



Price forecast

Resource Evaluation & Advisory

March 31, 2019



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Forecast commentary

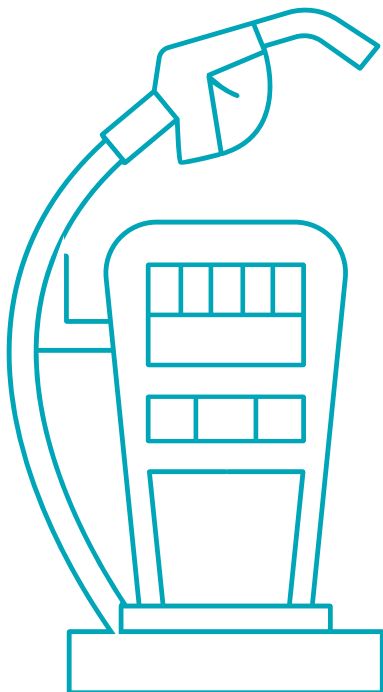
Curtailment, Line 3 delay challenge oil producers

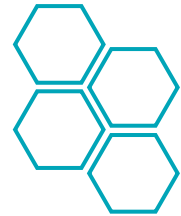
After dropping steeply during the last quarter of 2018, Canadian oil prices bounced back quickly in Q1 2019 following production curtailments brought into effect by the Government of Alberta in January. These curtailments had an immediate effect, with the WCS differential to WTI decreasing by US\$26/bbl in just one month and the Edmonton Light differential decreasing by \$24/bbl.

Although this price uptick has been welcomed by small producers that are exempt from the curtailments, it has had the unintended consequence of making crude-by-rail less economical for several large producers. When the cost of transporting oil by rail is not offset by a better-received price in other markets, producers will always opt to sell their volumes via pipeline if they are able to find capacity. Also affected negatively by the curtailments were those producers that had integrated refining capacity that benefited from larger differentials in their operations. With curtailments in place and rail economics less desirable, pipeline capacity became the most profitable transportation option during Q1 2019. Yet export capacity remains limited.

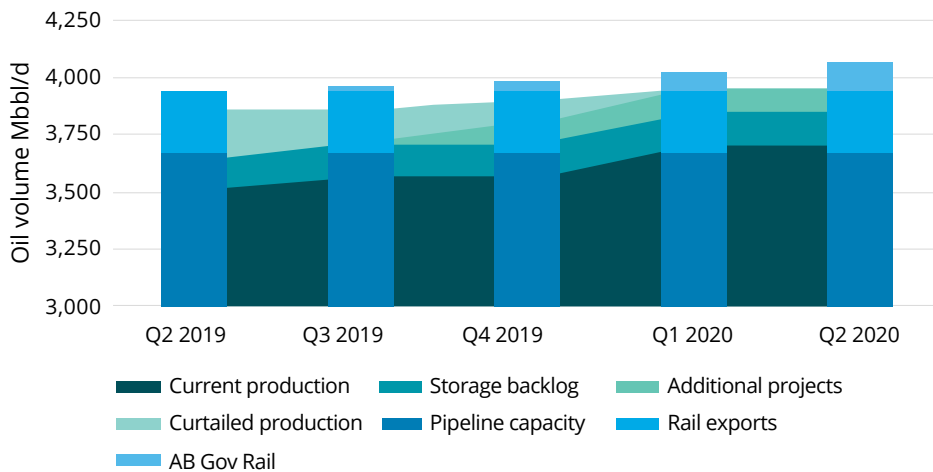
Further limiting growth for Canadian oil development is the recent announcement that the Line 3 pipeline replacement project by Enbridge has been delayed to the second half of 2020. This project was expected to add 370 Mbbbl/d of export capacity in the last quarter of 2019. With the curtailments of 225 Mbbbl/d expected to be terminated at the end of 2019 and with an additional 100 Mbbbl/d of production expected to come online throughout the year (primarily from the Christina Lake and Kirby North expansions), Line 3 was viewed as necessary to prevent a return to oil oversupply going into 2020.

This unexpected development means Canadian price differentials may widen over the year, prompting companies looking to expand their operations in 2019 to contemplate delaying their projects. Such delays would exacerbate an already difficult year for oil field services companies. A widening differential could also lead the Alberta government to consider extending the production cuts until mid-2020 to mitigate the chances of another blow-out in prices.





Alberta takeaway capacity and production



Source: NEB, Oil Sands Magazine

In another recent turn of events for takeaway capacity, the Alberta government announced its intention to lease rail cars, starting in the second half of 2019, to transport oil out of the province. These cars will initially accept 20 Mbbbl/d in 2019 before growing to 120 Mbbbl/d when fully operational in mid-2020. While this capacity is not large enough to handle the volumes associated with the Line 3 replacement, price differentials should see some positive movement since this plan should put a ceiling on the WCS-to-WTI differential. Private investment in rail capacity in 2019 is also expected to provide opportunities for production growth through 2020 to 2022, when significant additional pipeline capacity is expected to come online with Keystone XL and the Trans Mountain expansion.

Internationally, WTI and Brent prices have begun to strengthen slightly in Q1 2019 after dropping throughout Q4 2018, although WTI continues to trade at a steep discount to Brent due to oversupply in North America, primarily driven by the rapid development of the Permian Basin in the United States. OPEC's agreement in December 2018 to decrease its production output by 1.2 MMbbbl/d has helped ease sentiments that the global market is oversupplied.

We have maintained the WTI price from our year-end forecast of US\$58/bbl for 2019. However, we have narrowed our expected WCS differential to US\$17/bbl for the remainder of the year based on current futures expectations and the effectiveness of the Alberta curtailment.

Cold snap briefly warms natural gas prices

Canadian AECO prices increased throughout the first quarter as natural gas storage levels declined and Alberta natural gas demand peaked, in February. Cold weather across the province and into many parts of North America in January and February affected prices, with AECO reaching daily prices as high as \$4.22/Mcf.

Heating degree days provide an indication of natural gas demand in relation to cold temperatures as demand grows during cold-weather snaps. The graph below shows cyclical AECO prices, which are affected by regional average heating degree days.

Alberta heating degree days in relation to AECO price



Source: Government of Canada (Alberta stations)

Canadian AECO prices increased throughout the first quarter as natural gas storage levels declined and Alberta natural gas demand peaked, in February.

Natural gas demand in Alberta outpaced 2018 levels as volumes reached approximately 7.5 Bcf/d in Q1 2019, almost 1 Bcf/d greater than at the same time last year. The increased demand led to declining storage levels in Western Canada, dropping substantially below volumes seen in Q1 2018.

Storage levels were also affected by decreased gas production, as companies deferred capital spending. Active rig rates dropped to approximately 35 percent across Canada, with large decreases in Alberta and British Columbia. Within the first quarter of 2019, 287 natural gas wells were spud by 40 different operators, compared to 323 wells in 2018. Although the year-over-year variance is not drastic, activity in the Canadian natural gas industry continues to slow as the pricing market remains volatile and confidence in the industry wanes.

Natural gas prices in the United States saw volatility in Q1 2019 as production rates there continued to follow record levels set in Q4 2018. Unlike Canada, natural gas drilling south of the border continues to show

strength, with rig counts remaining stable in both the Marcellus and Haynesville plays. Companies continue to drill uncompleted wells in various gas plays, but these could be ready to flow relatively easily as required.

Total natural gas demand in the United States was tracking lower than historical levels in January but recovered in February and March as heating degree days increased, leading to NYMEX price increases for the remainder of the quarter. Storage levels in the United States declined throughout Q1 2019, following cyclical trends shown in prior annual data. Overall, US natural gas storage volumes show a 25-percent decrease from the five-year average.

While the cold snap buoyed natural gas prices at AECO recently, the market outlook for the remainder of 2019 hasn't changed. After the cold weather, the market expects supply will outstrip demand in Western Canada and the low pricing environment will persist. Our AECO forecast for 2019 is \$1.75 Mcf.

Natural gas demand in Alberta outpaced 2018 levels as volumes reached approximately 7.5 Bcf/d in Q1 2019, almost 1 Bcf/d greater than at the same time last year.

Innovation in the oil and gas sector

Industry 4.0: changing the traditional energy business

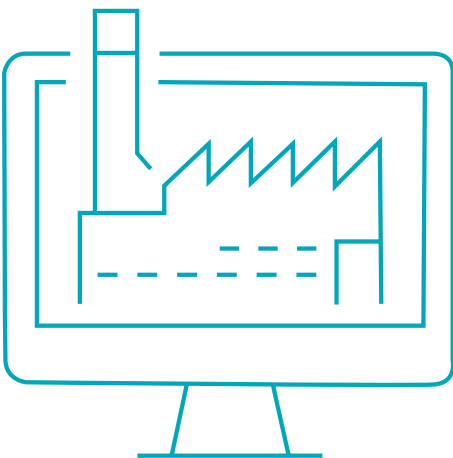
The oil and gas sector in Canada has been through many iterations, adaptations, reboots, and corrections. These days, along with price volatility in the domestic and global markets, it's feeling the disruption wrought by technology. While innovation is ingrained in the oil and gas sector's DNA—as evidenced by its history of technological and engineering advances, especially when it comes to production and environmental operations—the digital age is moving faster than any previous industrial revolution.

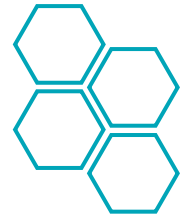
Innovation and transformation in the way the sector—indeed, any industry—does business is a competitive imperative. The term Industry 4.0 has emerged, encompassing a promise of a new industrial revolution that creates systems for data-sharing that are not only interconnected but which also communicate, analyze, and use information to drive further intelligent action back into the physical world.

This concept has its roots in manufacturing, but the ideas and practices have started to take root in the energy business.

Overcoming today's challenge to do more with less, however, is not a copy-and-paste solution. It requires wholly new approaches and the understanding there is no one path to achieving digital success, especially for capital- and asset-intensive industries that must also manage operations in radically diverse and shifting social and regulatory environments.

Companies undertake digital transformation initiatives to address specific business challenges and pain points that, when resolved, should lead to productivity improvements or operational efficiency gains. Productivity improvements are increasingly seen as a way to overcome short-term barriers to profitability while enhancing long-term resilience to market and global turbulence. Cyclical industries already have an especially tough time managing through periodic ups and downs, but surviving today's market dynamics means digging deeper, refining processes, and driving more value from what is already under control.





**Digital on the outside,
human at the core**

True digital transformation typically has profound implications for an organization, affecting its strategy, talent, business models, and even the way it's organized. It's about changing the way a company does business based on the new capabilities the leadership wants to build to enable the organization to fulfill aspirations.

While the drive to digital is fundamental from a process and productivity perspective, it does not begin and end with the technology. The key is thinking in terms of people, process, and business model—of leadership and culture. It is not about investing in tech and doing proofs of concepts. It is about changing the cultural norms of the business in terms of how things “used to be done” to how they “should be done” to be successful in the new market conditions.

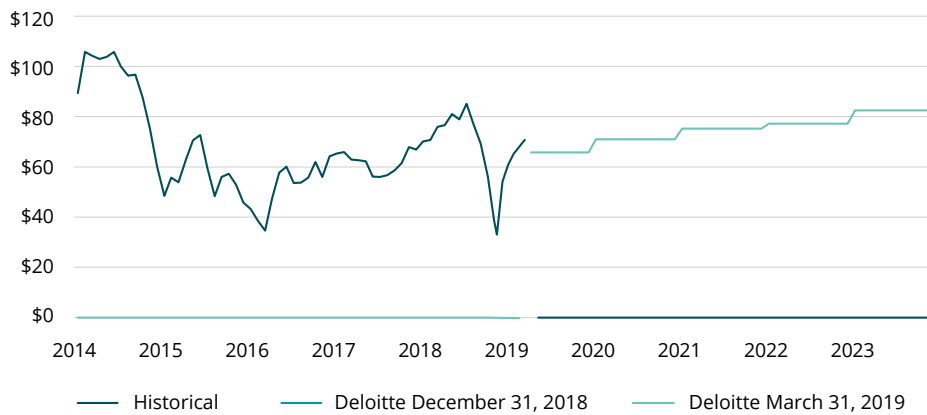
This transformation is most obvious in the mergers and acquisitions (M&A) space, with integrated tools, processes, and techniques being applied to provide both big-picture insights and microscopic levels of detail. The objective is to get a real-time analysis of a company's value drivers to enable incisive decision-making at every step of the M&A life cycle. Re-inventing the approach of other aspects of the business is already underway, with intelligent programs that use robotic process automation and machine learning.

The pace at which the oil and gas sector is changing is faster than most people think. The Industry 4.0 revolution is underway, and companies that don't act now risk becoming insignificant as smaller, leaner, more digitally enabled peers are ready to perform the jobs the sector hasn't even thought of yet.

Canadian domestic price forecast

Crude oil price and market demand forecast

Edmonton par (real \$)



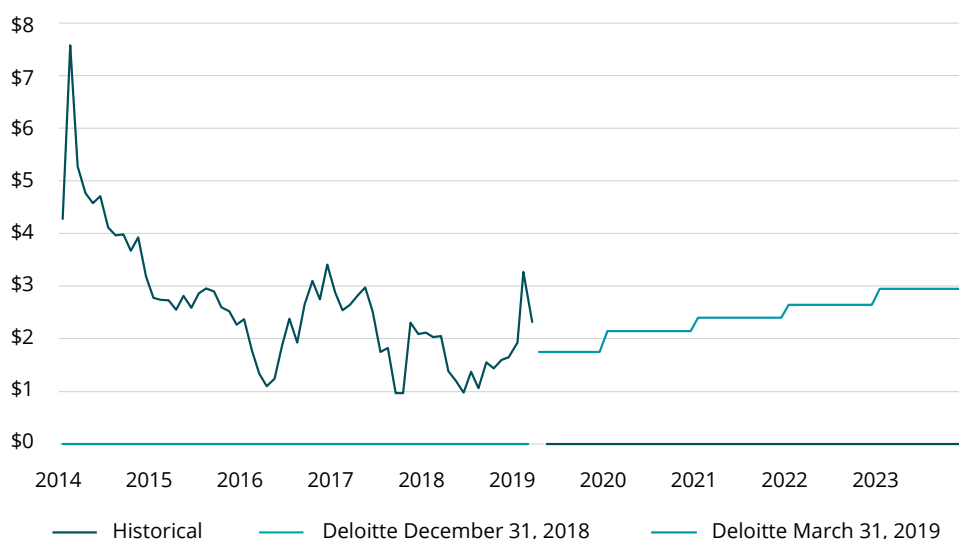
Forecast comments

- Edmonton Par is forecast as a differential to WTI. This differential is based on Canadian Light Sweet Oil Index Futures which began trading in January 2014.
- The Edmonton crude oil price is used as the basis for the remaining Canadian crude reference points. Offsets are based on five-year historical averages with recent years weighted more heavily in the determination.

Year	WTI Cushing OK (40 API)	WTI Cushing, OK (40 API)	Edmonton City Gate (40 API)	Edmonton City Gate (40 API)	WCS Hardisty (20.5 API)	Heavy Oil Hardisty (12 API)	Cost Inflation	CAD to USD Exchange
	US\$/bbl	US\$/bbl	C\$/bbl	C\$/bbl	C\$/bbl	C\$/bbl		
	Real	Current	Real	Current	Current	Current	Rate	Rate
Historical								
2016	\$45.53	\$43.15	\$55.09	\$52.22	\$38.90	\$34.08	1.4%	0.755
2017	\$52.91	\$50.88	\$64.35	\$61.88	\$50.53	\$45.01	1.6%	0.771
2018	\$66.44	\$64.94	\$70.70	\$69.10	\$49.68	\$45.34	2.3%	0.772
2019								
3 Mths H	\$54.23	\$54.23	\$67.62	\$67.62	\$52.70	\$48.25	1.8%	0.752
9 Mths F	\$58.00	\$58.00	\$65.80	\$65.80	\$53.95	\$48.95	0.0%	0.760
Avg.	\$57.06	\$57.06	\$66.26	\$66.26	\$53.64	\$48.77	-	0.758
Forecast								
2019	\$58.00	\$58.00	\$65.80	\$65.80	\$53.95	\$48.95	0.0%	0.760
2020	\$60.00	\$61.20	\$71.05	\$72.45	\$57.75	\$52.65	2.0%	0.760
2021	\$62.00	\$64.50	\$75.30	\$78.35	\$60.80	\$55.60	2.0%	0.770
2022	\$65.00	\$69.00	\$77.20	\$81.95	\$64.45	\$59.15	2.0%	0.790
2023	\$70.00	\$75.75	\$82.50	\$89.30	\$71.70	\$66.30	2.0%	0.800
2024	\$70.00	\$77.30	\$82.50	\$91.10	\$73.15	\$67.60	2.0%	0.800
2025	\$70.00	\$78.85	\$82.50	\$92.90	\$74.60	\$69.00	2.0%	0.800
2026	\$70.00	\$80.40	\$82.50	\$94.75	\$76.10	\$70.35	2.0%	0.800

Natural gas price and market demand forecast

AECO natural gas (real \$)



Forecast comments

- The AECO natural gas price is forecast based on historical differentials to Henry Hub and future contracts traded on the NGX based in Calgary.

Year	AB Ref. Avg. Price C\$/Mcf Current	AB AECO Avg. Price C\$/Mcf Real	AB AECO Avg. Price C\$/Mcf Current	BC Direct Station 2 Sales C\$/Mcf Current	NYMEX Henry Hub US\$/Mcf Real	NYMEX Henry Hub US\$/Mcf Current
Historical						
2016	\$1.93	\$2.28	\$2.16	\$1.75	\$2.65	\$2.52
2017	\$2.13	\$2.28	\$2.19	\$1.56	\$3.10	\$2.99
2018	\$1.36	\$1.57	\$1.54	\$1.26	\$3.24	\$3.17
2019						
3 Mths H	\$2.23	\$2.52	\$2.52	\$1.40	\$3.03	\$3.03
9 Mths F	\$1.55	\$1.75	\$1.75	\$1.45	\$3.00	\$3.00
Avg.	\$1.72	\$1.94	\$1.94	\$1.44	\$3.01	\$3.01
Forecast						
2019	\$1.55	\$1.75	\$1.75	\$1.45	\$3.00	\$3.00
2020	\$2.00	\$2.15	\$2.20	\$1.90	\$3.10	\$3.15
2021	\$2.30	\$2.40	\$2.50	\$2.20	\$3.30	\$3.45
2022	\$2.60	\$2.65	\$2.80	\$2.50	\$3.40	\$3.60
2023	\$3.00	\$2.95	\$3.20	\$2.85	\$3.55	\$3.85
2024	\$3.30	\$3.20	\$3.55	\$3.20	\$3.75	\$4.15
2025	\$3.60	\$3.40	\$3.85	\$3.50	\$3.90	\$4.40
2026	\$3.75	\$3.45	\$3.95	\$3.60	\$3.95	\$4.55

International price forecast

Crude oil price and market demand forecast

Year	Av. WTI Spot	Brent Spot (38.3 API with 0.37% sulphur content)	Gulf Coast ASC	Avg. OPEC Basket	Nigerian Bonny Light (33.4 API FOB)	Mexico Maya (21.8 API FOB)	Russia Urals (31.7 API FOB)
	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl
	Real	Real	Real	Real	Real	Real	Real
Forecast							
2019	\$58.00	\$66.00	\$55.50	\$64.15	\$66.75	\$57.00	\$64.75
2020	\$60.00	\$67.00	\$57.50	\$65.15	\$67.75	\$58.00	\$65.75
2021	\$62.00	\$67.00	\$59.50	\$65.15	\$67.75	\$58.00	\$65.75
2022	\$65.00	\$67.00	\$62.50	\$65.15	\$67.75	\$58.00	\$65.75
2023	\$70.00	\$72.00	\$67.50	\$70.15	\$72.75	\$63.00	\$70.75
2024	\$70.00	\$72.00	\$67.50	\$70.15	\$72.75	\$63.00	\$70.75
2025	\$70.00	\$72.00	\$67.50	\$70.15	\$72.75	\$63.00	\$70.75
2026	\$70.00	\$72.00	\$67.50	\$70.15	\$72.75	\$63.00	\$70.75

- International crude quality reference points for OPEC Basket, Venezuelan, Nigerian, UAE, Mexican, Chinese, Russian, and Indonesian crudes are now based on Brent in US dollars. For the purposes of this forecast Brent is receiving a premium to WTI on the world markets.
- Current forecasts for other Crude Oil reference points are based on historical trends to the WTI price.
- Brent, United Kingdom crude is based on 38.3°API with 0.37 per cent Sulphur content. Brent blend is a light sweet North Sea crude oil that serves as an international benchmark grade.
- United States Gulf Coast Argus Sour Crude Index (ASCI) is a blend of offshore Gulf Coast oil from Mars, Poseidon, and Southern Green Canyon.
- OPEC Basket represents the current grouping of crude oil prices from the OPEC member countries.
- Russia Urals 31.7°API is the FOB delivered price to the Mediterranean destinations.

Natural gas price and market demand forecast

Year	USD to GBP Exchange	USD to EUR Exchange	NYMEX Henry Hub	Permian Waha	San Juan Ignacio	Rocky Mountain Opal	UK NBP	India Domestic Gas
			US\$/Mcf	US\$/Mcf	US\$/Mcf	US\$/Mcf	US\$/Mcf	US\$/Mcf
	Rate	Rate	Real	Real	Real	Real	Real	Real
Forecast								
2019	1.28	1.15	\$3.00	\$1.80	\$2.50	\$2.50	\$8.50	\$3.75
2020	1.28	1.15	\$3.10	\$2.10	\$2.60	\$2.60	\$8.35	\$4.05
2021	1.28	1.15	\$3.30	\$2.30	\$2.80	\$2.80	\$8.30	\$4.05
2022	1.28	1.15	\$3.40	\$2.40	\$2.90	\$2.90	\$8.15	\$4.15
2023	1.28	1.15	\$3.55	\$2.55	\$3.05	\$3.05	\$8.30	\$4.15
2024	1.28	1.15	\$3.75	\$2.75	\$3.25	\$3.25	\$8.50	\$4.25
2025	1.28	1.15	\$3.90	\$2.90	\$3.40	\$3.40	\$8.65	\$4.40
2026	1.28	1.15	\$3.95	\$2.95	\$3.45	\$3.45	\$8.70	\$4.55

Global trends

Storage

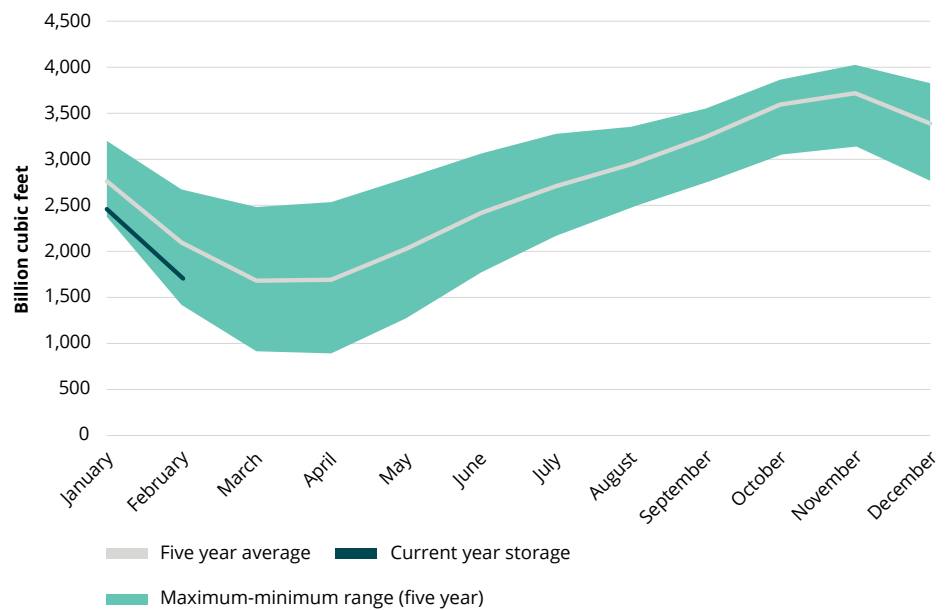
United States

- Natural gas storage in the United States continues to remain well below the five year average. Domestic demand continues to increase and LNG exports are ramping up, with 9.6 Bcf/d of LNG export capability expected by the end of 2019.

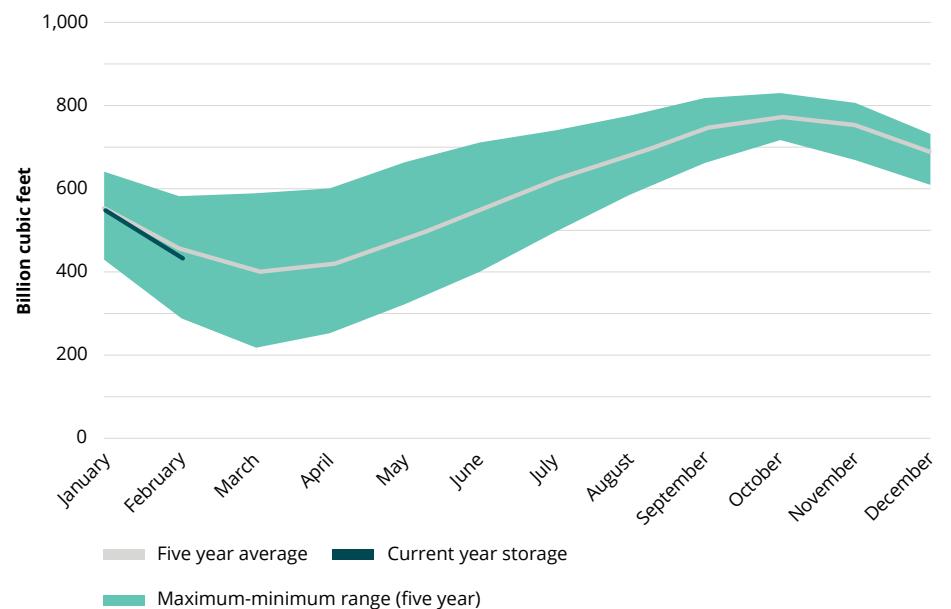
Canada

- Canadian natural gas storage is in line with the five year average. Demand has been very strong in 2019 due to colder than usual weather. However, production and exports in western Canada are both down from this time last year, offsetting stronger demand.

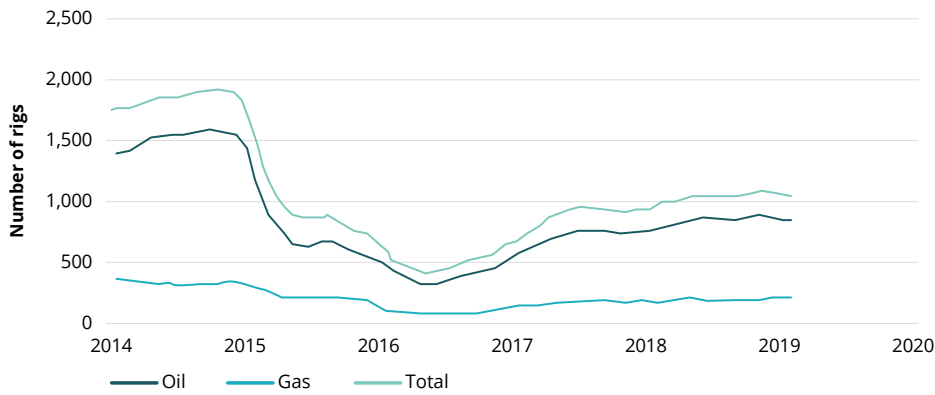
US natural gas storage



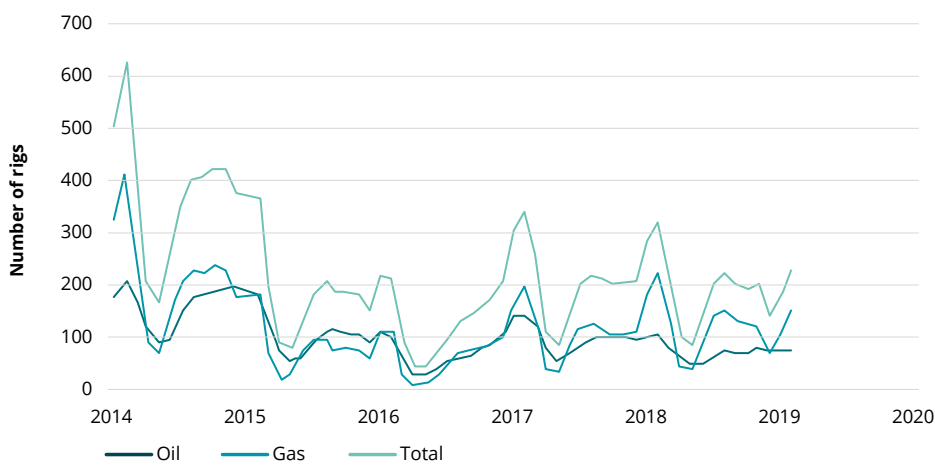
Canada natural gas storage



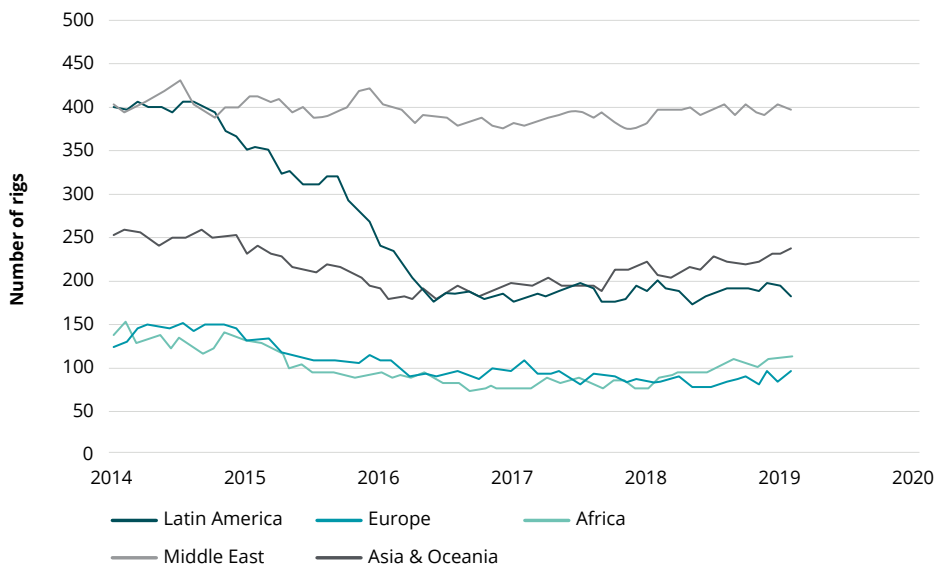
US Rig Counts



Canada Rig Counts



International Rig Counts



Rigs

United States

- Rig counts in the United States have dropped slightly over the last quarter. As prices have once again begun to strengthen, rigs are expected to begin growing in the coming months.

Canada

- Canadian rigs are down overall from this time last year as lower oil prices and production curtailments cut into the typical winter drilling season. Natural gas rig counts are also down from last year due to continued low gas prices.

International

- International rig counts continue to remain steady in most regions. The Middle East is still the leader in international drilling with Asia the next most active region, and growing. North America continues to maintain approximately 55 percent of the total drilling activity globally.

Canadian domestic price tables

Year	Crude Oil Pricing								
	Price Inflation	Cost Inflation	CAD to USD Exchange	WTI at Cushing Oklahoma	WTI at Cushing Oklahoma	Edmonton City Gate	Edmonton City Gate	WCS 20.5 Deg. API Hardisty	
	Rate	Rate	Rate	US\$/bbl Real	US\$/bbl Current	C\$/bbl Real	C\$/bbl Current	C\$/bbl Current	
Historical									
2009	0.3%	0.3%	0.880	\$72.30	\$61.65	\$77.51	\$66.10	\$58.66	
2010	1.8%	1.8%	0.971	\$92.82	\$79.40	\$90.96	\$77.80	\$67.22	
2011	2.9%	2.9%	1.012	\$108.98	\$94.88	\$109.73	\$95.54	\$77.12	
2012	1.5%	1.5%	1.001	\$104.94	\$94.11	\$96.53	\$86.57	\$73.10	
2013	0.9%	0.9%	0.972	\$107.51	\$97.91	\$102.52	\$93.36	\$74.97	
2014	1.9%	1.9%	0.906	\$101.45	\$93.26	\$102.25	\$94.00	\$81.06	
2015	1.1%	1.1%	0.783	\$51.95	\$48.69	\$60.82	\$57.00	\$44.80	
2016	1.4%	1.4%	0.755	\$45.53	\$43.15	\$55.09	\$52.22	\$38.90	
2017	1.6%	1.6%	0.771	\$52.91	\$50.88	\$64.35	\$61.88	\$50.53	
2018	2.3%	2.3%	0.772	\$66.44	\$64.94	\$70.70	\$69.10	\$49.68	
2019									
3 Mths H	1.8%	1.8%	0.752	\$54.23	\$54.23	\$67.62	\$67.62	\$52.70	
9 Mths F	0.0%	0.0%	0.760	\$58.00	\$58.00	\$65.80	\$65.80	\$53.95	
Avg.	N/A	N/A	0.758	\$57.06	\$57.06	\$66.26	\$66.26	\$53.64	
Forecast									
2019	0.0%	0.0%	0.760	\$58.00	\$58.00	\$65.80	\$65.80	\$53.95	
2020	2.0%	2.0%	0.760	\$60.00	\$61.20	\$71.05	\$72.45	\$57.75	
2021	2.0%	2.0%	0.770	\$62.00	\$64.50	\$75.30	\$78.35	\$60.80	
2022	2.0%	2.0%	0.790	\$65.00	\$69.00	\$77.20	\$81.95	\$64.45	
2023	2.0%	2.0%	0.800	\$70.00	\$75.75	\$82.50	\$89.30	\$71.70	
2024	2.0%	2.0%	0.800	\$70.00	\$77.30	\$82.50	\$91.10	\$73.15	
2025	2.0%	2.0%	0.800	\$70.00	\$78.85	\$82.50	\$92.90	\$74.60	
2026	2.0%	2.0%	0.800	\$70.00	\$80.40	\$82.50	\$94.75	\$76.10	
2027	2.0%	2.0%	0.800	\$70.00	\$82.00	\$82.50	\$96.65	\$77.60	
2028	2.0%	2.0%	0.800	\$70.00	\$83.65	\$82.50	\$98.60	\$79.15	
2029	2.0%	2.0%	0.800	\$70.00	\$85.35	\$82.50	\$100.55	\$80.75	
2030	2.0%	2.0%	0.800	\$70.00	\$87.05	\$82.50	\$102.60	\$82.35	
2031	2.0%	2.0%	0.800	\$70.00	\$88.80	\$82.50	\$104.65	\$84.00	
2032	2.0%	2.0%	0.800	\$70.00	\$90.55	\$82.50	\$106.70	\$85.70	
2033	2.0%	2.0%	0.800	\$70.00	\$92.35	\$82.50	\$108.85	\$87.40	
2034	2.0%	2.0%	0.800	\$70.00	\$94.20	\$82.50	\$111.05	\$89.15	
2035	2.0%	2.0%	0.800	\$70.00	\$96.10	\$82.50	\$113.25	\$90.95	
2036	2.0%	2.0%	0.800	\$70.00	\$98.00	\$82.50	\$115.50	\$92.75	
2037	2.0%	2.0%	0.800	\$70.00	\$100.00	\$82.50	\$117.85	\$94.60	
2038	2.0%	2.0%	0.800	\$70.00	\$102.00	\$82.50	\$120.20	\$96.50	
2038+	2.0%	2.0%	0.800	0.0%	2.0%	0.0%	2.0%	2.0%	

Notes:

- All prices are in Canadian dollars except WTI and NYMEX gas which are in U.S. dollars
- Edmonton city gate prices based on historical light oil par prices posted by the government of Alberta and Net Energy differential futures (40 Deg. API < 0.5% Sulphur)
- Real prices listed in 2019 dollars with no escalation considered

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Year	Natural Gas Liquids Pricing Edmonton Par Prices				Natural Gas Pricing				Sulphur		
	Ethane	Propane	Butane	Pentanes + Condensate	Alberta Reference Avg. Price	Alberta AECO Avg. Price	Alberta AECO Avg. Price	B.C. Direct Stn. 2 Sales	NYMEX Henry Hub	NYMEX Henry Hub	Alberta Plant Gate
	C\$/bbl	C\$/bbl	C\$/bb	C\$/bbl	C\$/mcf	C\$/mcf	C\$/mcf	C\$/mcf	US\$/Mcf	US\$/Mcf	C\$/lt
	Current	Current	Current	Current	Current	Real	Current	Current	Real	Current	Current
Historical											
2009	\$11.61	\$34.62	\$56.21	\$69.49	\$3.85	\$4.64	\$3.96	\$4.17	\$4.63	\$3.95	(\$5.08)
2010	\$11.53	\$45.19	\$68.79	\$84.02	\$3.76	\$4.69	\$4.01	\$4.01	\$5.13	\$4.39	\$56.94
2011	\$10.30	\$52.41	\$86.98	\$105.24	\$3.46	\$4.17	\$3.63	\$3.34	\$4.59	\$4.00	\$101.60
2012	\$6.73	\$30.80	\$75.47	\$99.67	\$2.25	\$2.66	\$2.39	\$2.29	\$3.07	\$2.75	\$126.81
2013	\$8.68	\$38.54	\$77.44	\$103.52	\$2.98	\$3.48	\$3.17	\$3.11	\$4.09	\$3.73	\$62.17
2014	\$12.46	\$42.93	\$59.43	\$101.47	\$4.22	\$4.90	\$4.50	\$4.16	\$4.78	\$4.39	\$88.99
2015	\$7.49	\$5.35	\$33.70	\$55.15	\$2.56	\$2.87	\$2.69	\$1.81	\$2.81	\$2.63	\$107.45
2016	\$6.04	\$8.71	\$31.45	\$52.43	\$1.93	\$2.28	\$2.16	\$1.75	\$2.65	\$2.52	\$45.40
2017	\$6.11	\$27.92	\$40.98	\$63.65	\$2.13	\$2.28	\$2.19	\$1.56	\$3.10	\$2.99	\$41.85
2018	\$6.90	\$29.76	\$46.17	\$75.74	\$1.36	\$1.57	\$1.54	\$1.26	\$3.24	\$3.17	\$89.25
2019											
3 Mths H	\$8.73	\$23.18	\$31.76	\$58.56	\$2.23	\$2.52	\$2.52	\$1.40	\$3.03	\$3.03	\$88.39
9 Mths F	\$5.70	\$29.60	\$29.60	\$65.80	\$1.55	\$1.75	\$1.75	\$1.45	\$3.00	\$3.00	\$85.00
Avg.	\$6.46	\$27.99	\$30.14	\$63.99	\$1.72	\$1.94	\$1.94	\$1.44	\$3.01	\$3.01	\$85.85
Forecast											
2019	\$5.70	\$29.60	\$29.60	\$65.80	\$1.55	\$1.75	\$1.75	\$1.45	\$3.00	\$3.00	\$85.00
2020	\$6.10	\$32.60	\$39.90	\$72.45	\$2.00	\$2.15	\$2.20	\$1.90	\$3.10	\$3.15	\$86.70
2021	\$6.95	\$35.25	\$50.95	\$78.35	\$2.30	\$2.40	\$2.50	\$2.20	\$3.30	\$3.45	\$88.45
2022	\$7.85	\$36.90	\$53.25	\$81.95	\$2.60	\$2.65	\$2.80	\$2.50	\$3.40	\$3.60	\$90.20
2023	\$8.95	\$40.20	\$58.05	\$89.30	\$3.00	\$2.95	\$3.20	\$2.85	\$3.55	\$3.85	\$92.00
2024	\$9.90	\$41.00	\$59.25	\$91.10	\$3.30	\$3.20	\$3.55	\$3.20	\$3.75	\$4.15	\$93.85
2025	\$10.70	\$41.85	\$60.40	\$92.90	\$3.60	\$3.40	\$3.85	\$3.50	\$3.90	\$4.40	\$95.70
2026	\$11.10	\$42.65	\$61.65	\$94.75	\$3.75	\$3.45	\$3.95	\$3.60	\$3.95	\$4.55	\$97.65
2027	\$11.50	\$43.55	\$62.85	\$96.65	\$3.85	\$3.50	\$4.10	\$3.75	\$4.00	\$4.70	\$99.60
2028	\$11.70	\$44.40	\$64.10	\$98.60	\$3.95	\$3.50	\$4.20	\$3.80	\$4.00	\$4.80	\$101.60
2029	\$11.95	\$45.30	\$65.40	\$100.55	\$4.00	\$3.50	\$4.25	\$3.90	\$4.00	\$4.90	\$103.60
2030	\$12.20	\$46.20	\$66.70	\$102.60	\$4.10	\$3.50	\$4.35	\$4.00	\$4.00	\$4.95	\$105.70
2031	\$12.45	\$47.10	\$68.05	\$104.65	\$4.20	\$3.50	\$4.45	\$4.05	\$4.00	\$5.05	\$107.80
2032	\$12.70	\$48.05	\$69.40	\$106.70	\$4.25	\$3.50	\$4.55	\$4.15	\$4.00	\$5.15	\$109.95
2033	\$12.95	\$49.00	\$70.80	\$108.85	\$4.35	\$3.50	\$4.60	\$4.20	\$4.00	\$5.30	\$112.15
2034	\$13.20	\$50.00	\$72.20	\$111.05	\$4.45	\$3.50	\$4.70	\$4.30	\$4.00	\$5.40	\$114.40
2035	\$13.45	\$51.00	\$73.65	\$113.25	\$4.55	\$3.50	\$4.80	\$4.40	\$4.00	\$5.50	\$116.70
2036	\$13.70	\$52.00	\$75.10	\$115.50	\$4.60	\$3.50	\$4.90	\$4.50	\$4.00	\$5.60	\$119.00
2037	\$14.00	\$53.05	\$76.65	\$117.85	\$4.70	\$3.50	\$5.00	\$4.55	\$4.00	\$5.70	\$121.40
2038	\$14.30	\$54.10	\$78.15	\$120.20	\$4.80	\$3.50	\$5.10	\$4.65	\$4.00	\$5.85	\$123.85
2038+	2.0%	2.0%	2.0%	2.0%	2.0%	0.0%	2.0%	2.0%	0.0%	2.0%	2.0%

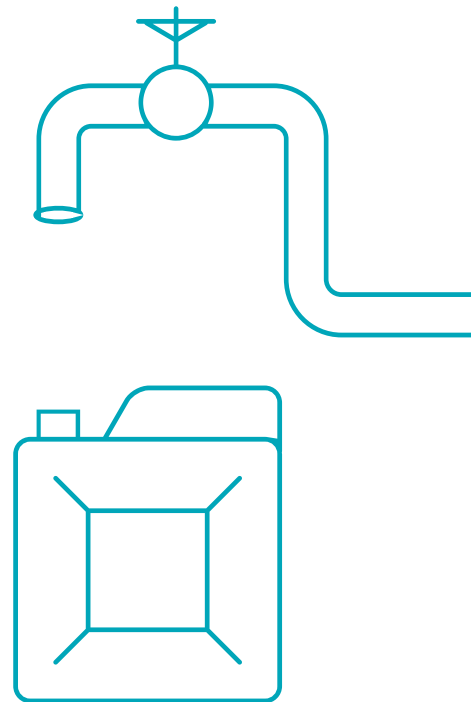
Notes:

- All prices are in Canadian dollars except WTI and NYMEX gas which are in U.S. dollars
- Natural Gas Liquid prices are forecasted at Edmonton therefore an additional transportation cost must be included to plant gate sales point
- 1 Mcf is equivalent to 1 mmbtu
- Real prices listed in 2019 dollars with no escalation considered
- Alberta gas prices, except AECO, include an average cost of service to the plant gate
- NGL prices have been switched from a mix reference to a spec reference

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Additional crude reference prices

Year	Crude oil pricing			Natural gas pricing
	Lt. Sour 35 Deg. API Cromer, SK	MSO 31 Deg. API Hardisty	Synbit (AWB) 70% Bitumen 30% Cond. 21 Deg. API	Ontario Dawn Reference Point
	C\$/bbl	C\$/bbl	C\$/bbl	C\$/mcf
	Current	Current	Current	Current
Historical				
2009	\$64.04	\$63.76	\$58.92	\$4.80
2010	\$76.40	\$72.32	\$67.64	\$4.79
2011	\$92.13	\$83.39	\$80.29	\$4.34
2012	\$84.27	\$77.53	\$74.75	\$3.11
2013	\$91.76	\$82.65	\$76.90	\$4.13
2014	\$92.91	\$89.39	\$82.03	\$5.76
2015	\$55.46	\$54.70	\$44.28	\$3.72
2016	\$51.37	\$48.29	\$39.58	\$3.46
2017	\$62.06	\$58.16	\$50.60	\$3.97
2018	\$73.06	\$62.82	\$54.46	\$4.07
2019				
3 Mths H	\$65.66	\$61.72	\$51.34	\$3.95
9 Mths F	\$66.80	\$60.80	\$54.00	\$3.90
Avg.	\$66.52	\$61.03	\$53.34	\$3.91
Forecast				
2019	\$66.80	\$60.80	\$54.00	\$3.90
2020	\$73.50	\$67.35	\$58.60	\$4.15
2021	\$79.40	\$73.15	\$62.40	\$4.40
2022	\$83.00	\$76.60	\$66.00	\$4.50
2023	\$90.40	\$83.90	\$73.25	\$4.75
2024	\$92.20	\$85.55	\$74.70	\$5.15
2025	\$94.05	\$87.30	\$76.20	\$5.45
2026	\$95.90	\$89.00	\$77.70	\$5.65
2027	\$97.85	\$90.80	\$79.25	\$5.80
2028	\$99.80	\$92.60	\$80.85	\$5.90
2029	\$101.80	\$94.45	\$82.45	\$6.05
2030	\$103.80	\$96.35	\$84.10	\$6.15
2031	\$105.90	\$98.30	\$85.80	\$6.30
2032	\$108.00	\$100.25	\$87.50	\$6.40
2033	\$110.20	\$102.25	\$89.25	\$6.55
2034	\$112.40	\$104.30	\$91.05	\$6.65
2035	\$114.65	\$106.40	\$92.85	\$6.80
2036	\$116.90	\$108.50	\$94.75	\$6.95
2037	\$119.25	\$110.70	\$96.60	\$7.05
2038	\$121.65	\$112.90	\$98.55	\$7.20
2038+	2.0%	2.0%	2.0%	2.0%



Notes:

- All prices are in Canadian dollars except WTI and NYMEX gas which are in US dollars
- Edmonton city gate prices based on historical light oil par prices posted by the government of Alberta and Net Energy differential futures (40 Deg. API < 0.5% Sulphur)
- Natural Gas Liquid prices are forecasted at Edmonton therefore an additional transportation cost must be included to plant gate sales point
- 1 Mcf is equivalent to 1 mmbtu
- Real prices listed in 2019 dollars with no escalation considered
- Alberta gas prices, except AECO, include an average cost of service to the plant gate
- NGL prices have been switched from a mix reference to a spec reference

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International price tables

Crude Oil Pricing																
Year	Average WTI Spot	Alaskan North Slope	California Midway-Sunset	Louisiana Heavy Sweet	Louisiana Light Sweet	MARS Blend	Wyoming Sweet	Brent Spot	Gulf Coast Argus Sour Crude Index ASCI	Average OPEC Basket	Venezuelan Meriy	Nigerian Bonny Light	Arabia UAE Dubai Feteh	Mexico Maya	Russia Urals	Indonesia Minas
	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl	US\$/bbl
	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real
Forecast																
2019	\$58.00	\$54.50	\$59.00	\$59.00	\$57.50	\$55.50	\$55.00	\$66.00	\$55.50	\$64.15	\$58.00	\$66.75	\$64.30	\$57.00	\$64.75	\$59.00
2020	\$60.00	\$56.50	\$61.00	\$61.00	\$59.50	\$57.50	\$57.00	\$67.00	\$57.50	\$65.15	\$59.00	\$67.75	\$65.30	\$58.00	\$65.75	\$60.00
2021	\$62.00	\$58.50	\$63.00	\$63.00	\$61.50	\$59.50	\$59.00	\$67.00	\$59.50	\$65.15	\$59.00	\$67.75	\$65.30	\$58.00	\$65.75	\$60.00
2022	\$65.00	\$61.50	\$66.00	\$66.00	\$64.50	\$62.50	\$62.00	\$67.00	\$62.50	\$65.15	\$59.00	\$67.75	\$65.30	\$58.00	\$65.75	\$60.00
2023	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2024	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2025	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2026	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2027	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2028	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2029	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2030	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2031	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2032	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2033	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2034	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2035	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2036	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2037	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2038	\$70.00	\$66.50	\$71.00	\$71.00	\$69.50	\$67.50	\$67.00	\$72.00	\$67.50	\$70.15	\$64.00	\$72.75	\$70.30	\$63.00	\$70.75	\$65.00
2038+	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Notes:

- Venezuelan Meriy replaced BCF-17 in the OPEC basket March 1, 2009.

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Year	Natural Gas pricing							Ethanol	
	USD to GBP	USD to EUR	NYMEX Henry Hub	Permian Waha	San Juan Ignacio	Rocky Mtn. Opal	UK NBP	India Domestic Gas	US CBOT Ethanol
	Exchange rate	Exchange rate	US\$/Mcf Real	US\$/Mcf Real	US\$/Mcf Real	US\$/Mcf Real	US\$/Mcf Real	US\$/Mcf Real	US\$/gal Real
Forecast									
2019	1.280	1.150	\$3.00	\$1.80	\$2.50	\$2.50	\$8.50	\$3.75	\$1.25
2020	1.280	1.150	\$3.10	\$2.10	\$2.60	\$2.60	\$8.35	\$4.05	\$1.25
2021	1.280	1.150	\$3.30	\$2.30	\$2.80	\$2.80	\$8.30	\$4.05	\$1.25
2022	1.280	1.150	\$3.40	\$2.40	\$2.90	\$2.90	\$8.15	\$4.15	\$1.25
2023	1.280	1.150	\$3.55	\$2.55	\$3.05	\$3.05	\$8.30	\$4.15	\$1.25
2024	1.280	1.150	\$3.75	\$2.75	\$3.25	\$3.25	\$8.50	\$4.25	\$1.25
2025	1.280	1.150	\$3.90	\$2.90	\$3.40	\$3.40	\$8.65	\$4.40	\$1.25
2026	1.280	1.150	\$3.95	\$2.95	\$3.45	\$3.45	\$8.70	\$4.55	\$1.25
2027	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2028	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2029	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2030	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2031	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2032	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2033	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2034	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2035	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2036	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2037	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2038	1.280	1.150	\$4.00	\$3.00	\$3.50	\$3.50	\$8.75	\$4.60	\$1.25
2038+	1.280	1.150	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

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Pricing philosophy

Price forecasting takes into account many variables that can influence future prices. Our experience tells us that we must continually review the forecasting tools we use to predict where oil and gas prices are heading. However, one constant influence on oil and gas pricing is the geo-political landscape. This impact is most accurately reflected in the financial industry's futures market for commodities, a main influence when Deloitte creates its price forecast. In other words, Deloitte looks to both the futures and the past when we create our forecasts.

This pricing philosophy challenges conventional thinking. The traditional view is based on the mean-reversion view of commodities presented by economists. Following this model, industry forecasts from 2000 to 2006 reflected a drop in prices over the long term from the current prices of the day – even though the futures market indicated otherwise. While the mean-reversion approach definitely has some merit, history has tended to reflect that the futures market is a more accurate barometer.

Client focus

At Deloitte, we believe it is part of our role to help our clients in both the oil and gas sector and the investment community make better long-term business decisions by providing them with the most accurate and realistic information. We understand that sound analysis of changing trends can influence decisions on mergers, acquisitions, divestitures and investments. One way we

ensure our price forecasts are as accurate as possible, given the continuing impact of near-term volatility, is to review our pricing assumptions on a quarterly basis.

Our process

In preparing the price forecast, Deloitte considers the current monthly trends, the actual price and trends for the year-to-date and the prior year actual prices. The base forecast for both oil and gas is based on New York Mercantile Exchange (NYMEX) futures in U.S. dollars.

Crude oil and natural gas forecasts are based on yearly variable factors, weighted to a higher percent for the current data and then reflect a higher percent to prior year historical data for the later years. Gas prices have been determined independently from oil prices, but still reflect the current competitive nature of the two fuels and historical oil-to-gas ratios for the latter years of the gas forecast.

Deloitte prepares our price and market forecasts based on information we collect from numerous government agencies, industry publications, oil refineries, natural gas marketers and industry trends. Inflation forecasts and exchange rates are also an integral part of the forecast.

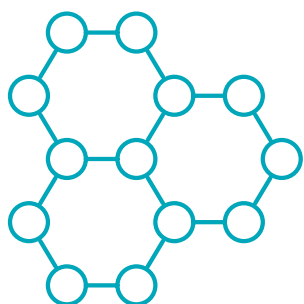
These forecasts are Deloitte's best estimate of how the future will look, and while they are considered reasonable, changing market conditions or additional information may require alteration from the indicated effective date.



Glossary

Some of the words, phrases and acronyms we use frequently when talking about pricing are listed below:

AECO	Alberta Energy Company - historical name of a virtual trading hub on the NGX system	LNG	Liquefied Natural Gas
ANS	Alaska North Slope	MESC	Middle East Sour Crude
ASCI	Argus Sour Crude Oil	MSO	Mixed Sour Crude Oil
AWB	Access Western Blend - Canadian condensate/bitumen mix	MSW	Canadian Light Sweet
BR	Bow River Crude Oil	NEB	Canadian National Energy Board
CAPP	Canadian Association of Petroleum Producers	NGX	Natural Gas Exchange
CBOT	Chicago Board Of Trade	NIT	Nova Inventory Transfer
CGA	Canadian Gas Association	NRC	Natural Resources Canada
CME	Chicago Mercantile Exchange	NYMEX	New York Mercantile Exchange
DCQ	Daily Contract Quantity	OECD	Organization of Economic Cooperation and Development
DOB	Daily Oil Bulletin	OPEC	Organization of Petroleum Exporting Countries
EIA	Energy Information Administration	PADD	Petroleum Administration Defense District
FERC	US Federal Energy Regulatory Commission	USGC	US Gulf Coast
FOB	Free on Board (shipper term)	USWC	US West Coast
IEA	International Energy Administration	WCS	Western Canada Select Crude Oil
LLB	Lloydminster Blend Crude Oil	WTI	West Texas Intermediate
		WTS	West Texas Sour





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