Deloitte.



Price forecast June 30, 2018 Resource Evaluation & Advisory

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Forecast commentary

Oil prices surged in Q2 2018 to their highest values since 2014 amid international supply uncertainty and diminishing global oil inventories. Continuous decreases in Venezuelan production volumes, the possibility of sanctions enforced by the United States on Iran, and decreased oil stockpile volumes have escalated global oil prices. However, these are expected to recede in coming months as OPEC members increase rates to fill void agreement volumes resulting from Iranian and Venezuelan production cuts.

As global oil sources regain export market share from the United States, the differential of WTI to Brent has widened, reaching an average of US\$7.00/bbl in May. Although the US continues to produce record oil volumes, domestic consumption has also increased during this period, leading to lower exportable crude oil volumes. There are also worries about potential crude oil transportation bottlenecks in the United States, potentially limiting further rate output increases. In addition, Permian producers may soon be forced to target lower-tier prospects to maintain their current crude oil outputs, which equates to requiring additional wells and increased capital costs; such a development may slow development of the area, as rates of return are not as lucrative as previous Permian wells.

Global oil demand showed strong growth in Q1 and Q2 but it's expected to fall in the second half of the year due to higher oil prices. Although demand may fall slightly, decreased supply volumes have led to negative stock changes and depleted global inventories over the last 15 months, which led to Brent prices climbing through the year. This growth has slowed recently as OPEC members agreed to increase production by approximately one million barrels per day and U.S. public sentiment supports the limiting of commodity and gas pump prices.





Source: EIA

Canadian WCS differentials to WTI narrowed to US\$16.74/bbl in May 2018, decreasing by approximately 30 percent from Q1 2018, but recent trends show a return to historical averages. Increased rail shipments of crude oil reduced transportation bottlenecks for the Western Canadian Sedimentary Basin in Q2 2018, with shipments expected to continue to increase for the remainder of the year to accommodate oil sands production. In addition, Canadian heavy crudes should experience increased demand from Gulf Coast refineries as they replace Venezuelan heavy crudes, the production of which continues to decrease.

For natural gas, Henry Hub prices have been stable throughout 2018, averaging approximately US\$3.00/Mcf in Q1 and Q2, whereas AECO pricing has been extremely volatile, with prices ranging from C\$2.12/Mcf in January to C\$1.20/Mcf in May. The United States continues to increase natural gas production volumes, primarily from shale gas plays as well as associated gas from the Permian Basin. It has steadily increased accessibility to international markets, primarily through LNG operations and exports to Mexico. Currently, LNG exports to Asian countries represent approximately 17 percent of all US natural gas exports, an increase of 12 percent from the prior year. Pipeline exports to Mexico continue to make up a large portion of total US exports, as Mexican domestic supply declines and demand for power generation increases.



US natural gas export volumes

Source: ElA

Although the US natural gas market seems to be strengthening from consistent export commitments, domestic infrastructure could be a potential issue in the coming months. Existing pipeline capacities are expected to become more saturated, primarily in the Northeastern seaboard and Permian Basin, as gas production continues to increase. Scheduled summer maintenance could also pose a short-term problem for producers trying to transport gas within the United States.

In Canada, natural gas prices have remained volatile and are expected to fluctuate for the remainder of the year. Planned pipeline outages in spring and summer are expected to limit existing transport system access and create oversupply throughout the Western Canadian Sedimentary Basin. Many natural gas producers have deferred or reduced their 2018 development capital spending due to low financial returns at current gas prices, while some companies have shutin production of non-core operations to alleviate reduced cash flows in low AECO gas price environments.

Numerous producers have turned to other markets, such as Dawn and Chicago, to mitigate low AECO pricing and minimize their exposure to AECO price volatility. Although producers pay higher transportation costs to reach eastern markets, companies have found current received prices from other hubs, transportation costs included, are still higher than AECO prices. Price diversification may help alleviate the AECO market as volumes are directed elsewhere, but access to the eastern hubs may become more challenging as gas production increases in the Marcellus and Utica plays in the northeastern United States. Deloitte expects companies will revert to AECO markets once AECO prices increase and transportation costs to the East Coast are no longer advantageous to receive a higher price.



Managing uncertainty and enhancing project delivery

As companies plan their capital spends for expansion or sustaining assets, a key consideration is the current regulatory environment. In the oil and gas industry, that environment presents a number of risks and opportunities.

On one side is the Petrochemicals Diversification Program (PDP), which is building on Western Canada's large supply of natural gas and encouraging companies to construct manufacturing facilities that offer companies the prospect of using up to \$500 million in royalty credits and that incentivizes diving in and capitalizing on the growing global demand for petrochemicals and their derivatives¹. On the other side is the uncertainty caused by the recent tariffs imposed by the United States on steel (25 percent) and aluminum (10 percent)², which could potentially increase construction costs at large, and other factors, such as the carbon levy rising from \$20/tonne in 2017 to \$30/tonne in 2018³.

Given these uncertainties, risks, and opportunities, ensuring companies are doing the right projects, and doing them right, is critical.

Minimizing implementation and operating risks, (including legislative), coupled with the technological and economic landscape creates a dynamic situation to balance. In selecting projects and optimizing portfolios, companies are increasingly opting for a "value" based approach to ensure the right projects are being executed. In developing value parameters, companies are considering the legislative environment, alignment with strategy and uncertainties. These parameters are designed to maximize benefits and costs assessed against risk factors to turn the biggest "bang for the buck" on the projects considered.



Once projects are underway, the ability to react to emerging situations is limited by the availability of reliable and timely data on project performance. As a result, companies are starting to develop digital strategies that allow for emerging technologies that capitalize on information in real time. These strategies have three pillars. The first is a comprehensive project management information system (PMIS) environment that supports all aspects of project execution, including cost, schedule, risk, safety, and quality management. This forms the bedrock for a project to capture, manage, and analyze data.

The second pillar is accelerated project delivery, which uses machine-learning technology that enables projects to use historical data to produce an accelerated starting point. The ability to employ technology to fast track the generation and completion of templates for governance documents using robotic process automation is one example. Other applications that could be developed would be for facility design, schedules, and estimate development.

The final pillar of such digital strategies is predictive project management. This uses emerging technologies to capture data in

real time— such as drone-enabled, threeway verification of site versus fabrication shop versus model; site progress validation; safety validation using wearable technology; and field actualization technology—to enable real-time data to track progress and validate invoices. Companies are also exploring 3D printing options for critical items or those that require reverse engineering.

Part of the predictive project management model is the development of 5D design models that overlay cost and schedule data onto traditional 3D design models. The 5D models incorporate work breakdown structures and advanced work packaging information that support effective whatif analysis, options, and optimization considerations. Another application being considered uses the valuable asset information contained by 5D models to support predictive maintenance once the facility is in operation.

In planning capital spends, companies are increasingly focused on ensuring the right projects are being pursued. Once these projects are in execution, empowering project teams with reliable real-time performance data is critical to responding to emerging risks and uncertainties.

- 1. "Petrochemical Diversification Program." Alberta Government, p. 1, https://www.alberta.ca/energydiversification-act.aspx
- "What U.S. steel, aluminum tariffs mean for Canadians and their wallets." Katie Dangerfield, Global News. Retrieved from: https://globalnews.ca/news/4244395/aluminum-steel-tariffs-canadians/
- 3. "Carbon levy and rebates." Alberta Government, //www.alberta.ca/climate-carbon-pricing.aspx

Canadian domestic price forecast

Crude oil price and market demand forecast



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.

	WTI Cushing,	WTI Cushing,	Edmonton City	Edmonton City	WCS Hardisty	Heavy Oil	Cost	CAD to USD	
Year	OK (40 API)	OK (40 API)	Gate (40 API)	Gate (40 API)	(20.5 API)	Hardisty (12 API)	Inflation	Exchange	
	US\$/bbl	US\$/bbl	C\$/bbl	C\$/bbl	C\$/bbl	C\$/bbl			
	Real	Current	Real	Current	Current	Current	Rate	Rate	
Historical									
2015	\$50.77	\$48.69	\$59.44	\$57.00	\$44.80	\$39.63	1.1%	0.783	
2016	\$44.50	\$43.15	\$53.84	\$52.22	\$38.90	\$34.08	1.4%	0.755	
2017	\$51.71	\$50.88	\$62.89	\$61.88	\$50.53	\$45.01	1.6%	0.771	
2018									
6 Mths H	\$65.17	\$65.17	\$75.39	\$75.39	\$55.29	\$44.73	2.1%	0.784	
6 Mths F	\$62.00	\$62.00	\$74.35	\$74.35	\$53.35	\$52.35	0.0%	0.780	
Avg.	\$63.59	\$63.59	\$74.87	\$74.87	\$54.32	\$48.54	-	0.782	
Forecast									
2018	\$62.00	\$62.00	\$74.35	\$74.35	\$53.35	\$52.35	0.0%	0.780	
2019	\$62.00	\$63.25	\$72.50	\$73.95	\$54.55	\$53.55	2.0%	0.800	
2020	\$62.50	\$65.05	\$70.90	\$73.75	\$56.10	\$55.05	2.0%	0.825	
2021	\$65.00	\$69.00	\$71.75	\$76.15	\$60.20	\$57.05	2.0%	0.850	
2022	\$67.50	\$73.05	\$74.70	\$80.85	\$64.60	\$61.35	2.0%	0.850	
2023	\$70.00	\$77.30	\$77.65	\$85.75	\$69.15	\$65.85	2.0%	0.850	
2024	\$70.00	\$78.85	\$77.65	\$87.45	\$70.55	\$67.20	2.0%	0.850	
2025	\$70.00	\$80.40	\$77.65	\$89.20	\$71.95	\$68.50	2.0%	0.850	

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.	AB AECO	AB 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						
2015	\$2.56	\$2.81	\$2.69	\$1.81	\$2.74	\$2.63
2016	\$1.93	\$2.23	\$2.16	\$1.75	\$2.59	\$2.52
2017	\$2.13	\$2.23	\$2.19	\$1.56	\$3.03	\$2.99
2018						
6 Mths H	\$1.31	\$1.61	\$1.61	\$1.52	\$2.96	\$2.96
6 Mths F	\$1.50	\$1.70	\$1.70	\$1.40	\$2.90	\$2.90
Avg.	\$1.41	\$1.66	\$1.66	\$1.46	\$2.93	\$2.93
Forecast						
2018	\$1.50	\$1.70	\$1.70	\$1.40	\$2.90	\$2.90
2019	\$1.80	\$1.95	\$2.00	\$1.70	\$2.90	\$2.95
2020	\$2.30	\$2.40	\$2.50	\$2.20	\$3.10	\$3.25
2021	\$2.55	\$2.60	\$2.75	\$2.45	\$3.30	\$3.50
2022	\$2.70	\$2.70	\$2.90	\$2.60	\$3.40	\$3.70
2023	\$3.00	\$2.90	\$3.20	\$2.85	\$3.55	\$3.90
2024	\$3.25	\$3.10	\$3.50	\$3.15	\$3.75	\$4.20
2025	\$3.55	\$3.30	\$3.80	\$3.45	\$3.90	\$4.50

International price 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							
2018	\$62.00	\$70.00	\$58.50	\$68.00	\$70.55	\$61.00	\$68.50
2019	\$62.00	\$66.00	\$58.50	\$64.00	\$66.55	\$57.00	\$64.50
2020	\$62.50	\$64.50	\$59.00	\$62.50	\$65.05	\$55.50	\$63.00
2021	\$65.00	\$67.00	\$61.50	\$65.00	\$67.55	\$58.00	\$65.50
2022	\$67.50	\$69.50	\$64.00	\$67.50	\$70.05	\$60.50	\$68.00
2023	\$70.00	\$72.00	\$66.50	\$70.00	\$72.55	\$63.00	\$70.50
2024	\$70.00	\$72.00	\$66.50	\$70.00	\$72.55	\$63.00	\$70.50
2025	\$70.00	\$72.00	\$66.50	\$70.00	\$72.55	\$63.00	\$70.50

Crude oil price and market demand forecast

- 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								
2018	1.38	1.20	\$2.90	\$2.30	\$2.40	\$2.50	\$8.00	\$3.40
2019	1.38	1.20	\$2.90	\$2.30	\$2.40	\$2.50	\$7.90	\$3.75
2020	1.38	1.20	\$3.10	\$2.50	\$2.60	\$2.70	\$7.80	\$3.75
2021	1.38	1.20	\$3.30	\$2.70	\$2.80	\$2.90	\$7.70	\$3.80
2022	1.38	1.20	\$3.40	\$2.80	\$2.90	\$3.00	\$7.60	\$3.85
2023	1.38	1.20	\$3.55	\$2.95	\$3.05	\$3.15	\$7.55	\$3.85
2024	1.38	1.20	\$3.75	\$3.15	\$3.25	\$3.35	\$7.50	\$3.90
2025	1.38	1.20	\$3.90	\$3.30	\$3.40	\$3.50	\$7.65	\$3.95

Global trends

Storage

United States

 Natural gas storage levels remain below the five year average in the United States. Large storage draws have continued due to higher demand and increased exports, resulting in stable Henry Hub prices over the quarter.

Canada

• Canadian natural gas storage levels have begun to dip below the five year average as production continues to drop due to low prices. At the same time, demand has remained above 2017 levels going into the summer months. Storage levels have also been impacted by recent pipeline outages that have kept volumes out of storage temporarily.

US natural gas storage



Canada natural gas storage



United States rig counts



Canada rig counts



Rigs

United States

 United States oil rig counts have continued to rise through 2018, primarily due to increases in the Permian basin. This growth will likely continue through the rest of 2018 as prices remain above \$60/bbl.

Canada

- Canadian rigs counts are down slightly on a year over year basis. A decline in gas rigs is primarily responsible for this decrease.
 International
- Drilling continues to increase slowly in the Middle East, Africa, and Asia. The United States now accounts for 50% of all rigs in the world.

International rig counts



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. AP Hardisty
				US\$/bbl	US\$/bbl	C\$/bbl	C\$/bbl	C\$/bbl
	Rate	Rate	Rate	Real	Current	Real	Current	Current
Historical								
2008	2.4%	2.4%	0.943	\$116.90	\$99.57	\$120.69	\$102.80	\$82.95
2009	0.3%	0.3%	0.880	\$70.66	\$61.65	\$75.76	\$66.10	\$58.66
2010	1.8%	1.8%	0.971	\$90.72	\$79.40	\$88.90	\$77.80	\$67.22
2011	2.9%	2.9%	1.012	\$106.51	\$94.88	\$107.24	\$95.54	\$77.12
2012	1.5%	1.5%	1.001	\$102.56	\$94.11	\$94.34	\$86.57	\$73.10
2013	0.9%	0.9%	0.972	\$105.08	\$97.91	\$100.20	\$93.36	\$74.97
2014	1.9%	1.9%	0.906	\$99.15	\$93.26	\$99.93	\$94.00	\$81.06
2015	1.1%	1.1%	0.783	\$50.77	\$48.69	\$59.44	\$57.00	\$44.80
2016	1.4%	1.496	0.755	\$44.50	\$43.15	\$53.84	\$52.22	\$38.90
2017	1.6%	1.6%	0.771	\$51.71	\$50.88	\$62.89	\$61.88	\$50.53
2018								
6 Mths H	2.1%	2.1%	0.784	\$65.17	\$65.17	\$75.39	\$75.39	\$55.29
6 Mths F	0.0%	0.0%	0.780	\$62.00	\$62.00	\$74.35	\$74.35	\$53.35
Avg.	N/A	N/A	0.782	\$63.59	\$63.59	\$74.87	\$74.87	\$54.32
Forecast								
2018	0.0%	0.0%	0.780	\$62.00	\$62.00	\$74.35	\$74.35	\$53.35
2019	2.0%	2.0%	0.800	\$62.00	\$63.25	\$72.50	\$73.95	\$54.55
2020	2.0%	2.0%	0.825	\$62.50	\$65.05	\$70.90	\$73.75	\$56.10
2021	2.0%	2.0%	0.850	\$65.00	\$69.00	\$71.75	\$76.15	\$60.20
2022	2.0%	2.0%	0.850	\$67.50	\$73.05	\$74.70	\$80.85	\$64.60
2023	2.0%	2.0%	0.850	\$70.00	\$77.30	\$77.65	\$85.75	\$69.15
2024	2.0%	2.0%	0.850	\$70.00	\$78.85	\$77.65	\$87.45	\$70.55
2025	2.0%	2.0%	0.850	\$70.00	\$80.40	\$77.65	\$89.20	\$71.95
2026	2.0%	2.0%	0.850	\$70.00	\$82.00	\$77.65	\$91.00	\$73.40
2027	2.0%	2.0%	0.850	\$70.00	\$83.65	\$77.65	\$92.80	\$74.85
2028	2.0%	2.0%	0.850	\$70.00	\$85.35	\$77.65	\$94.65	\$76.35
2029	2.0%	2.0%	0.850	\$70.00	\$87.05	\$77.65	\$96.55	\$77.90
2030	2.0%	2.0%	0.850	\$70.00	\$88.80	\$77.65	\$98.50	\$79.45
2031	2.0%	2.0%	0.850	\$70.00	\$90.55	\$77.65	\$100.45	\$81.05
2032	2.0%	2.0%	0.850	\$70.00	\$92.35	\$77.65	\$102.45	\$82.65
2033	2.0%	2.0%	0.850	\$70.00	\$94.20	\$77.65	\$104.50	\$84.30
2034	2.0%	2.0%	0.850	\$70.00	\$96.10	\$77.65	\$106.60	\$86.00
2035	2.0%	2.0%	0.850	\$70.00	\$98.00	\$77.65	\$108.75	\$87.75
2036	2.0%	2.0%	0.850	\$70.00	\$100.00	\$77.65	\$110.90	\$89.50
2037	2.0%	2.0%	0.850	\$70.00	\$102.00	\$77.65	\$113.10	\$91.25
2037+	2.0%	2.0%	0.850	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 2018 dollars with no escalation considered

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	Natural Gas Liquids Pric Edmonton Par Prices	ing			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\$/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											
2008	\$22.59	\$56.96	\$83.54	\$109.77	\$7.88	\$9.58	\$8.16	\$8.20	\$10.40	\$8.86	\$303.83
2009	\$11.61	\$34.62	\$56.21	\$69.49	\$3.85	\$4.54	\$3.96	\$4.17	\$4.53	\$3.95	(\$5.08
2010	\$11.53	\$45.19	\$68.79	\$84.02	\$3.76	\$4.58	\$4.01	\$4.01	\$5.01	\$4.39	\$56.94
2011	\$10.30	\$52.41	\$86.98	\$105.24	\$3.46	\$4.08	\$3.63	\$3.34	\$4.49	\$4.00	\$101.60
2012	\$6.73	\$30.80	\$75.47	\$99.67	\$2.25	\$2.60	\$2.39	\$2.29	\$3.00	\$2.75	\$126.81
2013	\$8.68	\$38.54	\$77.44	\$103.52	\$2.98	\$3.41	\$3.17	\$3.11	\$4.00	\$3.73	\$62.17
2014	\$12.46	\$42.93	\$59.43	\$101.47	\$4.22	\$4.79	\$4.50	\$4.16	\$4.67	\$4.39	\$88.99
2015	\$7.49	\$5.35	\$33.70	\$55.15	\$2.56	\$2.81	\$2.69	\$1.81	\$2.74	\$2.63	\$107.45
2016	\$6.04	\$8.71	\$31.45	\$52.43	\$1.93	\$2.23	\$2.16	\$1.75	\$2.59	\$2.52	\$45.40
2017	\$6.11	\$27.92	\$40.98	\$63.65	\$2.13	\$2.23	\$2.19	\$1.56	\$3.03	\$2.99	\$41.85
2018	·										
6 Mths H	\$4.38	\$29.54	\$45.93	\$81.62	\$1.31	\$1.61	\$1.61	\$1.52	\$2.96	\$2.96	\$58.73
6 Mths F	\$4.60	\$29.75	\$48.35	\$81.80	\$1.50	\$1.70	\$1.70	\$1.40	\$2.90	\$2.90	\$50.00
Avg.	\$4.49	\$29.64	\$47.14	\$81.71	\$1.41	\$1.66	\$1.66	\$1.46	\$2.93	\$2.93	\$54.36
Forecast											
2018	\$4.60	\$29.75	\$48.35	\$81.80	\$1.50	\$1.70	\$1.70	\$1.40	\$2.90	\$2.90	\$50.00
2019	\$5.35	\$33.30	\$51.75	\$81.35	\$1.80	\$1.95	\$2.00	\$1.70	\$2.90	\$2.95	\$51.00
2020	\$6.75	\$36.90	\$51.65	\$81.15	\$2.30	\$2.40	\$2.50	\$2.20	\$3.10	\$3.25	\$52.00
2021	\$7.45	\$38.10	\$53.35	\$83.80	\$2.55	\$2.60	\$2.75	\$2.45	\$3.30	\$3.50	\$53.05
2022	\$7.90	\$40.45	\$56.60	\$88.90	\$2.70	\$2.70	\$2.90	\$2.60	\$3.40	\$3.70	\$54.10
2023	\$8.65	\$42.90	\$60.00	\$94.30	\$3.00	\$2.90	\$3.20	\$2.85	\$3.55	\$3.90	\$55.20
2024	\$9.40	\$43.75	\$61.20	\$96.15	\$3.25	\$3.10	\$3.50	\$3.15	\$3.75	\$4.20	\$56.30
2025	\$10.20	\$44.65	\$62.45	\$98.10	\$3.55	\$3.30	\$3.80	\$3.45	\$3.90	\$4.50	\$57.45
2026	\$10.60	\$45.50	\$63.70	\$100.05	\$3.70	\$3.35	\$3.95	\$3.55	\$3.95	\$4.65	\$58.60
2027	\$11.00	\$46.45	\$64.95	\$102.05	\$3.80	\$3.40	\$4.05	\$3.70	\$4.00	\$4.80	\$59.75
2028	\$11.20	\$47.35	\$66.25	\$104.10	\$3.90	\$3.40	\$4.15	\$3.80	\$4.00	\$4.90	\$60.95
2029	\$11.45	\$48.30	\$67.60	\$106.20	\$4.00	\$3.40	\$4.25	\$3.85	\$4.00	\$4.95	\$62.15
2030	\$11.65	\$49.25	\$68.95	\$108.30	\$4.05	\$3.40	\$4.30	\$3.95	\$4.00	\$5.05	\$63.40
2031	\$11.90	\$50.25	\$70.30	\$110.45	\$4.15	\$3.40	\$4.40	\$4.00	\$4.00	\$5.15	\$64.70
2032	\$12.15	\$51.25	\$71.70	\$112.70	\$4.20	\$3.40	\$4.50	\$4.10	\$4.00	\$5.30	\$65.95
2033	\$12.40	\$52.30	\$73.15	\$114.95	\$4.30	\$3.40	\$4.60	\$4.15	\$4.00	\$5.40	\$67.30
2034	\$12.65	\$53.35	\$74.60	\$117.25	\$4.40	\$3.40	\$4.65	\$4.25	\$4.00	\$5.50	\$68.65
2035	\$12.90	\$54.40	\$76.10	\$119.60	\$4.50	\$3.40	\$4.75	\$4.35	\$4.00	\$5.60	\$70.00
2036	\$13.15	\$55.50	\$77.65	\$121.95	\$4.55	\$3.40	\$4.85	\$4.45	\$4.00	\$5.70	\$71.40
2037	\$13.40	\$56.60	\$79.20	\$124.40	\$4.65	\$3.40	\$4.95	\$4.50	\$4.00	\$5.85	\$72.85
2037+	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 2018 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

	Crude oil pricing		N	atural gas pricing
Year	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\$/mcl
	Current	Current	Current	Current
Historical				
2008	\$95.28	\$92.40	\$84.08	\$9.88
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			÷	
6 Mths H	\$75.75	\$69.04	\$55.80	\$3.70
6 Mths F	\$73.35	\$69.35	\$61.20	\$3.65
Avg.	\$74.55	\$69.19	\$58.50	\$3.68
Forecast			· ·	
2018	\$73.35	\$69.35	\$61.20	\$3.65
2019	\$72.95	\$69.85	\$61.90	\$3.65
2020	\$72.70	\$69.60	\$62.90	\$3.85
2021	\$75.10	\$71.90	\$65.05	\$4.10
2022	\$79.80	\$76.55	\$69.65	\$4.30
2023	\$84.65	\$81.30	\$74.40	\$4.60
2024	\$86.30	\$82.95	\$75.90	\$4.90
2025	\$88.05	\$84.60	\$77.40	\$5.25
2026	\$89.80	\$86.30	\$78.95	\$5.40
2027	\$91.60	\$88.00	\$80.55	\$5.55
2028	\$93.45	\$89.80	\$82.15	\$5.65
2029	\$95.30	\$91.55	\$83.80	\$5.80
2030	\$97.20	\$93.40	\$85.50	\$5.90
2031	\$99.15	\$95.25	\$87.20	\$6.00
2032	\$101.15	\$97.20	\$88.95	\$6.15
2033	\$103.15	\$99.10	\$90.70	\$6.25
2034	\$105.20	\$101.10	\$92.55	\$6.40
2035	\$107.35	\$103.15	\$94.40	\$6.50
2036	\$109.50	\$105.20	\$96.25	\$6.65
2037	\$111.65	\$107.30	\$98.20	\$6.75
2037+	2.0%	2 0%	2 0%	2.09

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)
- 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 2018 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 Kern River	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\$/bb
	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real
Forecast																
2018	\$62.00	\$58.00	\$59.00	\$63.00	\$61.00	\$58.50	\$59.00	\$70.00	\$58.50	\$68.00	\$62.00	\$70.55	\$67.50	\$61.00	\$68.50	\$63.00
2019	\$62.00	\$58.00	\$59.00	\$63.00	\$61.00	\$58.50	\$59.00	\$66.00	\$58.50	\$64.00	\$58.00	\$66.55	\$63.50	\$57.00	\$64.50	\$59.00
2020	\$62.50	\$58.50	\$59.50	\$63.50	\$61.50	\$59.00	\$59.50	\$64.50	\$59.00	\$62.50	\$56.50	\$65.05	\$62.00	\$55.50	\$63.00	\$57.50
2021	\$65.00	\$61.00	\$62.00	\$66.00	\$64.00	\$61.50	\$62.00	\$67.00	\$61.50	\$65.00	\$59.00	\$67.55	\$64.50	\$58.00	\$65.50	\$60.00
2022	\$67.50	\$63.50	\$64.50	\$68.50	\$66.50	\$64.00	\$64.50	\$69.50	\$64.00	\$67.50	\$61.50	\$70.05	\$67.00	\$60.50	\$68.00	\$62.50
2023	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2024	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2025	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2026	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2027	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2028	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2029	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2030	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2031	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2032	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2033	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2034	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2035	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2036	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2037	\$70.00	\$66.00	\$67.00	\$71.00	\$69.00	\$66.50	\$67.00	\$72.00	\$66.50	\$70.00	\$64.00	\$72.55	\$69.50	\$63.00	\$70.50	\$65.00
2037+	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 Merey replaced BCF-17 in the OPEC basket March 1, 2009.

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			Natural Gas pricing						Ethanol
Year	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									
2018	1.380	1.200	\$2.90	\$2.30	\$2.40	\$2.50	\$8.00	\$3.40	\$1.50
2019	1.380	1.200	\$2.90	\$2.30	\$2.40	\$2.50	\$7.90	\$3.75	\$1.50
2020	1.380	1.200	\$3.10	\$2.50	\$2.60	\$2.70	\$7.80	\$3.75	\$1.50
2021	1.380	1.200	\$3.30	\$2.70	\$2.80	\$2.90	\$7.70	\$3.80	\$1.50
2022	1.380	1.200	\$3.40	\$2.80	\$2.90	\$3.00	\$7.60	\$3.85	\$1.50
2023	1.380	1.200	\$3.55	\$2.95	\$3.05	\$3.15	\$7.55	\$3.85	\$1.50
2024	1.380	1.200	\$3.75	\$3.15	\$3.25	\$3.35	\$7.50	\$3.90	\$1.50
2025	1.380	1.200	\$3.90	\$3.30	\$3.40	\$3.50	\$7.65	\$3.95	\$1.50
2026	1.380	1.200	\$3.95	\$3.35	\$3.45	\$3.55	\$7.70	\$4.10	\$1.50
2027	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.15	\$1.50
2028	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2029	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2030	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2031	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2032	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2033	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2034	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2035	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2036	1.380	1.200	\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2037	7 1.380 1.200		\$4.00	\$3.40	\$3.50	\$3.60	\$7.75	\$4.20	\$1.50
2037+	1.380	1.200	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 -	LNG	Liquefied Natural Gas			
		historical name of a virtual trading hub on the NGX system	MESC	Middle East Sour Crude			
	ANS	Alaska North Slope	MSO	Mixed Sour Crude Oil			
	ASCI	·	MSW	Canadian Light Sweet			
		Argus Sour Crude Oil	NEB	Canadian National Energy Board			
AWB		Access Western Blend - Canadian condensate/bitumen mix	NGX	Natural Gas Exchange			
	BR	Bow River Crude Oil	NIT	Nova Inventory Transfer			
	CAPP	Canadian Association of Petroleum	NRC	Natural Resources Canada			
		Producers	NYMEX	New York Mercantile Exchange			
	CBOT	Chicago Board Of Trade	OECD	Organization of Economic			
	CGA	Canadian Gas Association		Cooperation and Development			
	CME	Chicago Mercantile Exchange	OPEC	Organization of Petroleum			
	DCQ	Daily Contract Quantity		Exporting Countries			
	DOB	Daily Oil Bulletin	PADD	Petroleum Administration Defense District			
	EIA	Energy Information Administration	USGC	US Gulf Coast			
	FERC	US Federal Energy Regulatory	USWC	US West Coast			
		Commission	WCS	Western Canada Select Crude Oil			
	FOB	Free on Board (shipper term)	WTI	West Texas Intermediate			
IEA		International Energy Administration	WTS	West Texas Sour			
	LLB	Lloydminster Blend Crude Oil					

Andrew Botterill 403-648-3239 abotterill@deloitte.ca

Lesley Mitchell 403-648-3215 lemitchell@deloitte.ca

Jonathan Listoe 403-648-3254 jlistoe@deloitte.ca

Sarah Clowes 587-293-3201 saclowes@deloitte.ca

Deloitte Bankers Court 700, 850 - 2 Street SW Calgary AB T2P 0R8 Canada

Tel: 403-267-1700 Fax: 587-774-5398

Deloitte.

www.deloitte.ca/priceforecast

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