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## MUSINGS FROM THE OIL PATCH

December 13, 2016

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Managing Director

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**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

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### **Clock Ticking – Obama Agencies Spin Up Fuel Rules**

**The Obama administration's bureaucracy is racing to get rules and regulations of all stripes in place before their tenure ends**

With the noon, January 20, 2017, date staring them in the face, the Obama administration's bureaucracy is racing to get rules and regulations of all stripes in place before their tenure ends. Actually, starting before the election, agency officials began laying out timetables by working backwards from the inauguration date to determine the last day when new rules and regulations could be published in the *Federal Register*, which is how laws become effective. If the rule or regulation approval requires a period for public comment, then that time span has to be factored into the schedule.

**It will force the incoming administration to likely have to pick and choose which rules and regulations they want to focus on to overturn**

To appreciate the scope and zeal with which this new regulatory push is being made, White House Domestic Policy Council Director Cecilia Muñoz has been directing her staff to get their flu shots and to take their vitamins. Ms. Muñoz was quoted in an article in *The Washington Post* saying, "The schedule is such that if we have anybody get sick, it's not clear that we can meet our deadlines." That's cutting things pretty close! However, given the scale of the regulatory push, it is not surprising. The rationale behind this frenzy was explained by a White House staffer who said that by adding more rules and regulations in the final months of the administration's term in office, it will force the incoming administration to likely have to pick and choose which rules and regulations they want to focus on to overturn. In other words, the Obama officials anticipate that a portion of the newly imposed blizzard of rules and regulations will survive the Trump putsch and govern the future operations and actions of people, companies and industries.

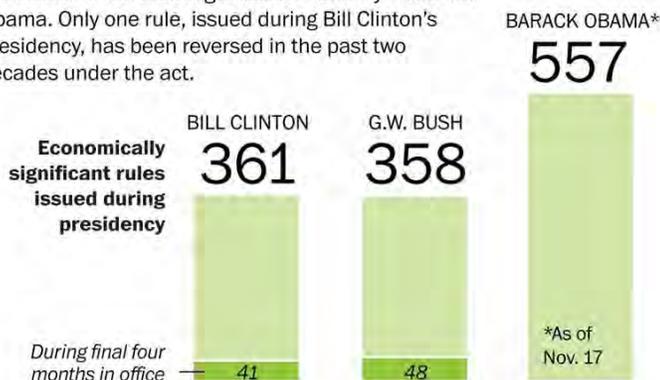
To put in perspective, the chart in Exhibit 1 (next page) shows that as of November 17<sup>th</sup> the Obama administration had enacted approximately 200 more economically-significant rules that during

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the eight year terms of either President George W. Bush or President Bill Clinton. These economically-significant rules are ones carrying at least \$100 million worth of economic impact. We fully expect the number of rules to increase before January 20, 2017.

**Exhibit 1. How The Obama Administration Has Worked Congressional reversal of presidential rules**

The final months of any administration can see an uptick in issuing of significant rules by federal regulatory agencies. Under the Congressional Review Act, the new GOP-controlled House and Senate sworn into office in January, with the new president's signature, can reverse by majority vote some of the final regulations issued by President Obama. Only one rule, issued during Bill Clinton's presidency, has been reversed in the past two decades under the act.



Note: Economically significant means actions that have at least \$100 million worth of economic impact, such as the cost of complying with stricter workplace and environmental standards.

Sources: Reginfo.gov, George Washington University Regulatory Studies Center

JULIET EILPERIN AND CRISTINA RIVERO/THE WASHINGTON POST

Source: *The Washington Post*

**The federal bureaucracy is considering measures dealing with a wide range of impacts**

*The Washington Post* article highlighted that the federal bureaucracy is considering measures dealing with a wide range of impacts ranging from protecting large areas of public land in the American West and bolstering energy efficiency appliances, to giving greater power to state and local governments to offer retirement savings plans for private-sector workers. It just announced a finalized rule to evaluate whether schools are succeeding or failing under the sweeping Every Student Succeeds Act enacted last year.

**The standard requires new car manufacturers' fleets to average 54.5 mpg by 2025**

Another rule review just undertaken involved the Environmental Protection Agency's (EPA) fuel efficiency standards for light-duty vehicles. This rule was part of the President Barack Obama's aggressive suite of environmental policies to deal with the threat of climate change, and has become part of his commitment to the United Nations' climate change initiative. The standard requires new car manufacturers' fleets to average 54.5 miles per gallon (mpg) by 2025. While EPA officials declared that the agency's early review and public comment period was not driven by the November 8<sup>th</sup> election results, the facts suggest otherwise. Under the law, the interim standard was to be reviewed and confirmed by April 2018.

**The required 30-day public comment period now ends on December 30, allowing the final rule determination to be made official before Inauguration Day**

The EPA's initial schedule called for it to make a preliminary determination by mid-2017 with the final determination in 2018. By accelerating the process, the required 30-day public comment period now ends on December 30, allowing the final rule determination to be made official before Inauguration Day. The argument for the quick revision came from EPA Administrator Gina McCarthy. "Although EPA's technical analysis indicates that the standards could be strengthened for model years 2022-2025, proposing to leave the current standards in place provides greater certainty to the auto industry for product planning and engineering." Ah yes, just being helpful.

**An EPA spokesman said that the new Trump Administration cannot use the Congressional Review Act (CRA) to overturn this fuel-economy standard**

In response to industry pushback, an EPA spokesman said that the new Trump Administration cannot use the Congressional Review Act (CRA) to overturn this fuel-economy standard. They can use the CRA on other Obama rules issued since May, but this decision is not considered a rule under the Administrative Procedure Act (APA), but rather an adjudication. That means it is not subject to the APA. This represents another game the Obama administration is playing with the official operating procedures of the federal government in an attempt to circumvent the will of the Congress. If the administration's view of the new rule withstands scrutiny by the incoming Trump administration, it would force Congress to attack the rule either through new legislation or by inserting over-turning legislation in other omnibus-type bills, which takes longer and risks engendering a greater political fight. On the other hand, sometimes bits of legislation such as overturning this rule can often be traded off for concessions on other issues in such a bill. The Congress could also attack the rule through spending legislation, but again that takes longer to have an impact.

**A debate has raged for some time over whether fuel-efficiency regulations or gasoline taxes are the more efficient and less harmful way to reduce greenhouse gases**

So why has this fuel-efficiency decision become such a contentious issue? Motor vehicles are a major source of greenhouse gas emissions and that plays into the Obama administration's goal of putting in place policies and regulations that will ensure a more environmentally-compliant United States economy and in line with UN climate change goals. A debate has raged for some time over whether fuel-efficiency regulations or gasoline taxes are the more efficient and less harmful way to reduce greenhouse gases.

**It may be based on flawed assumptions about the future of the transportation industry**

The EPA estimates its new standard would eliminate six billion metric tons of greenhouse gas emissions over the lifetime of vehicles built in model years 2012 through 2025. While an admirable goal, it may be based on flawed assumptions about the future of the transportation industry, much like the Renewable Fuel Standard that mandates the use of ethanol in America's gasoline supply. Last month the EPA determined that 19.28 billion gallons of corn ethanol and other biofuels must be included in the nation's gasoline supply next year. That represents an increase over the 18.11 billion gallons mandated for 2016. It is, however, a far cry from the original RFS mandate established in 2007 that called for 24

**Manufacturers of automobiles have raised concerns regarding the harm being done to new automobile engine performance from higher ethanol blends**

billion gallons in the 2017 gasoline pool. The increased ethanol blend comes at a time when gasoline consumption is growing much more slowly than originally forecast in 2007. As a result, the blend wall (the maximum percentage of ethanol that can be mixed in with gasoline without harming engines) is being hit, which has led to a battle over whether to force refiners to blend 15% ethanol in gasoline, up from the current 10% mix. Manufacturers of automobiles have raised concerns regarding the harm being done to new automobile engine performance from higher ethanol blends. Small gasoline engine owners – those for yard equipment, snow removal and boats, for example – have already experienced meaningful performance issues and damage caused by the current ethanol blend. They see nothing but further damage if the blend percentage is increased.

**They envisioned passenger cars comprising 66% of light-duty sales, with sport utility vehicles (SUVs) and trucks comprising the balance**

When the EPA and the National Highway Traffic Safety Administration (NHTSA) set the 54.5 mpg target for 2025 in 2012, they envisioned passenger cars comprising 66% of light-duty sales, with sport utility vehicles (SUVs) and trucks comprising the balance. In a 2015 federal report, the projected split was updated to 52% versus 48%, reflecting the shift in American vehicle purchasing patterns given historically low gasoline prices. If gasoline prices remain low, the assumptions underlying the EPA and NHTSA fuel-efficiency model will be way off.

**The EPA points out that in the program's first four years, overall fleet fuel-economy targets have been surpassed**

The rationale of the EPA in establishing such high fuel-efficiency standards was to force auto manufacturers to develop cleaner-burning engines and especially emission-free electric vehicles. The EPA points out that in the program's first four years, overall fleet fuel-economy targets have been surpassed. It also points out that the industry has more than 100 cars or light-duty trucks already meeting fuel-efficiency standards for 2020. They also point to improved range and reduced price points for electric vehicles. Those are positives for buyers of electric vehicles, but they don't do much to make them economic for buyers and manufacturers.

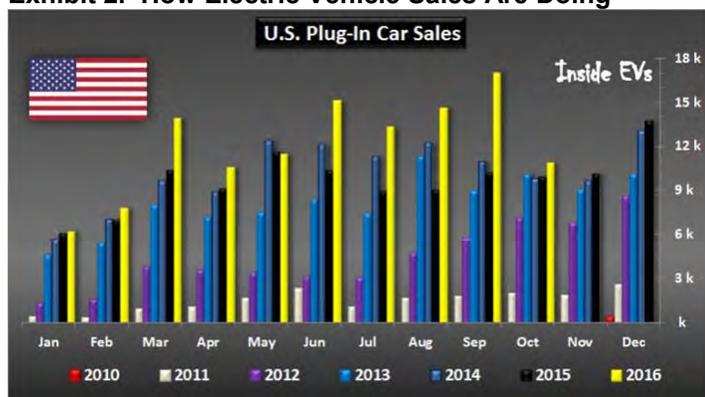
**Given the low price of gasoline, one wonders why electric vehicle sales are climbing**

Proponents of electric vehicles point to how well they are selling. In October, cumulative sales of plug-in electric vehicles in the United States exceeded 500,000 units. The pace of electric vehicle sales has picked up recently, with September's 16,974 units representing a monthly record. While sales fell in October, the 10,832 units sold represented a 9.1% increase over the same month in 2015, based on monthly plug-in sales data reported by *Inside EVs*. Given the low price of gasoline, one wonders why electric vehicle sales are climbing, although the total number of them on the nation's highways lags far behind President Obama's goal set forth in his 2011 State of the Union address. At that time, he projected his policies would put one million electric vehicles on America's roads by 2015, yet here we are, nearly a year beyond his target date and barely over half way to his target.

**In one way, the Bolt will not be kind to GM's bottom line, as the car manufacturer estimates it will lose \$9,000 on every one it sells**

Several recent articles about General Motors Co.'s (GM-NYSE) new Bolt all-electric subcompact car, the company's latest foray into the world of electric cars, enlightened us about the economics of electric vehicles. In one way, the Bolt will not be kind to GM's bottom line, as the car manufacturer estimates it will lose \$9,000 on every one it sells. But apparently that is the price GM has to pay if it wants to sell cars in California, one of the nation's most important automobile markets. According to government registration data, California represents 12.2% of all cars registered in the nation. In 2015, the state accounted for 2.05 million of the cars and light-duty trucks sold that year, or 11.7% of the nation's total sales.

**Exhibit 2. How Electric Vehicle Sales Are Doing**



Source: *Inside EVs*

**California has passed very tough clean air rules along with a mandate that automakers sell some non-polluting vehicles if they wish to do business in the state**

California has had a special exemption from federal law allowing the state to establish its own vehicle emissions standards. As a result, it has passed very tough clean air rules along with a mandate that automakers sell some non-polluting vehicles if they wish to do business in the state. Nine other states, including New York and New Jersey, have adopted similar policies. All told, the 10 states represent about 30% of the U.S. new vehicle market, which goes a long way to explaining why there are so many zero-emission (ZEVs) models from so many manufacturers being offered or about to be offered for sale. Most of these ZEVs are money losers, but without such products, the automakers would be forced out of those states' markets.

**According to California Air Resources Board staff projections, ZEVs may have to represent 40% of car sales, up from their current 3% level, in order to achieve that goal**

The price to access the California market has recently gone up. California Governor Jerry Brown (Dem) recently signed a bill ordering the state's greenhouse gas emissions to be 40% below 1990 levels by 2030. According to California Air Resources Board staff projections, ZEVs may have to represent 40% of car sales, up from their current 3% level, in order to achieve that goal. Is that a realistic target? Probably not, or at least not as long as auto manufacturers are losing in the neighborhood of \$10,000 per ZEV sold. It's okay to lose a small amount of money, but to lose that magnitude per car with a 40% market share could send companies

**What GM understands is that ZEVs are compliance vehicles, so pricing the Bolt to both achieve its ZEV credit needs and take market share from other auto manufacturers can be a smart strategy, even if they are losing so much money per unit**

to the poor house, unless profits on larger cars, SUVs and light trucks grow substantially. (Fiat Chrysler Automobiles NV's CEO said in 2014 that it was losing \$14,000 for each battery-powered Fiat 500e it sold in California.)

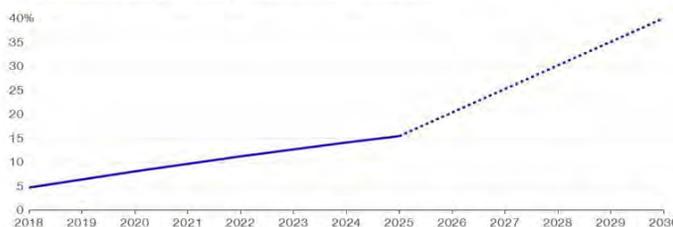
From GM's viewpoint, it needs to generate sufficient ZEV credits to avoid sharp fines or being shut out of the California market entirely. One analysis went as follows: In 2015, GM sold 219,962 vehicles in California. To avoid fines, it needs state-awarded ZEV credits equal to 14% of the units sold, or 30,794. That can be achieved by selling 7,698 Bolts that earn GM four credits each, or 10,082 Chevy Volt plug-in hybrids, or a combination of the two. What GM understands is that ZEVs are compliance vehicles, so pricing the Bolt to both achieve its ZEV credit needs and take market share from other auto manufacturers can be a smart strategy, even if they are losing so much money per unit. If GM can earn more ZEV credits than it needs, those can be sold to other manufacturers who are falling behind their ZEV credit goals. This is all part of the clean air gambit in which companies that are "doing more than they need to" in meeting certain thresholds find that they hold pieces of paper that increase in value over time and can be successfully monetized. Selling \$139 million of excess ZEV credits was what enabled Tesla Motors (TSLA-Nasdaq) to achieve third quarter profits on a GAAP basis.

**Exhibit 3. California's Path To A Carbon Free State**

**California's Zero-Emission Pathway**

Requirements for battery-only cars, plug-in hybrids and fuel cells are about to accelerate

■ Zero-emission vehicles as a percentage of each carmaker's California sales



Source: California Air Resources Board  
 ZEV data for 2018-2025 are estimates based on projected mix of vehicle types and ranges.  
 2030 is projection needed to meet California law for greenhouse-gas reduction.

Bloomberg

Source: **Bloomberg**

**Virtually everyone acknowledges that the car lacks outstanding design, but the word the GM exec uses to describe the Bolt is "practical."**

But what are the economics of electric vehicles for buyers? The *Associated Press'* automobile writer recently test drove the GM Bolt and interviewed the executive in charge of marketing it. Virtually everyone acknowledges that the car lacks outstanding design, but the word the GM exec uses to describe the Bolt is "practical." For tech-savvy Millennials that sounds more like their grandma's car. However, the Bolt is the first electric vehicle to get over 200 miles per charge (238 miles, exactly). It does have lots of interior space, a near-silent ride and emits no tailpipe emissions. Moreover, the Bolt can go from zero to 60 miles per hour in 6.5 seconds, out-muscling

some muscle cars. Even more important, the Bolt is now at showrooms in California and Oregon, while its prime competitor – the Tesla Model 3 – will not be available until the end of 2017.

#### Exhibit 4. GM's Bolt Electric Vehicle Savior



Source: GM

**After the federal tax credit of \$7,500, the purchase price drops to \$29,995, to which you need to add roughly \$1,200 for a 240-volt home charging station**

**If one takes the cost premium for the Bolt and divides it by the net annual operating cost savings, it requires roughly 24 years to recover that premium**

**To fully charge a Bolt from empty requires 9.5 hours**

The problem for the Bolt is its cost. The list price is \$37,495 including shipping. After the federal tax credit of \$7,500, the purchase price drops to \$29,995, to which you need to add roughly \$1,200 for a 240-volt home charging station, bringing your out of pocket expense to own a Bolt to \$31,195. For comparison, a comparably equipped, gasoline-powered Chevy Cruze compact hatchback with automatic transmission costs \$23,670 with shipping, a difference of \$7,525.

In terms of operating expense, the Bolt will save its owner \$450 a year on fuel based on the current average gas price of \$2.13 per gallon, according to the EPA. Additionally, a Cruze owner would need to change his car's oil twice a year for an estimated total cost of \$60. This means the Bolt owner would be \$510 a year ahead of the Cruze owner in annual operating cost savings. That advantage shrinks, however, when the cost of insurance is considered. Because of the higher initial cost for the Bolt, its insurance bill will generally run 15% to 25% higher than for a Cruze, according to the Insurance Information Institute. That cuts the Bolt's total annual operating expense advantage over the Cruze by \$200, bringing it down to about \$310. If one takes the cost premium for the Bolt and divides it by the net annual operating cost savings, it requires roughly 24 years to recover that premium. If one ignores the higher insurance cost, it still takes about 16 years to break even on a Bolt purchase.

The GM sales executive offered another advantage for the Bolt. Its owner wouldn't be spending all that time at the gas station filling up his car. But, to fully charge a Bolt from empty requires 9.5 hours, meaning it is an all-night job. That eliminates the Bolt as a long-distance vehicle choice because you won't be able to go 500-600 miles or more in a day given the length of the charging time. Just

**Over 100 years ago, electric vehicles outsold gasoline powered cars, although steam-powered ones were actually the largest segment**

how many hotels have charging stations? We may be more sensitive to this measure as we take several two-thousand-mile driving trips a year, which would turn our current three-day trips into nearly 10-day trips. Add that incremental cost to the Bolt premium analysis, and you might blow up your calculator.

At one time, over 100 years ago, electric vehicles outsold gasoline powered cars, although steam-powered ones were actually the largest segment. Compared to gasoline powered cars, electric vehicles were easier to operate and carried no odor, making them attractive, especially when roads were primarily urban. With the development of better roads and improvements in gasoline powered vehicles – electric starters that eliminated the hand crank and improved gear-shifting technology – electric vehicles faded from the scene, largely over difficulties maintaining their batteries. That seems to be the same situation today. Until battery technology improves and electric vehicle costs decline, these cars will be pushed into the market as a part of auto manufacturer profit-maximizing business strategies and not because the public is clamoring for them. You would never know that from the media coverage of the wonders of electric vehicles.

## Vienna Accord – How OPEC’s Agreement Was Preordained

**Crude oil prices were falling as traders began covering their optimistic bets on oil’s future and shifted their bets to lower prices anticipating a failure of the meeting to be announced**

Pessimism hung over the crude oil trading market on November 29<sup>th</sup>, the day preceding the 171<sup>st</sup> Meeting of the Conference of the Organization of Petroleum Exporting Countries (OPEC). The chaos that appeared evident among the key members of the organization heading into the final few days ahead of the meeting led traders and the energy media to throw substantial cold water on the likelihood of any agreement being forged...or certainly one that would stand the test of time, if only for 24 hours. Crude oil prices were falling as traders began covering their optimistic bets on oil’s future and shifted their bets to lower prices anticipating a failure of the meeting to be announced. Lo and behold – in the early morning hours of November 30 in New York City, the rumors flew that an agreement had been forged among the key OPEC members, but more importantly that Russia was onboard with cutting production to help accelerate the oil market’s rebalancing.

**Since it doesn’t become effective until January 1, 2017, it is not surprising that OPEC members are boosting their output, hoping to get a few more dollars into their treasuries by selling more output at oil prices above \$50 a barrel**

When the market opened, euphoria ruled in the oil trading pits and on Wall Street where energy stocks soared – extending the Trump Bounce that had been lifting stock prices since the election. By last week, however, the wind seemed to be coming out of the sails of the market as analysts suggested that OPEC would announce another record production month, along with Russia, and putting in doubt the sustainability of the agreement. Since it doesn’t become effective until January 1, 2017, it is not surprising that OPEC members are boosting their output, hoping to get a few more dollars into their treasuries by selling more output at oil prices above \$50 a barrel.

**Mr. Novak said that Russia was not only willing to cap its output, but would agree to cut it by half the non-OPEC volume the organization needed to put together a grand bargain**

After being shocked once again by the performance of OPEC members, reporters began digging to try to understand how this agreement came together. The reporters' objective was to finger who won and who lost in the negotiations. There had to be a kingmaker – and they found him when they learned of a 2 a.m. phone call between Saudi Arabia Energy Minister Khalid Al-Falih and his Russian counterpart Alexander Novak. Mr. Novak said that Russia was not only willing to cap its output, but would agree to cut it by half the non-OPEC volume the organization needed to put together a grand bargain and bring the oil market back into balance. Telling the story was much more fun than digging into the data and attempting to understand what, if anything, had changed or was in the process of changing, in oil's fundamentals that might have facilitated the OPEC deal.

**The media's storyline became that the Kingdom was waging a war against American shale producers who had revolutionized the finding and development of new oil supplies**

In November 2014, when Saudi Arabia decided to allow market forces to determine crude oil prices, to the world's shock, the media's storyline became that the Kingdom was waging a war against American shale producers who had revolutionized the finding and development of new oil supplies never thought capable of becoming a sustainable resource. These explorers' success had more than doubled U.S. oil output between 2005 and 2015, which contributed to a huge global inventory surplus. The issue of weaker than expected oil demand growth and the European Union's reversal of its view on the acceptability of "dirty" oil sands supply was ignored in the story. The shale supply performance was largely due to nearly a decade of extraordinarily high crude oil prices, enabling the financing of expensive shale wells. Projections of never-ending high oil prices sustained the fever.

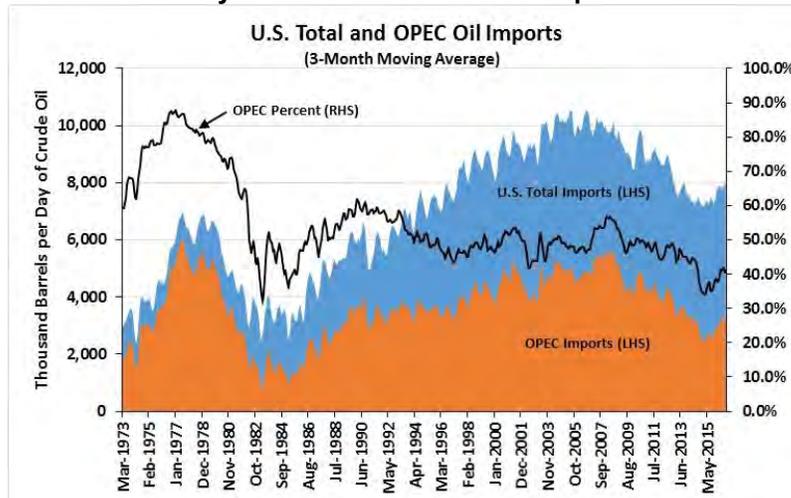
**In the mid 1970s, OPEC supplied about 80% of U.S. oil imports, which fell quickly and dramatically to about 30% by 1982**

A review of trends within the U.S. and global oil markets may help explain why the OPEC deal came together. According to the storyline of OPEC's 2014 decision being an attack on U.S. producers employing fracking technology, those companies were targeted for causing Saudi Arabia and OPEC to lose market share in the U.S. A long-term view of U.S. crude oil imports from OPEC shows how its share of supply had fallen over time. In the mid 1970s, OPEC supplied about 80% of U.S. oil imports, which fell quickly and dramatically to about 30% by 1982. Three forces explain that decline: the high price of oil following the Arab Oil Embargo; the collapse in consumption following the two significant price hikes of the 1970s and the resulting recession; and the growth of non-OPEC supply sources such as the opening of the North Sea and the development of West African oil supplies.

**By the end of the 1980s, OPEC had regained U.S. market share, getting it back to nearly 60%**

By the end of the 1980s, OPEC had regained U.S. market share, getting it back to nearly 60%. From that point forward, OPEC's market share fell slowly as more diverse supplies became available. The trend in OPEC's market share, and the challenge it presented for the organization becomes clearer once we look at data for the past decade. From 2006 to mid-2008, total OPEC imports rose,

Exhibit 5. History Of OPEC’s Share Of US Imports

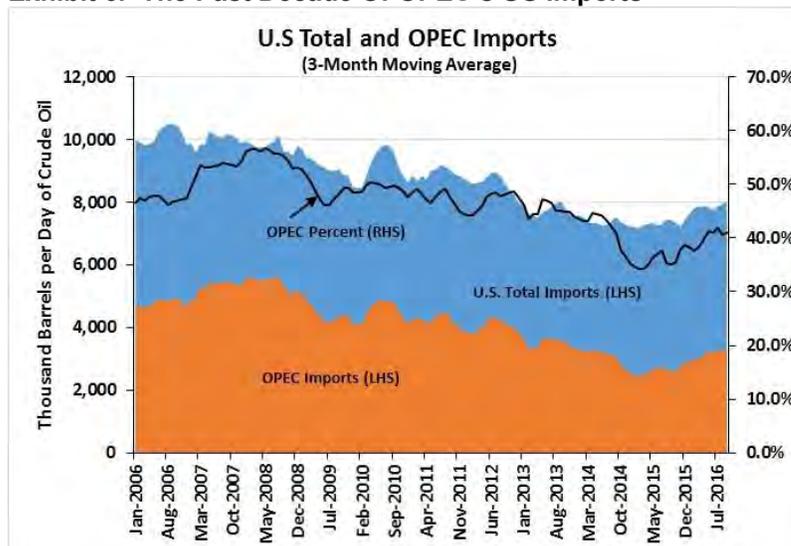


Source: EIA, PPHB

**In September 2014, OPEC’s market share of U.S. oil imports sat barely over 40%, but then dropped sharply**

while total U.S. oil imports declined, boosting the organization’s share from the low 40s% to the mid 50s%. Although the overall trend in OPEC’s share of U.S. oil imports was downward, by 2014 it had fallen back to the low 40%. In September 2014, OPEC’s market share of U.S. oil imports sat barely over 40%, but then dropped sharply – bottoming out in the mid 30s%. That share began climbing again but it was not until recent months that it exceeded 40%.

Exhibit 6. The Past Decade Of OPEC’s US Imports



Source: EIA, PPHB

Focusing on a narrower timeframe – January 2014 to now – shows how the OPEC market share shift has occurred. Starting in spring 2015, absolute OPEC imports began growing slowly. It wasn’t until

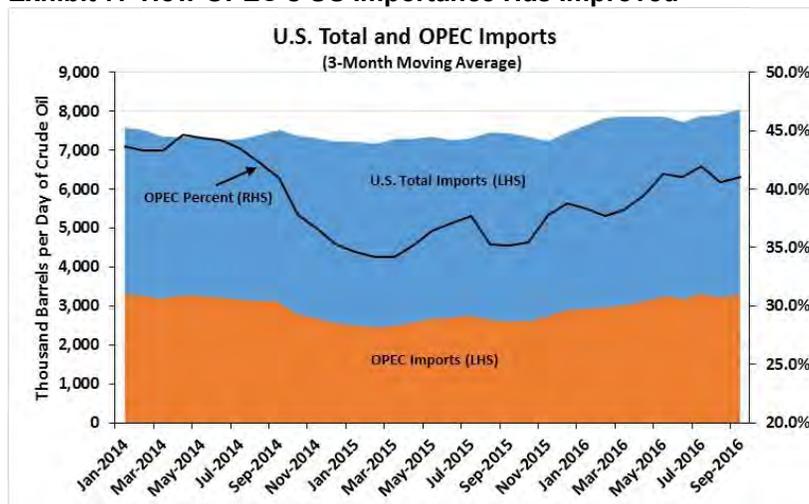
**OPEC’s market share is holding firmly above 40%**

**Venezuela’s problems are deep-seated and involve the government and the governed**

the end of 2015 that total U.S. imports began growing. That was largely a function of fuel consumption growth, as Americans were driving more, at the same time U.S. oil production was falling. With OPEC’s market share holding firmly above 40%, and certain OPEC and non-OPEC producers having serious production problems – Mexico, Venezuela and Nigeria – the outlook for OPEC’s volumes, especially those from Saudi Arabia, coming to the U.S. appears solid.

While Mexico may be able to restore some of its lost production, it will take substantial sums of money and time for that to occur on a sustainable basis. Venezuela’s problems are deep-seated and involve the government and the governed. The health of the country’s economy and its finances are so poor that it will likely take a political revolution and substantially higher oil prices for an extended period to revive its oil industry. How long that might take is anyone’s guess, but it likely won’t happen quickly.

**Exhibit 7. How OPEC’s US Importance Has Improved**

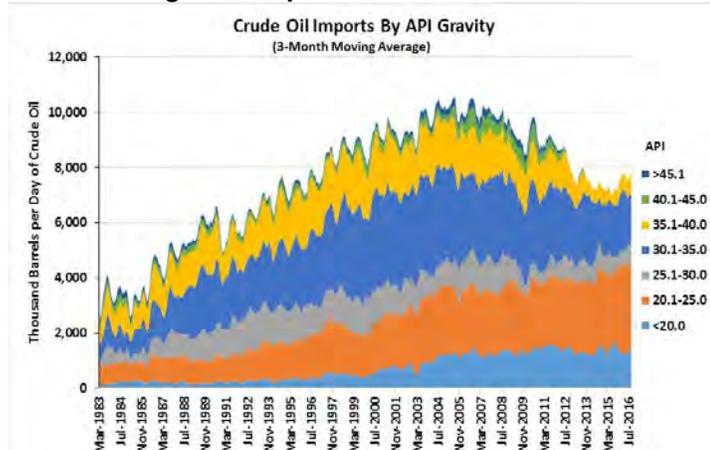


Source: EIA, PPHB

**Saudi Arabia’s imports have grown in recent months by 100,000-300,000 barrels per day**

From over one million barrels a day in 2010, Nigerian oil imports to the U.S. fell steadily hitting zero or the very low tens of thousands of barrels a day in 2015. Import volumes rebounded in spring 2016 to the low 300,000s of barrels a day before falling back to half that volume by August and September. Some of this volume increase may be attributed to the reduced anti-oil violence in Nigeria, but maybe more to declines in supplies from Algeria, Libya and Angola. Also, Saudi Arabia’s imports have grown in recent months by 100,000-300,000 barrels per day. What we don’t know about the imports from these countries is the quality of the crude oil. That is an important ingredient in understanding what is happening in the domestic oil market.

**Exhibit 8. Light Oil Imports Have Suffered From Shale**



Source: EIA, PPHB

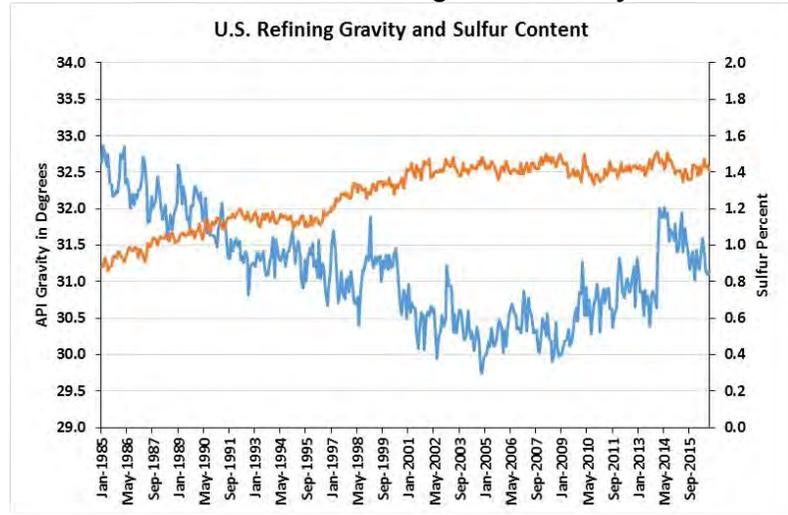
**From the early 1980s until the mid-2000s, there was dramatic growth in light oil (API gravity of 30.0-45.1 degrees or greater) imports**

When we examine the import volumes and crude oil quality, we find some interesting trends. Since 1983, the three-month moving average of crude oil imports have grown overall, but the mix in the quality of the crude oils coming into the U.S. tells an interesting and important story. From the early 1980s until the mid-2000s, there was dramatic growth in light oil (API gravity of 30.0-45.1 degrees or greater) imports. After that point, these light oil imports shrank meaningfully, with the absolutely lightest oils disappearing entirely from the import scene. It is also interesting that during this same time period, heavier crude oil volumes – 30.0-20.0 degrees or less – being imported in the U.S. have grown substantially. This is largely a result of the refining industry’s operating philosophy adopted some years ago that in the long term, the world’s crude oil supply would become heavier (lower API degree numbers) and more sour (higher sulfur content). It was in response to these trends, which became more evident as U.S. domestic oil production declined in the 1970s to 1990s. To counter these trends, U.S. refineries were reconfigured to handle more heavy and sour crude oil supplies and less light and sweet oil. In many cases, this involved the voluntary destruction of the catalysts used in the refining process since that facilitated increased use of lower quality crude oil supplies. These trends become evident when one examines the long term trends in the quality of oil going into refineries.

**The trend toward heavier crude oil bottomed in 2005 and then trended toward a lighter crude oil mix**

In examining Exhibit 9 on the next page, one sees how the quality of refinery crude oil input has become heavier (the downward slope in API gravity) and more sour (the upward slope in sulfur content) since the mid-1980s. Maybe more interesting is that the trend toward heavier crude oil bottomed in 2005 and then trended toward a lighter crude oil mix before jumping up in 2013 to a significantly lighter crude oil mix. We are not sure exactly why there was such a spike toward a lighter crude oil mix, but almost half of the rise in 2014 has been erased. Still, the mix of crude oils going into America’s

**Exhibit 9. US Refineries Are Using Lower Quality Crudes**

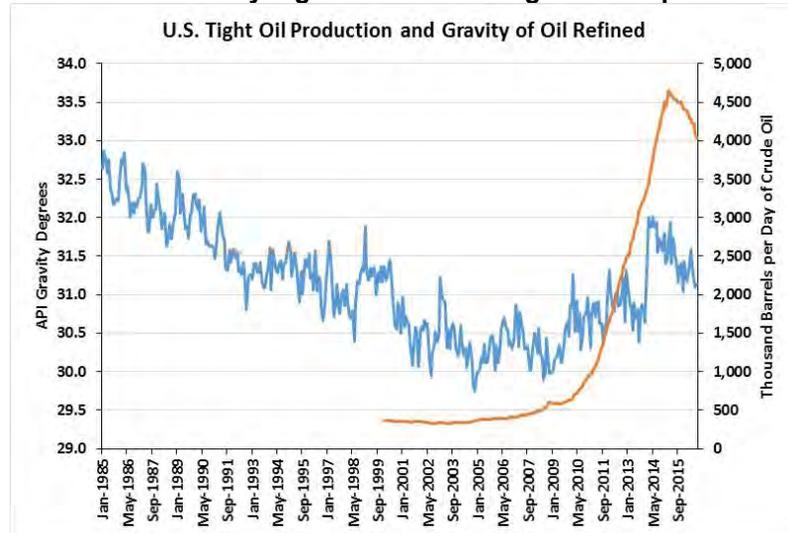


Source: EIA, PPHB

**The rise in domestic tight oil production has resulted in significantly greater light oil volumes being available**

refineries today is slightly lighter (just over one degree more) than it was in the mid-2000s. Why is this important? Maybe because the rise in domestic tight oil production has resulted in significantly greater light oil volumes being available. Note that in Exhibit 10, the sharp increase in tight oil output coincided with the refining industry’s mix of input becoming lighter. We are not sure whether the recent decline in tight oil output due to the drop in global oil prices and reduced drilling activity, just happens to coincide with the drop in the gravity mix of oil volumes going into refineries, or whether some other factors are at work.

**Exhibit 10. Refinery Light Oil Use And Tight Oil Output**



Source: EIA, PPHB

When we look at the mix of oil production in America by ranges of API gravity (Exhibit 11), the average of the output hasn't changed materially. This was a little surprising, but it is probably due to the fact that production volumes didn't change materially in the short time span of available data. If we had API gravity data for oil produced in say 2010 or even 2000, we likely would have seen a greater change.

#### Exhibit 11. How US Oil Production Has Become Lighter

API Degree	Jan-15 (1,000 B/d)	Pct. Of Total	Cumulative Percent	Sep-16 (1,000 B/d)	Pct. Of Total	Cumulative Percent
<20.0	492	5.6%	5.6%	403	5.0%	5.0%
20.1-25.0	288	3.3%	8.8%	161	2.0%	6.9%
25.1-30.0	609	6.9%	15.7%	765	9.4%	16.3%
30.1-35.0	1093	12.4%	28.1%	1031	12.7%	29.0%
35.1-40.0	1709	19.3%	47.4%	1548	19.0%	48.1%
40.1-45.0	2408	27.2%	74.6%	2461	30.3%	78.3%
45.1-50.0	1081	12.2%	86.9%	921	11.3%	89.7%
50.1-55.0	500	5.7%	92.5%	391	4.8%	94.5%
>55.1	573	6.5%	99.0%	405	5.0%	99.5%
Not Identified	89	1.0%	100.0%	43	0.5%	100.0%
Total	8842	100.0%		8129	100.0%	
40.1->55.1	4562	51.6%		4178	51.4%	

Source: EIA, PPHB

**While there appeared to be a slightly lighter crude oil slate, as measured by the heavier gravity volume percentages represented, the difference was not material**

When we examined the percentage distribution of crude oil volumes for January 2015 and September 2016 by ranges of API gravity, there was not a noticeable difference. To test this conclusion, we decided to calculate the cumulative gravity distribution of oil volumes flowing into refineries, going from heaviest to lightest oil volumes. While there appeared to be a slightly lighter crude oil slate, as measured by the heavier gravity volume percentages represented, the difference was not material. We confirmed the conclusion by adding up the oil volumes for API gravities 40.1-55.1 and greater to see the percentage of the total volumes they represented. Between early 2015 and this September, the slate's mix changed by only 0.2%, despite oil production volumes falling by nearly 700,000 barrels a day.

**We are using more of our current tight oil production to displace the imported light oil volumes**

When we examine this data in conjunction with the data contained in Exhibit 8 (page 12) that shows a declining API gravity mix of imported crude oils, it is easy to conclude that we are using more of our current tight oil production to displace those imported light oil volumes. Several questions arise from this analysis. First, what happens when domestic oil output begins rising again? How much light oil supply can our refining industry effectively utilize? What happens to our shale oil business if exporting domestic crude oil is banned again? Will we see new refineries built that are based on the increased tight oil output, especially if the optimistic production projections can be realized?

## How Abuse Of APA Could Alter The Future Of The GOM

**Laws drafted by Congress, especially in recent times, are written in broad terms signifying the intent of the legislation but leaving it up to the government agency responsible for enforcing the law to draft the specific rules and regulations**

Congress identifies issues requiring government intervention to protect the American public. Following hearings in which legislators gather information about the perceived risk, its magnitude and possible preventative actions, Congress drafts legislation. The legislation identifies the risk and proposes a solution to mitigate it. The draft legislation is then debated by the members of our legislative bodies – the House of Representative and the Senate. After passage of a law, it is sent to the president for his signature that puts the law into effect, and mandates his duty to enforce its provisions. Usually, laws drafted by Congress, especially in recent times, are written in broad terms signifying the intent of the legislation but leaving it up to the government agency responsible for enforcing the law to draft the specific rules and regulations to be followed by individuals, companies or organizations in order to comply with the law's intent.

**Government agencies are mandated to follow procedures outlined in administrative guidelines such as the Administration Procedures Act**

To facilitate the drafting of the specific rules and regulations under a law, and especially to modify existing laws and regulations, government agencies are mandated to follow procedures outlined in administrative guidelines such as the Administration Procedures Act (APA). Usually a key part of the process is soliciting comments from the public with regards to the draft rules and regulations. Following public input, the government agency adjusts the draft rules to allow the law to function smoother and inflict less pain on those individuals and companies impacted by the law. At that point, the law is published in the *Federal Register* making it effective.

**An agency will define the proposed modifications as minor tweaks rather than substantive changes, allowing it to avoid following the regimented and open APA process**

Increasingly during the Obama administration, we have witnessed government agencies deciding that they wished to amend existing laws and regulations to institute policies the administration deemed desirable and without taking into account public views. The primary reason agencies wish to ignore public comment is because they know there would be substantial criticism of and pushback to the proposed changes. An agency will define the proposed modifications as minor tweaks rather than substantive changes, allowing it to avoid following the regimented and open APA process. Much like beauty, how substantive the changes are lies in the eyes of the beholder. Stated another way, it all depends on whose ox is being gored!

**An official EPA spokesman said that the agency had not circumvented the APA because the ruling was considered an “adjudication” of the previously enacted regulations**

As commented in another article in this *Musings* dealing with the Environmental Protection Agency's (EPA) reaffirmation of the automobile fuel-efficiency standards, an official EPA spokesman said that the agency had not circumvented the APA because the ruling was considered an “adjudication” of the previously enacted regulations, even though in that case the process for reviewing the interim fuel-efficiency standard required specific steps and a time schedule that the agency had established.

**This rule change, considered by many students of the issue to be significant, was delivered to the industry in a Notice to Lessees and Operators**

For the offshore oil and gas industry, the Bureau of Ocean Energy Management (BOEM), part of the Department of the Interior (DOI), decided to alter the rules for determining the financial liability of companies for their future costs for decommissioning oil and gas assets on the U.S. outer continental shelf. This rule change, considered by many students of the issue to be significant, was delivered to the industry in a Notice to Lessees and Operators – known in the industry as an “NTL.” In this case, NTL-2016-NO1- Requiring Additional Security discontinues the prior supplemental bonding rules set forth in NTL 2008-NO7.

**The use of NTLs to institute broad policy changes circumvents the APA process that allows input from affected parties**

By using NTLs, BOEM can modify regulations without going through the time-consuming APA process, and therein lies a potential problem both for the rule of law and the companies in the industry. NTLs are usually given to lessees for violations of rules or regulations. The use of NTLs to institute broad policy changes circumvents the APA process that allows input from affected parties. Importantly, within the APA process is a mechanism for formally contesting agency decisions, although the battle is conducted on the agency’s home court and with agency officials.

**The historical practice of issuing waivers to operators partnering in a lease with financially-strong co-lessees who could cover the decommissioning costs has been replaced**

In the case of NTL-2016-NO1, new standards have been put in place by BOEM for determining the financial responsibility of lease holders for insuring that sufficient funds are in place to pay for the decommissioning of offshore facilities. The most significant change is that the historical practice of issuing waivers to operators partnering in a lease with financially-strong co-lessees who could cover the decommissioning costs has been replaced by a self-insurance requirement that requires a rigorous demonstration of each partner’s financial strength. The language of the new NTL states: “You are responsible for ensuring that all obligations, including decommissioning and abandonment, are satisfied for every lease, right-of-way and right-of-use-and-easement in which you have an ownership interest.”

**FOIA requests to BSEE for information related to the agency’s revised estimates for future well plugging and abandonment and platform decommissioning costs**

These new security requirements will be based on a recently updated cost structure for decommissioning, which is currently the subject of Freedom of Information Act (FOIA) requests to the Bureau of Safety and Environmental Enforcement’s (BSEE) for information related to the agency’s revised estimates for future well plugging and abandonment and platform decommissioning costs and BSEE’s own previous cost projections. The FOIA request was made by the National Ocean Industries Association (NOIA). Additionally, NOIA, along with three other industry groups representing the entirety of the offshore oil and gas industry in the Gulf of Mexico. The FOIA request went to both BOEM and DOI, seeking information related to the recent changes in the financial assurances and bonding requirements of offshore oil and gas producers under NTL-2016-NO1.

**The 14th condition that has been removed is quite significant**

One of the more interesting twists in this battle was the discovery that the Outer Continental Shelf Mineral Lessee's or Operator's supplemental bond form was altered without any notice. The form, which in an earlier version, had been in effect for decades, contains a list of conditions dictated by the agency and to which the surety bond provider must agree. In the earlier version, there were 14 conditions. Now there are only 13. The 14<sup>th</sup> condition that has been removed is quite significant, and based on antidotal evidence, people affected by it were not even aware of the change.

**By eliminating the cap, the surety bond provider is now exposed to an unlimited expense**

The 14<sup>th</sup> condition stated: "The Surety agrees to meet all existing and future Obligations of the Principal on the lease or leases described in Schedule A or on all leases within the area described in Schedule A at a cost not to exceed \_\_\_\_\_." In other words, there was a cap on the exposure the surety bond provider was assuming. By eliminating the cap, the surety bond provider is now exposed to an unlimited expense. What does that mean for pricing surety bonds, let alone insuring adequate bonding capacity, which was already considered inadequate?

**BOEM is also engaging in a more rigorous examination of a company's fundamentals in determining its financial strength**

Now that each and every company involved in an offshore lease has to demonstrate sufficient financial strength, surety bonding might become more important. That option may no longer exist. The impact may be to force smaller companies out of the offshore Gulf of Mexico oil and gas market because they can no longer rely on the financial strength of their partners. BOEM is also engaging in a more rigorous examination of a company's fundamentals in determining its financial strength. The five criteria it will consider include: 1) financial capacity – both short-term and long-term financial capacity "substantially in excess" of current and future lease obligations; 2) projected financial strength – demonstrating that existing production and proven reserves substantially exceeds current and future lease obligations; 3) business stability – demonstrating offshore operations for five years or more; 4) reliability – a company's credit rating from Moody's or Standard and Poor's; and 5) record of compliance – prior civil penalties assessed by BOEM or other citations for non-compliance of offshore operations.

**Besides less revenue, it could mean fewer fields being developed in the future with less production, all of which means reduced oil and gas royalty income**

The net impact of these new rules and regulations will be to reduce competition for offshore Gulf of Mexico leases, which in turn will be a detriment of the U.S. Treasury's offshore oil and gas lease and royalty revenues. With fewer companies able to operate in the Gulf of Mexico due to these new financial assurance requirements, there will be fewer companies participating at lease sales, likely to lower bid bonuses. Besides less revenue, it could mean fewer fields being developed in the future with less production, all of which means reduced oil and gas royalty income.

Likely as a result of these new policies, the offshore oil and gas business will increasingly become dominated by the super-major oil

**These outcomes form part of the environmental agenda of the Obama administration**

and gas companies since those will be the only companies able to readily satisfy the stricter financial tests imposed by BOEM through NTL-2016-NO1. Fewer oil and gas companies operating in the Gulf of Mexico could mean less of a workload for regulators, or, alternatively, increased scrutiny of those remaining operating companies. These outcomes form part of the environmental agenda of the Obama administration. It is doubtful these policies can withstand the philosophical shift in environmental and energy policies underway with the incoming President-elect Donald Trump administration.

**Under our federalist governmental structure, the states have primary responsibility for environmental regulation**

As we are already seeing in President-elect Trump's appointment of Oklahoma Attorney General Scott Pruitt to head the EPA, liberal critics are attacking him for being skeptical of climate change science. His primary governing focus, however, will be on restoring his agency's respect for the rule of law. Under our federalist governmental structure, the states have primary responsibility for environmental regulation. We fully expect BOEM officials to argue that using NTLs to alter historical precedent is both allowed and sacrosanct under APA. The lack of pushback by the oil and gas industry, especially in the case of BSEE's expansion of its regulation of offshore operators to include oilfield service companies working for them, has not helped the energy industry's case. Ultimately, the heads of BOEM and BSEE are appointed by the Secretary of the Interior, and we fully expect the current leaders to be replaced by officials who will adhere to APA.

**The offshore oil and gas industry is facing radical changes that if left unchecked will prove detrimental to its future**

The offshore oil and gas industry is facing radical changes that if left unchecked will prove detrimental to its future, the federal government's income, and Americans' pocketbooks and jobs. But until these rules are changed, the industry needs to aggressively push back against them, and importantly it must explain to the American public what the changes, as arcane as they may appear, mean for their future and that of this country.

## **Canada Faces Reality That Commodities Power Economy**

**As a liberal, Prime Minister Trudeau was elected partly for being a huge climate change supporter**

Two weeks ago, Canadian Prime Minister Justin Trudeau's government approved two oil export pipeline projects while killing a third, in what has become a philosophical debate over energy use and economic power. As a liberal, Prime Minister Trudeau was elected partly for being a huge climate change supporter. He immediately developed a close kinship with U.S. President Barack Obama and aided the President's efforts in forging an agreement at the United Nation's climate change conference in Paris a year ago. The Trudeau government has recently promoted a federal carbon tax plan for Canada that forces provinces that either don't have or institute a carbon tax to have to accept the federal plan.

The Canadian economy, however, is reeling from the two-year oil price downturn, as well as the ending of the commodity super cycle.

**Canada's oil industry is surviving on high condensate prices – currently averaging around \$68 a barrel – and long-standing contractual markets for the province's crude oil and natural gas output**

Alberta, where the economy is largely based on oil and gas production, as well as coal use, has been hard hit by the oil price downdraft. Canada's oil industry is surviving on high condensate prices – currently averaging around \$68 a barrel – and long-standing contractual markets for the province's crude oil and natural gas output. Canada also lives on the exports of mineral ores, timber and other agricultural products along with manufacturing products such as automobiles. But without an improvement in global natural resource demand, Canada's economy will struggle such as it is now. The key to the nation's economic recovery, besides higher commodity prices, is having greater access to world markets for Canada's crude oil and natural gas. That means more pipeline capacity and water-side export terminals.

**The ink was barely dry on this announcement before the crowing by the Liberals began**

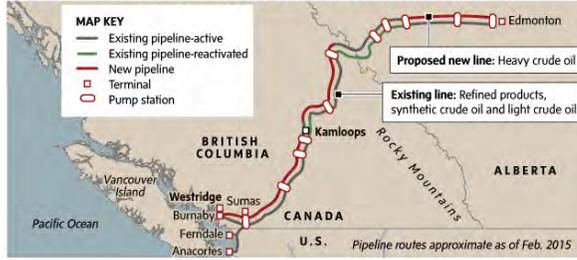
The approval of more pipeline export capacity was pre-ordained when Prime Minister Trudeau recently debuted a significant coastal waters protection plan for Canada. He then followed up with the endorsement of two of three proposed oil export pipelines – approving Kinder Morgan's (KMI-NYSE) Trans Mountain pipeline and Enbridge's (ENB-NYSE) replacement of its Line 3 – while killing Enbridge's Northern Gateway pipeline project to move oil sands output from northern Alberta to Canada's West Coast. The ink was barely dry on this announcement before the crowing by the Liberals began. The former editor of Alberta Oil magazine tweeted "Dear conservatives: It was Justin Trudeau and Rachel Notley [Alberta premier and leader of the liberal New Democratic Party (NDP) in the province] that got a pipeline to tidewater. Enjoy your cognitive dissonance." This was then picked up by Alberta Environment Minister Shannon Phillips (NDP) who retweeted one from a Liberal Party activist: "So in the end, it took 2 progressive govts working together on climate change to get pipelines approved, and do what Con(servative) govts could not." Ms. Phillips added "Nicely summed up." Her tweet was then picked up by a *National Post* columnist who observed that Trudeau got "a job done that Captain Oil Sands (Stephen Harper, Conservative and former Canadian prime minister) couldn't." The columnist then declared that this outcome must be "frustrating" for the Conservatives, implying that their ideology of pushing for exploitation of the country's resources was unable to open export opportunities for the energy industry, while a Liberal - anti-fossil fuel and pro-climate change – leader was successful.

**The reality is that during Stephen Harper's time as Prime Minister, two entirely new oil pipelines were approved and actually built**

The reality is that during Stephen Harper's time as Prime Minister, two entirely new oil pipelines were approved and actually built – the non-XL version of Keystone, from Alberta to Nebraska, was approved in 2006 and completed in 2010; and The Alberta Clipper, from Alberta to Wisconsin, was approved in 2008 and flowing oil in 2010. The changeover of Line 9 that takes oil in Canada from west to east was also approved and completed during the Mr. Harper's term. These lines ship 1.25 million barrels a day oil. The new Trans Mountain pipeline, approved by Mr. Trudeau, will move half that much – 600,000 barrels a day – assuming it is actually built,

**Exhibit 12. Canada's Trudeau's Pipeline Decisions**

**APPROVED: KINDER MORGAN INC.'S TRANS MOUNTAIN EXPANSION**



**APPROVED: ENBRIDGE INC.'S LINE 3 REPLACEMENT**



**DENIED: ENBRIDGE INC.'S NORTHERN GATEWAY**



PIPELINE	CAPACITY Bbl/d, proposed	LENGTH Kilometres	COST In billions
Trans Mountain	300,000 current 890,000 expansion	1,150	\$6.8
Line 3 Replacement	760,000 historical level restored 915,000 allowance for further expansion	1,659*	\$7.5*
Northern Gateway	525,000	1,177	\$7.9

\* Canada & U.S. total  
JOHN SOPINSKI/THE GLOBE AND MAIL | SOURCE: ENBRIDGE; KINDER MORGAN; ESRI

Source: *Globe and Mail*

**Energy politics in Canada will continue to remain acrimonious until these new pipelines go into service**

especially given the strong opposition from British Columbia-based First Nations communities and environmentalists. Maybe more interesting is that the 500,000 barrels-a-day capacity Northern Gateway pipeline was actually approved by the Conservatives, but killed by the Liberals. Energy politics in Canada will continue to remain acrimonious until these new pipelines go into service. Don't expect that to happen anytime soon given the social attitudes of Canada's East and West Coasts, much like those same regions in the United States.

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