PPHB
ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

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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

Separatism Is Alive And Well In Canada, But Will It Work?

A possible remedy, which appears to be growing in intensity in the province of Alberta, is for the province to separate from the Canadian federation and go its own way

The Canadian oil industry is being battered by structural challenges and political battles, which is causing those in the business to cast about for solutions – any solution! A possible remedy, which appears to be growing in intensity in the province of Alberta, is for the province to separate from the Canadian federation and go its own way. For most of us in the United States, we have little understanding of how Canada's government is structured, which makes venturing opinions about how various political issues in the country might be resolved dangerous. Our interpretation of possible solutions may be wrong, making us look foolish, or even worse, ignorant, but we will accept that risk. We believe we have sufficient perspective to speak to the separatist movement in Alberta.

The current form of government – a federal constitutional monarchy in which the Canadian Crown acts as the core governing instrument

In relying on *Wikipedia* for an official definition of the Government of Canada, we are told it should be referred to as Her Majesty's Government, which can mean either the collective set of institutions that governs the country, or specifically the Queen-in-Council, or the executive appointed by the monarch, in this case Queen Elizabeth of England. The current form of government – a federal constitutional monarchy in which the Canadian Crown acts as the core governing instrument – was established through the Constitution Act in 1867, originally known as "The British North America Act, 1867." The Act created a federal dominion and defines the operation of the Government of Canada, including the federal structure, the House of Commons, the Senate, the justice system and the taxation system.

The Act begins with a preamble that declares that the country's three original provinces, New Brunswick, Nova Scotia, and the Province of Canada (which would later separate into Ontario and Quebec), requested to form "one Dominion…with a Constitution similar in Principle to that of the United Kingdom." From that point

A hundred and thirteen years later, pressure is building for one, or possibly both provinces to leave the federation

forward, other provinces and territories in the region joined or were integrated into the Canadian federation under circumstances specific to each entry. In 1905, the western provinces of Alberta and Saskatchewan joined the Canadian federation. A hundred and thirteen years later, pressure is building for one, or possibly both provinces to leave the federation. Or, maybe just to use the threat of separation as a lever to extract more favorable federal government treatment and support for the province's needs. This is a strategy the province of Quebec has used effectively over the years to gain federal government support and preferential treatment for its economic and social programs.

The energy industry's problems are having wide-ranging impacts on Alberta's economy

As one would expect, the issue of separatism in the west is currently fueled by oil and gas market conditions. Those problems are the direct result of federal, and in some cases, provincial government energy policies tailored to win the electoral support of environmentalists. The energy industry's problems are having wide-ranging impacts on Alberta's economy. For example, the 2014 oil price downturn and the resulting provincial recession have eroded the value of Calgary's office buildings, just as the city was in the midst of a building boom spurred by the high oil prices. The boom saw oil and gas, energy service and midstream companies all expanding, which meant they needed additional office space to house their larger staffs. That also translated into a housing construction boom. Now that 35,000 energy jobs in downtown Calgary have evaporated, the vacancy rate for office space has soared, diminishing the value of the new shiny office towers. As the value of these buildings shrinks, their tax contribution has declined, leaving a huge hole in the city's budget. Politicians are struggling to find a way to close that revenue gap.

The lost value has created a $193 million tax gap

According to an article in the *Calgary Herald*, relying on a report to the Calgary city council about the magnitude of the tax hole it is facing, the need to shift the tax burden from the city core to the surrounding areas is clear, but it creates other challenges. For the first time, this new report identified the magnitude of the tax problem. The report notes that 142 non-residential tax accounts saw a collective $12.6-billion of assessed value disappear between 2015 and now. The lost value has created a $193 million tax gap that has been spread to other non-residential property owners across the city. The city has managed this problem for the past two years by tapping other income sources, which has limited the magnitude of the tax increases to about 5% per year. Now, however, these actions are less impactful in limiting the necessary tax increases.

The report explained the problem facing the city council if steps are not taken to find a better remedy. There are 13,800 commercial property owners in Calgary, with about 10,000 expecting property tax hikes of more than 5% next year. Of that group, 1,700 face hikes exceeding 30%, and more than 500 would see tax increases of 50% or more. Failing to find a viable solution will cripple the

development of a vibrant small business community. There are 55,000 small businesses in Calgary, and in the first nine months of 2018, 2,292 new businesses opened while 1,735 closed.

The unemployment rate is not projected to dip below 6% before 2023

The same report also showed that Calgary's population growth has rebounded in 2018 and is expected to remain healthy over the next five years, although economic growth is projected to be modest. The unemployment rate is not projected to dip below 6% before 2023, although wages and retail sales are projected to continue growing. That recovery could be in jeopardy in light of current oil and gas market conditions and very recent legal events involving the Trans Mountain and Keystone XL pipeline projects.

Let's examine the current oil and gas market and the problems it is creating for Canada's largest industry. The core issue is a lack of adequate egress options for Canada's growing oil and gas output. One can go back to the political battle in the United States during the Obama administration years over building the Keystone XL pipeline expansion that would have allowed an additional 830,000 barrels a day of oil, mostly from the oil sands, to migrate to the U.S. Gulf Coast refining center. Had the Obama administration not blocked that pipeline, it would likely be in operation today, largely eliminating the capacity shortage.

These options are less safe environmentally, and they are costlier

With a lack of pipeline egress, producers have been forced to turn to rail and truck to get additional output across the border. These options are less safe environmentally, and they are costlier, further eroding the returns for producers. Canadian oil producer profits are being squeezed by a widening price differential for domestic oil being sold into the U.S., especially the heavier grades of crude oil.

To compete in the U.S. market, Canada must price its oil more competitively, thereby increasing discounts to WTI prices, reducing the cash flow for Canadian oil producers

There are two primary oil streams that flow from Canada – light sweet and heavy sour crude oils. Because the physical quality of one is highly complementary to U.S. light oil output, it sells closer to the West Texas Intermediate (WTI) benchmark oil price. The heavy sour oil, mostly from the oil sands, is in less demand, thus it sells a significant discount to WTI. Since U.S. crude oil production is rising in response to the success of the shale revolution, its growth is blunting the demand for Canadian oil. To compete in the U.S. market, Canada must price its oil more competitively, thereby increasing discounts to WTI prices, reducing the cash flow for Canadian oil producers.

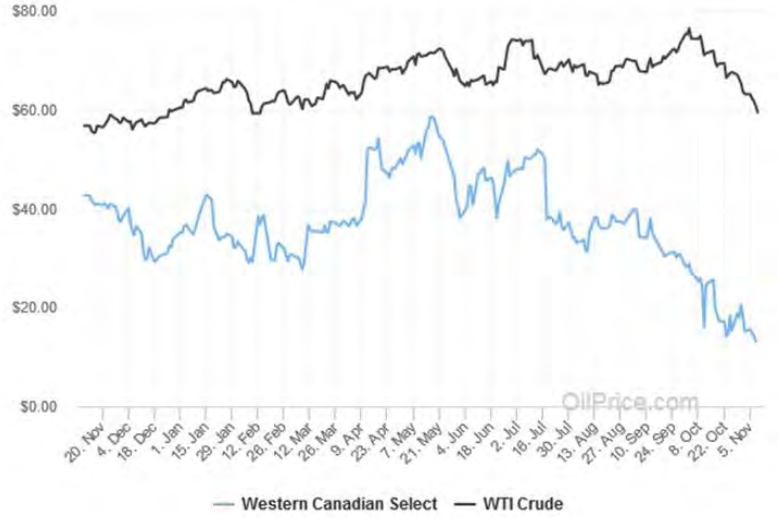
The oil price differential is also driven by the weakening of the value of the Canadian currency versus the U.S. dollar. However, a major new issue is the weakening of global oil prices. While much attention is paid to the growing differentials for Canadian oil, it is important to also bear in mind that producers earn their money based on wellhead netback prices. Therefore, even if differentials narrow, it may not help producers if the price of WTI falls. Here is an example: With WTI at $70 per barrel and a Canadian differential of

$20, a producer earns a netback price of $50. However, even with the differential improving by 25%, i.e., falling from $20 to $15 per barrel, if WTI drops from $70 to $60, the producer's netback is $5 per barrel less - $45 versus $50. This has been the case in recent weeks.

Canada, like the United States, employs benchmark crude oil measures to price its various output streams

Canada, like the United States, employs benchmark crude oil measures to price its various output streams, enabling producers to hedge against weaker future oil prices, and to provide liquidity for speculators interested in trading crude oil futures. In Canada, the two streams are: Western Canadian Select (WCS), which is the main benchmark price for Canadian heavy sour crude and specifies delivery at Hardisty, Alberta; while Canadian Light Sweet (CLS) is the main Canadian benchmark price for light sweet crude and specifies delivery at Edmonton, Alberta. As would be expected, WCS sells at a discount to CLS due to the lower quality of the oil stream.

Exhibit 1. Canada's Oil Price Differential Widens



Source: ***OilPrice.org***

The differential has widened in recent weeks to as much as $52 per barrel

In Exhibit 1, we show the price of WTI and WCS over the past year. The spread between the two prices reflects the differential that Canadian producers suffer in their income. The differential began widening last fall. It narrowed in the April-June period, largely because of the shutdown of Syncrude's production due to a power supply problem. That accident removed Syncrude's supply from the market, making the remaining fewer barrels of WCS worth more to refiners. The differential has widened in recent weeks to as much as $52 per barrel as Syncrude is back in operation and U.S. production has shown more rapid growth, limiting the amount of oil from Canada that U.S. refiners need.

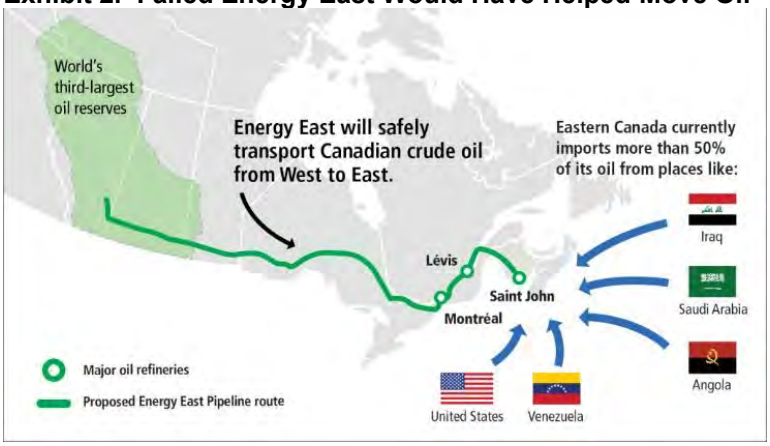
Based on the average differential during the first quarter of 2018 of US$26.30 per barrel, and assuming it continued for the balance of 2018, Canadian producer revenues would be reduced by roughly C$15.8 (US$12.1) billion, or 0.7% of Canada's national GDP

For heavy oil producers, aggressively managing their output has become critical, as their production is the least in demand and thus susceptible to the widest differential. They need to shut-in output to help control the glut of WCS and keep differentials from widening further. The differential increase directly impacts Canadian producer cash flows. An analysis of the impact was conducted by the Fraser Institute this spring. Based on the average differential during the first quarter of 2018 of US$26.30 per barrel, and assuming it continued for the balance of 2018, Canadian producer revenues would be reduced by roughly C$15.8 (US$12.1) billion, or 0.7% of Canada's national GDP. The average discount has actually widened recently. The lost cash flow is money producers could have used to increase their output, deleverage their balance sheets, and/or increase direct returns to shareholders.

Resolving the egress issue is a major headache for oil and gas producers. While trains and trucks are an export option, the logistics and expense are a hurdle. Those options don't work for natural gas producers, which is also finding its price discounted to that in the U.S. because of the growth of domestic gas supply from shale wells.

While the delay in the Keystone XL pipeline expansion is a U.S. issue with a knock-on impact on Canada's heavy oil producer volumes and profits, issues such as the legal delay of the Trans Mountain Pipeline expansion and the cancelation of the Energy East pipeline proposal highlight the struggles facing the industry.

Exhibit 2. Failed Energy East Would Have Helped Move Oil



Source: TransCanada

The line would have moved 1.1 million barrels per day of heavy oil from Alberta

The Energy East pipeline proposal from TransCanada Inc. (TRP-NYSE) was cancelled in the fall of 2017. The $12 billion project would have required converting an unused natural gas pipeline and constructing additional pipeline segments, mostly in Eastern Canada. The line would have moved 1.1 million barrels per day of heavy oil from Alberta to refineries in Quebec and Newfoundland, as well as to marine terminals that would have enabled this Canadian

oil to reach global markets, thereby earning higher prices. Environmental objections throughout the populous eastern provinces and political opposition in Quebec helped kill the pipeline.

Buying the pipeline was seen as the best way to overcome the industry's egress problem

A recent federal court ruling determined that the federally- and provincially-approved Trans Mountain Pipeline expansion project bringing increased oil output from Alberta to a marine export facility near Vancouver, British Columbia, violated federal law by failing to consider the impact of increased tanker traffic on local whale populations and by improperly handling the consultation process with First Nations communities. The decision was announced hours before the Canadian federal government purchased the pipeline from its owner and developer, Kinder Morgan Canada, a subsidiary of Kinder Morgan Inc. (KMI-NYSE) for C$4.5 (US$3.4) billion. This deal came in response to KMI's earlier decision to abandon the project because of the legal hassles waged by environmentalists, regardless of their loss in every legal case, and despite the existence of federal, Alberta and BC pipeline construction approvals. Buying the pipeline was seen as the best way to overcome the industry's egress problem.

As the National Energy Board reworks its environmental assessment of the Trans Mountain Pipeline expansion to address the whale/tanker traffic issue, the pipeline expansion remains on hold. Once the updated environmental analysis is completed, the revised project then needs to go through the public consultation phase. The likelihood is this project will require nearly another year to reach the construction phase.

There is a perception the purchase was a "small price to pay" for the Trudeau government to appear to be supporting the oil and gas industry while secretly killing the project and making its environmental supporters happy

People are beginning to wonder whether the Trans Mountain Pipeline expansion will ever be built. There is a perception the purchase was a "small price to pay" for the Trudeau government to appear to be supporting the oil and gas industry while secretly killing the project and making its environmental supporters happy. If there is any truth to this scenario, the energy egress issue will not be resolved until there is a change in government. This belief, and the widening oil price differentials that are harming Alberta's economy and its tax collections, underlie the growing separatist movement. It is a flashback to the 1970s and 1980s when Alberta and the federal government battled over Canada's energy policy. Ironically, that battle pitted Alberta Premier Peter Lougheed against Canadian Prime Minister Pierre Trudeau, the current prime minister's father.

We fondly recall that battle, which envisioned Alberta not only leaving the Canadian Federation, but also applying to join the United States. The fight was over control of Alberta's resources and whether the province would be the primary beneficiary of the oil price increases driven by OPEC's actions in the 1970s. The resource-rich western provinces with small populations were major beneficiaries of the quadrupling of world oil prices and other inflation-induced commodity price hikes, while the large population,

resource-poor eastern provinces were victims. The political battle centered on the idea of the four western provinces forming an organization to negotiate a better deal with the rest of the nation, or separating from the confederation. A truce was negotiated, but it was hard to determine the winners and losers.

When OPEC began pushing up global oil prices in the early 1970s, the prime beneficiaries were the American oil companies who controlled most of Canada's western oil and gas resources

When OPEC began pushing up global oil prices in the early 1970s, the prime beneficiaries were the American oil companies who controlled most of Canada's western oil and gas resources. Eastern Canadians believed those companies were gaining at the expense of average Canadians. As a result, in 1975, Prime Minister Trudeau moved to create Petro-Canada as a government-owned oil company. It was seeded with substantial capital and provided with easy access to additional capital. The federal government transferred its 45% stake in Panarctic Oils Ltd. and its 12% stake in Syncrude to the newly-established company. In 1976, Petro-Canada purchased Atlantic Richfield Canada, and in 1978 it bought Pacific Petroleums. In 1981, Petrofina was acquired, and the downstream operations of BP Canada were purchased in 1983.

The legacy of Lougheed's leadership is Alberta's healthy resource industry and its quality of life

As the battle raged over the energy windfall bestowed on Alberta, Premier Lougheed pushed to create the Alberta Heritage Savings Trust Fund, which used the province's oil income to invest for the long-term development of the province. Investments were made in areas such as health care, non-renewable energy research and the creation of parks and open spaces. The legacy of Lougheed's leadership is Alberta's healthy resource industry and its quality of life. The former is endangered by federal government energy and environmental policies, as well as global oil industry challenges. The impact of the federal policies, as well as Alberta's liberal politicians' policies for instituting a carbon tax, are threats to the lifestyle of residents by choking-off the tax revenues necessary to fund the province's social safety-net and its quality of life.

A private study of the issue suggests that if the price differential were reduced to only US$20 per barrel, Alberta's oil royalty income would rise from C$800 (US$610) million to C$6 (US$4.6) billion

Separatism would enable Alberta to build pipelines easier by negotiating cross-border agreements with fewer political considerations. A greater flow of oil and gas would help lift currently depressed prices, which in turn would inject greater revenues into the coffers of the Alberta government. A private study of the issue suggests that if the price differential were reduced to only US$20 per barrel, Alberta's oil royalty income would rise from C$800 (US$610) million to C$6 (US$4.6) billion. Can that be accomplished? It might require unorthodox political action. Given the frustration of energy CEOs with the respective federal and provincial governments, don't rule this possibility out.

Oil industry executives have proposed to Alberta Premier Rachel Notley that she invoke Section 85 of the province's Mines and Minerals Act. That clause provides for the province to "make regulations fixing the maximum amount of petroleum that may be produced under Crown agreements during any month…" The idea

of "pro-rationing" conjures images of the Texas oilfields in the early 1930s when the new discoveries in East Texas began to overwhelm demand, causing oil prices in the state to collapse to pennies a barrel. After several failed attempts to regulate Texas output, a pro-rationing plan was approved, oil production was capped and prices rebounded. Pro-rationing governed the Texas oil industry until the late 1960s when the state's productive capacity could no longer grow, and demand was sopping up all the nation's oil output.

Will it be embraced by the unpopular Notley government, especially as it heads into an election next spring?

This is the model being proposed for Alberta to close the differential gap. Will it be embraced by the unpopular Notley government, especially as it heads into an election next spring? Stranger things have happened in the political world. Think of President Richard Nixon's wage and price controls, closing the gold window and opening up China for an example of unorthodox policies that pleased voters and led to his landslide re-election in 1972. As the saying goes: Stay tuned.

Actually, Getting Oil Out Of Canada Isn't As Easy As Thought

Since the 1970s, shipping oil has not been a significant issue other than for short-term periods when pipelines were sidelined due to maintenance or accidents

The ability of Canada to ship its crude oil and natural gas output to market has always been a challenge, as most access routes are limited to the United States. Since the 1970s, shipping oil has not been a significant issue other than for short-term periods when pipelines were sidelined due to maintenance or accidents. Since the United States was dealing with declining domestic oil and gas production and rising energy consumption, it needed and welcomed more Canadian hydrocarbons. That situation began to change after 2005, when U.S. producers successfully exploited the nation's shale formations and began lifting domestic output. The continuing success in America's shale revolution has changed the country from an oil and gas importer to now a growing hydrocarbon exporter. As a result, the U.S. potentially does not need as much oil and gas from Canada, which is putting greater pressure on Canadian producers to seek alternative markets for its oil and gas.

Canada is finally looking at the possibility of exporting gas globally via LNG terminals

Traditionally, the delivery of Canadian crude oil has been via pipelines built to deliver volumes to the U.S. refining centers or for export from U.S. ports. For natural gas, pipelines into the U.S. have been the only option. Now, Canada is finally looking at the possibility of exporting gas globally via liquefied natural gas (LNG) terminals. The LNG option, however, is years away from having any meaningful impact on Canada's gas market.

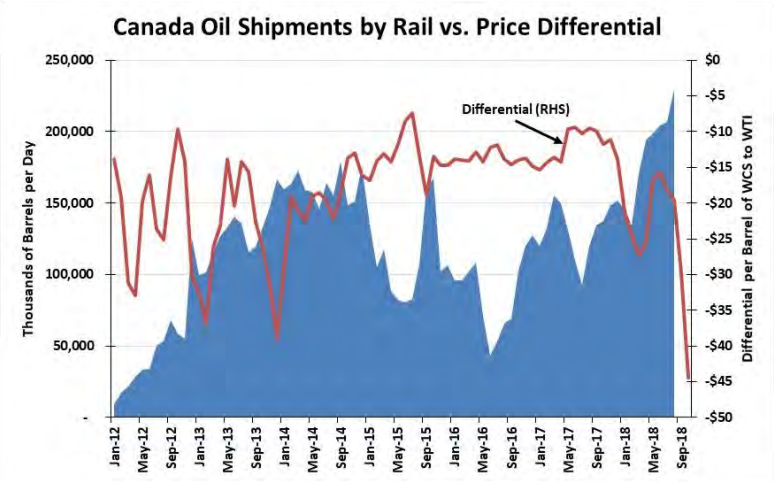
Crude oil has other transportation options – rail and truck. Hauling crude oil across the U.S. border by truck is a short-term and limited distance option. It has primarily been used in the Canadian extension of the U.S. Bakken formation into Saskatchewan and Alberta. Canadian producers have used trucks to bring their Bakken oil across to pipeline and rail terminals on the U.S.-side of the

border. So far in 2018, every month Canada has seen at least 100,000 barrels moved across the border by truck.

The rail transportation option enables a producer to potentially sell its oil for a higher net profit than having to rely exclusively on a pipeline

The rail option has provided greater flexibility for Canadian producers to capitalize on pricing anomalies among U.S. refineries. As opposed to being captive to one regional market, which is what happens with pipelines, producers can ship oil almost anywhere by rail. Thus, the rail transportation option enables a producer to potentially sell its oil for a higher net profit than having to rely exclusively on a pipeline. Rail has also been an option when pipeline capacity has tightened. The significance of the rail option is seen in Exhibit 3 that shows the daily rail shipments from Canada since the start of 2012.

Exhibit 3. Canada Oil Rail Shipments Are Rising



Source: Nation Energy Board

Rail shipments increased steadily during 2012 and 2013, reaching a peak in 2014. As shown, the oil price differential was extremely volatile during that period, however oil prices were near, or over $100 a barrel. Producers used the more expensive rail option to get increased volumes to market and to maximize their per-barrel profitability.

As pipeline capacity began to tighten, rail shipments began climbing in early 2018

When oil prices fell in late 2014, producers cut back on rail, the most expensive transportation option. Additionally, pipeline expansions began adding capacity at a lower cost to shippers, so producers switched. That cheaper option existed for much of 2015-2017. As pipeline capacity began to tighten, rail shipments began climbing in early 2018. The rail shipment increase came in response to the widening price differential.

In Exhibit 3, the latest differential reflects data for September and October, however, the oil by rail data is only available through August. We expect more recent rail data will show greater rail volumes in response to the widening price differential. It is possible

that the widening price differential actually reflects a lack of both pipeline and rail transport capacity. Market intelligence suggests this is the case, and that the price differential is being magnified by business strategies of specific integrated oil companies, designed to suppress upstream profits while allowing them to maximize their downstream profits.

The six largest Canadian integrated oil producers control about 90% of the nation's oil output

The six largest Canadian integrated oil producers control about 90% of the nation's oil output. Integrated companies are always balancing where to maximize their companies' profits. High wellhead prices lead to high upstream profit margins, but likely squeeze downstream profit margins. It also contributes to higher royalty payments and higher Canadian taxes. Low wellhead prices, assuming refined product prices remain relatively high, can produce maximum downstream profits. That profitability can be augmented if the profits are generated in the U.S., which now has a meaningfully lower corporate tax rate than Canada.

By not shipping extra oil output by rail, producers can use that oversupply to depress Canadian wellhead prices and widen the price differential

Currently, market conditions are keeping U.S. refined product prices at higher levels than a year ago. By not shipping extra oil output by rail, producers can use that oversupply to depress Canadian wellhead prices and widen the price differential. Producers engaged in that strategy can further maximize their profits by eliminating provincial royalty payments on the additional oil output. If they make more money on their refined product output in the U.S., and are taxed at a lower rate than they would be in Canada, the companies can substantially boost their overall profitability.

The target of the ire of some Canadian oil producers is Imperial Oil Company, which reportedly has its joint-venture rail-loading terminal with partner Kinder Morgan Inc. shut down

According to a Genscape analyst earlier this year, he expected Western Canadian crude oil production to exceed pipeline capacity by 338,000 barrels a day (b/d) by the end of 2018, or more than three-times the oversupply that existed at the end of 2017. More recent estimates suggest the oversupply may be closer to 250,000 b/d. The problem remains the lack of rail export capacity, especially if companies are deliberately limiting that option to help depress wellhead oil prices. The target of the ire of some Canadian oil producers is Imperial Oil Company (IMO-NYSE), which reportedly has its joint-venture rail-loading terminal with partner Kinder Morgan Inc. (KMI-NYSE) shut down.

To overcome the lack of export pipeline capacity, several Canadian producers are working on, or have announced, new rail transportation contracts. The most prominent contract was announced by Cenovus (CVE-NYSE). It plans to begin shipping over 100,000 b/d by rail in 2019 as part of a three-year contract for its Bruderheim terminal near Edmonton.

What Cenovus discovered in putting this deal together with Canadian National Railway Company (CNI-NYSE) and Canadian Pacific Railway Ltd. (CP-NYSE), is that it isn't as easy as everyone says to get more oil out of Canada by rail. The deal required nearly

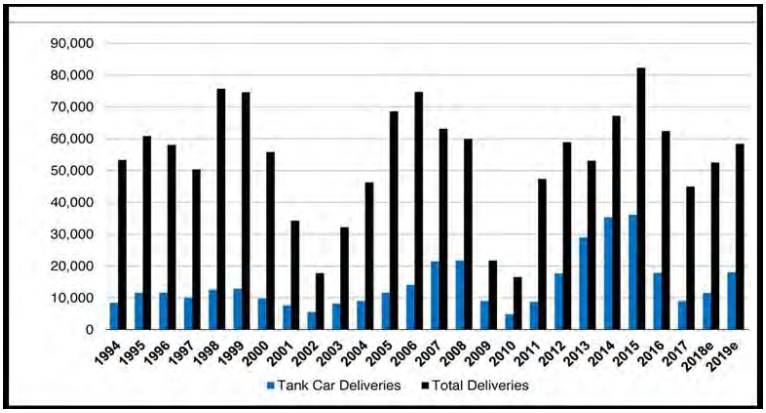
He said that oil companies "would get married with pipelines, but they only date the railroad"

a year of planning and negotiations. The challenge was securing the assets necessary to make the contract work, as the rail companies are not sitting with excess equipment. At an investor conference this spring, CN's CEO commented on the attitude of oil companies toward rail. He said that oil companies "would get married with pipelines, but they only date the railroad."

That means 50 unit-trains are necessary to deliver the projected output

This attitude contributes to the challenge the railroad must deal with. As expressed on CN's web site, "It is difficult to justify investing in long-life assets like rail and locomotives based on short-term demand." To better appreciate this challenge, one needs only to understand the magnitude of the Cenovus contract. To ship 120,000 b/d requires two unit-trains each day. Each unit train is composed of three locomotives and 100 tank cars, each holding 600 barrels of oil. To go from Edmonton to the U.S. Gulf Coast refinery center requires a 25-day roundtrip. That means 50 unit-trains are necessary to deliver the projected output.

Exhibit 4. Total Rail And Tank Car Deliveries



Source: Cowan

At these price estimates, the equipment investment for these unit-trains is in the range of $750 million

Cenovus had to secure 150 locomotives and 5,000 tanker rail cars. Besides that, the railroads must hire and train sufficient workers to staff 450 train crews because of the work schedules involved. Add to these logistical requirements the need for Cenovus to have sufficient storage capacity in the Gulf Coast region to store the crude oil until it is needed by refineries. Based on slightly dated information, locomotives cost about $1.7 million each and rail tank cars cost close to $100,000 apiece. Tank cars are often leased, and we have seen reported lease rates of approximately $450 per day. At these price estimates, the equipment investment for these unit-trains is in the range of $750 million. We noticed that in September, CN increased its 2017 order for 200 new General Electric (GE-NYSE) locomotives by 60, suggesting that the increase reflects the number of incremental engines it needs to fulfill its share of the Cenovus contract. The chart in Exhibit 4 shows the estimated number of new rail cars to be delivered in 2018 and 2019, as well as the number of tank cars, which is what the Canadian oil producers

are seeking. Note that the number of new tank cars is projected to climb in 2018 and 2019.

Exhibit 5. What CN Locomotives Look Like

Source: General Electric

Even with these additional rail contracts, it doesn't appear there will be complete relief from the oversupply situation

For CN and CP, the Cenovus contract lasts for three years. Cenovus CEO Alex Pourbaix, in a statement, said, "While we remain confident new pipeline capacity will be constructed, these rail agreements will help get our oil to higher-price markets." That statement doesn't dismiss the view that oil companies marry pipelines but only date railroads. What we are confident in knowing is that rail take-away capacity will expand by at least 120,000 b/d in 2019. We also understand that several other integrated producers are hoping to each add rail capacity in the 15,000-20,000 b/d range. Even with these additional rail contracts, it doesn't appear there will be complete relief from the oversupply situation. One analyst suggested that oil rail capacity will reach 300,000 b/d by the end of 2019, but that estimate may prove low. The bigger question for the Canadian oil industry is: Will more pipeline capacity be online in three years when this new rail contract ends?

Natural Gas Prices Come To Life With Winter's Arrival

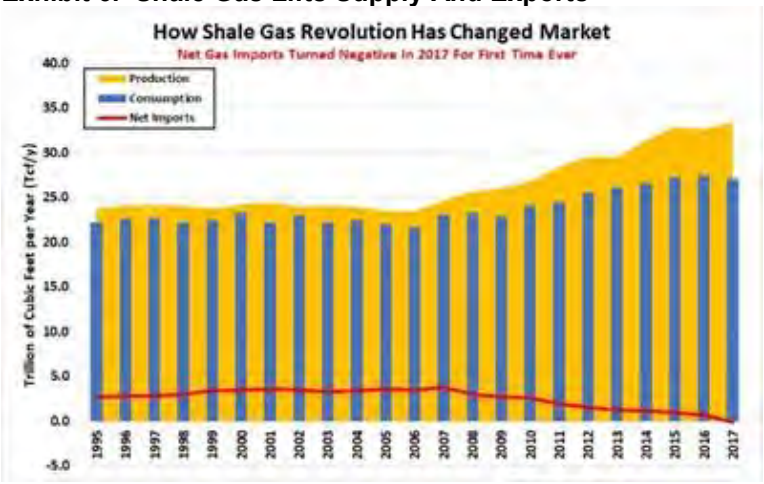
It is the fear that the second and/or third winter blast might find the gas storage caverns empty that has people concerned

After collapsing in early February, natural gas prices have suddenly come to life with the arrival of winter weather. In fact, it isn't actually Arctic cold weather that has prodded gas prices back to life. It is the fear that the second and/or third winter blast might find the gas storage caverns empty that has people concerned. No gas equals disaster, not only for the local gas utility and its executives, but also for the federal energy regulators, local and national politicians, but importantly, for consumers who will foot the bill and suffer the consequences. The easiest way to avoid a political catastrophe is to let gas prices work to allocate inadequate gas supply, unless the gas price jump was nothing more than a typical short squeeze in the futures trading market, making traders who bet wrong pay a price.

This is the lowest beginning winter gas storage volume since 2003 – 15 years ago!

November 1st marked the start of the natural gas withdrawal season. Unfortunately, during the 2018 injection season, the industry was only able to put sufficient volumes into storage to bring the national supply to barely over 3.2 trillion cubic feet (Tcf). This is the lowest beginning winter gas storage volume since 2003 – 15 years ago! Imagine how much the natural gas industry has changed in the interim.

Exhibit 6. Shale Gas Lifts Supply And Exports



Source: EIA, PPHB

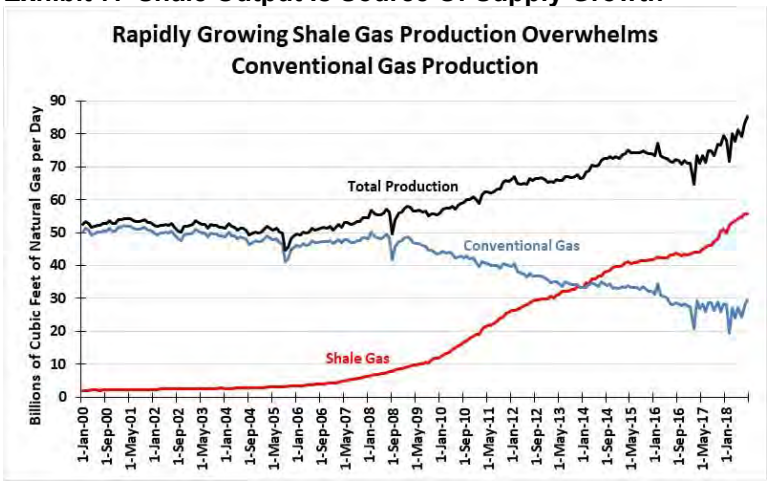
If we examine the domestic gas market in its very broadest terms over 1995-2017, we can see the dramatic changes that have occurred, largely due to the success of the shale gas revolution. From 1995 to 2007, natural gas production was essentially flat. Although consumption was also relatively stable during this period, it did not reflect the upcoming war on coal that lifted electric power consumption of gas.

The production growth evident after 2007 reflects the significant natural gas volumes flowing from shale wells

The production growth evident after 2007 reflects the significant natural gas volumes flowing from shale wells. The most significant impact of the increased shale output was our ability to begin exporting gas, rather than having to rely on imports. In fact, in 2017, net gas imports turned negative for the first time in history.

We can see shale's impact on total gas production more clearly in Exhibit 7 on the next page. In 2000, shale gas output barely registered on the chart. However, output began growing in 2006 and its rate of increase grew in 2007-2009, despite the economic and financial turmoil from the financial crisis and recession that undercut energy demand and energy drilling. By 2010, the pace of shale gas output growth was accelerating. Even with the interruption in energy industry activity created by the 2014 re-setting of the global oil price, shale gas output has continued to grow.

Exhibit 7. Shale Output Is Source Of Supply Growth



Source: EIA, PPHB

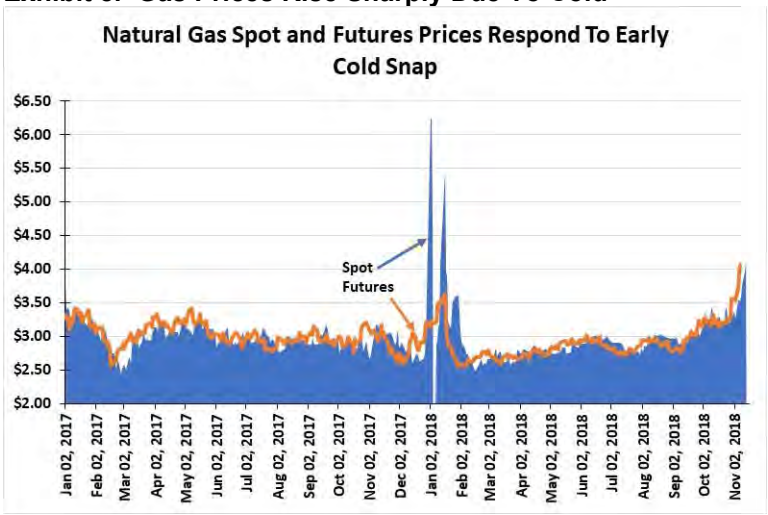
In the early 2000s, natural gas prices ranged from the upper single-digits into double-digit levels

In the early 2000s, natural gas prices ranged from the upper single-digits into double-digit levels. That was a reflection of the conventional thesis that the United States was short of natural gas and it would take substantially higher prices to induce producers to develop new supplies because of the costlier drilling and development expenditures necessary. As shale gas output began climbing, although slightly more expensive than conventional gas supplies, the cost differential was not of sufficient magnitude to derail the shale drilling effort. Industry participants anticipating that the future of shale would necessitate higher prices, found that not to be happening. As a result, shale gas drilling fell off, only to be replaced by increased oil shale drilling. What more oil shale drilling brought was greater volumes of associated natural gas. Since 2010, other than during times of cold weather stress, natural gas prices have remained quite low relative to expectations, often well below $3 per thousand cubic feet. That low price was a function of the fact that the economics of oil shale wells were based on crude oil production and prices, and any associated natural gas became what in South Louisiana is called “lagniappe” - an extra or unexpected gift.

The most important driver for natural gas prices right now is the combination of low storage volumes and an early, and possibly extended, winter

The most important driver for natural gas prices right now is the combination of low storage volumes and an early, and possibly extended, winter. From a mood of complacency, gas markets are suddenly in panic mode. Will there be enough gas in storage to see the nation through a potentially colder-than-normal winter? To insure adequate supply, the market is wielding its price weapon to induce more gas output and secure additional supplies for storage, while also causing gas consumers to reduce their usage.

Exhibit 8. Gas Prices Rise Sharply Due To Cold

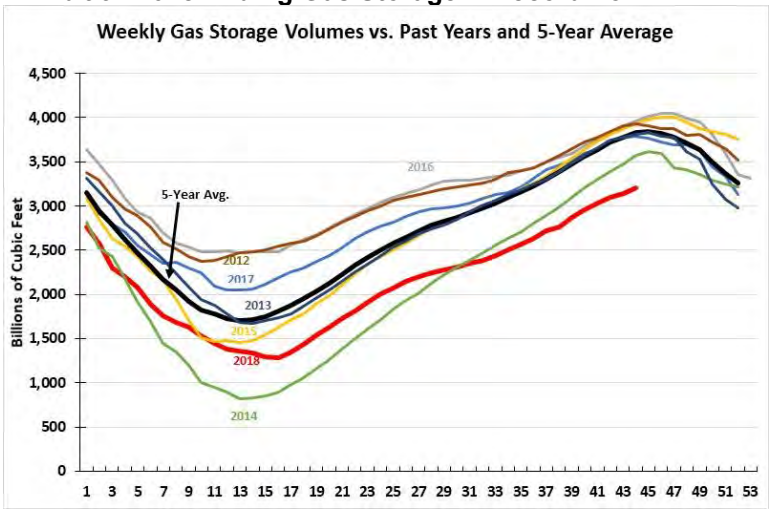


Source: EIA, PPHB

The fact that this cold wave is extending down to the Gulf Coast is surprising many people, adding to the fear about gas supplies for the balance of winter, which has not officially begun!

Exhibit 8 shows how both natural gas spot and futures prices have reacted in recent days to the early cold weather. The fact that this cold wave is extending down to the Gulf Coast is surprising many people, adding to the fear about gas supplies for the balance of winter, which has not officially begun! As we write this article, we are hearing reports of snow falling on the west side of Houston, although nothing is sticking due to the warm ground. This is the earliest snow in Houston in 40 years. Is it a harbinger of a colder than normal winter and greater gas consumption?

Exhibit 9. 2018 Ending Gas Storage A Record Low

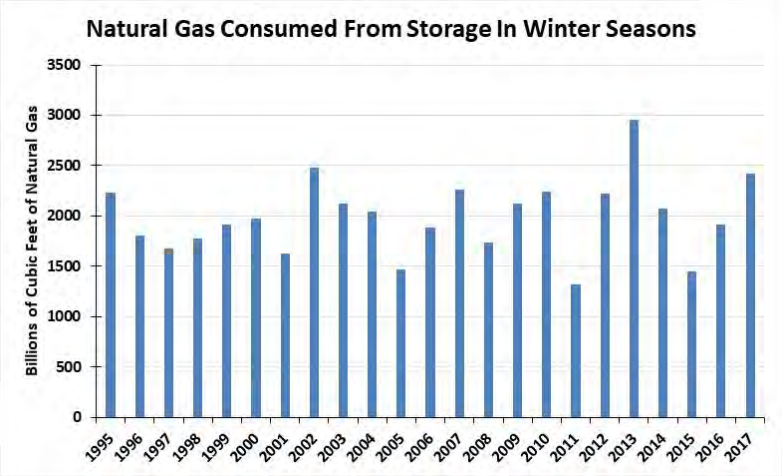


Source: EIA, PPHB

When we look at the record of weekly gas storage volumes since 2012, and the five-year average posted at the start of 2018, we see why gas markets may be shifting into panic mode. As mentioned

earlier, we have the least amount of natural gas in storage at the start of the withdrawal season in 15 years.

Exhibit 10. Winter Gas Consumption Varies Widely



Source: EIA, PPHB

With 3,200 billion cubic feet (Bcf) of gas in storage, it makes a difference whether we are going to have a 2018-19 winter that matches 2013 when we consumed nearly 3,000 Bcf of gas, or one like 2015-16 when we used only about half that amount

The question the gas market is attempting to answer is what type of winter will the U.S. experience – colder, normal or warmer? As Exhibit 10 shows, gas consumed from storage during winters can vary widely year to year because of the type of winter experienced. With 3,200 billion cubic feet (Bcf) of gas in storage, it makes a difference whether we are going to have a 2018-19 winter that matches 2013 when we consumed nearly 3,000 Bcf of gas, or one like 2015-16 when we used only about half that amount. If it is the former, we may have a serious problem, likely needing substantially higher gas prices to induce more supply and restrict demand. On the other hand, a warm winter will leave us with substantial storage volumes at the end of the withdrawal season, which would likely depress gas prices at least through the first part of the 2019 injection season, and maybe all year.

That indecision will translate into nervousness among the gas traders setting up the possibility for extreme volatility in natural gas prices for the next few weeks, and possibly for the entire winter

The latest winter forecast from the government suggests a normal-to-barely-colder winter for temperatures, but potentially a winter with greater precipitation due to the location of El Niño and the typical cluster of thunderstorms in the Pacific Ocean. The message so far from forecasters is that it is still too early to know which meteorological forces will influence this winter's weather formation patterns. That indecision will translate into nervousness among the gas traders setting up the possibility for extreme volatility in natural gas prices for the next few weeks, and possibly for the entire winter.

The volatility we have seen in recent days may actually be due to the use of a sophisticated financial investment strategy that saw commodity traders purchasing oil futures contracts (going long) and selling short contracts for natural gas as a hedge. Traders were expecting oil prices to rise and gas prices to fall. When oil prices

began falling and cold weather started pushing natural gas prices up, the traders were losing money on both sides of their "paired" trade. Being "short" natural gas futures put the traders at extreme financial risk because they have to post more collateral or buy gas contracts to cover their short positions. With a less liquid commodity market due to the financial regulations that have forced commercial banks out of the business of trading commodities for their own accounts, a buying panic may have caused the gas price explosion last week. When the buying rush was over – gas futures prices had climbed 77-cents, a 19% rise. A lack of buying the following day caused a collapse in prices – dropping 94-cents, or 20% drop! The only common thread between the arrival of cold weather and volatile commodity prices is panic!

The only common thread between the arrival of cold weather and volatile commodity prices is panic!

The Energy Industry Dodges Bullets This Election Season

The energy industry was certainly a target this election season. Increasingly, the oil and gas industry must defend its role in meeting the energy needs of the United States and the world, in an atmosphere of increased distrust among the citizens, and in a world that grows more litigious every day.

The energy industry lost broad public support years ago, not due to any specific event, but more likely due to a general attitude of arrogance. That arrogance might have developed when the Seven Sisters (the seven largest international oil companies) ruled the global oil world starting in the 1950s. Their actions not only contributed to the formation of the Organization of Petroleum Exporting Countries in 1960, but also the unleashing of its collective powers in the mid-1960s. However, it wasn't until the early 1970s when U.S. oil production peaked, effectively transferring pricing power to the cartel, that OPEC's real power became evident. Despite the power shift, the arrogance of oil companies did not fade away. The issue of arrogance formed part of the message CEO Ben van Beurden of Royal Dutch Shell Ltd. (RDS.A-NYSE) delivered to executives in the tech sector who are wrestling with arrogance as a catalyst that urges increased regulation of the companies.

That arrogance might have developed when the Seven Sisters (the seven largest international oil companies) ruled the global oil world starting in the 1950s

The November 6th mid-term elections saw the energy industry waging fights on several battlegrounds and over issues ranging from the drilling and production setback rule in Colorado to the carbon tax proposal of the State of Washington, and even to a public confirmation of the recently enacted gasoline tax hike in California. On the two issues with potentially the greatest impact on oil company operations, the industry prevailed. Its election issue losses were mostly trivial, however, because the House of Representatives was flipped from Republican to Democratic control, nationally, the future for the oil and gas industry will be more contentious than during its immediate past.

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The energy industry warned that its passage would cripple the future of the business, eventually costing Colorado 150,000 jobs

In Colorado, environmentalists promoted a measure to restrict new well drilling and the construction of other energy infrastructure to no closer than 2,500 feet from homes, schools, playgrounds and other 'vulnerable' areas. The ballot initiative was promoted as an air and water pollution prevention and general safety measure. The energy industry warned that its passage would cripple the future of the business, eventually costing Colorado 150,000 jobs, three-quarters of them outside of the oil and gas business.

The Colorado Oil and Gas Conservation Commission, which regulates drilling, studied the initiative and concluded the setback would rule out most of the state for new drilling, in particular in those regions where activity is the greatest. As a result, the decline in oil and gas activity would devastate many municipalities in the state that depend on energy industry fees and taxes to fund substantial portions of their budgets.

Ballot Initiative 1631 was defeated by a vote of 56% of the state's voters, even after this year's version was revamped to address concerns with the 2016 bill

The issue in the State of Washington was different, but no less significant. Enacting a carbon tax designed to levy a cost of carbon released in its burning by ballot was a radical endeavor. The state's voters had rejected a similar proposal in 2016, but that measure had not been supported by the state's environmental movement. If passed, this measure would have made Washington the first state in the union to enact a carbon tax, and the first government anywhere to do so by a ballot referendum. It turned out not to be the pacesetter environmentalists hoped. Ballot Initiative 1631 was defeated by a vote of 56% of the state's voters, even after this year's version was revamped to address concerns with the 2016 bill. It even failed despite a 2016 survey of citizens reporting that 80% of residents "are sure climate change is occurring" and 69% say they support the state taking action to reduce carbon emissions.

After dramatic pushback from Amazon, the city's leading employer, who even stopped construction on a new 17-story office tower, seven of the nine council members voted to rescind the tax in June

Was the defeat due to the $20 million opposition spending by energy companies, or is it a reflection of a deep-seated concern that going first on this issue would boomerang on the state? While Washington is an overwhelming 'blue state' politically, and one of the strongest anti-Trump bastions, when social causes impact pocketbooks, more likely they lose. It was Seattle that earlier this year waged a battle over an employee "head tax" to deal with the city's homeless crisis. A tax levied against corporations based on the number of their employees was unanimously passed in May by the Seattle city council. After dramatic pushback from Amazon (AMZN-Nasdaq), the city's leading employer, who even stopped construction on a new 17-story office tower, seven of the nine council members voted to rescind the tax in June.

What should not be lost on observers of these anti-fossil fuel votes is the amount of organization and money the energy industry has devoted to defeating them. As Nick Abraham of Yes on 1631 put it, "the oil industry wouldn't be spending $20 million if they weren't pretty worried about this passing." While that sentiment has merit,

an editorial in *Investor's Business Daily* (*IBD*) the day after the election made the following point:

> "But when it came time for these voters to put their money where their mouths are, they snapped their purses shut.
>
> "Washington state was a bellwether, as it turns out. It showed how so many of those who wring their hands about "climate change" don't actually want to do anything about it."

It is important to remember that whenever pollsters question people about issues that concern them the most, climate change ranks at the bottom

It is important to remember that whenever pollsters question people about issues that concern them the most, climate change ranks at the bottom. That is an important point, in contrast to the polls that present a list of concerns and ask people to rank them. In those cases, climate change generally comes out higher. Is that because people are conditioned to believe they must be concerned about climate change, rather than actually being concerned?

The defeat of the California ballot issue to rescind the recently enacted 12-cents per gallon gasoline tax increase is being hailed as a sign of citizens' concern about climate change. Others believe the issue failed because: 1) the tax increase hadn't happened yet, and; 2) the ballot question was poorly worded. These are legitimate explanations that will only be confirmed with the passage of time.

In Arizona, voters rejected an initiative that would require the state utilities to produce 50% of their electricity from renewable sources like wind and solar. The state currently gets 13% of its energy from renewables, primarily hydropower. Billionaire environmental activist Tom Steyer poured millions of dollars into the Arizona initiative. It was voted down by 70% of Arizona voters.

"But if they can't convince a liberal state like Washington that climate change is an urgent threat, what hope do they think they'll have in the rest of the country?"

As *IBD* concluded in its editorial, "…these defeats won't stop environmentalists from trying. But if they can't convince a liberal state like Washington that climate change is an urgent threat, what hope do they think they'll have in the rest of the country?" As comforting as this may appear to energy company executives, there are many politicians who are fully invested in "green" energy, and are willing to enact mandates to force the growth of renewables despite the views of their constituents. They are motivated to promote environmentalism to burnish their legacies, and they often have the support of businesses who see this as a way to ensure competitive advantages in new markets. One only has to look to Detroit and General Motors (GM-NYSE) who has begun pushing for changes to, and extensions of, the federal subsidy for electric vehicles in order to promote their new product line, something they need to develop to compete in the Chinese auto market. These battles over clean energy mandates are not going away, and it will cost the fossil fuel industry to fight them.

While legislation on energy and climate issues falls to other House committees, the Select Committee will give Democrats a megaphone to amplify climate change messaging

The new political landscape in Washington, D.C. following the mid-term elections is an example of how these battles will continue. The newly elected Democratic majority in the House of Representatives plans to revive the Select Committee on Energy Independence and Global Warming. This committee previously functioned from 2007 to 2011, until the Republicans shut it down after taking control of the House of Representatives. While legislation on energy and climate issues falls to other House committees, the Select Committee will give Democrats a megaphone to amplify climate change messaging. With the help of the Select Committee, the path for the cap-and-trade system for carbon dioxide emissions, which the House passed in 2009, was developed. Get ready for daily doses of climate change rhetoric from Washington.

It's Beginning To Look A Lot Like Winter – Houston Style!

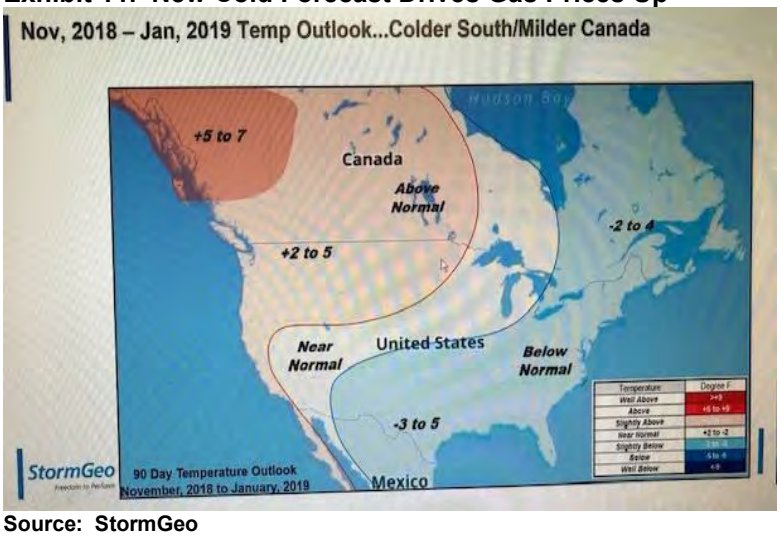
There have been 94 times since 1881 that snow has fallen in Houston

Snowflakes in Houston on November 13th is the earliest in 40 years! The previous record for the earliest snow seen here was November 23, 1979, according to the National Weather Service. While a rarity in Houston, the city does occasionally see snowfall – actually more often than most people realize. According to weather records, there have been 94 times since 1881 that snow has fallen in Houston. Last winter actually saw snowfall on three occasions, only the second winter (1973) that there have been as many snowfalls.

When 20 inches fell on the city

The record Houston snowfall occurred on Valentine's Day and the following day, February 14-15, 1895, when 20 inches fell on the city. It was part of a massive snowstorm that dropped snow from Tampico, Mexico to Pensacola, Florida. The storm set accumulation records in New Orleans and Alabama, as well. Does the early storm mean that this winter will be abnormally cold and wet?

Exhibit 11. New Cold Forecast Drives Gas Prices Up



Source: StormGeo

This winter's forecast has turned decidedly colder for much of the East and Southeast regions

A recent winter forecast from the meteorologists at StormGeo, presented in a webinar, highlighted that this winter's forecast has turned decidedly colder for much of the East and Southeast regions of the country. Two of their forecast charts for winter month temperatures reflect the revised colder outlook.

Exhibit 12. Two-thirds Of The Nation Will Be Colder

Source: StormGeo

Those winters highlighted serious structural problems for the natural gas and pipeline industries that resulted in significant revamps of the industries

Whether Houston sees another extremely cold winter, such as we experienced during the late 1980s and early 1990s when extended freezes and precipitation played havoc with travel and keeping warm, remains to be seen. Those winters highlighted serious structural problems for the natural gas and pipeline industries that resulted in significant revamps of the industries. While the new weather forecast is scaring gas traders and consumers, it is certainly warming the hearts of energy executives.

Climate Change, Hurricanes And Florida – One Analysis

According to this view, our future will be filled with more frequent and stronger tropical storms that will cause greater damage and loss of life

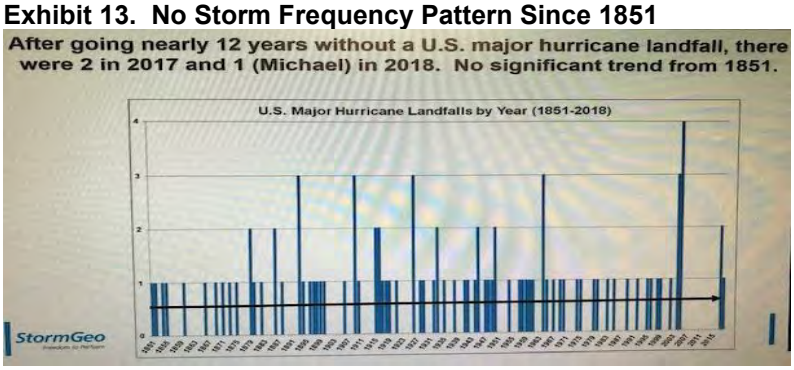
Hurricane Michael that devastated the Florida Panhandle in early October, was the third-most intense Atlantic hurricane, by barometric pressure, to ever make landfall in the contiguous United States. It trailed only the 1935 Labor Day hurricane and 1969's Hurricane Camille in intensity. The storm rapidly grew into a Category 4 storm as it approached landfall near Mexico Beach, Florida in the panhandle region of the state, due to its passage over the extremely warm waters close to shore. The 13th named storm, seventh hurricane and second major hurricane of the 2018 tropical storm season, Hurricane Michael was touted as representative of the future of storm seasons due to climate change. According to this view, our future will be filled with more frequent and stronger tropical storms that will cause greater damage and loss of life.

Weather patterns do have a tendency to cycle through history, which provides these forecasters with tools to improve the accuracy and warning times about storms

The meteorologists at StormGeo, in their wrap-up of the 2018 hurricane season, acknowledged Michael's fury and damage. They, too, have heard the arguments that the weather of the past two years is indicative of the bad storms we will be experiencing going forward unless we deal with climate change. As professionals dedicated to forecasting weather events to help clients better prepare for tropical storms, they understand the climate and meteorological forces that create and guide storms. Weather patterns do have a tendency to cycle through history, which provides these forecasters with tools to improve the accuracy and warning times about storms.

In response to the linkage with climate change, StormGeo showed two charts in a recent webinar. The first chart showed the number of major hurricanes making landfall in the United States by year since 1851. There were two hurricanes last year and one this year, but you need to go back to 2004-2005 to find back-to-back years with more than one major hurricane making landfall. Prior to that, you have to go all the way back to 1915-1916 for a comparable event.

Exhibit 13. No Storm Frequency Pattern Since 1851

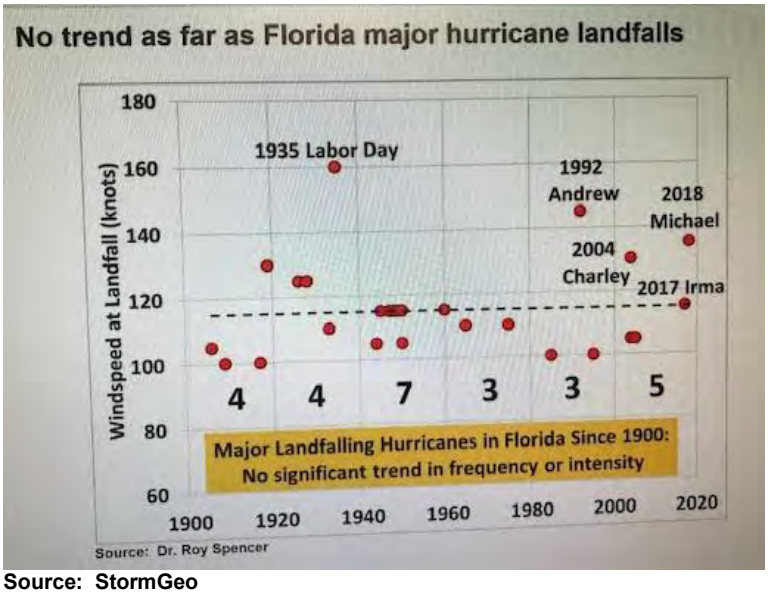


Source: StormGeo

The 1940s had many more major hurricanes hitting Florida than now

With respect to major hurricanes making landfall in Florida, the StormGeo forecasters showed a chart prepared by Dr. Roy Spencer, a meteorologist and a principal research scientist at the University of Alabama in Huntsville, who has also served as the senior scientist for climate studies at NASA's Marshall Space Flight Center. It shows major hurricanes making landfall in Florida by year rated by their strength. The 1940s had many more major hurricanes hitting Florida than now. As Dr. Spencer concluded, there is no "significant trend in frequency or intensity." The data in both charts refutes the hysteria of climate change activists.

Exhibit 14. Florida Hurricanes Show No Pattern



Source: StormGeo

As the data shows, no patterns linking increased carbon emissions with more frequent and severe tropical storms exist

Hurricanes Harvey and Maria last year, and Florence and Michael this year, have fueled the climate change disaster rhetoric, which was dispelled by the prior 12 years without a major U.S. hurricane landfall. Nature and climate run in cycles. The understanding of those cycles can be used to improve forecasting and thus provide earlier and more effective warnings to residents in the likely paths of major storms. Becoming hysterical over several major hurricanes is actually an irrational act. As the data shows, no patterns linking increased carbon emissions with more frequent and severe tropical storms exist.

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