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Energy, oil, and gas price forecast

New avenues opening for chemical
and oil and gas industries

December 31, 2023

Forecast commentary	3
New avenues opening for chemical and oil and gas industries	8
Canadian domestic price forecast	11
International price forecast	13
Global trends	14
Canadian domestic price tables	16
International price tables	19
Pricing philosophy	21
Glossary	22

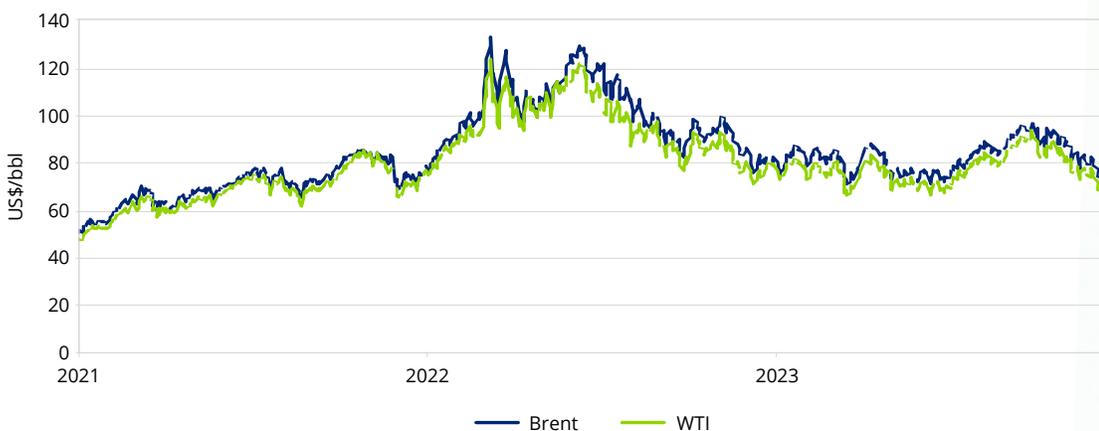
Forecast commentary

Oil prices in 2023 were volatile as the market faced several uncertainties.

Rising geopolitical tensions, which typically drive up prices as supply concerns overtake the market, did not move oil prices upward and expectations for softening demand growth—the EIA forecasts an increase in demand of 1.0 million barrels per day (bbl/d) in 2024 compared to 1.6 million bbl/d in 2023—have pushed prices down to levels not seen since late 2021.¹ In response, OPEC+ has agreed to remove 2.2 million bbl/d from the market in the first quarter of

2024, including a rollover of the current 1.3 million bbl/d of voluntary cuts from Russia and Saudi Arabia.² At the same time, production in the United States continues to grow, reaching record highs in December after nearly 9% growth through 2023.³ The US Strategic Petroleum Reserve currently has approximately 350 million barrels of oil stored, a figure that remains largely unchanged after significant volumes were released throughout 2022 and the first half of 2023.⁴ These factors all weighed on international oil prices throughout 2023.

Oil prices

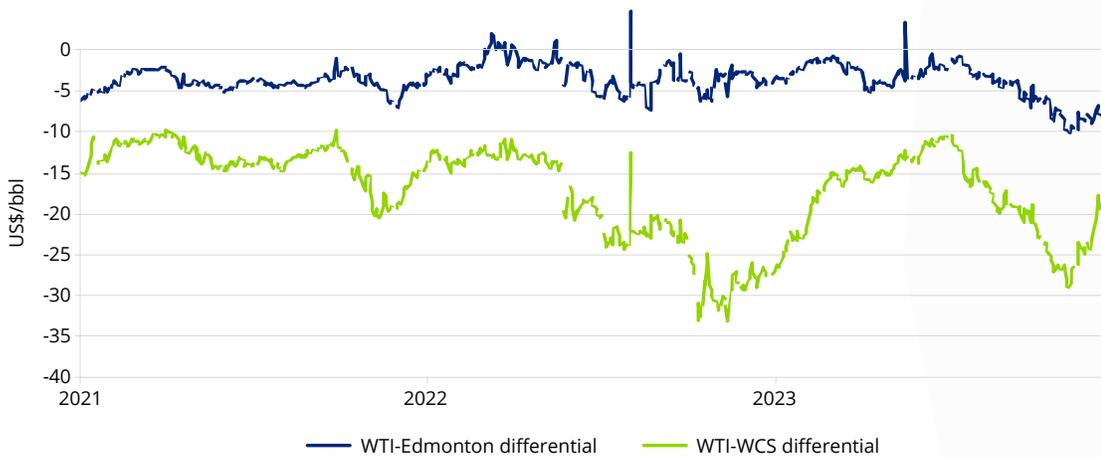


Source: EIA

In Canada, Edmonton Light and WCS differentials widened as WTI prices dropped but then stabilized in December. To accommodate the increased takeaway pressure, crude-by-rail shipments have increased by over 80%, or around 65,000 bbl/d, since the summer.⁵ The startup of the Trans Mountain Expansion

(TMX) is anticipated to relieve much of this pressure on the US pipeline system and bring more stability to Canadian price differentials. However, delays in construction now threaten to push the startup date beyond the first quarter of 2024.

Canadian oil differentials to WTI

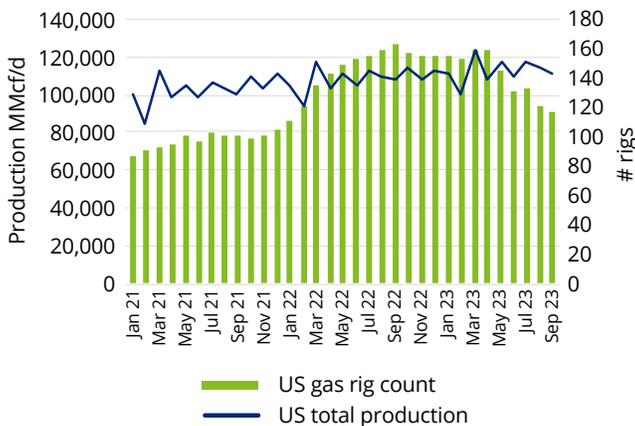


Source: Daily Oil Bulletin

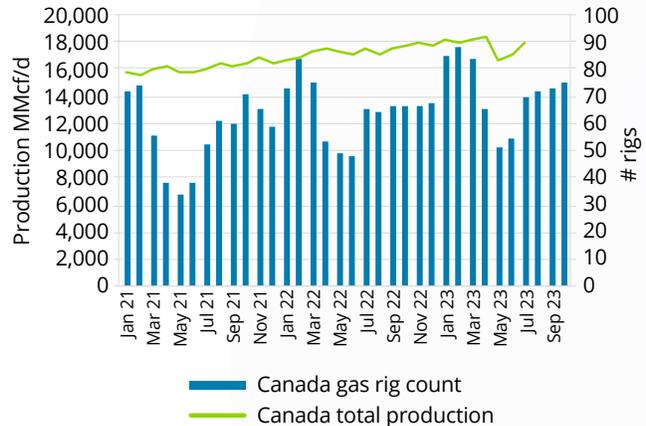
It was a remarkably steady year for Canadian AECO prices, which have consistently been around \$2.50/GJ since April 2023. At this time last year, we had expected higher prices as geopolitics were front and centre. The likelihood of a cold winter also led us to feel robust pricing could be expected in North America. Instead, it was a mild winter, leading to high storage levels in both the United States and Europe and prices taking a nosedive early in the year across North America. Despite this substantial drop in prices, production did not respond in any material way. Throughout the year, both

Canadian and US natural gas production have been growing modestly, with a 2% increase year over year in Canada and a 4% increase south of the border. As we have touched on in prior commentaries, this is largely due to associated natural gas from oil wells propping up the overall supply. This is much more pronounced in the United States, with Permian natural gas production increasing by 12% year over year and robust oil prices driving up rig activity, even while natural gas rig activity was on average 5% lower in 2023 than 2022.

US gas activity



Canadian gas activity



Sources: EIA, Baker Hughes, CER

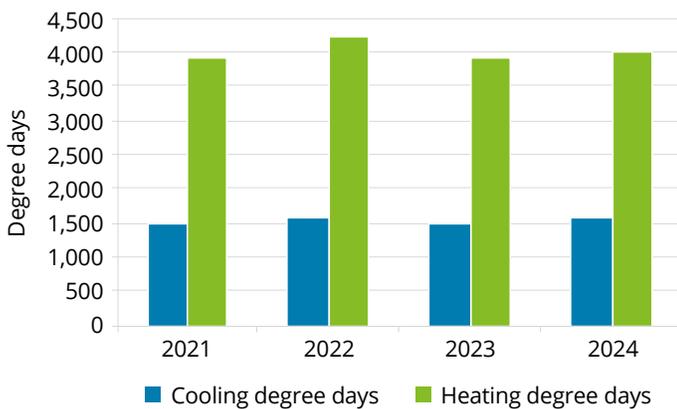
The lack of response in gas production when prices drop shows that producers have the inventory with satisfactory returns. Even with low prices, the inventory is generating the cash flow

needed to maintain the dividends promised to the market, which is really what the market wants from producers at this point.

Given high storage levels and the mild weather outlook, we expect that prices in 2024 will be very similar to 2023. Both Canadian and US storage levels are above the five-year average and Europe has almost the entirety of its storage capacity filled. In 2022, Europe pushed aggressively to build storage going into winter with uncertainty around supply due to the Ukraine conflict, but the mild winter meant that storage levels did not drop

below 50% for the EU countries combined, well above the 2022 norms of 25% to 30%.⁶ Combining high storage levels with the expectation this winter being mild due to the effects of El Niño, gas prices are not expected to get a remarkable winter boost. While it is difficult to say how the winter will pan out, El Niño's impact on US temperatures is forecasted to bring about the same number of heating days as 2023 and only slightly more cooling days.

US annual heating and cooling days



Source: EIA

In Canada, El Niño is also likely to mean a slow start to winter, but cold weather late in the season—if it materializes—could keep prices from crashing in the spring.⁷

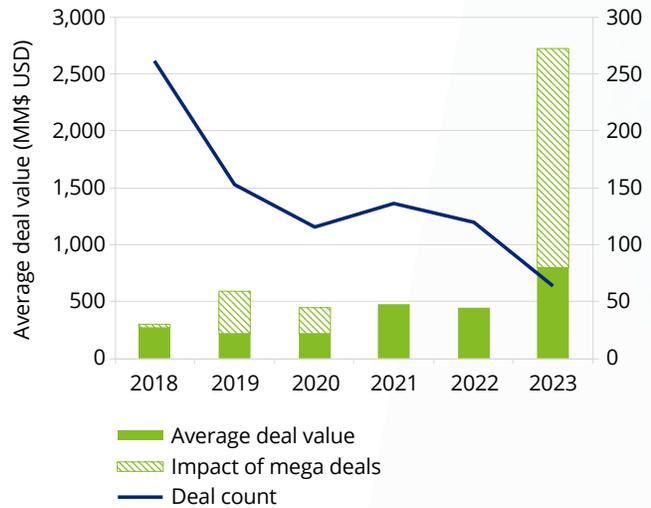
Another key 2023 highlight is the corporate consolidation trend that

continued throughout the year, with multiple mega deals being announced in Q4. While the number of transactions for North American upstream assets has been decreasing over the last few years, the average deal size has been generally increasing.⁸

Canadian upstream M&A



US upstream M&A



Sources: Enverus, Deloitte analysis

In both Canada and the United States, large deals were struck in 2023 where companies acquired assets to complement their existing operations and give them scale in the market. Two Canadian examples are the recent Deep Basin consolidation through Peyto acquiring Repsol's assets and Strathcona purchasing Pipestone. South of the border, mega

deals announced by Chevron and Exxon materially moved the needle on the average deal size, as illustrated in the US M&A chart. With deal values of more than US\$10 billion, these types of mega deals are infrequent but indicate that, with several months of solid cash flow and strong balance sheets, companies are thinking strategically and making big bets.

Sources

- ¹ EIA, [Short-Term Energy Outlook](#), December 2023.
- ² OPEC, ["Several OPEC+ countries announce additional voluntary cuts to the total of 2.2 million barrels per day,"](#) press release, November 30, 2023.
- ³ EIA, ["Weekly U.S. Field Production of Crude Oil,"](#) December 6, 2023.
- ⁴ EIA, ["Weekly U.S. Ending Stocks of Crude Oil in SPR,"](#) December 6, 2023.
- ⁵ CER, ["Canadian Crude Oil Exports by Rail – Monthly Data,"](#) November 20, 2023.
- ⁶ Council of the EU and the European Council, ["How much gas have the EU countries stored?"](#) Consilium.europa.eu, November 29, 2023.
- ⁷ Doug Gillham, ["El Niño's impact on Canada's winter: What to expect?"](#) The Weather Network, October 18, 2023.
- ⁸ Enverus, ["Market Research, Canada Upstream Transactions and US Upstream Transactions,"](#) accessed December 4, 2023.

Spotlight article

New avenues opening for chemical and oil and gas industries

In late 2023, Dow Chemical announced an \$11.5-billion project to renovate and expand its plant in Fort Saskatchewan, Alberta.¹ Committing to massive carbon-emissions reductions and touted as the world's first net-zero emissions ethylene cracker and derivatives site of its kind, the project will benefit from up to \$400 million in federal investment credits targeted at carbon capture, utilization, and storage (CCUS) and clean hydrogen, and up to \$1.8 billion in rebates through the Alberta Petrochemicals Incentive Program (APIP).

Dow is not the only company to take advantage of APIP to help expand its Canadian operations. In 2021, the program awarded a \$408-million grant to the Heartland Petrochemical Complex production facility, publicized as North America's only single-site propane dehydrogenation and polypropylene complex, which went into production in early 2023.²

These projects are emblematic of an important trend in the oil and gas industry. Throughout the energy transition, demand for materials that use petrochemicals are expected to increase.³ And as the market for petroleum products continues to broaden, investments like these within our borders will allow Canadian oil and gas companies to

participate earlier and more fully in the industry's integrated value chain.

In our recently released [2024 chemical industry outlook](#), several trends were identified that are taking shape here in Canada. Parallels with oil and gas trends are already apparent and convergence is likely to continue as the industrials become more intertwined.

Uncertain demand outlook

The chemical industry outlook calls for sluggish demand in the near term, due to inflation pressures, recession concerns, and a smaller-than-expected demand rebound in China. While growth will pick up over time, it will be slow to modest over the next few years. Capital spend in the US chemical industry, for instance, is expected to stay flat in 2024, increasing by just 3% to 4% in 2025 and 2026, a trend that may be reflected in oil and gas globally.⁴

At the same time, the chemical industry's importance to the energy transition is clear, given its role in supplying materials for battery manufacturing, refrigerants for heat pumps, lubricants for turbines, solvents for semiconductors, and more. But the reality is that this key role won't make a major impact on industry growth for several years to come.

Given the slower market and limited near-term growth, companies are instead focused on reducing costs and improving efficiencies to make up for revenue shortfalls. They're taking the opportunity to drive automation and digitalization into their operations, investments that will help them to build a competitive edge, in addition to creating efficiencies.

Competitive edge due to regional supply

Canada has an edge due to the regional availability of affordable feedstock, similar to China and the Middle East. However, regional *markets* are also key, and that's where we're less

areas such as lithium extraction from brine water (an innovative process being piloted by a Calgary company with the help of \$27 million in federal funding) and helium production.⁵

Accordingly, one area of enhanced focus for new Canadian incentives is the development of the critical minerals value chain—a significant move, given the importance of critical minerals in technologies like wind turbines, batteries, electric vehicles, and energy storage cells. In March 2023, the federal government announced a \$344-million investment to prioritize

We expect to see more partnerships, joint ventures, and other collaborations working to secure resilient supply chains and develop innovative products and processes.

advantaged. While we have access to a robust market in the United States, our manufacturers also compete directly with the same US companies we supply, which complicates the picture.

Given these realities and the pressures on our economy, we're seeing more desire for Canadian companies and governments to invest in operations within Canada to allow us to capture a larger proportion of the value chain. Dow Chemical could have chosen any number of places for its project, but government incentives helped to make Alberta an attractive location.

Diversification and collaboration

Around the world, we're seeing companies diversify operations to take a bigger piece of the supply chain, such as chemical companies expanding into lithium processing or battery manufacturing.

We expect to start seeing more of this in Canada as well. There are already interesting developments in

the development of critical minerals in Canada and advance the country's green transition and digital economy.⁶

To enable this type of expansion/diversification, it will be important for Canadian companies to continue to work within the global scene. We expect to see more partnerships, joint ventures, and other collaborations working to secure resilient supply chains and develop innovative products and processes. Companies may take a friendshoring approach, creating agreements with others in allied countries.

For example, another major export project on Canada's West Coast was recently announced in partnership with a European infrastructure company: the development of a large-scale liquefied petroleum gas and bulk liquids terminal.⁷ The goal is to increase Canada's ability to access petrochemical markets outside of the United States, particularly Asia.

Impacts of policies and incentives

Policies, regulations, and incentives are expected to continue to dictate investment for both the chemical and oil and gas industries. Alberta's petrochemical incentive, which came into effect on October 30, 2020, has provided funding for three projects to date—the two mentioned above and a natural gas to hydrogen production facility that received a \$161-million grant.⁸

These projects demonstrate that incentives do allow companies the opportunity to get over certain financial hurdles and pursue major projects in the drive toward sustainability, and there are other, similar incentives in the province and across the country. But not all projects are successful—some will falter, like the \$4-billion net-zero blue methanol project in Alberta that was cancelled in February 2023.⁹

Nevertheless, the Dow project and others like it illustrate that incentives can be

an important lever for governments to pull to accelerate Canada's energy transition while helping companies find new ways to participate in the value chain. Announcements at COP28 in December 2023 sent strong signals that the federal government is also leaning on regulations to achieve its goals. Time will tell if this combination of carrots and sticks will lead to the investments necessary to produce lasting change.

Slow growth, but opportunities ahead

The market may be sluggish as we head into the new year, but the possibilities are plentiful for Canada's chemical and oil and gas industries. Our abundant natural resources provide extensive opportunities to invest in onshore development, develop our export capabilities into the United States and other friendly markets, and partner with others in diversifying operations to allow Canadian companies to participate more fully in the emerging energy value chain.

Sources

¹ Emma Graney and Carrie Tait, "Dow Chemical announces \$11.5-billion project in Alberta," *Globe and Mail*, November 29, 2023; Lisa Johnson, "Dow's Alberta petrochemical megaproject to get billions in government support," *Edmonton Journal*, November 29, 2023.

² Inter Pipeline, "Inter Pipeline awarded \$408 million grant under Alberta's petrochemicals incentive program," press release, April 5, 2021; Inter Pipeline "North America's only single-site propane dehydrogenation and polypropylene complex," accessed December 6, 2023.

³ IEA, *Primary chemicals: Net zero emissions guide*, September 2023.

⁴ IEA, *Medium-term gas report 2023: Including the gas market report, Q4-2023*, October 2023; IEA, *Oil 2023: Analysis and forecast to 2023*, June 2023.

⁵ Josh Aldrich, "Calgary-based company secures \$27M in federal funding to develop lithium extraction in oilpatch," *Calgary Herald*, November 28, 2022; Naimul Karim, "E3 to test whether it can get lithium from abandoned oil fields in first for Canada," *Financial Post*, August 30, 2023; Josh Aldrich, "Company to drill for helium over vast tract in southern Alberta," *Calgary Herald*, January 10, 2023; Rod Nickel, "Canada's Saskatchewan province gets lift from record helium activity," *Reuters*, January 18, 2022.

⁶ Nick Lazarro, "Canada boosts critical minerals projects with latest investments," S&P Global, March 8, 2023.

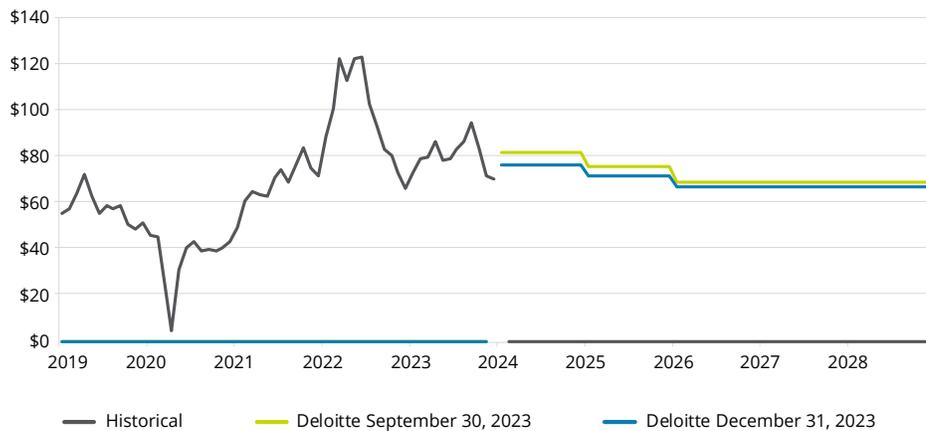
⁷ AltaGas, "Vopak and AltaGas form a new joint venture for large-scale LPG and bulk liquids export terminal in Prince Rupert, Canada," press release, April 26, 2023.

⁸ Government of Alberta, "Alberta Petrochemicals Incentive Program: Funded projects," Alberta.ca, accessed December 6, 2023.

⁹ Jesse Boily, "Smaller methanol gas plant might be in the works after \$4B project cancelled in Grande Prairie," *CTV News Edmonton*, February 23, 2023.

Canadian domestic price forecast

Crude oil price and market demand forecast Hardisty WCS (real \$)



Forecast comments

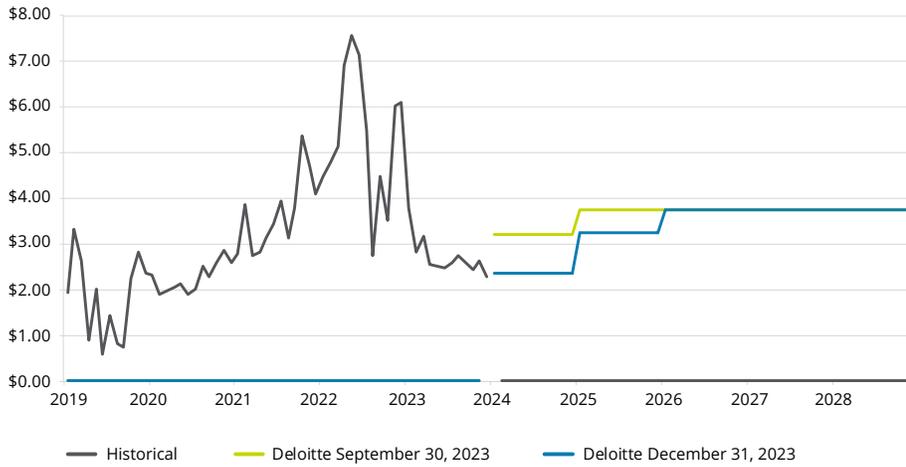
WCS is forecast as a differential to WTI. This differential is based on Western Canadian Select Crude Oil Futures.

Year	WTI Cushing, OK (40 API) US\$/bbl Real	WTI Cushing, OK (40 API) US\$/bbl Current	Edmonton City Gate (40 API) C\$/bbl Real	Edmonton City Gate (40 API) C\$/bbl Current	WCS Hardisty (20.5 API) C\$/bbl Current	Heavy Oil Hardisty (12 API) C\$/bbl Current	Cost inflation Rate	CAD to USD exchange Rate
Historical								
2020	\$43.89	\$39.23	\$51.12	\$45.69	\$36.09	\$31.48	0.7%	0.746
2021	\$75.52	\$67.99	\$89.35	\$80.44	\$68.21	\$63.82	3.4%	0.798
2022	\$101.70	\$94.79	\$128.37	\$119.64	\$96.96	\$92.06	6.8%	0.769
2023								
12 mths H	\$77.57	\$77.57	\$99.21	\$99.21	\$80.14	\$74.35	3.9%	0.741
0 mths F	-	-	-	-	-	-	-	-
Avg.	\$77.57	\$77.57	\$99.21	\$99.21	\$80.14	\$74.35	-	0.741
Forecast								
2024	\$72.00	\$72.00	\$91.90	\$91.90	\$75.70	\$71.20	0.0%	0.740
2025	\$70.00	\$71.40	\$87.00	\$88.75	\$72.90	\$68.30	2.0%	0.770
2026	\$68.00	\$70.75	\$81.25	\$84.55	\$68.95	\$64.25	2.0%	0.800
2027	\$68.00	\$72.15	\$81.25	\$86.20	\$70.30	\$65.55	2.0%	0.800
2028	\$68.00	\$73.60	\$81.25	\$87.95	\$71.70	\$66.85	2.0%	0.800
2029	\$68.00	\$75.10	\$81.25	\$89.70	\$73.15	\$68.20	2.0%	0.800
2030	\$68.00	\$76.60	\$81.25	\$91.50	\$74.60	\$69.55	2.0%	0.800
2031	\$68.00	\$78.10	\$81.25	\$93.35	\$76.10	\$70.95	2.0%	0.800

Canadian domestic price forecast

Natural gas price and market demand forecast

AECO natural gas (real \$)



Forecast comments

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

Year	AB Ref.	AECO	AECO	BC Direct	NYMEX	NYMEX
	Avg. price	Avg. price	Avg. price	Station 2 sales	Henry Hub	Henry Hub
	C\$/Mcf	C\$/Mcf	C\$/Mcf	C\$/Mcf	US\$/Mcf	US\$/Mcf
	Current	Real	Current	Current	Real	Current
Historical						
2020	\$2.00	\$2.52	\$2.25	\$2.20	\$2.28	\$2.04
2021	\$3.27	\$4.05	\$3.64	\$3.34	\$4.34	\$3.91
2022	\$5.05	\$5.75	\$5.36	\$4.56	\$6.88	\$6.42
2023						
12 mths H	\$2.58	\$2.72	\$2.72	\$2.28	\$2.54	\$2.54
0 mths F	-	-	-	-	-	-
Avg.	\$2.58	\$2.72	\$2.72	\$2.28	\$2.54	\$2.54
Forecast						
2024	\$2.10	\$2.35	\$2.35	\$2.05	\$2.75	\$2.75
2025	\$3.05	\$3.25	\$3.30	\$3.00	\$3.50	\$3.55
2026	\$3.65	\$3.75	\$3.90	\$3.60	\$4.00	\$4.15
2027	\$3.70	\$3.75	\$4.00	\$3.65	\$4.00	\$4.25
2028	\$3.80	\$3.75	\$4.05	\$3.75	\$4.00	\$4.35
2029	\$3.85	\$3.75	\$4.15	\$3.80	\$4.00	\$4.40
2030	\$3.95	\$3.75	\$4.20	\$3.90	\$4.00	\$4.50
2031	\$4.00	\$3.75	\$4.30	\$3.95	\$4.00	\$4.60

International price forecast

Crude oil price and market demand forecast

Year	Avg. WTI Spot	Brent Spot (38.3 API with 0.37% sulphur content)	Gulf Coast ASCI/MARS	Avg. OPEC Basket	Nigerian Bonny Light (33.4 API FOB)	Mexico Maya (21.8 API FOB)	Russia Urals (31.7 API FOB)
	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current
Forecast							
2024	\$72.00	\$76.00	\$70.00	\$76.50	\$77.00	\$66.00	\$66.00
2025	\$71.40	\$74.45	\$69.35	\$74.95	\$75.50	\$67.05	\$69.35
2026	\$70.75	\$73.85	\$68.65	\$74.40	\$74.90	\$66.35	\$70.75
2027	\$72.15	\$75.35	\$70.05	\$75.90	\$76.40	\$67.65	\$72.15
2028	\$73.60	\$76.85	\$71.45	\$77.40	\$77.95	\$69.00	\$73.60
2029	\$75.10	\$78.40	\$72.85	\$78.95	\$79.50	\$70.40	\$75.10
2030	\$76.60	\$79.95	\$74.35	\$80.50	\$81.10	\$71.80	\$76.60
2031	\$78.10	\$81.55	\$75.80	\$82.15	\$82.70	\$73.25	\$78.10

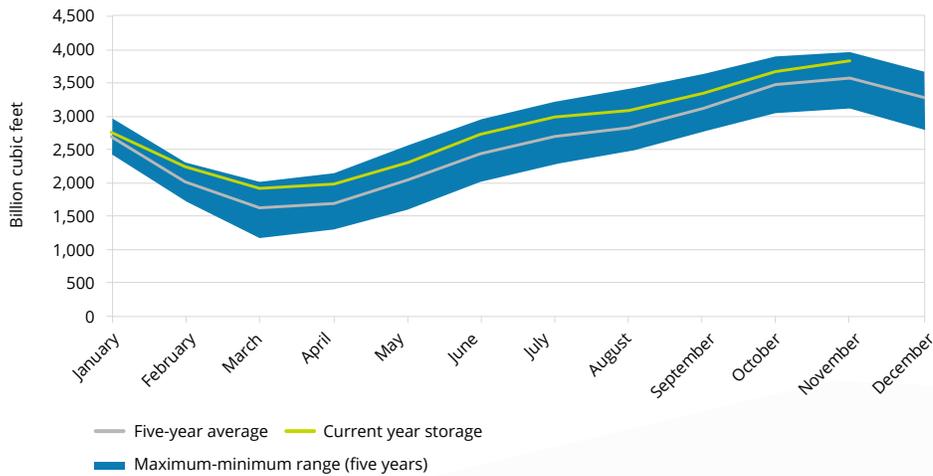
- International crude quality reference points for OPEC Basket, Venezuelan, Nigerian, UAE, Mexican, Chinese, Russian, and Indonesian crudes are now based on Brent in US dollars. For the purposes of this forecast, Brent is receiving a premium to WTI on the world markets.
- Current forecasts for other 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% 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 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
	Rate	Rate	US\$/Mcf Current	US\$/Mcf Current	US\$/Mcf Current	US\$/Mcf Current	US\$/Mcf Current	US\$/Mcf Current
Forecast								
2024	1.25	1.10	\$2.75	\$1.75	\$2.55	\$3.75	\$12.50	\$7.50
2025	1.30	1.15	\$3.55	\$2.80	\$3.35	\$4.60	\$12.75	\$7.35
2026	1.30	1.15	\$4.15	\$3.40	\$3.95	\$5.20	\$12.50	\$7.25
2027	1.30	1.15	\$4.25	\$3.45	\$4.05	\$5.30	\$12.75	\$7.40
2028	1.30	1.15	\$4.35	\$3.50	\$4.10	\$5.40	\$13.00	\$7.55
2029	1.30	1.15	\$4.40	\$3.60	\$4.20	\$5.50	\$13.25	\$7.70
2030	1.30	1.15	\$4.50	\$3.65	\$4.30	\$5.65	\$13.50	\$7.85
2031	1.30	1.15	\$4.60	\$3.75	\$4.35	\$5.75	\$13.80	\$8.05

Global trends

US natural gas storage



Storage

United States

Natural gas storage in the United States remains higher than the five-year average heading into the winter, as it has been for the entirety of 2023.

Source: Baker Hughes

Rigs

United States

Oil and gas rig counts remained relatively flat over the last quarter of 2023. Dropping prices may lead to both counts dropping in the new year.

Canada

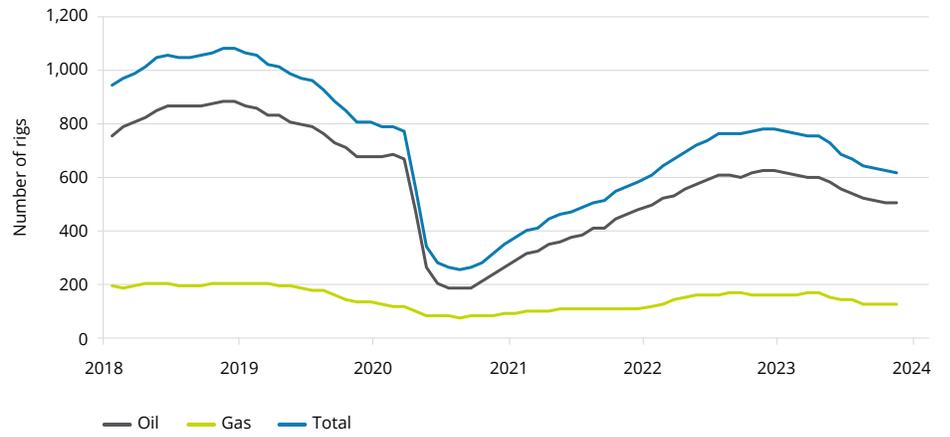
Oil and gas rig counts in Canada remain strong in comparison to 2022 in spite of lower commodity prices.

International

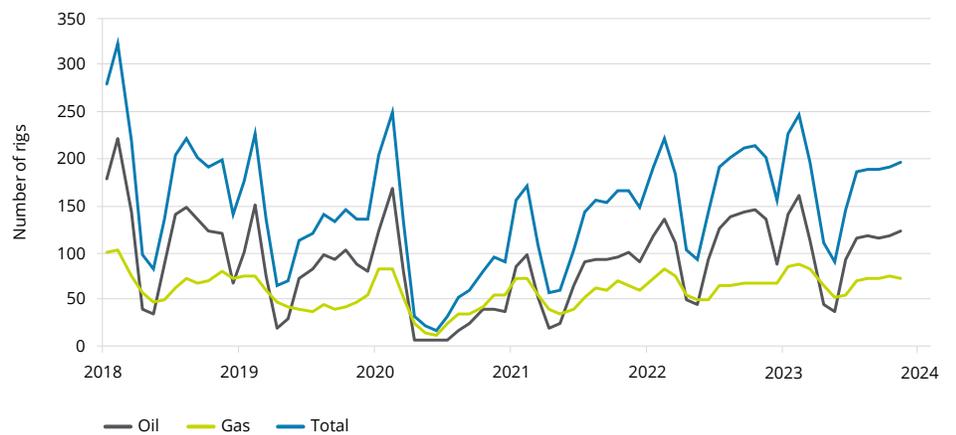
Notably, rig counts in Africa rose above those in Europe in November after a strong year of growth, driven primarily by activity in Nigeria. Rig counts have remained stable around the globe, with growth continuing in Africa and the Middle East. As oil prices continued to slide at the end of 2023, rig counts may drop in the new year.

*Source: Baker Hughes

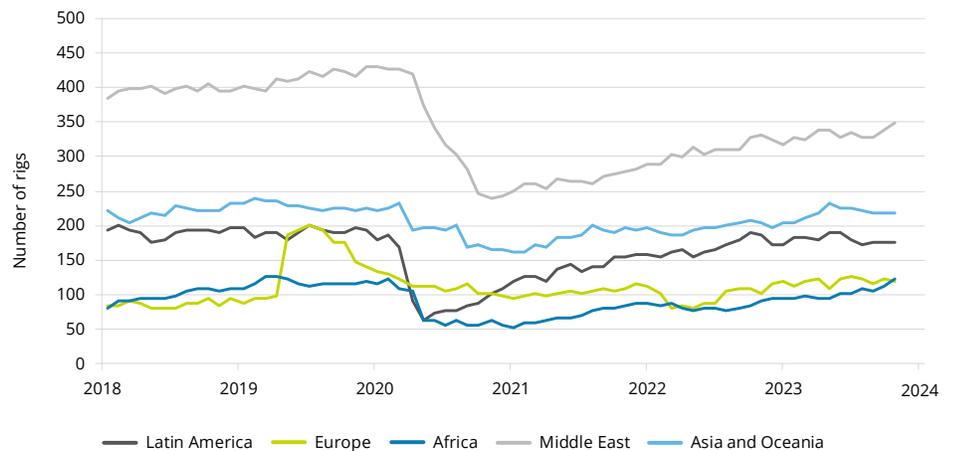
United States*



Canada*



International*



Canadian domestic price tables

Crude oil pricing								
Year	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								
2013	0.9%	0.9%	0.972	\$122.67	\$97.91	\$116.97	\$93.36	\$74.97
2014	1.9%	1.9%	0.906	\$115.75	\$93.26	\$116.66	\$94.00	\$81.06
2015	1.1%	1.1%	0.783	\$59.28	\$48.69	\$69.39	\$57.00	\$44.80
2016	1.4%	1.4%	0.755	\$51.95	\$43.15	\$62.86	\$52.22	\$38.90
2017	1.6%	1.6%	0.771	\$60.37	\$50.88	\$73.70	\$62.12	\$49.51
2018	2.3%	2.3%	0.772	\$75.81	\$64.94	\$80.67	\$69.10	\$49.89
2019	1.9%	1.9%	0.754	\$65.02	\$56.98	\$78.75	\$69.02	\$57.43
2020	0.7%	0.7%	0.746	\$43.89	\$39.23	\$51.12	\$45.69	\$36.09
2021	3.4%	3.4%	0.798	\$75.52	\$67.99	\$89.35	\$80.44	\$68.21
2022	6.8%	6.8%	0.769	\$101.70	\$94.79	\$128.37	\$119.64	\$96.96
2023								
12 mths H	3.9%	3.9%	0.741	\$77.57	\$77.57	\$99.21	\$99.21	\$80.14
0 mths F	0.0%	0.0%	-	-	-	-	-	-
Avg.	N/A	N/A	0.741	\$77.57	\$77.57	\$99.21	\$99.21	\$80.14
Forecast								
2024	0.0%	0.0%	0.740	\$72.00	\$72.00	\$91.90	\$91.90	\$75.70
2025	2.0%	2.0%	0.770	\$70.00	\$71.40	\$87.00	\$88.75	\$72.90
2026	2.0%	2.0%	0.800	\$68.00	\$70.75	\$81.25	\$84.55	\$68.95
2027	2.0%	2.0%	0.800	\$68.00	\$72.15	\$81.25	\$86.20	\$70.30
2028	2.0%	2.0%	0.800	\$68.00	\$73.60	\$81.25	\$87.95	\$71.70
2029	2.0%	2.0%	0.800	\$68.00	\$75.10	\$81.25	\$89.70	\$73.15
2030	2.0%	2.0%	0.800	\$68.00	\$76.60	\$81.25	\$91.50	\$74.60
2031	2.0%	2.0%	0.800	\$68.00	\$78.10	\$81.25	\$93.35	\$76.10
2032	2.0%	2.0%	0.800	\$68.00	\$79.65	\$81.25	\$95.20	\$77.60
2033	2.0%	2.0%	0.800	\$68.00	\$81.25	\$81.25	\$97.10	\$79.15
2034	2.0%	2.0%	0.800	\$68.00	\$82.90	\$81.25	\$99.05	\$80.75
2035	2.0%	2.0%	0.800	\$68.00	\$84.55	\$81.25	\$101.00	\$82.35
2036	2.0%	2.0%	0.800	\$68.00	\$86.25	\$81.25	\$103.05	\$84.00
2037	2.0%	2.0%	0.800	\$68.00	\$87.95	\$81.25	\$105.10	\$85.70
2038	2.0%	2.0%	0.800	\$68.00	\$89.70	\$81.25	\$107.20	\$87.40
2039	2.0%	2.0%	0.800	\$68.00	\$91.50	\$81.25	\$109.35	\$89.15
2040	2.0%	2.0%	0.800	\$68.00	\$93.35	\$81.25	\$111.55	\$90.95
2041	2.0%	2.0%	0.800	\$68.00	\$95.20	\$81.25	\$113.75	\$92.75
2042	2.0%	2.0%	0.800	\$68.00	\$97.10	\$81.25	\$116.05	\$94.60
2043	2.0%	2.0%	0.800	\$68.00	\$99.05	\$81.25	\$118.35	\$96.50
2043+	2.0%	2.0%	0.800	0.0%	2.0%	0.0%	2.0%	2.0%

Notes

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- Edmonton City Gate prices are based on historical light oil par prices posted by the Government of Alberta and Net Energy differential futures (40 deg. API < 0.5% sulphur).
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Canadian domestic price tables

Natural gas liquid pricing Edmonton par prices					Natural gas pricing							Sulphur
Year	Ethane	Propane	Butane	Pentanes + Condensate	AB Reference Avg. price	AECO Avg. price	AECO Avg. price	BC Direct Stn. 2 sales	NYMEX Henry Hub	NYMEX Henry Hub	AB plant gate	
	C\$/bbl Current	C\$/bbl Current	C\$/bbl Current	C\$/bbl Current	C\$/mcf Current	C\$/mcf Real	C\$/mcf Current	C\$/mcf Current	US\$/Mcf Real	US\$/Mcf Current	C\$/lt Current	
Historical												
2013	\$8.68	\$38.54	\$77.44	\$103.52	\$2.98	\$3.98	\$3.17	\$3.11	\$4.67	\$3.73	\$62.17	
2014	\$12.46	\$42.93	\$59.43	\$101.47	\$4.22	\$5.59	\$4.50	\$4.16	\$5.45	\$4.39	\$88.99	
2015	\$7.49	\$5.35	\$33.70	\$55.15	\$2.56	\$3.28	\$2.69	\$1.81	\$3.20	\$2.63	\$107.45	
2016	\$6.04	\$8.71	\$31.45	\$52.43	\$1.93	\$2.60	\$2.16	\$1.75	\$3.03	\$2.52	\$45.40	
2017	\$6.11	\$27.92	\$40.98	\$63.65	\$2.13	\$2.60	\$2.19	\$1.56	\$3.54	\$2.99	\$41.85	
2018	\$6.90	\$29.76	\$46.17	\$75.74	\$1.36	\$1.80	\$1.54	\$1.26	\$3.70	\$3.17	\$89.25	
2019	\$5.00	\$15.82	\$21.40	\$67.57	\$1.48	\$2.07	\$1.81	\$1.02	\$2.93	\$2.57	\$37.54	
2020	\$6.20	\$16.11	\$20.93	\$47.14	\$2.00	\$2.52	\$2.25	\$2.20	\$2.28	\$2.04	\$2.60	
2021	\$10.08	\$45.46	\$40.28	\$82.91	\$3.27	\$4.05	\$3.64	\$3.34	\$4.34	\$3.91	\$69.73	
2022	\$15.05	\$51.37	\$64.88	\$118.21	\$5.05	\$5.75	\$5.36	\$4.56	\$6.88	\$6.42	\$120.05	
2023												
12 mths H	\$7.55	\$30.68	\$48.30	\$99.46	\$2.58	\$2.72	\$2.72	\$2.28	\$2.54	\$2.54	\$16.67	
0 mths F	-	-	-	-	-	-	-	-	-	-	-	
Avg.	\$7.55	\$30.68	\$48.30	\$99.46	\$2.58	\$2.72	\$2.72	\$2.28	\$2.54	\$2.54	\$16.67	
Forecast												
2024	\$6.60	\$32.15	\$41.35	\$91.90	\$2.10	\$2.35	\$2.35	\$2.05	\$2.75	\$2.75	\$25.00	
2025	\$9.30	\$35.50	\$44.35	\$88.75	\$3.05	\$3.25	\$3.30	\$3.00	\$3.50	\$3.55	\$51.00	
2026	\$10.90	\$33.80	\$42.30	\$84.55	\$3.65	\$3.75	\$3.90	\$3.60	\$4.00	\$4.15	\$52.00	
2027	\$11.15	\$34.50	\$43.15	\$86.20	\$3.70	\$3.75	\$4.00	\$3.65	\$4.00	\$4.25	\$53.05	
2028	\$11.35	\$35.20	\$44.00	\$87.95	\$3.80	\$3.75	\$4.05	\$3.75	\$4.00	\$4.35	\$54.10	
2029	\$11.60	\$35.90	\$44.90	\$89.70	\$3.85	\$3.75	\$4.15	\$3.80	\$4.00	\$4.40	\$55.20	
2030	\$11.80	\$36.60	\$45.80	\$91.50	\$3.95	\$3.75	\$4.20	\$3.90	\$4.00	\$4.50	\$56.30	
2031	\$12.05	\$37.35	\$46.70	\$93.35	\$4.00	\$3.75	\$4.30	\$3.95	\$4.00	\$4.60	\$57.45	
2032	\$12.30	\$38.10	\$47.65	\$95.20	\$4.10	\$3.75	\$4.40	\$4.05	\$4.00	\$4.70	\$58.60	
2033	\$12.55	\$38.85	\$48.60	\$97.10	\$4.20	\$3.75	\$4.50	\$4.10	\$4.00	\$4.80	\$59.75	
2034	\$12.80	\$39.60	\$49.55	\$99.05	\$4.25	\$3.75	\$4.55	\$4.20	\$4.00	\$4.90	\$60.95	
2035	\$13.05	\$40.40	\$50.55	\$101.00	\$4.35	\$3.75	\$4.65	\$4.30	\$4.00	\$4.95	\$62.15	
2036	\$13.30	\$41.20	\$51.55	\$103.05	\$4.45	\$3.75	\$4.75	\$4.40	\$4.00	\$5.05	\$63.40	
2037	\$13.60	\$42.05	\$52.60	\$105.10	\$4.55	\$3.75	\$4.85	\$4.45	\$4.00	\$5.15	\$64.70	
2038	\$13.85	\$42.90	\$53.65	\$107.20	\$4.60	\$3.75	\$4.95	\$4.55	\$4.00	\$5.30	\$65.95	
2039	\$14.15	\$43.75	\$54.70	\$109.35	\$4.70	\$3.75	\$5.05	\$4.65	\$4.00	\$5.40	\$67.30	
2040	\$14.40	\$44.60	\$55.80	\$111.55	\$4.80	\$3.75	\$5.15	\$4.75	\$4.00	\$5.50	\$68.65	
2041	\$14.70	\$45.50	\$56.90	\$113.75	\$4.90	\$3.75	\$5.25	\$4.85	\$4.00	\$5.60	\$70.00	
2042	\$15.00	\$46.40	\$58.05	\$116.05	\$5.00	\$3.75	\$5.35	\$4.95	\$4.00	\$5.70	\$71.40	
2043	\$15.30	\$47.35	\$59.20	\$118.35	\$5.10	\$3.75	\$5.45	\$5.05	\$4.00	\$5.85	\$72.85	
2043+	2.0%	2.0%	2.0%	2.0%	2.0%	0.0%	2.0%	2.0%	0.0%	2.0%	2.0%	

Notes

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- NGL prices have been switched from a mix reference to a spec reference.

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Canadian domestic price tables

Additional crude reference prices

Crude oil pricing				Natural gas pricing	
Year	Lt. Sour 35 deg. API Cromer, SK	MSO 31 deg. API Hardisty	Syncrude Sweet Premium 32.5 deg. API	Ontario Dawn Reference Point	
	C\$/bbl Current	C\$/bbl Current	C\$/bbl Current	C\$/mcf Current	
Historical					
2013	\$91.76	\$82.65		\$4.13	
2014	\$92.91	\$89.39		\$5.76	
2015	\$55.46	\$54.70		\$3.72	
2016	\$51.37	\$48.29		\$3.46	
2017	\$62.06	\$58.16		\$3.97	
2018	\$73.06	\$62.82		\$4.07	
2019	\$69.68	\$65.72		\$3.22	
2020	\$45.41	\$43.55		\$2.51	
2021	\$80.08	\$76.58	\$83.62	\$4.55	
2022	\$117.99	\$113.47	\$128.10	\$7.92	
2023					
12 mths H	\$98.96	\$93.58	\$106.09	\$3.20	
0 mths F	-	-	-	-	
Avg.	\$98.96	\$93.58	\$106.09	\$3.20	
Forecast					
2024	\$90.40	\$86.90	\$95.70	\$3.45	
2025	\$87.20	\$84.15	\$93.30	\$4.40	
2026	\$82.95	\$79.85	\$89.75	\$4.95	
2027	\$84.65	\$81.45	\$91.55	\$5.05	
2028	\$86.30	\$83.10	\$93.35	\$5.15	
2029	\$88.05	\$84.75	\$95.25	\$5.25	
2030	\$89.80	\$86.45	\$97.15	\$5.35	
2031	\$91.60	\$88.15	\$99.05	\$5.45	
2032	\$93.45	\$89.90	\$101.05	\$5.55	
2033	\$95.30	\$91.70	\$103.10	\$5.70	
2034	\$97.20	\$93.55	\$105.15	\$5.80	
2035	\$99.15	\$95.45	\$107.25	\$5.90	
2036	\$101.15	\$97.35	\$109.40	\$6.00	
2037	\$103.15	\$99.30	\$111.55	\$6.15	
2038	\$105.25	\$101.25	\$113.80	\$6.25	
2039	\$107.35	\$103.30	\$116.10	\$6.40	
2040	\$109.50	\$105.35	\$118.40	\$6.50	
2041	\$111.65	\$107.45	\$120.75	\$6.65	
2042	\$113.90	\$109.60	\$123.20	\$6.80	
2043	\$116.20	\$111.80	\$125.65	\$6.90	
2043+	2.0%	2.0%	2.0%	2.0%	

Notes

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International price tables

Crude oil pricing															
Year	Avg. WTI Spot	Alaskan North Slope	California Midway-Sunset	Louisiana Light Sweet	Gulf Coast ASCI/MARS	Wyoming Sweet	Brent Spot	Avg. OPEC Basket	Venezuelan Merey	Nigerian Bonny Light	Arabia UAE Dubai Feteh	UAE Murban	Mexico Maya	Russia Urals	Indonesia Minas
	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current	US\$/bbl Current
Forecast															
2024	\$72.00	\$68.00	\$71.00	\$73.50	\$70.00	\$69.50	\$76.00	\$76.50	\$55.00	\$77.00	\$74.50	\$76.50	\$66.00	\$66.00	\$73.50
2025	\$71.40	\$67.30	\$70.40	\$72.95	\$69.35	\$68.85	\$74.45	\$74.95	\$53.05	\$75.50	\$72.95	\$74.95	\$67.05	\$69.35	\$71.90
2026	\$70.75	\$66.60	\$69.70	\$72.30	\$68.65	\$68.15	\$73.85	\$74.40	\$52.00	\$74.90	\$72.30	\$74.40	\$66.35	\$70.75	\$71.25
2027	\$72.15	\$67.90	\$71.10	\$73.75	\$70.05	\$69.50	\$75.35	\$75.90	\$53.05	\$76.40	\$73.75	\$75.90	\$67.65	\$72.15	\$72.70
2028	\$73.60	\$69.30	\$72.50	\$75.25	\$71.45	\$70.90	\$76.85	\$77.40	\$54.10	\$77.95	\$75.25	\$77.40	\$69.00	\$73.60	\$74.15
2029	\$75.10	\$70.65	\$73.95	\$76.75	\$72.85	\$72.30	\$78.40	\$78.95	\$55.20	\$79.50	\$76.75	\$78.95	\$70.40	\$75.10	\$75.65
2030	\$76.60	\$72.05	\$75.45	\$78.25	\$74.35	\$73.75	\$79.95	\$80.50	\$56.30	\$81.10	\$78.25	\$80.50	\$71.80	\$76.60	\$77.15
2031	\$78.10	\$73.50	\$76.95	\$79.85	\$75.80	\$75.25	\$81.55	\$82.15	\$57.45	\$82.70	\$79.85	\$82.15	\$73.25	\$78.10	\$78.70
2032	\$79.65	\$75.00	\$78.50	\$81.45	\$77.35	\$76.75	\$83.20	\$83.75	\$58.60	\$84.35	\$81.45	\$83.75	\$74.70	\$79.65	\$80.25
2033	\$81.25	\$76.50	\$80.05	\$83.05	\$78.90	\$78.30	\$84.85	\$85.45	\$59.75	\$86.05	\$83.05	\$85.45	\$76.20	\$81.25	\$81.85
2034	\$82.90	\$78.00	\$81.65	\$84.70	\$80.45	\$79.85	\$86.55	\$87.15	\$60.95	\$87.75	\$84.70	\$87.15	\$77.70	\$82.90	\$83.50
2035	\$84.55	\$79.60	\$83.30	\$86.40	\$82.05	\$81.45	\$88.30	\$88.90	\$62.15	\$89.50	\$86.40	\$88.90	\$79.25	\$84.55	\$85.15
2036	\$86.25	\$81.15	\$84.95	\$88.15	\$83.70	\$83.05	\$90.05	\$90.70	\$63.40	\$91.30	\$88.15	\$90.70	\$80.85	\$86.25	\$86.85
2037	\$87.95	\$82.80	\$86.65	\$89.90	\$85.40	\$84.75	\$91.85	\$92.50	\$64.70	\$93.15	\$89.90	\$92.50	\$82.45	\$87.95	\$88.60
2038	\$89.70	\$84.45	\$88.40	\$91.70	\$87.10	\$86.45	\$93.70	\$94.35	\$65.95	\$95.00	\$91.70	\$94.35	\$84.10	\$89.70	\$90.40
2039	\$91.50	\$86.15	\$90.15	\$93.55	\$88.85	\$88.15	\$95.55	\$96.25	\$67.30	\$96.90	\$93.55	\$96.25	\$85.80	\$91.50	\$92.20
2040	\$93.35	\$87.85	\$92.00	\$95.40	\$90.60	\$89.90	\$97.45	\$98.15	\$68.65	\$98.85	\$95.40	\$98.15	\$87.50	\$93.35	\$94.05
2041	\$95.20	\$89.60	\$93.80	\$97.30	\$92.40	\$91.70	\$99.40	\$100.10	\$70.00	\$100.80	\$97.30	\$100.10	\$89.25	\$95.20	\$95.90
2042	\$97.10	\$91.40	\$95.70	\$99.25	\$94.25	\$93.55	\$101.40	\$102.10	\$71.40	\$102.85	\$99.25	\$102.10	\$91.05	\$97.10	\$97.85
2043	\$99.05	\$93.25	\$97.60	\$101.25	\$96.15	\$95.40	\$103.45	\$104.15	\$72.85	\$104.90	\$101.25	\$104.15	\$92.85	\$99.05	\$99.80
2043+	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

Notes

- Data sources include: EIA, OPEC, ARC Energy, and Marex Spectron.
- Venezuelan Merey replaced BCF-17 in the OPEC basket on March 1, 2009.

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International price tables

Natural gas pricing								
Year	USD to GBP	USD to EUR	NYMEX Henry Hub	Permian Waha	San Juan Ignacio	Rocky Mtn. Opal	UK NBP	India domestic gas
	Exchange rate	Exchange rate	US\$/Mcf Current					
Forecast								
2024	1.250	1.100	\$2.75	\$1.75	\$2.55	\$3.75	\$12.50	\$7.50
2025	1.300	1.150	\$3.55	\$2.80	\$3.35	\$4.60	\$12.75	\$7.35
2026	1.300	1.150	\$4.15	\$3.40	\$3.95	\$5.20	\$12.50	\$7.25
2027	1.300	1.150	\$4.25	\$3.45	\$4.05	\$5.30	\$12.75	\$7.40
2028	1.300	1.150	\$4.35	\$3.50	\$4.10	\$5.40	\$13.00	\$7.55
2029	1.300	1.150	\$4.40	\$3.60	\$4.20	\$5.50	\$13.25	\$7.70
2030	1.300	1.150	\$4.50	\$3.65	\$4.30	\$5.65	\$13.50	\$7.85
2031	1.300	1.150	\$4.60	\$3.75	\$4.35	\$5.75	\$13.80	\$8.05
2032	1.300	1.150	\$4.70	\$3.80	\$4.45	\$5.85	\$14.05	\$8.20
2033	1.300	1.150	\$4.80	\$3.90	\$4.55	\$6.00	\$14.35	\$8.35
2034	1.300	1.150	\$4.90	\$3.95	\$4.65	\$6.10	\$14.65	\$8.50
2035	1.300	1.150	\$4.95	\$4.05	\$4.70	\$6.20	\$14.90	\$8.70
2036	1.300	1.150	\$5.05	\$4.10	\$4.80	\$6.35	\$15.20	\$8.85
2037	1.300	1.150	\$5.15	\$4.20	\$4.90	\$6.45	\$15.50	\$9.05
2038	1.300	1.150	\$5.30	\$4.30	\$5.00	\$6.60	\$15.85	\$9.20
2039	1.300	1.150	\$5.40	\$4.35	\$5.10	\$6.75	\$16.15	\$9.40
2040	1.300	1.150	\$5.50	\$4.45	\$5.20	\$6.85	\$16.45	\$9.60
2041	1.300	1.150	\$5.60	\$4.55	\$5.30	\$7.00	\$16.80	\$9.80
2042	1.300	1.150	\$5.70	\$4.65	\$5.45	\$7.15	\$17.15	\$10.00
2043	1.300	1.150	\$5.85	\$4.75	\$5.55	\$7.30	\$17.50	\$10.20
2043+	1.300	1.150	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

Notes

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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 geopolitical 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 past and the future when we create our forecast.

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 a 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 NYMEX futures in US 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

AECO	Alberta Energy Company— historical name of a virtual trading hub on the NGX system	LLB	Lloydminster Blend
ANS	Alaska North Slope	LNG	Liquefied Natural Gas
ASCI	Argus Sour Crude Index	MESC	Middle East Sour Crude
AWB	Access Western Blend— Canadian condensate/ bitumen mix	MSO	Mixed Sour Crude Oil
BR	Bow River Crude Oil	MSW	Mixed Sweet Blend
CAPP	Canadian Association of Petroleum Producers	NBP	National Balancing Point
CBOT	Chicago Board Of Trade	NEB	Canadian National Energy Board
CER	Canadian Energy Regulator	NGX	Natural Gas Exchange
CGA	Canadian Gas Association	NIT	Nova Inventory Transfer
CLS	Canadian Light Sweet	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	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
		WTI	West Texas Intermediate
		WTS	West Texas Sour

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