Chart Watch

7. The WCS-WTI diff widened last week
17. US Crude inventories drew by 5.6 MMB
30. W. Canadian gas export volumes are strong
36. US gas storage grew by 2 Bcf last week
43. WCSB well completions are 92% above last yr

<table>
<thead>
<tr>
<th>Spot WTI Crude</th>
<th>Edmonton Light</th>
<th>Spot Henry Hub</th>
<th>Spot AECO</th>
<th>Spot AECO Basis</th>
<th>Currency</th>
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</thead>
<tbody>
<tr>
<td>57.36 ↓</td>
<td>54.04 ↑</td>
<td>2.75 ↓</td>
<td>1.42 ↓</td>
<td>1.58 ↑</td>
<td>0.7781 ↓</td>
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</tbody>
</table>

1. Broad Equity Markets Year-to-Date

Indexed to 12 Months Ago
- Shanghai Composite
- S&P/TSX Composite
- Dow Jones

The DJIA hit a new record high on Friday.

The index is up by 23%, so far this year.

Broad market indices are one the many vital signs measuring the health of the economy. Energy demand is a function of economic health.

Source: Bloomberg, ARC Financial Corp.

2. Performance of Oil and Gas Equities Year-to-Date

Indexed to 12 Months Ago
- ARC Junior E&P Index
- S&P 500 E&P
- S&P/TSX E&P Index

Since the end of August US and Cdn E&Ps have gained 8% and... 16% respectively. This is less than the 21% gain in WTI.

Performance of Canadian and US oil & gas equities are compared against each other.

Source: Bloomberg, ARC Financial Corp.

3. Oil & Gas Service Equities Year-to-Date

Indexed to 12 Months Ago
- Philadelphia Service Index
- PSAC Canadian Index

The US Fed is expected to raise rates at its next meeting.

Although it's mostly priced in, the raise would put negative pressure onto the Loonie.

The performance of Canadian oil and gas service equities are plotted in tandem with the corresponding US index.

Source: Bloomberg, Petroleum Services Association of Canada

4. Canadian Currency Exchange

Indexed to 24-Month History
- $US/$Cdn

The US Fed is expected to continue through 2018.

Rate hikes are expected to continue through 2018.

Much of Canada’s oil and gas production is sold in US dollars. As such, the exchange rate significantly impacts corporate revenues and profits.

Source: Bloomberg

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North American crude oil prices can sometimes disconnect from global prices depending on regional supply and demand dynamics.

Source: Bloomberg

Canadian heavy crude oil differentials are becoming less volatile with growing access to new markets via pipeline and rail.

Source: Bloomberg

Canadian Light Crude Oil Price Differential to WTI
Western Canadian Select (WCS) Differential; Rolling 12-Month History

The differential should reflect the transportation cost from Alberta to Cushing. Greater discounts can result from infrastructure or refinery outages.

Source: Bloomberg

This represents the relative bullishness of money managers on the price of oil in the United States.

Source: Bloomberg, U.S. Commodity Futures Trading Commission

The advancement of drilling and completion methods boosted US crude oil production, prior to the downturn in prices.

Source: Bloomberg, U.S. Energy Information Administration
Most of Canada’s oil production comes from Alberta; split between oil sands and conventional production.

Source: Alberta Energy Regulator

Negative numbers indicate a global crude shortfall, while positive numbers indicate an oversupply.

Source: International Energy Agency

Crude oil imports from Canada are taking market share from overseas imports.

Source: U.S. Energy Information Administration

The US exports more refined products than crude oil. If/when tight oil growth resumes, most export growth should come from crude oil exports.

Source: U.S. Energy Information Administration
US Crude Oil Stocks

Historical Tracks and Current Year Levels

![Graph showing US Crude Oil Stocks](image)

Crude oil inventories drew by 5.6 MMB last week. This was a larger draw than expected, however it was mitigated by a 8.5 MMB gain in gasoline and distillate stocks.

Global oil stock levels can affect crude oil prices. Stock levels for the current year are represented by the blue line.

Source: U.S. Energy Information Administration

US Weekly Refinery Utilization Rates (%)

Historical Tracks and Current Year Levels

![Graph showing Refinery Utilization Rates](image)

Refinery utilization rates change the supply of refined products, impacting price. Utilization for the current year is blue.

Source: U.S. Energy Information Administration

US Oil Drilling Activity

Baker Hughes Horizontal Oil Rig Counts; 2014 to Present

![Graph showing US Oil Drilling Activity](image)

Tracking US oil drilling by major play provides insight into the composition of US oil supply and growth trends.

Source: Baker Hughes

OECD Total Industry Oil Stocks

Americas and Rest of OECD; 2012 to Present

![Graph showing OECD Total Industry Oil Stocks](image)

The last IEA Oil Market Report showed an OECD storage surplus...to the five year average of 119 MMB, down from more...than 300 MMB earlier in the year.

Global oil stock levels can affect crude oil prices. Stock levels for the current year are represented by the blue line.

*Includes U.S. (~90%), Canada, Mexico and Chile.

Source: International Energy Agency

US Motor Gasoline Consumption

Historical Tracks and Current Year Levels

![Graph showing US Motor Gasoline Consumption](image)

Gasoline consumption accounts for almost half of all oil use in the US. Gasoline consumption for the current year is represented by the blue line.

Source: U.S. Energy Information Administration

Daily NGL Prices as a % of Edmonton Light

Propane & Butane Spot Prices at Edmonton, AB

![Graph showing Daily NGL Prices](image)

Natural gas liquids have become critical contributors to producer’s cash flow. Prices are influenced by the price of oil as well as local supply and demand.

Source: Bloomberg, ARC Financial Corp.
23 Near-Month North American Natural Gas Prices
Daily Prices; Rolling 12-Month History

Near-month prices at AECO track Henry Hub prices, the exchange rate and the cost of transportation. Local factors can also affect price.
Source: Bloomberg

24 US Natural Gas Futures
Nymex (Henry Hub) 2017 to 2019

Forward contract prices are plotted against months in the calendar year. Years are distinguished by color and symbol coding.
Source: Bloomberg

25 Ratio of Long to Short Contracts – Henry Hub
Managed Money – Futures and Options

This represents the relative bullishness of money managers on the price of natural gas in the United States.
Source: U.S. Commodity Futures Trading Commission

26 Canadian Natural Gas Futures
AECO Hub (Bloomberg Estimate) 2017 to 2019

AECO forward prices mimic Henry Hub futures plus a differential
Source: Bloomberg

27 Global Natural Gas Prices
Japanese LNG, UK NBP, Henry Hub; Average Monthly Prices

International natural gas prices strongly impact the economics of proposed LNG projects.
Source: Bloomberg, Japanese Ministry of Economy, Trade and Industry

28 US Coal and Natural Gas Power Generation Cost
Converted to a $/MWh Equivalent

This graph illustrates when it may be economic to begin coal-gas switching in power generation. Average power plant efficiencies are assumed.
Source: Bloomberg

Closing Spot Prices at North American Natural Gas Hubs
Superimposed on Relative Physical Volumes Traded

North America has an integrated natural gas market. Prices are determined by regional supply and demand, and pipeline flows.
Source: Bloomberg

Pipeline Flows Out of Western Canada
Daily; Historical Tracks and Current Year Levels

The ability of gas producers to move gas out of the WCSB to eastern markets and the US is a major factor in local natural gas prices.
Source: Various Pipeline Companies

US Natural Gas Exports – Excluding Canada
Daily; Historical Tracks and Current Year Levels

Between exports to Mexico and LNG shipments, the US is growing as a natural gas exporter. Robust US supply growth has driven this trend.
Source: Bentek
Weekly natural gas demand is directly tied to the weather. The current year is in dark blue.

Source: National Oceanic and Atmospheric Administration

US production started ramping up in late 2007 and continues to grow year over year.

Source: Bentek

Weekly gas storage reports provide a snapshot of supply and demand. Current year changes are represented by the blue line.

Source: U.S. Energy Information Administration
38 Alberta Natural Gas Demand
TransCanada Intra-AB Deliveries; Current Year and Historical Tracks

Alberta natural gas demand has grown steadily in recent years, largely driven by new oil sands projects coming on line.
Source: TransCanada Pipelines

39 Western Canadian Natural Gas Storage Levels
Weekly; Current Year and Historic Tracks

Canada’s natural gas storage level provides a good metric if the country is well stocked. Abnormally high or low storage can affect the basis.
Source: Bloomberg

40 Weekly Canadian Oil and Gas Drilling Activity
Baker Hughes Average Rig Counts; Rolling 24-Month History

Unlike US drilling activity, Canadian rigs are dispatched seasonally. Capital allocation by operators is driven by views of future oil and gas prices.
Source: Baker Hughes

41 US Gas Drilling Activity
Baker Hughes Horizontal Gas Rig Counts; 2014 to Present

Tracking US gas drilling by major play provides insight into the composition of US gas supply and growth trends.
Source: Baker Hughes

42 Alberta Crown Land Sales – Excluding Oil Sands
Year-over-Year; Cumulative

Land prices are an important component of F&D costs. In Alberta, sales of petroleum and natural gas rights are held every two weeks.
Source: Alberta Department of Energy

43 Canadian Cumulative Well Completions
Current Year vs Years Prior

Relative year-over-year drilling activity is highlighted in this chart. Cumulative well completions for the current year are shown in blue.
Source: Daily Oil Bulletin/JWN
## Estimated Capital Flow in the Canadian Oil and Gas Economy for 2017

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Drilling</td>
<td>28,909</td>
<td>42,569</td>
<td>36,680</td>
<td>22,929</td>
<td>36%</td>
<td>37.19</td>
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<td>Oil &amp; Gas Prices</td>
<td>$37.39 per BOE</td>
<td>$37.33 per BOE</td>
<td>$37.19 per BOE</td>
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<td>$34.872 per BOE</td>
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<td>Volume</td>
<td>7.172 Billion</td>
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<td>7.172 Billion</td>
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<td>7.172 Billion</td>
<td>7.172 Billion</td>
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<tr>
<td>Wells Drilled</td>
<td>11,227</td>
<td>11,227</td>
<td>11,227</td>
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<tr>
<td>Service Sector Revenue</td>
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<tr>
<td>Debt, Equity</td>
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<td>$12,827</td>
<td>$12,827</td>
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<tr>
<td>Oil Wells</td>
<td>7.172</td>
<td>7.172</td>
<td>7.172</td>
<td>7.172</td>
<td>7.172</td>
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## Canadian Industry Statistics: Historical Data and Forecast

### Canadian Industry Metrics

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Price</th>
<th>Edmonton Par</th>
<th>AECO</th>
<th>Conv. Liquids</th>
<th>Bitumen + Synthetic</th>
<th>Natural Gas</th>
<th>Total Volume</th>
<th>Total Revenue</th>
<th>After-tax Cash Flow</th>
<th>Conv. Oil</th>
<th>Oilsands</th>
<th>Reinvest Ratio</th>
<th>Wells Compl.</th>
<th>Avg Rig</th>
<th>Utiliz.</th>
<th>Oil Wells</th>
<th>Gas Wells</th>
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