16 that type of infrastructure.

17 MODERATOR KELLEY: Thank you. Rory.

18 MR. MILLER: Well I'm maybe sounding a  
19 little bit like a broken record too, but I think  
20 from Williams' perspective, we're involved in so  
21 much new construction right now, and a lot of the  
22 cries is really to get these new pipelines in and

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1 we're trying to do that. Producers are signing  
2 up, markets are signing up.

3 Pipeline companies are stepping forward  
4 to build the assets for regulated rates of return,  
5 and yet the FERC jurisdictional projects are part  
6 of the federal process. But I can't really say  
7 that it's totally federally controlled, because  
8 parts of it are delegated and I'm sympathetic to  
9 the states needing input.

10 I'm just less sympathetic to maybe a  
11 lack of urgency. If you're not that lead agency  
12 and there aren't maybe any penalties of some sort.  
13 I know there have been several bills brought  
14 forward with penalties in them, and there may be  
15 instances where a project is so controversial that  
16 having hard deadlines and penalties, maybe that  
17 doesn't make sense.

18 But maybe there's a situation where  
19 there's a lead agency, and that lead agency, like  
20 the FERC, governs schedule. If the other parties  
21 aren't abiding by that, then the FERC has a chance  
22 to, you know, kind of assume where we're at is

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1 what we got, so we can bring some urgency to the  
2 process.

3           It's very easy if you're just looking at  
4 one narrow part of the project, to dig your heels  
5 in and say no. Yet, you know, we might have  
6 another polar vortex next winter and the one after  
7 that. I can guarantee you the result won't be  
8 better than it was this year, because the  
9 projects, particularly in the areas that are  
10 constrained like the Northeast, there's nothing  
11 changing right now.

12           The projects are there. The parties  
13 have all stepped forward to underwrite them and to  
14 make those commitments. But we've not -- we're  
15 not clipping through the regulatory process in a  
16 workman-like manner, and the customer is going to  
17 be the party that is left holding the bag, and  
18 that's basically because the process hasn't done  
19 its job.

20           So I think that's big issue. It's the  
21 one that customers are going to notice because  
22 their prices are either going to go through the



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1 roof, or heaven forbid, maybe there's even some  
2 shortages. We can't get enough supply there. The  
3 one thing that we haven't talked too much about  
4 today is this huge change in the fueling of --  
5 fuel for power generation.

6           It was touched on a little bit earlier,  
7 but that is a situation that is very much an  
8 Atlantic seaboard issue. That's where some of the  
9 oldest coal-fired generation plants were, and they  
10 are dropping like flies. On the Transco system,  
11 for instance, we get calls, one or two a week for  
12 new connections, new load.

13           The mix is changing a lot, and so it's  
14 imperative, I think, that we get this process  
15 streamlined, that we get control of it. One party  
16 has control of it and the rest of the parties feel  
17 that urgency to get this done.

18           Otherwise, we're going to be left with  
19 egg on our face, all of us in this industry. So  
20 there's -- we've kind of got a weak link there.  
21 The hard stuff is already happening. So many  
22 countries don't have the luxury of having all the

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1 supply right close to the biggest markets in the  
2 country. We have that, and yet we still haven't  
3 got the job done, to get consumers what they need.

4 MODERATOR KELLEY: Thanks Roy. Shelley,  
5 you want to wrap us up here?

6 MS. CORMAN: Yep. I think the focus is  
7 on how do we get involvement early in the process,  
8 to develop the best pipeline projects, and that  
9 can be looking in the QER, looking at things like  
10 in some states, pipelines have automatic survey  
11 permissions, in some states they don't.

12 You want a pipeline to do all the pre-  
13 investigative work they can, because that's going  
14 to allow them to avoid sensitive areas and avoid  
15 environmental concerns and so forth. You want to  
16 promote involvement. I think that that really  
17 gets to a dialogue in the QER of are there  
18 statutory time lines necessary? Are there time  
19 line commitments by different agencies?

20 I don't know if that's the right idea.  
21 I mean certainly, you know, the FERC's felt like  
22 that is actually an impediment. But you've got to

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1 figure out what, if you want the process to move  
2 more quickly, how do you engage the people that  
3 are willing to roll up their sleeves and work on  
4 solutions, and how do you tell the other people if  
5 you aren't going to participate early and  
6 seriously, then you know, your comments are not  
7 going to be weighed as much in the process.

8           MODERATOR KELLEY: Thank you. So once  
9 again a great group of panelists here. Please  
10 join me in thanking them.

11           (Applause.)

12           MODERATOR KELLEY: Okay. So for those  
13 of you here in the stands still, we do have a  
14 lunch break. We were originally scheduled for  
15 half an hour. We're going to stick to 15 minutes,  
16 because we're running a little bit behind. So for  
17 the third panelists, if you could be up here in  
18 the next 15 minutes, I'd appreciate it. The lunch  
19 is provided by the school, by Carnegie-Mellon. So  
20 thank you for that, and we'll get started here in  
21 15 to 20 minutes.

22           Panel 3

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1           MODERATOR KELLEY: Once we will, after  
2 this panel discussion, we will turn right to the  
3 public comments. So if you haven't already,  
4 please sign up at the front to be a public  
5 commenter. And for everyone's benefit, we do have  
6 a court reporter here today who is transcribing  
7 the events. That's how we're capturing the  
8 comments.

9           So every word and comment you make is  
10 recorded and the Department does it take it  
11 seriously. So I appreciate your understanding,  
12 and if you're joining us by live streaming, please  
13 make sure you send in your comments to  
14 qercomments@hq.doe.gov. So we have our forum  
15 here. It looks like the gang's all here.

16           MP One down.

17           MODERATOR KELLEY: Oh, we're one down?

18           MP Yeah.

19           (Pause.)

20           MODERATOR KELLEY: I'll tell you. In  
21 the interest of time, why don't we go ahead and  
22 get started, and if we need to do a separate

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1 introduction we can. Again, must a reminder that  
2 the views expressed the panelists that are joying  
3 me here are their own views and not the views of  
4 the Department of Energy.

5           So our third panel, the subject is "How  
6 Public-Private Partnerships Can Produce  
7 Sustainable Economic Development Out To 2030 and  
8 Beyond." Joining me here are David Peebles, Vice  
9 President of ASCENT and Senior Director, the  
10 Odebrecht Group; Tom Conway, International Vice  
11 President, United Steelworkers; Dr. Andrew  
12 Gellman, Lord Professor of Chemical Engineering  
13 and Co-Director, W.E. Scott Institute for Energy  
14 Innovation, Carnegie-Mellon University; and is it  
15 Jeff that we're missing?

16           And Jo Sexton, Director of the  
17 Cambridge, Ohio Area of Chamber of Commerce, and  
18 Jeff Herholdt, Director of West Virginia Division  
19 of Energy. So we'll go ahead and get started right  
20 here with David Peebles. Mr. Peebles.

21           MR. PEEBLES: Good afternoon. In the  
22 interest of time, I'll be very brief and I think

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1 what I would like to bring out and I'll repeat it  
2 four times is the ethane value chain, ethane value  
3 chain, ethane value chain.

4           We have been talking a lot about shale  
5 and gas, and we pointed out that one of the  
6 elements called C2 that is found in the area of  
7 the Marcellus is ethane. Ethane is the feedstock  
8 for the plastic industry, and when we think about  
9 the impact on the economy and the impact on what  
10 we call the manufacturing renaissance, ethane is  
11 going to be an essential part of that.

12           The ethane value chain, as you go  
13 downstream, in this region of Ohio, Pennsylvania,  
14 Indiana, West Virginia, we have 60 percent of our  
15 nation's downstream manufacturers of plastic  
16 products, whether they be diapers, medical  
17 devices, plastic bottles, etcetera.

18           So we see a very important element here  
19 in the value chain as infrastructure, and why is  
20 that? Everyone previously has shown maps of  
21 pipelines. They are the circulatory system of the  
22 United States energy system. But many of the

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1 pipelines that you look at are more superhighway  
2 pipelines, that are delivering product to the  
3 Gulf, delivering product to the east coast,  
4 delivering product to Canada.

5           In the area of ethane pipelines, we have  
6 the same phenomenon taking place, where some of  
7 the ethane pipelines are delivering product to the  
8 Gulf, delivering it to Canada and delivering it to  
9 the east coast for export. If we are to have a  
10 regional renaissance, if we are to have a  
11 strengthening of the manufacturing capabilities  
12 here in this area, we need what I call off ramps.

13           If we built the interstate highway from  
14 Boston or Washington or New York to California and  
15 had no off ramps, we would not have a developed  
16 country. So we need to think in terms of our  
17 infrastructure priorities, and I'm not sure that  
18 this can be managed or directed by the federal  
19 government.

20           But we do need to have attention to the  
21 ethane pipeline situation, where we have de-  
22 ethanizers who are able to deliver within the

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1 region. Where do they deliver their ethane to?  
2 They deliver it to crackers. Crackers are very  
3 important. They are the thing that transfer the  
4 ethane into ethylene and to polyethylene, which  
5 would be the feedstock for these industries.

6 From a policy point of view, this is  
7 certainly a challenge, and I think it is a  
8 challenge from what we call a public and private  
9 cooperation. We have had extraordinary  
10 cooperation from the states of West Virginia in  
11 our projects. We are building a stronger  
12 understanding among the downstream stakeholders in  
13 Ohio and Pennsylvania, as to the potential of  
14 crackers, whether they be built in Ohio or in  
15 Pennsylvania or in West Virginia.

16 But if we do not have an understanding  
17 of the need for the off ramps or the need for the  
18 local infrastructure or regional infrastructure  
19 and not just manage, whether it's through a  
20 regulatory point of view or through best  
21 practices, the ability to have delivery into the  
22 region, we're going to miss a big manufacturing



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1 opportunity.

2 I personally am very optimistic. I was  
3 reflecting today on the role of the federal  
4 government in policy initiatives, and I'm sure  
5 everyone has a list of the top 15 or top 10 or the  
6 top 5. But I would certainly start with the Bill  
7 of Rights. I would start next with the Louisiana  
8 Purchase. I would think about the Homestead Act,  
9 I would think about the Morrill Act that created  
10 land grant colleges.

11 I would think about the Intercontinental  
12 railroad and certainly the Emancipation  
13 Proclamation. These last four were all under the  
14 Lincoln administration. I would jump forward to  
15 the Wagner Act of Roosevelt, which allowed the  
16 labor unions to really interface with private  
17 sector and come to consensus on labor practices.

18 I would look at the GI Bill of Rights, I  
19 would look at certainly the Marshall Plan. I  
20 would look at Eisenhower's interstate highway  
21 system, which was done under the National Defense  
22 Act. I would certainly put in the NASA program

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1 and the civil rights legislation of the Johnson  
2 administration.

3 I would put in the EPA of Nixon and I  
4 would put in the NAFTA of the -- I don't remember  
5 whether it was the Carter or Clinton  
6 administration. All of these were significant  
7 events in our nation's history, and they were a  
8 result of policy initiatives by the federal  
9 government.

10 If you look at the Intercontinental  
11 railroad, many people thought it talk about  
12 railroad barons who put this through and grabbed  
13 land and just built however they wanted. But that  
14 foundation was laid by the Corps of Engineers and  
15 a lot of topographical studies and route alignment  
16 studies.

17 I think what we can hope for from the  
18 Department of Energy would be, as one of our  
19 panelists said here before, this fact-based  
20 approach to all of this. We do have, to create  
21 consensus among public and private stakeholders,  
22 we have to have dialogue. We have to have some

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1 level of consensus, and if we don't get into the  
2 fact-based world, we simply remain in rigid  
3 positions.

4           So again, our point of view for regional  
5 development, and I think of the Midwest, and it's  
6 God's gift to -- Napoleon gave to the nation,  
7 because of his war-like need for money. He sold  
8 us at a very low price the whole Louisiana  
9 Purchase, which if you reflect on it, it's from  
10 the Rockies really to the Appalachians was French  
11 territory at one time.

12           We had inherited -- that's where our  
13 shale plays are, and hopefully we can optimize  
14 this resource that we have before us. Again, if  
15 we think about in the particular case that I'm  
16 advocating some attention, is the ethane value  
17 chain. Thank you.

18           MODERATOR KELLEY: Thank you. Tom.

19           MR. CONWAY: Well David, I had never  
20 thought of Napoleon as the father of the shale gas  
21 revolution. Let me tell you a little bit about  
22 steelworkers, and then I want to talk about just

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1 really two issues. We're the largest  
2 manufacturing union in the country, and our focus  
3 is not just in steel.

4           It's a name we've kept through a series  
5 of mergers, and so we've merged with the old oil,  
6 chemical and atomic workers and we represent  
7 workers in all the refineries around the country,  
8 do all the pipeline work, a lot of pipeline work.

9           We represent the workforce at companies  
10 like TMK, who was on the earlier panel, as well as  
11 pipe companies across the country. We have the  
12 metals and the mining industries, glass, aluminum  
13 and it's a broad spectrum that we sort of look  
14 across, and spend a lot of time on trade issues.

15           They're difficult issues, they're  
16 difficult particularly in terms of energy issues,  
17 and the trade things that we're faced with. This  
18 morning you heard Congressman Murphy and again the  
19 panelist from TMK talk about this issue of the  
20 pipe, and the controversy that's sort of currently  
21 going on. But there's a bit of a longer back  
22 story to it, and I think it's important for the

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1 QER and actually a lot of people understand how  
2 this story comes together, and how much  
3 opportunity the U.S. is missing, because we have  
4 not coupled up our energy policy and our trade  
5 policies and a lot of other policies.

6           And particularly in trade, you can have  
7 Department of Commerce, Department of Energy,  
8 Transportation, all off doing something, but trade  
9 sort of sits out on the side, and no one pulls it  
10 together and links it in with what's going on. If  
11 you're going to have a comprehensive energy policy  
12 in America, you ought to know where your products  
13 are coming from.

14           Frankly right now, the U.S. isn't very  
15 smart about where it's coming from, or we're  
16 always playing catch up. So when the shale play  
17 first takes off, and in 2007-2008, that period of  
18 time, even given the depths of that recession, the  
19 Chinese step into the energy market in the form of  
20 pipes, what you heard referred to this morning as  
21 oil country tubular goods.

22           That's really just a bunch of pipes,

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1 large diameter, small diameter, pipe transmission,  
2 gas and oil transmission, down hole piping, and  
3 they flooded the market with it and caused  
4 thousands and thousands of layoffs in America, and  
5 the shutdown of pipe mills from Texas to  
6 Pennsylvania.

7 Americans are out of work, and the pipe  
8 that's coming in and not all exclusively China,  
9 but largely China and in particular China, because  
10 where they reached agreements with the U.S. to  
11 join their WTO and ascend into a partnership, a  
12 trade partnership, they continually cheat at it,  
13 and they've dumped their product.

14 They dumped their product at a cost  
15 that's cheaper than it takes them to make it, just  
16 to gain the market share, to gain a toehold. So  
17 we are forced to go into the courts, file  
18 petitions, go through the Department of Commerce,  
19 go through the International Trade Commission,  
20 finally prove our case, that China is cheating,  
21 and tariffs are put on the Chinese pipes.

22 It sounds quite protectionist, but

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1 you've got to remember, they're cheating. That's  
2 not what they said they would do, and they go off  
3 and do it and they capture a big portion of the  
4 market, and cause a lot of pain to a lot of  
5 Americans, and particularly to a lot of companies  
6 who have invested billions of dollars to prepare  
7 for the shale plays, and now the market's gone on  
8 that.

9           So as soon as the tariffs go in place,  
10 so do the Chinese and their pipes, and within a  
11 year, it pops up again in Korea. So now in the  
12 last year, Korea has flooded the market. No one  
13 in Korea is using one inch of oil country tubular  
14 goods to drill in that country. But they have put  
15 up mills solely for export base.

16           So into this energy market now come all  
17 these Korean pipes, and the week before last  
18 Friday, we finally got a determination out of the  
19 Department of Commerce that has a range of tariffs  
20 on it, from 10 to 16 percent. Sixteen percent is  
21 real money when you're in business, trying to  
22 supply equipment to an industry like this one.

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1           So it will go through another process.  
2 But from the time that -- I mean here's sort of  
3 the tricks that happened. We filed that case in  
4 February, and until the determination a week and a  
5 half ago, this market got flooded with pipe,  
6 because they knew the determination would be  
7 coming.

8           So you have to sort of unload your pipe  
9 and get it into the market and get it into  
10 warehouses and get it into inventory here in the  
11 U.S. So now the inventory ledge, the overhang,  
12 will take a long time to burn off.

13           We see this happen a lot in energy  
14 policy. We saw it happen in the early days of the  
15 wind industry, where the U.S. wasn't prepared to  
16 do much other than stand up and erect wind farms.  
17 It didn't really have the capacity to build the  
18 supply chain and build out the infrastructure to  
19 build the equipment.

20           We saw it in solar, and it took a long,  
21 long time for the U.S. to sort of bring itself up  
22 to speed, to have a structure in place, to really



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1 add value into jobs and communities with strong  
2 manufacturing bases, and instead -- and so we're  
3 here to sort of urge the QER that you've got to  
4 find a way to couple these various entities  
5 together, the Office of the USTR, some sort of  
6 policy on manufacturing supply chain, particularly  
7 on public-private partnerships that are going to  
8 go together in --

9           Where U.S. taxpayer dollars are going  
10 into projects, and Americans are losing their jobs  
11 because America's trade laws aren't being  
12 enforced, really just seems so counterproductive  
13 and just so wrong at so many levels.

14           So the other only topic I'd comment on  
15 while we're here is we hear a lot of discussion,  
16 we've heard a lot today about the growth of the  
17 potential for export of LNG, and we understand  
18 that, and we understand the delta between the  
19 prices, between what can be gained in other parts  
20 of the world and what natural gas is trading at  
21 here.

22           But you also heard the Secretary say

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1 that there's a potential \$200 billion growth in  
2 manufacturing as a result of the work that's going  
3 on here, and that liquid natural gas export in a  
4 way is our resource. Under our current rules,  
5 under our current laws, we are compelled where  
6 we've reached a free trade agreement with another  
7 nation, to export that LNG.

8           There's nothing new about that. That's  
9 been on the books forever. Our union is not so  
10 sure it's a great idea, at this point in time, to  
11 expand that export potential and ship that  
12 resource that we now have a comparative advantage  
13 off to other countries, so they can make something  
14 and ship it back here. We think that needs to be  
15 a thoughtful discussion.

16           MODERATOR KELLEY: Thanks, Tom. Andrew.

17           DR. GELLMAN: Let me follow up a little  
18 bit on certainly what David Peebles talked about,  
19 and that is the value of ethane and the wet  
20 components that are in natural gas.

21           So let me start by sort of going back a  
22 little bit and figuring out how did we get here,

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1 and pointing out that the reason that we're here  
2 today is because 20 or 30 years ago, a lot of  
3 people who were very visionary and decided to  
4 invest their careers and their time into the  
5 development of technologies that allowed us now to  
6 reap the reward of shale gas.

7           So these are the people who believed the  
8 fractionating could be used to get or extract  
9 methane and natural gas out of shale, people who  
10 developed horizontal drilling that allow us to  
11 access it. So those people were visionaries; they  
12 took risks. We have to do something the same.

13           We have to be visionary, we have to  
14 think long term. We have to be willing to take  
15 risks, and ultimately in order to reap the  
16 greatest benefit of this natural resource.

17           So what is the path forward that might  
18 lead to that? I think, as clearly my colleagues  
19 here do, that the use of the wet components in  
20 natural gas as the basis of natural gas-based  
21 chemical industry is one of the methods or  
22 pathways that will lead most probably to the

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1 greatest reward to U.S. society.

2           Natural gas, the wet components, can be  
3 used to make plastics, rubbers, textiles, fuels,  
4 solvents, all the things on which our modern day  
5 life depend. They all have far more value than  
6 natural gas. So we're in this enviable position  
7 of deciding what to do with natural gas. We can  
8 burn it to make heat and electricity; we can sell  
9 it to make money, or we can think long term and  
10 try to use it to make chemicals.

11           The way this works is that the ethane  
12 and the propane that are in the natural gas,  
13 especially the natural gas that's here in the  
14 Marcellus shale field, are quite plentiful and  
15 they have much higher value than the methane  
16 itself. You can take ethane and propane and  
17 convert them to ethylene and propylene, and those  
18 are the feedstocks for the chemical industry  
19 today.

20           The conversion process is cracking.  
21 It's well-known, the technology exists, it's  
22 practiced all across the planet, and we could

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1 practice it here. Extract natural gas clearly is  
2 creating jobs in the U.S. already.

3           Converting the wet components to  
4 chemical feedstocks will create even more jobs.  
5 Taking those feedstocks, using them to create  
6 chemicals will create even more jobs, and in  
7 allowing the U.S. manufacturing industry access to  
8 cheap energy and cheap locally-produced chemicals  
9 and materials is a win for everybody.

10           So what are the infrastructure needs?  
11 So they're clearly quite different from the  
12 infrastructure needs that have been talked about  
13 so far. The upstream and the midstream  
14 infrastructure needs have been covered. The  
15 infrastructure needs for a downstream processing  
16 of wet components of natural gas really begin with  
17 the crackers, that have been discussed already.

18           As I mentioned, the technology exists.  
19 The problem is they're big, they're expensive. IN  
20 order to facilitate their creation in the U.S.,  
21 maybe in this region, we need industry  
22 partnerships with the government or with the

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1 public sector in general, to incentivize the  
2 building of crackers here.

3           Once that's done, the rest of it is  
4 almost easy by comparison. What is the path to  
5 the long-term benefit? Well, it's quite clear  
6 that we could seize the opportunity to use natural  
7 gas as much more than just a cheap source of  
8 energy. What we need to do is to recognize that  
9 shale gas exists around the world. Wet shale gas  
10 exists around the world.

11           We have competition. We're in a  
12 position where technology and methodology  
13 developed in the U.S. put us in this enviable  
14 position of having options. We need to recognize,  
15 such as was just mentioned, and we need to be the  
16 first to market with these technologies that  
17 improve natural gas processing to produce  
18 chemicals.

19           But then in the long term, we always  
20 need to stay ahead of the market, and that  
21 requires technology development. It requires  
22 research into developing improved processes for

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1 natural gas conversion, through use of state-of-  
2 the-art modeling and optimization, process  
3 optimization methods.

4           As I mentioned, ethane and propane are  
5 easy to work with. Methane by comparison is a  
6 tougher nut to crack and we need to figure out how  
7 to do it. It can be done, but not efficiently.

8           Finally, we need to invest in research,  
9 not just into the economic processes or the ways  
10 of making money, but into state-of-the-art  
11 environmental monitoring, processes and methods  
12 for minimizing human health impacts of natural gas  
13 and all the processes that are incumbent or that  
14 arise from it.

15           Ultimately, though, this resource can be  
16 used to underpin the renaissance in manufacturing  
17 in the United States.

18           MODERATOR KELLEY: Thank you, Andrew.  
19 Jeff.

20           MR. HERHOLDT: Good afternoon. I'm Jeff  
21 Herholdt, Director of the West Virginia Division  
22 of Energy. We're part of the West Virginia

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1 Department of Commerce, and these are comments  
2 related to the partnership theme.

3 West Virginia is an energy state with a  
4 population of just 1.8 million. We contribute  
5 significantly to our nation's energy needs. We  
6 are number two in coal production, number four in  
7 net electricity exports, and are number ten in  
8 natural gas production. When we speak of  
9 electricity, the state of West Virginia exports 60  
10 percent of the electricity we generate.

11 We're also, interestingly enough, number  
12 three in forest cover behind Maine and New  
13 Hampshire. For more than 80 years, the world's  
14 leading chemical companies have focused on West  
15 Virginia. The West Virginia chemical industry  
16 directly employs 10,000 individuals, our largest  
17 manufacturing sector.

18 Only the coal industry, with 17,000  
19 employees, is responsible for more jobs in the  
20 state. With 8.2 billion in annual sales and \$714  
21 million in local wages, the value of the chemical  
22 sector to West Virginia's economy is easily



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1 appreciated.

2           With the liquids-rich shale content of  
3 West Virginia's Marcellus and Utica shale plays,  
4 West Virginia is returning to its chemical  
5 industry roots. The first commercial ethylene  
6 plant was established in Clendenin, West Virginia  
7 in 1920. This has been regarded as the start of  
8 the petrochemical industry. The production that  
9 several ethylene-based chemicals was begun by  
10 Union Carbide in South Charleston in 1923.

11           This industry, under Union Carbide's  
12 leadership, fostered a world class technology park  
13 in South Charleston, West Virginia. After Union  
14 Carbide's merger with Dow, the technology park was  
15 discontinued. With the support of the principal  
16 researchers at the park and state government  
17 MATRIC, the Mid-Atlantic Technology, Research and  
18 Innovation Center was formed.

19           MATRIC was established to preserve the  
20 science and engineering talent recruited to the  
21 Charleston area by the chemical industry. Another  
22 industry-government partnership is the Chemical

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1 Alliance Zone or CAZ. CAZ was created in 1999 to  
2 channel and leverage efforts to strengthen West  
3 Virginia's chemical industry.

4 CAZ is a non-profit collaborative of  
5 citizens, labor leaders, educators, government  
6 officials and chemical industry executives and  
7 business leaders.

8 A third business-government partnership  
9 focused on the chemical and related sectors is the  
10 Polymer Alliance Zone. PAZ was created in 1996 to  
11 recognize and advance the polymer-based industries  
12 located in West Virginia. This industry  
13 association was established by the state of West  
14 Virginia through executive order.

15 The multi-county recognized as the  
16 Polymer Alliance Zone has one of the highest  
17 concentrations of polymer production in the world.  
18 Considering our history, expertise and established  
19 partnerships, the liquids-rich shale development  
20 in West Virginia was quickly recognized as a  
21 tremendous job and value-added opportunity.

22 Government Earl Ray Tomblin and the West

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1 Virginia Development Office launched a concerted  
2 effort to attract ethane cracker plants to West  
3 Virginia. West Virginia has received multiple  
4 responses from our recruitment efforts. The  
5 progress that has advanced the furthest is a  
6 tentative commitment from Odebrecht, on our panel  
7 here today, to build a petrochemical complex in  
8 Wood County.

9           This complex would consist of an ethane  
10 cracker, three polyethylene plants and associated  
11 infrastructure for water treatment and energy co-  
12 generation. This project is term ASCENT,  
13 Appalachian Shale Cracker Enterprise. Though  
14 Odebrecht has not formally committed to the  
15 project, they have purchased a property for the  
16 site and are receiving ethane supply commitments.

17           In economic development, the public-  
18 private partnership that is most important is the  
19 partnership between the host state and the  
20 corporation that selects it. We are committed to  
21 walking the mile in their shoes to understand the  
22 requirements of businesses wanting to locate in

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1 West Virginia.

2           Projects as large as those being  
3 discussed here today are complex. They have a lot  
4 of moving parts. Are issues are resolved, we move  
5 closer to a former project announcement. Shell's  
6 Appalachian cracker project in Pennsylvania and  
7 West Virginia's ASCENT project represent  
8 departures from the traditional ethane clean  
9 government projects.

10           Since the early days of Union Carbide's  
11 presence in ethylene, our regional ethylene market  
12 has migrated to the Gulf Coast. The employment  
13 and value-added benefits of polyethylene  
14 production accrue at the southern end of the  
15 pipeline. The unprecedented production levels of  
16 natural gas and associated natural gas liquids  
17 from our regional shared sources want valuated  
18 economic development in our backyard.

19           Diversifying the location of the  
20 polyethylene industry will benefit more local  
21 economies, and make the U.S. chemical industry  
22 more resilient. West Virginia has committed to

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1 Odebrecht to assist with ASCENT as needed. With  
2 the recent declines in our nation's manufacturing  
3 sector, and opportunity to add significantly to  
4 West Virginia's workforce is treated as the  
5 highest priority.

6 Adding increased value to West  
7 Virginia's natural gas production is also a  
8 driving force to make this project happen.  
9 America needs good jobs and a secure energy  
10 future. Economic development fostered through  
11 fossil energy resources is not replicable in all  
12 states.

13 But the states that are gathered here  
14 today can capitalize on fossil energy resources  
15 within their borders for the benefit of the local  
16 economy and our nation as a whole. Thank you.

17 MODERATOR KELLEY: Thank you, Jeff. Jo?

18 MS. SEXTON: Good morning or good  
19 afternoon, and thanks for inviting me. I'd like  
20 to give more of a micro perspective from  
21 Cambridge, Ohio in Guernsey County. I'm glad to  
22 see West Virginia's here and now we've got Ohio.

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1 I'm the director of the Chamber of  
2 Commerce in our county, 40,000 people. Our town  
3 has about 11,000 and for the last three years we  
4 have been working diligently to embrace the gas  
5 and oil industry, and I'd like to tell you a  
6 little bit about how we've done that.

7 We are in the Utica. We have some  
8 Marcellus there, but we're primarily Utica, and we  
9 have a pickle shape of the Utica in southeastern  
10 Ohio. So we say we're in the pickle, and we have  
11 many counties who are -- that are involved in the  
12 Utica and have well over 100 wells permitted, and  
13 the background of our area is really glass  
14 production, which was brought there to produce  
15 glass with the coal-fired ovens.

16 The first thing we did when we learned  
17 three years ago what was coming our way was work  
18 very closely with Williamsport, Pennsylvania and  
19 some people involved in the industry there, both  
20 on the Chamber of Commerce and in local companies,  
21 to learn really what was going to happen and how  
22 we were going to be able to deal with it.

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1           So we spent a lot of time, per their  
2 request or per their advice, educating ourselves.  
3 So we formed a Guernsey County energy coalition,  
4 and within about six months we had 200, over 200  
5 members. We have met every month for three years,  
6 and I bring in speakers on the industry, who  
7 really instruct and advise and educate our chamber  
8 members on the gas and oil industry and with  
9 different components of it.

10           We held some conventions in Cambridge,  
11 some seminars, and really spent a lot of time on  
12 the educational component. We felt that that was  
13 really valuable for our Chamber members to be a  
14 part of, and they are the only ones that attend  
15 these meetings.

16           However, we've partnered with our local  
17 media, and the local media records every one of  
18 these sessions, and plays them on local television  
19 for the general public. We think has had a huge  
20 impact in our county, because we know that in  
21 order to make this successful for our economy, we  
22 need to embrace the industry and understand it and

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1 have a deeper knowledge of it.

2           And so we feel that it has reduced the  
3 controversies that sometimes come with it. It's  
4 helped everybody understand how the industry works  
5 and how we can make the best out of it.

6           We also have partnered with the media,  
7 and they present some gas and oil publications,  
8 some articles in the paper which educate also.  
9 One of the most recent things that has been huge  
10 for us is the Ohio State University extension has  
11 contacted our county, and we have about 40 people  
12 who are working on a long-range plan.

13           We've been through enough booms and  
14 busts in our country, that we want to make sure  
15 that we have long-term sustainable growth with  
16 this industry. So the extension has offered put a  
17 template together using our people, that they can  
18 then go sell and promote in other counties and  
19 communities around the country.

20           So we are in the midst of putting that  
21 long-range plan together right now, and we have  
22 all the key leaders in the community working on



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1 this. We think that this is the right way to go,  
2 and we can leave a template for how other shale  
3 plays in other communities handle the shale plays  
4 in their areas.

5           We think the biggest component of this  
6 is education, and we feel like we've really  
7 learned a lot about the industry, and we've seen a  
8 lot of growth and partnerships because of that.  
9 We have partners with local colleges and  
10 universities also, to develop workforce  
11 development.

12           MODERATOR KELLEY: Thank you. So once  
13 again, let's turn to our discussion here for the  
14 panel. My first question, I've heard some  
15 conversation about the crackers and the technology  
16 there. But there's been little investment in  
17 crackers, because using the local feedstocks from  
18 the Marcellus shale. It's sent down to the Gulf  
19 for processing.

20           Can you talk a little bit about the  
21 market influences locally here or nationally that  
22 could affect this and expand maybe a little bit

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1 upon the role of the federal government in  
2 influencing the market, in a way that might make  
3 this a little bit more efficient.

4 MR. PEEBLES: Well, the market is  
5 influenced by strategic decision, and I want to go  
6 back to the fact-based issue. If you look at a  
7 lot of national studies from Wall Street, there's  
8 a Gulf-based prejudice. They have a bias. We're  
9 talking about the infrastructure in place, the  
10 labor situation. They say there's no skilled  
11 labor here in the Northeast. They say there's no  
12 infrastructure.

13 Now this influences in a very subtle way  
14 banking and investment decisions. So but from a  
15 positive point of view, if we look at what the  
16 shale revolution has done here, we ourselves are  
17 investing in a cracker in Mexico. There will be a  
18 first wave of crackers coming in 2015 and 2016.  
19 The most modern facility will be ours in Mexico.  
20 A modernization strategy in the Gulf by four or  
21 five of the majors will bring on the first product  
22 wave of ethane-based polyethylene and

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1 polypropylene.

2           The second wave is going to come from  
3 those that are now investing in crackers, in new  
4 crackers in the Gulf, and hopefully here we have  
5 two or three groups looking at it. Now what do  
6 you have to do? You have to look at the market  
7 and say where, this is a long-term asset play.  
8 This is 40 years, this is 50 years.

9           So you have to look at supply, you have  
10 to look at reserve capability. You have to look  
11 at market, and that's where I get back to the  
12 market. The Department of Energy here can help a  
13 lot by fostering research.

14           We have an enormous talent base here in  
15 Ohio and Pennsylvania and West Virginia, and our  
16 national labs and our universities, and we have to  
17 somehow or another coordinate and focus this  
18 talent base on the R&D necessary, that will lead  
19 our product developers in the industry to say hey,  
20 what can I expect? What are the new formulas?  
21 What are the new methodologies that I can put to  
22 practice in an applied way, and this gets back to

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1 extension and education.

2           So if we're going to take advantage of  
3 this market opportunity, I think we need clear  
4 information about the assets we have here. There  
5 are people in the industry who claim that we do  
6 not have asset reserves sufficient to maintain a  
7 cracker and a commitment for 20 or 30 years. What  
8 they do is they pull out a well profile and say  
9 that a production profile is like this, and then  
10 it tails off, and they don't count the tail. They  
11 just count the hump.

12           When you look at the new technologies of  
13 horizontal and vertical drilling, and you look at  
14 all the maps you saw today of where things are  
15 being drilled. We are confident that there are  
16 reserve levels sufficient. But that's not the  
17 national information being cultivated and  
18 promulgated within some of your research groups.

19           Now are they prejudiced? Maybe. Or are  
20 they ignorant? Maybe. Or have they just not  
21 broken out and delved into the particularities in  
22 this area? You should go to some of the

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1 conferences in the Gulf, and they will tell you  
2 there's a labor situation, you can't build.

3           When we do our own analyses here in the  
4 Northeast, we probably have a better skilled labor  
5 force than the Gulf. We are building in the Gulf.  
6 We have to retail recruitment. Here, we work with  
7 unions and we say we want 40 welders, you get 40  
8 welders. They're drug-free. They've been  
9 processed, and so the message that I would say in  
10 regard to the cracker is the cracker is going to  
11 come.

12           The investment decision is going to come  
13 from good information about your resources, good  
14 information about your labor force, good and solid  
15 information about the research and R&D that you  
16 have available, and let's try to focus and foster  
17 what we call a cluster development.

18           We do not want to develop this asset,  
19 the same way we've done in the past, of an  
20 extractive model. We have to develop a  
21 downstream. That's why I went back to the ethane  
22 value chain. We have to develop and maximize and

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1 optimize what we have here for the benefit of the  
2 people in this region, not somewhere else.

3 MODERATOR KELLEY: Thank you, David.  
4 Tom, any comments?

5 MR. CONWAY: I know that it's good to  
6 have a drug-free welder. Look, I think --

7 MR. PEEBLES: My friend in the Gulf, we  
8 hire ten people, and we lose four because they  
9 can't pass the drug test. It's big deal. It's a  
10 big deal.

11 MR. CONWAY: No, I'm making light of it.  
12 I'm serious. It's good to have a drug-free  
13 welder. Look, I think this is exactly the issue  
14 we face. We had a problem here in Pennsylvania  
15 two years ago. We had a major refinery in  
16 Philadelphia going down, and everybody had  
17 concluded it's a lost cause. It's just going  
18 away.

19 We were able to get a good partnership  
20 together between the administration, the governor  
21 here, a private equity group and the refinery  
22 owner who was sort of working hard to find a way

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1 to step back, and we've got a plan to bring Bakken  
2 into that refinery and it's running fine now.

3           It's doing good, and I think the next  
4 step there can be how do we take care -- take  
5 advantage of sitting on top of this shale play and  
6 doing more in that refinery, and all the  
7 discussions up here with Shell and the cracker up  
8 here in this region too. That was a skilled  
9 worker facility that went down, that is under  
10 discussion of where it's going.

11           So it's incremental. All the discussion  
12 about is the resource here, not in -- you can read  
13 it both ways all the time. But I think step by  
14 step and successes, we've done are successes, and  
15 a refinery we did on the east coast has done it.

16 Really a grand  
17 one for Pennsylvania and I think they'll be more.

18           MODERATOR KELLEY: Thank you, Tom.

19 Andrew, any comments?

20           DR. GELLMAN: Well perhaps to rephrase a  
21 little bit what David said. I would look at it as  
22 an infrastructure problem. So to create the

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1 chemical industry here requires not just crackers  
2 but all the other infrastructure, and  
3 infrastructure action includes people.

4           So it's people and it's consumers of the  
5 ethylene produced by crackers. It's the entire  
6 value chain. The other point I guess that needs  
7 to be said or should be said is that whereas this  
8 morning we heard people imply that they didn't  
9 like the regional solutions to their problems,  
10 this one requires a regional solution.

11           So it really does require local states  
12 and municipalities to get behind this whole  
13 development project, and you know it's the case  
14 that on the Gulf Coast, you have most of this  
15 infrastructure. But you have to make a case for  
16 reinvesting and reproducing that infrastructure in  
17 this region.

18           MODERATOR KELLEY: Thank you. Jeff.

19           MR. HERHOLDT: I think probably the most  
20 important thing the federal government can do with  
21 these kind of developments is just let it happen.  
22 We saw with the Supreme Court ruling on the



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1 Tailoring Act. I mean we were unable to back away  
2 from a requirement that our major industries have  
3 some kind of a CO2 limit.

4 We need to be appreciative of the  
5 relevance of major economic developments in our  
6 economy. We need to husband those assets, you  
7 know, to be kind of frivolous about where our  
8 energy comes from is not in the long -- it's not  
9 in the best interest of the economy of our  
10 country.

11 MODERATOR KELLEY: Thank you. Jo.

12 MS. SEXTON: I'm going to take the  
13 opportunity to talk about drug-free welders,  
14 because I can't address the other issues to that  
15 extent. But one of the partnerships that's been  
16 very valuable for us locally in southeastern Ohio  
17 is a partnership between Pioneer Pipe and a local  
18 career and technology center, and some other  
19 things that are going on.

20 We like the idea of getting people  
21 excited, getting the youth excited about  
22 manufacturing again, and that many youth think

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1 that manufacturing is dirty, all greasy, dark,  
2 dingy places to work. We realized that that's not  
3 the case.

4 So we're trying to, and understanding  
5 the drug challenges and actually the challenge of  
6 a lot of young people who don't want to work very  
7 hard, and trying to get them into the gas and oil  
8 industry, and understanding that they're going to  
9 have to work hard.

10 Trying to start a little earlier, like  
11 in the junior high school level, getting them into  
12 manufacturing firms, getting them exposed to those  
13 areas and how much fun it can be to be in  
14 manufacturing, getting them exposed to the idea  
15 that they can't be on drugs and that they're going  
16 to have to work hard, and try to instill that work  
17 ethic in them early, so that when they get to the  
18 point of being able to have one of these well-  
19 paying wonderful careers, that they're ready for  
20 it. So I just wanted to add that component.

21 MODERATOR KELLEY: Thank you, Jo. So  
22 thinking back to your original opening comments, I

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1 was intrigued and wondered if maybe you guys were  
2 in cahoots a bit, because I heard a history  
3 lesson, and then I heard that turned into an  
4 opportunity for us to be visionary in the future.

5           We heard about some of the technology  
6 that's needed, but my question is is there a role  
7 for the U.S. federal government or other public-  
8 private partnerships? I mean you've touched on  
9 that a bit, but on specific future technologies,  
10 beyond what we've heard so far, if you recall the  
11 panel really is focused on economic, sustainable  
12 economic development out to 2030 and beyond.

13           So can you maybe expand a little bit on  
14 that, technologies that could help us expand  
15 economic development?

16           MR. PEEBLES: Well, if we look at the  
17 polymer industry, and that's a big word but it's  
18 basically plastic, in that it infuses all of our  
19 life from medical devices to diapers to automobile  
20 parts, and there's all sorts of new material  
21 combinations. I would really put the focus on  
22 R&D. The federal government can help in R&D.

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1           If we optimize our existing  
2 institutions, and we give them incentives to  
3 collaborate, we have extraordinary -- this complex  
4 we're in now. If you go over into Ohio, the Case  
5 Western Reserve, the Ohio State University,  
6 Battelle, some of the things that were mentioned  
7 that were happening in West Virginia.

8           We need to optimize this, and I think  
9 you as a federal government representative in the  
10 Department of Energy, you hand out grants. You  
11 hand out research. If we focus this on a regional  
12 basis, and focus it on the polymer industry, I  
13 think that would be an extraordinary facilitator  
14 for the manufacturers that are in place now, and  
15 some of whom don't know what could be.

16           They need to be in an extension model.  
17 I'm not talking about basic research necessarily.  
18 I'm talking about applied technologies, where they  
19 are shown and helped. We have -- we have a young  
20 gentleman here. We have an R&D facility here in  
21 Pittsburgh, where we bring a client in and we say  
22 let's prototype what it is you think you could do

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1 and what is your market.

2 Now let me give you an example.

3 Everybody goes to Starbucks now. You grab that  
4 cup of coffee and your hands get hot, and then  
5 somebody goes and sues Starbucks. So now they put  
6 that brown cover on it. Now why are they putting  
7 two pieces together? What we're trying to do is  
8 to do a research that would give the thermal  
9 capabilities of a cup, so that you wouldn't need  
10 to add on. So that's an economy of materials.

11 So there's a lot of things in R&D. I'm  
12 not going to get into the list, but if you  
13 prioritize the polymer industry in this region and  
14 you optimize the assets you have in place, and you  
15 start to sprinkle around research that is relevant  
16 to these areas and begin inter-institutional  
17 collaboration, we'll have a great deal of payoff.

18 We as the manufacturer and those in the  
19 downstream will benefit. We need to create a  
20 market here. The market that we have now, what  
21 we're selling to the advantages is a logistic  
22 advantage. We're selling the fact that we can get

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1 ethane without shipping it to the Gulf, the fact  
2 that we can deliver it to the market without  
3 bringing it back from the Gulf.

4           But the big advantage, the big advantage  
5 is going to be on the new products. If we can  
6 take some of the things that will be developed and  
7 take them out to the field, and show the  
8 manufacturers, they may -- we can say hey, we're  
9 going to charge you five cents more, but you're  
10 going to make 50 cents more.

11           This all has an R&D basis, and it all  
12 has an extension approach to the dissemination of  
13 knowledge. We have to have both.

14           MODERATOR KELLEY: Thank you, David.  
15 Tom, any comments?

16           MR. CONWAY: Yeah, look. I would agree  
17 with David. I think predominantly research and  
18 development is driven -- in the U.S. is driven by  
19 the manufacturing sector, and that innovation,  
20 that development is crucial to everything we've  
21 done. The problem with it from our perspective  
22 many times is that it leads.

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1           So you know, we can all pull one of  
2 these out of our pocket. This technology was all  
3 developed here. There's very few jobs in the U.S.  
4 as a result of this telecommunication boom, and  
5 you know, you can say well, it's small tedious  
6 work. We don't want to do it. That's nonsense.  
7 We have a lot of people who would be happy to make  
8 this glass, making these products, assembling  
9 these things.

10           So if we're going to incentivize an  
11 industry to make something, we shouldn't let them  
12 then put it on the boat and ship it somewhere else  
13 to send back to us. I think we miss those  
14 principles a lot.

15           MODERATOR KELLEY: Thank you. Andrew?

16           DR. GELLMAN: So I would, as an  
17 academic, agree with research being an important  
18 component of what we need to do. But maybe go  
19 above and beyond that, and maybe address Tom's  
20 point a little bit. You have to do research and  
21 you have to convert it into products and get it  
22 into the marketplace faster than the other guy.

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1           Sooner or later the other guy will --  
2 everybody catches up, right? So you need better  
3 technology. It's probably derived from R&D  
4 programs somehow, and then you need better  
5 mechanisms to translate that into products and  
6 market value.

7           MODERATOR KELLEY: Thank you. Jeff.

8           MR. HERHOLDT: Sure. There is a  
9 research consortium, I guess Carnegie-Mellon,  
10 Pitt, West Virginia, Penn State, others, excuse  
11 me; I don't know them all. But that seems like  
12 that group could be a good way to put this  
13 research agenda into play. I mean certainly, the  
14 whole issue of what West Virginia had with the  
15 Marcellus, with the Utica, how to make more jobs  
16 out of that.

17           It's a stepping stone and it sounds like  
18 it could be a stepping stone to those jobs. It's  
19 more research associated with the production of  
20 materials from the wet gas constituent, and  
21 certainly that seems like a logical way to go.

22           MODERATOR KELLEY: Thank you, Jo.



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1 MS. SEXTON: Really, I don't think we  
2 can underestimate the value of visionaries. We  
3 have a visionary in our area, Dr. Paul Brown at  
4 Zane State College. He really has driven a lot of  
5 the vision in the things that we're doing in  
6 southeastern Ohio.

7 Dr. Brown is envisioning a technology  
8 corridor in Appalachia to take Appalachia from  
9 poor Appalachia to progressive Appalachia, and he  
10 talks about this technology core or corridor being  
11 very similar to what Research Triangle Park is  
12 down in North Carolina.

13 So his vision really kind of inspires a  
14 lot of us to look at some innovative ways to get  
15 people involved in the industry. One of the  
16 things they've done at their Cambridge Campus that  
17 they just built, completed this past year, they  
18 have a land lot there where they actually put a  
19 well on it and they drilled and got a pump jack  
20 out there now, and they're really doing some  
21 innovative things.

22 I think there's a lot that can be done

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1 locally. It doesn't always have to be done on a  
2 large scale nationally or federally. But local  
3 visionaries can really change the landscape a lot  
4 for the workforce development and economic  
5 development.

6 MODERATOR KELLEY: Thank you. So for  
7 the last question, we'll stay with you Jo. Again,  
8 just like with the other panels. You have the QER  
9 Task Force here. They're anxious to hear what you  
10 have to say. What's your one suggestion,  
11 recommendation to this group?

12 MS. SEXTON: Well, I think providing the  
13 funding and helping with grants and that type of  
14 thing for allowing the visionaries to do what they  
15 want to do locally would be the biggest request we  
16 would have.

17 MODERATOR KELLEY: Thank you. Jeff.

18 MR. HERHOLDT: Yeah. I think we need to  
19 really be serious with this all of the above  
20 discussion of our energy resources. I mean  
21 without caveats, I mean we are a nation rich in  
22 energy resources. We are a nation that's short on

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1 jobs, you know. We could certainly use our energy  
2 resources to stimulate a more engaging economy for  
3 our nation's populace. Thank you.

4 MODERATOR KELLEY: Andrew.

5 DR. GELLMAN: I think I would say that,  
6 and it's been mentioned a few times here before,  
7 but public education is key to allowing many  
8 aspects of the opportunity that we have to evolve  
9 as smoothly as possible, to make sure that the  
10 public has a solid understanding of the realities  
11 around developing industries based on natural gas.

12 MODERATOR KELLEY: Thank you. Tom.

13 MR. CONWAY: Just that as you're  
14 developing energy policy going forward, you find a  
15 more collaborative, closer way to coordinate with  
16 both ITA, USTR and other agencies and departments  
17 who impact this tremendously.

18 MODERATOR KELLEY: Thank you. David,  
19 final comments?

20 MR. PEEBLES: Focus on R&D opportunities  
21 in the ethane value chain, to create a cluster of  
22 economic development in this region.

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1           MODERATOR KELLEY: Very succinct. Thank  
2 you. So with that, please join me in thanking  
3 this panel. Thank you very much.

4           (Applause.)

5 Public Comment

6           MODERATOR KELLEY: So now we're going to  
7 turn to our Public Comments portion. So just give  
8 us a moment to get set up.

9           (Pause.)

10          MODERATOR KELLEY: For those that are  
11 speaking, I'm going to call you in the order in  
12 which you signed up. You do have five minutes, up  
13 to five minutes. Please do hold your comments to  
14 five minutes, and I ask that you join us via the  
15 microphones that are here in the aisle. So just  
16 step up to the microphone, provide your name, and  
17 then make your comments.

18          If you do have a written comment that  
19 you'd like to submit in conjunction with your  
20 comments, we'll be collecting those as well up at  
21 the entrance to the auditorium, and those will be  
22 included in the record.

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1           So just like the speakers here today,  
2 you get the benefit of our little color light  
3 system. So you'll see it turn red when your five  
4 minutes is up. It's working. Okay. So joining  
5 me up here are the representatives from the QER  
6 Task Force. We have Karen, Dr. Karen Wayland.  
7 Kate Marks will be joining us shortly, Matt  
8 McGovern and John Richards, and they're very  
9 anxious to hear what you have to say.

10           So our first commenter is David Hasseck  
11 (ph). David Hasseck?

12           (No response.)

13           MODERATOR KELLEY: No? Next is Patricia  
14 Demarco.

15           (No response.)

16           MODERATOR KELLEY: It's a long day.

17 Next we have Sam Taylor. Sam, are you here?

18           (No response.)

19           MODERATOR KELLEY: Next on the list is  
20 Bryant Shields. I'm not sure if I'm saying that  
21 right.

22           (No response.)

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1                   MODERATOR KELLEY: Next is Paul  
2 Clemensick. Paul, your five minutes.

3                   MR. CLEMENSICK: (off mic) I think you  
4 heard from me this morning already, because I got  
5 a question this morning, five minutes. I just  
6 want to reiterate that since the topic here is  
7 natural gas development, and the infrastructure  
8 involved with natural gas, the pricing in the  
9 natural gas markets should be driving a lot of  
10 this.

11                   I think unfortunately the natural gas  
12 pricing, we need some type of control mechanism.  
13 For those of you who are unfamiliar with natural  
14 gas in the past, the control is basically done by  
15 the Texas Railroad Commission. The Texas Railroad  
16 Commission put in place well spacing requirements  
17 and pro-rationing agreements on major natural gas  
18 deals.

19                   Those regulations were adopted by other  
20 states, and they worked fine for traditional  
21 natural gas deals. But in shale gas and oil  
22 (inaudible), not so much. There is no pro-

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1 rationing, no acreage development restrictions,  
2 nothing to for any kind of control. You can have  
3 no surplus capacity.

4           So what you end up with is a lot of wild  
5 swings in natural gas prices. I think it would be  
6 helpful to review what has happened before the  
7 natural gas industry, to look at the way pricing  
8 was controlled so that it wasn't -- we didn't go  
9 through these wild swings in pricing, which really  
10 doesn't help anyone.

11           It really doesn't help the customers  
12 over the long haul. It doesn't help the  
13 producers, and it's a really frustrating  
14 experience.

15           I just want to add one last thing. I  
16 have personal experience on this. I helped bring  
17 up some big natural gas deals in southern  
18 Louisiana when we would go after the fixed price  
19 (inaudible) contracts, and the minute we got them.

20           I worked (inaudible) for weeks, and as  
21 soon as we brought the plants up and we put the  
22 gas into the pipeline, it was Texas Eastern, a big

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1 pipe that goes up to the New York City, they  
2 basically said look, we can't pay the price. It  
3 was \$10 per million Btus in 1980.

4           They immediately turned around and they  
5 said you run the company. They threw the keys  
6 across the desk. They said no, we don't  
7 (inaudible). So the price went to \$3, and you  
8 just get these swings, where you go from one  
9 extreme to the other, and it's been -- anybody  
10 who's been in the industry for the last 40 years  
11 have experienced these swings up and down, and you  
12 just end up with a great deal of loss.

13           And somehow, if you're going to continue  
14 doing Marcellus shale development, you've got to  
15 settle out these price swings. That's my comment.

16           MODERATOR KELLEY: Thank you. Next is  
17 Neprune Huffley (ph). Neprune Huffley.

18           (No response.)

19           MODERATOR KELLEY: Next is Costa  
20 Samaras. Costa.

21           (No response.)

22           MODERATOR KELLEY: Next is Leila Murphy.



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1 MS. MURPHY: (off mic-not transcribed)

2 MODERATOR KELLEY: Thank you. (off mic)

3 Next we have Daniel Slater.

4 MR. SLATER: I'm Daniel Slater. I teach  
5 at Carnegie-Mellon, the School of Computer  
6 Science. I guess I want to know the context of  
7 this. I talked to Kate earlier, so I just noticed  
8 the complete lack of any discussion of the issue  
9 of climate change, an issue of leaving it in the  
10 ground, and Professor (inaudible) stated  
11 explicitly that (inaudible) --

12 We've got -- most of the reserves that  
13 have been discovered in fossil fuels have to be  
14 left in the ground or we're going to destroy the  
15 planet. I believe Professor (inaudible) stated  
16 that. So when I read the agenda for this meeting,  
17 again (inaudible) context because I don't know the  
18 big picture of all of these different meetings  
19 you're going to have and so on.

20 Maybe climate change is going to be  
21 addressed. But I just found it odd that that  
22 wasn't even on the agenda at all, and this

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1 particular panel, the one we just had, they said  
2 that well, we're talking about 2030 and beyond.  
3 Well, we've got to get a plan in place to stop  
4 using the fossil fuels we have in the ground by  
5 2030, and yet the panel, all of whom have left, I  
6 think, and irrelevant to talk about at this point  
7 since they're not even here anymore.

8           But you know, the plan should be to  
9 figure out what's the plan for using this stuff  
10 and for not using it, okay? So I just don't  
11 understand how we can talk about fossil fuels like  
12 this, without having that foundation. That's the  
13 main elephant in the room here, is that we've got  
14 to leave most of this in the ground, okay, and  
15 figure out other ways of supplying the energy  
16 needs for this country. So that's my comment.

17           MODERATOR KELLEY: Thank you. I just  
18 want to circle back to the first folks on the  
19 list, to give them a chance in case they came in  
20 the room. David Hasseck. Patricia Demarco. Sam  
21 Taylor. Brian Shields. Okay. We have some time.  
22 Did anyone else care to comment or provide a

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1 comment here today?

2 (No response.)

3 MODERATOR KELLEY: No, okay. With that,  
4 let me turn it over to Dr. Wayland.

5 DR. WAYLAND: Thank you. I want to  
6 thank Carnegie-Mellon for hosting us. This is --  
7 we are surprised by the quality of the venues that  
8 we find. We're sort of taking them sight unseen  
9 and this has been quite wonderful. So thank you  
10 very much.

11 As people have mentioned, as the  
12 Secretary mentioned this morning, the stakeholder  
13 input is a vital part of the work that we're doing  
14 in the Quadrennial Energy Review. In fact, the  
15 Presidential memorandum had directed the Secretary  
16 to lead this effort, actually spends quite a bit  
17 of time talking about the importance of the  
18 stakeholder engagement piece.

19 We will be doing 16 or 17 of these  
20 meetings around the country. You can find all the  
21 information about those meetings, past and present  
22 at [www.energy.gov/qer](http://www.energy.gov/qer).

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1 I want to note that not only are the  
2 panelists' comments to us very important, but this  
3 public comment period is also very important to  
4 them, and you'll see that we continue to have a  
5 court reporter here who's been taking notes, and  
6 that will become part of the public record.

7 So all of your comments today will not  
8 only be used by our analysts and by our  
9 policymakers, but also will become part of the  
10 public record, so the public aware of who we're  
11 listening to when we're going around the country,  
12 learning about your views on energy policy and  
13 infrastructure.

14 So I want to thank you again. I'd like  
15 to also thank the Department of Energy staff and  
16 Energetics staff for helping to put together this  
17 meeting, and with that, I think we'll conclude.

18 MODERATOR KELLEY: The meeting is  
19 adjourned. Thank you.

20 (Whereupon, at 2:24 p.m., the meeting  
21 was adjourned.)

22

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