PPHB

ENERGY INVESTMENT BANKING

# MUSINGS FROM THE OIL PATCH

**November 15, 2016**

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**Managing Director**

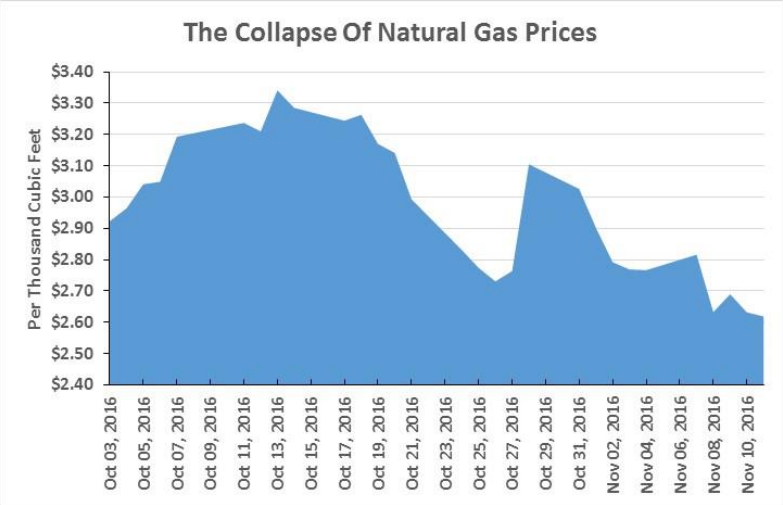
**Note**: *Musings from the Oil Patch reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating and planning for the future. The newsletter is published every two weeks, but periodically events and travel may alter that schedule. As always, I welcome your comments and observations.* Allen Brooks

## Natural Gas Prices Collapse As Upcoming Winter Written Off

**This La Niña weather event may not have as significant an impact on the winter weather**

The fickleness of commodity markets has been demonstrated lately as natural gas prices collapsed when traders began to suspect that the warm temperatures of this fall may become the prevailing trend for the upcoming winter. The latest thinking of meteorologists is that the emergence of this La Niña weather event may not have as significant an impact on the winter weather as originally anticipated. That means the more populous northern regions of the United States might not have a severe or overly cold winter that would consume the large supplies of natural gas in storage and set the producers up with a stronger price environment during the winter and early spring to attract them to drill more gas wells and help restore a somewhat depleted storage inventory.

**Exhibit 1. Warm Fall Weather Sapping Gas Price Recovery**




**Source: EIA, PPHB**

**The significantly oversupplied natural gas market was slowly shrinking**

As the natural gas market transitioned from the early to later weeks of fall, the prospect for increased electric power generation using natural gas along with falling gas output combined to lift expectations for higher gas prices. The first signal of this improving market was that weekly natural gas storage injections involved smaller volumes than were injected in 2015. This meant that the significantly oversupplied natural gas market was slowly shrinking. That would lead to better gas prices. Initial weather outlooks for the upcoming winter suggested a slightly colder than normal winter, which would translate into a considerably colder winter than the 2014-2015 winter that ranked as one of the warmest experienced since the last major El Niño event in 1998. It isn't happening yet.

**Once it became evident that these winter-like temperatures would be only fleeting, gas prices retreated**

After peaking near mid-October at $3.34 per thousand cubic feet (mcf) of natural gas, futures prices slid steadily as warm temperatures occupied the minds of traders. It wasn't until a blast of cold air and wintery precipitation arrived later in the month that gas traders were spurred to drive futures prices from $2.73/mcf to $3.11/mcf in a matter of two days. Can you say that the traders had been praying for a cold winter? However, once it became evident that these winter-like temperatures would be only fleeting, gas prices retreated to about where they were merely eight days prior. For natural gas traders, speculators and producers, the market focus quickly shifted to what will the remainder of fall's weather be like, and how cold might the upcoming winter be, as these dynamics will drive gas consumption, and in turn natural gas prices. The way gas prices had soared and then rapidly retreated, coupled with the fact that prices now remain low, would seem to support a view that gas traders, speculators and producers are anticipating the upcoming winter season to be warm once again, and thus producing another disappointing consumption season. If so, then the industry will confront large volumes remaining in storage at the end of winter, which will depress natural gas prices for the first half of 2017.

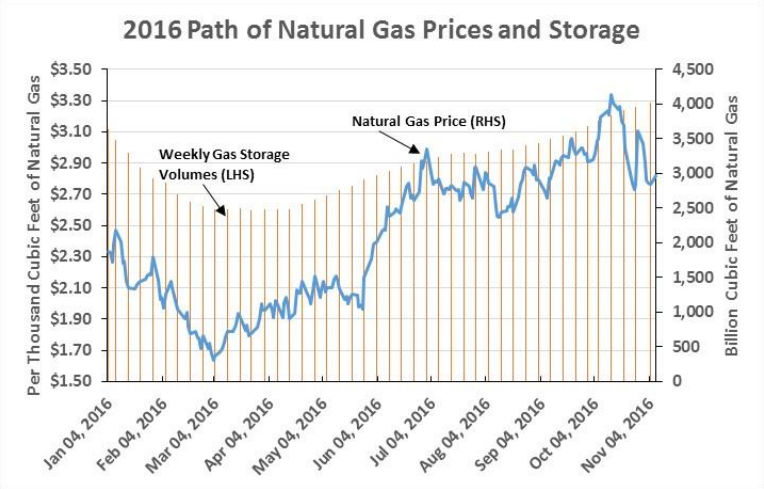
**This lack of forecast clarity makes predicting the upcoming winter weather a real challenge**

This year has produced a roller coaster year for natural gas futures prices as they respond to the impact low oil and gas prices will have on new gas supply volumes, along with the conflicting weather phenomena of a hot El Niño ending and a colder and wetter La Niña beginning. If the weather phenomena makes a smooth transition from one phase to the other and assuming that each is of normal strength, then we might have a clearer assessment of how these trends might impact winter temperatures in the various regions of the United States and Eastern Canada, as well as what the likely volumes of precipitation throughout North America might be. Unfortunately, there is no consensus among meteorologists as to whether the La Niña weather phenomenon will be strong, weak or normal. This lack of forecast clarity makes predicting the upcoming winter weather a real challenge, which makes forecasting natural gas consumption and volumes withdrawn from storage impossible to assess with any degree of confidence.

**It was the hot summer that boosted air conditioning load and gas consumption that drove gas prices up sharply to the $2.90/mcf level**

The levels and movement of natural gas prices during 2016 have reflected traders' expectations about the gas volumes to be withdrawn from storage and then the pace of rebuilding the gas storage volumes next spring. Exhibit 2 shows how gas storage volumes declined and then rebuilt between January and October of this year as compared to the trend in natural gas futures prices. As shown, natural gas prices began the year at a low level, but subsequently fell even lower as gas demand was very weak during the unusually warm winter shaped by the very strong El Niño. Stronger electricity demand, generated by natural gas-fired power plants, early in the year due to the warm winter and spring weather helped drive up natural gas prices. However, it was the hot summer that boosted air conditioning load and gas consumption that drove gas prices up sharply to the $2.90/mcf level. Gas prices subsequently slid lower, falling to nearly $2.55/mcf, before beginning to climb as weekly gas storage injections were trailing the average of weekly injection volumes for the past five years. Despite suffering several short periods of price reversals, natural gas futures prices rose steadily to a peak of $3.34/mcf before collapsing in early November.

**Exhibit 2. As Storage Grew, Gas Prices Fell**

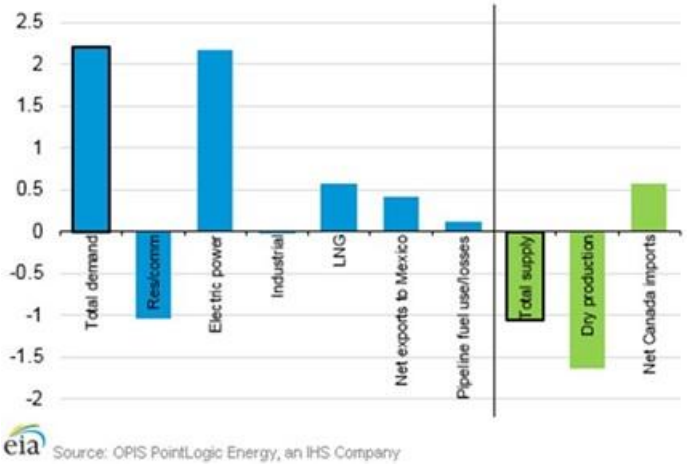



**Source: EIA, PPHB**

**Gas output has fallen, offset by a small increase in imports from Canada**

The Energy Information Administration (EIA) recently produced a chart contrasting the sources of incremental natural gas demand and supply during 2016 and 2015 over the period of April through October. The chart shows that the primary reason for natural gas demand growth is due to electric power increases. Gas output has fallen, offset by a small increase in imports from Canada. Both of these dynamics are likely to continue.

**Exhibit 3. How Supply And Demand Dynamics Changed**
**U.S. natural gas supply and demand, by sector, April to October, change from 2015 to 2016**
billion cubic feet per day




**Source: EIA**

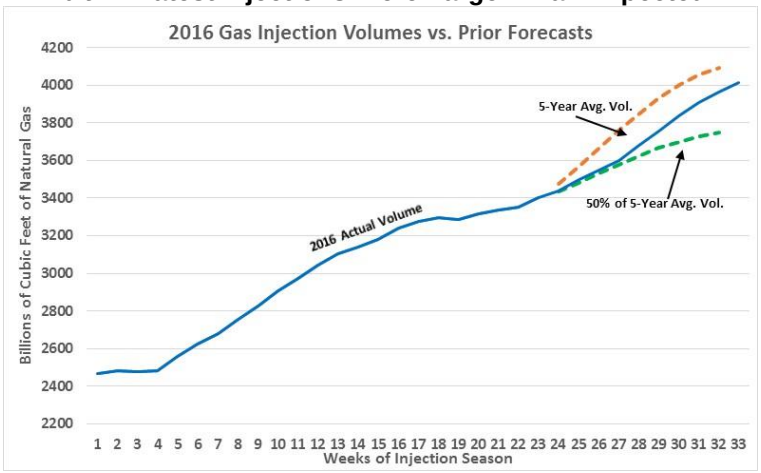
**Producers will be wrestling with the issue of existing shale gas well production declines that will force the industry to balance new supply against future demand estimates**

With recent natural gas prices weak due to the very warm temperatures gripping all of North America, concerns are growing about winter consumption and will limit gas price improvements in the near term until cold weather arrives. As a result, we expect to see reduced dry gas drilling, as well as lower volumes of natural gas associated with increased crude oil output as producers target more oil and less gas wells. A new dynamic that may become a longer term challenge for the natural gas industry is additional oil drilling in shale formations in response to higher oil prices that bring in additional associated gas volumes that could overwhelm gas demand growth. At the same time, producers will be wrestling with the issue of existing shale gas well production declines that will force the industry to balance new supply against future demand estimates.

**This pattern shift most likely reflects the very recent extreme warmth blanketing North America**

When we looked at the latest weekly gas storage injections compared to our August forecast, the result has been a record that has fallen well within our high and low projections. The initial weeks of injections after our forecast was made found that they tended toward the low end forecast, which was based on half the weekly average for 2015 injection volumes. The most recent weekly injections were closer to 100% of the 2015 weekly average injections. This pattern shift most likely reflects the very recent extreme warmth blanketing North America, but not sufficiently hot enough to promote increased air conditioning demand.

**Exhibit 4. Latest Injections Were Larger Than Expected**

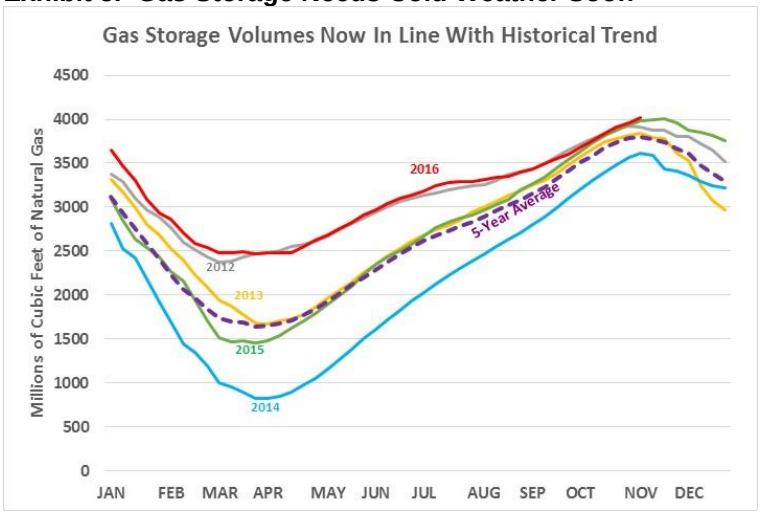



**Source: EIA, PPHB**

**The current amount of gas in storage matches the volumes at the same time in 2015 and 2012**

As a result of the larger recent weekly gas storage injections, the total volume of gas in storage has not decline closer to the five-year average storage line. The current amount of gas in storage matches the volumes at the same time in 2015 and 2012, and is essentially at 4,000 billion cubic feet of gas. The current volume is above the volumes of 2013 and the 5-year average.

**Exhibit 5. Gas Storage Needs Cold Weather Soon**



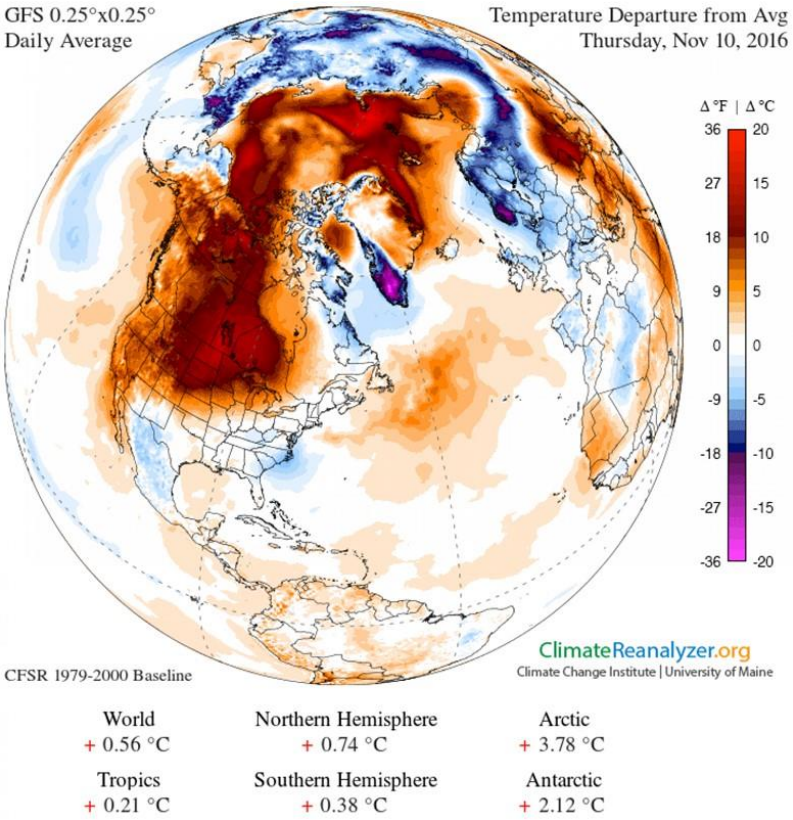

**Source: EIA, PPHB**

**The report calls for this winter to be slightly warmer than average**

At this point, the key to the natural gas market - gas prices and gas drilling - will be how the prospect for winter temperatures evolves. As we have written before, we hold the *Browning World Climate Bulletin* in high regard for its long-term weather forecasting. In its latest forecast, the report calls for this winter to be slightly warmer than average, especially in the early period, but then to experience brief episodes of extremely cold temperatures and wintery weather,

most likely in the January to March time frame. So far, the weather is showing extremely warm and unseasonal temperatures. In fact, in Canada there have been a number of record setting temperatures set in the past week.

**Exhibit 6. When Will No. America Heat Break?**

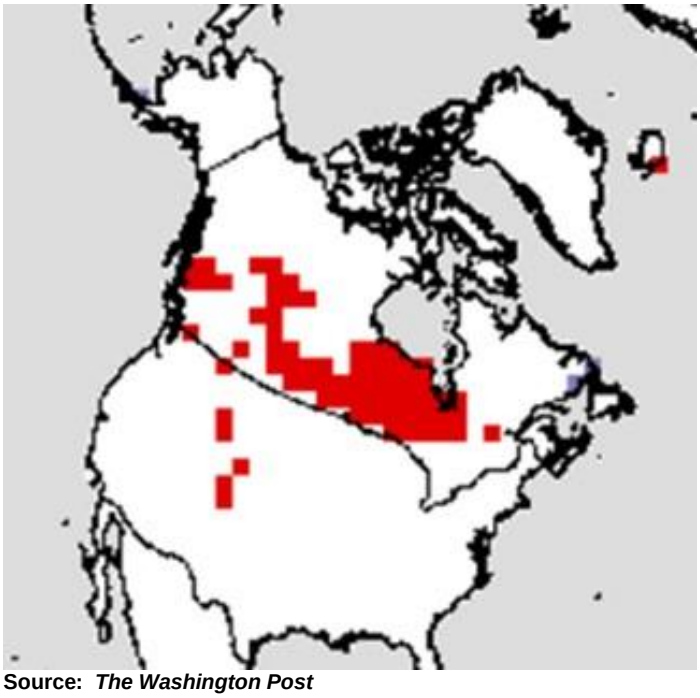



Source: NOAA

**The extreme warmth throughout North America has also translated into areas not having any snow coverage in contrast to normal conditions**

The extreme warmth throughout North America has also translated into areas not having any snow coverage in contrast to normal conditions. The map in Exhibit 7 (next page) shows in red the places were there would normally be snow coverage on November 9th but where none is present this year.

**Exhibit 7. Lack Of Snow Cover Reflects Current Heat**

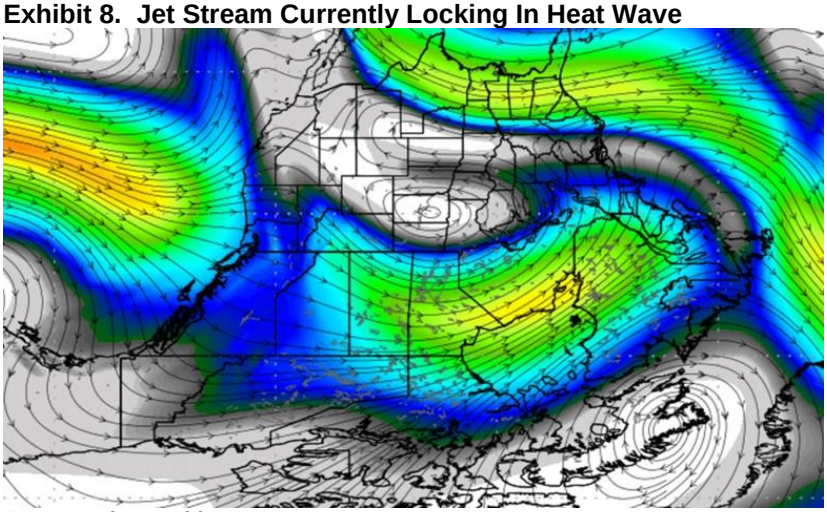


**Source:** ***The Washington Post***

**This jet stream pattern is similar to what occurred following the super El Niño winters of 1982-1983 and 1997-1998**

Another winter aspect, which has been discussed in the Browning report is the impact of the jet stream that is blocking cold weather coming into Canada and the United States. On the other hand, the jet stream has brought record early snow and cold temperatures to Europe. This jet stream pattern is similar to what occurred following the super El Niño winters of 1982-1983 and 1997-1998. Meteorologists are suggesting this pattern may change in the next several weeks, which could move natural gas prices.

**Exhibit 8. Jet Stream Currently Locking In Heat Wave**



**Source:** ***The Washington Post***

**What drives the gas market will likely be what happens to natural gas production**

It is possible that these winter weather episodes will consume substantial gas volumes, but the anticipated volatility in winter weather is likely to encourage people to become sanguine about the health of the gas market. What drives the gas market will likely be what happens to natural gas production. That's a topic for another day. Suffice it to say that the natural gas market will need either some early very cold temperatures or a sharper decline in gas output in order for gas prices to return to the $3.50/mcf level.

## It's Trump! Public's Concerns May Have Been Overblown

**This was a humbling experience – first, trying to explain the election campaign for the U.S. presidency and second, how America could have settled on the two primary candidates**

On the morning of October 19th, we made a presentation to clients of PPHB LP in Calgary, Alberta, Canada about the outlook for the American election and its impact on U.S. energy policy and the outlook for the oilfield services sector. This was a humbling experience – first, trying to explain the election campaign for the U.S. presidency and second, how America could have settled on the two primary candidates. We knew we would have to explain the unique American election process that reflects 50 state election races plus the District of Columbia, plus the workings of the Electoral College in contrast to national (popular) voting. We also had to enlighten our audience that besides Democratic candidate Hillary Clinton and Republican Donald Trump, there were other minority party candidates that might play a role in the determination of America's 45th president.

**Interestingly, the two female candidates – Hillary Clinton and Jill Stein (Green Party) – had unique characteristics**

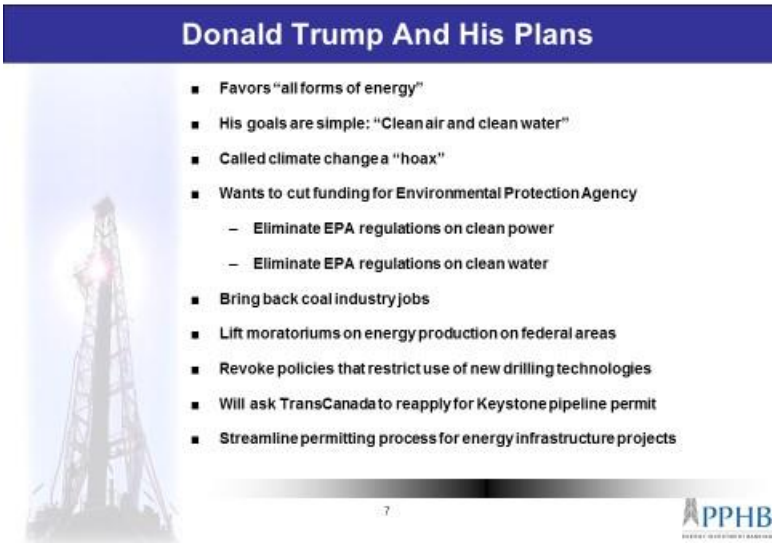
Interestingly, the two female candidates – Hillary Clinton and Jill Stein (Green Party) – had unique characteristics. Yes, many voters were hoping one of them would become the first female president. Unfortunately, one of them was under federal investigation while the other had been arrested for trespassing and damaging private property. Mrs. Clinton had her FBI investigation and Freedom of Information lawsuits over the use of a private email server and the handling of her emails and national security information contained in many of those emails. Ms. Stein had been arrested a few weeks ago for trespassing and damaging private property (construction equipment) at a Dakota Access Pipeline construction site.

**This controversy was driving up Mrs. Clinton's poll numbers and her likely election**

In the days leading up to our presentation, Mr. Trump was reeling from the disclosure of the audio of a video tape of his appearance on an *Access Hollywood* segment in 2005 and lewd comments he made about females. This video and his comments during the second debate with Mrs. Clinton about the episode and his relationship with females prompted numerous women to come forward claiming that Mr. Trump had groped them or engaged in other unacceptable behavior toward them. This controversy was driving up Mrs. Clinton's poll numbers and her likely election. In the five days leading up to our presentation, Mrs. Clinton's poll averages were between 4-12 percentage points ahead of Mr. Trump. That margin shaped our presentation conclusions.

In our introduction of the presidential candidates, we presented the following information about Mr. Trump's views on energy.

**Exhibit 9. What Donald Trump Thinks About Energy**




**Source: PPHB**

**We summed up Mr. Trump's views about energy policy with the statement that he desires "clean air and clean water"**

Our view on Mr. Trump's policies and what his election would mean for United States energy policy was based on these points. We summed up Mr. Trump's views about energy policy with the statement that he desires "clean air and clean water." This is a simple philosophy and one embraced by virtually every American and every citizen of the world. However, as the saying goes, the devil is in the details, which means that this isn't just a philosophy, but it needs to be extended into how to deal with the regulations impacting and influencing the energy, environmental and agricultural sectors. Here, Mr. Trump again holds to a simple philosophy – rip up the regulatory blanket smothering energy activity and progress.

**What was perceived as bad for coal and oil might possibly be good for natural gas**

Given the polling data and the popular media views of a likely landslide election for Mrs. Clinton, we spent much more of our presentation time discussing her views and comments about energy and the environment, and how policies might influence the future of various energy sectors. For example, what was perceived as bad for coal and oil might possibly be good for natural gas. On the other hand, fossil fuels in general would be challenged policy-wise under a President Clinton while renewable energy would receive support.

**The worst outlook for energy, especially oil and gas, would be for a Democratic trifecta**

While highlighting the negative impacts from a President Clinton, we warned the audience that the worst outlook for energy, especially oil and gas, would be for a Democratic trifecta in which the party wins the White House, the Senate and the House of Representatives. That possibility was considered unlikely at the time of our presentation as it seemed that even a Clinton landslide would not

overcome the 28-seat margin Republicans held going into the election. But given how strange this election campaign had become, we couldn't rule out the possibility of the Democratic Party winning control of the House of Representatives.

**The Democrats didn't rule out the possibility of winning outright control of the Senate**

The Senate was a different story. Republicans held a six-seat majority. But in the election, the Republicans were defending 24 out of the 34 seats up for election. Of the Senate races, the Democrats felt that nine seats could be considered critical races. They felt they had a chance to win enough Republican seats to bring the Senate either into a 50/50 balance, allowing a Democratic Vice President to decide the key issues. The Democrats didn't rule out the possibility of winning outright control of the Senate in conjunction with the support of the two independent Senators who caucus with the Democrats. As the political momentum for Mrs. Clinton was growing, the likelihood was improving that the Democrats would win outright control of the Senate, providing them with increased leverage against a Republican-controlled House of Representatives.

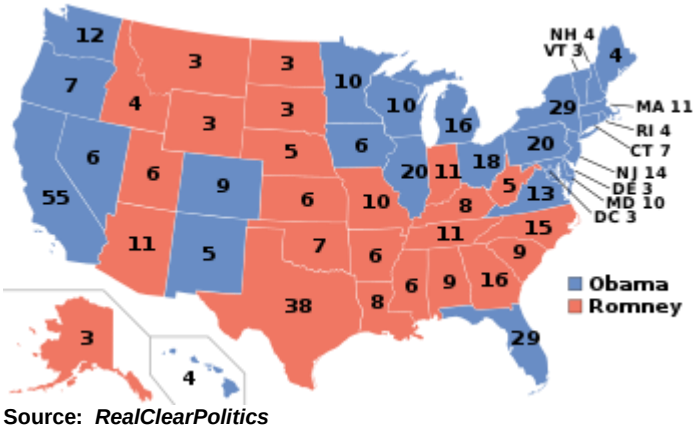
**The stronger the Democrats were after the election, the greater the power Mrs. Clinton's acolytes would have to carry out her agenda**

We speculated to the audience that if the Democrats won the presidency and the Senate, it would be in position to push through more anti-fossil fuel legislation, or prevent the passage of legislation by the Republican-controlled House that targeted Democratic policies. Of course, the worst possible outcome for energy would be if all three branches of government were won by the Democrats. That scenario would insure that the Clinton administration's policies and bureaucratic control would be supported by the legislatures. Our recommendation was that Calgary energy executives should watch the votes in the House and Senate races as well as the presidency, because the stronger the Democrats were after the election, the greater the power Mrs. Clinton's acolytes would have to carry out her agenda.

**The surprise last Tuesday night was that Mr. Trump did what he said would do to win the presidency**

The surprise last Tuesday night was that Mr. Trump did what he said would do to win the presidency – win the states that Mitt Romney won in the 2012 election race plus breakdown the 'blue firewall" of the Midwest states that Mrs. Clinton claimed would propel her into the White House. Exhibit 10 (next page) shows the states that Mr. Romney won in 2012 versus those won by President Barack Obama.

**Exhibit 10. Where Romney Fell Short In 2012 Election**

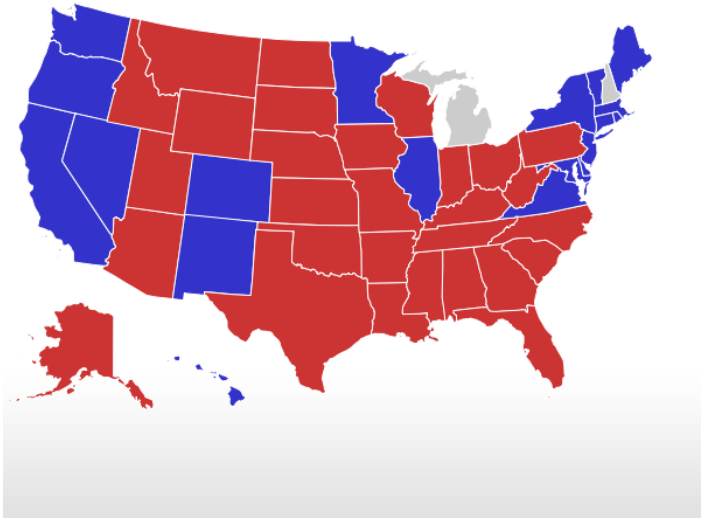



**Source:** ***RealClearPolitics***

**Besides winning Mr. Romney's states, Mr. Trump also won Florida, Ohio, Iowa, Michigan, Wisconsin and Pennsylvania**

The map in Exhibit 11 shows the states won by Mr. Trump and Mrs. Clinton, and those leaning either Democratic or Republican. Since this map was published, Arizona's 11 electoral votes were won by Mr. Trump. Besides winning Mr. Romney's states, Mr. Trump also won Florida, Ohio, Iowa, Michigan, Wisconsin and Pennsylvania. The latter two state wins are highly significant as a Republican candidate for president had not won Pennsylvania since 1988 and Wisconsin since 1984, 28 and 32 years apart, respectively.

**Exhibit 11. States Mr. Trump Won In Election**



**Source: RealClearPolitics**

**They concluded that 42 states had shifted to the right**

The impact of this election was felt immediately throughout the nation and the world. According to analyses conducted on the voting trends of the various states by *The New York Times*, they concluded that 42 states had shifted to the right. The *NYT* specifically cited that eight reliably Democratic states, primarily in the Northeast, shifted more than 5% toward the political center due to

**Mr. Trump won eight of the 13 battleground states that President Obama had won at least once in his two elections**

the strong performance of Mr. Trump. In fact, he won one of Maine's four electoral votes, something that hasn't been done before. There were 13 Republican-oriented states in which Mr. Trump won 5% more of the votes than Mr. Romney won. Finally, and most importantly, Mr. Trump won eight of the 13 battleground states that President Obama had won at least once in his two elections.

**This rightward shift in political leanings of state governments has become increasingly more important in the struggle over government regulations and policy actions**

This rightward shift in political leanings of state governments (governors and legislatures) has become increasingly more important in the struggle over government regulations and policy actions. It has been coalitions of state attorneys general, mostly from Republican-controlled states that have challenged various federal government laws and regulatory actions such as the Affordable Care Act, the Clean Power regulations promulgated by the Environmental Protection Agency and executive actions over immigration policies.

**Mr. Trump wants to exploit our nation's energy resources and strengthen our economy as a result**

Based on the political orientation of the nation and the total control of the federal government by the Republican Party, we anticipate a meaningful reorientation of the nation's energy and environmental regulation and policies. Mr. Trump wants to exploit our nation's energy resources and strengthen our economy as a result. We doubt that Mr. Trump has had time yet to call TransCanada Corp.'s (TRP-NYSE) management to ask them to refile their construction permit application for the Keystone XL pipeline, which he indicated during the campaign he would approve. Of course, Mr. Trump also said he wanted a share of the pipeline's profits, but without specifying how that would be achieved.

**There were reports that the web site of Canada's immigration organization crashed due to an overload of people wanting to know how to move to Canada**

It was barely hours after Mr. Trump was declared the winner of the election that humor involving U.S.-Canada relations began to surface. There were reports that the web site of Canada's immigration organization crashed due to an overload of people wanting to know how to move to Canada. We have no idea whether that was the cause of the crash or not. They should have been watching a Sunday morning news show several weeks ago that educated people about moving to Canada.

**The letter writers encouraged them to get moving as quickly as possible**

We have seen letters to the editor of U.S. newspapers listing the Hollywood actors and leading U.S. liberals who threatened to move to Canada if Mr. Trump was elected. The letter writers encouraged them to get moving as quickly as possible. It should also be noted, although none of the letter writers brought it up, that those moving will need to hand over a chunk of their assets to the U.S. government. We understand that these liberals are now backing off their declarations of moving north if Mr. Trump was elected. Why?

**Exhibit 12 Alberta Annexation Some 35 Years Later**


**Source: First Energy**

**It is funny to those of us who remember that era for another Trudeau to be part of the story**

We enjoyed the cartoon of Mr. Trump offering to buy Alberta from Canada's Prime Minister Justin Trudeau. It reminded us of the 1980s, when the National Energy Program (NEP), created by the Canadian federal government under Liberal Prime Minister Pierre Trudeau (Justin Trudeau's father), fostered a separatist movement for Alberta. At the time, Alberta's premiere was Peter Lougheed, who was a huge booster of Alberta and the question became should the province become a separate nation or apply to be annexed by the United States. At that time, the U.S. wouldn't have had to pay Canada as suggested by the cartoon, but it is funny to those of us who remember that era for another Trudeau to be part of the story.

A letter to the editor of *The New York Times* declared that the election demonstrated that there were two Americas. The writer suggested that California, Washington, Oregon, New York and the rest of the Northeast petition Canada to annex what he called the "United States of Canada."

**We will be closely watching the evolution of energy and environmental policy under President Trump**

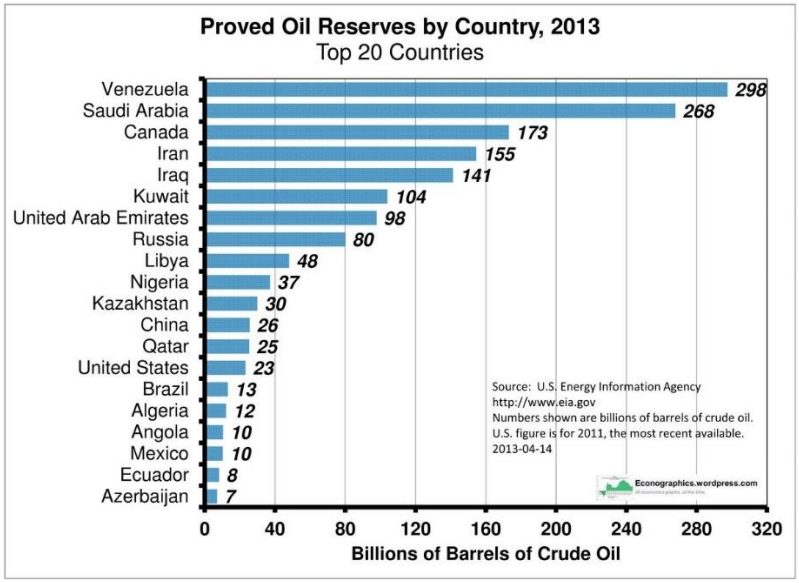
Along with the rest of the energy industry, we will be closely watching the evolution of energy and environmental policy under President Trump. Our sense is that it will lead to a better outcome for the domestic energy industry than would have been the case had Mrs. Clinton won.

# Is Canada Finally Getting Its Pipeline Export Act Together?

**Canada ranks third in the world in total oil resources**

Canada ranks third in the world in total oil resources due to its oil sands. The country, with 95% of its resources located in its oil sands deposits in Western Canada, trails Venezuela, with its huge heavy oil deposits, and Saudi Arabia, with only conventional oil resources, in the world's oil resource rankings.

**Exhibit 13. Where Canada's Oil Reserves Rank In World List**

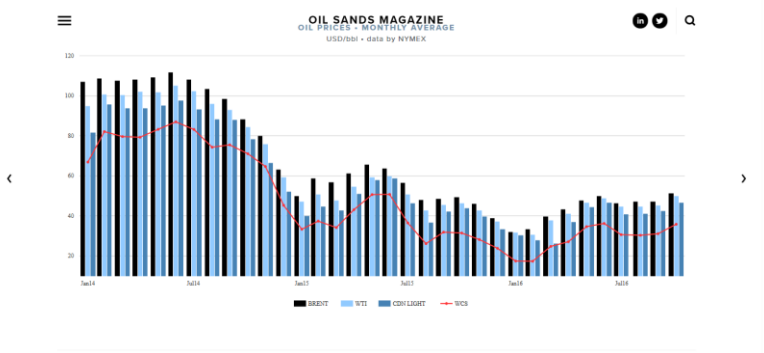



**Source:** ***Energygraphics***

**The problem for Canadian oil producers is that the price they receive at the wellhead is usually discounted from the spot market prices of WTI oil at Cushing, Oklahoma**

The problem for Canada has been its limited access to world oil markets for oil and gas output. By being tied almost exclusively to the United States, where it is the third largest supplier, Canada often suffers from price discounts due to its oil quality and the distance from America's refining centers. The explosion in oil shale output in the United States had the effect of dampening demand for Canadian oil imports along with imports from other countries around the world. The problem for Canadian oil producers is that the price they receive at the wellhead is usually discounted from the spot market prices of West Texas Intermediate (WTI) oil at Cushing, Oklahoma, the crossroads of the U.S. oil business. Exhibit 14 (next page) shows a set of monthly oil prices since the start of 2014. The chart shows the monthly price for Brent, WTI, Canadian light oil and Western Canadian Sweet (WCS) prices. The WCS price differential compared to WTI widened during 2014, but then closed in early 2015. Starting in the second half of 2015, the gap between the prices widened again and the gap has remained stable up to the most recent monthly data available.

**Exhibit 14. How Canada Oil Prices Track World Oil Prices**




**Source:** ***Oil Sands Magazine***

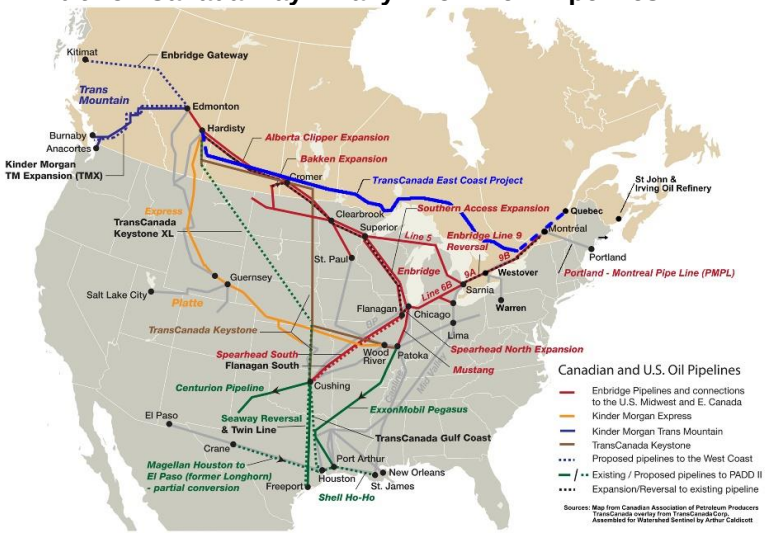
**The challenge for the Canadian oil industry has been finding more market access options as possible for their output**

The challenge for the Canadian oil industry has been finding more market access options as possible for their output. The problem is that there is a limit to the pipeline capacity into the U.S. and for shipping oil volumes to the East and West Coasts. The increased use of rail cars to ship oil, although more expensive per barrel moved than moving barrels by pipelines, provides optionality for producers to send their output to other markets where they could obtain the best prices.

**Political and social objections have become significant barriers to the approval of these proposed pipeline projects**

The oil industry in Canada has been proposing new export pipelines. What has happened, however, is that political and social objections have become significant barriers to the approval of these proposed pipeline projects. Exhibit 15 shows the major proposed pipeline projects along with the existing major pipelines in North America. The liberal political leadership at Canada's federal government level along with the government of the Province of Alberta have further added to the industry's struggles for gaining pipeline approvals.

**Exhibit 15. Canada May Finally Allow New Pipelines**




**Source: CAPP**

**The number of oil tankers that will be leaving Vancouver following the pipeline expansion will increase sevenfold**

The most recent development in these pipeline struggles was the announcement last week of a federal marine safety program. Prime Minister Justin Trudeau announced a $1.5 billion plan to ensure better protection from potential oil spills for Canada's coasts. The new program was announced only a few weeks ahead of the federal government's scheduled decision on Kinder Morgan's (KMI-NYSE) Trans Mountain pipeline expansion in Western Canada. The C$6.8 (US$5.4) billion project is designed to increase the volume of oil sands output from Alberta that can be transported to Vancouver for shipment to world markets. The number of oil tankers that will be leaving Vancouver following the pipeline expansion will increase sevenfold.

**The project was approved by the NEB with 157 environmental and operational conditions attached**

The pipeline project was approved by the National Energy Board (NEB) in May and recommended to the federal government for its final approval. However, the project was approved by the NEB with 157 environmental and operational conditions attached. These conditions, which would be enforced by the NEB, covered a wide range of topics, including: safety and integrity of the pipeline; emergency preparedness and response; protection of the environment; ongoing consultation with those affected, including Aboriginal communities; socio-economic matters; affirmation of commercial support for the Project prior to construction; and financial responsibility.

**One of British Columbia's five conditions that needed to be met to win the province's approval was creating a "world leading" oil spill response regime**

One of the major concerns of the Province of British Columbia over the expansion of the Trans Mountain pipeline was the protection of their waters. This new marine program proposed by Prime Minister Trudeau addresses those concerns. One of British Columbia's five conditions that needed to be met to win the province's approval was creating a "world leading" oil spill response regime. The Trudeau plan will fund a strengthening of the Canadian Coast Guard, add tougher industry pollution rules, increase funding for coastal habitat restoration and create laws increasing vessel owner responsibility.

**One aspect involves building three new salvage tugs**

British Columbia Premier Christy Clark has listed 11 gaps in marine safety that needed to be filled in order for the province to support more pipelines and other heavy-oil projects. One aspect involves building three new salvage tugs at a cost of $25-$50 million each that would be based at Vancouver, Kitimat and Port Renfrew along with a new Coast Guard station in Prince Rupert.

**The new ocean-protection plan is part of an organized approach for dealing with the objections to constructing new oil export pipeline**

It appears that the new ocean-protection plan is part of an organized approach for dealing with the objections to the construction of new oil export pipeline capacity to help Canada's oil industry tap global oil markets and earn higher returns. In reacting to these developments, the *Calgary Herald* wrote the following in an editorial about the new coastal protection plan:

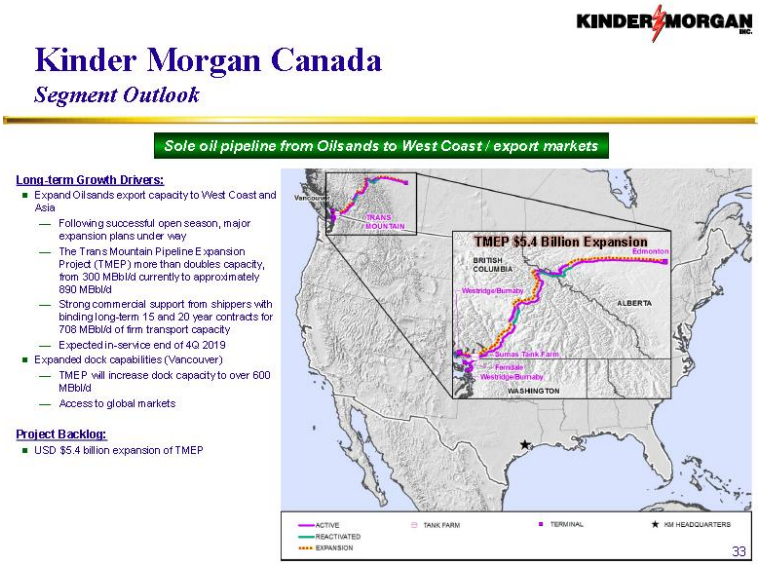
"It's a good thing pipeline approvals aren't up to [B.C. Premier] Clark or other B.C. politicians who refuse to be reasonable when it comes

**"The lack of pipeline capacity is costing the national economy dearly"**

to the need for Canada to get more of its oil to tidewater, so it can fetch a higher price. The lack of pipeline capacity is costing the national economy dearly, and it appears the Trudeau government acknowledges project approvals are in the best public in the best public interest. Sadly, there's no persuading some special interest groups of the necessity of building pipelines."

Now one might say that a newspaper based in Calgary, Alberta has an axe to grind because its oil business is the most impacted by the pipeline roadblocks. On the other hand, Canada's economy is suffering from the impact of the roadblocks, too.

**Exhibit 16. KMI's Trans Mountain Pipeline May Be Approved**




**Source: Kinder Morgan**

**If the tanker ban is put in place, it will force the development of the Trans Mountain pipeline as the primary West Coast oil export pipeline**

Another issue that has yet to be addressed is a proposed ban on oil tankers operating off British Columbia's coastline that would effectively shut down the development of an oil export terminal at Kitimat and thus kill the proposed Enbridge (ENB-NYSE) Northern Gateway oil export pipeline. If the tanker ban is put in place, it will force the development of the Trans Mountain pipeline as the primary West Coast oil export pipeline. That would leave the Trudeau government to deal with TransCanada Corp.'s (TRP-NYSE) Energy East oil pipeline project to move Western Canadian oil to the East Coast where it could be exported to the U.S. East Coast or Europe. Despite being the "environmental" prime minister, Mr. Trudeau is recognizing that without more oil and gas export opportunities, his nation's economy, which depends on a healthy energy economy, will suffer with many social and financial repercussions.

The Canadian federal government's decision about Trans Mountain on December 19th will be an important milestone for the nation's energy business. There are still numerous other policy decisions

that must be addressed before Canada develops a full-scale oil and gas export expansion regime, but the first steps appear to have been taken last week.

## Autonomous Trucks Pave The Way For Self-driving Cars

**The 53-foot long truck was controlled by a human driver only for driving onto and off the interstate highway**

In late October, as the leaves were turning color in Colorado, a load of 51,744 cans of Budweiser beer were hauled between two distribution centers in Colorado by an autonomously-driven truck. Early in the morning on one day during the week of October 17th, a truck owned by Uber's Otto subsidiary, and equipped with sensors and cameras on its roof top, was able to navigate a 120-mile stretch of Interstate 25 from Fort Collins to Colorado Springs. The 53-foot long truck was controlled by a human driver only for driving onto and off the interstate highway. The rest of the time the driver was monitoring the trip from the sleeper berth behind the driver's seat. The truck averaged 55 miles per hour on the highway and it was escorted by a police cruiser for safety. Importantly, this trip marks the first revenue generating job for an autonomous truck in this country, as Otto was paid the standard $470 for the trip. The secrecy and co-operation of the Colorado Department of Transportation were important ingredients for this first test, but the details of the trip highlight why self-driving vehicles will likely require more time in order to gain approval for travel on America's roads than optimists would have you believe.

**We remember the days when one could only buy Coors beer in Colorado**

We were surprised to read that this first commercial beer run in Colorado involved Budweiser, given that the state is the home to Coors beer. We remember the days when one could only buy Coors beer in Colorado because it always had to remain cold. We guess this switch reflects what happens when a local icon is sold to foreign owners.

**Exhibit 17. Driver Monitors Truck From Behind**


**Source: American Trucking Associations Inc., Aether Films**

An interview with Shailen Bhatt, the executive director of the Colorado Department of Transportation conducted by a reporter for the web site *Trucks.com*, reviewed the origin of the trip, the details that went into the state granting approval for the test and some of the longer term issues with autonomous vehicles.

**Otto told Mr. Bhatt that it had a truck equipped with autonomous driving technology that it had been driving across the U.S. in autonomous mode but with a driver in the seat**

Mr. Bhatt disclosed that Otto executives had contacted his agency three months before the test run to see if the state would agree to participate in a commercial test of its autonomous driving technology. Otto told Mr. Bhatt that it had a truck equipped with autonomous driving technology that it had been driving across the U.S. in autonomous mode but with a driver in the seat, and the technology works. They wanted to do a commercial trip involving the full use of the technology. The Colorado DOT agreed to work with Otto because it wanted to ensure that the technology was safe.

**The truck had to make this trip eight times with a driver in the seat and without him taking over before the DOT would allow the computer to drive the whole route while the driver was in the sleeper compartment**

After three months of discussions with multiple state agencies, the protocol for the test drive was agreed to. The truck had to make this trip eight times with a driver in the seat and without him taking over before the DOT would allow the computer to drive the whole route while the driver was in the sleeper compartment. Before the test was conducted, the highway department swept the entire route to eliminate any debris on the roadway. Tow trucks traveled the road to make sure there were no abandoned vehicles along the way that could cause confusion for the sensors. They also checked to make sure there were no unexpected road projects going on that could cause weird traffic patterns. The involvement with the highway patrol also involved addressing issues such as how it would pull over a truck without a driver in the seat, and how it would communicate effectively with the autonomous vehicle.

**Hacking the autonomous technology could have caused some unexpected event**

One reason the test was not publicized, although it was not a secret, was because the highway patrol didn't want anyone to say, "Hey, how can we mess with that truck?" Hacking the autonomous technology could have caused some unexpected event. In essence, the DOT didn't want this test to become a spectacle.

**That time frame was quantified as five to 10 years for a lot more autonomous trucks to be on the roads**

Mr. Bhatt told the reporter that this was a one-time special event. It isn't something that the DOT anticipates will be regularly running up and down I-25. And in response to the question of how the DOT sees the technology being implemented on the highway, Mr. Bhatt offered his view that autonomous trucks will be on the highways of Colorado in the "short-to-medium term." That time frame was quantified as five to 10 years for a lot more autonomous trucks to be on the roads, but Mr. Bhatt doesn't think it will take drivers out of the trucks. He said, "The way I see this working in the future is that when truckers get tired, as all humans do, the self-driving technology would take over and allow the driver to rest in the sleeper berth. Then when the driver is rested, they would get back behind the wheel and drop off their load. I see a hybrid of this in the medium-term of where truck drivers will still be in the trucks."

**The truck drove straight down the center of the lane**

Mr. Bhatt praised the workings of the technology. He pointed out that during the test run, the truck drove straight down the center of the lane. It also adjusted its speed to that of other trucks and cars around it. In fact, he highlighted that for some reason a car slowed down to about 35 miles per hour and the truck slowed down to maintain the appropriate distance.

**With autonomous technology, the computer doesn't get tired as humans do, and computers don't take substances nor do they become distracted**

Colorado was supportive of the autonomous truck test as a way to improve the safety of highways. Mr. Bhatt quoted the national statistics of roughly 35,000 highway deaths per year. The majority of those deaths are related to driver error. With autonomous technology, the computer doesn't get tired as humans do, and computers don't take substances nor do they become distracted, major causes of highway accidents. The weak point, however, remains cybersecurity for the technology.

**Truck drivers have become more concerned about their job security after learning of the Colorado beer run**

A significant concern being raised now is the job risk for America's commercial drivers as autonomous vehicle technology gains wider acceptance. According to government figures, there are 2.9 million truck and delivery drivers, 674,000 bus drivers and 181,000 taxi drivers and chauffeurs. Some of these drivers view the success that robots have had in penetrating and remaking the assembly lines of America's manufacturing plants as a reason to worry about the impact autonomous vehicles will have on their job outlook. It was recently pointed out that a 2004 book by two economists concluded that truck drivers were safe from being deposed by robots because trucks surely couldn't navigate highway rush-hour traffic without a human's hand. By 2010, Google's (GOOG-Nasdaq) self-driving cars were crisscrossing San Francisco's Golden Gate Bridge and circling Lake Tahoe. Truck drivers have become more concerned about their job security after learning of the Colorado beer run.

**Autonomous truck technology looks more promising as the wedge for widespread entry of self-driving vehicles into the highway transportation sector**

So will Mr. Bhatt's "short-to-medium" term timeframe of "five-to-10 years" prove realistic for autonomous trucks making a significant presence on the highways, or will this technology move faster? In our view, autonomous truck technology looks more promising as the wedge for widespread entry of self-driving vehicles into the highway transportation sector since there is so much back and forth for trucks between locations that lend themselves to being programed. We can envision the day when the over-the-road truck driver population declines and is replaced by a growing population of local truck drivers who navigate the vehicle between the terminal and the highway before sending the truck down the interstate in autonomous mode. Besides safer driving conditions, it is possible that the lifestyle of truck drivers will improve.

## Does The Trump Election Change OPEC Rolling The Dice?

The world of politics – not just in the United States, but worldwide – changed the night of November 8th. Donald J. Trump was elected to become the 45th President of the United States in an election upset

**It is possible that they had already contracted for new White House drapes after having taken their measurements**

of epic proportions. Only a rare poll or political pundit gave Mr. Trump any chance of beating Hillary Clinton. With the active support of the Washington bureaucracy, the President and First Lady and the mainstream media, we were assured that Mrs. Clinton's transition team was ready to take over the government. It is possible that they had already contracted for new White House drapes after having taken their measurements.

**Around the world, blurry-eyed politicians and Americans of all persuasion contemplated exactly how America's future and their own had changed as a result of the election**

The projected short night for the election returns turned into a rather long night. In fact, John Podesta, the Clinton campaign chairman, strode to the podium at about 2:15 am EST on Wednesday morning to tell a crowd of Clinton supporters who had spent the night agonizing over the dismal voting results at the Jacob K. Javits Convention Center in New York City to go home and get a good night's sleep as the campaign would have more to say later in the morning. Surprisingly, it was shortly later when Mrs. Clinton called Mr. Trump to concede the race and congratulate him on his election. Around the world, blurry-eyed politicians and Americans of all persuasion contemplated exactly how America's future and their own had changed as a result of the election.

**The question quickly became how rapidly America's commitment to the terms of the Paris climate change agreement would dissolve**

For the American delegates to the United Nation's 22nd session of the Conference of the Parties (COP 22) that had just opened in Marrakech, Morocco, the question quickly became how rapidly America's commitment to the terms of the Paris climate change agreement would dissolve? On the campaign trail Mr. Trump had called climate change a hoax and he declared that if elected he would overturn the agreement. He has already appointed a "climate denier" to head his environmental policy transition team, not a positive sign for the continuation of the Obama administration's climate change regulations.

**Could that mean the re-imposition of U.S. sanctions against Iran?**

In Vienna, the planners of the upcoming 171st Meeting of the Organization of Petroleum Exporting Countries (OPEC) to be held on November 30th started recounting the number of short straws they needed to have in their hand. Mr. Trump had declared that the Iranian nuclear deal was the world's worst deal ever and he would tear it upon taking office. Could that mean the re-imposition of U.S. sanctions against Iran? What might that mean for the planned revival of Iran's oil and gas industry, and especially for stepped up oil exports in a world slowly moving toward a balanced global oil market? Maybe the key to 2017 oil prices won't be demand growth, but rather what happens to OPEC's supply growth.

**Projected demand growth in 2017 remained unchanged, which is positive given the recent downward revisions to world economic growth forecasts**

In that regard, the November OPEC *Monthly Oil Market Report* showed a minimal decrease in 2016 oil demand, reflecting slightly weaker consumption growth in Latin America and the Middle East. Projected demand growth in 2017 remained unchanged, which is positive given the recent downward revisions to world economic growth forecasts from quasi-governmental agencies such as the World Bank and the International Monetary Fund. More important

for the oil price outlook was the reduction in non-OPEC oil supply growth next year – the first reduction since projections flipped in September showing oil supply growth rather than continued declines. Is it possible that after another month or two of the current OPEC policy, the oil market might rebalance without production cuts by OPEC members?

**OPEC would have to cut up to a million barrels per day of output to make good on its late September promise to cap production**

On Friday, OPEC said that its October output rose to 33.64 million barrels per day (b/d) last month, up 240,000 b/d from September's volume. Following this announcement, OPEC would have to cut up to a million barrels per day of output to make good on its late September promise to cap production at between 32.5 million and 33.0 million bpd. Despite the October production increase, the shift in political sentiment following the U.S. election might signal that Iran's future will be more restrained economically than perceived before the election. Less oil output from Iran would make Saudi Arabia's role in managing an OPEC production agreement easier.

**Will Russia remain as supportive of the Iranian regime financially and militarily going forward?**

One also has to wonder how the election may have changed the view in Moscow of future U.S.-Russia relations. If there is to be a more favorable political climate between the two countries because of the supposed positive leanings of Mr. Trump towards Vladimir Putin, Russia's leader, might Middle East tensions ease? Also, will Russia remain as supportive of the Iranian regime financially and militarily going forward, and how might that influence the policies of Saudi Arabia as the leader of the Sunnis in the region?

**In the near term, uncertainty about geopolitical and economic responses to world conditions may cause energy executives to become more cautious in their planning for 2017 and beyond**

There are many questions about how the view of geopolitics and the policies for managing relations held by the current U.S. president may change given the arrival of Mr. Trump in the Oval Office. All those policies will be put under a microscope for re-examination. Some may change. Some may not. Which ones change, and importantly how they change, will determine the shape of world relations in the near future, and certainly the global economic outlook. A first clue may appear on November 30th when OPEC decides on what to do about the oil market. The fate of the global energy recovery and the role of fossil fuels in our energy future might be different than we have been assuming. In the near term, uncertainty about geopolitical and economic responses to world conditions may cause energy executives to become more cautious in their planning for 2017 and beyond. As the saying goes, there is never a dull moment in the energy business, and that is certainly true after last Tuesday's election!

# Correction

In our last *Musings*, we wrote an article titled "Government Should Tell Obama About Climate Change." We referred to the Rockefeller Foundation as the creators of Williamsburg. We should have referred to its role in the re-creation of Colonial Williamsburg, a living history museum. We regret the error.

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