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"ENERGY: Sources, Supply, and Security"

CHAIR:

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SPEAKERS:

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Mr. Jay Pryor – Chevron Corporation, Vice President for Corporate Business Development.

Ms. Rayola Dougher – Senior Economic Advisor, American Petroleum Institute.

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ENERGY: SOURCES, SUPPLY AND SECURITY

[Dr. John Duke Anthony] One of the most misunderstood of the issues between the United States and the Arab world in terms of how the American public perceives it, is that we have moved from a consensus four or five years ago, on energy security to a situation where in the last two presidential State of the Union addresses and the last two of the previous Administration's State of the Union addresses call for ending America's, lessening America's reliance on foreign oil. For most specialists this has been a code word for Arab and Islamic oil. It's not that Americans are in favor of driving less, it's just that the political, policy implications have been driving less on Arab and Islamic origin oil.

We have Randa Fahmy Hudome to chair this session. She's a member of the National Council's Board of Directors. She has worked in high-ranking policy implementation sectors of the U.S. Department of Energy. She heads her own firm. She has been intimately involved with Libya and increasingly with the oil and gas producers of Arabia and the Gulf. Chairman Randa Fahmy Hudome.

[Ms. Randa Fahmy Hudome] Thank you, Dr. Anthony and thank you to the National Council for not only is sponsoring this seminar on energy, which is, you're right, is so important with respect to our relations between the U.S. and the Arab world, but also for the work that the National Council does throughout the year. Many of you may know about the Model Arab League and other types of events, but this past year Dr. Anthony and the National Council sponsored an event on Capitol Hill, which was attended by about 200 policymakers, the men and women who advise the Senators and Congressmen and it was probably one of the most enlightening sessions they had had regarding the issues of energy.

I'd like to quote Ambassador Adel al Jubeir yesterday, when he said, when you talk about energy issues with respect to the U.S. and Arab worlds sometimes it becomes the silly season. Right now in the political election season of America here, it's silly season, but those of us who have to live in Washington all year round are constantly bombarded by the silly season here.

Some of the truths that I like to talk about and some of the truths that our expert panel are going to talk about today, with respect to energy source and supply and security has to do with the real facts of energy supply not only throughout the world but here in America. For instance, as Dr. Anthony said, that we often times like to talk in evil sorts of ways about the relationship between the United States and Arab world when it comes to petroleum.

Truth. The majority of oil imported into the United States comes from Canada and Mexico.

Truth. The United States is going to be petroleum dependent for the next 20 years. That being said countries like Qatar, the United Arab Emirates and Saudi Arabia are moving forward on the highest technology for energy efficiency.

Truth. On security issues. Since the oil embargo of the 1970s, the oil producers particularly in the Arab world have never again used oil as a weapon and have promised to never do that again.

And finally, on the issue of price. The truth is a matter of why the price of gasoline fluctuates is, I saw Tom Doggett somewhere here. He's the reporter that we love to love from Reuters and he would dog the Energy Secretary. He would dog the Minister of Petroleum from Saudi Arabia. He would dog the OPEC oil producers and his questions were always the same. Right, Tom? What's the price of oil? What's the perfect price band? What sets that price? The truth of the matter is, in 2008, when you saw the price of gas rise and the price of oil rise on the market it was the speculators from Wall Street who were driving up the price of oil, and Congress finally understood that when they not only held hearings regarding that matter but implemented new regulations regarding that.

So as I mentioned today we are here to hear more truths from our expert panel on sources, supply and security.

Our first speaker is Jay Pryor, who is going to talk a little bit about partnership and that quest for energy security. Jay is presently the Vice President of Chevron, in corporate business development. He's been at the corporation for 31 years, which is the hallmark and trademark of an excellent corporation. They retain their best and brightest. He's worked in places such as the Asia, Europe, Russia, Turkmenistan, Kazakhstan, Nigeria, Chad and Equatorial Guinea. Most importantly I found as part of Jay's bio he took a leadership role in the Center for Sustainable Energy Efficiency in Qatar, where the center itself trains Qatari engineers, scientists and students on energy efficiency issues. So Jay please take the microphone.

[Jay Pryor] Well thanks, Randa for such a nice introduction. I hope I deserve only half of that. It's a pleasure to be here again, to share with you some of Chevron's perspectives that are really the dynamics of reshaping our industry.

In the role of business development I spend a lot of time in airplanes and probably far too much time for someone that's a petroleum engineer, who's shaped most of his career around the subsurface. But it gives me a lot to think about. A lot of time by myself to really contemplate issues around the industry, energy consumption, demand and supply and those sort of things. Not to mention the complexity I've seen in my 31 year career and how much it's changed and become much more complex both from an energy technology point of view but just the pure geopolitics of energy.

The global financial crisis has shifted the focus away from our long-term energy supply issues but trust me that issue has not been resolved. People everywhere have similar aspirations. They all want reliable and affordable energy. They want it to be produced responsibly. They want things that energy can provide light, heat, mobility and in some cases 24 hour texting, tweeting, e-mails.

As a big global energy system is today it's become even bigger because of the world's industry base continuing to grow. New technologies are invented and of course the population expands. Just consider this. Americans make about 13 billion requests for Google searches in a month. That increase is actually roughly the same amount of energy 4200 homes use in a month. That technology wasn't

here ten years ago. And by 2030 there will be 8.2 billion people in the world, all of them needing to maintain their lifestyle at least, maybe improve their lifestyle and in no doubt make even more Google searches, tweets and texts and who knows what else could be going on by then.

That will take a lot of energy and most of the estimates the world energy demand, Randa has kind of gone through a little of this, we talk about increases between 30 and 40% by 2030. What's interesting to note is a sizable volume of that demand that will come from the Middle East itself. In fact, the Middle East total energy demand is projected to grow roughly 90% between 2007 and 2030. That'll be 10% of the global growth. Apart from Asia that will be the fastest growing region of the world.

Middle Eastern oil demand is expected to increase 70% over that same period of time and will on an absolute basis match the growth of India. Those demand projections sound very big and maybe even daunting. The more you understand about energy and its criticality as a building block of economic growth you will understand the sheer size and scale of these issues. The world's energy needs go far beyond the capacity of one resource or one technology. As Randa talked about, under any scenario oil and natural gas will be the largest part of that portfolio for at least the next three decades.

So what does it mean for us to achieve energy security? Well I think there's probably three things we need to focus on: integration, diversity and importantly partnership. In a region like the Middle East, greater integration can enable each resource holder to have the capacity of developing their resource to the best advantage. We'll say more efficiently. What happens when countries realize you get a best economic return on assets by sending resources to their best use. By consuming them at home when economically, and sending them abroad when more advantageous becomes a problem. This is important not simply on individual countries but also on global energy markets. When energy is consumed more efficiently all people benefit.

We talked about energy efficiency and how Chevron feels strongly about that, internally we've decreased the amount of energy we consume per unit by 20% in the last 15 years. We think leadership in this area is needed.

When the approach incorporates diversity countries of all types, all abilities can meet their needs in a variety of ways and promote a variety of energy types and resources. Of course the question of uncertainty around the future energy security and supplies don't really involve the resources themselves. I'm a petroleum engineer and there's plenty of molecules out there. Instead uncertainty really hinges on the level of collaboration taking place.

This raises the third and most important issue of energy security. That's partnership. In a sense our ability to partner will power the future. To meet the world's future and current needs strong interaction is needed between IOCs, NOCs, resource holding governments and of course the general public, And not simply more activity but greater understanding and in-depth understanding of each other's issues.

Importantly we're seeking to increase interaction even as the nature of partnership grows much more complex. Partnerships have always been critical but from Near East to Far East from Africa

to Asia and other regions in between, I've visited a lot of these over a year and I can tell you some of the issues they think are important.

Partner countries are going much beyond just seeking a world-class project development capability or a technology or ability to even help to maximize the value of the resource. Many can do that themselves. I think three priorities are starting to emerge in the conversations I've had with a lot of the owners and operators in the region. Safety and operational excellence is now an issue that's discussed openly again. Environmental stewardship has always been an issue but a lot more discussion these days about those issues. Greenhouse gases, issues around water, issues around land use, all of those are big issues. Innovative approaches to energy production and economic development. In other words, power to wellhead or how do you get the molecules to be usable in a way that communities and of course the overall world population can use it.

This is creating a lot more complexity in our traditional partnerships. I can tell you let me give you a couple of examples. One new partnership that we formed is a very new and interesting partnership. In Russia we've just signed a deal to work on with Rosneft, the Black Sea Deepwater area around Shatsky Ridge, 8600 square kilometers in the Russian Black Sea.

What's interesting, is this is very close to the resort city of Sochi which is of course a warm water recreation area in Russia on the Black Sea, also will be the host to the Winter Olympics in a couple of years. What they were very interested in was talking about environmental stewardship and how to keep and focus on the right things to develop a very new region of deep water in the Black Sea. This would be the first development in a deepwater scenario in the Black Sea. Accordingly activities will need to be conducted to make it more efficient and to make sure the most current, up-to-date and leading technologies for deepwater will be employed in addition to management systems that mitigate any potential for an accident.

Turning to some of the older partnerships. Many of you know I've been in this forum before and I know Prince Turki is sitting here in the audience, but we have been proud to be in Saudi Arabia since the '30s. The first discovery well there and the first production of oil that was exported from Ras Tanura was in the 30s and Chevron was proud to be one of the early partners with Saudi.

As the legacy continues though we have to keep looking forward, not looking in the past. Many unconventional resources in the Kingdom pose an opportunity to look at things in a different way. We're looking at three fields in 2004 had produced around 3 billion barrels in what's called the petition Neutral Zone between the Kingdom and Kuwait. In 2009 we implemented a steam flood pilot project, first in the world to talk about the Wafra Fields ability to produce out of a carbonate reservoir, a marine carbonate. We started injection of steam and we'd like to say the results are very promising. What's important about this not only is the technical expertise but the partnerships we had with the Kingdom around the Saudi Petroleum Services Polytechnic and supporting educational programs that will empower young people to be a part of this development from day one. In both cases at scale solutions created partnerships while securing global energies supplies.

We see this as a way of the future, an enabler of continued business growth. Stronger partnerships create deeper market integration and create deeper diversity of supply and our pathways to greater stability and predictability of global production. And as I said earlier, partnership will power the future.

Thank you.

[Hudome]

Thank you very much Jay. Now we will have a presentation by Dr. Hermann Franssen. Dr. Franssen was one of those names those legendary names that I heard when I've served at the Department of Energy, someone who has had an extraordinary amount of expertise in the energy industry. Presently he is President of International Energy Association but his previous posts have included Senior Advisor to the Minister of Petroleum for Oman, Chief Economist at the International Energy Agency. At the Department of Energy he was Director of the Office of International Markets Analysis and he also served at the Congressional Research Service setting those members of Congress a little more straight on the issue of energy. So, Dr. Franssen.

[Dr. HermanFranssen]

Thank you very Madam Chairman. John I want to thank you very much for inviting me to this conference as you've done on occasions in the past and if our mutual friend the late Joe Malone would have seen what you have done with this conference he would have been very, very proud how this conference has developed over the years.

I was asked to talk about the relationship and the importance of Arab oil to the world and to the United States. Just from the BP statistics, the Bible for most of us energy analysts, to show and agreeing there the great importance of Arab oil in the world it's about 60%, if you add North Africa about it's about 65%. It is huge compared to it anything else in the world.

Why am I optimistic about the growth of the demand for oil? Well the world I was born in, shows my gray hair, was a world of 2 billion people, now all we have a world of almost 6 or 6 ½ billion people growing to 8 1/2 billion people by 2030. Most of the growth, most of the growth is now taking place in Asia and countries like Brazil. China alone from '79 until now has taken 400 million people out of poverty into the money economy and their current plan is to take another 400 million out of the rural areas into the money economy and that requires massive volumes of energy including oil and natural gas.

India which is about 15 years or so behind China will go through similar cycles. Now what is so good for those who are involved in the oil and gas business, maybe not so good for us from a geopolitical point of view, is that those countries are very poor in terms of oil resources and somewhat less poor in terms of gas resources.

When they grow they need to import more and more oil. While this is important a big ball of things on this particular graph but what is shows is the return to normal positions. Until the 1820s India and China together were all close to 50% of the world GDP. They declined and we

won't go over the reasons for it, by the 1950s they had reached about rock bottom and each saw about 5% of the world's economy. Now they are back to significant roles, both China and India, and perhaps as early as 2020 China will have surpassed the United States as the number one economy and India is likely to be 50% of the EU economy. These gentlemen and ladies are the new giants, and in the process they will need massive, massive volumes of energy.

Here you see the changes that the IAEA projects what this will do to the oil sector, look at China, look at the Middle East itself because it's getting enormous economic growth inside the Middle East. It is the second largest in terms of expected growth in oil demand, then India, other Asia, Latin America. On the other hand the old world, the OECD world, isn't anymore for the producers because we have let the problem of demand goals pass because of population growth, we no longer have population growth in Europe and Japan. It is actually declining. The United States is still growing but finally on both Mr. Bush and Mr. Obama, we have initiated the CAFE standards that will once and for all change us from building the least efficient cars in the world to cars that are just as efficient as the ones produced in Asia and in Europe.

Now changing oil patterns are going to be very important. China and India together has two and a half billion people only have 20 billion barrels of oil reserves compared it to the 28 billion in the United States and 12 billion in Europe. Now add that up of these giants of the industrial world and the giant of China and India together and compare that with the GCC. The GCC alone holds up to 500 billion barrels and the GCC plus Iraq and Iran some 750 billion barrels. So whatever we have except tiny fraction of what you find in the Middle East.

Between the countries that I just mentioned they import 32 million barrels a day of crude oil and products and the Middle East is the biggest area of export of oil export over 70 million barrels a day. Now we think, and some of our dreamers believe that we are not going to be in a situation of importing much more oil, but the latest assessment in January of the International Energy Agency, sorry the EIA, part of the Department of Energy, shows that 25 years from now we are importing just as much oil as we do today despite the massive efforts to improve the efficiency, despite that massive efforts to go into other forms of energy in the transportation sector.

China is expected to grow from 4 to 13,000,000 barrels a day of oil imported to China from just over 2 to close to 7,000,000 barrels a day. What does that mean? That means the competition for oil is going to be heating up in the coming decade and thereafter.

Now on the supply side it doesn't look all that optimistic when you look at the declining rates in the existing provinces. The declining rate is somewhere between four and 7%. I think only companies like Halliburton would know more accurate numbers but these are the kind of numbers tossed around by the EIA, IEA and others. So what that means, in the coming quarter of a century we have to find every other year another Saudi Arabia in terms of production capacity to meet all the needs of additional oil in the world.

Here oil production by source, you see this yellow area, see what the IEA projects that we will need quote unquote from the Middle East. Well of course we do not know whether they are going to increase their capacity to that level because they may be the design to almost a neocolonial way of looking at the world and we do this and then you were forced to do that. Well

it's interesting to see that only recently King Abdullah of Saudi Arabia said that he didn't really favor additional exploration for oil. Why? Because he said we should reserve some of it for our future generations, because it's not going to be so easy to wean the economy away from the advantages of oil and gas and its derivatives. And the king is a very wise man.

On the matter of supply security I've always found it insulting that we and all the previous, several previous Administrations talk about replacing Middle East oil imports. Under Bush 75% of all oil imports from the Middle East would be replaced by 2025. Then in an address to the National Governors Conference, I spent a lot of time worrying about disruptions of energy because of politics and several strikes in other countries because tyrants control the spigots. Are there any tyrants in this room control the spigots? And President Obama before he became President, energy security requires stemming the flow of money to oil rich regimes that are hostile to America and its allies and the official website of the White House in January 2009 had a similar type of text.

Now why such hostility? It's partly related to the 1973 embargo the only time in the past three decades when supply was disrupted by OAPEC. Why? Because we in the middle of a war against what we had been telling our Arab friends to do, we supplied Israel with weapons, that's why it happened. And it was very short the panic created massive increases of actually of prices not so much the embargo itself. And what about our own sanctions over that same period it had taken more oil out of the market than the Arab embargo ever could have dreamt to do.

What about China's leasing policy on their earth minerals? They embargoed for two weeks Japan why because of a dispute in the East China Sea. Rare earth is the oil for the future high tech society and economy. So imagine that the website of the Diwan of the Kingdom of Saudi Arabia would have a text saying something like, "Well we have to really reduce our dependence of the American weapons or American food because the American people really don't like us." These are things that are so petty we shouldn't do it.

Secondly it really is of no consequence because oil is fungible. Even if we buy it with zero from Saudi Arabia, zero from the Middle East, the prices are going up based on a disruption of supply or just based on market forces itself. The price goes up for everybody the Chinese pay the same price of oil as we do, as the Europeans do.

Now this shows our dependence on Persian Gulf oil or Arab Gulf oil it's about 15% of total imports which is less than 10% of our total consumption of oil so it is minuscule really. It's not all that big, and trying to reduce it further has also has another side to it. When you import less from the Gulf you also trade less with the Gulf. You trade less with the Gulf, somebody else will take your slot.

I was surprised when I had to give a talk two weeks ago on Oman where I spent 10 years and when I left Oman the biggest buyer of Omani crude was Japan. Who is it now China, by far by far the biggest buyer. China is the biggest buyer of Iranian crude. China is building refineries in Iran. China is developing a big new field in Iran, regardless of our sanctions.

So the world is changing and changing very rapidly. Just the thought of the transition there are those who believe you including our former Vice President, Al Gore that this transition to other forms of energy is easy, it's going to be quick we can do it in 10 years. That never happened before. It usually takes about half a century to do this kind of a job. It's a massive effort and I believe it's going to take us many, many decades to achieve that. In the meantime we will still need to import a lot of oil. We have been very good in improving the efficiency of cars so we're going to have much more efficient cars in the future but I have some doubts about this one that were going to see such a rapid increase of electric driven cars at post 2015. I just don't see it coming, but Inshallah it will happen but even with the scenario you still get the same number of imports of oil by 2035 as we have today.

All this depends, this transformation to other forms of energy, on massive government infusion in these new technologies because they don't pay for themselves. You have to subsidize them. Now here you see under Jimmy Carter the top-of-the-line how much we were spending on R&D. We dropped it and we were no longer the leaders in solar, we were no longer the leaders in windmills. We did do nothing on lithium batteries so all those new technologies are now controlled by others.

You see the hiccup there at end of the curve that's the stimulus program, following the stimulus program finish. It's not going to be the same growth in the outlays for renewables and new forms of energy and when we have a new Congress coming in in November these are the areas where they are really going to cut. So forget about these massive increases.

I just have to go very quickly to the conclusions but the conclusions basically are that demand for oil is stagnating in the OECD and will continue to grow rapidly outside the OECD particularly in Asia. And the non-OPEC oil production is reaching a plateau and this comes from the likes of [unintelligible] the head of Total and this comes from James Schlesinger my former boss and from a lot of other people so don't dismiss it lightly. So that means that the growth of additional fuel, of additional oil, in the future will come again from the Middle East and our dependence as a world on the Middle East will increase.

The transformation is going to take a lot of time and as a result of it we are going to see it more global dependence on the Middle East in the decades and decades ahead till we succeed in this transformation process and we are going to have major rivals in China and India and others for access to that oil in the Middle East.

So China will become, China is already at par right now with imports from Saudi Arabia and in a few years time China will import more than we do from Saudi Arabia. So supply security has already dealt with.

The last point is the future supply of oil in the Middle East depends on stability in the region much has been discussed here over the last day and a half. The U.S. has not contributed to that stability as we heard from various speakers in fact we are more part of the problem than the solution.

We have not been the honest broker in the Arab-Israeli conflict as we heard in the previous panel and we have seriously upset the balance of power in the region by the invasion of Iraq. Isn't it amazing to see that Maliki had to go to Iran to form an alliance with the person who disliked him very much, Muqtada al Sadr in the quiet diplomacy of Mr. Ahmedinajad, so he owes Mr. Ahmedinajad a great deal in having achieved that for him.

Instead of coming to Washington he went to Tehran. What a difference. And my final note is on the other alliance we have which has made us, let us say, less loved by people in the region let's just use one sentence that Bismarck used when he was the Prime Minister of Prussia. Bismarck said when we in Prussia have alliances every alliance has a rider and horse, and Prussia will always be the rider. Unfortunately in the alliance we have with one other small ally in the region we have always been the horse. Let us say a Belgian horse, big and nice and jolly, but moving in the direction wherever the rider wants us to go. And we want to have continued access to oil in the future we need a stable Middle East, if we want a stable Middle East in part let us listen to Bismarck.

Thank you very much.

[Hudome] Thank you, Dr. Franssen for that very comprehensive presentation.

Next we are going to hear from Rayola Dougher. Rayola is a Senior Economic Adviser for the American Petroleum Institute's Media Relations Department.

I know all of us here in America greatly appreciate the work of the American Petroleum Institute in educating the American public about petroleum markets. In this capacity Rayola serves as the principal spokesperson in media and she's also often found testifying in front of Congress on these issues, which is not an easy thing. Prior to the American Petroleum Institute, Rayola was with the Institute for Energy Analysis and she is also very involved in the oil and gas industry in working in cohort with them in the American Petroleum Institute on educational issues.

So Rayola, thank you so much.

[Ms. Rayola Dougher] I'm hoping when I get up here my slides will magically appear, they haven't yet, so just bear with me one moment. No, well I'm going to wing it then.

It's very nice to be here. It's really an honor for me and as some of you may know the American Petroleum Institute is a national trade association for U.S. oil and natural gas companies. We have about 400 member companies and they represent all aspects of the business. The U.S. oil and gas industry supports over 9 million jobs in the United States. We account for over 60% of our nation's energy needs. We pay hundreds of billions of dollars in taxes that goes to federal and state governments and since the year 2000 we have invested almost \$2 trillion in US energy projects.

So what happens to our investments, what happens to our resources are critical to the United States energy supply. When we look to securing that supply it is within the context and the framework of the world energy market.

[Slides Appear]

I'm going to go ahead because I have a nice picture of the world. Here we go. I really liked this because it really helps underscore the importance of energy to the quality of our lives and most of us take it for granted. We come home at night we flip on the switch, voila its there, its magic for us. But for an estimated 20% of the population of the world don't have basic access to electricity. There are women in Africa today that spends several hours a day just collecting firewood. So it is clear that energy really is the engine of our economic growth. It creates more jobs, higher income and a better quality of life for all of us.

And when we look to the global energy consumption outlook we are going to be challenged to be able to sustain this economic growth, but it does look somewhat optimistic to me going from \$63 trillion as a world to 104 trillion almost a doubling, going from 500 quads of energy to 739 in just another 25 years or so.

That's going to take a lot and it is going to be a challenge for all of us and I think the formula is pretty simple for the United States it is really the implementation that's the challenge and that is to consume less, provide more, supply more and invest in these new technologies.

When we look to how much energy countries use it is really a function of a lot of things, our wealth, our weather and a lot of other variables. The United States uses less energy on average per capita than the rest of the world, which kind of surprises me a little bit. Japan of course we're way ahead of Japan. We're way behind China in terms of consumption per dollar of GDP. And we've improved a lot over the past 20 or 30 years or so. We used about 42% less energy for every dollar we produce. And moving forward, we're fairly, at least the Department of Energy is looking to our GDP almost a doubling in 25 years, our population increasing by about a third and yet we are on a path to consume to about 60% of the energy we do today.

That's really the good news in the sense that our biggest source of supply moving into the future is going to be saving energy. It's going to be consuming less. Without it we'd be on the path to almost doubling our energy consumption in 25 years. Instead we're going to increase maybe another 15% or so, 14 or 15%, but if you look at this chart you'll see that most of the energy we use today and even most of the energy were going to use than 25 years is going to come from fossil fuels, over half of it of oil and natural gas.

And the picture for the world is really no different. Except the slope of that curve is a little awesome and it is kind of exciting to if it really plays out this way in terms of the economic growth happening and taking off from the rest of the world. If this really comes about but it's going to be a terrific challenge.

And there are some who, you can hardly see the world but it's behind there, and there are some who propose that one way to enhance America's energy security is to is energy independence which is really code for just getting off of oil. And I think a lot of support for this notion comes from the mistaken idea that somehow we can isolate ourselves from the worlds oil markets. In

fact our security lies exactly in that marketplace, it lies in our mutual interdependence, it lies in supporting and encouraging our relationships rather than trying to sever them.

And it lies to, we have a variety of options in terms of diversifying our sources of supply. Most Americans are pretty shocked to know that we get most of our supplies from Canada and we do have opportunities with the development of oil sands in Canada to move forward with them and displace other imports if we so choose to do so. We have a lot of resources in the United States and we are very rare of the countries in the world in terms of keeping a lot of these resources off-limits to development. We have options in that regard.

But we'll never be totally energy independent. In terms of the global oil trade challenges ahead we are going to need about, at least according to the Department of Energy 26 million barrels a day more oil in 25 years from now than we have today. That's the equivalent of replacing all of the oil used in North America. Interestingly they show an uptick a little bit in the United States supply and a lot of this will hinge on development of offshore areas and the rest of the country.

But the biggest development in this country has been in the development of unlocking shale gas finds. It has been over the past four or five years it has really been a big game changer in terms of our vision of our energy future. In the Barnett shale in the Texas area right now it's providing about six percent of the energy we use and forecasts, very conservative forecasts, looking at the Marcellus shale in Pennsylvania, New York and West Virginia shows that it could actually provide about 15% of the natural gas our nation needs.

So its enormous and it's very exciting for us and for our energy future and again in terms of natural gas use actually growth in natural gas is going to be even faster than the growth of oil worldwide. Again you can see a lot of that growth coming out of Asia but the United States is still poised to add more to supply than we are to our demand.

Investing of course is the third tier. Investing in new sources of energy, new technologies, the oil and gas industry it invests more than any other than all other industries combined in new low carbon emitting fuels and technology and from biofuels to algae to wind, solar, geothermal we have invested about \$58 billion since the year 2000 out of a total of \$133 billion.

In fact one out of every five dollars spent in the United States on non hydrocarbon fuel is being spent by oil and natural gas companies and we hear an awful lot about green jobs and green jobs and let's get off oil so we can have green jobs. We are the biggest investor in green jobs in America today. So we're all for them.

This chart is from Exxon Mobil but I like it. It shows the United States share of our fuel and how we have fueled this country since 1859 with forecasts going out to 2030 or 2035. If you think about 100 years ago or so, coal was king and in the turn of the last century and there were articles at the time they were worried about are running out of coal and just as today many people are worried about running out of oil. And just think the changes if you were at the start of this century ago and you were looking out to the future, just think of all the changes that happen in that century. The cars, the automobiles, the men on the moon, our communications systems,

having instant communication with one another. They had no idea what was coming. And I think if anything that change is now accelerating in our lives.

We have no idea either and that leaves me very optimistic actually about the future because I think we have a lot of possibilities. We are going to have technologies we haven't envisioned that are going to change up lives moving forward. In the meantime we are in the present and transitions do take some time. And we do need elected and appointed officials who understand the challenges we face as a nation, the challenges we face as a world to fuel that future.

We would like to see them focus on increasing production from all sources of fuel and encouraging that production, encouraging energy efficiency, encouraging investments in new and renewable sources of fuel and technologies, allow the markets to work. They're much better than government at doing this efficiently. Refrain from new taxes because if you have more taxes you have less investment and you have fewer supplies.

We as an industry want to grow that tax base we want to grow those jobs and we want to grow that energy and finally recognize and support R&D to participate in the global marketplace, because at the end of the day we are really all in this together.

Thank you very much.

[Hudome] Thank you, Rayola. We are now going to have a great question and answer period. We have some fabulous questions from the audience, I think will only have time for one a piece it looks like is that right. So it I'm going to start with the fun question since this is for such a fun panel.

Dr. Franssen this question is for you. The Obama administration is presently having heart palpitations that the Presidency of OPEC will be assumed by the country of Iran. If you were advising the U.S. administration what would you tell them to do and if you were advising OPEC what would you tell them to do?

[Fransson] If I were advising the U.S. Administration I would say that this is of no consequence so don't do anything. It really doesn't mean anything. OPEC is an array like NATO. What is NATO? It is an organization which includes Luxembourg and it includes the United States. Are they equal? Yes in some ways. OPEC who is OPEC? The one with the clout with the spare capacity who can enforce what OPEC wants to do, Saudi Arabia. And Saudi Arabia usually gets its consent from its GCC partners the United Arab Emirates, Kuwait, Qatar.

So taking that into consideration I'm not worried because the real power rests with the GCC and Saudi Arabia. Saudi Arabia has been extremely responsible manager of the global oil markets. Many times when there was disruptions of supply and when the Saudis had the spare capacity, they have used this time and again to reduce the impact on prices.

They did not succeed in 2007 and 2008 because the demand had grown so rapidly that the demand was surpassing supply. There were about two million barrels a day spare capacity for

one million barrels a day we didn't have the capacity to refine it so the speculators then came into the market, the financial institutions and pushed prices to \$150 a barrel.

But as the world of OPEC is still run basically by the GCC and I have all the confidence in the GCC and Saudi Arabia to make sure that prices will remain moderate, reasonable for as long as they can. Reasonable why, \$60 today is the marginal cost of developing and finding and producing new oil and that is oil from deepwater so the current price range is just slightly above the marginal cost of finding and producing an additional barrel and it is a very closely observed by our friends in the GCC.

[Hudome] Thank you. So the Obama administration has nothing to worry about. Rayola this question is for you. Can you talk a little bit about the impact of the BP oil spill on the American petroleum industry and any legislation that Congress either has passed or intends to pass during this lame duck session regarding the addressing of this particular problem.

[Dougher] Well it's had an enormous impact on the oil industry. First and foremost it came as a big shock to all of the people who work in this industry that it ever could have even happened. In our years in the decades in the Gulf of Mexico we've drilled over 40,000 wells successfully, over 2,000 in the deepwater. So the fact of this incident really took everyone by surprise. And what we've done as an industry, we've gone back with four different task forces and looked at offshore safety again, looked at the well control, looked at the blowout preventer, you name it and gave recommendations back to the government in terms of tightening up, were there any gaps in the system, how can we make us safer, how can we make it better.

And so we have been working very closely with the government on this. This is something the American Petroleum Institute has done since 1919. We have over 500 recommended practices and we are constantly revising them as technology evolves.

But our concern now is that this moratorium, although the moratorium has been lifted its really a defacto moratorium on the industry, because the permitting process, we're very concerned that it's not going to be done in a manner that will allow us to get back to work sooner than later.

When we look at the shallow water drillers they didn't have a moratorium, yet their permitting processes has really been slowed down. In the past six months they have had permits approved, they've had all only about a dozen or so permits approved. Normally they would have that many done in a month.

So there's concern about that and there's concern that about legislation moving forward. What this is going to mean, especially liability limits. If there is no liability limits as some in Congress have proposed, what this could mean is they could put a lot of drillers out of business in the Gulf of Mexico. So we have to have a better formula than that, but at the end of today I think we are going to end up with a safer industry and we're hopeful we can move ahead sooner rather than later and get them back to work and back to bringing the energy the nation needs.

Thank you.

[Hudome] Thank you, Rayola. And Jay, we have one last question for you. I'll read it from the questioner. It is well known that the future stability of Iraq depends on the ability of the international oil companies to rejuvenate Iraq's oil ministry. However 20 years of embargoes and sanctions means there is very little experience in Iraq with the Iraqi people within the IOCs. What are the IOCs doing or need to do to ensure their efforts are coordinated and complementary in putting Iraq back to its rightful place both as an oil producer and as a powerful ally in the Middle East.

[Pryor] A very, very thoughtful question. I think it touches on a lot of dimensions of our industry that are probably misunderstood to it a certain degree. Many of the IOC's and national oil companies and resource holders, when you think about the importance, generally a lot of technical people, not a lot of military strategists or security people employed in these companies. And I think what is very important to understand is long-term stability is very important to energy development. So its price stability, its capital into the market, it's security, it's the ability to create transport sectors and infrastructure sectors to support anything from roads, bridges, pipelines, power, you name it.

That all takes people; people are the common denominator of our industry. We began training Iraqi people right after the bullets stopped flying the first time, and we've trained over 1000 Iraqis outside of Iraq in the new technologies directly applicable to oil and gas production, not some of the other industrial things but very much.

What you have to do in any circumstance is you have to employ the local people and bring up their living their standard of education, their ability to help in the whole process it. No IOC is going to come in and do this, it's not possible to do it that way. That's an old-fashioned imperialistic way of looking at things. As I talked to earlier partnership is the key to work directly with the Iraqi people, to work with their neighbors. NOCs in the region are going to be very helpful in this process I believe.

The IOCs have a role to play but it's a long-term process, don't expect miracles overnight. I've probably made 10 trips into Iraq in the last three years personally and feel like there's a lot of progress being made and if we are allowed to be in the right environment in the region that you will see development of that resource over the next 10 or 20 years. It won't happen by next week or next month but over the next 10 or 20 years that industry will be back to its normal place, I'll say, in the region.

[Hudome] Terrific. Well thank you thank you very much to the panel that was a terrific overview of all the issues and now that we have the audience educated on this issue let's go out and educate the American public.

Thank you.

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