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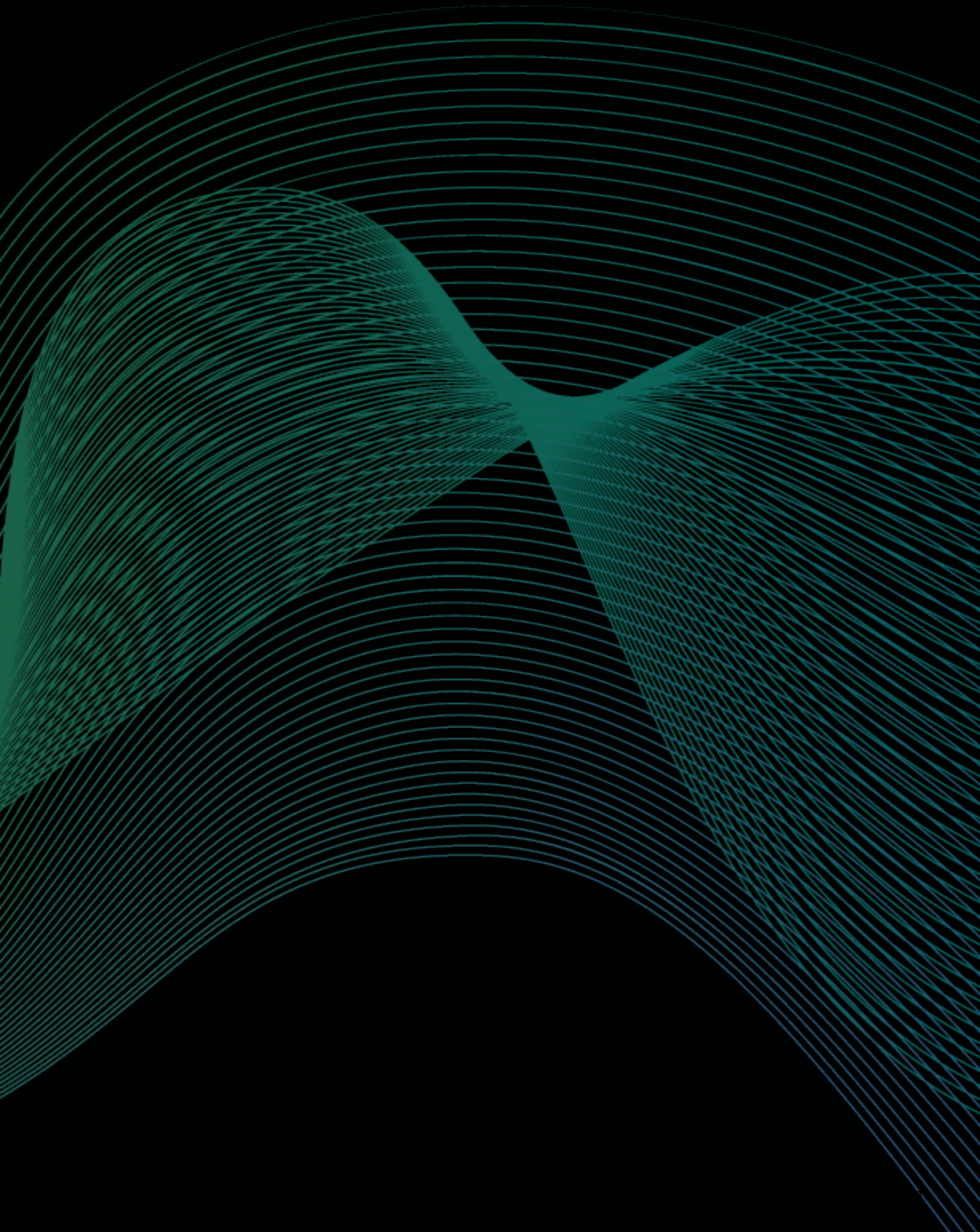
Oil and gas price forecast

Sustainable ecosystems: Collaborating to reach Canada's carbon goals

September 30, 2021



Forecast commentary

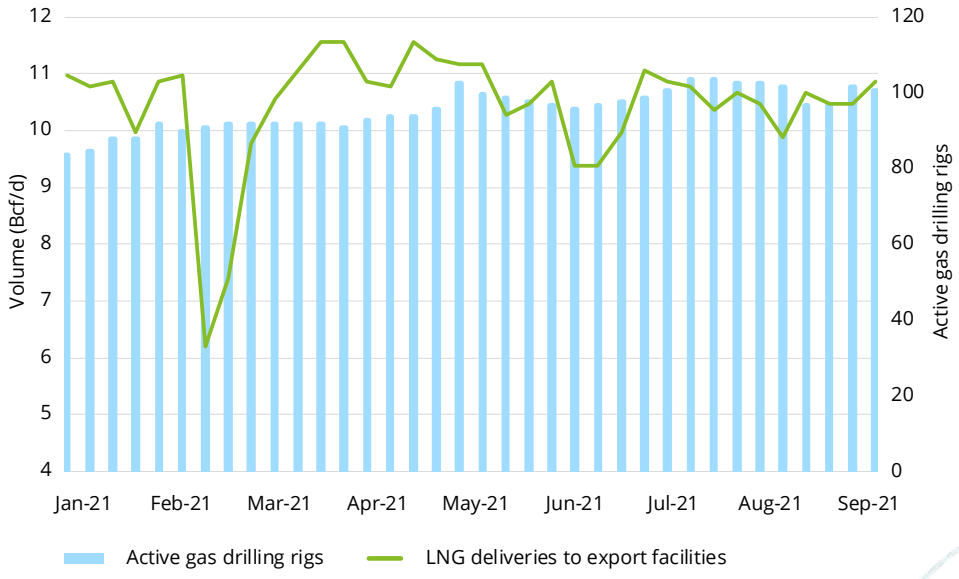
Natural gas has a sweet quarter, hitting its highest price since 2014

Natural gas prices showed reliable strength over the summer months as storage levels remained below five-year averages across North America. US injection rates averaged 15% below the five-year average, with subdued drilling activity and increased liquid natural gas (LNG) exports. Demand for US LNG feed gas remained elevated in response to high LNG cargo prices in both European and Asian markets. The steady export volumes, coupled with decreased supply due to slow natural gas production growth and low storage levels, resulted in the highest seasonal Henry Hub gas price since 2014.

Canadian gas prices have continued to trend upward over the summer as domestic demand outpaced that of recent years, and pipeline flows out of Western Canada increased because of the unusually warm temperatures across North America. Canadian production volumes soared above last year's seasonal levels as prices remained strong; however, natural gas drilling activity in Canada has not responded by exceeding the five-year average. This trend confirms that producer discipline is holding, and companies are focused on maximizing cash flow.

Internationally, UK NBP and Dutch TTF prices reached record highs in September, the result of decreased supply from Russia and storage levels being under 70% capacity, tracking 10-year lows. Asian LNG prices also surged due to demand competition from Europe as European nations looked to bolster their natural gas storage volumes for winter months. The construction of the Nord Stream 2 pipeline in September should alleviate European gas supply concerns, as the pipeline will be able to export additional gas to Western Europe once it's operational.

US deliveries to LNG export terminals and rig counts



Source: EIA, Baker Hughes.

As we head into the fourth quarter of 2021 and the beginning of the storage withdrawal season, North American prices should remain strong. However, we expect prices will flatten when US natural gas production rises, and that LNG export volumes flatten as prices decrease in Europe and Asia.

Hurricane season disrupts the Gulf Coast

Crude oil prices slumped throughout the summer as analysts projected weaker demand forecasts due to surging COVID-19 Delta variant cases around the world. Supply increased over recent months as both the United States and OPEC+ producers grew production; however, production levels have not yet recovered to pre-pandemic rates nor are they expected to by the end of the year. Hurricane Ida caused short-term supply interruptions from the offshore United States, and the prospect of subsequent hurricanes, coupled with plans by OPEC+ members to keep production levels constant, are expected to offset decreased demand and allow prices to remain stable over the coming months.

The short-term disruptions to offshore production has resulted in the lowest US crude inventories in nearly two years. While US Gulf Coast refineries were also affected by Ida, they outpaced producers in returning on-stream, leading to increased demand for crude oil feedstock. During the first three-quarters of 2021, US producers significantly reduced the backlog of drilled-uncompleted (DUC) wells.

Some US shale companies wanting to cash in on higher oil prices and jump-start production growth may look to increase capital spending on drilling new wells rather than provide returns to investors or pay down debt. If implemented, this change in capital allocation methodology will increase spending in the sector and offset declining production and short-term hurricane losses. Realistically, US drilling will need to ramp up at some point, as the backlog of DUC wells diminishes and producers look to increase production to levels similar to 2019.

Canadian crude holding steady

Sector activity in Canada remained strong as oil rig counts exceeded the five-year average over Q2 2021. High prices allowed producers to drill new wells, a trend we believe will continue as they head into the winter drilling season. According to the International Energy Agency (IEA) Oil Market Report from August 2021, Canadian supply is forecasted to outpace 2019 levels by the end of 2021 and maintain strength through 2022. By the end of 2021, the IEA forecasts Canadian crude oil supply will exceed 5.9 MMbbl/d. Higher rates in late 2021 and early 2022 will be supported by Enbridge's Line 3 replacement, which is scheduled to be commissioned in the last quarter of 2021.

The forecast increase in Canadian production could place downward pressure on light and heavy oil differentials, but Q4 2021 price fluctuations will be dependent on the response to shut-in USGC production. Overall, we expect crude oil prices to remain relatively flat for the remainder of 2021.

Sustainable ecosystems: Collaborating to reach Canada's carbon goals

As global efforts to decarbonize broaden and accelerate, the oil and gas industry is taking substantial steps to do its part. Industry players recognize that while they have a critical role in building a carbon-neutral future, they also need a solution that ensures they can continue to be key energy providers to domestic and global economies. If Canada and the rest of the world hope to meet their commitments to carbon neutrality by 2050, we must see collaboration among the many interested parties–and sooner rather than later.

An industry in transition

Global decarbonization requires large-scale transitions, from energy production and storage to transportation and distribution. Oil and gas companies are working to reshape their existing businesses to succeed in a low-carbon future, with several large and influential companies taking the lead. Some of the more notable and viable steps include:

- **New investments in carbon capture and storage (CCS).** Some companies are planning large-scale CCS facilities. Shell Canada, for example, has announced the Polaris CCS project in Scotford, Alberta, which, when built, will not only capture carbon for long-term storage, but could also produce alternative hydrogen fuel or have other uses.
- **Hydrogen production.** Hydrogen produced through decarbonization is also useful as a cleaner-burning alternative to current fossil fuel options. However, its adoption will first require demand and corresponding infrastructure on the buyer side.
- **Greater reliance on biofuels.** Biofuels synthesized from renewable plant sources, such as corn or wheat, can help reduce net emissions since the act of growing these crops removes carbon from the atmosphere.
- **Decarbonizing existing assets.** Intensifying the measuring and monitoring of current assets can provide a more accurate picture of emissions and help companies target areas for reduction, including by retiring inefficient assets.
- **Alliances.** Cooperation on the issue is mobilizing some companies to form alliances. Pathways, for example, is an initiative started by a group of oil sands producers to work with governments to find the best route to carbon neutrality.

Note that all these alternatives include a continued role for oil and gas production in Canada. Indeed, to suddenly eliminate, or even severely reduce, fossil fuel use would result in a shock to the economy, with severe consequences for energy supply and everything downstream that depends on a reliable source of power. The way forward must be well-planned and well-managed to avoid this kind of disruption while transitioning.

The industry is actively trying to determine which options will be most viable, given factors such as capital requirements, infrastructure requirements, regulatory barriers and disincentives, labour scarcity, risk, and the urgency of bringing emissions down by target dates.

"The challenge on these projects is efficiently partnering with the federal government and across the ecosystem to come up with a recipe that works for companies to invest capital," says Craig Alexander, Deloitte Canada's chief economist. But it's an investment that will have an impact well beyond the energy sector. "The expertise, the science, the technology that is being developed in the oil and gas industry will be used to decarbonize the entire Canadian economy," he notes.

Uncertainties and risks

Deloitte's Economic Advisory practice has modelled the impact of the current federal government carbon price on both the Canadian economy and emissions. The model shows that even with a carbon price of $170 per tonne[1], Canada will not reach its 2030 emissions-reduction target. To close the gap and get to net-zero emissions by 2050 will require bold action beyond carbon pricing.

It will require intensive investment, for one. Carbon capture and storage, which is an essential component of any emissions-reduction plan, entails the construction of new facilities capable of capturing as much carbon as possible, transportation infrastructure (pipelines or trunk lines) to get it to the facilities, and storage.

Once the carbon is captured, it may be stored (or sequestered) underground or used to offset new emissions in industrial applications such as construction or natural gas extraction. However, current and future demand for captured carbon (and hydrogen) is uncertain, making it too risky for individual companies to commit to at this time. If we're dedicated to CCS, then to incentivize investment, the public sector needs to implement collaborative strategies with meaningful targets (i.e. investment levels, approved projects and milestones) that companies will need to meet. Mitigating these risks is essential to ensuring the long-term viability of what promises to be an iterative process, with new information and lessons taken at each stage and applied to the next.

Partnerships on many levels

Given the urgency of the task, finding the most efficient path forward is essential. Carbon sequestration projects can take up to a decade to complete, and delays serve no one's interest. Cooperation and collaboration among all interested parties, therefore, will be the key to minimizing harmful delays—and bold action to establish them must be taken as soon as possible. These partnerships can take many forms place on many levels, including:

Government incentives. Urgency also means that traditional government incentives–tax breaks and subsidies–may not suffice. Traditional notions of viability may also have to be re-examined and reset to account for the benefits of decarbonization. Unique financing structures, including some that take higher risks, will be necessary to make the industry- and economy-wide changes required to meet our international commitments. These may include price guarantees for carbon to help reduce risk and to make these projects more attractive to private capital.

[1] The federal government has set the price of carbon for 2022 at $50 per tonne, rising yearly to $170 per tonne by 2030. https://www.theglobeandmail.com/canada/article-canada-carbon-tax-explained/#:~:text=How%20much%20is%20Canada's%20carbon,it%20reaches%20%24170%20in%202030.

Facilitating partnerships. Decarbonization projects, while industry-led, will also have to include partnerships with suppliers, consumers, Indigenous peoples, and other stakeholder parties. Here again, governments can play a leadership role in supporting the oil and gas industry by bringing the various stakeholders together to anticipate and eliminate any sources of costly delay. The industry itself can help this effort by encouraging suppliers to be a part of the conversation.

Infrastructure investments. Government can also participate with investments in infrastructure, whether alone or in partnership with private capital. This may include the construction of carbon pipelines (to reduce the overall cost of storage), carbon sequestration facilities, or charging stations for electric vehicles. As we emerge from COVID-19, the Canadian government should follow the lead of other countries and budget for infrastructure builds that contribute to decarbonization.

Training and education. A carbon-neutral future will require new skills and trades to be taught and developed at government-supported educational institutions, from high school to community college to retraining programs.

Consumer participation. Public opinion polls show that most Canadians are concerned about climate change[2]. This may point to a willingness to accept higher carbon taxes or credits for lower-carbon choices such as electric vehicles, but the reality is that it will be challenge to encourage them to pay the price for carbon neutrality: while Canadians say climate change is a priority, they chafe at paying for it.

"It's going to require a different level of collaboration to keep the economy going and reach the targets that we're holding ourselves to," says Alexander. Leaders in both the public and private sectors must find ways to overcome this hesitancy so that consumers do their part to create sustainable demand for a low-carbon economy.

Transparency. Revenues generated by carbon capture will amount to several billion dollars annually. This money needs to be channelled back to individuals and businesses in order to continue incentivizing and facilitating the transition to low-carbon energy. Public support for these programs will wane quickly if these revenues are channelled elsewhere.

The lessons of LNG[3]

In the early 2000s, rising Asian demand for liquified natural gas (LNG) spurred plans to develop pipelines to bring Alberta-produced LNG to British Columbia ports for export. Several projects were proposed, largely supported by private investment. However, numerous delays, regulatory setbacks, and strong opposition from stakeholder groups left many investors unwilling to put more money into projects that only seemed to be getting riskier.

As a result, sales of Canadian LNG to Asia have fallen well short of expectations; only a fraction of the projects have been built. The lack of commitment and clear policy demonstrates the importance of collaboration and consultation to avoiding the kinds of delays that plagued LNG projects. It's a mistake we can't afford to repeat in our efforts to decarbonize.

It takes an ecosystem

Decarbonization can't be viewed as a challenge only the oil and gas industry need to resolve. It must be understood as belonging to a broad ecosystem, with touchpoints at every level of society. Anyone who uses energy–which is everyone–has an interest.

And while the pressure to make sweeping changes is greater on the industry, governments must also show leadership. The experiences with liquified natural gas (LNG) projects in the recent past demonstrate the cost of poor coordination (see box). Many lessons came out of the failings of those projects. To ignore them would be a terrible mistake.

"It's not individual companies solving their own issues; it's a broader infrastructure plays that will require government participation," says Alexander. "The trick shot is to find a way that everybody feels like they're getting value from their investment."

Recent weather-related events–wildfires, extreme heat, drought, and flooding among them– underline what we've all known for many years: climate change must be halted for the sake of the planet's future. Goals have been set and commitments have been made. To keep them will require a massive shift in our collective priorities. The oil and gas industry is well down the path to doing its part, but it cannot get there alone.

Decarbonization solutions

Deloitte offers a broad range of climate change services and solutions that link finance to science. Applying the latest climate science, these solutions consider multiple strategic and financial factors, such as business growth and capital allocation, to help companies make meaningful investments in emissions-abatement opportunities.

The Decarbonization Solutions package includes modules relating to abatement portfolio management, decarbonization scenarios, abatement pathways, impact analysis, and consideration of physical climate risk. The modules are based on scientific information from leading bodies and methodologies, such as Represented Concentration Pathways from the Intergovernmental Panel on Climate Change, shared socio-economic scenarios from the International Institute for Applied Systems Analysis, and methodologies from the Science-based Targets Initiative, among others. The modules compare forecast emissions reductions from selected abatement projects with short, medium, and longer-term aspirations and pathways as well as identify physical climate risk.

Deloitte also offers access to a deep pool of professionals with science, business, and technology backgrounds. They can help companies to identify grants and incentives to fund the transition, establish sustainability targets and metrics, disclose performance, implement digital solutions, including data integration and intelligent monitoring systems, and respond to ESG requests, concerns, and challenges.

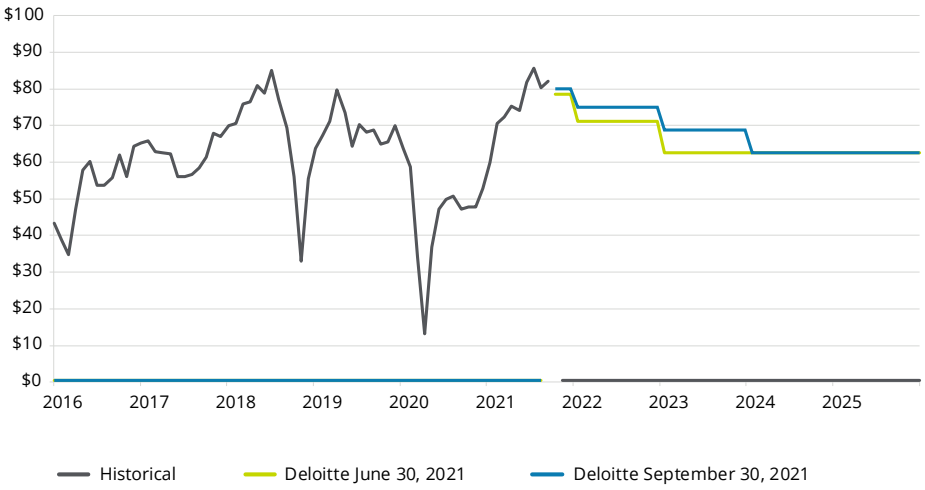
[2] An Ipsos Reid poll of Canadians in 2021, said that 61% of Canadians believe climate change should be a priority in the country's economic recovery from COVID-19.

[3] https://www.theglobeandmail.com/opinion/editorials/article-the-fading-fortunes-of-canadas-liquefied-natural-gas-exports/

Canadian domestic price forecast

Crude oil price and market demand forecast

Edmonton par (real $)



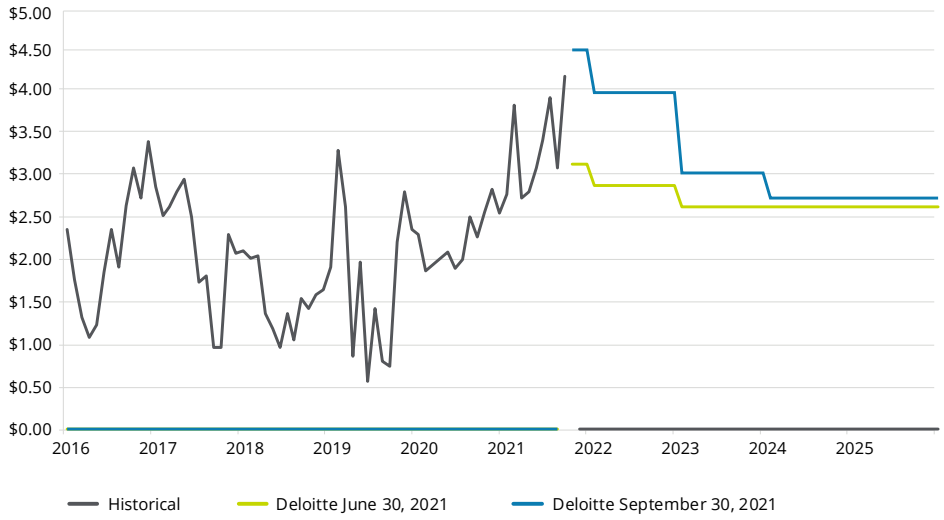
Forecast comments

- 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$/bbl Real	US$/bbl Current	C$/bbl Real	C$/bbl Current	C$/bbl Current	C$/bbl Current	Rate	Rate
Historical								
2018	$68.25	$64.94	$72.63	$69.10	$49.68	$45.34	2.3%	0.772
2019	$58.54	$56.98	$70.90	$69.02	$58.75	$55.11	1.9%	0.754
2020	$39.51	$39.23	$46.02	$45.69	$35.60	$31.48	0.7%	0.746
2021								
9 Mths H	$64.55	$64.55	$75.83	$75.83	$65.34	$59.92	2.7%	0.800
3 Mths F	$68.00	$68.00	$80.00	$80.00	$71.25	$66.75	0.0%	0.800
Avg.	$65.41	$65.41	$76.88	$76.88	$66.82	$61.63	-	0.800
Forecast								
2021	$68.00	$68.00	$80.00	$80.00	$71.25	$66.75	0.0%	0.800
2022	$65.00	$66.30	$75.00	$76.50	$66.30	$61.70	2.0%	0.800
2023	$60.00	$62.40	$68.75	$71.55	$58.50	$53.85	2.0%	0.800
2024	$55.00	$58.35	$62.50	$66.35	$53.05	$48.30	2.0%	0.800
2025	$55.00	$59.55	$62.50	$67.65	$54.10	$49.25	2.0%	0.800
2026	$55.00	$60.70	$62.50	$69.00	$55.20	$50.25	2.0%	0.800
2027	$55.00	$61.95	$62.50	$70.40	$56.30	$51.25	2.0%	0.800
2028	$55.00	$63.20	$62.50	$71.80	$57.45	$52.25	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	AB AECO Avg. Price	AB AECO Avg. Price	BC Direct Station 2 Sales	NYMEX Henry Hub	NYMEX Henry Hub
	C$/Mcf	C$/Mcf	C$/Mcf	C$/Mcf	US$/Mcf	US$/Mcf
	Current	Real	Current	Current	Real	Current
Historical						
2018	$1.36	$1.62	$1.54	$1.26	$3.33	$3.17
2019	$1.48	$1.86	$1.81	$1.02	$2.64	$2.57
2020	$2.00	$2.27	$2.25	$2.20	$2.05	$2.04
2021						
9 Mths H	$2.87	$3.33	$3.33	$3.23	$3.59	$3.59
3 Mths F	$4.25	$4.50	$4.50	$4.45	$5.00	$5.00
Avg.	$3.22	$3.62	$3.62	$3.53	$3.94	$3.94
Forecast						
2021	$4.25	$4.50	$4.50	$4.45	$5.00	$5.00
2022	$3.85	$4.00	$4.10	$4.05	$4.00	$4.10
2023	$2.90	$3.05	$3.15	$3.10	$3.25	$3.40
2024	$2.65	$2.75	$2.90	$2.85	$3.00	$3.20
2025	$2.70	$2.75	$3.00	$2.90	$3.00	$3.25
2026	$2.75	$2.75	$3.05	$3.00	$3.00	$3.30
2027	$2.80	$2.75	$3.10	$3.05	$3.00	$3.40
2028	$2.85	$2.75	$3.15	$3.10	$3.00	$3.45

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
	Current	Current	Current	Current	Current	Current	Current
Forecast							
2021	$68.00	$71.00	$66.50	$69.75	$71.00	$65.00	$69.75
2022	$66.30	$70.40	$64.75	$69.10	$70.40	$63.25	$69.10
2023	$62.40	$66.60	$60.85	$65.30	$66.60	$59.30	$65.30
2024	$58.35	$62.60	$56.75	$61.30	$62.60	$55.20	$61.30
2025	$59.55	$63.85	$57.90	$62.50	$63.85	$56.30	$62.50
2026	$60.70	$65.15	$59.05	$63.75	$65.15	$57.40	$63.75
2027	$61.95	$66.45	$60.25	$65.05	$66.45	$58.55	$65.05
2028	$63.20	$67.75	$61.45	$66.35	$67.75	$59.75	$66.35

- 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 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	Current	Current	Current	Current	Current	Current
Forecast								
2021	1.38	1.18	$5.00	$4.70	$4.75	$4.85	$20.00	$3.05
2022	1.38	1.18	$4.10	$3.75	$3.85	$3.95	$14.30	$9.20
2023	1.38	1.18	$3.40	$3.05	$3.10	$3.25	$8.60	$6.75
2024	1.38	1.18	$3.20	$2.85	$2.90	$3.00	$7.95	$4.40
2025	1.38	1.18	$3.25	$2.90	$3.00	$3.10	$8.10	$4.05
2026	1.38	1.18	$3.30	$3.00	$3.05	$3.15	$8.30	$4.15
2027	1.38	1.18	$3.40	$3.05	$3.10	$3.20	$8.45	$4.20
2028	1.38	1.18	$3.45	$3.10	$3.15	$3.25	$8.60	$4.30

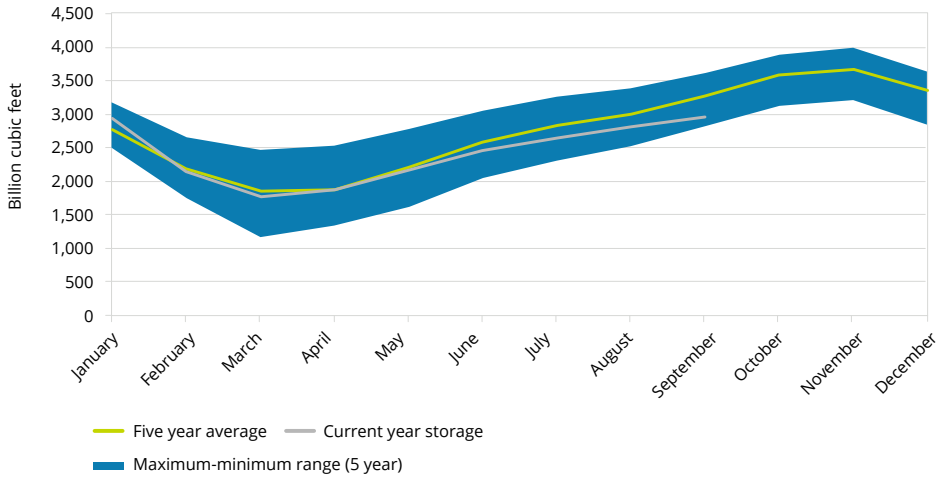
Global trends

Storage

United States

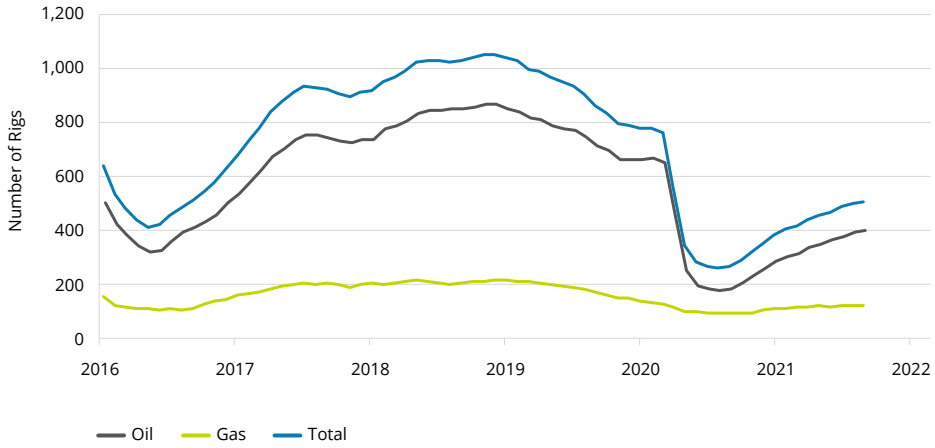
Natural gas storage in the United States has begun to trend below the five year average as LNG exports continue to grow and drilling activity remains relatively consistent even as prices rise.

US natural gas storage



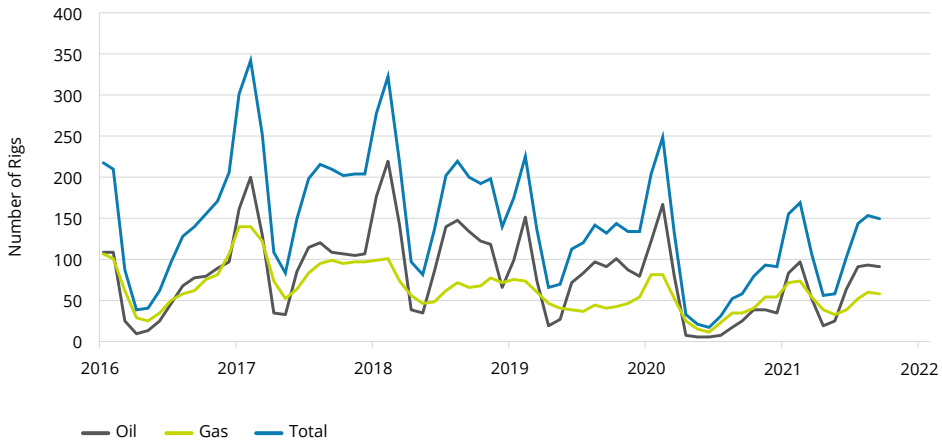
Source: Baker Hughes.

US rig counts



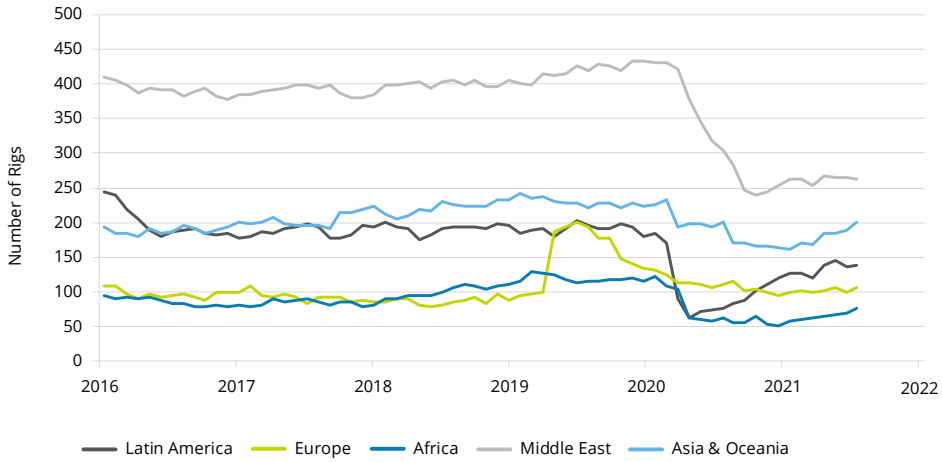
Source: Baker Hughes.

Canada rig counts



Source: Baker Hughes.

International rig counts



Source: Baker Hughes.

Rigs

United States

Oil rig counts continue to grow as oil prices remain strong, though this grow appears to have slowed down in recent months. The increase in gas rig counts has leveled off in the last quarter, in spite of continually strengthening prices.

Canada

Oil and gas rig counts appear on track to meet or exceed the activity levels seen in 2019 this winter drilling season as companies look to capitalize on stronger oil and gas prices.

International

Strength in both oil and gas markets has led to rig counts increasing across much of the globe. Asia and Africa are currently experiencing the highest rates of growth, followed closely by Latin America.

Canadian domestic price tables

Year	Price Inflation	Cost Inflation	CAD to USD Exchange	Crude Oil Pricing: WTI at Cushing Oklahoma	WTI at Cushing Oklahoma	Edmonton City Gate	Edmonton City Gate	WCS 20.5 Deg. API Hardisty
				US$/bbl	US$/bbl	C$/bbl	C$/bbl	C$/bbl
	Rate	Rate	Rate	Real	Current	Real	Current	Current
Historical								
2011	2.9%	2.9%	1.012	$111.95	$94.88	$112.72	$95.54	$77.12
2012	1.5%	1.5%	1.001	$107.80	$94.11	$99.16	$86.57	$73.10
2013	0.9%	0.9%	0.972	$110.44	$97.91	$105.31	$93.36	$74.97
2014	1.9%	1.9%	0.906	$104.21	$93.26	$105.03	$94.00	$81.06
2015	1.1%	1.1%	0.783	$53.37	$48.69	$62.48	$57.00	$44.80
2016	1.4%	1.4%	0.755	$46.77	$43.15	$56.59	$52.22	$38.90
2017	1.6%	1.6%	0.771	$54.35	$50.88	$66.10	$61.88	$50.53
2018	2.3%	2.3%	0.772	$68.25	$64.94	$72.63	$69.10	$49.68
2019	1.9%	1.9%	0.754	$58.54	$56.98	$70.90	$69.02	$58.75
2020	0.7%	0.7%	0.746	$39.51	$39.23	$46.02	$45.69	$35.60
2021								
9 Mths H	2.7%	2.7%	0.800	$64.55	$64.55	$75.83	$75.83	$65.34
3 Mths F	0.0%	0.0%	0.800	$68.00	$68.00	$80.00	$80.00	$71.25
Avg.	N/A	N/A	0.800	$65.41	$65.41	$76.88	$76.88	$66.82
Forecast								
2021	0.0%	0.0%	0.800	$68.00	$68.00	$80.00	$80.00	$71.25
2022	2.0%	2.0%	0.800	$65.00	$66.30	$75.00	$76.50	$66.30
2023	2.0%	2.0%	0.800	$60.00	$62.40	$68.75	$71.55	$58.50
2024	2.0%	2.0%	0.800	$55.00	$58.35	$62.50	$66.35	$53.05
2025	2.0%	2.0%	0.800	$55.00	$59.55	$62.50	$67.65	$54.10
2026	2.0%	2.0%	0.800	$55.00	$60.70	$62.50	$69.00	$55.20
2027	2.0%	2.0%	0.800	$55.00	$61.95	$62.50	$70.40	$56.30
2028	2.0%	2.0%	0.800	$55.00	$63.20	$62.50	$71.80	$57.45
2029	2.0%	2.0%	0.800	$55.00	$64.45	$62.50	$73.25	$58.60
2030	2.0%	2.0%	0.800	$55.00	$65.75	$62.50	$74.70	$59.75
2031	2.0%	2.0%	0.800	$55.00	$67.05	$62.50	$76.20	$60.95
2032	2.0%	2.0%	0.800	$55.00	$68.40	$62.50	$77.70	$62.15
2033	2.0%	2.0%	0.800	$55.00	$69.75	$62.50	$79.25	$63.40
2034	2.0%	2.0%	0.800	$55.00	$71.15	$62.50	$80.85	$64.70
2035	2.0%	2.0%	0.800	$55.00	$72.55	$62.50	$82.45	$65.95
2036	2.0%	2.0%	0.800	$55.00	$74.00	$62.50	$84.10	$67.30
2037	2.0%	2.0%	0.800	$55.00	$75.50	$62.50	$85.80	$68.65
2038	2.0%	2.0%	0.800	$55.00	$77.00	$62.50	$87.50	$70.00
2039	2.0%	2.0%	0.800	$55.00	$78.55	$62.50	$89.25	$71.40
2040	2.0%	2.0%	0.800	$55.00	$80.10	$62.50	$91.05	$72.85
2040+	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 2021 dollars with no escalation considered

	Natural Gas Liquids Pricing Edmonton Par Prices				Natural Gas Pricing						Sulphur
Year	**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$/bbl	C$/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											
2011	$10.30	$52.41	$86.98	$105.24	$3.46	$4.28	$3.63	$3.34	$4.72	$4.00	$101.60
2012	$6.73	$30.80	$75.47	$99.67	$2.25	$2.74	$2.39	$2.29	$3.15	$2.75	$126.81
2013	$8.68	$38.54	$77.44	$103.52	$2.98	$3.58	$3.17	$3.11	$4.21	$3.73	$62.17
2014	$12.46	$42.93	$59.43	$101.47	$4.22	$5.03	$4.50	$4.16	$4.91	$4.39	$88.99
2015	$7.49	$5.35	$33.70	$55.15	$2.56	$2.95	$2.69	$1.81	$2.88	$2.63	$107.45
2016	$6.04	$8.71	$31.45	$52.43	$1.93	$2.34	$2.16	$1.75	$2.73	$2.52	$45.40
2017	$6.11	$27.92	$40.98	$63.65	$2.13	$2.34	$2.19	$1.56	$3.19	$2.99	$41.85
2018	$6.90	$29.76	$46.17	$75.74	$1.36	$1.62	$1.54	$1.26	$3.33	$3.17	$89.25
2019	$5.00	$15.82	$21.40	$67.57	$1.48	$1.86	$1.81	$1.02	$2.64	$2.57	$37.54
2020	$6.20	$16.11	$20.93	$47.14	$2.00	$2.27	$2.25	$2.20	$2.05	$2.04	$2.60
2021											
9 Mths H	$9.43	$38.92	$36.65	$77.30	$2.87	$3.33	$3.33	$3.23	$3.59	$3.59	$61.69
3 Mths F	$12.40	$36.00	$40.00	$84.00	$4.25	$4.50	$4.50	$4.45	$5.00	$5.00	$75.00
Avg.	$10.17	$38.19	$37.49	$78.97	$3.22	$3.62	$3.62	$3.53	$3.94	$3.94	$65.02
Forecast											
2021	$12.40	$36.00	$40.00	$84.00	$4.25	$4.50	$4.50	$4.45	$5.00	$5.00	$75.00
2022	$11.20	$34.45	$42.10	$80.35	$3.85	$4.00	$4.10	$4.05	$4.00	$4.10	$51.00
2023	$8.75	$32.20	$42.90	$75.10	$2.90	$3.05	$3.15	$3.10	$3.25	$3.40	$52.00
2024	$8.00	$29.85	$39.80	$69.65	$2.65	$2.75	$2.90	$2.85	$3.00	$3.20	$53.05
2025	$8.15	$30.45	$40.60	$71.05	$2.70	$2.75	$3.00	$2.90	$3.00	$3.25	$54.10
2026	$8.35	$31.10	$41.40	$72.50	$2.75	$2.75	$3.05	$3.00	$3.00	$3.30	$55.20
2027	$8.50	$31.70	$42.25	$73.95	$2.80	$2.75	$3.10	$3.05	$3.00	$3.40	$56.30
2028	$8.65	$32.35	$43.10	$75.40	$2.85	$2.75	$3.15	$3.10	$3.00	$3.45	$57.45
2029	$8.85	$33.00	$43.95	$76.90	$2.95	$2.75	$3.20	$3.15	$3.00	$3.50	$58.60
2030	$9.00	$33.65	$44.80	$78.45	$3.00	$2.75	$3.30	$3.25	$3.00	$3.60	$59.75
2031	$9.20	$34.30	$45.70	$80.05	$3.05	$2.75	$3.35	$3.30	$3.00	$3.65	$60.95
2032	$9.40	$35.00	$46.65	$81.65	$3.10	$2.75	$3.40	$3.35	$3.00	$3.75	$62.15
2033	$9.60	$35.70	$47.55	$83.25	$3.15	$2.75	$3.50	$3.40	$3.00	$3.80	$63.40
2034	$9.75	$36.40	$48.50	$84.95	$3.25	$2.75	$3.55	$3.50	$3.00	$3.90	$64.70
2035	$9.95	$37.15	$49.50	$86.60	$3.30	$2.75	$3.65	$3.55	$3.00	$3.95	$65.95
2036	$10.15	$37.90	$50.45	$88.35	$3.35	$2.75	$3.70	$3.65	$3.00	$4.05	$67.30
2037	$10.35	$38.65	$51.50	$90.10	$3.45	$2.75	$3.80	$3.70	$3.00	$4.10	$68.65
2038	$10.55	$39.40	$52.50	$91.95	$3.50	$2.75	$3.85	$3.80	$3.00	$4.20	$70.00
2039	$10.80	$40.20	$53.55	$93.75	$3.55	$2.75	$3.95	$3.85	$3.00	$4.30	$71.40
2040	$11.00	$41.00	$54.65	$95.65	$3.65	$2.75	$4.00	$3.95	$3.00	$4.35	$72.85
2040+	2.0%	2.0%	2.0%	2.0%	2.0%	0.0%	2.0%	2.0%	0.0%	2.0%	2.0%

Notes:

- Data sources include: EIA, DOB, NRC, Flint Hills Resources, Alberta Government
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- 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 2021 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

Additional crude reference prices

Year	Crude oil pricing Lt. Sour 35 Deg. API Cromer, SK	 MSO 31 Deg. API Hardisty	 Synbit (AWB) 70% Bitumen 30% Cond. 21 Deg. API	Natural gas pricing Ontario Dawn Reference Point
	C$/bbl	C$/bbl	C$/bbl	C$/mcf
	Current	Current	Current	Current
Historical				
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	$69.68	$65.72	$58.85	$3.22
2020	$45.41	$43.55	$36.18	$2.51
2021				
9 Mths H	$72.95	$70.27	$62.44	$4.07
3 Mths F	$80.50	$76.00	$71.95	$5.75
Avg.	$74.84	$71.70	$64.81	$4.49
Forecast				
2021	$80.50	$76.00	$71.95	$5.75
2022	$77.00	$72.40	$67.30	$4.90
2023	$72.05	$67.35	$60.25	$4.00
2024	$66.85	$62.10	$54.70	$3.75
2025	$68.20	$63.30	$55.80	$3.85
2026	$69.55	$64.60	$56.90	$3.90
2027	$70.95	$65.90	$58.05	$4.00
2028	$72.35	$67.20	$59.20	$4.10
2029	$73.80	$68.55	$60.40	$4.15
2030	$75.30	$69.90	$61.60	$4.25
2031	$76.80	$71.30	$62.85	$4.35
2032	$78.35	$72.75	$64.10	$4.40
2033	$79.90	$74.20	$65.40	$4.50
2034	$81.50	$75.70	$66.70	$4.60
2035	$83.15	$77.20	$68.00	$4.70
2036	$84.80	$78.75	$69.40	$4.80
2037	$86.50	$80.30	$70.75	$4.85
2038	$88.20	$81.90	$72.20	$4.95
2039	$90.00	$83.55	$73.65	$5.05
2040	$91.80	$85.20	$75.10	$5.15
2040+	2.0%	2.0%	2.0%	2.0%

Notes

- Data sources include: EIA, DOB, NRC, Flint Hills Resources, Alberta Government
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International price tables

Year	Crude Oil Pricing															
	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 Merey	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
	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current
Forecast																
2021	$68.00	$62.00	$67.50	$67.00	$67.25	$66.50	$64.00	$71.00	$66.50	$69.75	$52.00	$71.00	$69.50	$65.00	$69.75	$68.50
2022	$66.30	$60.20	$65.80	$65.30	$65.55	$64.75	$62.20	$70.40	$64.75	$69.10	$51.00	$70.40	$68.85	$63.25	$69.10	$67.85
2023	$62.40	$56.20	$61.90	$61.40	$61.65	$60.85	$58.25	$66.60	$60.85	$65.30	$46.80	$66.60	$65.05	$59.30	$65.30	$64.00
2024	$58.35	$52.00	$57.85	$57.30	$57.55	$56.75	$54.10	$62.60	$56.75	$61.30	$42.45	$62.60	$61.00	$55.20	$61.30	$59.95
2025	$59.55	$53.05	$59.00	$58.45	$58.70	$57.90	$55.20	$63.85	$57.90	$62.50	$43.30	$63.85	$62.25	$56.30	$62.50	$61.15
2026	$60.70	$54.10	$60.15	$59.60	$59.90	$59.05	$56.30	$65.15	$59.05	$63.75	$44.15	$65.15	$63.50	$57.40	$63.75	$62.40
2027	$61.95	$55.20	$61.40	$60.80	$61.10	$60.25	$57.45	$66.45	$60.25	$65.05	$45.05	$66.45	$64.75	$58.55	$65.05	$63.65
2028	$63.20	$56.30	$62.60	$62.05	$62.30	$61.45	$58.60	$67.75	$61.45	$66.35	$45.95	$67.75	$66.05	$59.75	$66.35	$64.90
2029	$64.45	$57.40	$63.85	$63.25	$63.55	$62.70	$59.75	$69.15	$62.70	$67.65	$46.85	$69.15	$67.35	$60.95	$67.65	$66.20
2030	$65.75	$58.55	$65.15	$64.55	$64.85	$63.95	$60.95	$70.50	$63.95	$69.00	$47.80	$70.50	$68.70	$62.15	$69.00	$67.50
2031	$67.05	$59.75	$66.45	$65.85	$66.15	$65.20	$62.15	$71.90	$65.20	$70.40	$48.75	$71.90	$70.10	$63.40	$70.40	$68.85
2032	$68.40	$60.95	$67.75	$67.15	$67.45	$66.50	$63.40	$73.35	$66.50	$71.80	$49.75	$73.35	$71.50	$64.65	$71.80	$70.25
2033	$69.75	$62.15	$69.10	$68.50	$68.80	$67.85	$64.70	$74.85	$67.85	$73.25	$50.75	$74.85	$72.90	$65.95	$73.25	$71.65
2034	$71.15	$63.40	$70.50	$69.85	$70.20	$69.20	$65.95	$76.30	$69.20	$74.70	$51.75	$76.30	$74.40	$67.25	$74.70	$73.10
2035	$72.55	$64.65	$71.90	$71.25	$71.60	$70.60	$67.30	$77.85	$70.60	$76.20	$52.80	$77.85	$75.85	$68.60	$76.20	$74.55
2036	$74.00	$65.95	$73.35	$72.70	$73.00	$72.00	$68.65	$79.40	$72.00	$77.70	$53.85	$79.40	$77.40	$70.00	$77.70	$76.05
2037	$75.50	$67.25	$74.80	$74.15	$74.45	$73.45	$70.00	$81.00	$73.45	$79.30	$54.90	$81.00	$78.95	$71.40	$79.30	$77.55
2038	$77.00	$68.60	$76.30	$75.60	$75.95	$74.90	$71.40	$82.60	$74.90	$80.85	$56.00	$82.60	$80.50	$72.80	$80.85	$79.10
2039	$78.55	$70.00	$77.85	$77.15	$77.50	$76.40	$72.85	$84.25	$76.40	$82.50	$57.15	$84.25	$82.10	$74.25	$82.50	$80.70
2040	$80.10	$71.40	$79.40	$78.65	$79.05	$77.95	$74.30	$85.95	$77.95	$84.15	$58.25	$85.95	$83.75	$75.75	$84.15	$82.30
2040+	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%	2.0%

Notes:

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

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$/Mcf Current	US$/Mcf Current	US$/Mcf Current	US$/Mcf Current	US$/Mcf Current	US$/Mcf Current	US$/gal Current
Forecast									
2021	1.380	1.180	$5.00	$4.70	$4.75	$4.85	$20.00	$3.05	$2.50
2022	1.380	1.180	$4.10	$3.75	$3.85	$3.95	$14.30	$9.20	$2.55
2023	1.380	1.180	$3.40	$3.05	$3.10	$3.25	$8.60	$6.75	$2.60
2024	1.380	1.180	$3.20	$2.85	$2.90	$3.00	$7.95	$4.40	$2.65
2025	1.380	1.180	$3.25	$2.90	$3.00	$3.10	$8.10	$4.05	$2.70
2026	1.380	1.180	$3.30	$3.00	$3.05	$3.15	$8.30	$4.15	$2.75
2027	1.380	1.180	$3.40	$3.05	$3.10	$3.20	$8.45	$4.20	$2.80
2028	1.380	1.180	$3.45	$3.10	$3.15	$3.25	$8.60	$4.30	$2.85
2029	1.380	1.180	$3.50	$3.15	$3.20	$3.35	$8.80	$4.40	$2.95
2030	1.380	1.180	$3.60	$3.25	$3.30	$3.40	$8.95	$4.50	$3.00
2031	1.380	1.180	$3.65	$3.30	$3.35	$3.45	$9.15	$4.55	$3.05
2032	1.380	1.180	$3.75	$3.35	$3.40	$3.55	$9.35	$4.65	$3.10
2033	1.380	1.180	$3.80	$3.40	$3.50	$3.60	$9.50	$4.75	$3.15
2034	1.380	1.180	$3.90	$3.50	$3.55	$3.70	$9.70	$4.85	$3.25
2035	1.380	1.180	$3.95	$3.55	$3.65	$3.75	$9.90	$4.95	$3.30
2036	1.380	1.180	$4.05	$3.65	$3.70	$3.85	$10.10	$5.05	$3.35
2037	1.380	1.180	$4.10	$3.70	$3.80	$3.90	$10.30	$5.15	$3.45
2038	1.380	1.180	$4.20	$3.80	$3.85	$4.00	$10.50	$5.25	$3.50
2039	1.380	1.180	$4.30	$3.85	$3.95	$4.05	$10.70	$5.35	$3.55
2040	1.380	1.180	$4.35	$3.95	$4.00	$4.15	$10.95	$5.45	$3.65
2040+	1.380	1.180	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

Notes:

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

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 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

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

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