

Par Pacific Market Indices

The latest version of this document should be relied upon to the extent there are inconsistencies with prior publications.

US \$ per Barrel		Sing (Brent)	WY (WTI)	PNW (ANS)	Crude Prices						Par Hawaii Crude Differential
Time Period		3.1.2 Crack	3.2.1 Crack	5.2.2.1 Crack	Brent	WTI	ANS	Bakken Clearbrook	WCS Hardisty	Brent M1-M3	
November 6 - November 12		11.77	17.54	15.31	83.43	82.25	84.33	83.69	63.14	2.11	
October 30 - November 5		12.35	20.49	14.26	82.94	81.78	83.78	83.68	65.04	2.27	
October 1 - October 31		11.02	23.61	16.95	83.75	81.22	84.48	82.43	67.41	1.60	
2021 - Q3		6.20	41.78	18.59	73.23	70.52	73.83	70.77	57.54	1.36	2.27
2021 - Q2		4.38	30.04	16.05	69.08	66.17	69.44	65.99	53.33	0.96	2.01
2021 - Q1		3.80	20.97	11.46	61.32	58.14	61.65	57.60	46.16	0.81	1.02
2020 - YE		3.15	17.80	11.44	43.21	39.65	41.77	37.19	27.45	(0.98)	5.15
2020 - Q4		2.63	18.45	11.26	45.26	42.70	43.68	40.67	31.21	(0.41)	2.25
2020 - Q3		1.92	19.63	9.39	43.34	40.92	43.11	39.44	30.93	(0.79)	1.13
2020 - Q2		(0.14)	17.39	11.92	33.39	28.00	28.17	24.63	18.40	(2.19)	5.54
2020 - Q1		8.11	15.86	13.24	50.82	45.98	52.27	42.67	27.96	(0.54)	7.04
2019 - YE		10.80	24.90	14.85	64.19	57.08	65.72	56.04	43.18	1.00	3.44
2019 - Q4		12.12	28.26	16.58	62.42	56.87	65.51	55.37	37.76	1.39	4.79
2019 - Q3		12.41	27.32	14.76	62.03	56.44	63.63	55.32	43.61	1.10	3.26
2019 - Q2		9.39	28.89	17.14	68.47	59.91	69.40	58.49	47.35	1.42	2.95
2019 - Q1		9.15	15.09	10.93	63.83	54.90	64.15	54.84	44.26	0.07	2.45
2018 - YE		10.90	22.69	14.63	71.69	64.90	72.16	62.36	38.33	0.37	2.00
2018 - Q4		10.79	23.97	15.88	68.60	59.34	69.09	51.31	25.31	(0.09)	0.87
2018 - Q3		11.39	26.25	13.98	75.84	69.43	75.83	68.58	41.67	0.11	3.00
2018 - Q2		10.49	24.99	16.34	74.97	67.91	75.12	67.58	49.59	0.76	2.68
2018 - Q1		10.93	15.65	12.93	67.23	62.89	67.66	62.06	36.73	0.71	2.07
2017 - YE		10.63	21.80	16.43	54.74	50.85	54.09	51.15	38.17	(0.15)	0.35
2017 - Q4		10.54	23.79	13.55	61.46	55.30	61.84	56.94	38.94	0.59	1.58
2017 - Q3		11.70	25.29	19.59	52.17	48.20	52.70	48.75	37.61	0.03	0.56
2017 - Q2		10.02	21.47	15.45	50.79	48.15	49.80	47.94	38.15	(0.59)	0.05
2017 - Q1		10.25	16.51	14.44	54.57	51.78	52.64	50.96	38.00	(0.64)	(1.31)
2016 - YE		7.68	16.27	13.94	45.13	43.47	42.07	45.57	29.50	(1.09)	(0.18)
2016 - Q4		9.28	13.69	13.71	51.06	49.29	48.06	47.36	34.27	(1.47)	(1.21)
2016 - Q3		6.56	19.12	15.54	46.99	44.94	43.14	43.69	30.58	(0.91)	1.50
2016 - Q2		7.24	18.16	14.50	47.03	45.64	44.33		32.82	(0.70)	0.54
2016 - Q1		7.60	13.44	11.76	35.21	33.63	31.92		19.95	(1.29)	0.16

Singapore 3.1.2 Crack Spread is calculated as follows:

Singapore Daily: computed by taking 1 part gasoline (RON 92), and 2 parts middle distillates (Sing Jet & Sing Gasoil) as created from a barrel of Brent Crude.

Month (CMA): computed using all available pricing days for each marker.

Quarter/Year: computed using calendar day weighted CMAs for each marker.

Post-closing the IES acquisition on December 19, 2018, we believe the Singapore 3.1.2 crack spread is the most representative market indicator of our current operations in Hawaii.

Wyoming 3.2.1 Crack Spread is calculated as follows:

Rapid City Daily: Computed by taking 2 part gasoline and 1 part distillate (ULSD) as created from three barrels of West Texas Intermediate Crude (WTI).

Denver Daily: Computed by taking 2 part gasoline and 1 part distillate (ULSD) as created from three barrels of WTI.

Daily: computed using a weighted average of 50% Rapid City and 50% Denver.

Month (CMA): computed using all available pricing days for each marker.

Quarter/Year: computed using calendar day weighted CMAs for each marker.

Pacific Northwest 5.2.2.1 Crack Spread is calculated as follows:

Pacific Northwest Daily: computed by taking 2 part gasoline (PNW Suboctane), 2 parts middle distillates (PNW ULSD & PNW Jet), and 1 part fuel oil (SF 180 Waterborne) as created from a barrel of Alaskan North Slope Crude.

ANS price: calculated using the Argus ANS-Brent differential beginning in July 2017. Prior to July 2017, a blended Platts and Argus ANS-WTI differential was used.

Month (CMA): computed using all available pricing days for each marker.

Quarter/Year: computed using calendar day weighted CMAs for each marker.

Crude Market Indicators:

ANS crude price influences the Hawaii Refinery's financial performance and is the most relevant benchmark for PNW product pricing. Source: Argus, Platts.

Bakken Clearbrook crude price influences the Washington and Wyoming Refineries' financial performance. Source: CME

Western Canadian Select crude price influences the Washington Refinery's financial performance. Source: CME.

Brent M1 - M3 is an instructive directional indicator for market structure which influences the Hawaii Refinery's financial performance.

Par Hawaii crude differential reflects the Hawaii refining operation's actual delivered crude differential to Brent. The Q4-2021 estimated differential is \$2.88/bbl.

Beginning in Q1 2021, the quarterly Par Hawaii crude differential is based on each month's Brent calendar month average (CMA), weighted by the calendar days in each month.

Prior to Q1 2021, the quarterly Brent price was calculated based on the simple average of each trading day. We believe the calendar day approach is more indicative of our realized crude costs, particularly during periods of significant price volatility.

The preceding data is for informational purposes only and is not reflective or intended to be an indicator of Par Pacific's past or future financial results. This data is general industry information and does not reflect prices paid or received by Par Pacific, other than the Par Hawaii Crude Differential, which reflects the difference in price between Brent and the actual price Par Pacific pays for crude oil delivered to the Par East and West refineries (inclusive of adjustments for quality, energy content, transportation and other fees, derivatives, and regional/local differentials). The data was compiled from publicly available information, various industry publications, other published industry sources, including OPIS and Argus, and our own internal data and estimates. Although this data is believed to be reliable, Par Pacific has not had this information verified by independent sources. Par Pacific does not make any representation as to the accuracy of the data and does not undertake any obligation to update, revise or continue to provide the data.

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