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Renewable Fuels, Carbon Credits, Feedstocks

CHEMICAL MARKET ANALYTICS

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NGLs, Monomers, Polymers &
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Coal, Metals & Mining

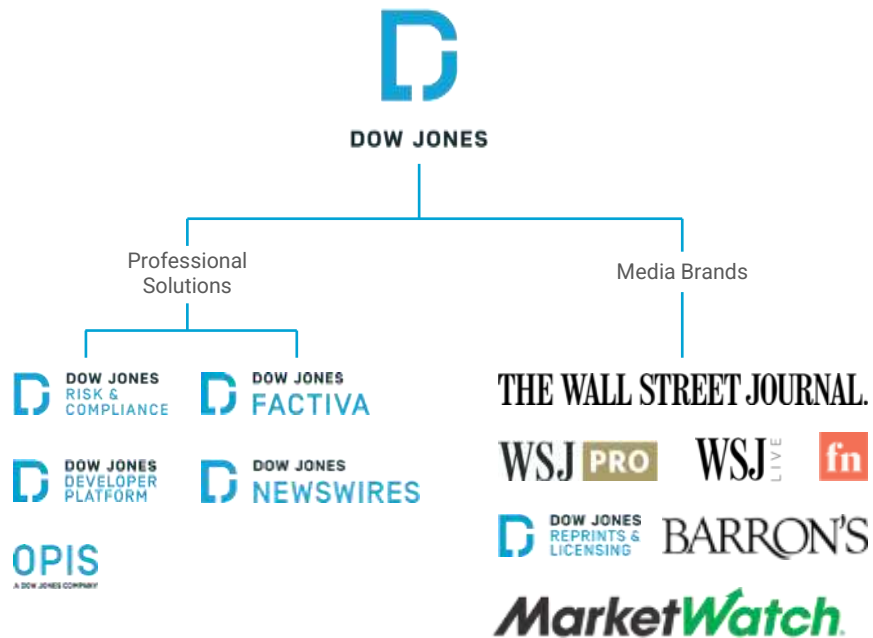
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Integrated Fuel Management

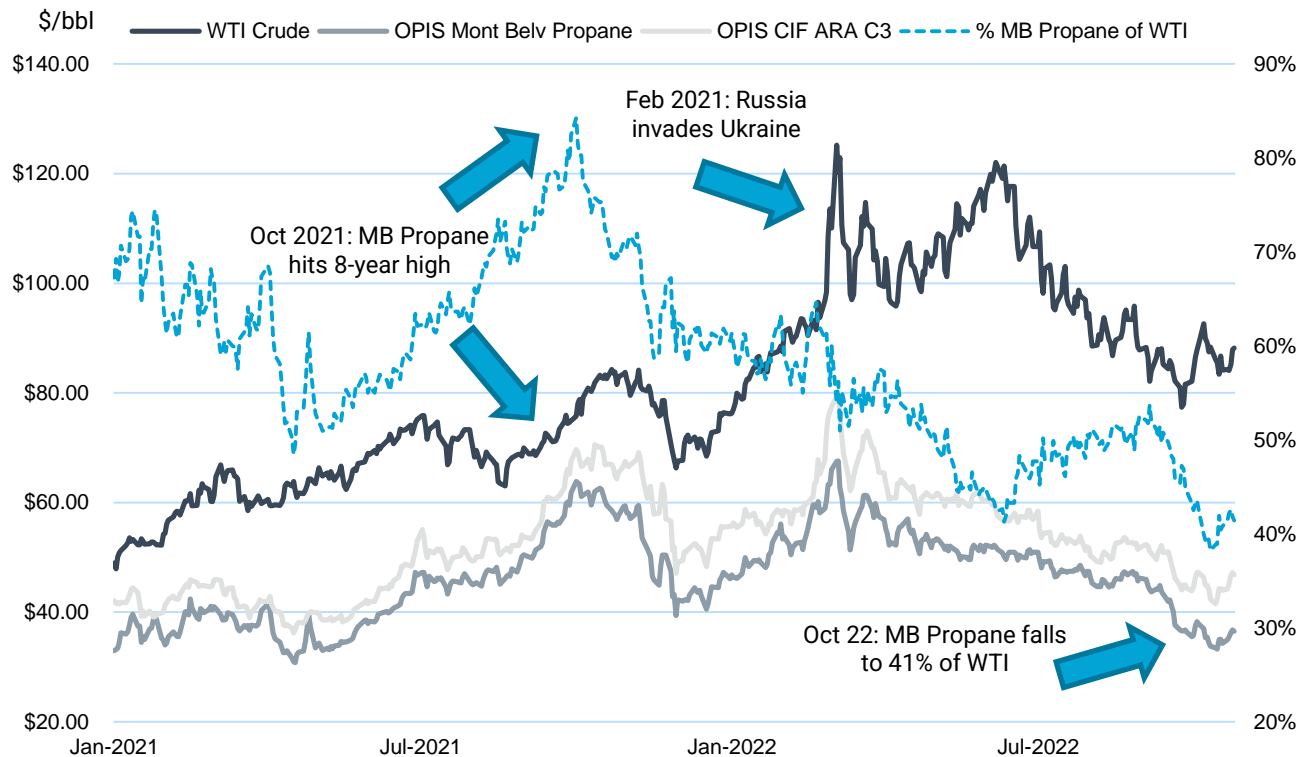
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Propane Values Slump in 2022

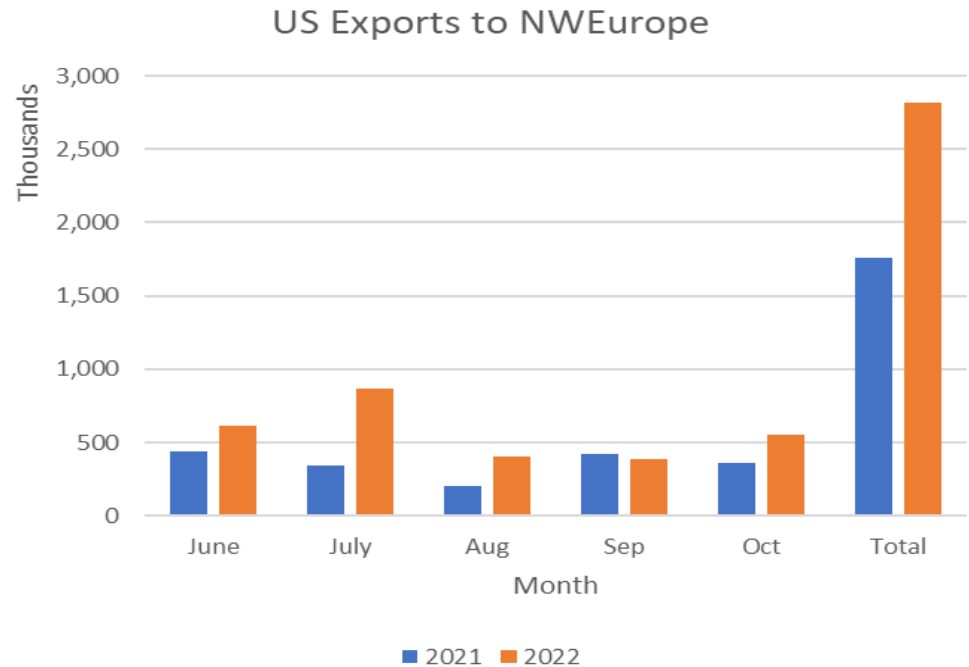
Reduced chem demand and rebound in crude values after the Russian invasion of Ukraine key to divergence of crude and propane



Source: OPIS

US Exports to Northwest Europe Surge Year on Year, Replacing Russia-Origin, North Sea Bbls

- Total LPG volumes traded in northwest Europe during October reached 845,000 metric tons, up 50% from September's levels
- Overall, 72% of petrochemical intake as feedstock originated from the U.S., with 60% from the U.S. Gulf Coast and 12% from the U.S. East Coast
- High natural gas prices in Europe have led producers in the North Sea to re-inject a portion of the LPG into the natural gas stream



Source: OPIS

- Currently a third of NGLs produced in the North Sea are being re-injected into the natural gas stream where they have more value
- The Dutch TTF spot natural gas price, an indicator of inland gas prices in northern Europe, has traded at the equivalent of \$32.80/mmBTU compared to \$11.70/mmBTU a year ago
- Neste' has been successfully replacing natural gas with propane at its 206,000 b/d Porvoo refinery in Finland to fuel furnaces. The company confirmed to OPIS that its incremental supply is all from the US and for diversification away from Russian supply



Source: OPIS

- Potential recessions globally have reduced expectations for growth in oil demand
- Low inventories mean that physical markets likely remain tight in coming months, according to new analysis by the Dallas Federal Reserve bank
- "There are some serious concerns about recession, especially in Europe, where the question isn't whether they go into recession, but about the depth and length of the downturn. Meanwhile, on the other side of the globe, China's GDP has taken a nosedive from double-digit growth over the past number of years to low single digits at best." Jim Teague, Enterprise



Source: OPIS

- Houston-Chiba, Japan (via Panama), marker reaches \$187.00/t; the Houston-Flushing, Netherlands, route increased to \$104.00/t; and the Arab Gulf-Japan route moved up to \$116.00/t
- The Houston-Chiba rate has soared by 36% Since Oct 27, Houston-Flushing by 38% and Arab Gulf-Japan by 23%
- Freights are at the highest level seen since 2019
- Significant delays crossing the Panama Canal, active lifting in the Middle East after holidays in India and slow offloading, the Far East continuing to draw vessels for prompter dates at increased premiums, robust U.S. exports, and cargoes being offered in the West for December for which no vessels have yet been fixed
- Delays at the Canal going north to the Atlantic Basin were 17 days and going south to Asia 22 days

Source: OPIS

- Asian olefin makers are set to cut LPG consumption to a one-year low in December amid margin-driven lower cracker run rates and in anticipation of higher seasonal gas demand in the upcoming winter, according to an OPIS survey and industry sources
- Asian flexi-crackers plan to reduce LPG feed by 4% in December according to the OPIS monthly cracking survey concluded on Nov. 4
- The cracking volume was last lower at 246,000 mt in December 2021, OPIS data shows



Source: OPIS

But Demand Could Revive If Winter Weather Boosts Consumption

- LPG demand might increase with the advent of winter weather in Northeast Asia
- Reduced crude production by OPEC+ will cut LPG production alongside crude starting in November, leading to a more balanced supply/demand picture
- Heating demand for LPG in Northwest Europe could overtake lost demand from crackers

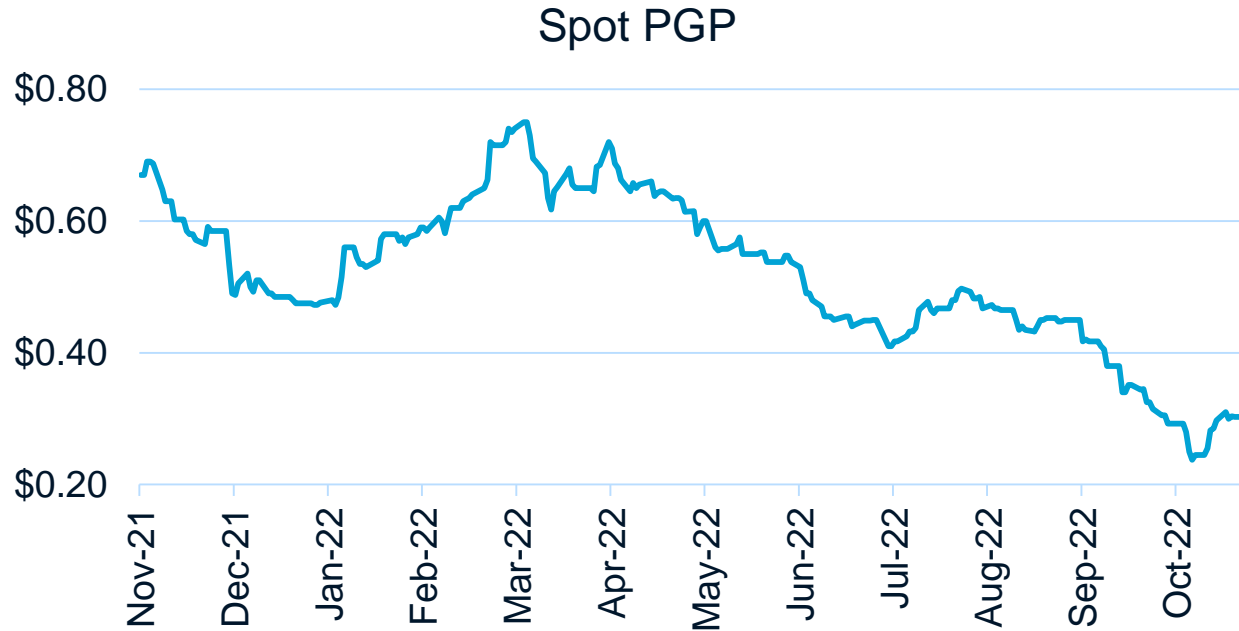


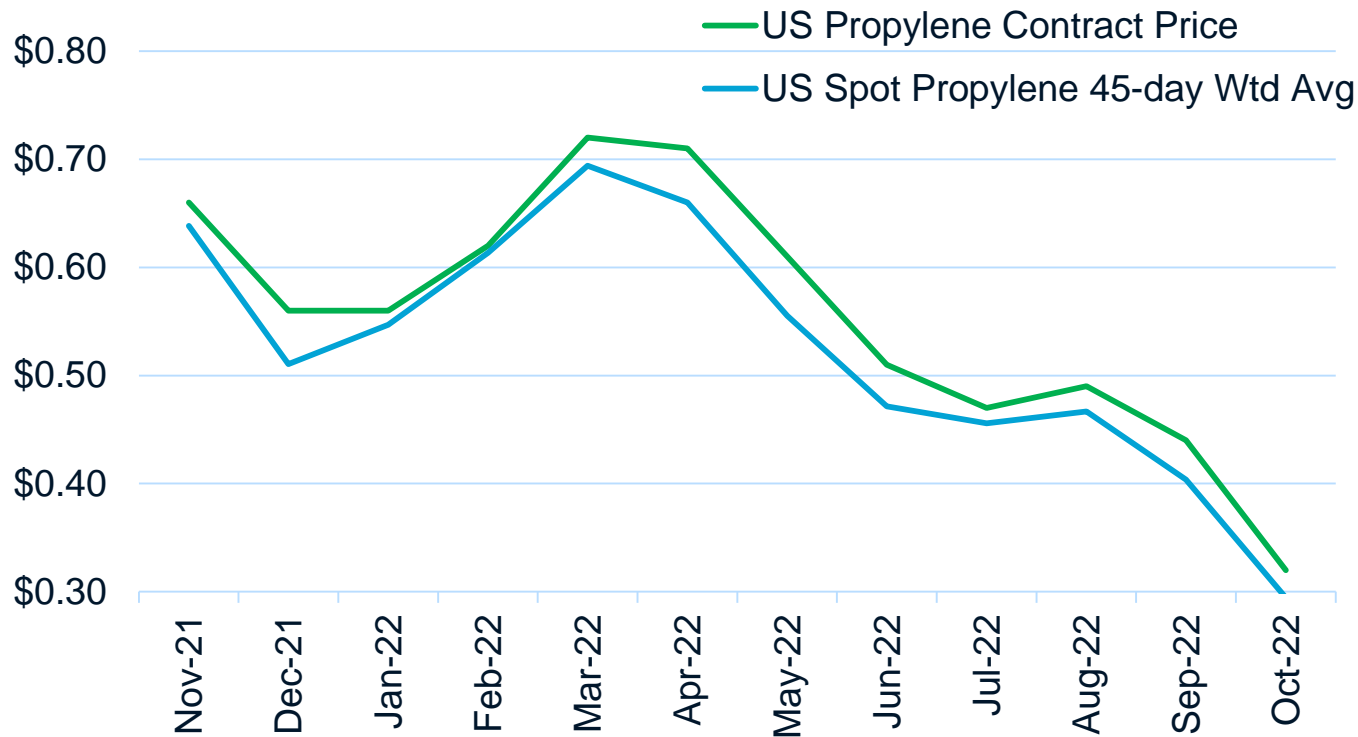
Source: OPIS

Summing Up the Picture At Hand

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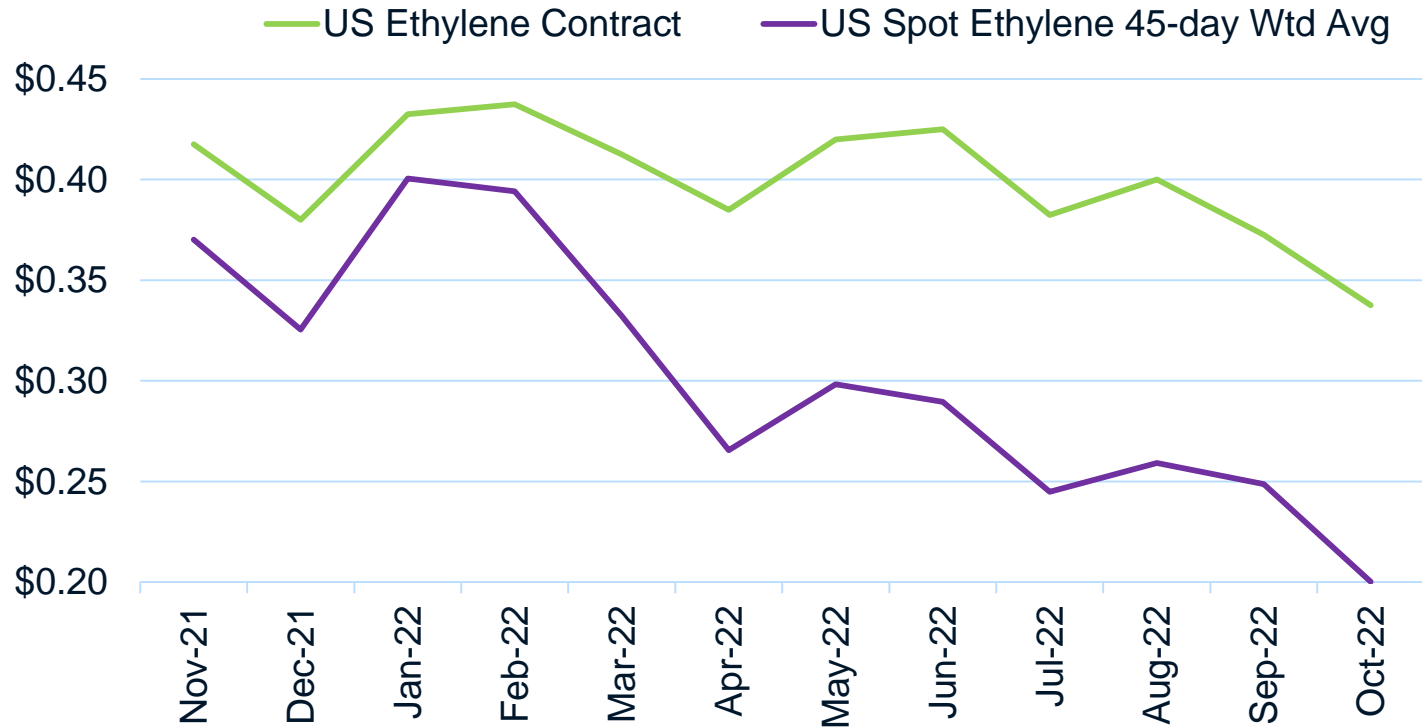




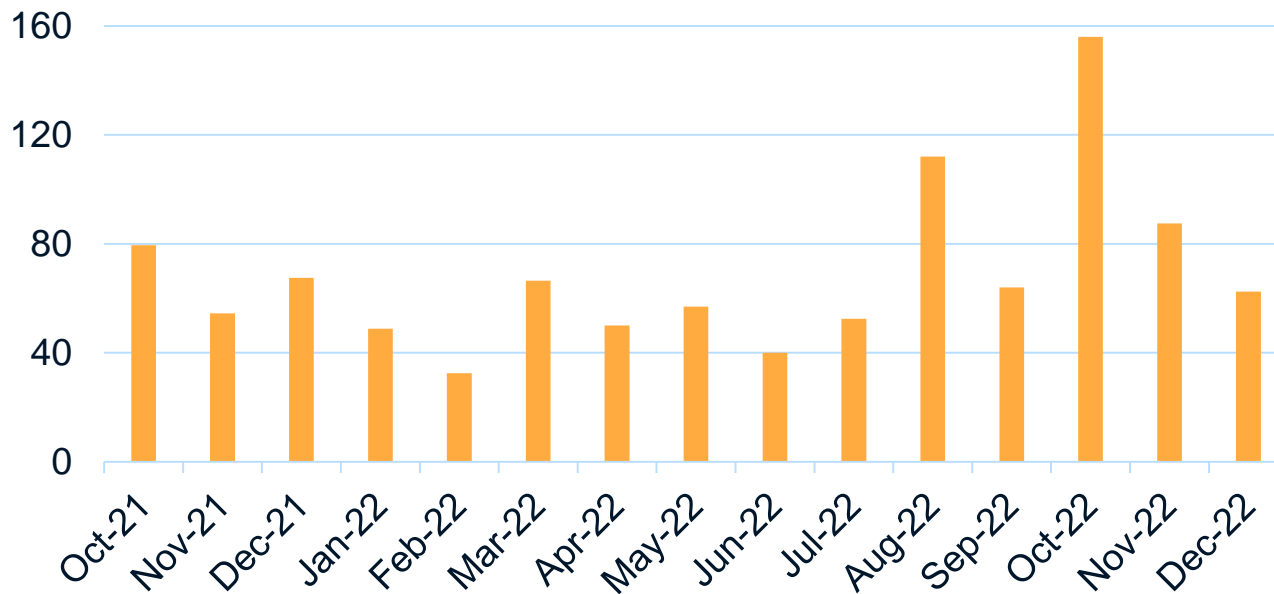


Spot US Ethylene

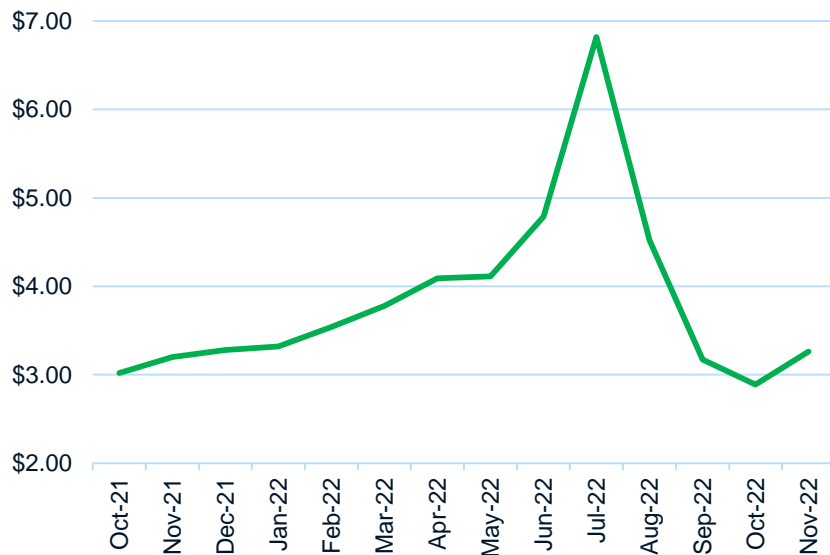




US ETHYLENE EXPORTS - SPOT FIXTURES (kmt)



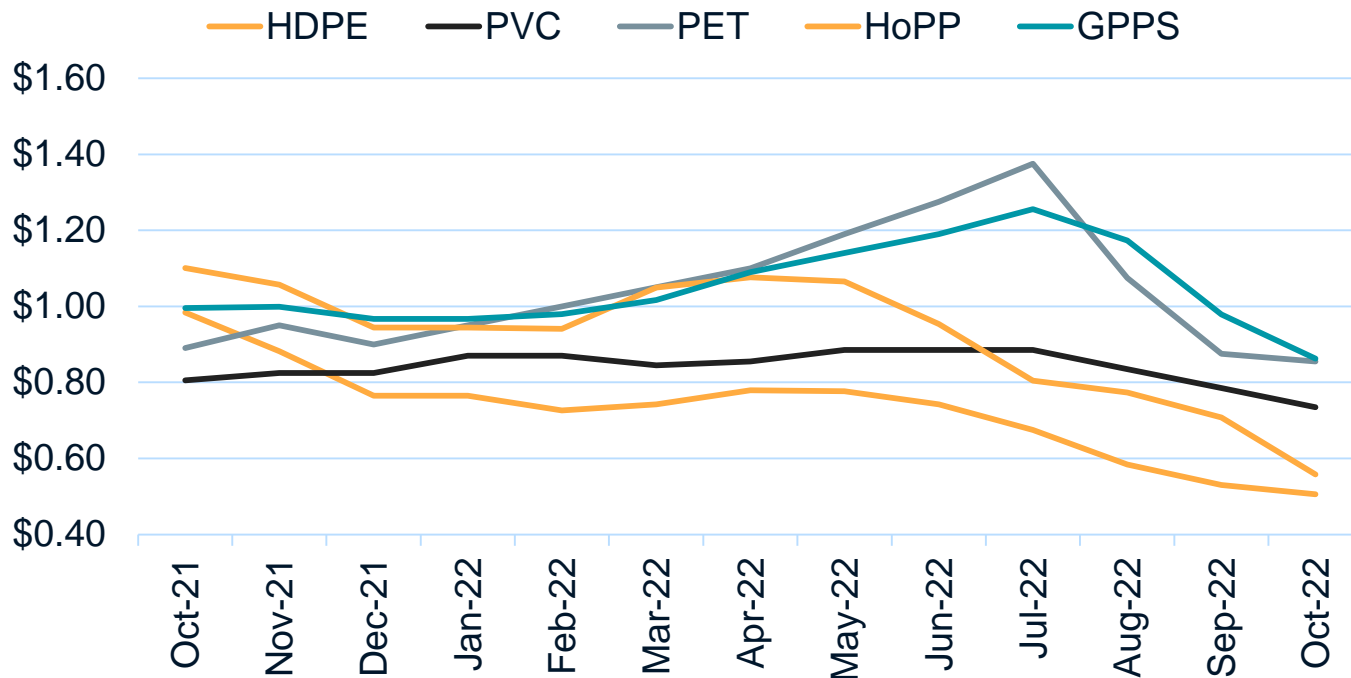
US Benzene Contract



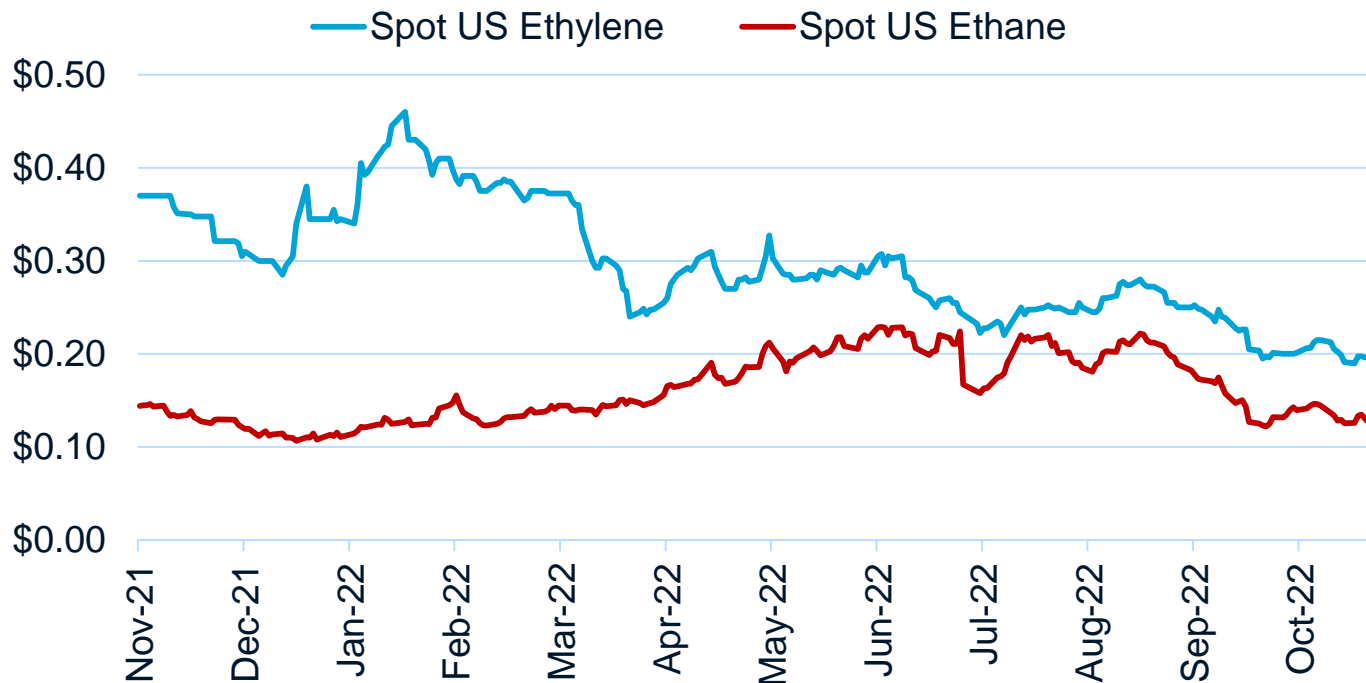
Spot US Benzene



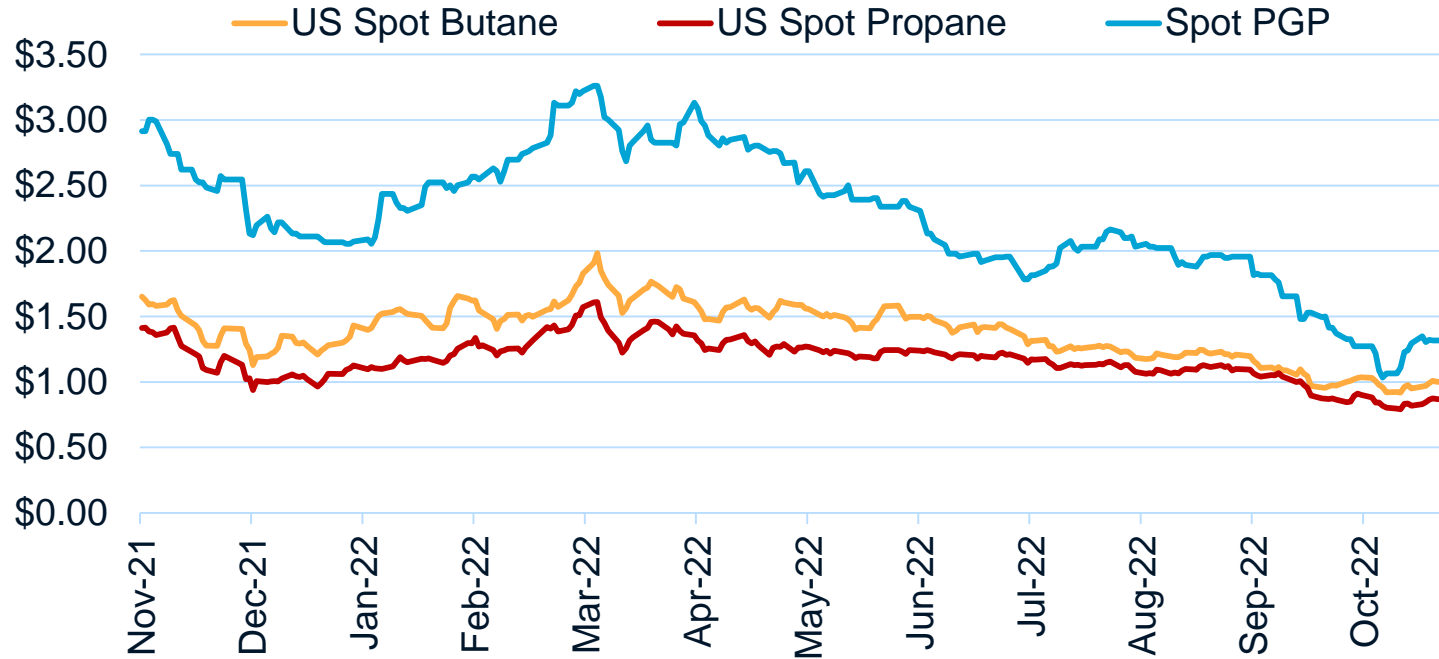
Downstream Petrochemical Markets – No Help from Polymers



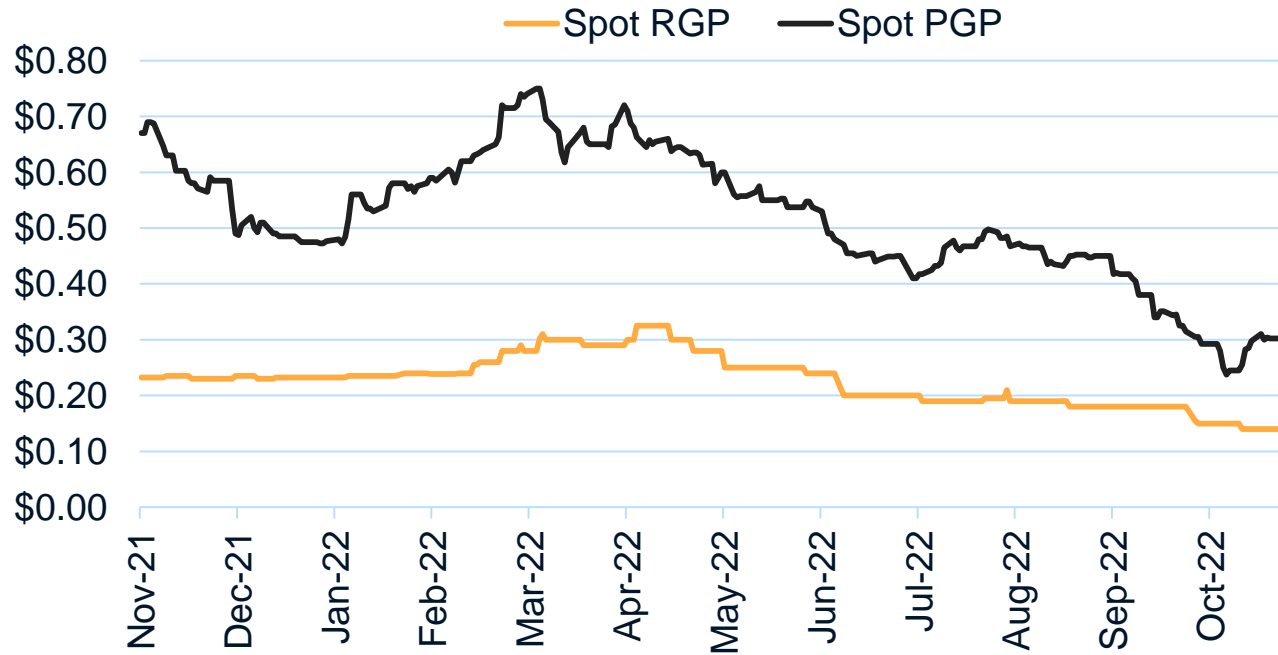
Upstream Petrochemical Feedstocks – Limited Support



Upstream Petrochemical Feedstocks – Limited Support



Upstream Petrochemical Feedstocks – Limited Support



What Does the 2023 Market Hold?

OPIS, A DOW JONES COMPANY | NGL FORWARDS REPORT

ETHANE C2 (MONT BELVIEU) cts/gal

OPIS 14:30 ET SNAPSHOT: 41.750

FORWARD MONTH	LOW ASSESSMENT	HIGH ASSESSMENT	AVG PRICE	NET CHANGE	FRAC SPREAD	% OF CRUDE
Dec 22	41.375	42.000	41.6875	2.0625	0.2980	20.31
Jan 23	41.125	41.750	41.4375	2.0000	-2.4331	20.39
Feb 23	40.000	40.625	40.3125	1.7500	-1.7869	20.07
Mar 23	36.375	37.000	36.6875	1.4375	-0.6619	18.48
Apr 23	31.875	32.500	32.1875	1.0625	-0.2992	16.40
May 23	31.125	31.875	31.5000	1.0000	-0.7346	16.22
Jun 23	31.125	31.750	31.4375	1.0000	-1.2615	16.35
Jul 23	31.125	31.750	31.4375	1.0000	-1.7458	16.51
Aug 23	31.125	31.750	31.4375	0.9375	-1.7922	16.66
Sep 23	31.125	31.750	31.4375	0.8750	-1.3942	16.81
Oct 23	31.375	32.000	31.6875	0.9375	-1.5024	17.07
Nov 23	31.500	32.250	31.8750	1.0000	-3.3117	17.30
Dec 23	31.625	32.250	31.9375	0.9375	-5.3920	17.47

OPIS, A DOW JONES COMPANY | NGL FORWARDS REPORT

PROPANE C3 (MONT BELVIEU TET) cts/gal

OPIS 14:30 ET SNAPSHOT: 87.625

FORWARD MONTH	LOW ASSESSMENT	HIGH ASSESSMENT	AVG PRICE	NET CHANGE	FRAC SPREAD	% OF CRUDE
Dec 22	86.750	87.375	87.0625	0.1875	29.9363	42.42
Jan 23	88.625	89.250	88.9375	0.2500	28.3869	43.77
Feb 23	88.250	88.875	88.5625	0.1875	30.4566	44.09
Mar 23	86.250	86.875	86.5625	0.3125	35.0125	43.60
Apr 23	84.250	85.500	84.8750	0.5000	40.0366	43.23
May 23	83.625	84.250	83.9375	0.3750	39.4470	43.21
Jun 23	83.375	84.000	83.6875	0.3750	38.5561	43.52
Jul 23	83.750	84.250	84.0000	0.3125	38.2002	44.11
Aug 23	84.125	84.500	84.3125	0.1250	38.4486	44.68
Sep 23	84.500	85.000	84.7500	-0.0625	39.4355	45.30
Oct 23	84.750	85.500	85.1250	-0.1250	39.3160	45.86
Nov 23	85.000	85.750	85.3750	-0.1250	36.8100	46.34
Dec 23	85.375	86.125	85.7500	0.0000	34.2275	46.89

What Does the 2023 Market Hold?

RETROCHEM WRC BY OPIS, A DOW JONES COMPANY | RETROCHEM DAILY WIRE

Closing Forward Curves (\$/lb)

FORWARD MONTH	ETHANE BASED COST	PROPANE BASED COST	BUTANE BASED COST	C3-BASED COST	ETHYLENE WIB FPC	ETHYLENE CHEE	POP FOR WIB FPC	HOPE FOR CHEE	LDPE FOR CHEE	HOPP FOR CHEE	HDPE FOR CR	LLDPE FOR CR	HOPP FOR CR
NOV 22	0.16904	0.26059	0.25899	0.43725	0.21000	0.20125	0.35300	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
DEC 22	0.17058	0.26147	0.25796	0.46073	0.21000	0.20125	0.33750	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
JAN 23	0.16840	0.26601	0.25290	0.49990	0.21250	0.20125	0.34500	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
FEB 23	0.16396	0.26625	0.25164	0.49638	0.21125	0.20125	0.32000	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
MAR 23	0.15006	0.25865	0.24466	0.49616	0.21000	0.20125	0.35250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
APR 23	0.13268	0.25278	0.24014	0.49934	0.21000	0.20125	0.35500	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
MAY 23	0.12980	0.24863	0.23790	0.48098	0.21000	0.20125	0.35750	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
JUN 23	0.12938	0.24729	0.23710	0.47509	0.21000	0.20125	0.36000	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
JUL 23	0.12921	0.24836	0.23775	0.47130	0.21000	0.20000	0.36250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
AUG 23	0.12905	0.24891	0.23828	0.46745	0.21000	0.20000	0.36750	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
SEP 23	0.12903	0.25018	0.23920	0.46385	0.21000	0.20000	0.37250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
OCT 23	0.12995	0.25147	0.24091	0.46203	0.21000	0.20000	0.37500	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
NOV 23	0.13007	0.25157	0.24087	0.45742	0.21000	0.20000	0.37750	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
DEC 23	0.12964	0.25221	0.24127	0.45262	0.21000	0.20000	0.38000	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
JAN 24	0.13009	0.25095	0.24112	0.44148	0.21000	0.20000	0.38375	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
FEB 24	0.12995	0.24763	0.23949	0.43157	0.21000	0.20000	0.38875	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
MAR 24	0.12732	0.23726	0.23160	0.42570	0.21000	0.20000	0.39375	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
APR 24	0.13432	0.23847	0.23337	0.40955	0.21000	0.20000	0.39875	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
MAY 24	0.12545	0.22951	0.21991	0.39722	0.21000	0.20000	0.40250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
JUN 24	----	----	----	----	0.21000	0.20000	0.40250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
JUL 24	----	----	----	----	0.21000	0.20000	0.40250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
AUG 24	----	----	----	----	0.21000	0.20000	0.40250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
SEP 24	----	----	----	----	0.21000	0.20000	0.40250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
OCT 24	----	----	----	----	0.21000	0.20000	0.40250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000
NOV 24	----	----	----	----	0.21000	0.20000	0.40250	0.36000	0.36000	0.38000	0.46000	0.47000	0.47000

FOB = Free on Board, MB = Mott Service, CHEE = Chevron, HOPE = Houston, CR = Clowage, FPC = full technology, VSH = www.opis.com/stats/matchlogs/fpcn

What Does the 2023 Market Hold?

	<u>Ethylene MtB-E</u>	<u>PGP</u>
Nov-22	0.21000	0.33500
Dec-22	0.21000	0.33750
Jan-23	0.21250	0.34500
Feb-23	0.21125	0.35000
Mar-23	0.21000	0.35250
Apr-23	0.21000	0.35500
May-23	0.21000	0.35750
Jun-23	0.21000	0.36000
Jul-23	0.21000	0.36250
Aug-23	0.21000	0.36750
Sep-23	0.21000	0.37250
Oct-23	0.21000	0.37500
Nov-23	0.21000	0.37750
Dec-23	0.21000	0.38000

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Forward Curves

Forward Curves November 10, 2022 (cents/gallon)

Period	Curve	Benzene		Curve	Toluene		Curve	Mixed Xylene	
		Previous	Change		Previous	Change		Previous	Change
Nov-22	321.00	313.50	7.50	415.00	403.00	12.00	460.00	468.00	-8.00
Dec-22	310.00	306.00	4.00	410.00	390.50	19.50	450.00	463.00	-13.00
Jan-23	310.50	308.50	2.00	405.00	387.50	17.50	445.00	458.00	-13.00
Feb-23	311.00	309.00	2.00	403.50	386.00	17.50	443.50	456.50	-13.00
Mar-23	312.50	308.50	4.00	403.75	386.25	17.50	443.75	456.75	-13.00
Apr-23	305.00	305.00	0.00	421.25	404.00	17.25	461.25	474.50	-13.25
May-23	305.75	305.75	0.00	420.25	402.75	17.50	460.25	473.25	-13.00
Jun-23	303.50	303.50	0.00	417.75	400.25	17.50	457.75	470.75	-13.00
Jul-23	301.25	302.25	-1.00	414.25	396.50	17.75	454.25	467.00	-12.75
Aug-23	300.00	300.50	-0.50	410.00	391.75	18.25	450.00	462.25	-12.25
Sep-23	298.25	299.00	-0.75	404.50	386.50	18.00	444.50	457.00	-12.50
Oct-23	296.75	297.50	-0.75	387.25	371.50	15.75	427.25	442.00	-14.75
Nov-23	295.75	297.50	-1.75	382.00	365.25	16.75	422.00	435.75	-13.75
Dec-23	294.25	295.50	-1.25	379.25	362.00	17.25	419.25	432.50	-13.25

“The Future Ain’t What It Used to Be.” – Yogi Berra

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