

January 2012

Bedrock of the Canada-United States Energy Relationship: Fostering Job Creation and Energy Security through the Development of Clean Oil, Coal, and Natural Gas, The

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Recommended Citation

Steven Reed, John Felmy, Steve Winberg, and Danielle Droitsch, *Bedrock of the Canada-United States Energy Relationship: Fostering Job Creation and Energy Security through the Development of Clean Oil, Coal, and Natural Gas, The*, 36 Can.-U.S. L.J. 53 (2011)
Available at: <https://scholarlycommons.law.case.edu/cuslj/vol36/iss2/5>

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THE BEDROCK OF THE CANADA-UNITED STATES ENERGY RELATIONSHIP: FOSTERING JOB CREATION AND ENERGY SECURITY THROUGH THE DEVELOPMENT OF CLEAN OIL, COAL, AND NATURAL GAS

Session Chair - Steven Reed

Speaker - John Felmy

Speaker - Steve Winberg

Speaker - Danielle Droitsch

INTRODUCTION

MR. REED: Good morning. Welcome to our panel discussion on the Canada-United States energy relationship. My name is Steve Reed.¹ I am an attorney with the law firm of Steptoe & Johnson in Washington, D.C. and for the last thirty years or so, I have been specializing in United States federal energy regulation, particularly with respect to Canada-United States energy relationships, and now representing our good friends from Enbridge² for a year.

Before I introduce our three distinguished panelists, I wanted to say just a few words about our over-all topic. As you all know, we live in a world with a growing appetite for energy in all forms and, as a result, developments in the energy sector sparked a great deal of interest, not just from industry insiders but from the general public as well. We only have to think about the news stories that have dominated the headlines for the last several months. For example, the nuclear disaster in Japan that is raising questions around the world about the future of nuclear power.³ Political developments in the Middle East that are leading to rising oil prices that threaten the economic recov-

¹ *Steven Reed—Biography*, STEPTOE & JOHNSON, <http://www.steptoec.com/professionals-359.html> (last visited Oct. 21, 2011).

² *See generally Corporate Overview*, ENBRIDGE, [http://www.enbridge.com/AboutEnbridge/Corporate Overview.aspx](http://www.enbridge.com/AboutEnbridge/Corporate%20Overview.aspx) (last visited Oct. 21, 2011) (noting Enbridge operates the world's longest crude oil liquid transportation system and owns in addition to operates Canada's largest natural gas distribution company).

³ *2011 Japan Nuclear Crisis: Overview*, N.Y. TIMES, <http://topics.nytimes.com/top/news/international/countriesandterritories/japan/index.html> (last modified Jan. 31, 2012) (describing repercussions of the meltdown of reactors at the Fukushima Daiichi Nuclear Power Station).

ery around the world, as well as impacting people directly at the gas pump.⁴ Closer to home, in terms of the Canada-United States energy relationship, is an ongoing controversy in the United States over whether to issue a Presidential permit for the Keystone Pipeline to carry crude oil from Western Canada to the United States Gulf Coast.⁵ It has featured an aggressive public campaign on both sides. Living in Washington, I even hear ads on the radio each day driving to work with pros and cons on the Keystone Pipeline, a truly unforeseen development.

In short, this is an unusually pivotal time in the world energy sector. Important and far-reaching decisions are being made daily that are going to affect industries in both countries and the public as well.

With that background, we are truly fortunate to have with us three distinguished and knowledgeable panelists who can give us valuable insights into the issues affecting the Canada-United States energy relationship today.

First up today will be John Felmy, Chief Economist of the American Petroleum Institute in Washington.⁶ John has a long and extensive background in the energy industry stretching back more than thirty years. A Ph.D. economist from the University of Maryland, John is responsible for overseeing the economic statistical and policy analysis done at the American Petroleum Institute, which is an organization that represents more than four hundred members of all aspects of the petroleum industry.

Our second speaker today will be Steve Winberg,⁷ who is the Vice President for Research and Development in Coal Conversion and Power Development at CONSOL Energy⁸ in Pittsburgh. Like John, Steve has more than thirty years of experience in many aspects of the energy industry, including such leading topics today as carbon capture and sequestration, coal-to-liquids conversion, greenhouse gas limitation technology, and other areas. I would also point out that Steve has his Masters of Business Administration from the

⁴ MICHAEL RATNER & NEELISH NERURKAR, CONG. RESEARCH SERV., R41683, MIDDLE EAST AND NORTH AFRICA UNREST: IMPLICATIONS FOR OIL AND GAS MARKETS 7 (2011) (“Recent unrest in the Middle East and North Africa (MENA) region has affected the international energy markets and put upward pressure on oil prices . . . Even after the current outbreak of unrest subsides, concerns that it could re-emerge may mean that part of the current risk premium may persist.”).

⁵ See generally PAUL W. PARFOMAK ET AL., CONG. RESEARCH SERV., R41668, KEYSTONE XL PIPELINE PROJECT: KEY ISSUES (2011) (describing the implications of the Keystone Pipeline project, process, and requirements related to issuing a Presidential permit for this project).

⁶ *John Felmy—Biography*, AMERICAN PETROLEUM INST., <http://www.njchamber.com/Images/Events/Energy/API%20-%20John%20Felmy%20bio.pdf> (last visited Jan. 31, 2012).

⁷ *Steve Winberg—Biography*, CITYLAB, <http://www.citylabpgh.org/person/steve-winberg/> (last visited Jan. 31, 2012).

⁸ *Id.*

University of Pittsburgh and John is a graduate of Penn State, so I hope we can keep the Panther/Nittany Lion rivalry to a minimum here.

Our last speaker is Danielle Droitsch,⁹ who is the Director of United States Policy for the Pembina Institute in Washington.¹⁰ The Pembina Institute is an organization dedicated to analyzing and supporting sustainable energy solutions. Danielle, I would note, was originally from the Washington area where I live, Arlington, Virginia. However, she moved to Canada with her husband where she became the Executive Director of Water Matters in Alberta before coming back to the United States to take her current position at Pembina in 2010.

So without further ado, I will turn this over to the panelists and we will hopefully reserve a few minutes at the end for questions and answers.

REMARKS OF JOHN FELMY

MR. FELMY: Thank you very much. I am truly honored to be here. This is a very important topic at a critical time for both our countries. I would like to share with you my thoughts in terms of energy, where we are going, and, more importantly, where we should not go and what mistakes we should not repeat that we have made in the past.

But before that, I thought I would share a little history of our industry with you all. If you read the President's most recent State of the Union Address, he called the oil industry an "old industry."¹¹ That is right. We are over one hundred and fifty-one years old; the industry started August 27, 1859.¹² A year and a half ago about fifty energy geeks in Washington got together, hired a bus, and took a six-hour drive up to Oil City in Titusville. That is kind of a daunting thought of having that many geeks on a bus for that long but we entertained ourselves with lectures and briefings and so on, and so it was really exciting. For those of you who have never been there, this is the memorial to Colonel Drake.¹³ The burial place is in front of it. We visited that in Titusville.

⁹ *Danielle Droitsch—Biography*, PEMBINA INST., <http://www.pembina.org/contact/219> (last visited Jan. 18, 2012).

¹⁰ *Id.*

¹¹ President Barack Obama, Remarks by the President in the State of the Union Address (Jan. 25, 2011).

¹² CHARLES AUSTIN WHITESHOT, *THE OIL-WELL DRILLER: A HISTORY OF THE WORLD'S GREATEST ENTERPRISE, THE OIL INDUSTRY* 729 (1905).

¹³ DRAKE WELL MUSEUM, <http://www.drakewell.org/> (last visited Nov. 5, 2011) (providing information about the museum that now stands where Colonel Edwin L. Drake drilled the oil well that launched the industry in 1859).

We also visited the world's oldest operating oil well. This is the McClintock Number 1 well.¹⁴ This operates once a year. It has been operating since 1860.¹⁵ They produce a little oil and they sell that oil in the Drake Well Museum. They sell that oil, a one-ounce bottle, for two dollars. Now, how expensive is that? Does anybody know how many ounces there are in a barrel of oil? There are forty-two gallons, of course, and you multiply that times 128 and you get \$5,376. So that oil sells for almost eleven thousand dollars a barrel. Pretty good.

We also visited the original site of the industry. This rather small area is the National Trust designation. That is where it all started, with Colonel Drake producing commercial oil.¹⁶ We visited one of the bigger gushers of oil places that they had, a real boomtown. This is a quaintly named place called Pig Hole, and this was a town that had gushers of oil of one hundred barrels a day.¹⁷ A town sprung up with fifteen thousand people in it.¹⁸ It was the third largest post office in Pennsylvania.¹⁹ They pumped oil for five hundred days.²⁰ The oil ran out.²¹ They tore everything down and left, and you would have no idea that there was actually oil produced there. I bring that up because every time I hear Sarah Palin saying, "Oh, once you produce oil, it will be horrible forever," that is of course not true. Now, they also sell oil here in a little museum. Nobody lives here, but they have a museum and

¹⁴ See Mary Hill, *150 Years Later, Oil Well Still Producing*, TITUSVILLE HERALD (Aug. 16, 2011),

<http://www.titusvilleherald.com/articles/2011/08/16/news/doc4e4b452d3c518727905287.txt> (indicating the 150-year-old McClintock Well No. 1 has been producing oil since 1960 and is the world's oldest continuously producing oil well).

¹⁵ See *McClintock Number 1*, PA. HERITAGE MAG., Vol. XXXV, No. 3, Summer 2009, available at http://www.portal.state.pa.us/portal/server.pt/community/history/4569/marking_time/471312#mc1 (last visited Jan. 31, 2012) (explaining that McClintock Well No. 1 was built in 1960 but did not begin producing oil until 1961).

¹⁶ EDGAR WESLEY OWEN, *TREK OF THE OIL FINDERS: A HISTORY OF EXPLORATION FOR PETROLEUM* 12 (1975) ("The importance of the Drake well is in the fact that it caused prompt additional drilling, thus establishing a supply of petroleum in sufficient quantity to support business enterprises of magnitude.").

¹⁷ See Beatrice Paul Hirschl, *A Peak at Pithole's Past; This 1800s Oil Boom Town Went Bust but Left Behind A Rush for Pennsylvania Crude*, PITTSBURGH POST-GAZETTE, Apr. 12, 1996, at D-1 ("News raged along the oil-field grapevine that a gusher of 250 barrels a day, at \$8 per barrel, had come in . . . what would soon become the Borough of Pithole."); see also BRIAN BLACK, *PETROLIA: THE LANDSCAPE OF AMERICA'S FIRST OIL BOOM* 149 (2000) (indicating that news of oil wells producing 250 or more barrels a day spurred the development of Pithole).

¹⁸ BLACK *supra* note 17, at 141.

¹⁹ *Id.* at 157.

²⁰ See Hirschl, *supra* note 17 (referring to Pithole as the "500-day wonder").

²¹ BLACK, *supra* note 17, at 169.

sell that one-ounce bottle for five dollars, so that is twenty-seven thousand dollars a barrel. Pretty good.

And of course, with my history lesson, I will say that I also did a lecture on it. I was tasked with talking about a very important pipeline in the United States, since we have been talking about Keystone XL,²² and I personally am very excited about the prospect of that line being developed. I talked about the original major pipeline in the United States, the Tide Water Oil Line.²³ It ran from Bradford, Pennsylvania, northwest all the way down through the Williamsford-Muncy area, ultimately to Bayonne. It was a cast-iron line screwed together with collars, dug by hand, and it was built by the independents who were trying to break John D. Rockefeller's hold on rail transportation.²⁴ He had monopolized the rails.²⁵ So they were producing oil but they could not ship it anywhere. In response, they built this line, finished it in 1879, and ran it for a few years.²⁶ Then they sold out to John D. as part of one of the original Standard Oil trusts.²⁷ They made a lot of money and did good.

The reason I was lecturing on it is because I worked on this line as a kid. No, not in 1879, but I did work on it as a kid, and so that is how I got my start in the oil business. I started off with an honest job, and then I turned to the dark side and became an economist. Since I have never seen most of you folks before, it gives me an opportunity to tell you an economist joke.

What is the definition of an economist? Of course, there are many but my favorite definition is an economist is somebody who is real good with numbers but does not have the personality to be an accountant.

²² See generally Parfomak, *supra* note 5 (stating the Keystone XL pipeline would have the capacity to transport 830,000 barrels of crude oil per day from the oil sands of Alberta to refineries in Oklahoma and Texas.)

²³ See ROSS PORTER ET AL., *TIMELESS HOME* 66-67 (2003) (stating that the Tidewater Pipe Company changed the way in which oil was delivered via the first long-distance pipeline over mountainous terrain).

²⁴ But see Floyd L. Hartman, 'Pump station' in Black Forest Area Played Important Role in Oil Distribution, *WILLIAMSPORT SUN-GAZETTE* (Feb. 15, 2009), <http://www.sungazette.com/page/content.detail/id/522572.html> (indicating the Tidewater company built a pipeline, seeking to connect independent refineries in spite of Rockefeller's monopoly on rail, made of wrought iron.); see also Porter, *supra* note 23, at 66 ("To bypass his monopoly, the Tidewater Pipe Company was formed in 1878.").

²⁵ Porter, *supra* note 25, at 66 ("Standard Oil Company, the tool of oil mogul John D. Rockefeller, had a monopoly for transporting oil over its extensive rails.").

²⁶ *Id.* at 67.

²⁷ See Hartman, *supra* note 24 (stating that Tidewater and Standard Oil were prohibited to merge, but Tidewater agreed to an acquisition under a market-sharing agreement in 1882); see also SILAS HUBBARD, *JOHN D. ROCKEFELLER AND HIS CAREER* 107-109 (1904) (explaining that the original Standard Oil Trust was created in 1882 to consolidate Rockefeller's oil industry holdings).

So where are we as an industry? In Washington, everybody is saying you are an old industry, you are going to disappear; this is all the rhetoric that you hear. We are an industry that is responsible for 9.2 million jobs²⁸ and seven to twelve percent of gross domestic product;²⁹ as Carl mentioned, it is a very important sector. But yet we are dismissed as being just an old industry that does not contribute much.

We are also an industry that is owned by tens of millions of Americans.³⁰ Probably every one of you here owns a piece of an oil company whether you know it or not, either through IRAs or pension funds, fully forty percent of the equities of the companies, and in money market funds and everything else.³¹ In all, half the states have major investments.³² So when you hear people proposing to tax the oil industry, we are going to tax the industry, we are going to take money for them. Grab your wallet because it is probably coming out of your pocket whether you know it or not, and that is just another example of Washington, where you can choose to demonize people and things and so on. It has no basis in reality.

So let me turn to markets right now, because of course that is what everybody is asking about and it is fundamental to what our energy policy is. This is a graph that I show just to help explain a very simple relationship between crude oil, gasoline, and diesel fuel.³³ The blue line is crude oil in dollars per gallon. There are forty-two gallons in a barrel, and so let us see, yesterday oil was a \$118 a barrel or about \$2.57 a gallon. The green line is gasoline and the difference between those lines, in terms of retail gasoline and crude oil historically, has averaged about \$1.10 adjusted for inflation.³⁴ About

²⁸ Press Release, Am. Petroleum Inst., Policy Shift on Oil and Natural Gas Could Create 1.4 Million New Jobs, Increase Revenue to Government by \$800 Billion, Study Says (Sept. 7, 2011), available at <http://www.api.org/Newsroom/how-to-create-jobs.cfm>.

²⁹ *Id.*

³⁰ See ROBERT D. SHAPIRO & NAM D. PHAM, THE DISTRIBUTION OF OWNERSHIP OF U.S. OIL AND NATURAL GAS COMPANIES 8 (2007) ("It is very likely that the tens of millions of households whose mutual fund portfolios include oil and natural gas shares closely resemble the average, middle-income mutual fund holder.").

³¹ *Id.*

³² John Felmy, Chief Economist, Am. Petroleum Inst., Presentation: The Bedrock of the Canada-U.S. Energy Relationship: Fostering Job Creation and Energy Security through the Development of Clean Oil, Coal, and Natural Gas, Can.-U.S. L. Inst., at 9 (Apr. 15, 2011), available at

http://cusli.org/conferences/annual/annual_2011/documents/Presentation_Felmy.pdf (tracking the relationship between crude oil, retail gasoline, and diesel from April 2005 to April 2011).

³³ *Id.*; see also U.S. Gasoline and Crude Oil Prices, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/forecasts/steo/images/fig2.png> (last visited Nov. 20, 2011) (suggesting that the price difference between crude oil and retail gasoline from January 2007 through November 2011 has averaged \$1.10).

³⁴ Felmy, *supra* note 32, at 9.

\$0.48 of that is taxes and then everything else is refining, marketing, transporting, getting it to the consumers and, yes, some earnings in it.³⁵

Diesel is a little higher because diesel is not your father's diesel fuel. It has been ultra-low sulfur diesel, so it is much more expensive to make than what it used to be.³⁶ Demand for diesel is much stronger both in the United States and worldwide. We have got a much stronger economy going on right now and so you see a relatively tighter market for diesel fuel.³⁷

Looking at the numbers recently, what you can see is from the recent run up in prices from August 2010 up through April 2011, you can explain virtually one hundred percent of the increase in gasoline prices due to three things—actually four, but three are really identifiable. The first is you have had crude oil prices go up in these points, and this is a couple days ago. Crude oil went up \$0.98 a gallon.³⁸ We had ethanol go up by \$0.90 a gallon, and since it is blended at ten percent, that is an additional \$0.09.³⁹ Then you have credit card fees, which are a percentage of usually two to three percent.⁴⁰ They went up by a dollar, so another couple cents in that. So you can explain virtually all of that.

³⁵ See *What do I Pay For in a Gallon of Gasoline?*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/tools/faqs/faq.cfm?id=22&t=6> (last visited Nov. 20, 2011) (stating that gas prices consist of crude oil, refining costs and profits, distribution, marketing, refining costs and profits, and taxes); see also *Gasoline Taxes: Combined Local State and Federal*, AM. PETROLEUM INST., <http://www.api.org/statistics/fueltaxes/upload/Gasoline-Tax-Map.pdf> (last visited Nov. 20, 2011) (stating that the average United States gasoline tax is \$0.488).

³⁶ *New Ultra Low Sulfur Diesel Fuel and New Engines and Vehicles With Advanced Emissions Control Systems Offer Significant Air Quality Improvement*, CLEAN DIESEL FUEL ALLIANCE, http://www.clean-diesel.org/images/ULSD_issue_paper.pdf (last visited Nov. 20, 2011).

³⁷ U.S. ENERGY INFO. ADMIN. OFFICE OF INTEGRATED ANALYSIS AND FORECASTING, LIGHT-DUTY DIESEL VEHICLES: MARKET ISSUES AND POTENTIAL ENERGY AND EMISSIONS IMPACTS 21 (2009) (“The most prominent force in changing the dynamics of petroleum product markets has been growing demand for diesel fuel to supply the growing diesel component of the European Union’s light-duty vehicle fleet, which together with declining demand for gasoline in Europe has led to a tighter diesel market and a looser gasoline market in the Atlantic Basin.”).

³⁸ Felmy, *supra* note 32, at 10.

³⁹ Press Release, Am. Petroleum Inst., Industry Urges EPA to Avoid a Rush to Judgment on Pending Decision on the Use of E15 (May 5, 2010), *available at* <http://www.api.org/Newsroom/epa-e15-decision.cfm> (stating that ethanol is currently blended at ten percent ethanol with ten percent gasoline). See DON HOFSTRAND & ANN JOANNS, AGRICULTURAL MARKETING RESOURCE CENTER, FUEL AND GRAIN HISTORIC PRICE COMPARISONS (2011), *available at* http://www.agmrc.org/renewable_energy/ethanol/ethanol_prices_trends_and_markets.cfm (indicating that ethanol increased from \$1.69 per gallon in August 2010 to \$2.57 per gallon in April 2011, approximately a \$0.90 increase).

⁴⁰ David Goldman, *How Credit Cards Boost Gas Prices*, CNN MONEY (May 17, 2008, 8:29 AM), http://money.cnn.com/2008/05/14/news/economy/credit_cards_gasoline/ (stating that credit card companies charge gas stations up to three percent in credit card fees).

You also have higher costs of operation in terms of the crude cost is more expensive, the energy is more expensive and so on. So it is not hard to see why you have had gasoline prices go up \$1.13.⁴¹ It is pretty much all the rise in costs. I bring that up because this is really a third grade arithmetic challenge, but yet we have people who say, "Oh, it is a conspiracy," and you have calls for price gouging investigations and everything else. It is just third grade arithmetic, but you have to know there are forty-two gallons in a barrel, and we have not done a very good job of it.

That being said, of course it is very political in Washington right now. So let me ask a question. Does anybody know what the price of gasoline was on January 20, 2009? Can anyone hazard a guess about what it was? It was less than half what it is today or a \$1.84.⁴² Therein lays the political challenge that is going on. Why has gasoline gone up that much? Because crude oil has gone up that much. You have had gasoline go up by \$1.96, crude oil went by \$1.76, ethanol up another say \$0.15 or so.⁴³ It explains virtually all of that.

Now, why did crude oil prices go up so much? If we look at the United States Energy Information Administration, it is a function of primarily a whole series of factors. On a day-to-day basis you have things like the value of the dollar affected. Speculation, of course, because in future markets every day is speculation as you do not have a close of the contract and so on. You have got a whole host of other things that have real impacts like the Organization of the Petroleum Exporting Countries ("OPEC") supply and non-OPEC supply. Clearly, OPEC is not producing as much as they could, but the main factor that I look at is global economic growth and record oil demand.⁴⁴

If you look back for record demand from the collapse in 2009, the International Energy Agency ("IEA") in 2010 said we had an all-time record demand level, 87.9 million barrels a day.⁴⁵ It is an astonishing amount. Over thirty billion barrels a year.⁴⁶ They are projecting that to be 89.4 billion bar-

⁴¹ Felmy, *supra* note 32, at 10.

⁴² *Id.*

⁴³ *Id.* at 11. See HOFSTAND & JOANNS, *supra* note 39 (indicating that the price of ethanol increase by \$0.15 from March 2011 to April 2011).

⁴⁴ See Felmy, *supra* note 32, at 15; see also Dmitry Zhdannikov & Christopher Johnson, *Oil Demand Growth Could Stall in 2012: IEA*, REUTERS (Aug. 20, 2011, 6:21 PM), <http://in.reuters.com/article/2011/08/10/idINIndia-58714120110810> ("The IEA said OPEC was still under-producing around 700,000 bpd to fill the supply gap later this year.")

⁴⁵ Felmy, *supra* note 32, at 13, and INT'L ENERGY AGENCY, OIL MARKET REPORT 4 (Apr. 2010), available at <http://omrpublic.iea.org/omrarchive/12apr11full.pdf> (stating that oil demand in 2010 averaged 87.9 barrels a day).

⁴⁶ Felmy, *supra* note 32, at 13.

rels in 2011;⁴⁷ in other words, another record demand level. When you combine these record levels with not a lot of increasing capacity in places like non-OPEC. And certainly here in the United States, because of the moratoriums, the permatorium, things like that, we have had obviously a lot of the industry and exploration shut down.⁴⁸ Of course most of that growth is China, and you can see that from the green line.⁴⁹

It used to be the United States. We are a player. We have an increase in it, but it is not as much as what it used to be. There is limited capacity and this is something to really think about. We start at the beginning of the year with four million barrels a day of excess capacity.⁵⁰ You have a million and a half of growth, and you had Libya shut down, so another million and a half, and, therefore, excess capacity is really limited right now and that is what is driving everything.⁵¹

Let me turn to the energy economy quickly and go through these. This is our economy—far too complex to really understand. This is the EIA's flow where you have where it comes from, how it is used, line losses, energy losses, and so on.⁵² It is a very complex industry and so anything that you do has to take it into account. I break it down a little bit more by looking at just some simple looks, and if there is anything that you want to take from this presentation, I would suggest this one. Down the left-hand side it says, “Where do we get our energy?” Thirty-seven percent oil, twenty-five percent gas, twenty-one percent coal, eight percent renewables, and nine percent nuclear.⁵³ Now, how it is used is seen down the right-hand side. Transportation uses a lot. Electric power uses a lot, and a lot of that is because two-thirds of the energy going electric power is lost through conversion losses, line losses, and so on.

⁴⁷ Felmy, *supra* note 32, at 13, and INT’L ENERGY AGENCY, *supra* note 45 (stating that oil demand in 2011 is expected to 89.4 million barrels a day).

⁴⁸ JOSEPH R. MASON, THE ECONOMIC COSTS OF A MORATORIUM ON OFFSHORE OIL AND GAS EXPLORATION TO THE OIL REGION (2010), available at <http://www.noia.org/website/download.asp?id=40016> (explaining how the six-month moratorium on offshore drilling enacted in 2010 could cost more than \$2.7 billion in global economic activity and thousands of jobs).

⁴⁹ Bloomberg News Report, *Led by Demand, Energy Use is Projected to Rise 53% by 2035*, N.Y. TIMES, Sept. 20, 2011, at B4 (explaining that China is the major contributor to the increase in global energy demand).

⁵⁰ Felmy, *supra* note 32, at 17. See U.S. ENERGY INFO. ADMIN., SHORT-TERM ENERGY OUTLOOK MARCH 2011 13 (2011).

⁵¹ Felmy, *supra* note 32, at 13. See U.S. ENERGY INFO. ADMIN., *supra* note 45, at 3 (“EIA expects that lost crude oil production from Libya will be made up for by both drawdown of inventories and increases in production from other OPEC countries.”).

⁵² Felmy, *supra* at note 35, at 16.

⁵³ *Id.* at 17.

If we look then at petroleum, just break it out this way, it is really the key line on the top and the challenge in terms of energy in a lot of ways. We use seventy-two percent of our oil in transportation, twenty-two percent industrial, a lot of chemicals, five percent residential/commercial, and only one percent electric power.⁵⁴ I bring that up because I hear a politician constantly saying, “We need solar wind and geothermal or nuclear to reduce oil needs.”

How? We do not use any in electricity except in Alaska and Hawaii,⁵⁵ and we do not have a fleet of electric cars. But yet it is said over and over again as though it has any truthful component at all. The key issue, though, is ninety-four percent of the fuel of transportation is oil.⁵⁶

We do use some other oil, for example, and then I will just break out natural gas to show you where gas is used. We use a little bit in transportation, a lot in industrial for chemicals and things like that, residential/commercial, and electric power; therefore, thirty percent of gas goes to electric power.⁵⁷ But I will break down the transportation use.

The challenge we have is if you are going to change that oil number from ninety-four percent, it is going to have to come from somewhere else. Yes, we can use more natural gas, and the whole shale gas development is exciting. It is really exciting for me because I was a dirt-poor country boy who grew up in north central Pennsylvania. I remember the size of the crews going up and down all those valleys, and I always wondered what they found. They found this huge block of shale with gas in it but did not know how to develop it.⁵⁸ So it is a wonderful economic development opportunity in that part of Pennsylvania. It could be in Ohio, too, but yet we have opponents that will fight everything.⁵⁹ I hope irresponsibility will not stop that wonderful opportunity.

Now, can we expand natural gas into transportation? You bet. We can do that.

It is a known technology. Boone Pickens's plan for heavy trucks is one example: “We can use fleets,” something like that.⁶⁰ It is only a question of

⁵⁴ *Id.* at 18.

⁵⁵ See Anduin Kirkbride McElroy, *A New Generation*, BIODIESEL MAG., Jan. 1, 2008 (suggesting that Alaska and Hawaii are the most significant examples of states that use a form of crude oil as an electricity source).

⁵⁶ Felmy, *supra* note 32, at 18.

⁵⁷ *Id.* at 19.

⁵⁸ John A. Harper, *The Marcellus Shale—an Old ‘New’ Gas Reservoir in Pennsylvania*, PA. MAGAZINE, Spring 2008, at 2 (stating that Marcellus shale has been a known gas reservoir for over seventy-five years but the technology and price incentives to develop this source of energy have not been available until recently).

⁵⁹ Steve Bennish, *Gas Boom Could Create Ohio Jobs*, DAYTON DAILY NEWS, Sept. 10, 2011, at A1 (indicating that natural gas production could create jobs, despite opposition from environmentalists).

⁶⁰ *Boone Pickens Responds to Obama’s Natural Gas Fleet Order*, OIL & GAS FIN. J., May

cost and time, and that is really the challenge of energy, cost and time, because it is so vast in terms of what we do.

We use some renewable energy. We could use more, but the amount of ethanol that you can put into the gasoline pool right now is almost at the maximum level because we use about 137 billion gallons of gasoline.⁶¹ We could use more, but if we use 137 billion gallons of gasoline and cars can only run on ten percent, then we maxed out at 13.7 billion gallons. We are already going to use 12.6 billion gallons this year.⁶² In regards to these proponents trying to say we are going to use a lot more biofuels, until you can actually have flex fuel vehicles, you can not do much more than you already have, and I hope we do have flex fuel vehicles.

Now, let me close with the question on electricity. Where does electricity flow?

I added this to the right, and you can see that only 0.2% of the electric power goes to transportation.⁶³ If we do not have a fleet of electric cars, not much is going to happen there. I hope we do have successes in the Chevy Volt and so on, but it is hard to see whether or not that technology will actually be successful. I hope we do because we own that. But until you have a fleet of electric cars, these arguments that we are going to reduce oil use by electric cars make absolutely no sense.

If you look out in the future, similar to Carl's projections, the energy situation is going to be very much like it is today. The proposals we have are pretty much a repeat of the mistakes of the past by taxing the industry. This has been in the President's budget for the last three years.⁶⁴ We tried it back

25, 2011, available at <http://www.theenergyreport.com/pub/na/9692> (noting energy expert T. Boone Pickens' vocal support of the use of alternative fuel-powered truck fleets).

⁶¹ John Carey, *Controversies Continue to Swirl Over Corn Ethanol*, BLOOMBERG BUS. WK. (Apr. 16, 2009, 5:00 PM), http://www.businessweek.com/magazine/content/09_17/b4128038023092.htm (indicating that the United States uses about 137 billion gallons of gasoline, but the use of ethanol in gasoline is limited due to a "blend wall").

⁶² Charles Abbott & Karl Plume, *Analysis: Ethanol to Edge Pigs for Corn Use, But Not Quite Yet*, REUTERS (July 18, 2011, 11:27 AM), <http://www.reuters.com/article/2011/07/18/us-usa-ethanol-idUSTRE76H3MX20110718> ("Output is headed for 13.7 billion gallons this year, according to Energy Department data, well above the federal mandate to use 12.6 billion gallons.")

⁶³ Felmy, *supra* note 32, at 21.

⁶⁴ See OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, A NEW ERA OF RESPONSIBILITY: RENEWING AMERICA'S PROMISE 79 (2009) (indicating that funding for the Department of the Interior in fiscal year 2010 could come from an excise tax on the oil and gas industry); see also OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, BUDGET OF THE UNITED STATES GOVERNMENT X, FISCAL YEAR 2011 8 (2010) (indicating that the fiscal year 2011 budget would end "subsidies for big oil, gas, and coal companies"); see also OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, BUDGET OF THE UNITED STATES GOVERNMENT, FISCAL YEAR 2012 22 (2011) (indicating that the fiscal year 2012 budget proposes "eliminating [twelve] tax breaks for oil, gas, and coal companies").

in the 1970s and 1980s.⁶⁵ All it resulted in was lower production of oil and increased imports.⁶⁶ Then they spent the money down on things that did not work. Let us not repeat that mistake.

We can produce a lot more. We have invested two trillion dollars in a lot of things since 2000—a vast amount of money.⁶⁷ We could produce more in this country. In fact, if you look at increasing both Canadian and United States production, you could dramatically lower the amount of imports that come in, far in excess of the one-third that the President proposed.⁶⁸ But we need to be able to produce that oil and we need to go into areas that are off limits right now. We have over one hundred billion barrels of oil.⁶⁹

It is funny that you will hear people say, “We only have two percent of the world’s reserve.”⁷⁰ That figure is absolutely accurate and totally irrelevant. The fact is, we have over one hundred billion barrels that we could find—resources, not reserves—but we need to move forward. We need a five-year plan. We need all these things.

We also need alternatives. The industry invests more in alternatives than anybody else, over fifty billion dollars in that period.⁷¹ Yes, it is only five percent, but when you compare that to what the reality of energy is, it is not out of line. If you think of what everybody talks about—solar, wind, and geothermal—how much are those of our energy supply? A little more than one percent, so you have people saying we are going to double it.⁷² What

⁶⁵ MOLLY F. SHERLOCK, CONG. RESEARCH SERV., R41227, ENERGY TAX POLICY: HISTORICAL PERSPECTIVES ON AND CURRENT STATUS OF ENERGY TAX EXPENDITURES (2010) (explaining the efficacy and impact of energy policy from the 1970s onwards in reducing import independence and promoting renewable energy sources).

⁶⁶ *Id.*

⁶⁷ BRIAN M. RIEDEL, HERITAGE FOUND., SPENDING BY THE NUMBERS 2010 (2010) (tracking the increase in levels of government spending since 1990 and indicating that spending since 2000 has exceeded two trillion dollars).

⁶⁸ *Energy in Brief: How Dependent Are we on Foreign Oil?*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/energy_in_brief/foreign_oil_dependence.cfm (last visited Nov. 25, 2011) (indicating that most oil imports come from North America and increased production of oil leads to decreased dependence on foreign oil).

⁶⁹ Felmy, *supra* note 32, at 25.

⁷⁰ See, e.g., Press Release, White House Office of the Press Sec’y, Remarks by the President on America’s Energy Security (Mar. 30, 2011) (“I give out this statistic all the time, and forgive me for repeating it again: America holds about [two] percent of the world’s proven oil reserves.”).

⁷¹ Felmy, *supra* note 32, at 27.

⁷² See U.S. ENERGY INFO. ADMIN., RENEWABLE ENERGY CONSUMPTION AND ELECTRICITY PRELIMINARY STATISTICS 2010 1 (June 2011) (indicating that in 2010, solar, wind, and geothermal energy accounted for fifteen percent of renewable energy, which accounted for eight percent of total energy supply; solar, wind, and geothermal energy therefore accounted for 1.2 percent of total energy supply in 2010).

does that make? Two percent. Where is the other ninety-eight percent going to come from?

It is going to come from oil, coal, and gas. It is going to be oil sands, so we need the Keystone Pipeline.⁷³ We need all of these things to move forward.

On climate change, if you are going to move forward on things, it should meet the following three points: one, it should not pick winners and losers; two, you do not want to destroy the economy; and three, you should do it as effectively as possible. Waxman-Markey clearly failed that,⁷⁴ and the Environmental Protection Agency regulations that they are talking about right now will probably fail that same test.⁷⁵ Going forward, we are going to need balanced energy. We are going to need all forms of it. We are going to need energy efficiency and so let us be rational about what we are doing instead of just trying to reach for the silver bullet or the sound byte that most likely will not work. I want to thank you very much for your time and turn it over to the next speaker.

REMARKS OF STEVE WINBERG

MR. WINBERG: I am going to talk today about what some people call the “train wreck.” It is basically the suite of the Environmental Protection Agency (“EPA”) regulations that will affect the coal-fired power plant fleet in the United States.

First, a disclaimer. I got the longest one I could because I knew I was talking in front of a group of lawyers.

Let me start with a summary of CONSOL Energy and then the pending regulations affecting coal. I am not going to go through each of those regulations in the interest of time. I will be happy to talk about them afterward. We will talk about the impact of coal fuel generation and then what I believe will be an impact on natural gas for this reason. As we shut down the coal fleet, there is simply not going to be enough renewables to replace it.⁷⁶ I

⁷³ See generally PARFOMAK ET AL., *supra* note 5 (indicating the Keystone Pipeline will facilitate transporting oil from the Alberta oil sands to the United States).

⁷⁴ See generally American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009) (proposing a cap-and-trade system, as passed by the House of Representatives in the Waxman-Markey Bill).

⁷⁵ See Deferral for CO₂ Emissions From Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs, 76 Fed. Reg. 15249 (Mar. 21, 2011) (to be codified at 40 C.F.R. pt. 51-52, 70-71) (describing a series of proposals to address issues associated with biogenic CO₂ emissions from stationary sources).

⁷⁶ See Gabriel Nelson, *AEP Needs to Shutter 25% of Coal Fleet*, N.Y. TIMES (June 9, 2011), available at <http://www.nytimes.com/gwire/2011/06/09/09greenwire-aep-predicts-need-to-shutter-25-of-coal-fleet-91911.html> (highlighting concerns surrounding the impact of shutting down current coal-powered fleets).

think given the events in Japan,⁷⁷ the probability of building nuclear, especially in the next six to eight years, is really off the table. Therefore, the only realistic replacement will be natural gas.

Let me start off with a summary of CONSOL.⁷⁸ We are headquartered in South Point, Pennsylvania. We have been producing energy since the Civil War.⁷⁹ We are an \$11 billion market cap.⁸⁰ We are the largest underground coal producer in the United States.⁸¹ We produce about sixty million tons of high BTU coal, mostly out of the Pittsburgh Eight Seam.⁸² We have 4.4 billion tons of proven and recoverable coal reserves, and we are the second largest among United States coal producers.⁸³

We have also recently laid a big footprint down in the Marcellas and Utica shale.⁸⁴ We purchased \$3.5 billion of gas assets from Dominion, which is headquartered in Richmond.⁸⁵ We purchased about 155 billion cubic feet of natural gas and we have 3.7 Tcf of net-proved reserves.⁸⁶ One thing that makes us unique from other gas producers in the Marcellas play is that we own our reserves in fee.⁸⁷ Very little of that 3.7 Tcf is under lease and, therefore, we are not under any mad rush to go ahead and drill this reserve. A lot

⁷⁷ 2011 Japan Nuclear Crisis, *supra* note 3.

⁷⁸ See generally *Quick Facts*, CONSOL ENERGY, <http://www.consolenergy.com/AboutUs/QuickFacts.aspx> (last visited Jan. 31, 2012) (stating CONSOL is a leading American fuel producer, providing two-thirds of the nation's power supply).

⁷⁹ *Id.*, and Steve Winberg, Presentation to the Canada-United States Law Institute 28th Conference: Impact of EPA Regulations on Coal and Gas, Canada-U.S. L. Inst., at 3 (Apr. 15, 2011), available at http://cusli.org/conferences/annual/annual_2011/documents/Presentation_Winberg.pdf.

⁸⁰ Winberg, *supra* note 79, at 4.

⁸¹ *Id.* at 4

⁸² *Id.* See also *Map of Mines*, CONSOL ENERGY, <http://www.consolenergy.com/Powering/MapofMinesList.aspx> (last visited Nov. 25, 2011) (indicating that the bulk of 2007 coal production came from the Pittsburgh Eight Seam).

⁸³ Winberg, *supra* note 79, at 4. But see *Major U.S. Coal Producers, Annual Coal Report*, U.S. ENERGY INFO. ADMIN, <http://www.eia.gov/coal/annual/> (last visited Dec. 1, 2011) (listing CONSOL as the fifth largest coal producer in the United States based on production).

⁸⁴ Press Release, CONSOL Energy, CONSOL Energy Proved Gas Reserves Nearly Double, from 1.9 Tcf to 3.7 Tcf (Feb. 8, 2011), available at <http://phx.corporate-ir.net/phoenix.zhtml?c=66439&highlight=&id=1526229&p=irol-newsArticle> (last visited Dec. 1, 2011) (stating CONSOL expects to expand Marcellus shale drilling and recently discovered promising sources of Utica shale).

⁸⁵ *Consol Buys Natural Gas Operation*, N.Y. TIMES, Mar. 15, 2010, at B3.

⁸⁶ Winberg, *supra* note 79, at 4.

⁸⁷ Kris Maher, *Noble Energy to Pay Consol \$3.4 Billion for Shale-Gas Stake*, WALL STREET J., Aug. 19, 2011, at B3 (stating CONSOL purchased Marcellus shale holdings from Dominion and is offering other producers an interest in developing CONSOL's holdings).

of the producers have five-year leases.⁸⁸ So if they do not produce, they lose the lease.

We are also the only United States coal company with a research and development facility, and we have 8,600 employees.⁸⁹ Finally, we have the naming rights for the CONSOL Energy Center, which is where the Pittsburgh Penguins play, so you all come and watch a hockey game with us.⁹⁰

Let us talk about these pending regulations. This is a chart that was put together by Edison Election Institute.⁹¹ It shows the regulations between now and 2017.⁹² This is what people call the “train wreck.” There is a lot of EPA activity underway. I am going to concentrate on the broad picture and step back from this rather detailed chart.

The first regulation on my list, but not the first one that has been sent out for comment, is the Transport Rule.⁹³ It regulates fine particulates.⁹⁴ The second one is the Hazardous Air Pollutant Rule.⁹⁵ This regulation was released about two or three weeks ago. I think it is 937 pages long. It will require reductions in a suite of hazardous air pollutants. We also have the Coal Combustion Residue Rule.⁹⁶ This largely is an outcome of the accident that happened at Tennessee Valley Authority a couple years ago.⁹⁷

Then, we have a cooling water intake structure to protect aquatic creatures from getting sucked into cooling water.⁹⁸ This regulation may very well require most power plants to have cooling towers for those that do not already have them. Finally, we have Effluent Guidelines.⁹⁹ This one is not talked about much because it is only a proposal. The EPA is studying it right now, but it is planning on proposing regulations this year.¹⁰⁰

⁸⁸ LEASING OIL AND NATURAL GAS RESOURCES: OUTER CONTINENTAL SHELF, U.S. DEP'T OF THE INTERIOR MINERALS MGMT. SERV. 9-23 (2007) (describing the process of applying for five-year lease programs among oil and natural gas producers.).

⁸⁹ Winberg, *supra* note 79, at 4.

⁹⁰ Milan Simonich, *Consol Wins Naming Rights For Arena*, PITTSBURGH POST-GAZETTE, Dec. 16, 2008, at A1 (stating that Consol Energy won the naming rights for the arena in which the Pittsburgh Penguins play).

⁹¹ *See* Winberg, *supra* note 79, at 4.

⁹² *Id.*

⁹³ *Id.* at 7 and 12.

⁹⁴ *Id.*

⁹⁵ *See id.*

⁹⁶ *Id.* at 7.

⁹⁷ *See generally*, Laura Ruhl et al., *Survey of the Potential and Environmental Impacts in the Immediate Aftermath of the Coal Ash Spill in Kingston, Tennessee*, 43 ENVTL. SCI. & TECH. 6326 (2009) (describing the environmental impacts of the 2008 Tennessee Valley coal ash spill, the largest in United States history, which deposited 4.1 million cubic meters of ash into a major drinking water source.)

⁹⁸ Winberg, *supra* note 79, at 8.

⁹⁹ *Id.*

¹⁰⁰ News Release, Env'tl. Protect. Agency, EPA Announces Schedule to Develop Natural

The mother of all regulatory initiatives, of course, is greenhouse gas, which the EPA is proposing to regulate under the Clean Air Act Amendments of 1990.¹⁰¹ I think this regulatory initiative will not be regulated through the EPA. Congress will have to deal with this.

The Transport Rule.¹⁰² This rule deals with the transport of emission, primarily SO_x and NO_x, eastward because of prevailing winds and it accounts for eighty-six percent of United States coal-fired generation; basically from Texas to the East.¹⁰³ Let us talk about coal-fueled generation. There have been a series of studies that have come out and it is worth pointing out that all of these studies that you see on this table were done in advance of the regulation actually coming out, although there have been some drafts that have hit the street.¹⁰⁴ These are studies that have been done to determine the impact of these regulations on the coal-fired fleet.

The column here in the middle is conventional coal regulations.¹⁰⁵ Said another way: everything but greenhouse gas reductions. If you look down that column, you will see anywhere from a low of about eighteen up to maybe 144 gigawatts.¹⁰⁶ This column here is the addition of CO₂,¹⁰⁷ so this is a real guesstimate, in my opinion, on what will be the impact of greenhouse gas regulations, as well as the criteria pollutant regulations. It goes up to 159 gigawatts.

So what CONSOL did is study this for about the last year and a half. We made an assumption here. We bracketed the issue by looking at this as in a moderate case where you might see about forty gigawatts of coal-fuel generation being shut down due to these regulations. In the severe case it would

Gas Wastewater Standards/Announcement is Part of Administration's Priority to Ensure Natural Gas Development Continues Safely and Responsibly (Oct. 20, 2011), *available at* <http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/91e7fad4b114c4a8525792f00542001!OpenDocument>.

¹⁰¹ Clean Air Act Amendments 42 U.S.C. §§ 7521-7554, 7571-7574, 7581-7590 (1990) (enacting emissions standards for moving sources). *See also* Winberg, *supra* note 79, at 9. (stating the Clean Air Act would require the Environmental Protection Agency to regulate CO₂ emissions).

¹⁰² Winberg, *supra* note 79, at 7 and 12.

¹⁰³ *Id.* at 10.

¹⁰⁴ *See, e.g.*, MICHAEL J. BRADLEY ET AL., ENSURING A CLEAN, MODERN ELECTRIC GENERATING FLEET WHILE MAINTAINING ELECTRIC SYSTEM RELIABILITY 2-6 (2010) (examining proposed effects of the Transport Rule based on the Environmental Protection Agency's draft rules); *see also* ELECTRIC RELIABILITY COUNCIL OF TEXAS, REVIEW OF THE POTENTIAL IMPACT OF REGULATIONS ON THE ERCOT SYSTEM i-iii (2011) (examining the potential impact of new Environmental Protection Agency regulations on generation in Texas).

¹⁰⁵ Winberg, *supra* note 79, at 12.

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

be one hundred gigawatts. Those are the two red bars you see in front of you.¹⁰⁸

Keep in mind we have about 310 gigawatts of generation in the United States that uses coal and it is about 950 million tons of coal, almost a billion.¹⁰⁹ In fact, back in 2007 it was a billion tons of coal.¹¹⁰ Then, we took out the announced retirements and we added back in the new capacity, and so for the moderate case, what we are looking at is a loss of about forty-two million tons of coal. That is bituminous, which is mostly eastern coal, sub-bituminous out in the west.¹¹¹ The other is the lignite, which is primarily in Texas and also up in North Dakota.¹¹² So you see about a forty million ton or four percent loss in coal. Under the severe case, we would be looking at about a twenty-three percent loss in coal.

Any of you that are really paying attention to these numbers, the difference between forty gigawatts and one hundred gigawatts is a factor of two-and-a-half, but it is a factor of five between forty-two million tons of coal lost and 216 million tons. So how can you go from forty gigawatts to one hundred gigawatts but lose by a factor of five? The reason is the forty gigawatts represents older, smaller uses that do not operate very much so you do not burn a lot of coal.¹¹³ As you start eating into the fleet and you get up to that one hundred megawatt case, these units operate at very high capacity factors; therefore, the coal they burn is higher.¹¹⁴ In fact, a lot of people talk about this train wreck in the one hundred gigawatt sense that if we lose one hundred gigawatts of coal-fired power in the next six to eight years, we better call out the National Guard because we are going to have rolling blackouts. We simply cannot build enough capacity to replace that in that short amount of time.

I am going to build up this slide because there is a lot of information and I want to talk to you about the cost of new generation versus the cost of existing generation because, in what I believe is still a relatively fragile economy, cost is an issue. Integrated gasification combined cycle with carbon capture

¹⁰⁸ *Id.* at 13.

¹⁰⁹ ICF INTERNATIONAL, COAL-FIRED ELECTRIC GENERATION UNIT RETIREMENT ANALYSIS 1 (2010) (stating there are 310 gigawatts of coal-fired generation capacity in the United States). *See also* ENERGY TRANSPORTATION, ENCYCLOPEDIA OF LIFE SUPPORT SYSTEMS 3.2 (Sunggyu Lee ed., 1998) (stating that United States coal production is 950 million tons).

¹¹⁰ FRED FREME, U.S. ENERGY INFO. ADMIN., U.S. COAL SUPPLY AND DEMAND 7 (2007).

¹¹¹ U.S. DEP'T OF THE INTERIOR, U.S. GEOLOGICAL SOC'Y, COAL FIELDS OF THE CONTINENTAL UNITED STATES (1996).

¹¹² *Id.*

¹¹³ *Contra* CREDIT SUISSE, GROWTH FROM SUBTRACTION 25 (2010) ("Remarkably, although these plants are small and old, they are significant contributors to our electricity needs: on average they are dispatched at 48%, only 15% lower than US average (63%).").

¹¹⁴ *See id.* at 20-27 (discussing the status of the United State's coal plants).

and sequestration (“CCS”) comes in at about \$150 per megawatt hour.¹¹⁵ That is a levelized cost. The next generation, where the Department of Energy (“DOE”) wants to go, where Carl Bauer and the road he started the DOE down, would bring that down to about \$102 per megawatt hour.¹¹⁶ Conventional technology is about \$151 per megawatt hour.¹¹⁷ It is \$110 per megawatt hour once we do the research and development, including the development on the new technologies that will reduce the cost.¹¹⁸ I would not say these are aspirational. I think they are possible but they are probably ten to fifteen years away before we are commercially ready to put coal-fired power plants on the ground with CCS in that \$100 to \$110 price range.

Here is where the coal fleet sits right now at about thirty-three dollars per megawatt hour.¹¹⁹ You can see there is a pretty significant difference in price. Today’s natural gas combined cycle is about eighty-three dollars per megawatt hour¹²⁰ and today’s new super critical pulverized coal without CCS is about eighty-five dollars.¹²¹ There is about a two dollar a megawatt difference. That is really in the band of noise. However, to build out a natural gas plant, you are looking at about two years and about maybe \$1,500 per kilowatt hour.¹²² To build coal, you are probably at \$4,000 per kilowatt hour and six years away.¹²³ There is a time value of money here. I think most of the power generation in the United States will be building out natural gas rather than coal because there is a fair amount of risk in building coal right now at regulatory certainty.

So, let us look at what that does to natural gas if we lose forty to one hundred gigawatts of power. This slide here shows you gas consumption in the electric power sector and the industrial sector.¹²⁴ If we lose about forty gigawatts, that is one trillion cubic feet of additional gas. If we lose the one

¹¹⁵ Winberg, *supra* note 79, at 13. See generally David Biello, *How Fast Can Carbon Capture and Storage Fix Climate Change?*, SCI. AM. (Apr. 10, 2009), <http://www.scientificamerican.com/article.cfm?id=how-fast-can-carbon-capture-and-storage-fix-climate-change>.

¹¹⁶ Carl O. Bauer, Dir. of Nat’l Energy Tech. Lab., U.S. Dep’t of Energy, House Select Comm. on Energy Independence and Global Warming, Hearing on Future of Coal: Carbon Capture and Storage (2007) (detailing the Department of Energy’s thirteen year plan to reach optimized carbon sequestration and storage technology for commercial deployment).

¹¹⁷ Winberg, *supra* note 79, at 13.

¹¹⁸ *Id.*

¹¹⁹ *Id.*

¹²⁰ *Id.*

¹²¹ *Id.*

¹²² Cf. STAN KAPLAN, POWER PLANTS: CHARACTERISTICS AND COSTS 82 (2008) (reporting average estimated cost of constructing a natural gas plant at \$1,165 per kilowatt hour).

¹²³ See DAVID SCHLISSEL, ALLISON SMITH & RACHEL WILSON, COAL-FIRED POWER PLANT CONSTRUCTION COSTS 3 (July 2008) (“Wisconsin Power & Light . . . estimated that the cost of building a new supercritical coal plant also would exceed \$3,500/kW.”).

¹²⁴ Winberg, *supra* note 79, at 15.

hundred gigawatts, we are at about five trillion cubic feet of additional gas.¹²⁵ Again, that extreme difference is because at one hundred gigawatts, these are high capacity factor units. They are operating in the eighty to eighty-five percent range.¹²⁶

Now, let us look at natural gas production. What this slide shows you is all the sources of natural gas production using 2010 as the small index. This slide was also put together by the National Energy Technology Lab as part of the DOE.¹²⁷ If you add all of those sources of gas together, and I think the one to pay attention to is the lower forty-eight unconventional, that is the role Marcella and Utica shale plays.¹²⁸ By 2020, we will have about one trillion cubic feet of gas over what we have right now.¹²⁹

Now, if I index this back to 2007, when the economy was robust, we would be at a deficit by 2020, but I put it at 2010. If you believe the economy is going to take off, it will easily absorb this one trillion cubic feet of natural gas without any additional generation, just bringing industry back.¹³⁰ But the point is, with the Marcella shale and Utica shale, I believe that we can produce enough natural gas if we lose about forty gigawatts of power because that is the one trillion cubic feet.

Go all the way over to your right-hand side of the slide, at 2.3 trillion cubic feet by 2035, this again is EIA's estimate, if we are at that one hundred gigawatt loss of coal, we need to bring on five trillion cubic feet of natural

¹²⁵ *Contra* CREDIT SUISSE, *supra* note 113, at 62 (estimating only 3.72 trillion cubic feet per year increase in demand for natural gas in the event that all on hundred gigawatt plants are retired).

¹²⁶ *See generally* STAN KAPLAN, *DISPLACING COAL WITH GENERATION FROM EXISTING NATURAL GAS-FIRED POWER PLANTS* 26 (2010) (defining capacity factor and discussing its relevance to plant utilization).

¹²⁷ Winberg, *supra* note 79, at 17.

¹²⁸ *See generally* KENT PERRY & JOHN LEE, *UNCONVENTIONAL GAS RESERVOIRS—TIGHT GAS, COAL SEAMS, AND SHALES 1* (2007) (“[U]nconventional gas reservoirs represent a vast, long-term, global source of natural gas and have not been appraised in any systematic way. Unconventional gas resources—including tight sands, coalbed methane, and gas shales—constitute some of the largest components of remaining natural gas resources in the United States.”).

¹²⁹ *See* U.S. ENERGY INFO. ADMIN., *ANNUAL ENERGY OUTLOOK 2011 202* (2010) (citing 23.66 trillion cubic feet of gas per year for 2009 as compared to an estimated 25.12 trillion cubic feet of gas per year for 2025, for an increase of 1.46 trillion cubic feet of gas).

¹³⁰ *Natural Gas Demand*, NATURALGAS.ORG, <http://www.naturalgas.org/business/demand.asp> (last visited Feb. 2, 2012) (“When the economy is expanding, output from industrial sectors is generally increasing at a similar rate. When the economy is in recession, output from industrial sectors drops. These fluctuations in industrial output accompanying economic upswings and downturns affects the amount of natural gas needed by these industrial users . . . Thus the short term status of the economy has an effect on the amount of natural gas consumed in the United States.”).

gas.¹³¹ That is going to be a very, very heavy lift to the natural gas industry and, quite frankly, I think it is not possible.

So the question is, if we have to bring on that much gas, what is that going to do to the average fossil fuel price and, therefore, the average price of electricity? I think that is largely unknown, and I think there are a number of factors that make it unknown. Electric price increase will be a function of the timing of the regulation implementation. If EPA provides power producers with more time, then they are not going to be putting this equipment in and you are not going to see super escalation in things like labor cost and steel cost and those sort of commodity prices. Clearly, the power industry needs more time than is currently set up in the regulatory structure. Otherwise, we are going to see significant escalation.

Second, of course, is the price of natural gas. If the price of natural gas stays down to the levels where it is at, I think you will see a lot of people shutting down older, smaller units and building natural gas. If the economy recovers in the next couple years and we see prices moving towards that six, seven, eight dollar per Mcf (thousand cubic feet) range, I think people are going to be installing capital in existing, fully-depreciated plants rather than going to natural gas.

Finally, I think the real issue between the forty gigawatt loss and the one hundred gigawatt loss is what happens with CO₂. Are you going to put hundreds of millions of dollars of capital into a plant that is twenty or thirty years old if you think you are going to have carbon legislation in the next ten to fifteen years because you need to get a return on that capital? I think that is going to play a significant role in the decision making of these companies on whether they invest in existing infrastructure and existing power plants or build new with natural gas. So with that, I will turn it over to the next speaker and I look forward to your questions.

REMARKS OF DANIELLE DROITSCH

MS. DROITSCH: Thank you for having me. My name is Danielle Droitsch. I work with the Pembina Institute.¹³² We are a Canadian environmental think-tank. We are based out of Canada. There is now a Washington, D.C. office, which is me. Our focus is on energy solutions, so we work in four program areas: oil sands, energy efficiency renewables, climate change, and transportation. Many people do not know this about us, so for those who do not know, we are partly a consulting firm and partly a policy outfit. For the consulting firm, we actually have engineers, a number of technicians, and policy analysts who provide services to provincial, federal, and local com-

¹³¹ Winberg, *supra* note 79, at 16.

¹³² PEMBINA INST., <http://www.pembina.org> (last visited Nov. 17, 2011).

munities, as well as non-governmental organizations and businesses. And we also have a policy arm, in which I work, and we actually engage directly in energy policy at all levels.

I am going to talk to you about two of the areas that we work on today, which are climate change and oil sands. I will let you know the presentation will begin a little bit in the negative end, as sort of a downer, but I promise you that by the end of the presentation it will be more hopeful.

Climate change is one of the reasons we do what we do. Scientists are painting an increasingly dire picture of the nature of climate change and the impact on the planet. If we do nothing, sea level will increase by one meter and will permanently displace tens of millions of people with disastrous social and economic effects.¹³³ Water shortages alone from glaciers will actually impact twenty-five percent of the population.¹³⁴ It has been described as the biggest global health threat in this century, which would have tremendous impacts on water, food, security and extreme events.¹³⁵ Extreme seasonal heat would actually have a particular impact on rain-fed agriculture.¹³⁶ Africa rain-fed agriculture will be reduced by fifty percent and after forty percent a species would become globally extinct.¹³⁷ This is if we do nothing.

Now, in Canada there will be impacts as well. The average temperatures in the Canadian provinces will increase by two to six degrees centigrade, with the largest increases in the Arctic.¹³⁸ There will be an increase in heat-related deaths and more droughts, which will have a profound impact on water supply, particularly in the western provinces.¹³⁹ There will be stress on

¹³³ ANTHONY OLIVER-SMITH, UNITED NATIONS UNIV. INST. FOR ENV'T AND HUMAN SEC., SEA LEVEL RISE AND THE VULNERABILITY OF COASTAL PEOPLES 9, 28 (2009), available at <http://www.ehs.unu.edu/file/get/4097>.

¹³⁴ INT'L HYDROLOGICAL PROGRAMME, THE IMPACT OF GLOBAL CHANGE ON WATER RESOURCES 9-10 (2011).

¹³⁵ Anthony Costello et al., *Managing the Health Effects of Climate Change*, 373 THE LANCET 1693, 1693 (2009).

¹³⁶ LARRY BERNSTEIN ET AL., CLIMATE CHANGE 2007 SYNTHESIS REPORT SUMMARY FOR POLICYMAKERS 11 (2007) (stating in regard to Africa, "[b]y 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%," in regard to North America, "[i]n the early decades of the century, moderate climate change is projected to increase aggregate yields of rain-fed agriculture by 5 to 20%, but with important variability among regions.").

¹³⁷ *Id.* See also OFFICE OF THE HIGH REPRESENTATIVE FOR THE LEAST DEVELOPED COUNTRIES, LANDLOCKED DEVELOPING COUNTRIES AND SMALL ISLAND DEVELOPING STATES, THE IMPACT OF CLIMATE CHANGE ON THE DEVELOPMENT PROSPECTS OF THE LEAST DEVELOPED COUNTRIES AND SMALL ISLAND DEVELOPING STATES 21 (2009).

¹³⁸ GOV'T OF CAN., CANADA'S FOURTH NATIONAL REPORT ON CLIMATE CHANGE 6 (2006) ("The climate change will not be uniform, and the north's climate may rise by nearly 3°C to 4°C in winter months over the next 50 years.").

¹³⁹ *Id.* at 180 (discussing the effect of global warming on Canadian water resources). See also GOV'T OF CAN., CANADA'S THIRD NATIONAL REPORT ON CLIMATE CHANGE 101 (2001) (predicting heat-related deaths in Toronto, Canada will increase from nineteen in 2001 to 563

wildlife, a decline of sea ice, more severe winter storms, shifting ecosystems, loss of wetlands, and it will impact our Canadian icon species of polar bears, seals, caribou, and ducks. The sea level rise will, of course, especially affect Canada's sea and facial river delta.¹⁴⁰ It would also place stress on forests with more drought-favorable conditions and increase mortality for susceptible tree species.¹⁴¹

The growing consensus is that we must do whatever is possible to not exceed a warming threshold of two degrees centigrade.¹⁴² Above two degrees centigrade, warming is regarded as dangerous climate change, the point at which there is irreversible ecological damage and reversing human development.¹⁴³ Unfortunately, it is happening faster than previously estimated.¹⁴⁴ Already global surface temperatures have increased by 0.7 degrees centigrade, already above pre-industrial levels due mainly to a buildup in the atmosphere of greenhouse gas emissions.¹⁴⁵ Even if we were to stop all greenhouse gas emissions today, we would still see a warming that would double from existing emissions in the atmosphere.¹⁴⁶

in 2050).

¹⁴⁰ OLIVER-SMITH, *supra* note 133, at 22.

¹⁴¹ CAN. COUNCIL OF FOREIGN MINISTERS, VULNERABILITY OF CANADA'S TREE SPECIES TO CLIMATE CHANGE AND MANAGEMENT OPTIONS FOR ADAPTATION: AN OVERVIEW FOR POLICY MAKERS AND PRACTITIONERS (2009).

¹⁴² M.G.J. DEN ELZEN & M. MEINSHAUSEN, MEETING THE EU 2°C CLIMATE TARGET: GLOBAL AND REGIONAL EMISSION IMPLICATIONS 6 (2005) ("[T]he point of departure of our analysis will be the long-term EU climate target of limiting the global mean temperature increase to 2°C above pre-industrial levels (1861-1890), as adopted in 1996, and recently reaffirmed by the European Council in March 2005.").

¹⁴³ RICK DUKE & DAN LASHOF, NATURAL RES. DEF. COUNCIL, THE NEW ENERGY ECONOMY: PUTTING AMERICA ON THE PATH TO SOLVING GLOBAL WARMING (2008) (summarizing impacts from global warming of roughly two degrees Celsius). *See generally* CHRISTOPHER B. FIELD ET AL., INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY 12-17 (Michael MacCracken & Gordon McBean eds., 2007) (discussing the human and environmental impacts of climate change on North America).

¹⁴⁴ DUKE & LASHOF, *supra* note 143, at 2.

¹⁴⁵ David Biello, *The New Normal?: Average Global Temperatures Continue to Rise*, SCI. AM. (July 22, 2010), <http://www.scientificamerican.com/article.cfm?id=average-global-temperature-rise-creates-new-normal> (quoting Jay Lawrimore, of the National Climatic Data Center as stating "[t]he global temperature has increased more than 1 degree Fahrenheit [0.7 degree C] since 1900 and the rate of warming since the late 1970s has been about three times greater than the century-scale trend.").

¹⁴⁶ *Climate Q&A: If we immediately stopped emitting greenhouses gases, would global warming stop?*, NASA (July 2, 2007), <http://earthobservatory.nasa.gov/blogs/climateqa/would-gw-stop-with-greenhouse-gases/> ("Even if all emissions were to stop today, the Earth's average surface temperature would climb another 0.6 degrees or so over the next several decades before temperatures stopped rising.").

Our work around climate change is closely linked to our work around Canadian oil sands, which are also known as the tar sands.¹⁴⁷ The tar sands and oil sands are one and the same. So this is a key aspect in Canada. It is a fairly major issue. It has generated a tremendous amount of controversy and now also in the United States, in addition to Canada. There are 1.7 trillion barrels of oil that underlie portions of Alberta.¹⁴⁸ Today, there are 175 billion barrels that are recoverable with today's technology and what is considered economically feasible.¹⁴⁹

The area that the oil is under is like fifty-four thousand square miles, about the size of Florida.¹⁵⁰ There are two types of extraction methods: surface mining¹⁵¹ and in situ or drilling,¹⁵² both of which I am going to cover. The area affected by oil sands development would be about one and a half times the size of Yosemite National Park.¹⁵³ Mining is water intensive, energy intensive, and land intensive. Water intensive in terms of two to four barrels of water required for every barrel of oil, land intensive because you need about four tons of material, and energy intensive as well.¹⁵⁴

One of the major issues is the creation of major tailings ponds.¹⁵⁵ There are a number of environmental issues. I cannot get into all of them today, but one of the issues that we are particularly concerned about are the tailings ponds, which are more like lakes. Essentially, you need water in the production process and ninety percent of the water that is withdrawn from mostly surface water actually cannot be returned to the environment.¹⁵⁶ So, while there is water recycling, the reality is ninety percent of the water cannot be

¹⁴⁷ See OILSANDSWATCH.ORG, <http://www.pembina.org/oil-sands> (last visited Nov. 20, 2011).

¹⁴⁸ *Oil Sands: Facts and Statistics*, GOV'T OF ALTA., <http://www.energy.alberta.ca/OilSands/791.asp> (last visited Feb. 3, 2012).

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*

¹⁵¹ ENV'T NORTHEAST, CANADA OIL SANDS PRIMER 2-3 (2009), available at http://www.envne.org/public/resources/pdf/ENE_Canadian_Oil_Sands_Primer_20090810_final.pdf.

¹⁵² *Id.*

¹⁵³ Danielle Droitsch, *Key to U.S. energy security is decreasing oil demand, not increasing oil sands supply*, PEMBINA INST. (Mar. 30, 2011), <http://www.pembina.org/blog/515>.

¹⁵⁴ INT'L BOREAL CONSERVATION CAMPAIGN, CANADA'S TAR SANDS I (2008), available at www.calproject.org/factsheet-ibcc-tarsands.pdf (stating "[u]p to four barrels of water are drained from the Athabasca River to produce one barrel of tar sands oil").

¹⁵⁵ *Id.* at 3 (stating "the toxic tailings ponds pose health and environmental risks from the migration of cancer-causing pollutants through the groundwater system and due to the leaks to the surrounding soil and surface water.").

¹⁵⁶ MARY GRIFFITHS ET AL., PEMBINA INST., TROUBLED WATERS, TROUBLING TRENDS (Rande Holmes ed., 2006) ("While the removal of water from the watershed is not unique to the oil industry, it is true that much of the water used for oil recovery does not return to the watershed.").

returned.¹⁵⁷ The water then goes into these lakes because it is too contaminated. The lakes right now cover an area about the size of Washington, D.C., and they are projected to grow.¹⁵⁸ Even with current regulations in Alberta, they are projected to grow.

There is an impact of these ponds on bird populations; I wanted to mention this because a lot of people look at these tailings ponds and say, “That is in Canada so it does not affect me.” But, in fact, these ponds are actually right on the top of the North American bird pathway. Birds basically see these ponds, mistake the ponds for lakes, and they actually land on the ponds.¹⁵⁹ There have been two reported incidents of bird deaths in a couple thousand birds over the past couple of years.¹⁶⁰ Pembina Institute, Natural Resources Defense Counsel (“NRDC”), and the Royal Songbird Initiative put together a study where we actually estimate these deaths because we do not know about all the bird deaths; so there are about eight thousand or more bird deaths annually due to these types of incidents.¹⁶¹

The other type of extraction is in situ, which is drilling. Basically, hot water is injected into the ground to soften the bitumen and then they bring it back to the surface. Now, it has been described as the environmentally friendly alternative to mining, but actually it has major impacts, particularly in the area of greenhouse gas emissions,¹⁶² which I will get to in a second. Further, in situ is still an intensive land use. You will need roads, seismic

¹⁵⁷ BRIAN GREG, GEN. ELECTRIC, MANAGING WATER RESOURCES IN THE OIL SANDS INDUSTRY 1 (2010) (listing methods to enhance, reduce use of, and recycle water in the context of oil sand extraction).

¹⁵⁸ JENNIFER GRANT ET AL., PEMBINA INST., FACT OR FICTION: OIL SANDS RECLAMATION 2 (2008) (“Tailings ponds already cover an area greater than 50 square kilometres . . . Including new approvals and planned projects, tailings ponds will occupy over 220 square kilometres. This area is five times the size of Alberta’s Sylvan Lake.”), and *State & County QuickFacts: District of Columbia*, U.S. CENSUS BUREAU, <http://quickfacts.census.gov/qfd/states/11000.html> (last modified Jan. 17, 2012) (reporting Washington, D.C.’s land mass as 61.05 square miles, which is equivalent to 158.118774 square kilometers).

¹⁵⁹ Letter from Sarah Burt, Earthjustice, & Melissa Gorrie, Ecojustice Canada, et al. to Ken Salazar, U.S. Sec’y of the Interior (Sept. 22, 2011), *available at* <http://www.ecojustice.ca/media-centre/media-release-files/tar-sands-pelly-petition> (stating migratory birds mistake tailings ponds for natural ponds, become oiled with toxic elements, and drown).

¹⁶⁰ See *Oilsands Tailings Ponds Kill More Ducks*, CBC NEWS (Oct. 26, 2010, 10:40 PM), <http://www.cbc.ca/news/canada/edmonton/story/2010/10/26/edmonton-more-ducks-tailings-pond.html>.

¹⁶¹ See JEFF WELLS ET AL., NAT. RES. DEF. COUNCIL, THE BOREAL SONGBIRD INITIATIVE & THE PEMBINA INSTITUTE, DANGER IN THE NURSERY: IMPACT ON BIRDS OF TAR SANDS OIL DEVELOPMENT IN CANADA (2008).

¹⁶² IHS CERA, OIL SANDS, GREENHOUSE GASSES AND U.S. OIL SUPPLY 8 (2010) (“On average, oil sands products processed in the United States result in well-to-wheels GHG emissions of about six percent higher than the average crude consumed in the United States.”).

lines, and pipelines. You will need well pads so there are still impacts to that landscape.

This area here is a satellite image that shows an area that would actually be subject to in situ development.¹⁶³ We worked with some artists and actually came up with a projection of what this area would look like if we were to project into the future.

This is what in situ development would look like for that region. There is still a fairly intensive land use. If you are wildlife, you would not want to be inhabiting this area. Right now we already see declining populations of caribou, lynx, and wolverine.¹⁶⁴ We know that with oil sands development total, mining and in situ, that woodland caribou is projected to become locally extinct or extricated because of this type of development.¹⁶⁵

One of the major concerns around in situ is greenhouse gas emissions. Oil sands in general is the fastest growing source of greenhouse gas emissions in Canada and oil sands in general are some of the most greenhouse gas intensive oil on earth.¹⁶⁶ Without stronger government policies, emissions from this sector will grow by two or three times by the end of the decade,¹⁶⁷ and it is putting our attainment for Canada's national emissions target at risk.¹⁶⁸

Now, going back to in situ for a moment, you can see here that in situ is actually two and a half times more intensive than mining, so that is one of the concerns with in situ.¹⁶⁹ It is not the more environmental alternative, at least

¹⁶³ Danielle Droitsch, Pembina Inst., Presentation: Canada's Oilsands: Energy Security, Oil Dependence, and a Path for the Future, Can.-U.S. L. Inst., at 14 (2011), *available at* http://cusli.org/conferences/annual/annual_2011/documents/Presentation_Droitsch.pdf.

¹⁶⁴ Vince Stricherz, *Caribou in Alberta's Oil Sands Stressed by Human Activity, Not Wolves, Research Suggests*, U. WASH. (June 22, 2011), <http://www.washington.edu/news/articles/caribou-in-alberta2019s-oil-sands-stressed-by-human-activity-not-wolves> ("In the area of the petroleum-rich Athabasca Oil Sands in the northern part of the Canadian province, some say [Caribou] could disappear in as little as 30 years.").

¹⁶⁵ *Id.*

¹⁶⁶ JENNIFER GRANT, THE PEMBINA INST., CLEARING THE AIR ON OIL SANDS MYTHS 5 (2009). *See generally* CAN. ASS'N. OF PETROLEUM PRODUCERS, AIR EMISSIONS IN CANADA'S OIL SANDS I (2011) ("Life cycle GHG emissions for oil sands are comparable to [United States] domestic and imported conventional crude oils.").

¹⁶⁷ GOV'T OF CAN., CANADA'S EMISSIONS TRENDS 22 (2011) ("[I]ncreased production in the oil sands is expected to result in overall oil and gas emissions increasing by 46 Mt (30%) between 2005 and 2020.").

¹⁶⁸ *Id.* at 8.

¹⁶⁹ Elizabeth McGowan, *To Green Oil Sands, Mining, Solvent Instead of Steam?*, REUTERS (Jan. 24, 2011, 7:00 AM), <http://www.reuters.com/article/2011/01/24/idUS65892539220110124> (stating that not only is in situ much more carbon intensive than open pit mining, but it is becoming more prevalent because nearly eighty percent of the bitumen is underground).

when it comes to greenhouse gas emissions. Mining is actually still far more greenhouse gas intensive than conventional so the concern is still there for mining.¹⁷⁰

The Keystone XL Pipeline has been already mentioned a few times. It is a major debate in the United States that this pipeline is a significant pipeline. There has not been much controversy over previous pipelines, but this pipeline is actually initially rated as 700,000 barrels a day.¹⁷¹ It will be ultimately 900,000 barrels a day.¹⁷² To give you a sense of how big that is, that is about the size of the amount of oil sands that are actually coming to the United States. This is a doubling of imports¹⁷³ and that is why there is so much controversy. Greenhouse gas emissions are a big part of that.

The pipeline is about 1,700 miles long.¹⁷⁴ It would carry crude oil from Canada down to the Gulf Coast, go through six states,¹⁷⁵ and there are a number of impacts in the United States. There is no time to kind of go through those today, but pipeline safety and impacts to the algal aquifer are two of them. In Canada, our organization is very concerned about the fact that this pipeline in our estimation would actually have an increased impact on production.¹⁷⁶ That is counter to the estimation of some studies that have been coming out recently saying Keystone XL would have no impact on production,¹⁷⁷ but we disagree.

¹⁷⁰ See generally Christina Marshall, *Can Canada Clean Alberta's Oil Sands?*, SCI. AM. (Dec. 17, 2010), <http://www.scientificamerican.com/article.cfm?id=can-canada-clean-oil-sands> (discussing various studies comparing in situ versus conventionally processed oil).

¹⁷¹ Bradley Olson, *TransCanada to Fund Keystone XL Pipeline With Cash After Delay*, BLOOMSBURG BUSINESSWEEK (Nov. 18, 2011, 4:07 AM), <http://www.businessweek.com/news/2011-11-20/transcanada-to-fund-keystone-xl-pipeline-with-cash-after-delay.html> ("TransCanada Corp. plans to pay for the remaining \$5 billion of its Keystone XL without issuing more debt since U.S. approval of the project was delayed until at least 2013."). See generally *Keystone Pipeline Map*, TRANSCANADA.COM, http://www.transcanada.com/keystone_pipeline_map.html (last modified July 6, 2011).

¹⁷² Nicholas St. Fleur, *To Build or Not to Build the Keystone XL Pipeline*, THE CORNELL DAILY SUN (Nov. 2, 2011), <http://cornellsun.com/node/48662>.

¹⁷³ Clifford Krauss & Elisabeth Rosenthal, *Reliance on Oil Sands Grows Despite Environmental Risks*, N.Y. TIMES (May 18, 2010), <http://www.nytimes.com/2010/05/19/business/energyenvironment/19sands.html?pagewanted=all> ("The United States produces about five million barrels of oil a day and imports 10 million more. Canada accounts for about 1.9 million barrels of the daily import.").

¹⁷⁴ St. Fleur, *supra* note 172.

¹⁷⁵ Olson, *supra* note 171.

¹⁷⁶ ENSYS ENERGY, *KEYSTONE XL ASSESSMENT 11* (2010) (estimating that between 2025 and 2030 "the fraction of crude produced from oil sands [will rise] from 65% to 91%").

¹⁷⁷ Claudia Cattaneo, *The Stranded Oil Sands: A Worst-Case Scenario*, FIN. POST (Oct. 29, 2011, 9:00 AM), <http://business.financialpost.com/2011/10/29/the-stranded-oil-sands-a-worst-case-scenario/> (predicting that production will increase regardless of whether the Keystone XL Pipeline is built as oil companies will simply look to other markets).

So the pipeline actually raised some very important questions. Does this pipeline in Canada's oil sands bring the United States more energy security? What is energy security? There are as many definitions of energy security out there as there are opinions.¹⁷⁸ It has basically become a very polarized discussion and it is unfortunate, but the International Energy Agency ("IEA"),¹⁷⁹ one of the world's most respected organizations tracking energy issues, has defined energy security as a function of three things: price, environmental impacts, and the source of supply.¹⁸⁰

Now, when it comes to Canada, there is no doubt that Canada is a friendly country. If you are going to get oil from Canada versus the Middle East, there is going to be no comparison there. But when you are looking at the environmental impacts, oil sands is high impact oil.¹⁸¹ It just is. It has got tremendous impacts associated with it, especially for greenhouse gas emissions.¹⁸² Then when it comes to price, there is a bit of conventional wisdom that somehow the price issue is resolved with oil sands. You need high oil prices to have oil sands be economic. You need high gas prices in order for this source of energy to become a source of energy to the United States. In terms of price, you are not going to have lower gas prices with oil sands.

Now, this is really where I wanted to end up: the problem with oil dependence. Yes, the United States has less than two percent of the world's oil supply and is responsible for a quarter of the world's oil consumption.¹⁸³ The growing consensus, and this is not just the environmental community anymore, is that the United States must significantly reduce oil demand.¹⁸⁴ There are two reasons for that. Because we are so reliant on oil, we are not in the driver's seat. The OPEC cartel is in the driver's seat. We are so addicted to oil, we are now going after the harder and harder to reach oil, which is having environmental ramifications.

The absolute best way for us to not be held hostage to the ups and downs of the global oil market is to reduce our dependence on oil itself. I cannot

¹⁷⁸ INT'L ATOMIC ENERGY AGENCY, ANALYSES OF ENERGY SUPPLY OPTIONS AND SECURITY OF ENERGY SUPPLY IN THE BALTIC STATES 145-200 (2007).

¹⁷⁹ INT'L ENERGY AGENCY, <http://www.iea.org/> (last visited Nov. 19, 2011).

¹⁸⁰ *Energy Security*, INT'L ENERGY AGENCY, http://www.iea.org/subjectqueries/keyresult.asp?KEYWORD_ID=4103 (last visited Nov. 19, 2011) (stating energy security may be described as "the uninterrupted physical availability at a price which is affordable, while respecting environment concerns").

¹⁸¹ INT'L BOREAL CONSERVATION CAMPAIGN, *supra* note 154, at 1.

¹⁸² PIERRE GOSSELIN ET AL., ROYAL SOC'Y OF CAN., ENVIRONMENTAL AND HEALTH IMPACTS OF CANADA'S OIL SANDS INDUSTRY 4-5 (2010).

¹⁸³ NATURAL RES. DEF. COUNCIL, CLEAN ENERGY: THE SOLUTION TO VOLATILE GAS PRICES 1 (2009).

¹⁸⁴ COUNCIL ON FOREIGN RELATIONS, NATIONAL SECURITY CONSEQUENCES OF U.S. OIL DEPENDENCY 5 (2006) (acknowledging that "while reducing U.S. oil imports is desirable, the underlying problem is the high and growing demand for oil worldwide").

emphasize that more strongly. We have got to start getting control of the oil dependence. So more oil, whether it is offshore drilling, oil shale, or oil sands, going after those sources and trying to satiate this addiction is actually not going to help us with the energy security debate, and I am talking about economic issues, not environmental.

The other reason we need to address reducing our demand for oil is to protect our climate. According to the IEA, oil demand needs to peak by 2018 if we are to avert major climate disaster.¹⁸⁵ If we are to continue business as usual in terms of the growth of fossil energy consumption, the long-term concentration of greenhouse gases in the atmosphere—and this is according to the IEA—would damage and result in global average surface temperatures of six degrees centigrade.¹⁸⁶ That is massive climatic change and would result in irreparable damage to the planet.¹⁸⁷ We have to get after the oil demand.

Now, as my colleague from the American Petroleum Institute pointed out, how do we get started? Transportation is where we are going to have to begin. Transportation is where most of the oil is being consumed at this time.¹⁸⁸ Right now, we are going to have to be more aggressive with vehicle efficiency, which can go a long way to reducing oil demand. The Obama Administration established fuel efficiency standards for automobiles and light trucks, and this is just the beginning.¹⁸⁹ There are now going to be the first-ever fuel efficiency standards for medium and heavy-duty trucks.¹⁹⁰ Trucks consume more than two million barrels every day and they only average six miles per gallon.¹⁹¹

¹⁸⁵ Lorne Stockman, *The IEA Acknowledges Peak Demand is Needed*, OILCHANGE INT'L (Dec. 4, 2010),

<http://priceofoil.org/2010/12/04/the-ica-acknowledges-peak-oil-demand-not-supply/>.

¹⁸⁶ Vivienne Walt, *After the Recession, an Energy Crisis Could Loom*, TIME (Nov. 10, 2009), <http://topics.time.com/energy-crisis/articles/>.

¹⁸⁷ *Id.*

¹⁸⁸ Cf. U.S. ENERGY INFO. ADMIN., ANNUAL ENERGY REVIEW 2010 38 (2010) (indicating the following end-use sector shares of oil: industrial with thirty-one percent, transportation with twenty-eight percent, residential twenty-three percent, and commercial with nineteen percent).

¹⁸⁹ Press Release, Nat'l Highway Traffic Safety Admin., *We Can't Wait: Obama Administration Proposes Historic Fuel Economy Standards to Reduce Dependence on Oil, Save Consumers Money at the Pump* (Nov. 16, 2011), *available at* <http://www.nhtsa.gov/About+NHTSA/Press+Releases/2011/We+Can't+Wait:+Obama+Administration+Proposes+Historic+Fuel+Economy+Standards+to+Reduce+Dependence+on+Oil,+Save+Consumers+Money+at+the+Pump.>

¹⁹⁰ EPA ET AL., EPA AND NHTSA PROPOSE FIRST-EVER PROGRAM TO REDUCE GREENHOUSE GAS EMISSIONS AND IMPROVE FUEL EFFICIENCY OF MEDIUM- AND HEAVY DUTY VEHICLES: REGULATORY ANNOUNCEMENT 1 (2010) (describing proposed regulations of medium- and heavy-duty vehicles designed to address the concerns of energy security, oil dependency, and global climate change).

¹⁹¹ Paul Rauber, *Beyond Oil in 20 Years*, SIERRA CLUB, Jan./Feb. 2011, at 35.

Boosting fuel economy also creates jobs, too. One study estimated that as many as 124,000 new jobs will be created nationwide simply by going after fuel efficiency.¹⁹² Now, there are any number of ways for us to start going after this oil demand and we could have a seminar for two days simply just on going to the different opportunities to go after oil demand but how much oil can we save? This is really where we have to begin the national conversation, and it is already started. President Obama has certainly made some statements as of late to say how can we go after it and he has basically said we can cut the oil by one-third.¹⁹³ Yes, we can, it is entirely possible. It is not pie in the sky.

This is a Natural Resources Defense Council (“NRDC”) graph.¹⁹⁴ Basically, there are two pieces here. The clean energy is basically a projection that if we were to make investments in fuel economy, building efficiency, advancing biofuels, making air travel more efficient, doing smart growth, transit, and electric vehicles. If we were to basically make more investments in these essentially low hanging fruits, it is still going to be difficult, still going to be hard, but we can do it and basically we can save ten million barrels a day by 2030.¹⁹⁵

Others have estimated. The EPA has estimated we can cut oil use by seven million barrels a day by 2030¹⁹⁶ and others’ estimates are more aggressive.¹⁹⁷ The Rocky Mountain Institute in cooperation with the Pentagon put out a study that said we can actually reduce oil demand altogether by 2050.¹⁹⁸ There are lots of debates about how far you can go but the reality is that we can actually make serious cuts.

Now, that red section there is actually the proposed drilling in a lower, off-shore drilling and Arctic refuge.¹⁹⁹ The point of this slide from NRDC is

¹⁹² UNION OF CONCERNED SCIENTISTS & CALSTART, DELIVERING JOBS: THE ECONOMIC COSTS AND BENEFITS OF IMPROVING THE FUEL ECONOMY OF HEAVY DUTY VEHICLES 2 (2010).

¹⁹³ President Barack Obama, Remarks by the President on the Clean Fleet Partnership in Landover, Maryland (Apr. 1, 2011) (“When I was first elected to this office, America imported 11 million barrels of oil a day – 11 million barrels. [By a little more than] [a] decade from now, I want us to have cut that by one-third.”).

¹⁹⁴ Droitsch, *supra* note 163, at 25.

¹⁹⁵ NAT’L RES. DEF. COUNCIL, ENERGY FACTS: CLEAN ENERGY SAVES AMERICANS MONEY 1 (2009).

¹⁹⁶ MARK BETTINGER ET AL., SIERRA CLUB, ENDING OUR DEPENDENCE ON OIL (2010), available at <http://www.sierraclub.org/pressroom/downloads/2010-05-ending-oil-dependence.pdf>.

¹⁹⁷ AMORY B. LOVINS ET AL., WINNING THE OIL ENDGAME: EXECUTIVE SUMMARY 4 (2007), available at <http://www.ecofuels.ca/files/pdf/Winning%20the%20Oil%20Endgame.pdf> (stating “[b]y 2040, oil imports could be gone. By 2050, the U.S. economy should be flourishing with no oil at all.”).

¹⁹⁸ *Id.*

¹⁹⁹ Droitsch, *supra* note 163, at 25.

that we can actually do more by making investments to reduce oil demand than going after off-shore drilling.

I am personally convinced that we can save oil in a profound way but we have to overcome what has become a politically protracted fight. This is not a Democrat or Republican piece. We have to reduce oil for energy security and to protect our climate, and I hope that all of you will join in that fight. Thank you.

DISCUSSION FOLLOWING THE PANELISTS' REMARKS

MR. REED: Thank you to all of our panelists. I think that was a very enlightening discussion as it certainly represented a broad spectrum of opinion on these issues. I also want to commend the panelists on sticking to their time limit, so I think we do have some time now to take questions from the audience.

MR. KENNEDY: I am going to be the natural gas guy today. Danielle, thank you. Thank you to all of you. I am Tim Kennedy with Spector Energy.

Your last slide was titled "Clean Energy."²⁰⁰ Does Pembina include natural gas as a clean energy source? We have heard that President Obama includes natural gas.²⁰¹ So what is Pembina's perspective on that? Thank you.

MS. DROITSCH: I do not think that particular slide includes it, but that is just basically showing a savings using those particular measures, energy efficiency, and that sort of thing. Pembina views natural gas as part of the mix. We are actually just undertaking a new study on natural gas right now. Obviously, it is the issues around environmental concerns, but we view it as part of the transition process in terms of climate change.

MR. FELMY: Just a point of clarification. With President Obama's Clean Energy Strategy, natural gas gets a half a credit, if you will.²⁰² So to reach eighty percent clean energy by 2035, if you used forty percent of the natural gas to produce or if electricity was produced by forty percent natural gas, then there would be no coal and everything else would have to be nuclear, wind, or solar.²⁰³ So forty percent is as much natural gas as we can use

²⁰⁰ *Id.*

²⁰¹ See generally MATTHEW BRAMLEY, IS NATURAL GAS A CLIMATE CHANGE SOLUTION FOR CANADA? 35-40 (2011), available at <http://pubs.pembina.org/reports/dsf-pembina-natgas-report-eng-final.pdf> (recommending that natural gas play a limited role in climate policies of the future).

²⁰² THE WHITE HOUSE, BLUEPRINT FOR A SECURE ENERGY FUTURE 9 (2011), available at http://www.whitehouse.gov/sites/default/files/blueprint_secure_energy_future.pdf.

²⁰³ David W. Kreutzer, *By Any Other Name, Energy Cuts Still Stink*, BACKGROUNDER, Apr. 7, 2011, at 4.

for power generation and then no coal at all. The math is a little bit difficult to work through.

MR. SCOTT: Hi. My name is Ryan Scott with the Consumer Energy Alliance. I wanted to ask Mr. Winberg about his reaction to the greenhouse study that came out earlier this week about greenhouse gas emissions relating to natural gas and to future emissions, and how that has affected the life of the program.²⁰⁴

MR. WINBERG: I have not read through the study yet. I think it is actually not out in its final form. There are some bootleg copies that have been floating around, but I understand that study attributed a twenty-year life cycle, if you will, to methane emissions from natural gas.²⁰⁵ A cycle is mostly done over a hundred-year period, and so that is going to necessarily make natural gas look worse. Additionally, I heard—I have not read—but what I have heard is that it used a global warming factor that was higher than the twenty-one or twenty-three factor that is often used when you put it on a CO₂ equivalent basis.

MR. SCOTT: I think it was seventy-to-one instead of twenty-to-one.²⁰⁶

MR. WINBERG: So that is obviously going to make the picture look a lot worse. I always have a little difficulty with life cycle emissions, whether it is from coal, natural gas, nuclear, or even wind or solar. There is a lot of latitude that you could put into the calculation, so I think there will be a lot of people looking at it. They will have a whole variety of opinions on whether it is accurate or not, but at the end of the day, it will be fifteen minutes and we will be on to the next thing.

MR. SCOTT: Can I ask you one more question? On your slide, one of your slides, you had cost per megawatt hour of coal going from \$150 to \$102 with carbon capture and sequestration.²⁰⁷ What is the big change? I saw on the graph there was second generation of carbon capture and sequestration. Is there some certain technology or cost cutting?

MR. WINBERG: Yes. There are a number of technologies out there, air separation units being one of them, studies in cryogenics, and we go to membrane air separation units.²⁰⁸ There are also some membrane technologies that can be used to strip the CO₂ out.²⁰⁹ A lot less power intensive and a lot

²⁰⁴ See Richard Lovett, *Natural gas greenhouse emissions study draws fire*, NATURE (Apr. 15, 2011), <http://www.nature.com/news/2011/110415/full/news.2011.242.html> (referring to an upcoming study by researchers at Cornell University regarding natural gas and greenhouse gas emissions).

²⁰⁵ *Id.* (stating the researchers use a twenty-year lifespan).

²⁰⁶ *Id.*

²⁰⁷ Steven Winberg, *supra* note 79, at 13.

²⁰⁸ GLOBAL CLIMATE & ENERGY PROJECT, STANFORD UNIV., AN ASSESSMENT OF CARBON CAPTURE TECHNOLOGY AND RESEARCH OPPORTUNITIES 9-10 (2005).

²⁰⁹ *Id.* at 9.

lower capital cost. At least right now they anticipate a lot lower capital cost. There are probably a dozen or so technologies going to a higher efficiency turbine, more hydrogen in the turbine, those types of things that will reduce the cost.

MR. SCOTT: Thank you.

MR. CUNNINGHAM: I am Dick Cunningham with Steptoe & Johnson. I practice with five hundred of my closet friends. One of them is on the panel, the moderator here.

In efforts to achieve a clean energy world, how important is increasing the price of carbon fuels? And as a related question of that, I want to focus on natural gas for just a moment. I have some friends in the renewable industry who say natural gas is a bad thing, not a bridge. It is a bad thing because it retards the increase in the price of carbon fuels that is necessary to make renewable fuels economical. So if you could comment on both of those, answer the first and comment on the second, I would appreciate it, from both sides of the podium.

MS. DROITSCH: I can tell you that the Pembina Institute absolutely thinks we have to put a price on carbon. There is no way we are going to get out of this mess if we do not. There are obviously multiple ways to do that. Cap and trade was within reach last year and sort of evaporated in the United States. In Canada, I think there is still interest, but we have a policy of harmonization which has sort of become a bit of a barrier. I think we are going to have to do cap and trade.

I think the challenges that we are looking at politically are the challenges around putting a price on carbon, which has been viewed as so essential. What can we do in the interim? What can we do now that we do not have that political lineup? That is precisely why I think President Obama is moving forward with these clean energy pieces and saying, "Here is what can be done until we can actually bring together that political consensus to have a cap and trade or a carbon tax." I guess in the United States the cap and trade or a carbon tax is much less likely, but in Canada there is more discussion of a carbon tax.²¹⁰ Without that we do not have an even playing field to actually have competition.

Now, on the natural gas piece, I can say that within even my organization we have the same debates about natural gas and where it is on the bridge of fuel. It is certainly not as large as maybe some organizations look at, but there is no doubt that some of the harder to reach, I mean with all due respect, some of the shale gas, we have serious concerns about that. So in terms of where it actually acts in the bridge fuel piece is something that is

²¹⁰ See generally *Where Carbon is Taxed*, CARBON TAX CTR., <http://www.carbontax.org/progress/where-carbon-is-taxed/> (last modified July 25, 2011) (discussing the coal taxes imposed in Québec and British Columbia).

particularly of interest to us and that is what our study is going to be, to really say where it actually is in the mix. Because we do not want it to actually create a barrier to the development of renewables and energy efficiency—certainly energy efficiency in terms of where we need to be making investments now.

MR. CUNNINGHAM: A couple quick things. First of all, yes, carbon taxes can have an impact. There is no question. I mean, that is just an economist's perspective, but in terms of a carbon tax improving the feasibility of renewables, let us say you impose a carbon tax on oil. How does that improve the competitiveness of some renewables when they are solar, wind, and geothermal? Those are electricity sources. They do nothing. Now, a carbon tax on coal. Yes, then you can change that, but when you start getting into those positions, first of all, is it politically feasible when we have got \$3.80 gasoline? Unlikely.

And then the other thing is you are starting to get to the point where you are picking winners and losers. If you impose a carbon tax, it is going to hammer coal. So you are going to have winners and losers across the country in terms of coal producers. States like Ohio that get eighty-six percent of its electricity from coal are going to be big losers; those are the difficulties you have in terms of putting it in.²¹¹

Yes, economists think that that is probably an easier way in terms of being able to implement it, but politically the history is littered with political candidates who proposed \$0.50 per gallon gasoline taxes and a carbon tax would probably be in the same category.

MR. REED: Could I respond also? Actually, I agree with my colleague that we are not going to have significant reduction in greenhouse gases if we do not have a carbon price. Where I part from her is what she said on how to get us out of this mess. I do not think we are in a mess the way she thinks about it. I think our mess actually is more of a budgetary mess and deficit mess. I think what is going to happen is we may very well end up putting a carbon tax on energy but it will have little or nothing to do with climate change. It will have to do with our deficit. That is why we are going to end up putting a tax on energy: to get us out of the hole that we are in on the deficit.

MR. BLANCHARD: There is certainly a real disconnect here in the facts discussed and, Danielle, as I understand it, over half the oil that comes to the United States from Canada is already from the oil sands.²¹² This is not something new. I know the challenges you have mentioned—greenhouse gas, water, land, reclamation, wildlife, the industry—and we have other people

²¹¹ OHIO PUBLIC UTILITIES COMMISSION, *WHERE DOES OHIO'S ELECTRICITY COME FROM?* 1 (2011).

²¹² ENERGY POLICY RESEARCH FOUND., *THE VALUE OF THE CANADIAN OIL SANDS* 7 (2010).

from the industry here who will insist that they are making great strides in dealing with those issues. It is not a matter of whether we are going to have oil sands. We have a lot of it. We are going to have a lot more of it. They do need to deal with those issues.

My question for you is, is there not a carbon tax in Alberta and how does that work? I understand it is probably not enough, but what is it? Fifteen dollars a ton? John Kerry was talking about twenty dollars a ton in the United States.²¹³ How does that work? Is that having any effect at all?

And my question for Steve is how expensive is it to convert an existing coal plant to natural gas, which appears to be the direction, regardless of what we say, it is going in? If we are going to have electric cars, as you know, it does not make any sense to have a coal-fired plant provide electricity. It is going to be nuclear or natural gas and then perhaps as a backup, wind, but right now it is intermittent. I am wondering how expensive that is, because that is clearly where we are headed. Those are two questions but I am just curious.

MS. DROITSCH: There were a couple things there. I want to start with a question that I expected to get today, this question of do we not absolutely have to do this? I would like to challenge you and everyone in this audience that right now the way we invest our energies, whether it is a regulatory or whether it is subsidies, right now we are not dedicating enough regulatory energy to making the other clean energy investments possible. Without that right now, the trajectory we are on is we need oil sands, right? That is where we are.

MR. BLANCHARD: We are. We are oil sands.

MS. DROITSCH: We already are, but I am saying we need more, right? So that is the trajectory we need to be on.

MR. BLANCHARD: That is probably going to happen, yes.

MS. DROITSCH: Yes, so my broad message is not so much let us cut off oil sands. That is not a realistic scenario. If we continue to make the investments we are making in terms of where we put our tax subsidies, where we are putting our regulatory pressure, we will continue to need that oil. So that is a big picture case.

Now, on the management of the oil sands themselves, there is a big debate about whether or not the issues are being managed properly. I would suggest that right now we are not doing a good job up in Alberta to manage the problems. There are strides. There are some developments, but if you are looking at the issue when you are talking about what the problem is, the amount of monitoring the management of the oil sands is far below. The

²¹³ American Power Act, S. 1733 111th Congress (2009). *See also* TSF ENERGY, AMIDST UNCERTAIN SENATE SUPPORT, JOHN KERRY AND JOE LIEBERMAN RELEASE DISCUSSION DRAFT OF THE AMERICAN POWER ACT 3 (2010).

Royal Society just came over with a paper on this very issue that we are not doing enough to manage the problems up there so we have got to get more serious about going after these problems, much more so than what is on the books.²¹⁴

The final piece was around the carbon tax, the fifteen dollars per ton in Alberta.²¹⁵ That is a carbon tax. The problem is that that money does not actually do very much to provide any sort of investment into the other pieces. Right now that money goes into a central fund.²¹⁶ We have no idea whether or not that money is actually taking. The Government of Alberta puts out press releases saying it takes several million cars off the road but there is actually no proof of that.²¹⁷ So there are problems with that system.

If we can make that system more transparent so we understand where the money is going—is it creating incentive, is it actually displacing carbon?—then we would be more supportive of it. But because it is not a transparent process, it has actually been used more as sort of a “here is what we are doing,” and it is not really showing us that there is actually much in the way, if at all, in actual carbon reduction. So that is our concern.

MR. WINBERG: Yes, I would agree. Fifteen to twenty dollars per metric ton of carbon does not move the needle much in terms of investment. It might change people's behavior a little bit, but in terms of the energy delivery infrastructure, it will not change it much. But to get to your specific question to me, converting coal to natural gas, we are not actually going to take that boiler and convert it to a natural gas fired boiler. The technology does not work for a variety of reasons. More than likely what will happen is they will repower those existing facilities or maybe just shut them down and build new gas-fired facilities. Maybe we can strip the boiler out and put in gas-fired turbines and use the existing steam turbines, so there may be some things that can be done to repower the existing fleet, but I think the majority of it will be new-build.

²¹⁴ See ROYAL SOC'Y OF CAN., EXEC. SUMMARY, ENVIRONMENTAL AND HEALTH IMPACTS OF CANADA'S OIL SANDS INDUSTRY (Dec. 2010), *available at* http://www.rsc.ca/documents/expert/RSC_Exp_ExecutiveSummary_ENG_Dec14_10_FINAL_v5.pdf (discussing the impacts of the Alberta oil sands development and the meanings of those impacts).

²¹⁵ GREG FLANAGAN, FIXING WHAT'S BROKEN: FAIR AND SUSTAINABLE SOLUTIONS TO ALBERTA'S REVENUE PROBLEMS 30-31 (2011).

²¹⁶ Can. Chamber of Commerce, *A Carbon Tax v. Cap-and-Trade*, POLICY BRIEF, Dec. 2008, at 14.

²¹⁷ See *Facts and Statistics*, GOV'T OF ALTA., <http://www.energy.alberta.ca/OilSands/791.asp> (last modified on Nov. 4, 2011) (stating “Alberta's GHG reduction program continues to support a global clean energy future with 2009 emissions reductions being the equivalent of removing 1.4 million cars off the road”).

MR. BLANCHARD: Just as a point of clarification, I sponsored the first Wind-to-Energy Assistance Bill²¹⁸ in Congress in 1980 and it passed with Norm and Ed and Jim Jeffries.²¹⁹ I never saw it as the answer to all of our problems but I saw it as one answer. I went to Congress after the Arab Oil Embargo²²⁰ and dealt with solar and wind tech, you name it. So we are very much into wind and solar but I end up looking at the realities, and what I am trying to say is we are going to need all these energy sources. We are going to need them for the foreseeable future and we need to figure out how to get everything cleaner and secure.

I do not like heavy oil from Venezuela, Mexico, or Bakersfield, California any more than oil sands. They are all the same, but we are going to need all of them. The real question will be how do Canada and the United States regulate this? How do we manage it toward a cleaner, healthy future? We have to take into account the economy and reality, and that is what the Conference is all about. That is why I am glad we have a mixture of opinion here. Steve, this is really an interesting panel. Thank you all.

MR. REED: Thank you.

²¹⁸ Wind Energy Systems Research, Development, and Demonstration Act of 1979, H.R. 3556 96th Cong. (1979).

²¹⁹ Wind Energy Systems Act of 1980, H.R. 5892 96th Cong. (1980).

²²⁰ See generally *Arab Oil Embargo of 1973*, AM. BUS. (Dec. 10, 2010), <http://american-business.org/2300-arab-oil-embargo-of-1973.html> (detailing the history of the 1973 Arab Oil Embargo).