March 8, 2021

energyresearch institute

ARC Energy Charts

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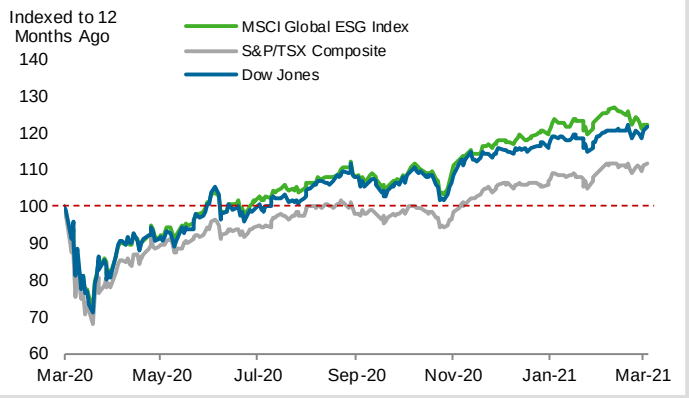
Chart Watch

- **2** E&P equity indices have surged over the last yr
- **14** Cdn light oil price at highest since August 2018
- **19** Refinery utilization fell during Texas power crisis
- **26** OPEC+ agreed to extend production cuts
- **48** Jan/Feb drilling down 35% from last year

Spot WTI Crude $US/B	Edmonton Light $US/B	Spot Henry Hub $US/MMBtu	Spot AECO $Cdn/GJ	Spot AECO Basis $US/MMBtu	Currency $US/$Cdn
65.05 ↑	62.39 ↑	2.67 ↓	2.70 ↓	0.42 ↑	0.7898 ↓

1 Broad Equity Markets

Daily Index Values; Rolling 12-Month History

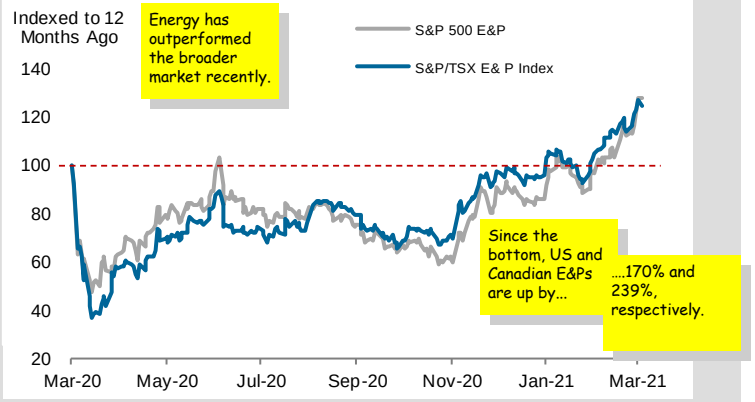


Broad market indices are one the many vital signs measuring the health of the economy. Energy demand is a function of economic health.

Source: Bloomberg, ARC Financial Corp.

2 Oil and Gas E&P Indices

Daily Index Values; Rolling 12-Month History

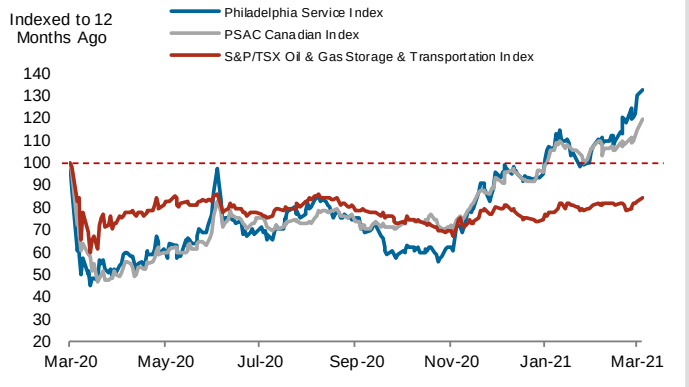


Performance of Canadian and US oil & gas equities are compared against each other.

Source: Bloomberg, ARC Financial Corp.

3 Oil & Gas Service and Midstream Indices

Daily Index Values; Rolling 12-Month History

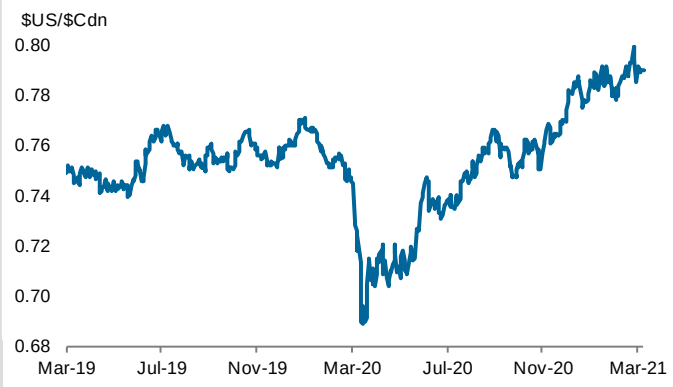


The performance of Canadian oil and gas service and midstream equities are plotted in tandem with the corresponding US Oilfield index.

Source: Bloomberg, Petroleum Services Association of Canada

4 Canadian Currency Exchange

Daily Close Values; Rolling 24-Month History



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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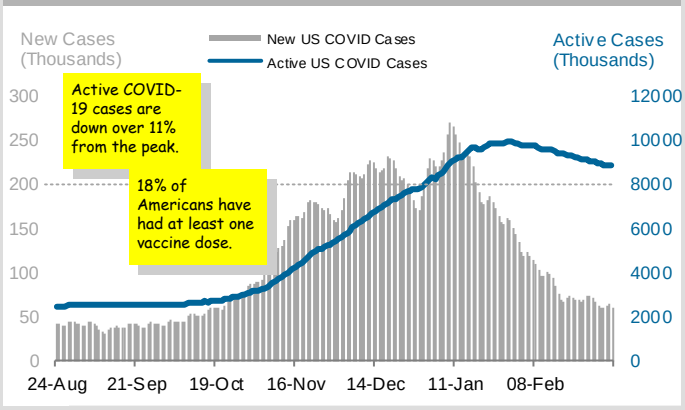
5 United States: New and Active COVID-19 Cases

Daily (5-Day Rolling Average); Last 6 Months

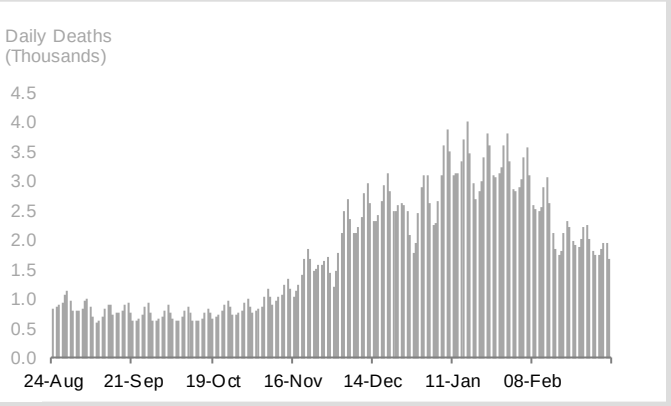


Daily infection rates and active cases of COVID-19 will determine reopening and recovery of the world's largest economy.

Source: Worldometer

6 United States: Daily New Deaths

Deaths per Day (5-Day Rolling Average): Last 6 Months

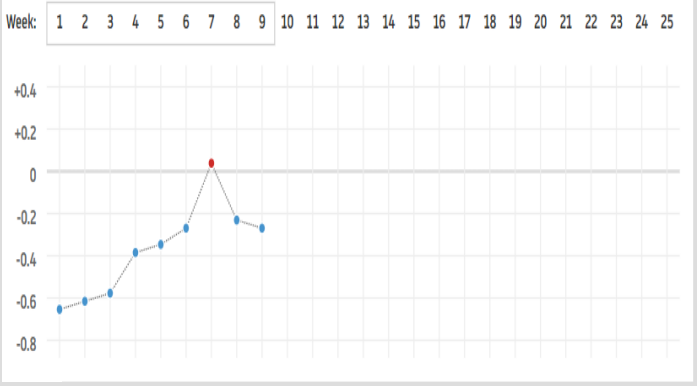


The growth rate of daily deaths is a useful statistic for tracking the progress of COVID-19 and predicting healthcare needs.

Source: Worldometer

7 TomTom Traffic Index: Chicago, U.S.

2021 Congestion Level Relative to 2019

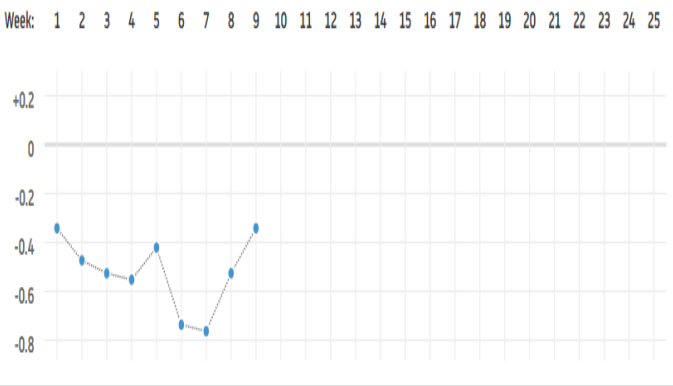


Traffic congestion levels show a real-time picture of the number of vehicles on the road; an indication of gasoline demand and economic recovery.

Source: TomTom International BV

8 TomTom Traffic Index: Beijing, China

2021 Congestion Level Relative to 2019

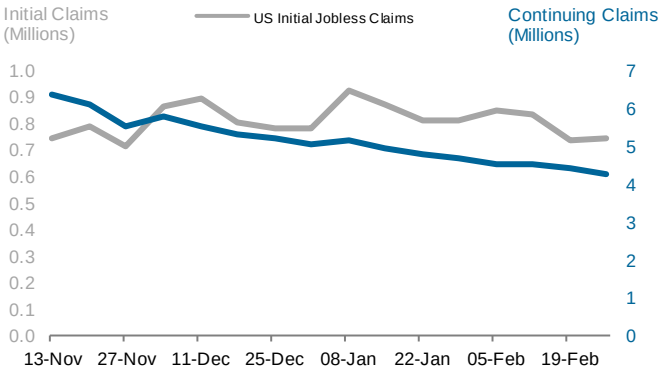


Traffic congestion levels show a real-time picture of the number of vehicles on the road; an indication of gasoline demand and economic recovery.

Source: TomTom International BV

9 U.S. Weekly Jobless Claims

Initial and Continuing Claims

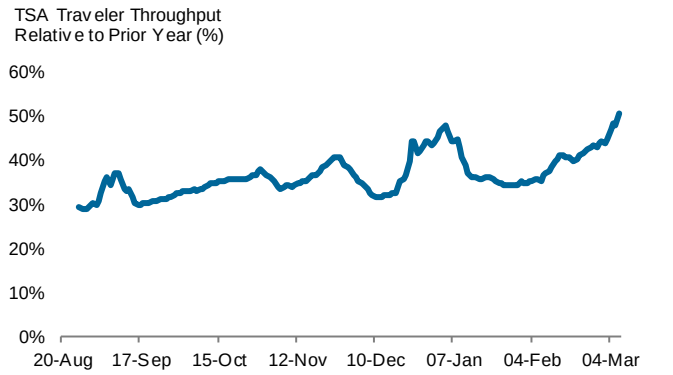


Jobless claims are an important leading indicator on the state of the employment situation and the health of the economy.

Source: US Labor Department

10 TSA Checkpoint Screening Numbers

Number of Travelers as % of Prior Year; 7-Day Rolling Average

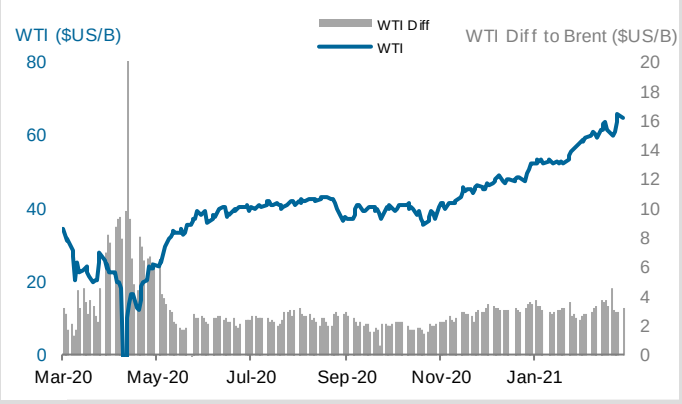


Monitoring the daily number of passengers screened at TSA checkpoints in the United States is a leading indicator of recovery in air travel.

Source: Transportation Security Administration

11 WTI Crude Oil Price and Differential to Brent

Near-Month WTI and Brent Differential; Rolling 12-Month History

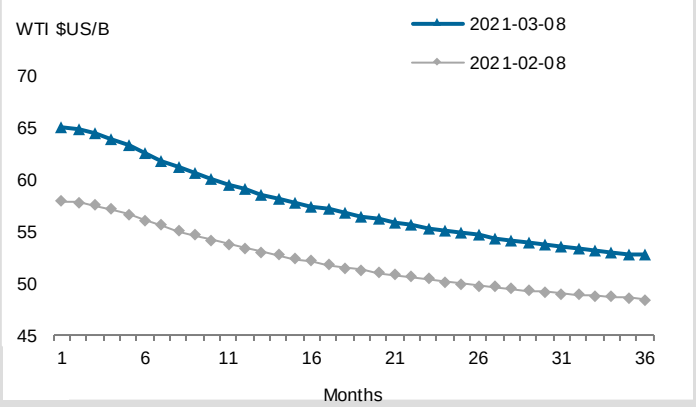


North American crude oil prices can sometimes disconnect from global prices depending on regional supply and demand dynamics.

Source: Bloomberg

12 US Crude Oil Futures

West Texas Intermediate (WTI), Next 36 Months

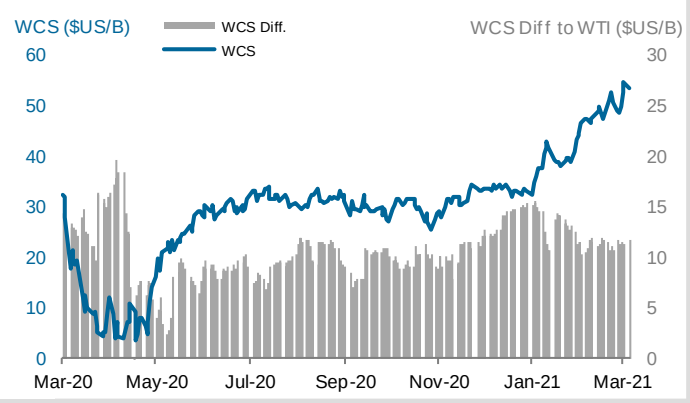


Forward prices for WTI are plotted for the next 36 contracts, and compared against the same contracts one month prior.

Source: Bloomberg

13 Canadian Heavy Oil Price Differential to WTI

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

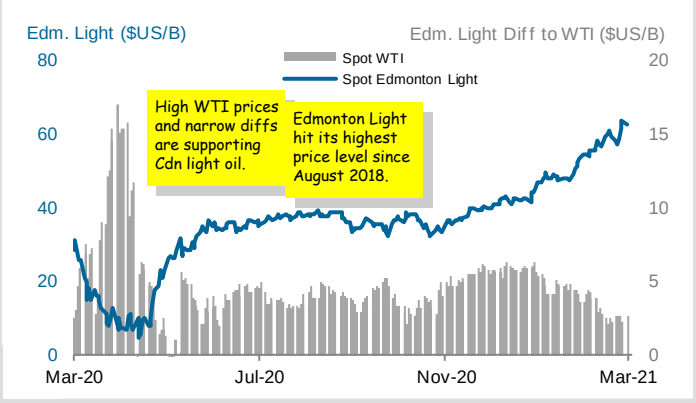


The differential should reflect quality differences and transportation costs. Greater discounts can result from infrastructure or refinery outages.

Source: Bloomberg

14 Canadian Light Crude Oil Price Differential to WTI

WTI and Edmonton Light differential; Rolling 12-Month History

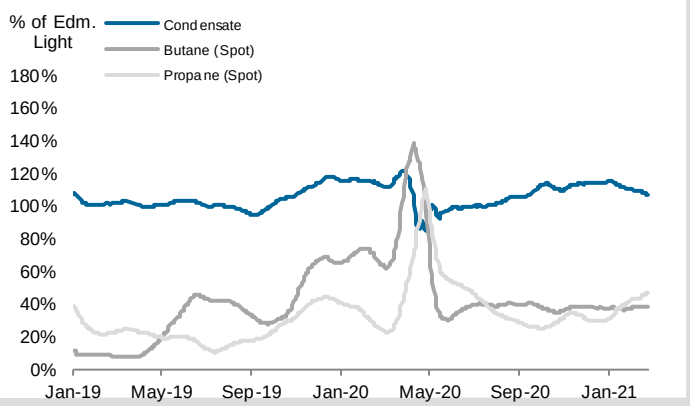


The differential should reflect the transportation cost from Alberta to Cushing. Greater discounts can result from infrastructure or refinery outages.

Source: Bloomberg

15 Daily NGL Prices as a % of Edmonton Light

NGL Prices at Edmonton, AB, 10 Day Rolling Average Shown

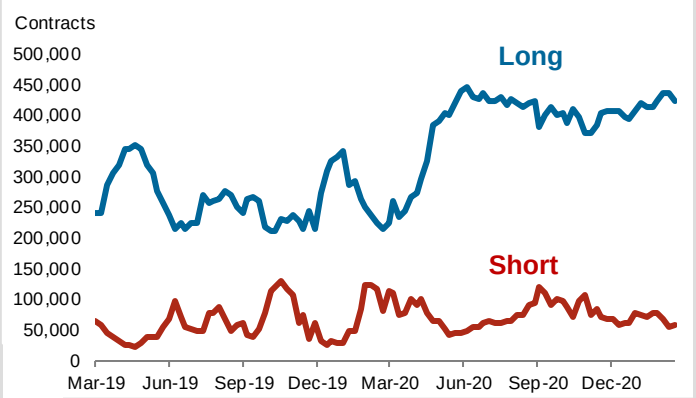


Natural gas liquids have become critical contributors to producer's cash flow. Prices are influenced by the price of oil as well as local supply and demand.

Source: Bloomberg, ARC Financial Corp.

16 Long and Short Contracts - WTI

Managed Money - Futures

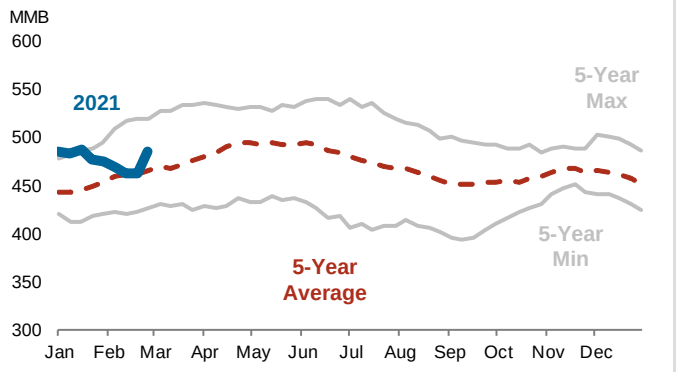


Long contracts take the position that WTI oil price will increase, while short contracts expect a decline.

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

17 US Crude Oil Stocks

Historical Range and Current Year Levels

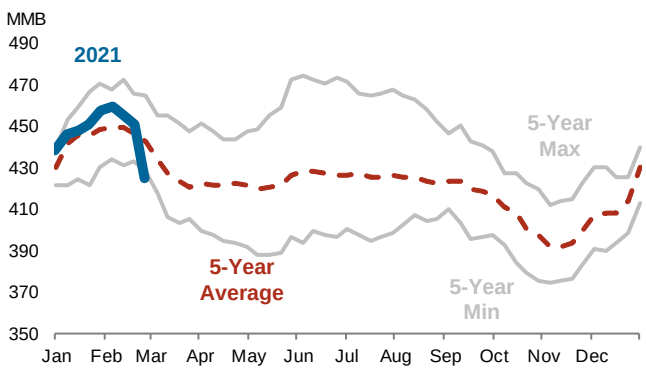


US crude oil stock levels can affect crude oil prices. Stock levels for the current year are represented by the blue line.

Source: U.S. Energy Information Administration

18 US Refined Product Stocks

Historical Range and Current Year Levels

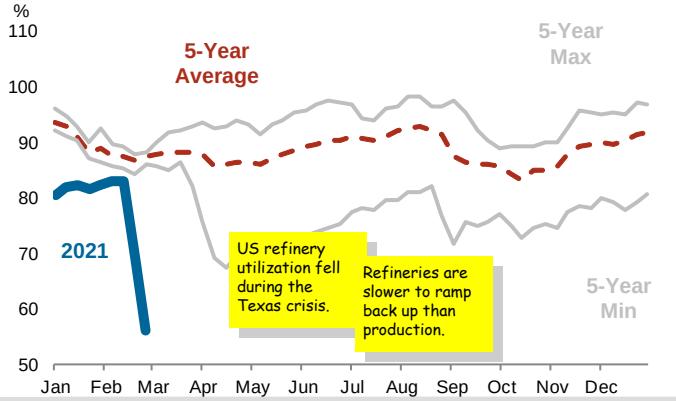


Total stocks of gasoline, diesel and jet fuel are shown. Stock levels for the current year are represented by the blue line.

Source: U.S. Energy Information Administration

19 US Weekly Refinery Utilization Rates (%)

Historical Range and Current Year Levels

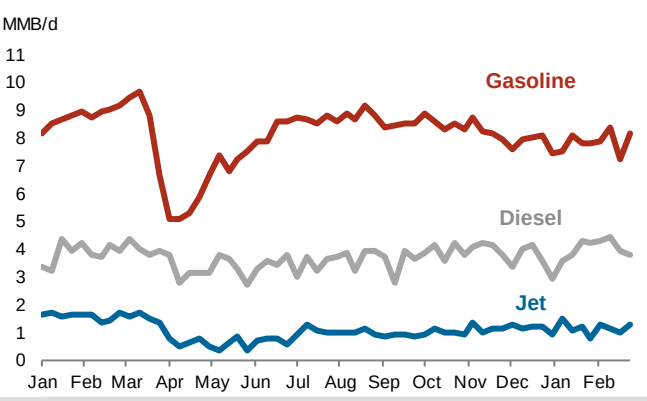


Refinery utilization rates change the supply of refined products, impacting price. Utilization for the current year is blue.

Source: U.S. Energy Information Administration

20 US Petroleum Product Consumption

Top Three Product Categories; Jan 2020 to Present



Gasoline, diesel and jet fuel consumption represent the majority of oil use in the US.

Source: U.S. Energy Information Administration

21 US Weekly Crude Oil Production

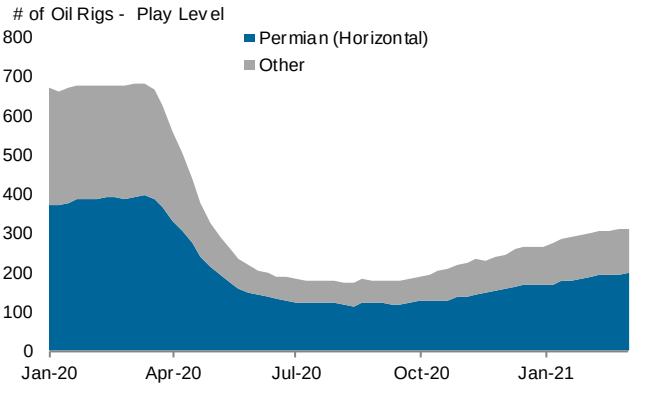
US Field Production of Crude Oil; 2019 to Present

Weekly production is modelled by the EIA. It is less accurate then monthly reported numbers, but is instructive of up to date changes.

Source: U.S. Energy Information Administration

22 US Oil Drilling Activity

Baker Hughes Oil Rig Counts; 2020 to Present

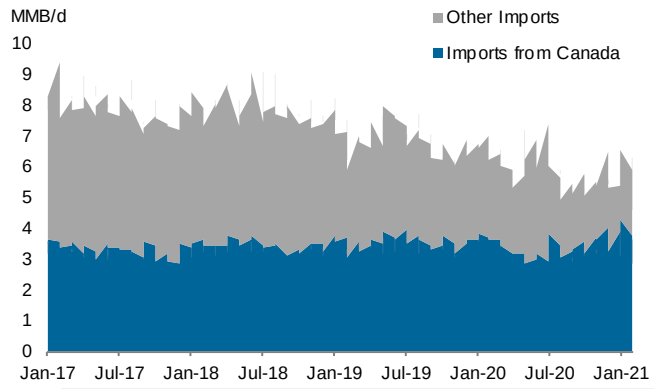


Tracking US oil drilling by major play provides insight into the composition of US oil supply and growth trends.

Source: Baker Hughes

23 US Crude Oil Imports

Weekly Data; 2017 to Present

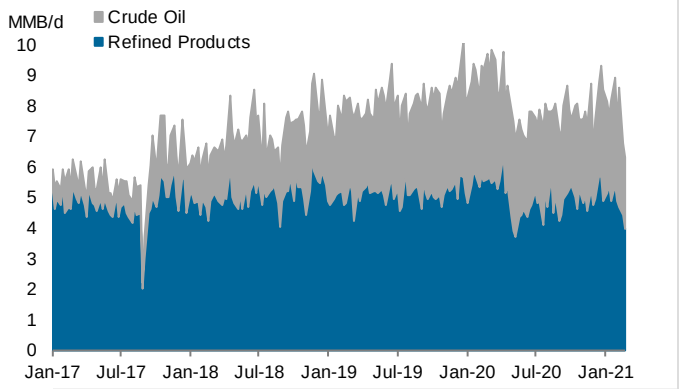


Crude oil imports from Canada are taking market share from overseas imports.

Source: U.S. Energy Information Administration

24 US Exports of Crude Oil and Refined Products

Weekly Data; 2017 to Present

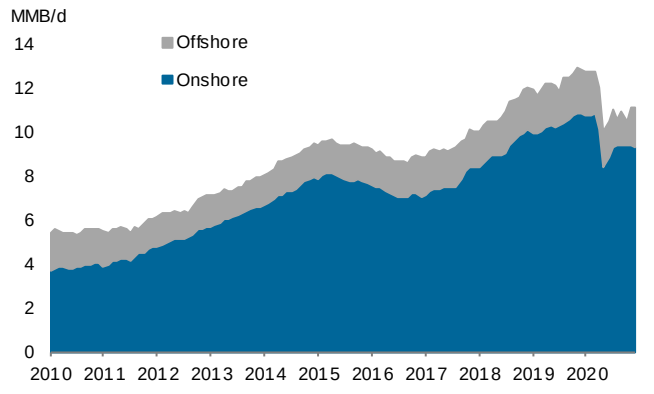


The US exports more refined products than crude oil. With the rapid growth of tight oil, most export growth should come from crude oil exports.

Source: U.S. Energy Information Administration

25 Total US Oil Production

Monthly; 2010 to Present

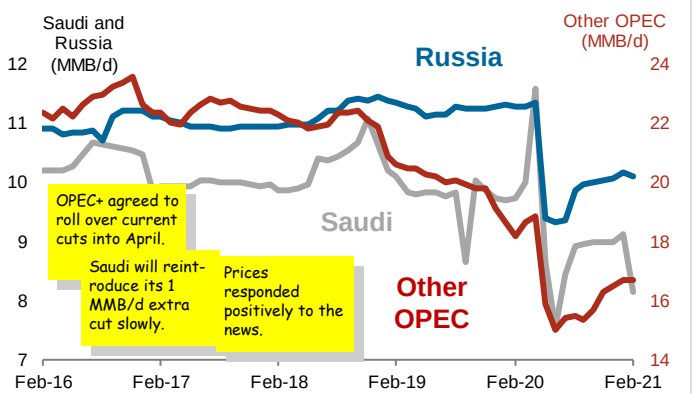


The advancement of drilling and completion methods is increasing US crude oil production.

Source: Bloomberg, U.S. Energy Information Administration

26 OPEC and Russian Oil Production

Monthly; Rolling 60-Month History

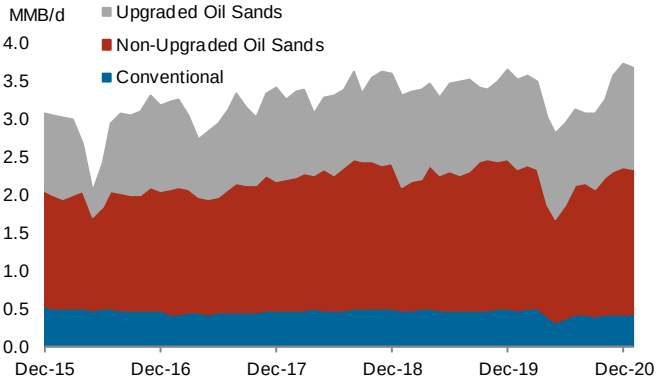


OPEC's production levels relative to its sustainable and spare capacity influences global crude prices. Note: scale has been expanded.

Source: Bloomberg, Russia Ministry of Energy

27 Alberta Oil Production

Monthly; Conventional and Oil Sands

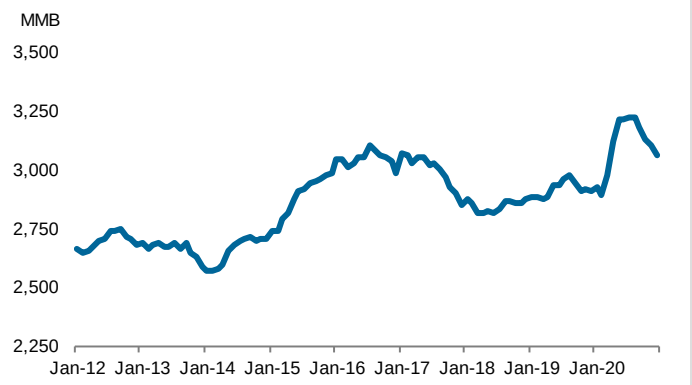


Most of Canada's oil production comes from Alberta; split between oil sands and conventional production.

Source: Alberta Energy Regulator

28 OECD Total Industry Oil Stocks

Monthly; 2012 to Present

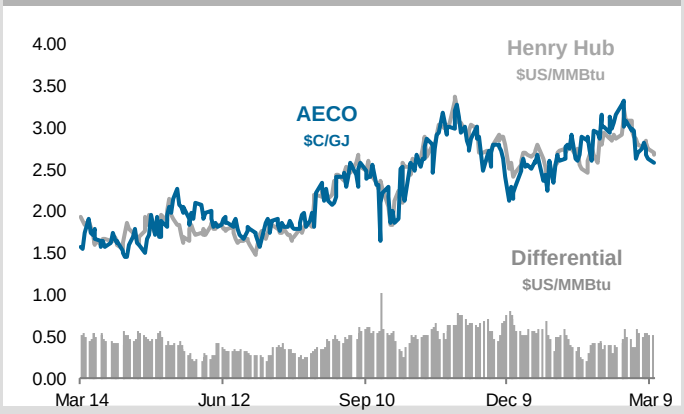


OECD stock levels can affect crude oil prices.

Source: International Energy Agency

29 Near-Month North American Natural Gas Prices

Daily Prices; Rolling 12-Month History

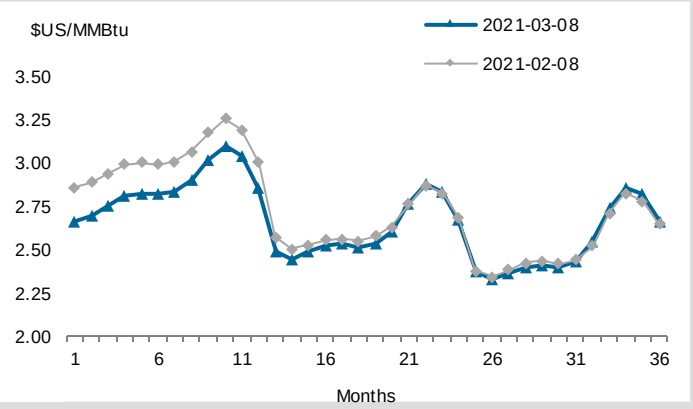


Near-month prices at AECO track Henry Hub prices, the exchange rate and the cost of transportation. Local factors can also affect price.

Source: Bloomberg

30 US Natural Gas Futures

Nymex (Henry Hub) Next 36 Months

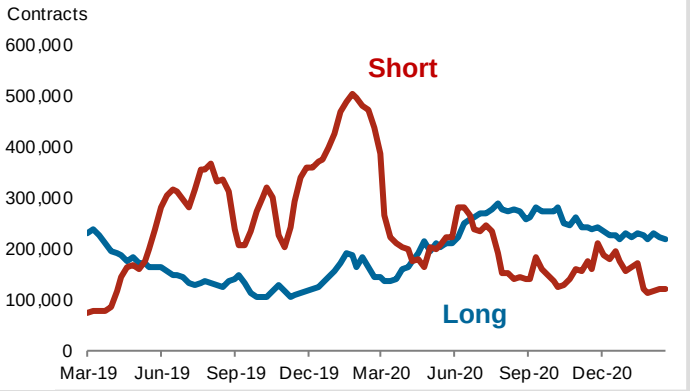


Forward contract prices are plotted for the next 36 months, and compared against the curve one month prior.

Source: Bloomberg

31 Long and Short Contracts – Henry Hub

Managed Money - Futures

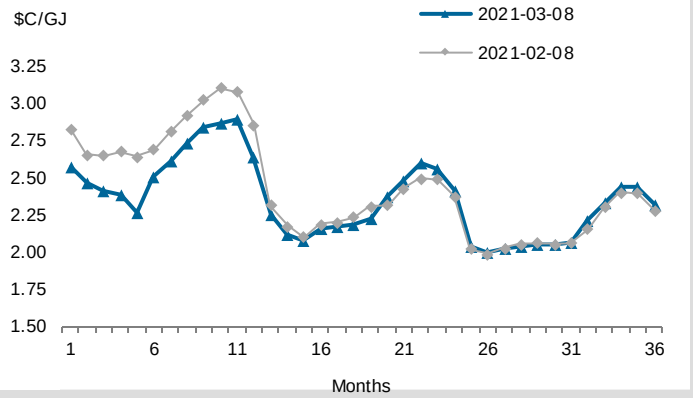


Long contracts take the position that Henry Hub gas price will increase, while short contracts expect a decline.

Source: U.S. Commodity Futures Trading Commission

32 Canadian Natural Gas Futures

AECO Hub (Bloomberg Estimate) Next 36 Months

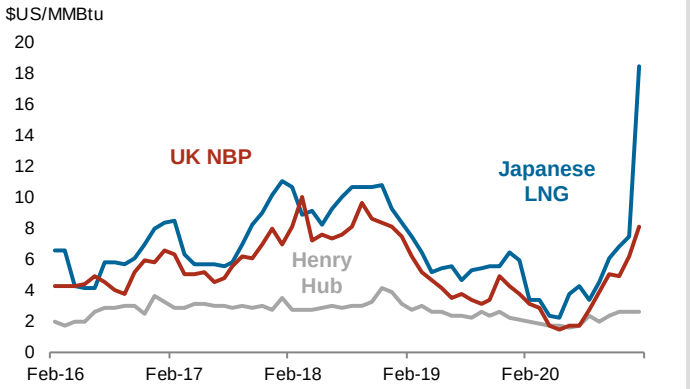


AECO forward prices mimic Henry Hub futures minus a differential.

Source: Bloomberg

33 Global Natural Gas Prices

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

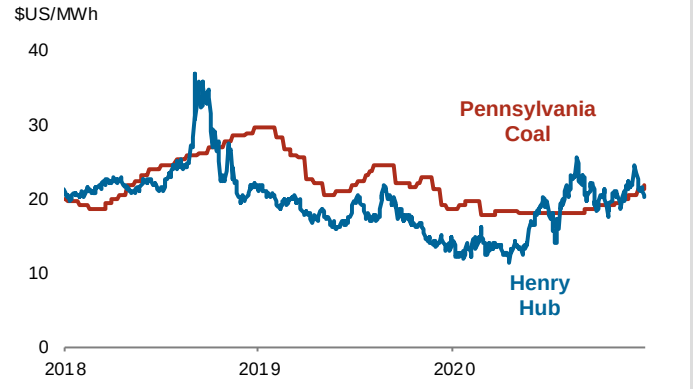


International natural gas prices strongly impact the economics of proposed LNG projects.

Source: Bloomberg, Japanese Ministry of Economy, Trade and Industry

34 US Coal and Natural Gas Power Generation Cost

Converted to a $/MWh Equivalent



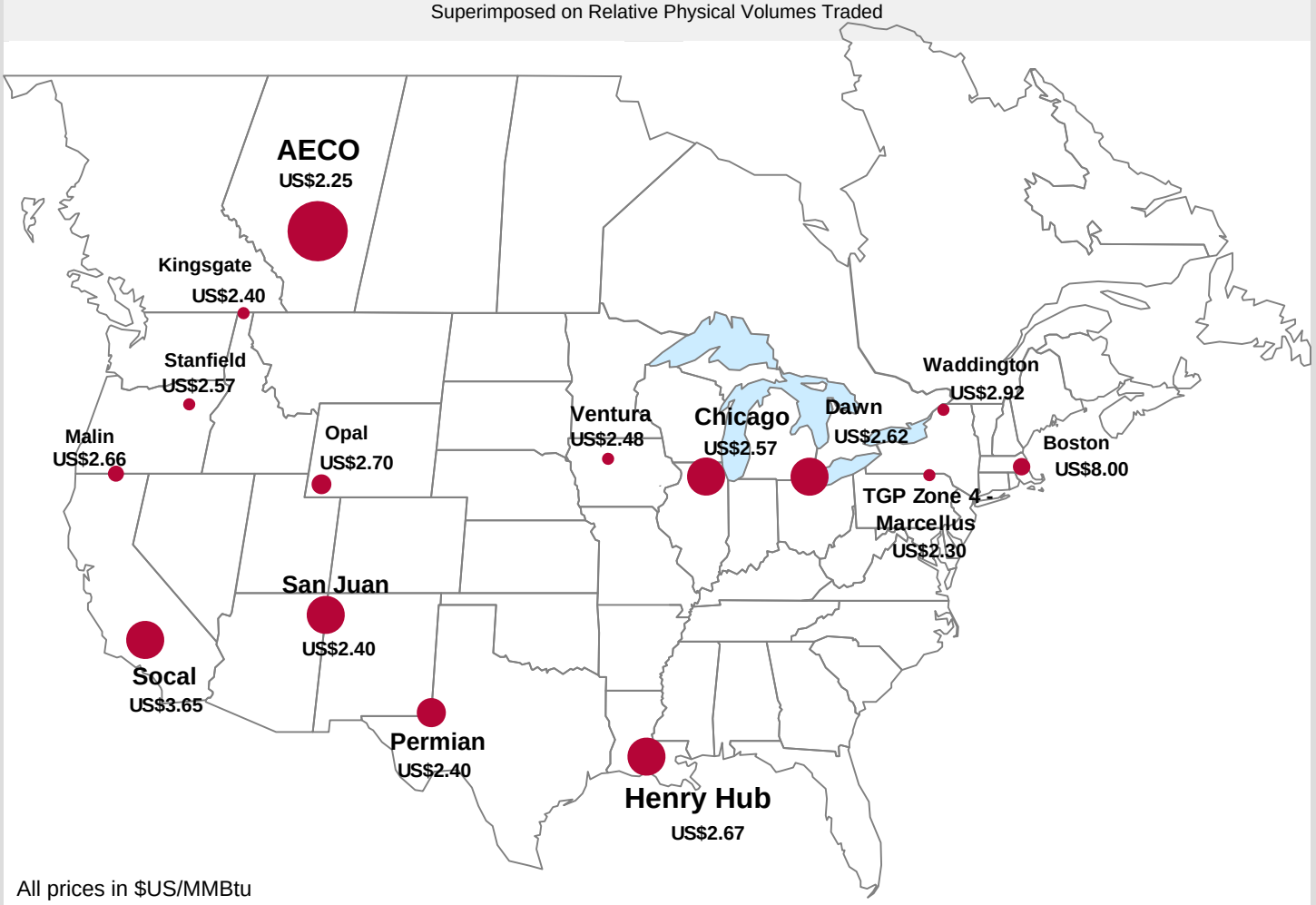
This graph illustrates when it may be economic to begin coal-gas switching in power generation. Average power plant efficiencies are assumed.

Source: Bloomberg

35

Closing Spot Prices at North American Natural Gas Hubs

Superimposed on Relative Physical Volumes Traded



All prices in $US/MMBtu

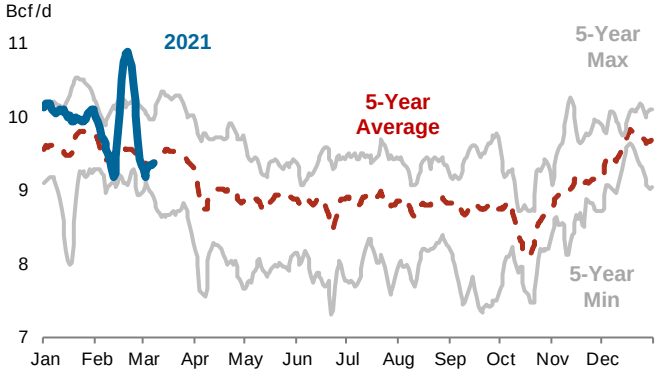
North America has an integrated natural gas market. Prices are determined by regional supply and demand, and pipeline flows.

Source: Bloomberg

36

Pipeline Flows Out of Western Canada

Daily; Historical Tracks and Current Year Levels



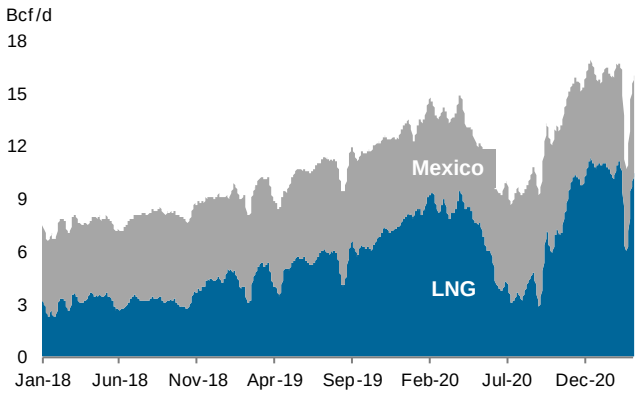
The ability of gas producers to move gas out of the WCSB to eastern markets and the US is a major factor in local natural gas prices.

Source: Various Pipeline Companies

37

US Natural Gas Exports – Excluding Canada

Daily; Historical Tracks and Current Year Levels

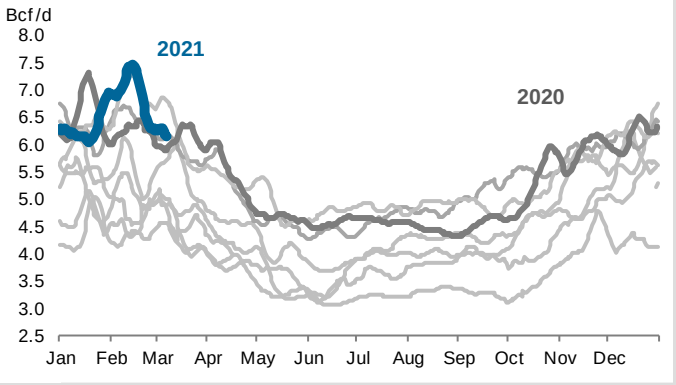


Between exports to Mexico and LNG shipments, the US is growing as a natural gas exporter. Robust US supply growth has driven this trend.

Source: S&P Global Platts

38 Alberta Natural Gas Demand

TransCanada Intra-AB Deliveries; Current Year and Historical Tracks

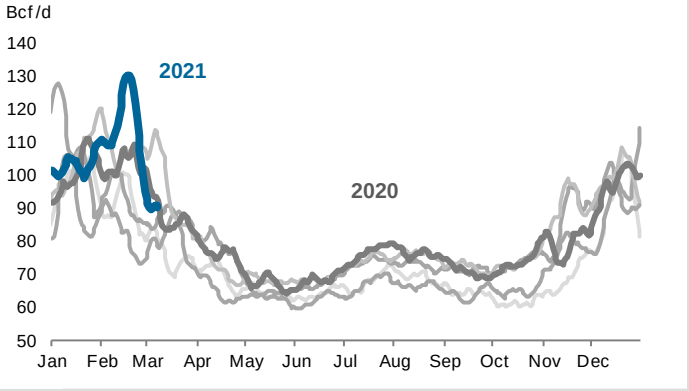


Alberta natural gas demand has grown steadily in recent years, largely driven by new oil sands demand and power generation projects.

Source: TransCanada Pipelines

39 US Domestic Natural Gas Demand

Daily; Historical Tracks and Current Year Levels

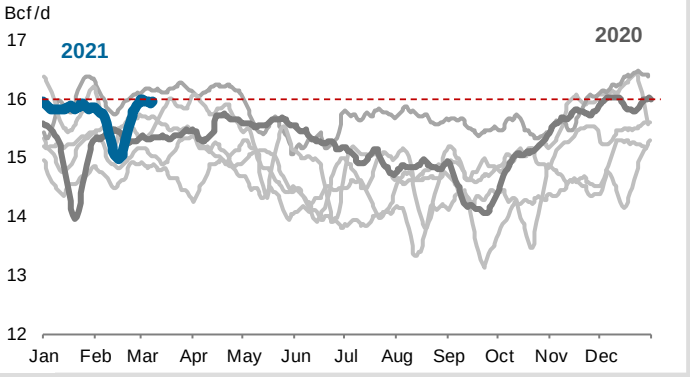


Domestic US demand fluctuates in the summer and during the winter as weather is an important driver of consumption.

Source: S&P Global Platts

40 Daily Western Canadian Production

Estimated Using Major Pipeline Receipts

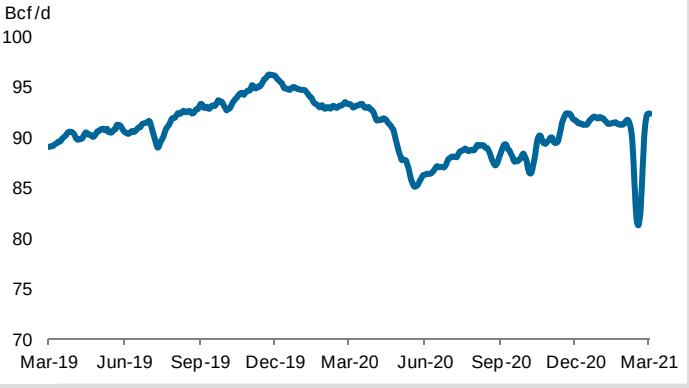


This includes receipts on the TCPL, Alliance, WestCoast and TransGas pipelines.

Source: Various Pipeline Companies

41 Total US Dry Natural Gas Production

Daily; Rolling 24 Months

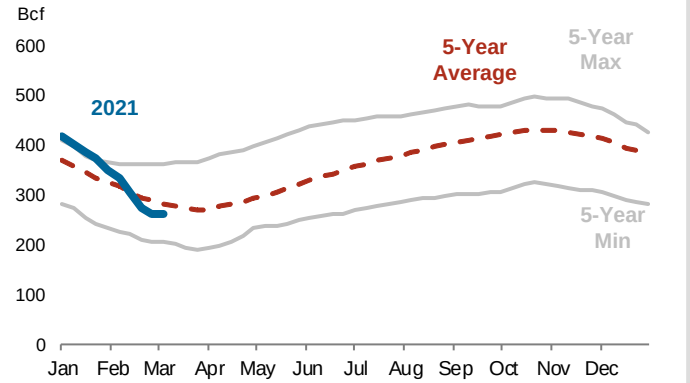


US production started ramping up in late 2007 and continues to grow year over year.

Source: S&P Global Platts

42 Western Canadian Natural Gas Storage Levels

Weekly; Current Year and Historic Tracks

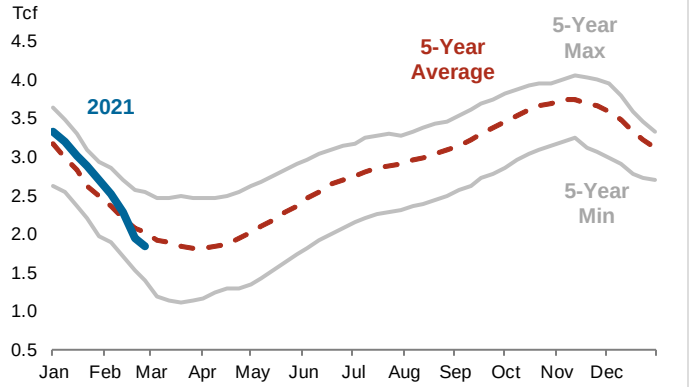


Canada's natural gas storage level provides a good metric if the country is well stocked. Abnormally high or low storage can affect the basis.

Source: Bloomberg

43 Total Working Natural Gas in US Storage

Historical Range and Current Year Levels

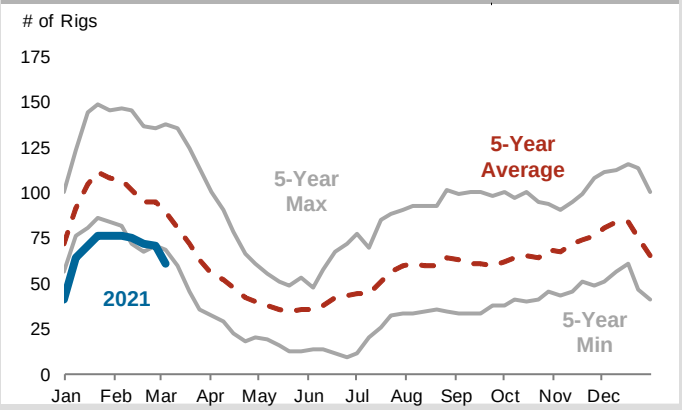


The EIA reports changes in US natural gas inventories held in underground storage facilities on a weekly basis.

Source: U.S. Energy Information Administration

44 Canada: Weekly Gas Drilling Activity

Baker Hughes Drilling Rig Count; Current Year and Historical Range

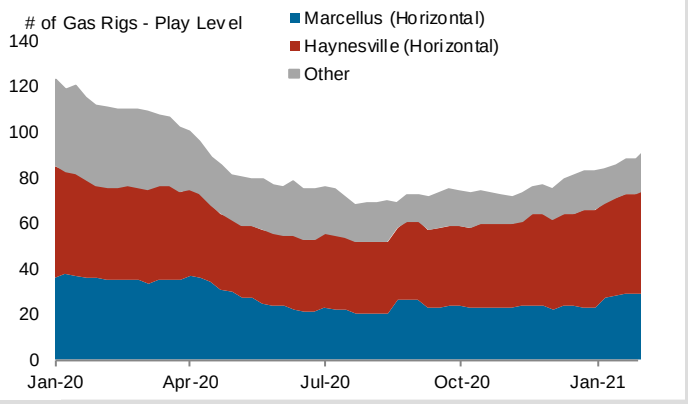


Unlike US drilling activity, Canadian rigs are dispatched seasonally. Capital allocation by operators is driven by views of future oil and gas prices.

Source: Baker Hughes

45 United States: Weekly Gas Drilling Activity

Baker Hughes Gas Rig Counts; 2020 to Present

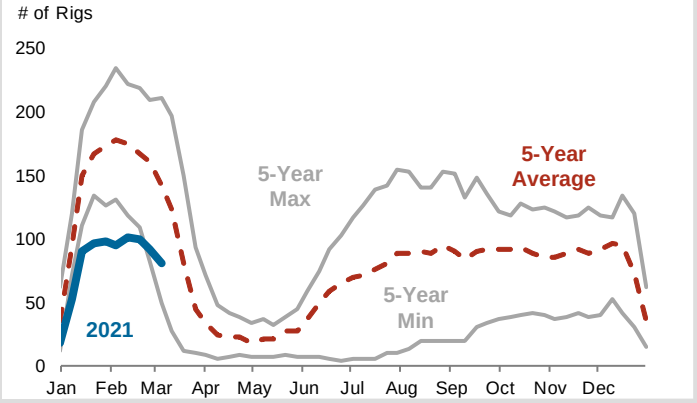


Tracking US gas drilling by major play provides insight into the composition of US gas supply and growth trends.

Source: Baker Hughes

46 Canada: Weekly Oil Drilling Activity

Baker Hughes Drilling Rig Count; Current Year and Historical Range

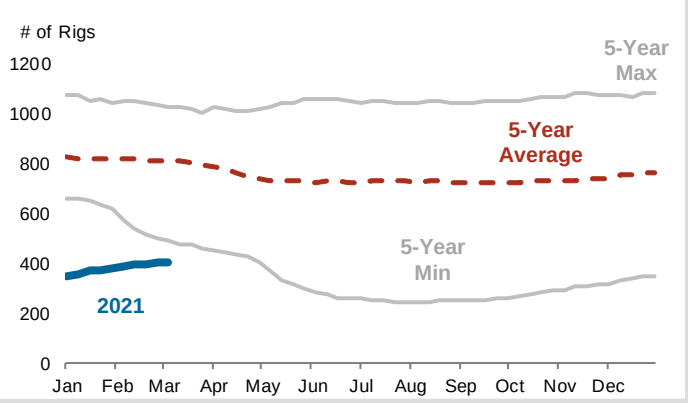


Unlike US drilling activity, Canadian rigs are dispatched seasonally. Capital allocation by operators is driven by views of future oil and gas prices.

Source: Baker Hughes

47 United States: Weekly Oil & Gas Drilling Activity

Baker Hughes Drilling Rig Count; Current Year and Historical Range

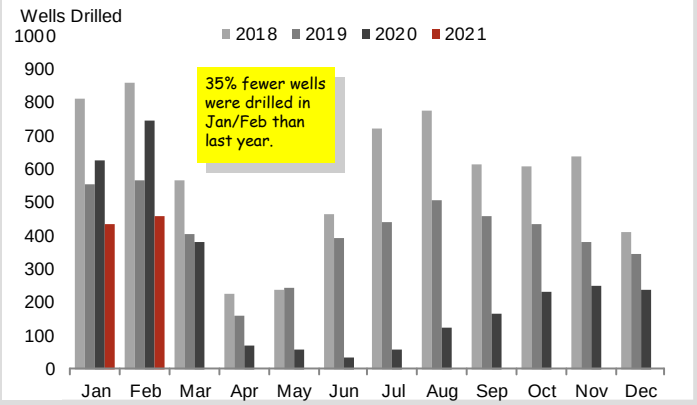


Tracking total US rigs provides insight into oil field services demand and total industry activity.

Source: Baker Hughes

48 Canada: Monthly Wells Drilled

Current Year *vs* Years Prior

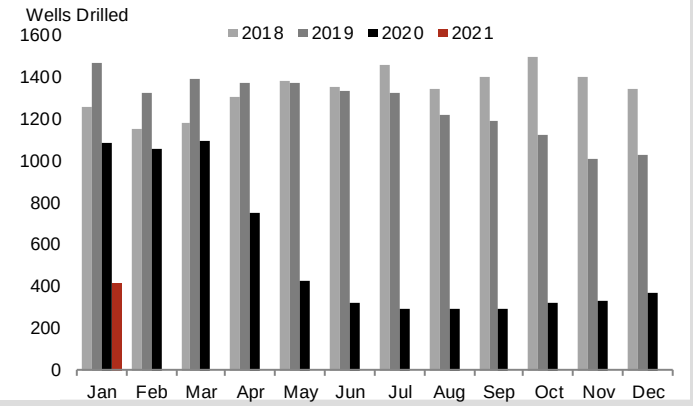


Total rig-releases for exploratory and development wells are highlighted in this chart. Rig releases for the current year are shown in red.

Source: Daily Oil Bulletin/JWN

49 United States: Monthly Wells Drilled

Current Year *vs* Years Prior

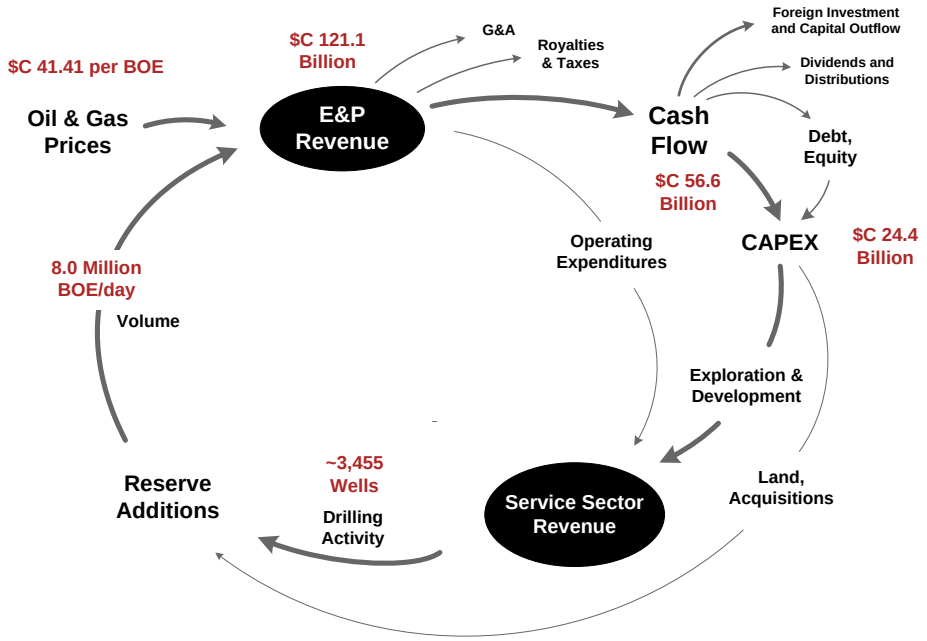


Total wells drilled in US Drilling Productivity Report regions are shown. These are the most active onshore US plays.

Source: EIA

Estimated Capital Flow in the Canadian Oil and Gas Economy for 2021

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	%	%	%
2011	55.32	95.24	3.44	1,873	1,482	2,386	5,740	115,890	53,448	40,139	22,491	1.10	12,827	52%	69%	31%
2012	50.60	86.38	2.27	1,905	1,743	2,327	5,975	111,389	48,908	39,733	27,199	1.37	11,067	44%	83%	17%
2013	55.95	93.47	3.02	2,023	1,940	2,343	6,306	128,787	54,711	43,165	30,809	1.35	11,071	42%	84%	16%
2014	60.69	95.07	4.23	2,085	1,964	2,480	6,530	144,660	66,977	46,872	33,868	1.21	11,222	45%	78%	22%
2015	37.34	57.63	2.56	1,995	2,381	2,531	6,907	94,127	29,985	31,609	22,929	1.82	5,382	24%	69%	31%
2016	32.61	53.09	2.06	2,013	2,421	2,564	6,998	83,298	23,701	23,040	15,426	1.62	4,060	17%	73%	27%
2017	39.18	62.42	2.10	2,119	2,674	2,605	7,398	105,788	45,031	28,712	13,803	0.94	7,076	30%	73%	27%
2018	39.57	69.24	1.46	2,292	2,913	2,737	7,942	114,705	48,322	27,374	11,661	0.81	6,927	32%	79%	21%
2019	42.34	69.02	1.70	2,409	2,950	2,673	8,032	124,115	55,248	25,847	9,306	0.64	4,886	26%	81%	19%
2020e	28.36	46.10	2.12	1,906	2,805	2,620	7,330	75,890	23,286	15,346	6,514	0.94	2,970	18%	72%	28%
2021e	41.41	65.77	2.72	2,130	3,185	2,699	8,013	121,104	56,588	16,699	7,660	0.43	3,455	24%	70%	30%