Interview on ExxonMobil Energy Policy in the Americas

April 2nd, 2014

Martin Smith & Justin Hilliard

Energy and Climate

Summary of Interviewee: Simon M. Smith

Simon M. Smith graduated from the University of Toronto in 1980, with a Bachelor of Arts in Economics, and later received a Masters of Business Administration in Marketing and Finance in 1982 from his Alma Matter. His experience in the Petroleum industry began in 1981 at Imperial Oil Ltd., the Canadian subsidiary of ExxonMobil Corporation. As his time at Imperial Oil progressed, rising to the position of Manager of Supply, he was transferred to the Marketing Manager for Esso France (ExxonMobil's European Brand). Where he served for two years before moving to Belgium in 1999, and entering the role of Marketing Manager for European Operations. After his time in Europe concluded in 2001, he was transferred back to Toronto entering the position of Vice-President and General Manager of Fuels Marketing for Imperial Oil Limited, and overseeing all operations pertaining to fuels marketing throughout Imperial Oil. He would split time in this position between Toronto, Ontario, and Calgary, Alberta. On June 1st, 2011, he was transferred to Washington D.C., where he took on the position of Retail Director for North America, later having his position expanded to Retail Director of the Americas for ExxonMobil Corporation in April of 2012. At the time of his retirement in 2013, he oversaw ExxonMobil's entire retail operations for North and South America which included a network of over 12,000 retail sites and 800KBD in fuels sales all under the Exxon, Mobil, and Esso brands. Mr. Smith's position also included all areas of ExxonMobil's downstream sector that pertained to Fuels Marketing. As well as his time at ExxonMobil, Mr. Smith was the Chair of the Marketing Sub-Committee of the American Petroleum Institute, and Former Director of the Canadian Fuels Association. Simon's time at ExxonMobil and his positions on various Associations and committees, provides unique insight into the Canadian Athabasca Oil Sands, and Imperial Oil's cultivation, refinement, and sale of extra-heavy crude oil from the Kearl Oil Sands.

Today's media debate surrounding the tar-sand cultivation, and energy dependence, Mr. Smith's opinions on the debate can help clarify the perspective of the Petroleum industry, and

help people grasp both sides of a relevant debate. The realities and economics surrounding the extra-heavy crude production of tar sands, is a portion of the argument that can, at sometimes be lost in the media's portrayal of operations in the tar-sands. The environmental impact of cultivation of the tar sands is an important issue, and an aspect that this interview will attempt to grasp as it is the central topic in the public debate. This interview will attempt to shed light on the necessity, cost, and other realities of the Athabasca Oil Sands operations (specifically the Kearl Oil Sands), and provide deeper insight into the situation that currently surrounds the tar-sands.

Mr. Smith's position in Marketing will also help to gain a deeper understanding on the economics surrounding the tar-sands, and its relation to the United States' energy dependence on so called "foreign oil". The current debate surrounding the XL Keystone pipeline can also be inquired upon, as his position of distribution and sales would have directly exposed him to the benefits and costs of constructing the highly controversial pipeline project currently proposed to the United States Government.

Questions for Interview:

1. *Could you briefly explain the process that surrounds extra-heavy crude oil production in the Athabasca Tar Sands?*

2. *In terms of the process of extracting, refining, and the sale of this crude oil, what are the benefits of its production, along with the consequences of its production?*

3. *In terms of the Environmental cost of extra-heavy crude oil production, what is currently in place, to the best of your knowledge, to offset or reduce the impact of the oil sand cultivation?*

4. *Current processes of oil extraction have come under scrutiny (fracking, tar-sands, etc…) what would be your response to critics that claim the environmental dangers represented in either of these types of crude extraction are too great to continue that specific method?*

5. *What are the different methods of extracting crude from Oil sands and which method would you considered economically and environmentally superior?*

6. *In terms of the benefits of extra-heavy crude production, what reasons do you see for the continued production of extra-heavy crude oil?*

7. *How extensive do you believe the economic benefits of tar-sand cultivation extend?*

8. *In response to the critics of tar-sand exploitation, what would you say to justify the continued production of the extra-heavy crude?*

9. *With the US refusal to ratify the Kyoto accord and Canadian withdrawal from the Kyoto accord, what impacts did it have on oil sands production?*

10. *Could you briefly summarize the different methods of transportation that is currently in place to transport crude oil?*

11. *In terms of the KeyStone XL pipeline, would you say that it is the best method of transportation of crude from the tar-sands? Critics of pipeline construction state that the*

environmental cost of the pipeline will far outweigh the economic benefit that the pipeline represents, what is your response to this claim, and could you elaborate on the benefits and consequences of each?

12. *With the seizure of assets by the Venezuelan government, how does this affect the economics of Oil Sands production?*

Transcript of Interview with Simon Smith

Interviewer: Justin Hilliard

Interviewee: Simon Smith, former Director of Marketing for the Americas, ExxonMobil

Interview Setting: Room 125B, Porter Hall, Carnegie Mellon University

Date: Wednesday April 2nd, 2014

Interviewer represented by "I", *Interviewee represented by* "P".

(Start of Interview)

I: Our first question for you is, could you briefly explain the process that surrounds extra-heavy crude oil production in the Atha—

P: *Athabasca*

[Inaudible]

I: Athabasca Oil Sands.

P: Athabasca Tar Sands, yeah there are basically two ways right, I mean… the Athabasca Tar Sands basically have *oil* that is saturated in sand… and that goes back to prehistoric times, right? When the dinosaurs were there and they basically died in that sediment, and the petroleum product became imbedded in sand. So unlike conventional oil which, you know, typically is in rock formations, where you can stick a pipe in the ground and the pressure brings it to the surface, like in Saudi Arabia and other places, this stuff actually *sits* in the sand. And so the way it works is there's really kinda two layers, or multi-layers of Athabasca Tar Sands, some of them sit very close to the surface, some of them sit very deep. So there's basically two ways to extract it. If it's close to the surface, the way that makes the most sense, economically, and

probably even from an environmental prospective, if you do the full cycle properly, is actually just open strip mining. So you remove the overburden, typically boreal forest, you remove it, you then mine the sand, and the sand goes to a treatment plant where the oil is separated from the sand, ok? And that's… what you'd see at the big plants in Fort McMurray, like Syncrude, and the Suncor Plant in Fort McMurray, so that's—think about that as conventional strip mining, like mining… open pit mining for coal for all kinds of other minerals in the world where they sit close to the surface. The second way is what we call In Situ, and that's where the tar sand's resource it sits sometimes hundreds of meters below the surface, so obviously you can't—you can't strip mine it right?, it's too far away. So what you do typically there, is you inject steam, and that was actually a technology that was developed in the 60s and 70s, and then commercialized, probably maybe even late 70s early 80s, and you basically take water, you convert it to steam, you inject it into the ground, into the sand formation, to heat it up and loosen it up, then you bring it to the surface. So, that one, from an environmental footprint perspective is, you know, a fraction of what strip mining is. So basically you drill a conventional pad, like a well and you just go straight down so it doesn't disturb the surface as much. On the other hand you've got to use quite a bit of water, you've got to heat it and turn it into steam, which typically you do by natural gas. So in a sense you're burning natural gas to make steam, to inject into the ground to extract oil right? Whereas obviously in the other process it's a little bit different, it's more heavy equipment and strip mining. So it's a function of how deep is the resource in the ground? And assuming that you have, you know, the same saturation of oil in the tar sands, you would chose the methodology based upon the type of deposit… close to the surface, strip mining, deep underground… In Situ injection with… heat to bring it back to the surface. And those are the two, you know, basic premises that we use. On the strip mining piece, you know… if you go through the full cycle right? I mean basically like any strip mine, you would… take down the boreal forest, you remove the overburden, you mine the sand, which *maybe* a couple of meters deep, and then when you're done, you basically fill that back in, you reforest and replant. You

know, and that's the part of the story that doesn't get told very often right? You may remember that… several years ago there was a cover article on National Geographic which was a picture of the tar sands in Alberta. And it showed a picture of the boreal forest *before*, it showed your picture in the middle of the strip mining operation. What it didn't show was the third part, when you reforest recover, and let the forest come back over time. Because once you've mined it, you go on to the next, you know, mine right? Or the next land area to extract the resource from.

I: Okay.

P: So those are the two basic ways.

I: Interesting. Okay, so you briefly touched on the next question in that question, but in terms of the process of extracting, refining, and the scale of this heavy [sic] crude oil, what are the benefits of its production, along with the consequences? So you basically touched on it a little bit, but—

P: Yeah, yeah a little bit. I guess, you know… my view would be, right, that… the world at large, the world at large, needs *every possible* source of energy, right, and that includes renewables, it includes solar, it includes wind, it includes nuclear, it includes natural gas, it includes coal, *done the right way*, and it includes oil. And you know this resource, that sits in that part of North America, is equivalent to almost the reserves that exist in Saudi Arabia. So it's the second largest, you know, known reserve of petroleum, in the world *right*, so… I mean not to *develop it*, to me is like saying you don't want the world at large to have that source of energy to help lift peoples standard of living in Africa, in China, in India, and you're—where're going to [sic] need collectively, *every possible* source of energy, just to keep up with the billion people that live in China that want to live like you and I right. They want to go to a college like this one, they want to have hot water when they want it, they want to have lighting anytime they need it, they want to have natural gas piped into the buildings, they want to have two computers, they want to

have all this equipment [points to computers and voice recorder] and know of it right, none of it happens without energy. So that's the one side of it, is that we need every single source, and the Athabasca Oil Sands, I mean we are blessed in North America to be sitting now on a some of the largest reserves in the world. And some of that's been uncovered lately with some of the fracking right for natural gas and oil in parts of the US and Canada, some of its come out of technology, you know. 30 years ago, what we do at Cold Lake with In Situ mining, you couldn't do economically. And why can you do it today? Because technology has gotten so much better, and it will continue to get better. And that technology will also help us have less of a footprint environmentally. If [sic] you go and look at the Syncrude plant today in Fort McMurray which was built in the 70s, and you go look at the Kearl Oil Sands facility that's just been built in the last four years, I mean the difference in technology 30, 40 years later is amazing. Not only the cost of extraction, but also the environmental footprint and it's [sic] impact. So to me, from an environmental perspective, technology is the answer to allow us to develop all of these resources in an environmentally friendly responsible way, and also, by the way, generate… economic well-being not just for North Americans but for everybody in the world that's going to [sic] energy to lift their standards of living to the place that you and I… enjoy today, so… I you look at it, I mean there are [sic] lots of debates in the media about, well you know… "we could stop this development," "We don't really need it," but, I mean it's no different than any other heavy crude around the world, you know, we don't stop Mexican heavy crude production, right, we didn't stop the heavy crude production off the coast of California. Now, yes it's true that this method today is more energy intensive than some of the other conventional types of oil. But it's also a massive resource that has massive potential. If you look at from *well to wheel,* what I think is important when you look at energy options, you've got to [sic] look at the full life cycle [sic], the full life cycle from when I put a hole in the ground, to when it comes out at the end of that tailpipe or that plant, or whatever else [sic], if you look at Athabasca Oil sands from the *well* to what we call *the wheel*, the full cycle, so everything included, everything included, it's about

ten percent more energy intensive than a conventional heavy-crude is today, plus or minus. It's not a *massive* increase in the energy, *and* that's with today's technology, who know what it might be ten years from now. But to stop it or not develop it to me, is a huge missed opportunity. Much like not developing the natural gas resources and the other non-conventional oil resources through fracking in North America. I mean, we are in a unique position in North America, to be on the edge of what is an [sic] energy revolution. That's going to [sic] make manufacturing more competitive, it's going to [sic] make the cost of fuel and energy to everybody that lives in North America less expensive and cheaper. It's going to [sic] make it easier for consumer to pay for energy to heat their homes and to power their homes, and [sic] all the other things that they need to do with energy. So, not developing these resources is a mistake… you can develop them in a way that's responsible, and keep looking for new technology to improve it… but not to do it, to me it's a big mistake.

I: So can you touch—you touched on benefits of it can you briefly explain [sic] the consequences that you might see.

P: Well it's more energy intensive, there's no doubt, like today [inaudible] because this stuff when it sits in the ground, and I've seen it, it is basically like a tar in sand, you know, so the processes that we know of today to separate that are more energy intensive than you know putting a pipe in the ground in west Texas, and pulling up some WTI… Now those resources they are declining over time [sic], we keep finding new ways through fracking to get at them, but even fracking is not as easy as sticking a pipe, you know, in the ground and letting it come up by natural pressure. So… it is more energy intensive, it requires more technology, but for me *that's* the challenge, right, find ways to develop it with new technology that leaves less of a footprint, and by the way when you're down, make sure you do go back and refurbish and reforest, and put the land back to the state it was. Which you know can be done much like any strip mine in the world, it can have that same… after the resource has been extracted, return it

to its natural state, and in the meantime, have as little footprint and impact as you can… that's the—that's the consequence but to me the benefits

I: Outweigh—

P: Oh by far, it would be absolutely silly for us to be sitting on this type of resource base… Think about it this way, today there are *huge* crude tankers, okay, that come *all* the way from the middle east, and by the way they bring Saudi heavy crude sometimes, okay, all the way to the golf coast, to put them in refineries, when we're sitting on top of a resource base in North America that we can connect by pipeline, for a fraction of the cost to get it there, and full life cycle of that transportation system by the way, a lot less of an environmental footprint from the plant to the refinery then putting it in a super tanker and crossing the Atlantic running on marine bunker fuel and the risks that go with marine transport, right? That we all know about. To me it's, you know, just not to develop it would be a big mistake.

I: Interesting, okay… Next Question, unless you have any more to add…

P: *No*, the only thing more that I would say is [inaudible] the last time I looked around, in this, in North America, I mean we don't exactly have an economy that has full employment [sic]… to kinda in a sense arbitrarily pick winners and losers based upon people's personal views, I watched a segment last night on the news about Portland Maine, okay, Portland Maine has a pipeline that's running from Montreal down to Portland, and for years the tankers have come across from the middle east, from the North Sea, and they brought oil, some of it heavy oil by the way, is what they call dirty oil, but they brought heavy oil and other types of oil into that port, they put it in a pipeline, and they sent it into Montreal, and into the mid-continent. Now, of course, because we've become such a huge producer of crude in North America, they want to reverse that pipeline, and all of the sudden people say "we don't want that oil going out of our port," right, "we want to stop it,"… to me it's just a big mistake.

I: Okay, awesome… in terms of the environmental costs of heavy crude oil production, what is currently in place, to the best of your knowledge, to offset or reduce the impact of soil cultivation.

P: Soil?

I: … Oil sand cultivation, sorry,

P: *To reduce* the impact?... Well, all kinds of things, right I mean, for example if you're doing a… an In Situ mine, the one where you inject steam, one of the biggest advances in the last ten to twenty years has been much more effective, which [sic] is co-generation. Where in a sense you set up a co-generation plant at the facility that allows you, not just to burn natural gas, but also to use the heat to regenerate power and electricity. So that's been one significant change, the other one is that [sic] one of the consequences of refining that heavy—heavy crude, particularly the ones where you're separating it from the sands like in the Athabasca Tar Sands is that, when you separate the oil from the sand, you—you use a process that involves heat and water, and as a result then there is… in that process some water, and water like substances, that are deposited in tailings ponds. And those tailings ponds become a risk to manage them, for wildlife, for a whole bunch of things. So the technology by which you manage the… not just the emissions per say but also the tailings from the plant, I mean there have been huge inroads in reducing the impact and the footprint of those. The efficiency of the whole operation, whether it be [inaudible]… continuously gets better right, I mean, both economically and environmentally because even in the process that's energy intensive like that there is a *huge* incentive for the producer to reduce energy use, because that reduces their cost of production right? So, there's an added benefit to the environment by reducing CO2 emissions, but also by getting your cost of production down and getting it competitive. Because, you know, for years the reason why that resource wasn't developed wasn't that we didn't know it was there, it's always been there right, it's that the cost doing it because the technology wasn't advanced enough, you couldn't do it.

So—So there are built in incentives now, you know, there's nothing… you know, there's all kinds of policy options right, that, you know that you can act and put in place as a government, I mean it might be limits on CO2 emissions, or emissions from plants, which is a little bit where, it looks like governments in Canada are towards. There are more complicated cap-and-trade systems which, you know, some states in the US like California, and certain Canadian provinces, and the Europeans seem to favor. There are carbon taxes, so there are ways in which policies [sic] can be put in place that would increase the incentive to reduce emissions and the full cycle [sic] impact of production of these resources. But to me [sic] it's no different than, you know, you've got all kinds of coal-fired power plants in the United States and all over the world today that are *major, major* emitters of CO2 emissions, in fact if you wanted my personal view on what the biggest challenge facing us when we look at climate change, and CO2 emissions, you know at the end of the day the oil sands from Alberta, they aren't going to [sic] make a dent compared to the impact of every time a new coal-fired plant opens in China. With very poor technology in terms of, you know, scrubber technology and emissions, I mean just look at the news [sic] just go to Beijing today [sic] it's not even close. So it's become a lightning rod in my view [sic] because of the way the media's portrayed the process [sic], the national geographic article for example that didn't *talk* about the third step, it *talked* about the first two only, because it was trying to sell magazines, right, rather than tell the whole story. To me anyway—long story short there are some policy options for governments [sic] I think that they could put in place that would increase the incentive [sic], and not just for the [sic] Athabasca Oil Sands, by the way, but for coal extraction, coal power plant generation, refineries, all kinds of plants and factories, chemical plants, I mean everything in manufacturing uses energy, you know, has emissions, so creating a level playing field of incentives to increase the incentive to become more efficient and have less of an impact [sic], to me those are very appropriate, right and some governments are looking at them, unfortunately some better than others, and not always [sic] in a way that's consistent.

I: Do you have a favored government—

P: Policy?

I: Yeah

P: In my personal view, I mean my personal view I would favor a carbon tax. It's very simple, it's very simple, it's very transparent, my criticism of cap-and-trade… *too friggin complicated*, *way* too complicated, and lots of, you know lots of games that can be played, right [sic], I'd favor a carbon tax and that creates the right incentive for everybody to reduce their impact, right. It's also got to be [sic] a level playing field, one of the things that gets in the way carbon tax is that typically they tend to get applied to across the whole chain, so not just the producer but to the end consumer [sic] at the pump right. Or in the—in the home heating tank or the factory or whatever else is using that energy where [sic] there is a high carbon content. That becomes a little bit less politically [sic] attractive for politicians so that's why in some cases it doesn't get the traction I think it deserves, but carbon tax; very transparent, very simple, right incentive, and people find even faster ways to become more efficient [sic].

I: Yeah, interesting… so next question unless you have anything to add?

P: … no I think I covered that.

I: Current processes of oil extraction—or extraction, have come under scrutiny, fracking, tar sands, etc… what would your response to critics that claim environmental dangers represented in either of these types of crude extraction are too great to continue that specific method.

P: Well then I'd say then [sic] stop mining for coal, stop burning coal in power plants all over the world, I mean you know, honestly the Athabasca Oil Sands are—they are a tick on the back of a bull when you compare to the impact of what is already happening, and happened in the past. I mean, [sic] you could make the argument, "well then [sic] where do you stop?" do you stop all

heavy-crude production in the world? Do you stop using coal as a source of energy? I think to single out a particular technology that happens to represent, probably at its maturity, about *two percent* of the crude oil production, *even* in the most optimistic scenarios, the Athabasca Oil sands will probably, at *best*, get to two percent of just *crude* oil production, forget about all sources of energy, [sic] on an equivalent—barrel equivalent basis right, including coal and natural gas, solar, wind, everything [sic], thermonuclear. So, to me, to single out a particular type of technology because you *think* it's that much worse than the others, I think is just very bad policy. It's [sic] not—not sound policy for North America… much like fracking, I mean [sic] everything needs to have some oversight, and certain regulations, that are [sic] supposed to be in a transparent and open process around permitting [sic] right, that allows everybody to have their own view and opinion, and then finally there's a decision made to grant a permit or not… I think [sic] to not develop that resource base would be a big mistake. I mean, you think of what is on the verge of possible in North America, if we develop the resources, that *five years ago we didn't even know* they were there, I mean [sic] it wasn't that long ago that [sic] most of the pipelines in North America were being reversed in the other direction, why? Because the view of the day, as recently as 15 years ago, was that North America is running out of light synthetic oil, *running out*, and WTI is going to trade at a huge premium, in the mid-continent, to granter [sic] to any off-shore crude, so any pipeline that was pointing out was turned around to point in, and everyone was going to be importing crude [sic] now, you know, because of entrepreneurs, technology, science, people who took risks, you know have [sic] oil and gas production that has all of these pipelines being turned around, and North America on the verge of going from [sic] being a *huge* oil importer, to being a massive producer. I mean, it's a huge opportunity. You think about what that does to our manufacturing base in North America, *cheap, easily accessible* natural gas and oil, and energy, for them to run those plants. I mean, I think you have the possibility of seeing manufacturing coming back from Asia, you know, coming back Mexico and other places around the world where it left because energy was getting more

expensive, and labor was expensive. Going the other way, you know. So a *huge* boom for manufacturing, a huge boom for a whole new industry that can [sic] have a resurgence. So, to me again, fracking, oil sands technology, not developing those resources is a *huge* opportunity missed in a part of the world that could be in—you know on the verge of a major renaissance [sic] as a manufacturing center, as cheap and affordable energy… its [sic]—the benefits are massive. Not to mention the fact that we've got an economy that for the last decade [sic] has had a huge amount of slack in it, and has—you know, people have trouble finding jobs, I mean [sic], a lot of these industries that those manufacturing jobs, those energy jobs, they all have one thing in common, they are *very well* paying jobs, right, they create a lot of wealth, and with that [sic] there's a huge benefit to the economy at large. Now, you've got to do it in a way that [sic]—

I: Is economically—

P: Economic, and also environmentally responsible. So you've got to have some rules and make [sic] sure those rules are consistent [sic]. I mean, get me on a pipe [inaudible] around KeyStone, that's just absolute nonsense [sic]. *Absolute utter nonsense*, what's happened with the KeyStone KL [sic] pipeline, it's just such poor policy, and it's a shame. [inaudible] Yeah we'll get into it later [laughter].

I: Okay… so you did touch on this next question in the first response [sic] you gave, but I'm ask it anyway—

P: Sure

I: If you have a little—

P: More literation, yeah—

I: Or more insight into [sic] it, what are the different methods of extracting extra-heavy crude [sic] from oil sands, and which method would you consider economically and eni—environmentally res—superior.

P: well I guess its two things, I still—really the oil sands deposit the way you extract it depends on how close that deposit is to the surface, okay? So [sic] if… if you looked at the full cycle of development of heavy crude [sic], there are [sic] a couple of other things that come into play, as in, once you've actually extracted that heavy crude, what we call bitchumen, it actually is so thick that you need to cut it with a lighter product called condensate, to [sic] actually make it flow in a pipeline, and then you have a choice, you can either take that heavy—which is like a heavy-crude that comes from Mexico, Venezuela, Saudi Arabia, or California [sic], or other parts of North America, it—as a heavy crude, in order to make more valuable products like gasoline, jet fuel, diesel fuel, and low sulfur fuels [sic] that vehicles and the transportation sector needs today, it has to go through a much more intensive upgrading process inside of a refinery. Which is very energy intensive, but [sic] applies equally to whether I extract it by strip mining, or whether I extract it by In Situ, so the decision about how you do it, really is based upon where the resource sits. Then the economics of it become [sic], if it happens to be sitting near the surface, that may be all well and good, but if it's not a high quality resource, with enough [sic] oil in the sands to justify the massive capital investment to extract it and strip mine it, you wouldn't do it. Even independent whether you're concerned about the environmental [sic] footprint. Same with the In Situ, the In Situ, the difference is that although it's not strip mining, you have some other energy intensity issues to deal with, with one you've got to generate steam, and that has to be pumped into the ground, usually done with natural gas, and you can get at some of it with co-generation, but again if that resource base, that's deep down in the Earth's crust, is not sufficiently sized, and doesn't have a concentration of enough resource, then the economics kill you because you've got a big capital investment. So, both have that, and then you've got to look

at [sic], from an environmental impact perspective, I mean there's arguments on both sides… Strip mining sell lots of newspapers right, and lots of covers of national geographic cause it looks particularly ugly when you have the before and after picture, but the third part of that process which includes reforestation, I mean, doesn't necessarily mean that in the full life cycle of the use of that land, that it's necessarily worse off, it takes time [sic]. On the In Situ side, [sic] there are some concerns about the amount of water use, and whether or not [sic] injecting steam into that formation deep—a little bit like fracking, are you causing any permanent damage to the water table, to the rock formation—so both of them [sic] need to be carefully thought through, much like fracking needs to be carefully thought through. They both have risks—different risks. But the economics are driven by where the resource sits and the feasibility of it, if its close to the surface you strip mine, if its deep, you inject and extract.

I: So actually I have a question going back to when [sic] you were talking about the refining process for transformational vehicles, being [sic] a car, being able to use the oil in a car, what are the economics behind, this is my own question [sic], what are the economics behind that process and basically would—would it be fair to say that better technology needs to be developed in that sector to make it more economically feasible to get at more crude oil because of how much crude oil there is in a certain area or…

P: Well I mean if you look at it [sic], as I said earlier, technology is really the key, [sic] twenty years ago—I mean listen, ten years ago there was a famous book written by an American, I think he was an American, and it was the peak oil theory, it's 2007-2008, and here's the theory, Saudi Arabia is running out of oil, we're running out of oil in North America, China, India, the brick countries are booming, and you may recall the crude oil price for West Texas, I think peaked at 140 dollars a barrel—

I: So basically—

P: So his theory was basic economics, right? Supply was declining, demand was increasing, guess what happens you move up the price line, the curve right, and so the theory was we're running out oil [sic]. You fast forward to five years later, and he *couldn't* have been more wrong, I mean he couldn't have been more wrong, why? Because somebody knew, with a new idea, new technology, and entrepreneurial spirit, and took a risk right? And boom all of the sudden now you have huge, huge supply of crude oil and natural gas in North America, that a decade ago, we didn't think we could get at it. Some of it we didn't even know was there, some of it we didn't think we'd ever get at it economically. Now how much more of that is in the world? I mean, think about China, India, Russia, all these countries in Africa that are still so far from being developed that we have no idea what resources base is there. So in terms of a transportation fuel, you know liquid gasoline or diesel fuel in a hybrid engine, in a small motor engine vehicle, with the latest in emission technology, boy, pretty economical, and pretty efficient—and by the way, pretty clean, [sic] if you stand behind the tailpipe of a brand new Honda Accord, or a GM Malibu [sic], I mean these are almost zero emission vehicles. Now there is still the CO2 issue, but [sic] you think about what's changed, in ten years, or twenty years, you know the cars that my parents drove versus the one that we arrived in Pittsburgh in today, I mean who knows what that's going to be in ten years, it'll be even better. To me [sic], one of the revolutions in the last five years has been this huge resurgence [sic] in North America, crude and natural gas resources, that are now available to be extracted at very low cost, which then [sic] is the old supply curve right? How does that compete against lithium battery in a Tesla, well pretty good right? Until somebody invents a new technology. It also [sic] has energy content that's a pretty amazing product when you think about a liter of ultra-low sulfur clean gasoline [sic], this stuff packs a lot of power, you can store it at ambient temperature, you can transport it around, doesn't have to be under pressure, you can carry it into a jerry can into this room and it wouldn't really present super hazards right? [sic] pretty amazing product and probably has a role to play for a while, despite what some people think.

I: Interesting, interesting. Okay, unless you have anything else to say I'm going to move on. In terms of benefits of heavy-crude production, what reasons do you see for continued production in heavy-crude oil, you might of [sic] just touched on this, but if you could elaborate a little bit that would be…

P: Sure well, as I said earlier [sic], it's a massive resource base, it's not the only one, it's like… it's like all the resource bases that have been rediscovered with fracking, natural gas, and light crude [sic], the Bakken Field, they're the same thing. It's a resource base that has phenomenal potential, and not to develop it would be a waste of that potential—

I: So—

P: It wouldn't serve the interest of what I believe is a continuing and growing need, for energy in the world. All forms, not just heavy-oil, *everything,* but if you went and looked at [sic], I told Martin, that if you look on the ExxonMobil website, they do a pretty good job in their energy outlook. If the use of solar and wind, and other renewables, even if it grows at exponential rates, *exponential rates*, it's going to make a dent, *a tiny, tiny dent,* in the growth and energy demand in the world. Why? Because you've got a billion people in China that want to live like us, right, another billion in India, you've got all of Africa that's still [sic], nowhere close to being developed. I mean, they're *burning wood*, to cook—

I: Another one of my questions, so basically what you're saying is it's not really—

P: Don't single out a resource, okay? My point is to single out a particular resource, as one that you shouldn't develop, to me is *really, really*, bad policy, because, why stop there? Stop all the coal mining in the world, stop all the heavy-crude production in the world, totally absurd.

I: But we should be focusing our economic resources more on making these energy uses more efficient, as opposed to saying—

P: Yeah

I: hey look—

P: Or another way of saying that, let the market work. Because you know what? That's how fracking was discovered, it was an entrepreneur who said, "You know what? I got to find a way—[inaudible]—I know the resource is there, right? It's sitting in these rock formations, I can't just stick a pipe in it and get it out. It doesn't work. What can I do?" and bingo he has an idea, "let's inject water, with sand and blast the oil and gas out of the rock formation." And boom, you have an oil boom in the Dakotas, and western Canada, that years ago we didn't even know it was there, right? You have the same thing in Texas [sic]. Let the markets decide, don't have governments picking winners, right [laughter], because if we've learned anything [sic] about the collapse of centrally controlled economies, hopefully we've learned that governments don't pick winners. That's why again I come back to [sic] a particular government, or governments, or individuals single out a particular resource or a particular pipeline project, or a particular type of energy, whether it be solar. Manufacturers in California, right, that Mr. Obama so heavily subsidized, to me that's a big mistake.

I: So basically [inaudible]—

P: *Let the market decide!*

I: Making it an open market.

P: Make it an open market, tax carbon, make it a level playing field, and obviously you have regulations, and environmental permitting processes but let the market decide. You know what? The Athabasca Oil Sands, have been there for a thousand years, and the only reason it's being developed today, is that—

I: They have the technology—

P: Somebody had an idea, somebody had an idea, "Let's go inject steam in the ground, let's find a way to upgrade this *goop*, to a light synthetic crude oil" by making a huge manufacturing plant at Syncrude to do that. That's entrepreneurs, capitalism, and the free-market at work [sic].

I: Interesting, that's a very interesting take on it. So, next question, is—how extensive do you believe economic benefits of the Oil [sic] Sands cultivation extends?

P: *Oh*, *huge, huge*. *Thousands, and thousands*—I mean it's just across [sic] all of North America, right? In fact its impact goes beyond North America [sic]. The one thing about that type of resource extraction, is that it is capital intensive, it's capital intensive, it's just the nature of the beast [sic]. The jobs, the GDP impact, and the second order impact of developing all of our resources in North America, so that North American consumers, and businesses, have access to affordable energy. *I mean to me*, that multiplier is *massive, massive*. You want manufacturing jobs to remain in the Americas—North America? Cheap energy [sic]. You want consumers to have more money in their pocket? I mean, you need more energy [sic]. If the price of gasoline goes above five dollars a gallon in the U.S., [sic] the economy goes south. Well, if you want to keep the price of gasoline down to consumers, increase supply, don't restrict supply [laughter] [sic]. Not to mention the fact that [sic] to me it's a bit absurd, as I said earlier, that we find it acceptable—or that we think it makes sense, for a VLCC ship in Saudi Arabia, to load crude oil, to cross the Atlantic Ocean, to come all the way to the golf coast, to unload, to put it in a pipeline, and—up until recently—send it all the way up to Chicago—to the golf coast and Chicago refining centers—to make gasoline for North American consumers, when you're sitting on resource base in Alberta, in Dakota, and [sic] in Texas, that's massive. Let those barrels from Saudi Arabia go to China, let them go to India, let them be redeployed somewhere else in the world, but then back those barrels out of the Gulf Coast, and let's use the energy we have right here, develop it ourselves. [sic] To me, it's—the benefits are massive. [sic] You can't—I wouldn't, again, I wouldn't single out the oil sands, because I said earlier, [sic] maximum two

million barrels a day on a world [sic] supply of 80-90 million barrels a day [sic], it's not huge, *not zero*, but it's not huge [sic]. If you couple that with fracking, the Bakken, the deposits in Texas, the stuff that crosses the border into the prairie provinces of Canada, not to mention all the natural gas, some of which we probably haven't [sic] even discovered yet [sic]. Develop those resources responsibly, use them, and reap the benefit of it, right? Energy is key to everything that we do.

I: Right, right. That makes sense, very interesting. In response to the critics of oil [sic] sands exploitation [sic], what would you say to justify the continuing production of the heavy-crude, and I know you've touched on this—

P: Have faith in technology [sic], have faith in progress, recognize that there are lots of things in our energy mix today that need to be better. But to pick on the [sic] Athabasca Oil Sands while there are thousands of coal-fired power plants all over the world, some of them still being built with old technology, to me is a bit silly. If you look at again, the full cycle emissions of that operation versus strip mining, and taking coal and turning it into electricity, without the proper scrubber technology, and emission technology, that is a lot worse, right? Don't—don't single out a particular resource base just because you don't like the way it's extracted. To me that's not good policy.

I: So, basically you're saying people haven't had a chance to innovate on this new—

P: It's happening all the time.

I: Right—

P: It's happening every day and every day that we sit here we get better. The Kearl Oil Sands plant is one *heck* of a lot more environmentally responsible, smaller environmental footprint, then the original Syncrude plant was in the 1970s, that's understandable. In Situ mining for oil sands today versus ten years ago is better, more energy efficient, we're learning all the time.

Technology to me is the solution, and have faith in that technology, but to stop stuff, and not let technology have its chance, to me, is a mistake, and again because the world at large is going to need every possible form of energy, stopping one particular resource, in a particular part of the world, I mean to me makes—[inaudible]—you can stop a whole bunch of others too, which to me would be just as silly. Much like those coal-fired plants in China, hopefully one day, if they're still burning coal, its clean coal technology, or its natural gas, right?

I: Right.

P: Maybe one day North America will have clean coal technology in 100 percent of our plants, natural gas, but not what we have today, and yet, nobody's talking about shutting down coal-fired power plants. To me that's the hypocrisy of it a little bit, it comes with that—don't single something out, because it's going to get better, it's going to get more efficient, more environmentally responsible every single day.

I: Interesting. Okay… With the U.S.—With the U.S. refusal to ratify the Kyoto Accord, and Canadian withdrawal from the Kyoto Accord, what were [sic] the impacts on oil sands production?

P: None, none, I mean, because Canada, like the U.S., Canada has been enacting its own regulations around CO2 emissions, covering all industrial processes, including the oil sands. Both the province of Alberta and the federal government of Canada—now some people who would [sic] argue that they are not enough, and you can always have that argument, but there are regulations that are being promulgated and discussed, as we speak, that talk about limiting CO2 emissions, not just from oil sands plants, because there are all kinds of other sources CO2, but from all industrial emitters, both in Canada and the United States. I think that process has to happen. My own personal view, I was living in Europe at the time Kyoto was passed, and I'll use a good example, Belgium ratified Kyoto, okay? Now, if you went back to Belgium and

look what actually happened… What did they do differently With respect to Kyoto, I think that you'd find very, very little. First of all, they couldn't get it passed their federal government, down to the provincial governments within the Belgian Federation to agree on whose going to accept these cuts in emissions? Well they argued for the last ten years and really nothing has happened in my view. Kyoto to me fails because it also doesn't include the single largest challenge we face, and that is how do we ensure that the standards of living in Africa, India, and China, and the rest of Asia, and the other parts of the developing world are lifted in a way that reduces its impact on the environment. That's the biggest challenge we face, because in reality we're going to see CO2 emissions in the developing world, they've already started to decline, on average in developed countries [sic], even if Canada were to rise it's not going to make a huge difference—it's going to pale in comparison with what's already happening in China alone. The real challenge for us is to find ways to get environmentally responsible and clean energy technology, into the hands of as many citizens in this world as we can, to allow them to, you know, cook with gas not wood, heat their homes, clean water, lights, computers, mobile transportation, modern railways, airports, all those items take energy, and if they do that by building conventional coal-fired plants, forget about Kyoto. If the dooms dayers are right, we're done, we're done in a minute because the growth in emissions will make everything that Canada or the U.S. is doing just a—not even material in my view.

I: Interesting. Cool. Okay, could you briefly summarize the different methods of transportation that is currently in place for transport of heavy-crude [sic] oil? So basically—you basically—

P: Sure, yeah, okay so, I think this is an interesting discussion because of all the stuff in the news about Keystone. I would expand it to include natural gas, petroleum products, gasoline, diesel fuel, jet fuel, and crude oil. Basic economics, and I would argue, sound policy both environmentally and from an economic perspective would say, "Hey listen, within very short distances, let's call it less than several hundred miles, the most economical [sic] way to

transport liquid petroleum products is actually by truck," once you get beyond a certain distance, particularly once you get beyond a distance, a driver can work a full shift in a large tanker truck, you start to get to rail, and rail becomes economic up to a certain distance, that's probably—maybe as much as five hundred, six hundred miles. The most efficient, and safest way to transport petroleum products, natural gas and crude oil, is by pipeline. It uses almost [sic] zero energy, you're talking about pumping stations that once that crude is moving, it's very little energy to keep it moving. With modern sensing technology, and construction techniques, I mean I know there's a lot of stuff in the press recently about pipeline leaks here and there, but if you actually go and look at the *millions and millions* of barrels of oil, petroleum products, and natural gas, that get transported by pipeline, and then looked at the failure rate, *it is miniscule, miniscule*. You block a pipeline, and what happens? The market will find a way to make it work, so what's happened is crude producers with no choice, because they have production that they need to sell and get to market, and get to a refinery, they start buying up the entire rail capacity of North America, *I'm exaggerating, I'm exaggerating,* but that's what really happening, you are now transporting crude, in jumbo tank cars thousands of miles. First of all, what are you burning in a train? Diesel fuel, okay so the environmental footprint to transport the oil, you've probably tripled the footprint versus a pipeline, probably tenfold. Secondly, don't tell me there aren't environmental risks and safety risks around transport by rail, we know what they are, just look in the news in the last couple of years. Crude, natural gas, and petroleum products have been moved pipeline for a hundred years almost, incredibly safe, incredibly good environmental record, and by-the-way it is one *heck* of a lot cheaper, heck of a lot cheaper. Blocking Keystone pipeline, I mean, very, very bad policy, very bad policy, and the consequence has been that now in North America there's a shortage in rail cars. [sic] The other modes of transport that typically would say rail is their best option, they're being pushed out by oil producers, just trying to survive and find a way to get their crude to market. Now you can't find rail cars, you can't move the stuff that normally should be advantaged in rail, because there are no rail cars left. You also

[sic] have an infrastructure that eventually gets pushed to the limit, which is where we are today. So to me it's a question of proximity, from the major oil field, to a refinery, more often than not, the most economic, and safest way to move crude is by pipeline. The other option, of course, is when you cross the ocean you move by ship. When you build KeyStone, as I said earlier, and when you increase the capacity of pipelines in North America, now that we have this boom, a couple things are going to happen; one, you're going to back out some of these tankers that are coming across the Atlantic from the North Sea, Africa, the Middle East, and they're going to stay home, and they're probably going to be diverted to other parts of the world, it'll probably make more sense, go to China, go to Asia where there's huge demand, those ships are going to stop arriving at the Gulf Coast, North America is going to become a net producer of crude oil, it may even start exporting some, maybe one day, there's already talk about that for natural gas, and by-the-way the benefit that doesn't get talked about much, which is absolutely shocking to me is that, you have crude producers in the mid-continent of North America who are getting paid anywhere from—well it's a range from 5 to 25 $ a barrel less for our own production then we're paying for foreign oil arriving in the Gulf Coast.

I: [inaudible] transportation costs.

P: They can't get it out. What happens is that [sic] it trades at a discount. That's what happened with WTI and mid-continent crude, it's trading at a huge discount to North Sea Brent, because they can't get it to market, so you start to pay people to take it away. In a sense what happened is, you think about the government royalties that are being missed on that oil. Not to mention the fact that this is our resource, its right in the middle of where we live, and we're paying 20 percent more to bring stuff from Saudi Arabia, from the North Sea, from Africa, I mean the economics of that are just absolutely absurd, but it doesn't get talked about [sic]. If that was any other commodity, wheat, copper, gold, I mean it's ridiculous, [sic] the economic destruction of not allowing pipeline capacity to get expanded, the cost is *huge, huge*. Now [sic] other people

argue that's cheap crude for mid-continent, which is not bad for consumers, well that's all well and good, but eventually when we increase supply, what will happen is WTI won't go up to brand, I mean right, they'll meet somewhere in the middle, so the entire cost of energy will come down as you increase supply, which is a good thing, but don't publish domestic producers, because you have [sic] some, I think, really unsound policy with respect to pipelines, I mean that's just—KeyStone should be built, there should be more that should be built and pipeline capacity should be expanded, so that rail capacity can go back to where it should be used; shorter runs for those commodities and goods that need to get to the west coast, get to L.A.. It's [sic] not for stuff going from one end of the continent to the other, I mean we've [sic] know this for 80 years, you know it's the best way to transport petroleum products and crude and natural gas. We sit in this University, and there is nothing but gas pipelines all over.

I: So in your eyes why hasn't it been done?

P: It's politics, it's pure politics [sic]—

I: But it sounds like it's going to be creating jobs, it's going to be—

P: I mean don't get me going [sic], you're right, it's absolutely *absurd, absurd,* but I think reality is that there's some fairly strong supporters of the democratic party of the United States, that are the same folks that love that national geographic article, the same folks that believe that dirty oil from Alberta is *the worst thing the world has ever seen, it's going to change the future of climate change*, and that they just—they want to stop it. They're big supporters of Obama, and he can't lose their support. Unfortunately he doesn't have the courage, to look at sound science, even though his own government approved it, even though they approved the rerouting, and here we are how many years later? [sic] In [sic] that last seven years, I mean crude producers in the mid-continent of this—of Canada and the U.S., have been punished with prices for their production that are anywhere from ten to 20 percent below fair value. [sic] We've reduced the

supply of oil getting to where it needs to get to, in terms of turning it into useful products, because people don't realize it but crude doesn't run anything, crude oil by itself is a useless product, it needs to get to a refinery and be made into gasoline, diesel, and jet fuel, or lubricants, you know something useful.

I: Makes sense.

P: KeyStone, that's just ridiculous, honestly.

I: That is—Okay, cool, definitely. Our next question actually has to do with KeyStone, actually you may have just answered this, but I'm going to ask it anyway in case you have anything else that you want to say, In terms of the KeyStone Pipeline… would you say that it is the best method of transportation of crude oil, from the oil [sic] sands. Critics of the pipeline's construction state that environmental costs of the pipeline will [sic] outweigh the economic benefit of the pipeline—that the pipeline represents. What is your response to this claim, and could you elaborate on the benefits and consequences of each.

P: Sure, well my personal view is that's [sic] completely unsound, I mean if that was true then why do [sic] we build any pipelines? The fact is that the safest and least expensive way to move petroleum products, natural gas or crude oil, over long distances, is by pipeline [sic]. 80 years of history have shown that if you look at the volume of products that have been transported, and it's [sic] not without risk, even natural gas—you may have heard in the news today that the west coast utility now has been charged with that big explosion in San Francisco, what was that? It was a natural gas pipeline, under the ground, that's under pressure, its dangerous stuff if it gets close to a source of ignition, you can have a dangerous—people can get killed. But I don't hear people saying stop building natural gas pipelines. It's the same, KeyStone by itself, it's really not the issue, it's wherever it makes sense, and where we have resources, if its crude oil, petroleum products or natural gas, they should be moved by pipeline over long distances. When Critics

state that [sic] the environmental impact of KeyStone [sic] is worse than [inaudible] what is happening on our railways today, I mean to me that's just again, that's completely unsound policy, you're basically tying up rail capacity to move crude oil in small containers [ironic laughter], when you can be putting into pipe in the ground, out of sight, very little energy to move it, and an [sic] environmental impact of—even when you do have a leak with modern detection technology it's pretty minor, compared to the risks of having it rolling through neighborhoods and major cities.

I: Like it's going to crash or something—

P: Yeah sure, well you just look about what's happened twice in North America in the last year and a half, and not to mention the economics of that don't make any sense, and it's not just KeyStone, every pipeline should go through a permitting process, it should be careful about where it's routed, it should be careful how its constructed, it should use the latest technology, but every time we put a new pipeline in the ground, with the latest technology, that is far better than the stuff that was built 10 years ago, 20 years ago, 40 years ago, and over time we need to replace those pipelines with new technology. To me there's no science, nor economics, that somebody can put in front of and say [sic] building efficient, and modern pipeline infrastructure in North America, doesn't make sense. It's not just KeyStone, all kinds of pipelines. And again to single out a particular resource, again bad policy, in my view—

I: It just doesn't make sense

P: It doesn't make sense, you're sitting on a huge resource base the size of Saudi Arabia, and [sic] *you just want to leave it there?* To me, it's not good policy in the context of North America, but it's not good policy as we try to help the balance of the world get access to affordable energy, because we have a long way to go, and we want to make sure they do it, in a way that's more environmentally friendly than what's [sic] happening today.

I: Interesting. Okay, this is our last and final question—

P: By the way, sorry, one more thing on crude pipelines and crude access, one of the things that doesn't get talked about very much is that over the last decade, in North America, there's probably been anywhere from 10 to 20 refineries closed. Each time one of those refineries close, thousands and thousands and thousands of jobs are lost, and one of the reasons those refineries are closing, is they don't have access. Now some of them are too small, and not complex enough, they're not going to compete, its creative destruction of the free market at work, but some of them have closed because of lack of access to feedstock, and so to restrict feedstock access, to me is silly. One of the things impacting refineries on the east coast of North America, Philadelphia, St. John's New Brunswick, New Jersey, all those refineries that today, basically for the most part, run on a diet of foreign crude that gets to their plants, okay? So they pay brand price, or brand equivalent prices in Saudi Arabia, Africa, North Sea, to bring the crude into North America, to produce gasoline, diesel, and jet fuel, and then can't get access to… the feedstock in the middle of the continent that's sitting there. There are only so many railcars that can go around, a few railcars get to Philadelphia, and some railcars get to New Jersey, some to Halifax, Montreal, but the reality is that more of those plants will close unless we expand capacity and allow them to have access to this resource base we have [sic]. The United States, up until recently was a huge importer of finished petroleum products, particularly gasoline, now that's starting to change, because of what's happened to some of resource base, but still a fairly large importer of crude in certain areas of the country because the logistics aren't there to get the product to them. That's [sic] another advantage of getting that infrastructure, with access and pipeline to allow them to have access to the feedstock that is [sic] sitting under our feet.

I: Right, yeah, that makes sense.

P: By the way, again, those are very good paying jobs, lots of taxes, a lot of revenue, a lot of ripple benefits of contractors that maintain those facilities, *thousands of jobs, thousands and thousands of jobs*.

I: So it's not just the innovative jobs that are going to be increasing, but it will—

P: Sure—

I: Manufacturing—

P: Manufacturing, to me North America has the potential to be on the verge of a huge renaissance in manufacturing, because of inexpensive and affordable energy. Man it's a—

I: All types of manufacturing?

P: All types—every type of manufacturing uses energy, right?

I: Right

P: Whether it be chemical plants, whether it be car plants, whether it be refineries, every single—pretty much every manufacturing process in one way or another, uses energy. I mean, if you go to where I live now, in the province of Ontario, one of the things that's been killing manufacturing jobs [sic], is the cost of electricity. People don't realize, how do you make electricity? It just doesn't show up on the wires [laughter], electricity has to be generated. What are the ways of doing it? Nuclear plants, not a lot of appetite to build new ones, I'm not sure they necessarily make economic sense because the capital costs are *massive,* so nuclear is one, but that's a fixed capacity, Hydro, but there are [sic] only so many high water falls that close to anywhere, most of them have been tapped, Niagara Falls, others. Coal? Okay, well we know that coal burning to make power, particularly if we don't have modern scrubbing technologies, not really great [sic] from a CO2 and emissions perspective. Natural gas, most of the oil burning power plants have been phased out in favor of natural gas [sic]. If you can take

advantage of this energy source, in North America to get affordable natural gas into the power generation grid, every single plant, every house, every school [sic], everybody uses electricity.

I: What about long-term solar?

P: You know solar power has its applications, but even if solar were to grow *exponentially,* I mean *exponential, forever!* It doesn't make a dent [whisper]. The fundamental issue with solar is that, first of all you've got to be in a part of North America to get enough sun. There are certain places in North America where solar makes some sense, because you get long hours of sunlight, but the other challenge is you've got to clear vast tracts of land to put up a solar farm. It's not without its own issues with respect to its impact on the environment, you can stick them in the middle of the desert, but then you've got to have a way to transport, and store that electricity, a little bit like wind, they have their applications in certain jurisdictions, but from a cost and scale perspective, even if they grow exponentially… forever… it has an impact, it's just too small because the need for energy is so massive—

I: Is it just not efficient enough?

P: Doesn't have the scale, exactly right, doesn't have the scale, it's also not without its cost challenges, I mean the cost of solar panels have come down a lot, the cost of wind is coming down all the time, but it just doesn't have the capability to have the scale, and by the way, you're sitting on a massive resource base, you poke a hole in the ground, you put it in a pipe, you send it to a plant, and boom you have electricity. That [sic], versus, clearing half of Pennsylvania, I'm exaggerating obviously, clear half of Pennsylvania, put up solar panels everywhere, and that might satisfy a certain amount of solar demand in Pennsylvania, doesn't have the scale. If you go and look at, I said to Martin, if you go and look at the ExxonMobil Energy Outlook, it'll show you even with exponential growth of renewables, solar, wind, geothermal, even if they grow at exponential rates, the scale they need to make up [sic] is massive. The world is just—is going to

have such a massive need for energy that you just don't have the size and scale—unless there's some other kind of massive technology breakthrough, and there might be, so let the market decide by the way right? Don't subsidize solar manufacturers in California with tax dollars, let the market decide, because smart entrepreneurs they'll find solutions if you take the handcuffs off.

I: Right, that makes sense—

P: But no it has a place [sic], but it's basically going to be more in niche applications, and it's going to be more isolated because there's only—

I: Doesn't make sense everywhere—

P: For most parts of Canada, where we have days that are incredibly short in the winter time, mostly to the northern part of this hemisphere, you don't get enough sunlight, you don't get enough sunlight to make solar be [sic] remotely competitive. Maybe in Arizona, parts of California—

I: Not necessarily competitive [sic], but what about economically feasible?

P: *No.*

I: You don't think so?

P: Because you can't—you can't generate enough power in the day if you don't have the sunlight. That's the basic fundamentals of solar, is that you need to have those panels—

I: What about during the summer?

P: Yeah, during the summer is good, buts that's only half the year, right, and depending on how far north you come, its unfortunately [laughter] it's only three or four months. What's [sic] interesting is, if you go into—I was looking at one—because I have a place up north were we

actually use solar and wind for power generation, we're off grid, I read a very good book recently about renewable energy, and there are maps of North America, all of North America, and they'll show you, using metrological data, how many average hours of sunlight, in each part of North America, so if you start in the south—

I: What book is this?

P: Oh it's the Altern—what is it, The Alternative Power Hand Book, or Alternative Energy Handbook, I got it off Amazon, I bought it last year [sic]—

I: Okay, cool—

P: And they have a map, a map for two things, they have a map for wind farms, and they have a map for solar, and they'll tell you, if you live in this part of North America, this is how many average hours of sunlight you get in each month of the year [sic]. You can [sic] go and do your math of installing a solar power system, and all the costs of associated with that relative to what cost of electricity might be from the grid, you're math works out pretty quick. The [sic] further south you come, the better it works, and you have more sunlight, wind? I mean it's a function of proximity [sic] to the oceans, you've got to be close to the great lakes, the plains, but you've got to have a steady supply of wind, and preferably, close to where the people are right? [sic] The other problem with once you generate power from solar and—

I: It dies out—

P: Exactly, you lose that when you transport it into the grid, the further it goes, the more you lose, that's one of the challenges, of those technologies, you lose them as you transmit them, and they have a hard time competing if where the power is, isn't where the people live right? Whereas with natural gas generation, you can build that anywhere if you have pipeline access to natural gas, you can build it close to where the people are.

I: Interesting.

P: So there's a role for it, but the problem is it just doesn't have the scale, and people underestimate the amount of energy that's required just to meet the growing needs power generation, forget about cars, and batteries in cars, the single largest challenge we have is going to be power generation, because everybody wants this, and this isn't oil right? This is electricity generated by something, and that's going to be the biggest challenge.

I: [inaudible]

P: What's that?

I: Whether it be x, y, or z—

P: Yeah sure, yeah sure, sure, and because we're sitting on a whole pile of natural gas in North America, we have a unique advantage, because natural gas is one of the most efficient and cleanest ways to generate electricity, and of course everybody needs electricity, whether you're manufacturing, or you're a homeowner, or at university, or—right?

I: Yeah, definitely, okay, so this is our last question [inaudible] add. With the Caesar—excuse me—with the seizure of assets by the Venezuelan government, how does this affect the economics of [sic] oil sands production?

P: Well I don't think has a huge impact directly on Athabasca by itself, I mean it has an impact on energy markets general. I think it has an impact on crude oil markets in general. Unfortunately, anytime you look at any country around the world, and Mexico is a good case study, anytime you have a country in the world, I mean if we learned anything in the last century, we've learned, *hopefully*, that centrally controlled economies fundamentally do not work. The Soviet Union, even China today is not what the original revolution called for in terms of a communist state, where a central government tries to control all facets of production, and

tell people what to do, rather than letting the free market work. Venezuela, for the longest time, since they expropriated their resource base from the multinational companies, what was it, the 70s, I think the last expropriation was actually in the 80s[i], it's exactly the same story everywhere, what happens is, slowly but surely, production will decline, there won't be new capital, there won't be new ideas and innovation to increase production, and production will decline. That's bad for everybody, that's bad for all of us as citizens of this world, because we need that energy in order to allow us to lift the standards of living. The seizure [sic] will reduce supply, but is it material enough with everything else that is going on in the world, it's counter-balancing that? Probably not. I mentioned Mexico, it's a very good case in point. Mexico, like a lot of other countries in South America, and other parts of the world, even Canada up until 1986 had a centrally controlled production of crude oil and natural gas, and then [sic] finally realized, "you know what? That's not a good idea, let the markets work." Mexico nationalized its oil industry decades, and decades, and decades, ago created one company, PAMEX, which is really government, right? It [sic] was responsible for all facets of oil, exploration, production, refining, and marketing—you [sic] may have been following in the news that finally they've recognized, "You know what? *This… does… not… work…*" why? Because they can't get the capital, they can't get the innovation, and the entrepreneurial spirit, to develop their vast resource base. They [sic] finally decided, "You know what? We're going to stop this, we're going to open up our oil industry, to the best, *anybody,*" anybody who wants to come and put in a bid to develop the [sic] resources in Mexico [sic], obviously with certain conditions, Mexico [sic] wanted certain royalties, they [sic] wanted certain environmental rules and regulations, and the companies are going to demand the same thing, like rule of law—"no kidding this time, you're not going to expropriate me in five years after I've invested billions to develop your resources," but they've come to the conclusion, because they've seen their production steadily decline, that a centrally controlled economy with one state company running the oil industry, is not a good idea.

I: Right, so it's different then like, an airline industry, where like a lot of—because like their isn't as much innovation anymore in an airline industry because, you know—Korea and some places—

P: Well a lot of state governments, yeah [inaudible], it's government controlled, but I think if you looked at North American airline industries, there has been quite a bit of innovation amongst those carriers in terms of—you look at how they work with manufacturers to produce—a jet aircraft today, it's jet fuel consumption versus jet aircraft of 30 years ago, not even the same—

I: Gotcha, okay—

P: They work with the manufacturers, because they know, "If I can get the cost of travel down to my buying public, guess what? They're going to fly more than they're going to take rail, or drive," so it's in their best interest to innovate [sic]. These state controlled companies like PAMEX, like Venezuelan—I mean Venezuela is a sad story, Argentina's a worse story. Argentina is a very sad—there is a country that's rich in resources, whose government has decided "we think we can control everything, so we're going to take everything back, we're going to control everything, we're going to expropriate stuff, it is going to be run by the state," and now [sic] look at what's happened to that country, it's sad. Mexico is finally waking up and saying [sic] it doesn't work, it doesn't work. Venezuela, it'll mean a decline in production, it will mean a reduction in supply to the world market, so it has some impact, but I think there's some other offsetting things that mitigate it, Mexico liberalizing, the *boom* in North America, its just—what's happened here in the last five years, phenomenal, phenomenal—

I: Interesting—

P: I don't think that it'll be a huge impact, no—

I: Interesting.

P: Yep.

I: Interesting, I think that's it, thank you so much for—

P: No problem, my pleasure—

I: Answering our questions—

P: If you have any questions after

[Inaudible]

(End of Interview)

Interview Time: 1:07.11

This paper will discuss an interview had with Simon Smith conducted by Justin Hilliard and Martin Smith. You can read and learn more about Simon Smiths accomplishments at this link here or at the end of this essay.

The first topic of the interview discusses the extra heavy crude oil production in the Athabasca Tar Sands. The Athabasca Tar Sands is the second largest known oil reserve in the world. Extra heavy crude oil is essentially and saturated oil. According to Mr. Smith, there are two types of Tar Sands heavy crude that sits near the surface that requires Strip Mining and heavy crude that sits deep beneath the earth's surface, which requires In Situ Mining. The Strip Mining process is to remove the overburden, typically boreal forest, mine the sand, removing the sand from the crude, and send the sand to a treatment plant where the oil is separated from the sand, and the last step is to reforestation the area. The In Situ Mining process is to remove the overburden, typically boreal forest, inject steam, use the steam to heat up the sand and loosen up the reserve to bring it to the surface, and the last step is to reforestation the area. In Situ Mining is a phenomenon that Mr. Smith discusses as an innovation that was developed in the late 1960's and commercialized in the early 1980's.

The benefits of the extraction of the Athabasca Tar Sands are laid out as follows: economically it would be a great way, compared to other available and practical energy resources, to help reduce to the global price of energy and due to the fact that energy is integral in almost every aspect of life, help improve the standard of living through cheaper access to energy resources, the economic impact of importing crude from the middle east (on supertankers) while sitting on this resource base make the benefits of utilizing this crude vastly more environmentally and economically effective, the utilization of this resource can create well-paying jobs in an economy that is not at full employment, the efficiency of improving how tailings ponds are managed as increased drastically in recent years. The consequences of the extraction of the Athabasca Tar Sands are laid out as follows: exaction is more energy

intensive, when separating the oil from the sand a process that involves heat and water is used this is inefficient, waste is also difficult to manage.

According to Mr. Smith, "From well to wheel," (everything included) it is about ten percent more inefficient than conventional oil production. That being said, the environmental impact of Tar Sands production is much less than other sources of energy such as coal. Mr. Smith describes the Athabasca Tar Sands as a “huge missed opportunity. The Tailings ponds that are created through refining the extra-heavy crude is one of the bigger aspects of environmental damage that occurs and in recent years, the technology to manage these tailings ponds has drastically improved and now these tailings ponds can be managed effectively. Mr. Smith states “To single out a single technology that at its maturity can measure up to 2% of global crude production (not including any other forms of energy, renewable, coal etc…) because you think it's that much worse than the other is not sound policy and foolish”. He goes on to say “The opportunity that America has to change from a crude importer to a huge crude exporter, has the potential to revitalize the entire economy through the creation of jobs”.

Mr. Smith goes on to discuss the how it is vital that the world use every source of energy, as it will more quickly increase the quality of life for developing nation. When the government picks and chooses what will be cultivated, they are picking winners and losers, which is detrimental to the overall economy. Mr. Smith points out the overall political games that are played, which play a role in how energy cultivation is enacted. According to Mr. Smith, “The concept of environmental impact of the Athabasca Oil Sands has, in my opinion, become a lightning rod for political debate when compared to other forms of energy”.

In an ideal world, Mr. Smith would be in favor of a Carbon Tax as an incentive for firms to become more efficient. Companies also want to reduce the impact of their refining and increase the efficiency because of governmental policies that make it beneficial to reduce the

full cycle impact of these processes. Mr. Smith sites cap-and-trade as too complicated because of the games that can be played. He cites the EU as an example.

The continuing theme of market fundamentalism defines the responses for most of the questions, whether it be focusing on the economic importance of heavy-crude oil production, or the environmental protection of the areas affected by petroleum operations, market fundamentalism is an ingrained aspect of the policy that is adhered to when approaching large scale petroleum operations such as the Athabasca Oil Sands. This underlying concept, while it does have flaws environmentalists can argue that it fails to correct the current market failure, conceptualizes the impact of technology and the faith that is instilled in the free-market "invisible hand" by today's business leaders. The transcript of the interview highlights that while there are groups in society that target certain energy sources (anti-KeyStone activists, etc…), it is important to look at the entire energy market as a whole, and not identify specific resources that garner media attention. The issue that arises when certain energy sources, that are not as harmful as other, are vilified by the media, it creates economic policy were the government hampers market function that would balance out the effect. The main point to take away from the discussion concerning the Athabasca Oil Sands, and extra-heavy crude production for that matter, is that instead of creating policy that hampers one small portion of the energy market, creates deadweight loss in the economy similar to what occurs when the government takes control of the economy. Governments need to adhere by policy that encompasses all carbon-emitting facets of the economy, based on the amount of carbon they emit, not media-backed vilification of one sector. While this idea may seem idealistic, it goes beyond just energy policy and highlights the inefficiencies of governmental economic policy, and how easily any policy can be manipulated by special-interest groups.

The Kyoto Accord is a further example of poor policy instituted by governments. While the United States did not ratify the accord, Canada did, and Mr. Smith's experience in Belgium

highlights the vagueness of the accord, and its inability to be instituted. While the accord never directly impacted the Athabasca Oil Sands, the multi-tier rankings of nations mimics the poor policy that is expanded on when the oil sands were discussed earlier in the interview. The accord states that developed nations needed to reduce their emissions, and if this was adhered to, it would have greatly affected the production of crude from the tar sands. The reason why the Kyoto Accord was poor policy is because it singles out resources bases that reside in developed nations, such as Athabasca, while allowing nations like China to freely develop their resources bases, while still adhering to a non-binding form of the accord. This was clearly recognized by the U.S. and Canadian governments as they either refused to ratify or pulled out of the accord. In the end the impact of the Kyoto Accord was minimal on the Athabasca Oil Sands due mainly to the fact that it would have hindered economic development within North America, and raised global energy prices by reducing supply. This, however, is not an anti-accord stance to reducing CO2 emission, but through the same logic that was discussed in terms of the KeyStone pipeline in the interview, the necessary legislation needs to be all encompassing across all nations and resource bases. Without a unilateral accord, there will always be issues with implementing CO2 reduction policy (similar to why Germany gave up its attempts to reduce its environmental footprint).

The last aspect of the interview goes back to free-market fundamentalism with a discerning view on centrally controlled petroleum production. With the seizure of multinational corporate assets in Venezuela, the efforts by a state-run petroleum corporation will reduce the overall supply in the market. At the time of the expropriation there may not be a huge difference (even though there are reports that Venezuelan crude production is already at half the levels it was at in 2007 [unconfirmed reports]), the incentives for individuals to create more efficient, and environmentally friendly methods of production will no longer exist. The reduction in production however, is the area that would have the greatest effect on the Athabasca Oil Sands, as it would

raise the global crude price, making it more difficult for developing nations to raise their standard of living with cheap energy. The idea of nationalized petroleum corporations circles back to the main theme of the interview, with too much government intervention, inefficiencies are created.

In conclusion, the point of Mr. Smith, is that there are ways that the government can approach the issue of CO2 reduction, but when that approach becomes too heavy handed, deadweight loss will arise in the energy market, and as a whole it will not be operating its most efficient level, whether that be an economic sense, or an environmental impact sense. The role of the government cannot be understated, by has to be properly stated. Through the discussions of the oil sands, the Kyoto Accord, and Venezuela's expropriation of multinational corporations, the view that Mr. Smith expresses is that the market will balance itself out, and if there are negative externalities that are not addressed by market forces, then it becomes necessary for the government to institute policy that is unbiased to any specific sector of the energy market. Mr. Smith's stance is that this is the only way to ensure reduction in C02 emissions, and more sound environmental policy, is through proper intervention, and anything other than that borders on being associated with a (flawed) centrally planned economy. In the words of Mr. Smith, "*let the market decide!*"

[i] "The expropriation of Exxon-Mobil reserves in Venezuela is probably not material to overall global energy supplies. Experience has shown that when states take over economic output like oil production, that over time, supplies decline as they typically do not have sufficient capital, nor expertise, to reinvest in the industry. This reduces supply and puts upward pressure on prices. There are offsets, however, such as additional oil sands production from Canada and increased production in the continental United States with better technology such as fracking. In addition, other oil producing nations, such as Mexico, have recently announced de-nationalization of their oil production, given declining production and declining reserves. They have invited foreign companies to come back into Mexico, which over time should also increase supply and offset some of the potential declines in Venezuela."—Simon Smith, April 14th, 2014