| WTI Crude $US/B | Edmonton Light $Cdn/B | Henry Hub Gas $US/MMBtu | AECO Gas $Cdn/GJ | AECO Basis $US/MMBtu | Currency $US/$Cdn |
|---|---|---|---|---|---|
| 103.22 ↑ | 99.84 ↑ | 3.51 ↓ | 2.79 ↓ | 0.73 ↑ | 0.9452 ↓ |

## Chart Watch

| | |
|---|---|
| 1 | Dow up 1.5% last week amid positive US jobs report |
| 7 | WTI edges above $US 100/B |
| 13 | EIA reports 10.3MMB draw from US crude stocks |
| 36 | US gas production climbs back above 65Bcf/d |
| 48 | US net gas imports from Canada below 5-yr range |

## Energy Thinking is Off the Rails

Already, this weekend's train tragedy in Lac-Mégantic has elevated the rail versus pipelines debate. Such punditry about energy systems seems trite and insensitive while people's thoughts are absorbed with those who just perished or are still missing. Yet soon enough the citizenry's attention will turn to policymakers and corporate leaders to address specific issues of transportation safety, pipes versus rail cars, and the broader issue of social license to pump more petroleum through the land. Antithetical voices that insist on the end of oil will amplify in the aftermath of this calamity too.

Lots of opinions can be expected. But let's step back: What the Lac-Mégantic catastrophe highlights is that this country's energy policy is off the rails.

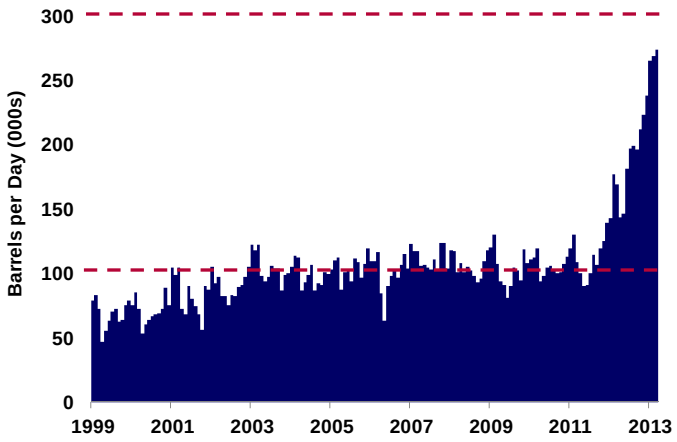
The cause of the derailment and fire is still being investigated, but we do know that the shipment of oil by rail in Canada has nearly tripled in the past 18 months. Let's look at the trends.

Our chart shows that there has always been a fairly steady movement of oil at any one time, about 100,000 barrels every day before 2012. Much of that volume has been composed of crude oil and petroleum products being shunted around in eastern markets, and a lot of it includes cross-border trade between US and Canadian refineries.

We don't know whose oil was on the train at Lac-Mégantic, but it's not likely to be of western Canadian origin. Most of the oil in the east is brought into ports like Montreal and New Jersey from places like the North Sea, Middle East and West Africa. Imports then get refined and distributed – or distributed and refined – to mostly serve traffic jams in high-population-density markets in the Northeast.

**Fig 1: Canadian Fuel Oils and Crude Petroleum by Rail**

**Average Monthly Volumes; 1999 to April 2013**




*Sources: Statistics Canada, ARC Financial Research*

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*Research Associate*
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**Sources** Bloomberg, CAODC, Baker Hughes, EIA, NOAA, CPC, IEA, Natural Resources Canada, Canadian Gas Association, ARC Financial Research

Around the end of 2011, Canadian petroleum shipments by rail started gaining momentum. The rise in volume from 100,000 to almost 300,000 B/d was a direct consequence of wide differentials between the price of Canadian and US oil, caused by constrained pipeline capacity. To Alberta oil producers, a $30/B price discount was a threat to the viability of their business; but to the railroad companies it spelled opportunity – especially sweet, because building new pipelines had become a lightning rod for environmental activism and quicksand for regulatory approval. Most of the incremental 200,000 B/d is now heading south of the border from Alberta, fetching higher prices again, and also lining the pockets of US railroad companies instead of Canadian pipelines.

Like it or not, rail traffic carrying petroleum in all directions of the compass in North America will continue to increase. More large-scale loading and unloading facilities are being built in oil fields and refinery sidings to handle trains dedicated to hauling oil. Scanning through public announcements, in Canada another 450,000 B/d of new capacity additions are slated for construction – all while there is multi-year dithering about pipeline approvals and construction. On one hand, this is the beauty of the free market at work; there's nothing stronger than competition and innovation when it comes to solving inefficient markets. But a rapid rise in crude oil rail shipments is an unplanned societal outcome. It's an unintended, reactionary consequence of laggard thinking about how we should be transporting one of the biggest contributors to the Canadian economy in an era that's characterized by massively disruptive changes in supply and demand.

In a region that already had plenty of oil on the tracks, there was always the risk of an accident in a community like Lac-Mégantic, regardless of the recent increase in Canadian traffic. But that's not the point. Nor is the point that three times as many cars carrying flammable products increases the probability, however marginal, of another tragedy in some other quaint community, at some point. And for sure this rail tragedy is not a simple-minded justification for building more pipelines indiscriminately in all directions across the land. There has to be balance to a problem that is much broader in scope, a problem that begs us to figure out how to optimize safety, environment, national security, First Nations and economic prosperity concerns across our privileged nation.

Canada is one of the largest producers of primary energy resources. We have world scale reserves of oil, natural gas, coal, uranium, hydroelectric power, wood and other renewable sources too. Yet despite our global energy stature, we have a sad lack of cohesive, proactive thinking about how we should be producing, consuming and trading all our valuable energy resources, not just oil. Lac-Mégantic is a most unfortunate metaphor: how we think about energy is like a train without a conductor.

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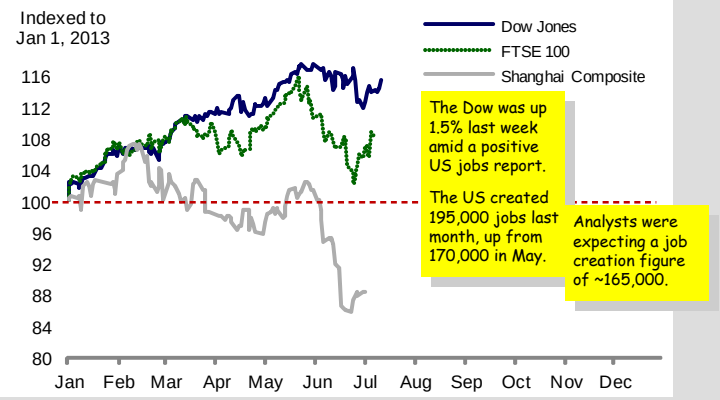
*Look for our Commentary in Canada's National Newspaper, The Globe and Mail (www.theglobeandmail.com).*
*Twitter: @PTertzakian*

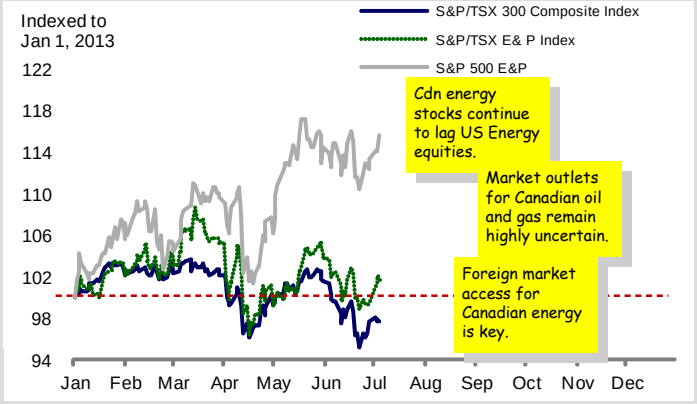
## Market Indicators

### 1 Broad Equity Markets Year to Date
Daily Index Values; Indexed to January 1, 2013




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

### 2 Performance of Oil and Gas Equities Year to Date
Daily Index Values; Indexed to January 1, 2013




Performance of Canadian and US oil & gas equities are compared against the broader market.

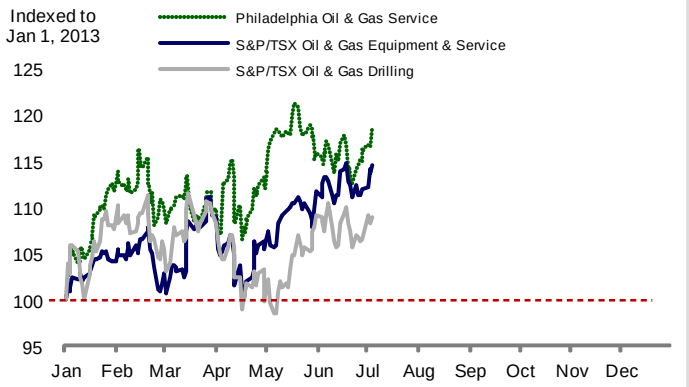
### 3 ARC Canadian Oil & Gas Growth Equity Index
Daily Index Values; Rolling 24-Month History


The ARC CDN Oil & Gas Growth Index measures the performance of over 100 oil and gas producers that are not included in larger exchange indices.

### 4 ARC Oil Sands Producers Equity Index
Daily Index Values; Rolling 24-Month History


The ARC Oil Sands Index measures the performance of six oil sand producers.

### 5 Oil & Gas Service Equities Year to Date
Daily Index Values; Indexed to January 1, 2013




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

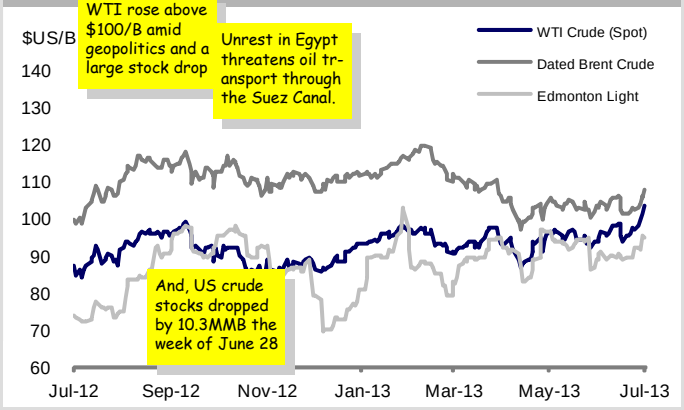
### 6 Canadian Currency Exchange
Daily Close Values; Rolling 24-Month History


Much of Canada's oil and gas production is exported. As such, the value of the Canadian dollar has significant impact on corporate revenues.

## Crude Oil

### 7 Daily Spot Crude Oil Prices

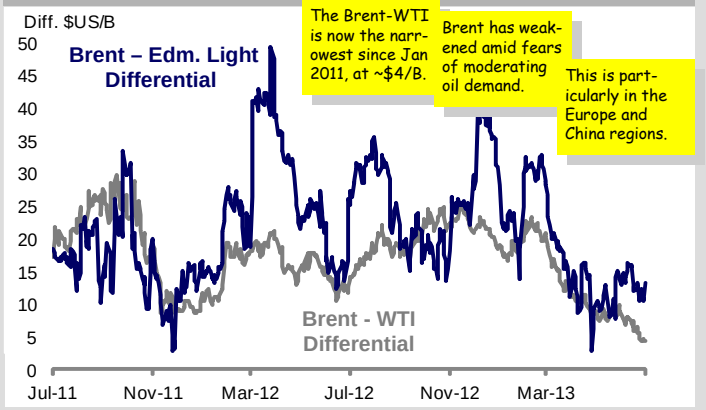
WTI, Brent Crude, Edmonton Light; Rolling 12-Month History




Spot crude oil prices are principally driven by stock levels, international supply/demand dynamics and related geopolitical influences.

### 8 Brent-WTI and Brent-Edmonton Light Differentials

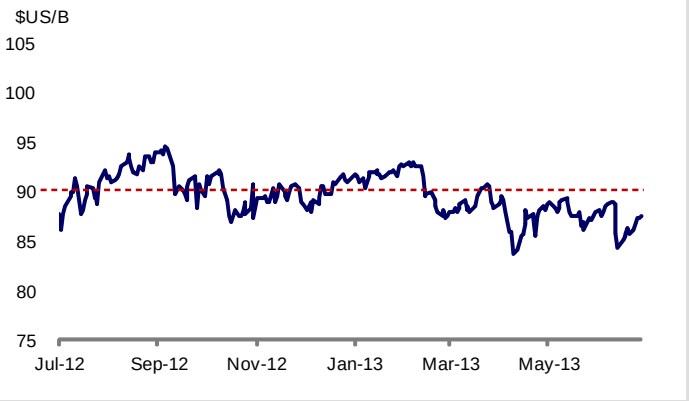
Daily; Rolling 24-Month History




Crude oil price differentials are driven by domestic and international supply/ demand dynamics including market accessibility and related geopolitics.

### 9 Daily Futures Crude Oil Prices: 24-Mth Contract

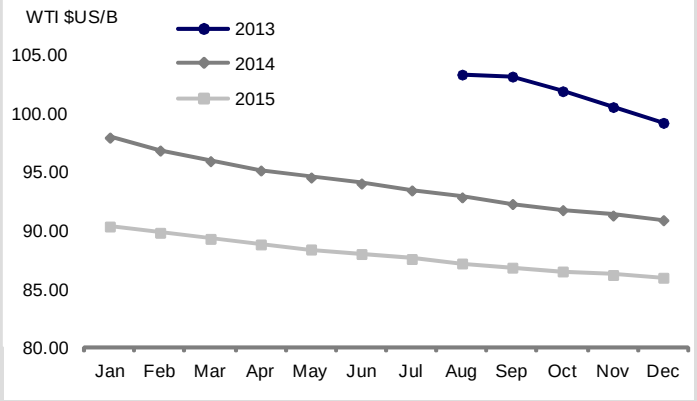
WTI NYMEX; Rolling 12-Month History




The daily close of the long end of the futures curve is important to watch for structural changes in the crude oil market.

### 10 US Crude Oil Futures

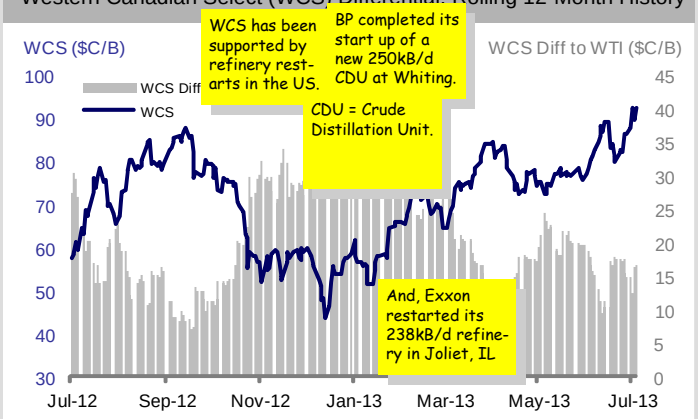
West Texas Intermediate (WTI) 2013 to 2015




Here forward contract prices for WTI are plotted against months in the calendar year. Years are distinguished by color and/or symbol coding.

### 11 Canadian Heavy Oil Price and Differential to WTI

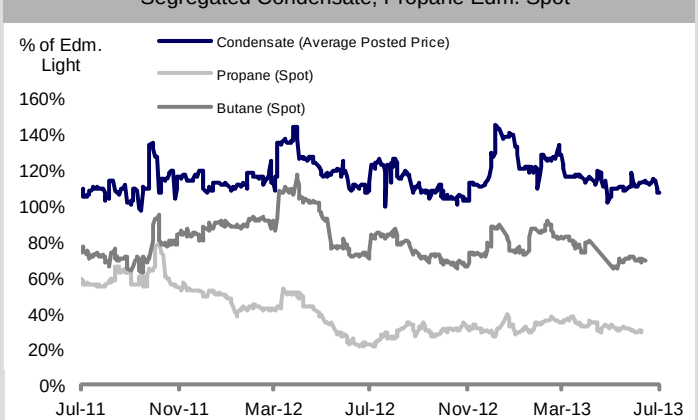
Western Canadian Select (WCS) Differential: Rolling 12-Month History




Canadian heavy differentials vary depending on barrel-to-barrel competition at a limited number of US refineries with specialized refining capacity.

### 12 Daily NGL Prices as a % of Edmonton Light

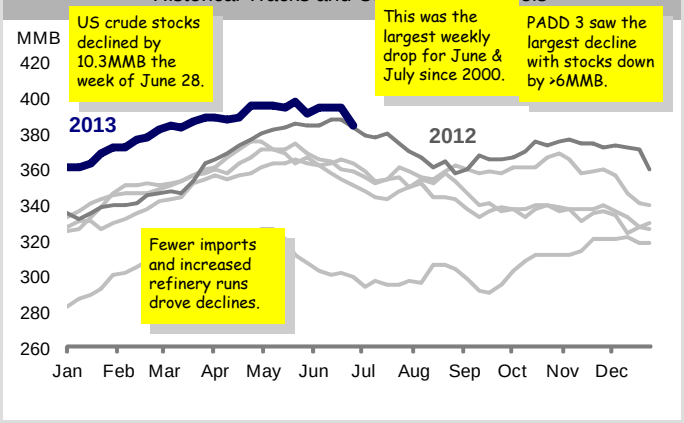
Segregated Condensate; Propane Edm. Spot




Natural gas liquids have become critical contributors to producers' cash flow. Prices are influenced by the price of oil.

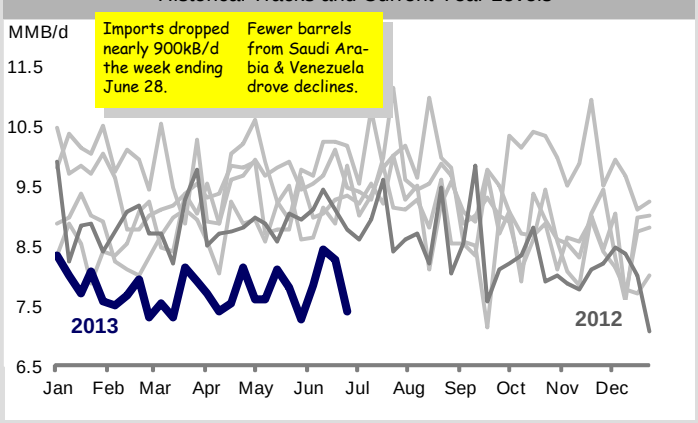
## Crude Oil

### 13 US Crude Oil Stocks
Historical Tracks and Current Year Levels



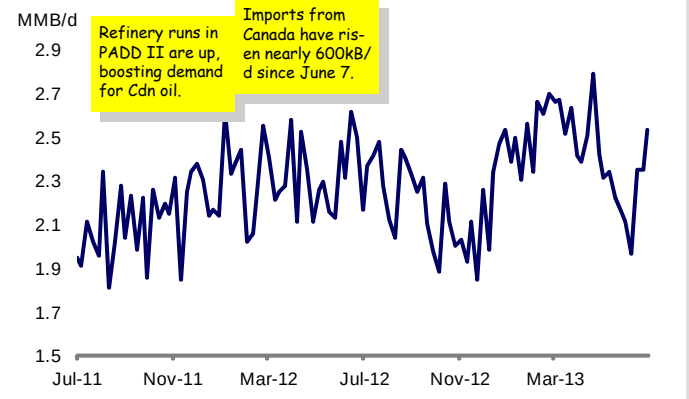

Weekly stock levels provide a snapshot of supply and demand. The grey lines span a historical range; the blue line plots current year levels.

### 14 US Crude Oil Imports
Historical Tracks and Current Year Levels



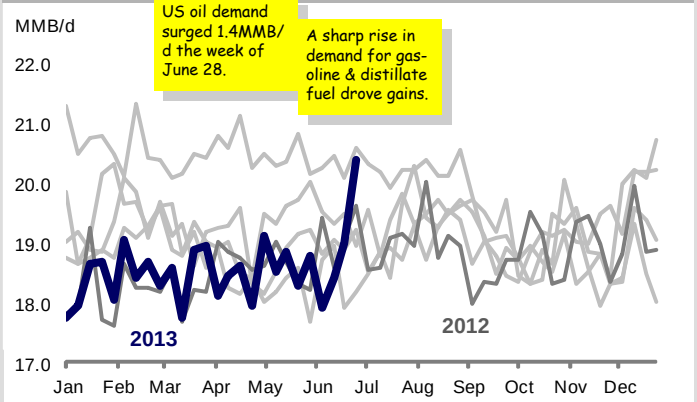

The US must import crude oil to augment its domestic supply. The grey lines span a historical range; the blue line plots current year values.

### 15 US Weekly Crude Oil Imports from Canada
Rolling 24-Month History



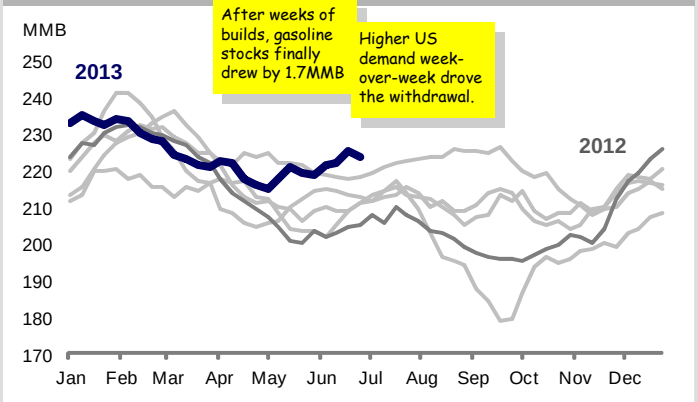

Total US crude imports are trending downward year-over-year. Canadian volumes are taking market share from overseas imports.

### 16 Total Weekly US Petroleum Supplied
Historical Tracks and Current Year Levels



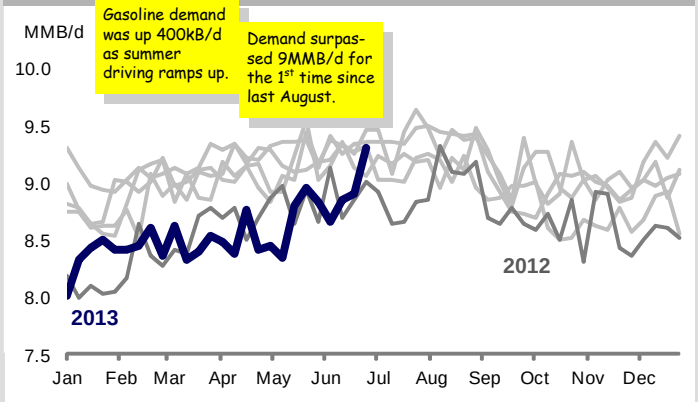

Petroleum supplied represents the total consumption of petroleum products in the U.S. Oil consumption for the current year is in blue.

### 17 US Motor Gasoline Stocks
Historical Tracks and Current Year Levels




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

### 18 US Motor Gasoline Consumption
Historical Tracks and Current Year Levels

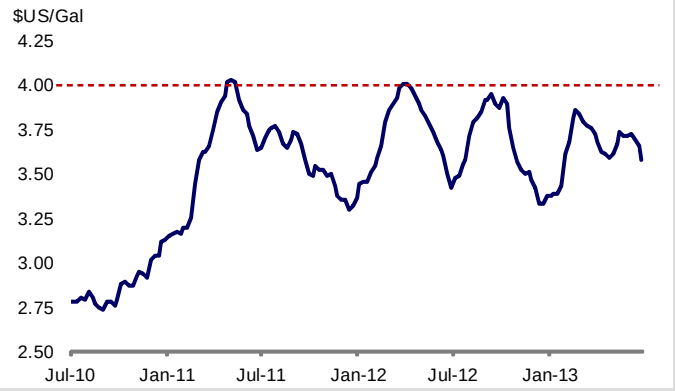



Gasoline consumption accounts for almost half of all oil use in the U.S. Gasoline consumption for the current year is in blue.

# Crude Oil

## 19 US Average Retail Gasoline (All Grades) Prices

Weekly Data; Rolling 3-Year History




Gasoline is one of the main products refined from crude oil. Gasoline prices are influenced by crude oil prices, seasonality and retail competition.

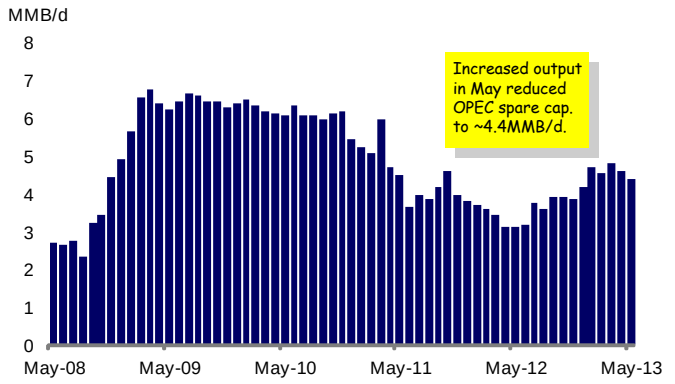
## 20 Global Oil Demand

Monthly; Rolling 60-Month History


Global oil demand growth is largely driven by economic growth. The majority of new demand is coming from non-OECD countries.

## 21 OPEC Notional Spare Capacity

Monthly; Rolling 60-Month History




World oil spare capacity resides only in OPEC member countries. It is assumed that non-OPEC countries produce at full capacity.

## 22 OPEC Production Data Table

Recent Production Targets and Spare Capacity: MMB/Day

| | Target Effective May-13 | May-13 Prod'n | Sustainable Capacity | Spare Capacity |
|---|---|---|---|---|
| Algeria | | 1.15 | 1.19 | 0.04 |
| Angola | | 1.78 | 1.82 | 0.04 |
| Ecuador | | 0.50 | 0.51 | 0.01 |
| Iran | | 2.68 | 2.98 | 0.30 |
| Iraq | | 3.14 | 3.34 | 0.20 |
| Kuwait | | 2.84 | 2.90 | 0.06 |
| Libya | | 1.38 | 1.55 | 0.17 |
| Nigeria | | 1.96 | 2.44 | 0.48 |
| Qatar | | 0.73 | 0.77 | 0.04 |
| Saudi Arabia | | 9.56 | 12.27 | 2.71 |
| UAE | | 2.73 | 2.90 | 0.17 |
| Venezuela | | 2.45 | 2.60 | 0.15 |
| **TOTAL OPEC** | **30.00** | **30.90** | **35.27** | **4.37** |

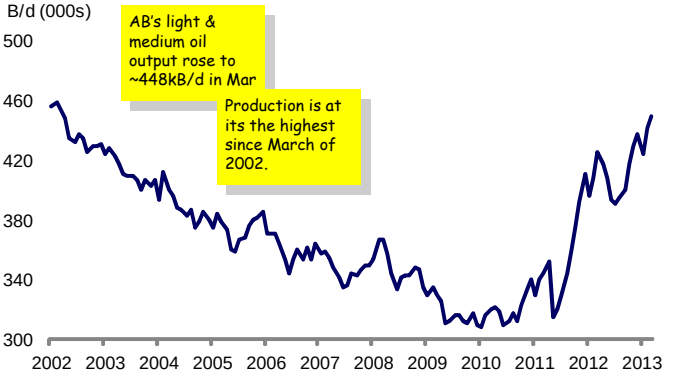
OPEC crude oil supply rose by 135kB/d in May to a 7-mo high.

Increased supply from Saudi, Iran, the UAE & Kuwait drove gains.

OPEC's production levels relative to its sustainable and spare capacity ties directly into near and long-term crude oil prices.

## 23 Alberta Oil Production

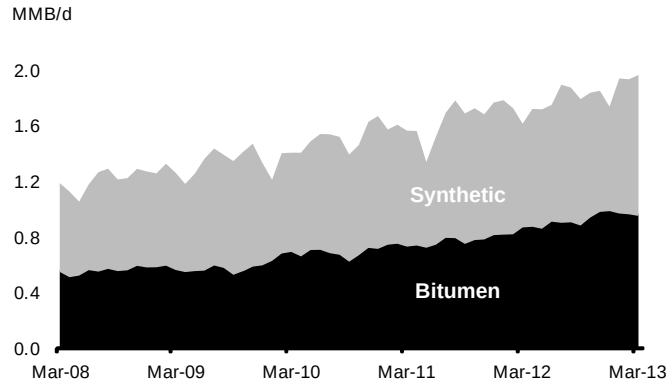
Monthly; Light & Medium Crude




Alberta is the largest producer of crude oil in Canada. Recent growth has come as a result of innovations in drilling and completions methods.

## 24 Canadian Oil Sands Production

Monthly; Rolling 60-Month History

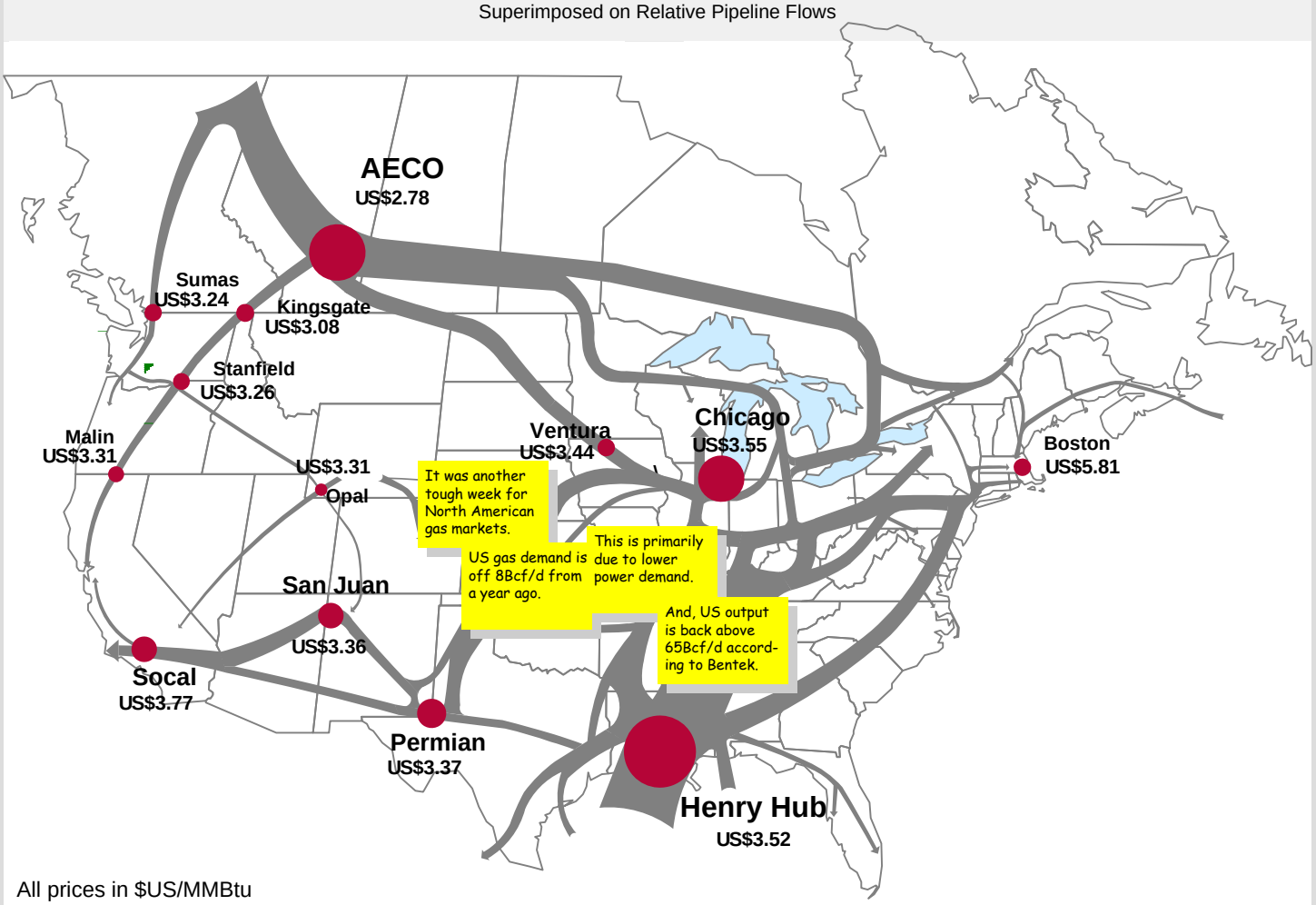



Cdn oil sands is an important source of new supply to meet global oil demand growth. Production is projected to reach 2.1 MMBd by 2015.

25

## Closing Spot Prices at North American Natural Gas Hubs

Superimposed on Relative Pipeline Flows




All prices in $US/MMBtu

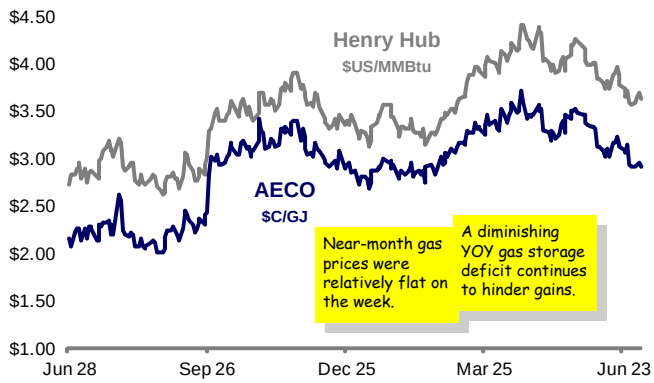
26 **Henry Hub-AECO Near Month Price Differential**

Daily; Rolling 12-Month History


Historically the AECO price has traded at approximately 85% of the Henry Hub price (in $US/MMBtu).

27 **Near-Month North American Natural Gas Prices**

Daily Prices; Rolling 12-Month History




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

## Natural Gas

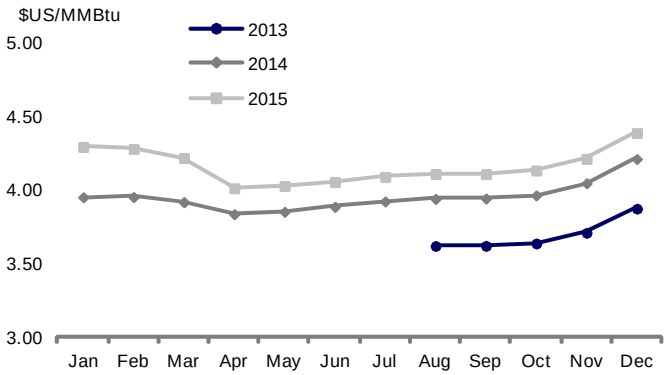
### 28 Daily Natural Gas Prices Futures Average

Average of 25-to-36 month out contracts; Rolling 12-Month History


The daily close of the long end of the futures curve is important to watch for structural changes in the natural gas market.

### 29 US Natural Gas Futures

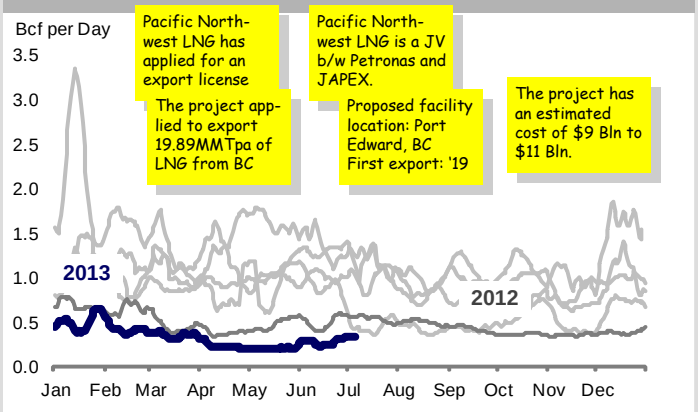
Nymex (Henry Hub) 2013 to 2015




Here forward contract prices are plotted against months in the calendar year. Years are distinguished by color and/or symbol coding.

### 30 US LNG Import Volumes (Net)

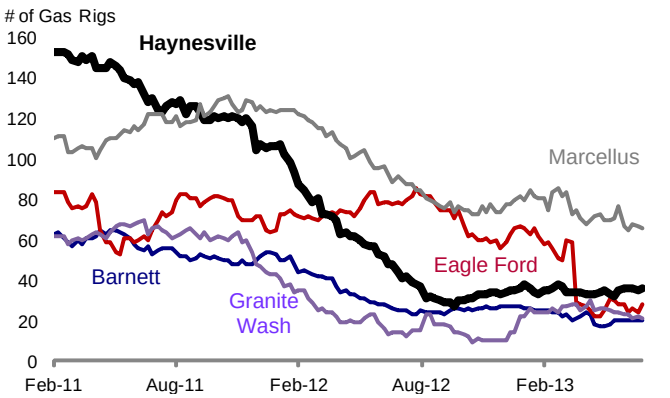
Daily; Historical Tracks and Current Year Levels




LNG Imports are an important component in meeting US natural gas demand. Source: Bentek

### 31 US Shale Gas Horizontal Drilling Activity

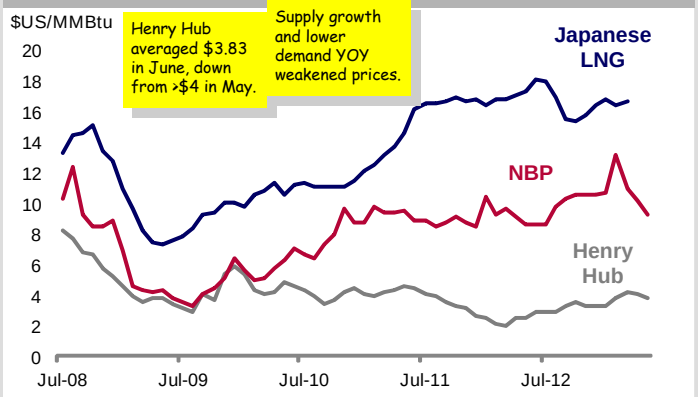
Baker Hughes Horizontal Shale Gas Rig Counts




Tracking US gas drilling by major shale gas play provides insight into the composition of US natural gas supply and productivity growth trends.

### 32 Global Natural Gas Prices

Japanese LNG, UK NBP, Henry Hub; Average Monthly Prices




Japan's LNG import price is inclusive of freight cost. NBP reflects the gas price at a notional delivery point in the UK National Transmission System.

### 33 Canadian Natural Gas Forward Prices

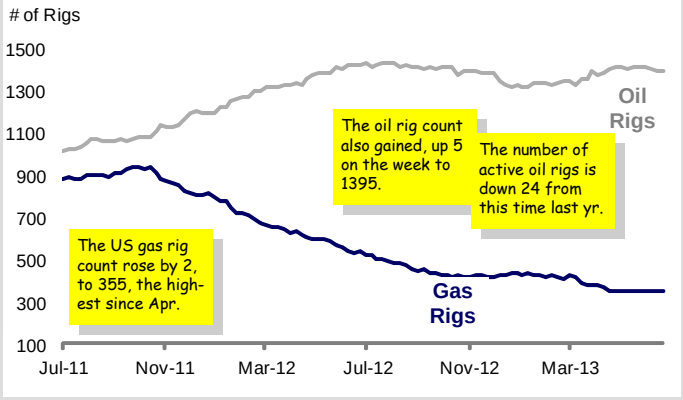
AECO Hub

| | $C/GJ | $C/Mcf | $US/MMBtu |
|---|---|---|---|
| AECO Spot Price | 2.79 | 2.94 | 2.78 |
| 1-Month Fwd | 2.92 | 3.08 | 2.91 |
| AECO Nov 1 Yr Out | 3.32 | 3.50 | 3.31 |
| Rest of Gas Year | 2.96 | 3.12 | 2.95 |
| Fwd Winter Strip | 3.34 | 3.52 | 3.33 |

AECO forward prices mimic Henry Hub futures plus a differential. Due to less liquidity, forward AECO quotes do not extend out beyond one year.

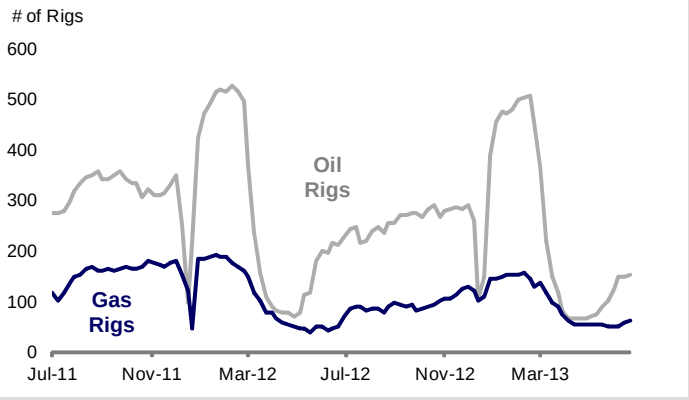
## Natural Gas

### 34 Weekly US Oil and Gas Drilling Activity
Baker Hughes Average Rig Counts; Rolling 24-Month History



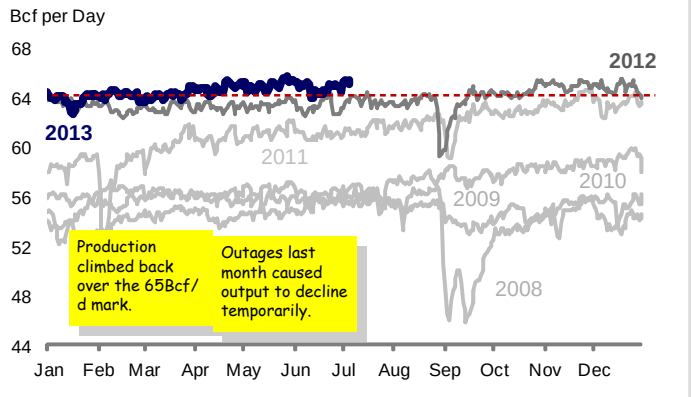

US rig activity is a leading indicator of continental supply. Capital allocation by operators is driven by views of future oil and natural gas prices.

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



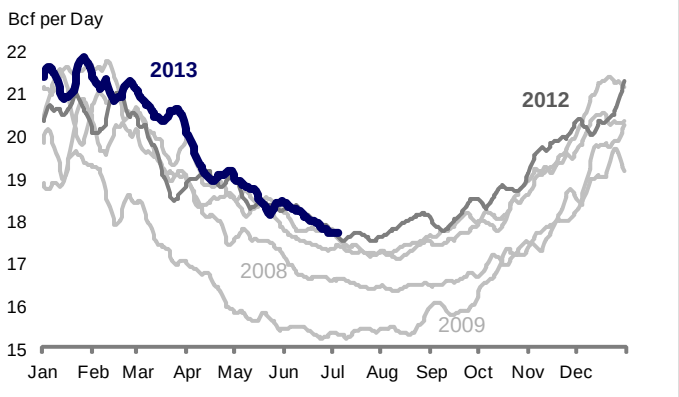

Canadian rig activity is a leading indicator of continental supply. Unlike US drilling activity Canadian rigs are dispatched seasonally.

### 36 Total US Dry Natural Gas Production
Historical Tracks and Current Year Levels



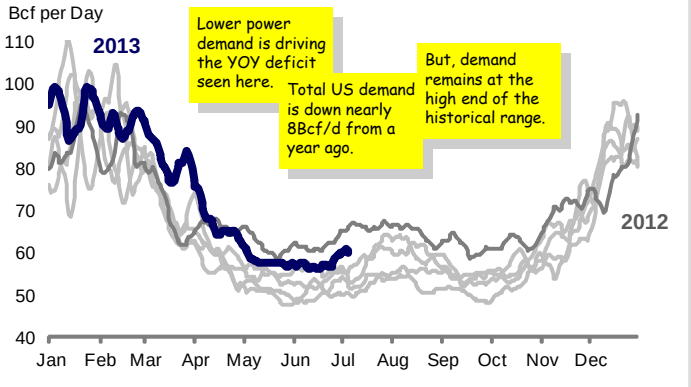

Tracking US natural gas supply helps monitor the growth in domestic production that started ramping up in late 2007.

### 37 US Total Natural Gas Industrial Demand
Daily; Historical Tracks and Current Year Levels



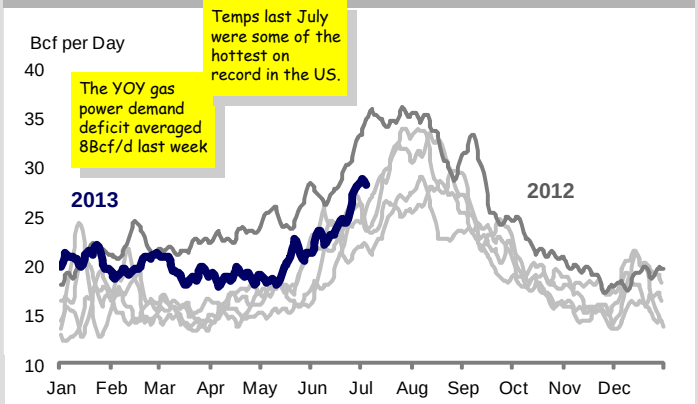

Industrial sector energy use is largely for process heating/ cooling and powering machinery. US gas demand in the sector is on the rise.

### 38 US Total Natural Gas Demand
Daily; Historical Tracks and Current Year Levels




Total US demand fluctuates between 50 Bcf/d in summer and 100 Bcf/d in the winter. Weather is still the most influential factor driving consumption.

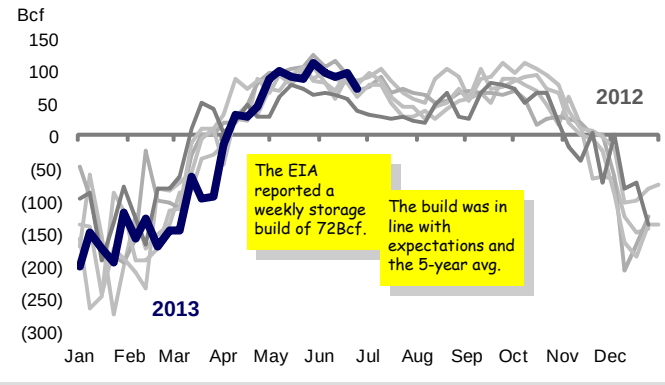
### 39 US Total Natural Gas Power Demand
Daily; Historical Tracks and Current Year Levels




The electric power industry has become an important driver of total US natural gas demand. It is the largest component by far in the summer.

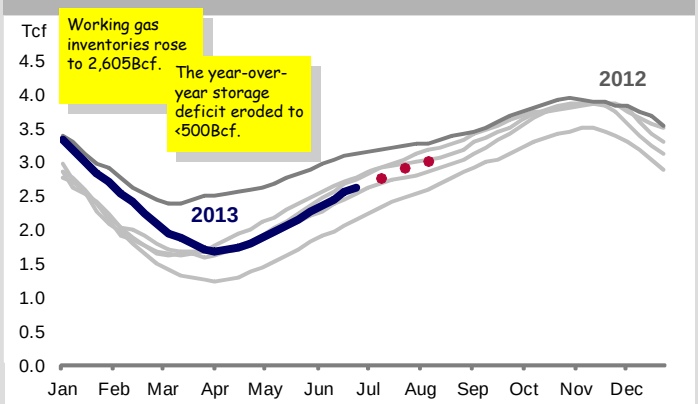
## Natural Gas

### 40 Weekly US Natural Gas Storage Net Change
Weekly Injection or (Withdrawals); 2007 to Current



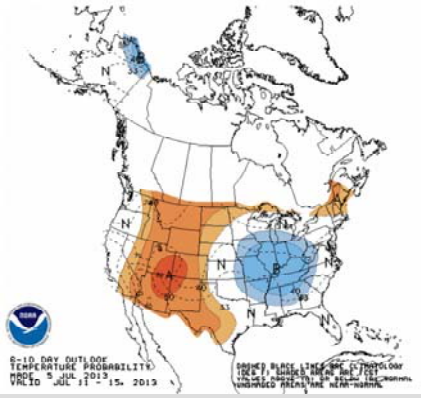

Weekly gas storage reports provide a snapshot of supply and demand. Previous years are in light grey; the blue line plots current year levels.

### 41 Total Working Natural Gas in US Storage
Historical Tracks and Current Year Levels



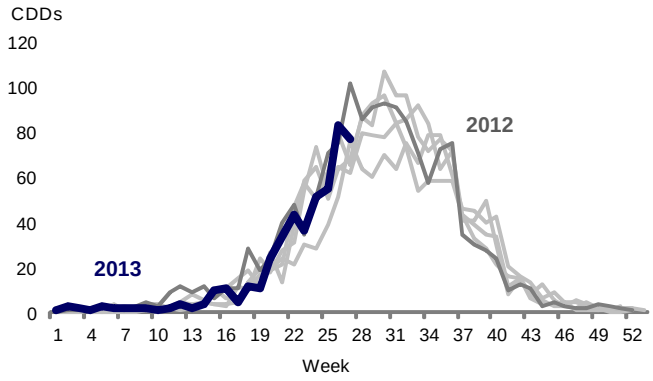

The EIA reports changes in US natural gas inventories held in underground storage facilities on weekly basis.

### 42 US Temperature Outlook: 6 to 10 Days
NOAA Temperature Probability Contours



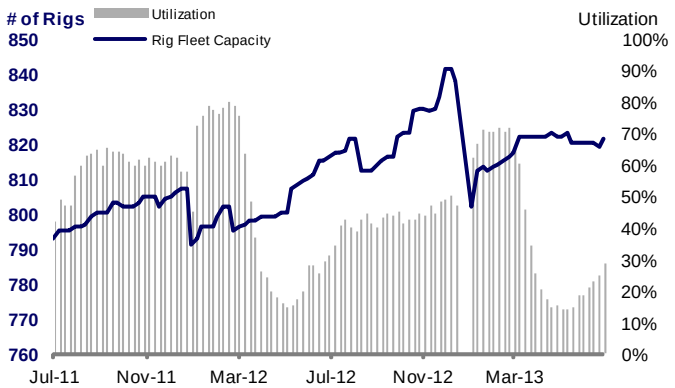
Probability contours show which regions are expected to be anomalously warmer or cooler. Deeper reds imply warmer-than-average; blueish cooler.

### 43 US Weekly Cooling Degree Days
Source: NOAA



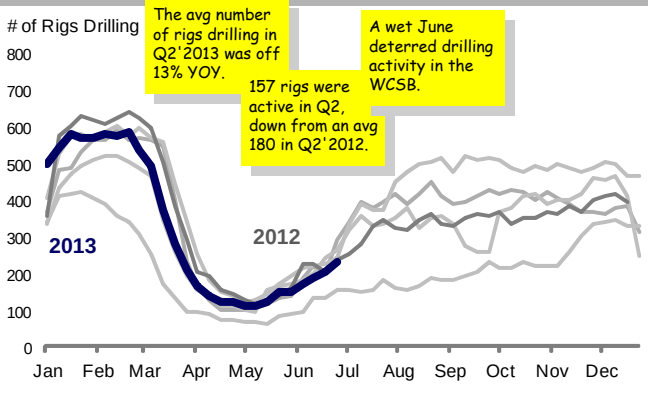

Weekly natural gas demand is directly tied to the weather. Current year is in dark blue; historical years are in grey.

### 44 Cdn Oil and Gas Rig Capacity and Utilization
CAODC Average Weekly Rig Count; Rolling 2-Year History




Rig utilization in Canada is a function of broad fundamentals and seasonality. Utilization always drops off during spring breakup.

### 45 Weekly Canadian Oil and Gas Drilling Activity
CAODC Average Weekly Rig Count

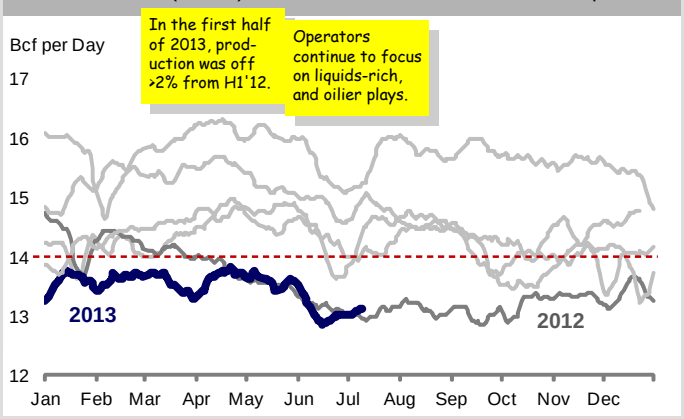



Unlike US drilling activity Canadian rigs are dispatched seasonally. The active rig count for the current year is in blue.

# Natural Gas

## 46 Daily Western Canadian Pipeline Receipts

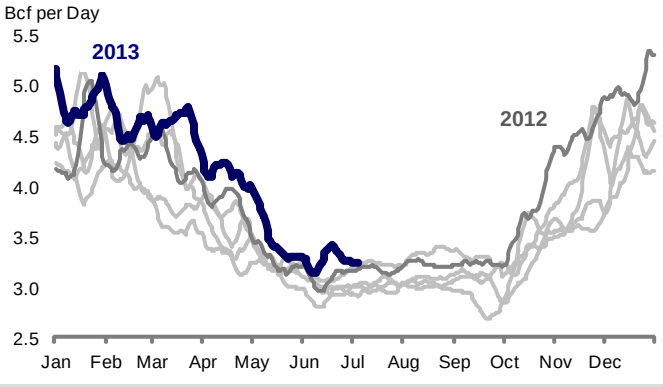
TransCanada (NOVA), Alliance, WestCoast & TransGas Pipelines




All combined, TCPL, Alliance, WestCoast and TransGas pipelines move over 13 Bcf/d of natural gas out of Western Canada.

## 47 Alberta Natural Gas Demand

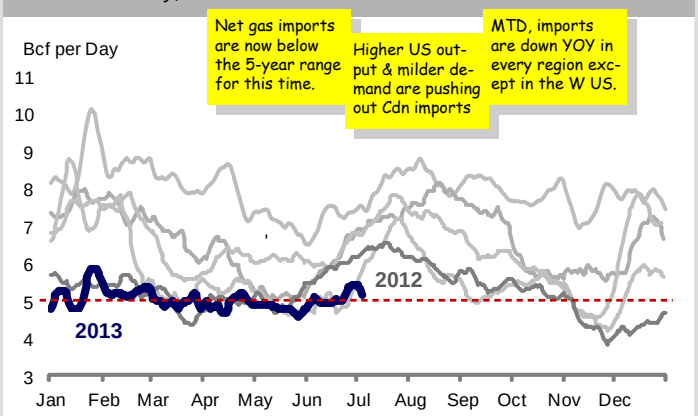
TransCanada Intra-AB Deliveries; Current Year and Historical Tracks




As Alberta's economy grows, and as more oil sands projects come on line, it will be increasingly important to monitor the Province's gas demand.

## 48 US Net Natural Gas Imports From Canada

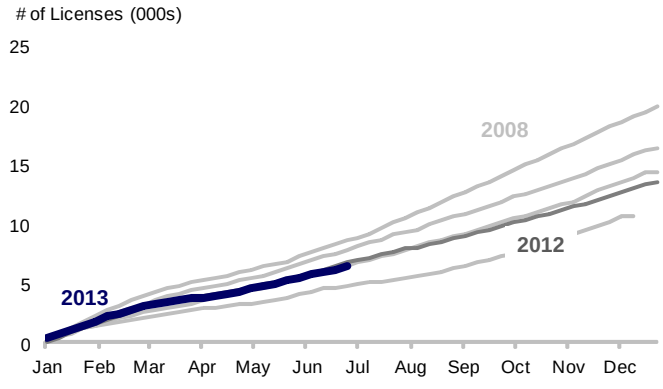
Daily; Historical Tracks and Current Year Levels




The US is a large consumer of Canadian gas. However, the dynamic is changing as US domestic production continues to grow.

## 49 Canadian Cumulative Well Licensing Activity

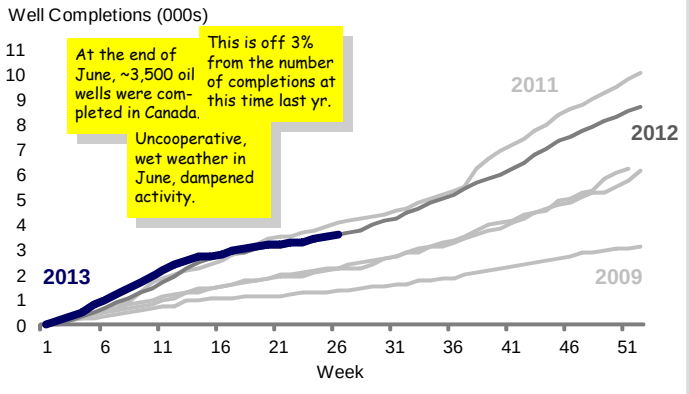
Current Year *vs* Years Prior




Canadian well licenses are a leading indicator of WCSB drilling activity. Cumulative well licenses for the current year are in blue.

## 50 Canadian Cumulative Oil Well Completions

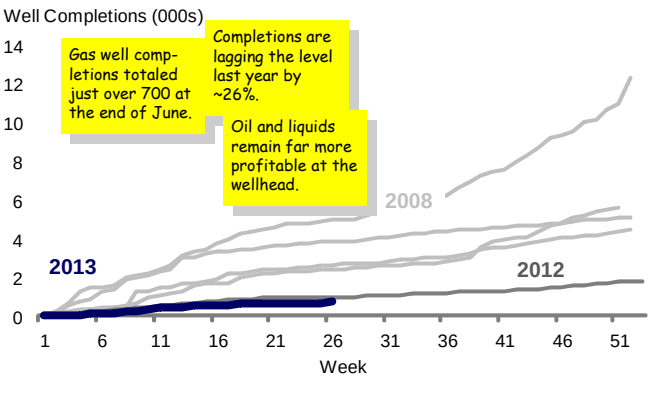
Current Year *vs* Years Prior




Relative year-over-year drilling activity is highlighted in this chart. Cumulative oil well completions for the current year are shown in blue.

## 51 Canadian Cumulative Gas Well Completions

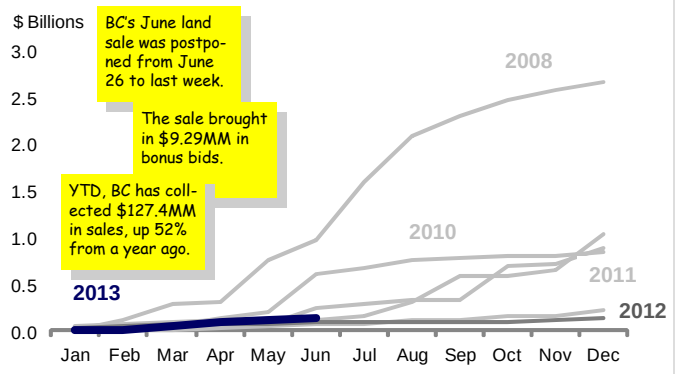
Current Year *vs* Years Prior




Relative year-over-year drilling activity is highlighted in this chart. Cumulative gas well completions for the current year are shown in blue.

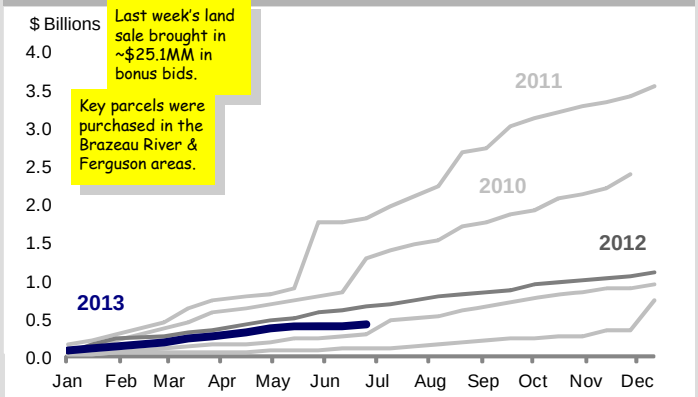
## Other Indicators

### 52 British Columbia Crown Land Sales
Year-over-Year; Cumulative



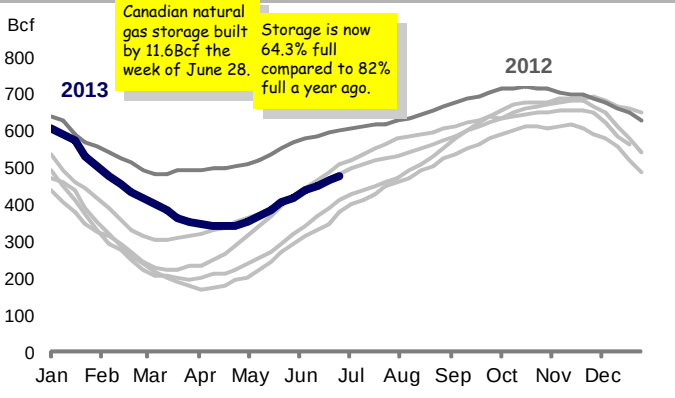

Land prices are an important component of F&D costs. In British Columbia, sales of petroleum and natural gas rights are held every month.

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



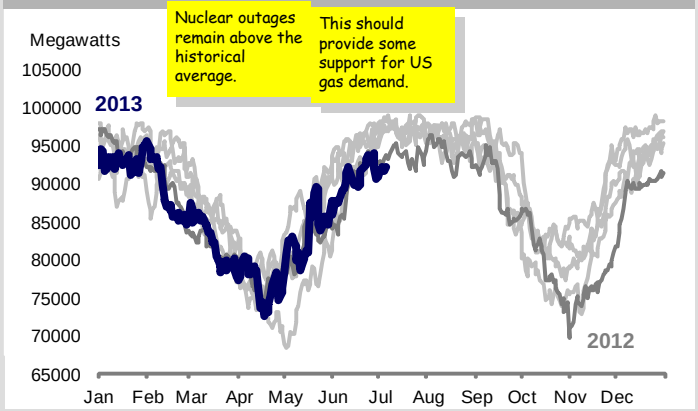

Land prices are an important component of F&D costs. In Alberta, sales of petroleum and natural gas rights are held every two weeks.

### 54 Canadian Natural Gas Storage Levels
Weekly; Current Year and Historic Tracks



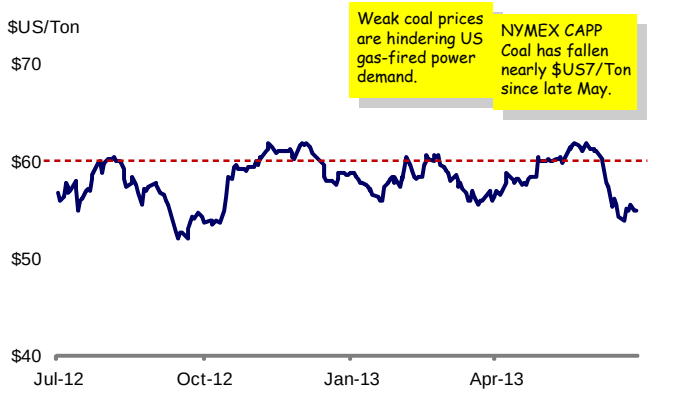

Canada's natural gas storage level provides a good metric if the country is well stocked. Abnormally high or low storage can affect the basis.

### 55 Weekly US Nuclear Electricity Generation
Current Year *vs* Years Prior



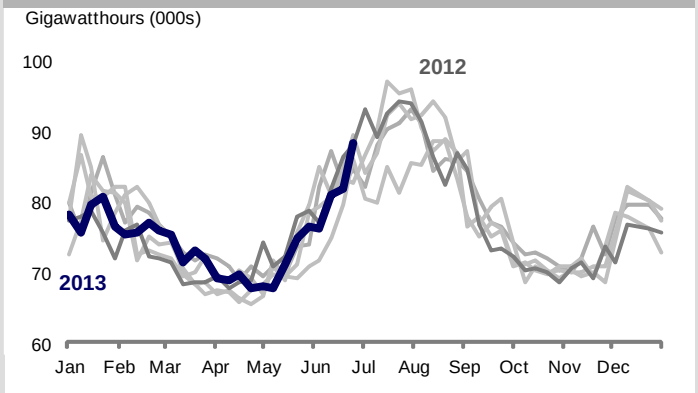

The capacity of electricity generated from US nuclear power plants is 99,910 megawatts. Source: Nuclear Regulatory Commission.

### 56 NYMEX CAPP Coal Prices – Near Month
Daily; Rolling 12-Month History




Nymex offers a liquid market to hedge physical coal contracts. In power markets, coal competes for market share against oil and gas.

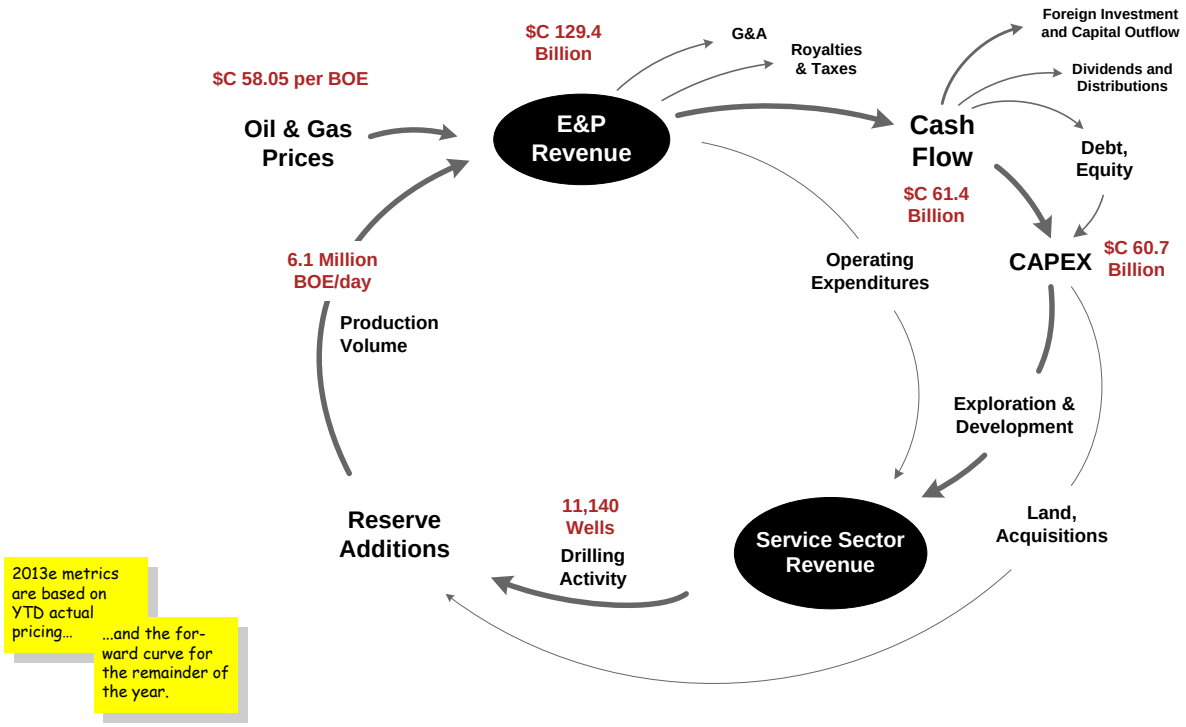
### 57 Weekly US Electrical Power Output
All Sources of Power Generation




Weekly US electrical power output can be compared against output at the same time for years prior. Current year is plotted in blue.

## Estimated Capital Flow in the Canadian Oil and Gas Economy for 2013

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

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## Canadian Industry Statistics: Historical Data and Forecast

### Canadian Industry Metrics

| | Price | | | Production Volume | | | | Capital Inflow | | Reinvestment | | | Drilling | | Well Split | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average Price | Edmonton Par | AECO | Conv. Liquids | Bitumen + Synthetic | Natural Gas | Total Volume | Total Revenue | After-tax Cash Flow | Conv. Oil and Gas | Oilsands | Reinvest Ratio | Wells Compl. | Avg Rig Utiliz. | Oil Wells | Gas Wells |
| | $/BOE | $C/B | $C/GJ | Average MBOE/d | Average MBOE/d | MBOE/d (@ 6:1) | MBOE/d (@ 6:1) | $C millions | $C millions | $C millions | $C millions | x:1 | # / Year | % | % | % |
| 1999 | 18.60 | 27.61 | 2.77 | 1,990 | 568 | 2,745 | 5,303 | 35,996 | 16,846 | 13,743 | 2,422 | 0.96 | 10,605 | 46% | 26% | 59% |
| 2000 | 29.41 | 44.48 | 5.31 | 2,056 | 608 | 2,840 | 5,504 | 59,094 | 26,543 | 18,795 | 4,223 | 0.87 | 16,485 | 63% | 33% | 54% |
| 2001 | 31.22 | 39.26 | 5.17 | 2,024 | 659 | 2,889 | 5,572 | 63,481 | 29,064 | 21,998 | 5,907 | 0.96 | 17,933 | 62% | 26% | 62% |
| 2002 | 27.71 | 40.21 | 3.89 | 2,102 | 741 | 2,886 | 5,729 | 57,939 | 29,433 | 18,107 | 6,746 | 0.84 | 14,459 | 45% | 27% | 63% |
| 2003 | 35.95 | 43.40 | 6.31 | 2,085 | 863 | 2,800 | 5,738 | 75,298 | 37,644 | 23,855 | 5,048 | 0.77 | 19,851 | 62% | 23% | 70% |
| 2004 | 39.79 | 52.86 | 6.24 | 2,089 | 993 | 2,827 | 5,865 | 85,179 | 43,959 | 26,828 | 6,183 | 0.75 | 21,593 | 63% | 21% | 72% |
| 2005 | 51.53 | 69.19 | 8.36 | 2,044 | 990 | 2,840 | 5,837 | 107,455 | 56,442 | 34,815 | 10,437 | 0.81 | 21,925 | 68% | 22% | 70% |
| 2006 | 46.98 | 73.27 | 6.20 | 2,042 | 1,126 | 2,850 | 5,941 | 103,294 | 54,171 | 38,345 | 14,337 | 1.00 | 22,127 | 65% | 22% | 71% |
| 2007 | 49.28 | 77.01 | 6.12 | 2,077 | 1,199 | 2,810 | 6,070 | 109,274 | 54,985 | 31,184 | 18,065 | 0.88 | 19,144 | 38% | 28% | 66% |
| 2008 | 68.22 | 102.66 | 7.75 | 1,994 | 1,207 | 2,700 | 5,864 | 145,425 | 83,255 | 36,293 | 18,113 | 0.65 | 16,877 | 41% | 36% | 56% |
| 2009 | 42.26 | 66.42 | 3.79 | 1,840 | 1,331 | 2,514 | 5,683 | 89,057 | 36,680 | 22,335 | 11,227 | 0.91 | 8,368 | 25% | 41% | 51% |
| 2010 | 48.41 | 77.55 | 3.79 | 1,830 | 1,403 | 2,434 | 5,668 | 101,056 | 43,569 | 35,666 | 17,195 | 1.19 | 12,119 | 40% | 56% | 40% |
| 2011 | 55.32 | 95.24 | 3.44 | 1,873 | 1,482 | 2,386 | 5,740 | 115,890 | 53,448 | 40,139 | 22,491 | 1.17 | 12,827 | 52% | 65% | 29% |
| 2012e | 50.64 | 86.38 | 2.27 | 1,894 | 1,776 | 2,275 | 5,945 | 109,883 | 48,697 | 32,802 | 22,991 | 1.15 | 11,067 | 53% | 74% | 17% |
| 2013e | 58.05 | 91.53 | 3.22 | 1,938 | 1,926 | 2,242 | 6,106 | 129,387 | 61,427 | 37,227 | 23,491 | 0.99 | 11,140 | 40% | 74% | 17% |