March 19, 2018

ARC Energy Charts

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Chart Watch

4  The CAD fell to a 9 month low last week
12 US imports from Venezuela fell to a 15-year low
26 The summer ‘18 AECO differential is very wide
34 US gas production is tracking near record highs
40 The Canadian rig count is falling with breakup

<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>62.34 ↑</td>
<td>57.24 ↑</td>
<td>2.70 ↓</td>
<td>2.00↑</td>
<td>1.09 ↓</td>
<td>0.7637 ↓</td>
</tr>
</tbody>
</table>

1  Broad Equity Markets Year-to-Date
Daily Index Values; Rolling 12-Month History

Indexed to 12 Months Ago

- Shanghai Composite
- S&P/TSX Composite
- Dow Jones

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
Daily Index Values; Rolling 12-Month History

Indexed to 12 Months Ago

- ARC Junior E&P Index
- S&P 500 E&P
- S&P/TSX E&P Index

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
Daily Index Values; Rolling 12-Month History

Indexed to 12 Months Ago

- Philadelphia Service Index
- PSAC Canadian Index

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
Daily Close Values; Rolling 24-Month History

On Friday the Canadian Dollar fell to its lowest since June 2017. Trade uncertainty as well as comments from the Bank of Canada around a slower pace of rate hikes contributed.

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

As pipeline capacity becomes more constricted, shipments of petroleum products (especially crude oil) are expected to rise. 

Source: Canadian National Railway, Canadian Pacific Railway
Most of Canada’s oil production comes from Alberta; split between oil sands and conventional production.

Source: Alberta Energy Regulator

OPEC’s production levels relative to its sustainable and spare capacity influences global crude prices.

Source: Petroleum Intelligence Weekly

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

Source: International Energy Agency

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

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 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

Global oil stock levels can affect crude oil prices. *Includes U.S. (~90%), Canada, Mexico and Chile. 

Source: International Energy Agency

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 crude oil drilling activity is tracked by major plays to provide insight into the composition of US oil supply and growth trends. 

Source: Baker Hughes

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.
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*

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*

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

All prices in $US/MMBtu
### Weekly US Natural Gas Storage Net Change

Weekly US natural 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*

<table>
<thead>
<tr>
<th>Year</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>50 Tcf</td>
</tr>
<tr>
<td>2018</td>
<td>15 Tcf</td>
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</table>

The last storage draw came in at 93 Bcf, neutral to expectations.

### US Total Natural Gas Demand

Total US demand fluctuates between 60 Bcf/d in the summer and over 100 Bcf/d in the winter. Weather is the most important driver of consumption.  
*Source: Bentek*

<table>
<thead>
<tr>
<th>Year</th>
<th>Bcf/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>80 Bcf/d</td>
</tr>
<tr>
<td>2018</td>
<td>100 Bcf/d</td>
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</table>

### Total Working Natural Gas in US Storage

The EIA reports changes in US natural gas inventories held in underground storage facilities on a weekly basis.  
*Source: U.S. Energy Information Administration*

<table>
<thead>
<tr>
<th>Year</th>
<th>Tcf</th>
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<tbody>
<tr>
<td>2017</td>
<td>450 Tcf</td>
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<tr>
<td>2018</td>
<td>150 Tcf</td>
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The storage deficit to the 5-year average is now 296 Bcf.
**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*

**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*

**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*

**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*

**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*
## Estimated Capital Flow in the Canadian Oil and Gas Economy for 2018

Industry Revenue, Cash Flow, Reinvestment, Drilling Activity and Production

### Oil & Gas Prices

- **$39.03 per BOE**

### Operating Expenditures

- **$106.2 Billion**

### E&P Revenue

### Cash Flow

- **$43.7 Billion**

### CAPEX

- **$42.5 Billion**

### Exploration & Development

### Land, Acquisitions

### Service Sector Revenue

### Reserve Additions

### Drilling Activity

### 7.5 Million BOE/day

### 6,968 Wells

### Canadian Industry Statistics: Historical Data and Forecast

#### Canadian Industry Metrics

<table>
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<tr>
<th>Year</th>
<th>Average</th>
<th>Edmonton</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>E&amp;P</th>
<th>Reinvestment</th>
<th>Drilling Activity</th>
<th>Service Sector Revenue</th>
<th>Exploration &amp; Development</th>
<th>Land, Acquisitions</th>
<th>Capital Flow</th>
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<td>0.91</td>
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<td>2011</td>
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<td>1,743</td>
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<td>62.42</td>
<td>2.10</td>
<td>1,905</td>
<td>2,690</td>
<td>2,574</td>
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<td>37,745</td>
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