

Chemicals

Chem Weekly: Paint contractor survey and updates on PE, propylene, TiO₂, and VAM

Industry Overview

PE production steps up in February, rates tighten

According to preliminary data from the American Chemistry Council (ACC), polyethylene (PE) production for the month of February fell 8.6% MoM (+2.6% YoY). However, adjusting for the fewer calendar days (28 in Feb vs. 31 in Jan) shows a bit of a different story (+1.5% m-m). Operating rates for PE stepped up m-m accordingly, to 88% from 87% in January, and inventories held flat m-m. Industry sources have also indicated that one of Shell's three new production lines has experienced a critical accident with a blower which could delay commissioning of 1.2bn pounds of production to January 2024. We are uncertain if these issues are enough to push producer 3 cent per pound (cpp) PE increases in March through given macro sentiment and crude weakness.

Propylene prices likely to move higher in March

A confluence of market forces is tightening the US polymer grade propylene market. The first was turnarounds at Enterprise and Invista propane dehydrogenation (PDH) units. Invista reportedly failed to successfully restart its operations and has since gone into force majeure. Additionally, the US ethylene market is cracking max ethane at the moment (~90% of mix), which is reducing the amount of by-product propylene to the market. We suspect propylene could settle 10-15cpp higher in March. This follows a +7cpp move in February and a +11cpp move in January. Even with a successful increase in March, ethane cracks would still favor the next best crack, butane, butane ~2-4cpp and propane by 7-8cpp (depending on how much March propylene price increases). This would be net beneficial for Lyondell and Eastman, and a net negative for Dow.

Ashtabula TIO₂ and Dow VAM are offline

ICIS is reporting that INEOS has taken one of its two chloride-based TIO₂ production lines at Ashtabula offline due to a union strike. Apparently only one of the two facilities is unionized, which leaves the remaining 50% of the plant operable (7% of US capacity). ICIS is also reporting that Dow has begun a one month turnaround at its 365ktpa vinyl acetate monomer (VAM) facility at Texas City, TX (20% of US VAM capacity).

Paint contractor survey indicates pricing/backlog strength

For the sixth year, we have collaborated with the Retail-Hardline and Building Products teams on a paint contractor survey to assess market share shifts, pricing trends, and contractor backlogs. While results are still preliminary, out of 11 respondents, 8 expect the price of paint to increase in 2023, with the most popular answer being between 5-10% higher y/y. This expectation is even more cemented in 2024, with 10 expecting the price of paint to increase, mostly by 5-10%. These data are interesting given the deflation expected in 2023 (and 2024); however, likely a testament to the coatings companies pricing power. In terms of volumes, most contractors expect similar levels of paint volumes in 2023 vs 2022, near pre-pandemic levels, and most contractors see their current backlogs at 2019 levels as well. While these survey results are preliminary, they are a bit surprising, given concerns about sharply lower new home construction and the potential for less residential repaint demand. Sherwin is the most popular brand to be spec'd by customers and chosen by contractors (when brand is not spec'd).

20 March 2023

Equity
United States
Chemicals

Steve Byrne, CFA
Research Analyst
BofAS
+1 646 855 5746
steve.byrne@bofa.com

Matthew DeYoe, CFA
Research Analyst
BofAS
+1 646 855 5738
matthew.deyoe@bofa.com

Salvator Tiano, CFA
Research Analyst
BofAS
+1 646 855 5904
salvator.tiano@bofa.com

Rock Hoffman
Research Analyst
BofAS
+1 917 565 6205
rock.hoffman@bofa.com

Jargon Buster:

DAP: Diammonium phosphate

MAP: Monoammonium phosphate

Mtpa: Million metric tons per annum

Ktpa: Thousand metric tons per annum

PE: Polyethylene

NOLA: New Orleans

TiO₂: Titanium dioxide pigment

VAM: Vinyl Acetate Monomer

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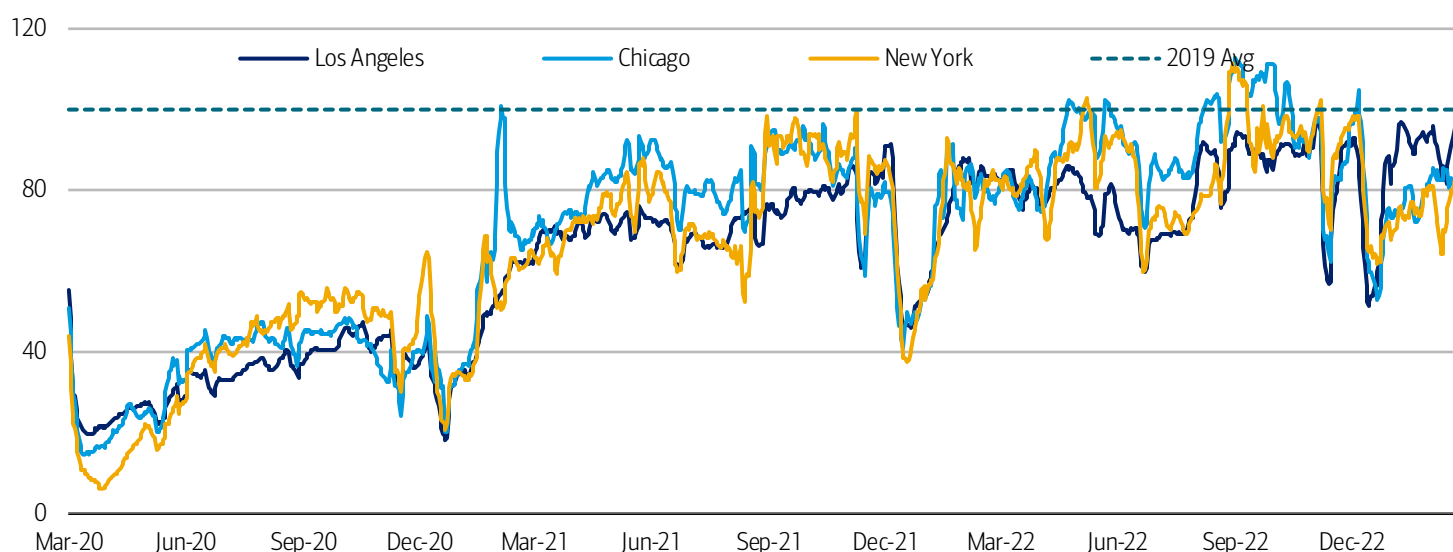
Timestamp: 20 March 2023 04:59AM EDT

Congestion has recovered from holiday lull, more to come

Although TomTom has changed the format in which they report data to Bloomberg, updated city-wide data (Exhibit 1) shows an almost full recovery from the recent holiday lull, showing that congestion levels are near the Dec 2022 peaks, approaching the 2019 average congestion levels again. On a regional basis, congestion during this past week (3/8-3/14) was up w/w only in Europe (+4.7%) but down in other regions (North America -3.4%, APAC (ex-China) -4.0%). This rates were also directionally similar on a 4-week MA basis albeit more muted with Europe up 2.8%, North America down 0.2%, and APAC (ex-China) down 1.9%, suggesting that the medium term growth patterns in congestion levels are stabilizing near the early December peaks. Looking at this past week's data y/y paints a picture of strong recovery with positive growth in both Europe (+10.7% y/y) and North America (+3.4% y/y). However, the fact that congestion levels are not currently above the 2019 daily averages in Asia and North America means that there is still more recovery to be seen in refinish paint demand.

Exhibit 1: TomTom Congestion Index – Top 3 US Cities

All three cities have recovered from holiday weakness and are approaching early December highs



Source: TomTom Congestion Index, Bloomberg

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Petrochemical & Chlor-Alkali

Exhibit 2: Historical pricing overview for PE, PP, PVC, LNG, Isocyanates

EU naphtha PE margins are higher than US ethane margins

	2017	2018	2019	2020	2021	2022	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22
Integrated PE Margins														
US Ethane	36	34	28	25	58	34	44	63	70	52	42	38	26	28
EU Naphtha	38	31	28	29	49	45	39	65	49	45	36	55	56	34
China Naphtha	20	17	5	11	2	-17	8	10	-1	-9	-22	-17	-14	-16
Polyethylene Prices														
HDPE Net Transaction (NA c/lb)	61	62	52	49	85	69	69	88	98	83	74	78	65	61
HDPE Discounted Contract (EU c/lb)	74	74	66	60	91	87	81	102	92	88	91	100	79	76
HDPE Spot (Asia c/lb)	52	58	44	40	50	47	48	50	49	51	51	50	45	42
Ethylene Prices														
Ethylene (US Gulf c/lb)	29	20	19	19	45	29	47	46	50	38	38	30	25	21
Ethylene (EU c/lb)	51	50	42	27	53	51	50	54	53	54	60	65	40	40
Ethylene (SE Asia c/lb)	51	53	39	33	47	49	44	46	46	50	54	55	44	43
Ethylene Cash Costs														
US Ethane (c/lb)	12	15	11	11	14	23	12	11	15	18	18	27	26	20

Exhibit 2: Historical pricing overview for PE, PP, PVC, LNG, Isocyanates

EU naphtha PE margins are higher than US ethane margins

	2017	2018	2019	2020	2021	2022	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22
US Propane (c/lb)	20	23	13	13	23	32	17	16	23	37	39	34	32	25
US Naphtha (c/lb)	20	29	30	21	24	47	19	19	17	42	61	47	38	43
EU Naphtha (c/lb)	24	30	25	18	29	28	29	25	30	31	43	31	10	29
Asia Naphtha (c/lb)	25	35	33	21	40	53	32	32	42	53	64	55	46	47
US Butane (c/lb)	18	19	11	14	18	31	10	9	17	34	41	32	25	25
Feedstock Dynamics														
US Ethane (c/gal)	25	32	23	18	28	47	22	24	29	39	37	46	59	47
US Propane (c/gal)	71	92	57	45	98	116	71	89	99	131	114	137	119	96
US Butane (c/gal)	86	96	60	54	107	130	73	93	109	150	143	155	121	103
Brent Oil (\$/bbl)	55	72	64	44	71	99	61	68	74	79	97	112	99	89
Isocyanates														
US MDI (c/lb)	148	136	157	184	165	218	168	162	155	177	221	231	223	199
US TDI (c/lb)	164	152	211	268	234	274	239	223	227	249	287	280	265	263
EU MDI (Eur c/lb)	105	103	130	150	130	140	138	130	124	128	139	145	138	137
EU TDI (Eur c/lb)	90	107	151	147	88	140	89	79	84	100	129	142	119	169
China MDI (c/lb)	74	74	144	115	75	98	73	83	64	81	120	104	91	78
China TDI (c/lb)	87	106	187	183	83	115	88	84	75	86	119	122	111	108

Source: OPIs, Bloomberg, BofA Global Research

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Exhibit 3: Weekly historical pricing overview for PE, PP, PVC, LNG, Isocyanates

EU naphtha PE margins are higher than US ethane margins

	12/8	12/15	12/22	12/29	1/5	1/12	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9	3/16
Integrated PE Margins															
US Ethane	30	28	29	27	27	28	28	28	28	28	29	29	29	29	30
EU Naphtha	43	43	43	43	25	25	25	25	27	27	27	27	25	25	25
China Naphtha	-15	-13	-9	-12	-12	-14	-17	-17	-14	-11	-14	-13	-16	-15	-10
Polyethylene Prices															
HDPE Net Transaction (NA c/lb)	61	61	61	61	54	54	54	54	54	54	54	54	54	54	54
HDPE Discounted Contract (EU c/lb)	78	78	78	78	75	75	75	75	78	78	78	78	78	78	78
HDPE Spot (Asia c/lb)	40	41	43	42	42	42	42	42	42	44	44	44	44	44	44
Ethylene Prices															
Ethylene (US Gulf c/lb)	20	21	20	20	20	21	27	27	23	23	23	23	24	22	22
Ethylene (EU c/lb)	38	38	38	38	38	38	38	38	42	42	42	42	44	44	44
Ethylene (SE Asia c/lb)	43	43	43	43	43	42	42	42	43	43	43	45	45	45	45
Ethylene Cash Costs															
US Ethane (c/lb)	18	20	19	21	14	13	13	13	13	13	12	12	12	12	11
US Propane (c/lb)	20	19	18	19	22	21	24	25	27	22	21	21	22	13	7
US Naphtha (c/lb)	42	37	39	38	42	43	47	47	47	41	42	41	40	27	19
EU Naphtha (c/lb)	23	23	23	23	37	37	37	37	38	38	38	38	41	41	41
Asia Naphtha (c/lb)	44	42	41	43	42	43	48	49	47	45	48	47	48	48	43
US Butane (c/lb)	25	23	24	23	27	27	27	27	30	33	31	34	32	11	5
Feedstock Dynamics															
US Ethane (c/gal)	42	43	37	37	40	40	40	43	38	35	38	34	32	28	25
US Propane (c/gal)	91	80	84	88	88	88	85	82	72	67	68	71	71	73	82
US Butane (c/gal)	103	91	94	97	103	102	97	98	97	86	91	94	102	100	112
Brent Oil (\$/bbl)	86	76	79	84	86	79	85	88	87	80	86	83	83	86	83
Isocyanates															
US MDI (c/lb)	201	196	191	191	191	191	191	183	191	186	186	186	181	181	186

Exhibit 3: Weekly historical pricing overview for PE, PP, PVC, LNG, Isocyanates

EU naphtha PE margins are higher than US ethane margins

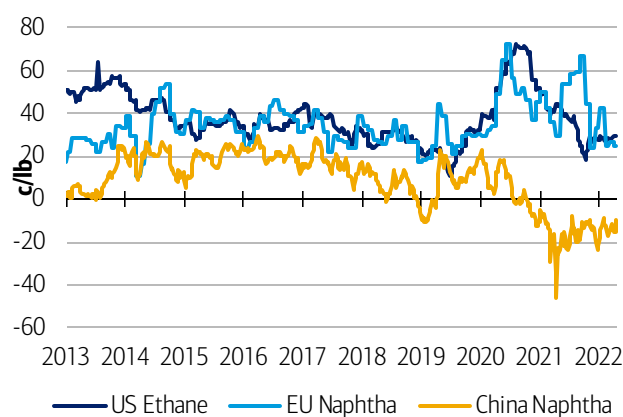
	12/8	12/15	12/22	12/29	1/5	1/12	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9	3/16
US TDI (c/lb)	262	262	272	272	272	272	272	272	272	272	272	272	272	272	272
EU MDI (Eur c/lb)	142	140	139	139	139	140	141	142	142	139	139	138	139	137	137
EU TDI (Eur c/lb)	182	181	181	181	180	178	179	181	181	178	171	170	171	169	161
China MDI (c/lb)	71	74	74	76	78	78	81	81	88	90	88	88	92	92	87
China TDI (c/lb)	109	105	105	105	115	115	115	115	115	115	115	115	113	113	115

Source: OPIS, Bloomberg, BofA Global Research

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Exhibit 4: Global PE Margins based on feedstock mix

Integrated margins remain negative for Chinese producers



Source: IHS, Bloomberg, BofA Global Research

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Exhibit 5: US premium to global netbacks

The US polyethylene price continues to have a premium to historics

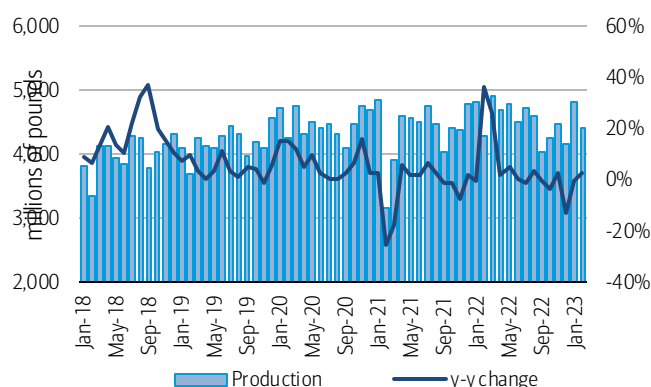


Source: OPIS, Bloomberg, BofA Global Research

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Exhibit 6: US polyethylene production

Production is not accelerating with new capacity

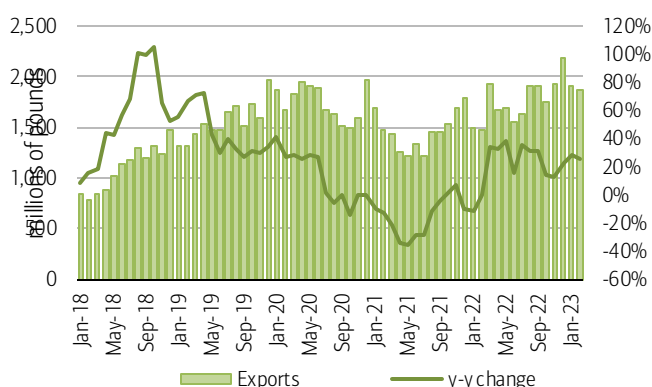


Source: American Chemistry Council, BofA Global Research

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Exhibit 7: US polyethylene exports

Exports have improved more recently

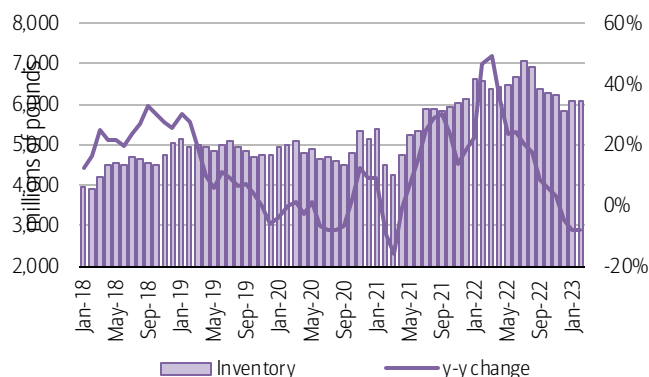


Source: American Chemistry Council, BofA Global Research

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Exhibit 8: US polyethylene inventory

Inventories remain elevated, though are off peak

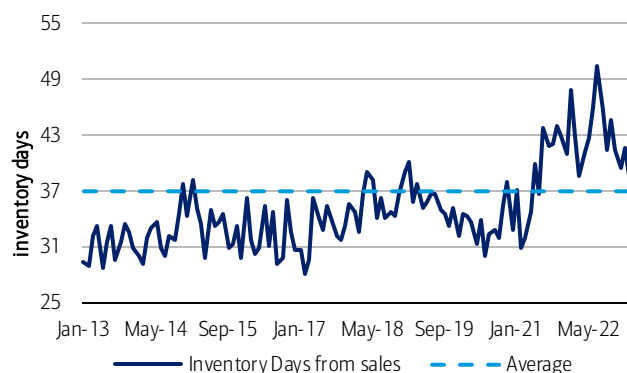


Source: American Chemistry Council, BofA Global Research

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Exhibit 9: US polyethylene days of sales in inventory

Days of sales in inventory are above normal

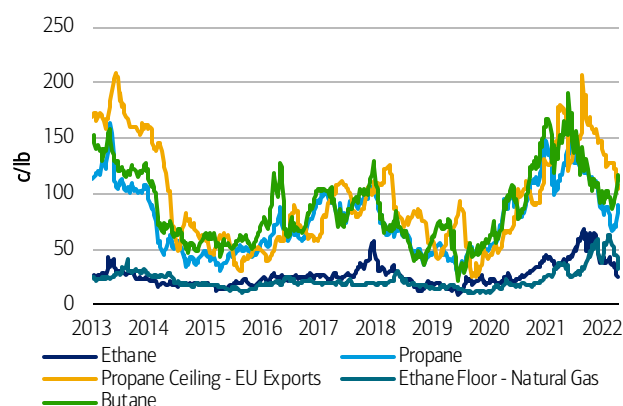


Source: American Chemistry Council, BofA Global Research

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Exhibit 10: US NGL Dynamics (c/lb)

US ethane is at the low end of the PE cost curve

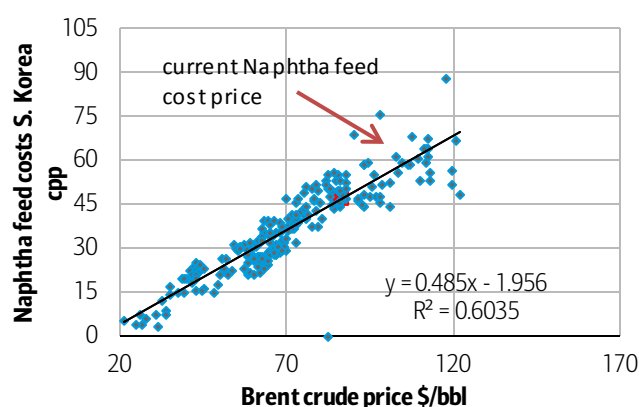


Source: OPIS, Bloomberg, BofA Global Research

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Exhibit 11: Brent Oil vs Naphtha feed cost (S. Korea) price regression

Naphtha feedstock cost closely follow changes in Brent crude

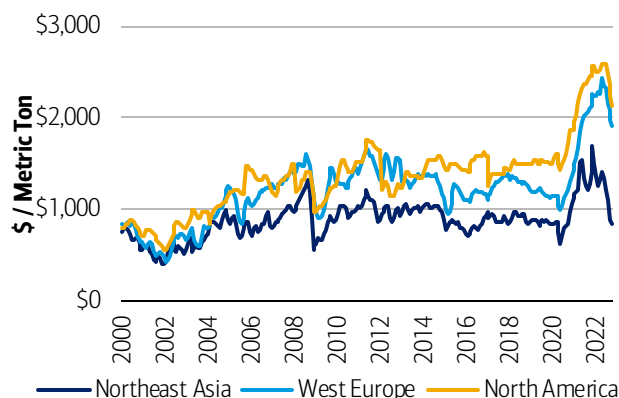


Source: OPIS, Bloomberg, BofA Global Research

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Exhibit 12: PVC prices (\$/mt)

PVC prices moving off of multi-decade highs

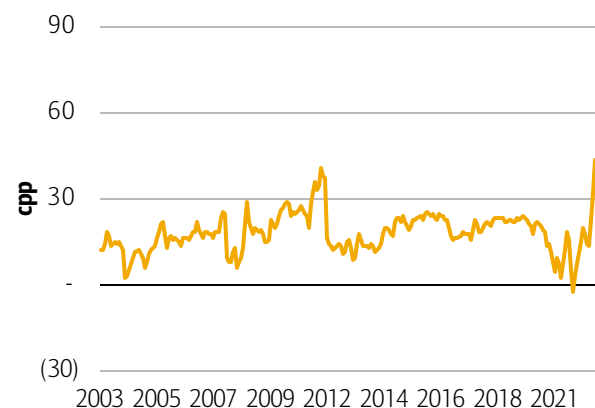


Source: OPIS, Bloomberg, BofA Global Research

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Exhibit 13: US Contract PVC Premium over Spot

Spot markets trade at a significant discount to contract



Source: OPIS, BofA Global Research Estimates

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Exhibit 14: non-integrated PVC margin (80% contract 20% spot)

PVC margins are moving off peak



Source: OPIS, Bloomberg, BofA Global Research Estimates

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Exhibit 15: US ethylene dichloride price

Prices have collapse with international PVC price



Source: Bloomberg, BofA Global Research

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Exhibit 16: US chlorine price

Chlorine prices have moved higher on initiatives by Olin

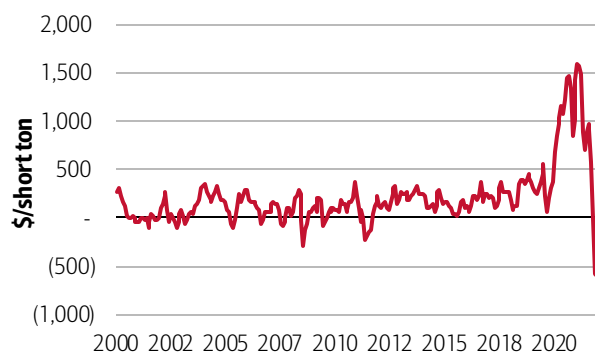


Source: OPIS

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Exhibit 17: Implied chlorine premium in spot PVC vs. merchant price

A negative value indicates an incentive to sell chlorine vs spot PVC



Source: OPIS, BofA Global Research

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Exhibit 18: ECU cash margin

ECU Margins have increased on chlorine strength

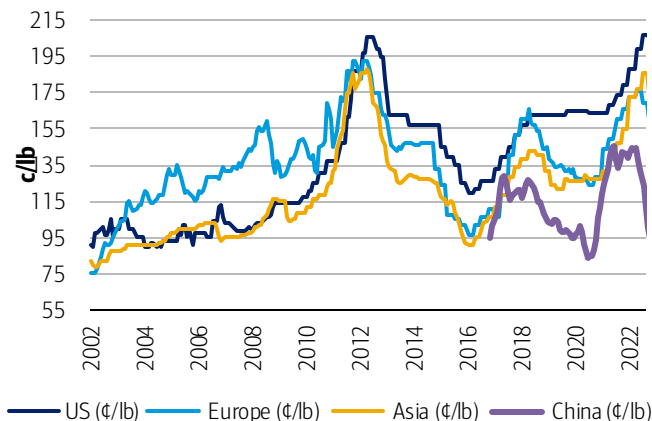


Source: OPIS, Bloomberg, BofA Global Research

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Exhibit 20: Global TiO2 price benchmarks

China prices have weakened considerably

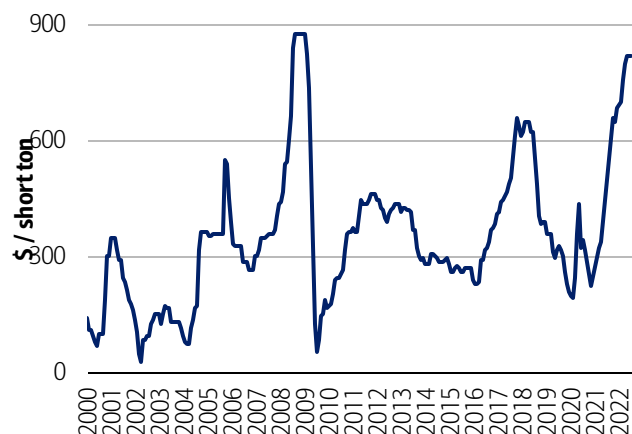


Source: ICIS

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Exhibit 19: US Caustic Soda Export Price (\$/st)

Caustic prices are around historical averages

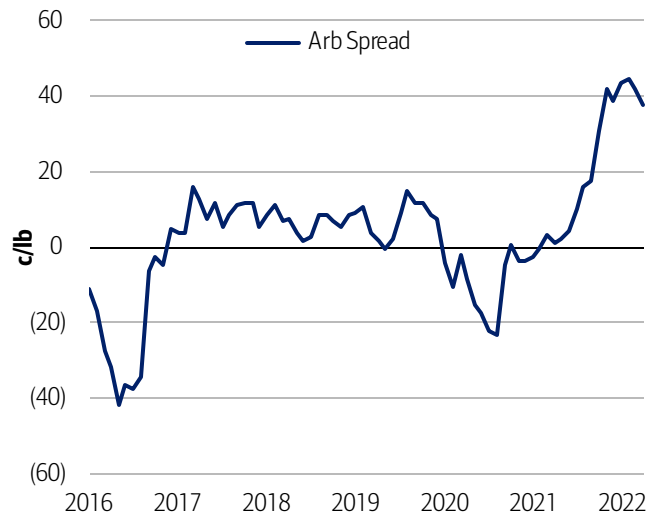


Source: Bloomberg, BofA Global Research

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Exhibit 21: Arbitrage spread between China and EU TiO2 markets

The arbitrage window supports shipping product from China to Europe

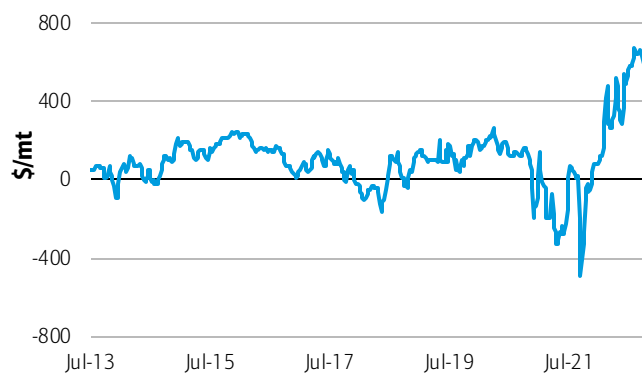


Source: ICIS, BofA Global Research

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Exhibit 22: US acetic acid spread to China

US acetic acid spread to China is at peak levels

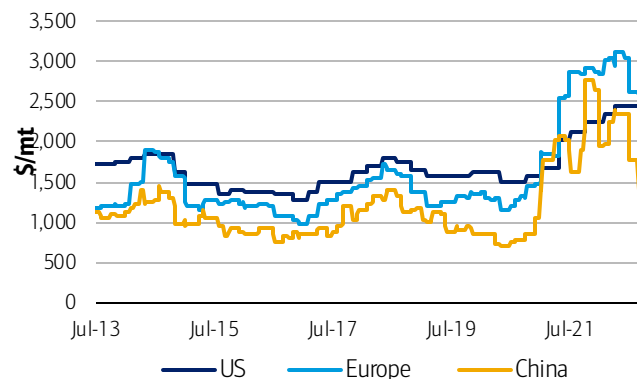


Source: Bloomberg, BofA Global Research

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Exhibit 23: Global VAM contract prices

US & European VAM prices remain bid

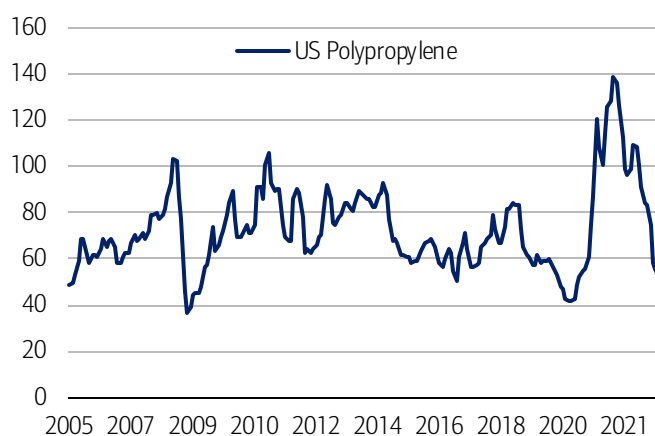


Source: Bloomberg

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Exhibit 24: US Polypropylene price

Polypropylene prices have retraced sharply

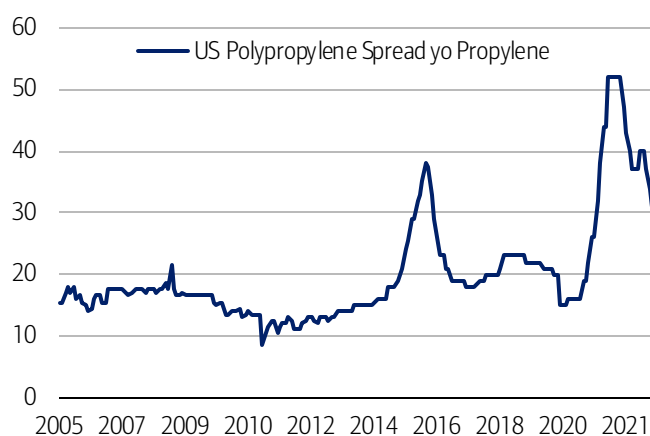


Source: OPIS

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Exhibit 25: Polypropylene spread to propylene

PP spread to monomer would seem to have more downside

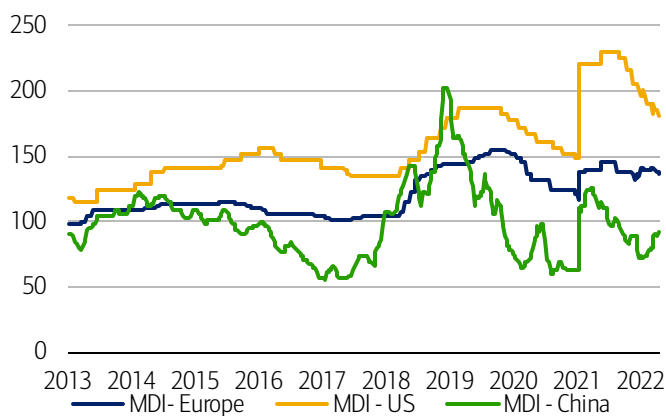


Source: OPIS and BofA Global Research

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Exhibit 26: Global polymeric MDI price deck

US remains at a healthy premium to global markets



Source: ICIS

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Exhibit 27: US Polymeric MDI spread over raw material costs

US margins are off peak, but still at healthy levels

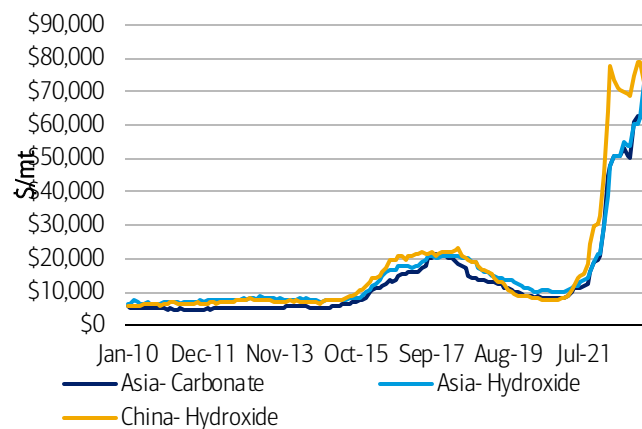


Source: ICIS, OPIS, BofA Global Research Estimates

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Exhibit 28: China and Asia (non-China) lithium prices

China prices continue to trade at a premium to other benchmarks



Source: Benchmark Miners

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Exhibit 29: Premium of lithium hydroxide over carbonate

Hydroxide has historically carried a \$2,000/mt premium over carbonate



Source: Benchmark Minerals, BofA Global Research

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Nitrogen

Exhibit 30: Nitrogen pricing overview

Nitrogen prices may be nearly an inflection point

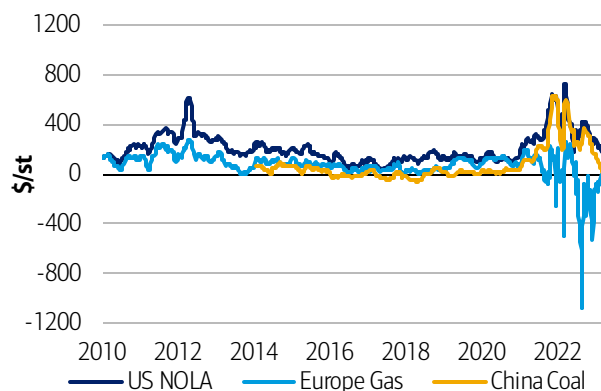
	2017	2018	2019	2020	2021	2022	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22
Nitrogen Prices														
Urea granular (US NOLA \$/st)	208	259	244	228	492	601	342	398	466	752	677	613	591	522
Urea granular (US Midwest \$/st)	244	297	302	272	535	667	379	437	499	814	752	679	633	604
Urea granular (Mediterranean \$/st)	231	265	252	238	510	687	351	376	462	843	800	703	682	562
Urea granular (SE Asia \$/st)	223	266	255	240	503	629	328	363	449	861	727	687	570	532
Ammonia (US Midwest \$/st)	359	415	403	328	759	1276	492	626	654	1251	1382	1394	1086	1240
UAN (US Midwest \$/st)	185	211	202	160	372	561	250	331	336	566	601	614	482	546
Feedstock Costs														
Natural Gas (US HH \$/mmbtu)	3.02	3.07	2.53	2.12	3.70	6.49	2.69	2.96	4.24	4.81	4.53	7.39	7.78	6.01
Natural Gas (UK ICE \$/mmbtu)	5.84	7.89	4.86	3.30	15.81	31.84	6.83	8.50	16.08	30.69	32.03	21.98	41.54	31.09
Anthracite coal (China \$/mt)	120	139	131	131	164	212	144	143	144	223	237	221	200	194
	12/8	12/15	12/22	12/29	1/5	1/12	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9
Nitrogen Prices														
Urea granular (US NOLA \$/st)	483	468	455	455	438	388	403	363	345	313	315	323	323	298
Urea granular (US Midwest \$/st)	555	555	545	545	508	480	470	470	415	405	405	405	395	380
Urea granular (Mediterranean \$/st)	522	531	499	499	472	458	426	408	399	376	354	356	372	363
Urea granular (SE Asia \$/st)	467	449	449	449	435	422	413	404	386	376	342	342	342	311
Ammonia (US Midwest \$/st)	1250	1050	968	968	968	953	953	1000	983	790	790	790	763	738
UAN (US Midwest \$/st)	530	516	496	496	476	474	399	397	381	327	327	297	297	297
Feedstock Costs														
Natural Gas (US HH \$/mmbtu)	6.25	6.60	5.08	4.48	3.71	3.42	3.17	3.11	2.41	2.51	2.28	2.45	3.01	2.43
Natural Gas (UK ICE \$/mmbtu)	41.30	42.40	35.04	24.10	22.48	20.56	19.88	20.94	17.45	17.83	16.22	14.56	15.25	13.62
Anthracite coal (China \$/mt)	194	197	197	197	199	201	206	203	203	203	200	197	201	204

Source: CRU, Bloomberg, BofA Global Research

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Exhibit 31: Global granular urea cash margins (\$/st)

European urea margins are negative

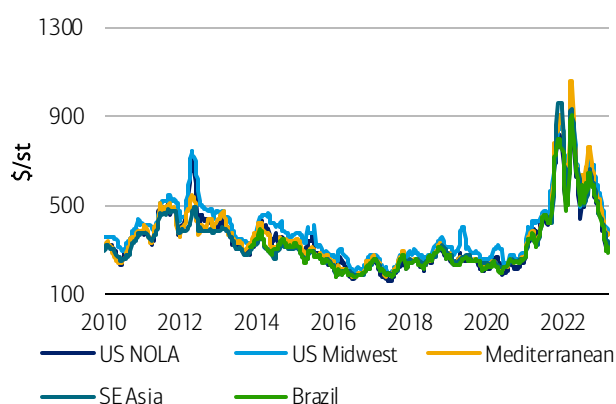


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 33: Global granular urea prices (\$/st)

Prices have come off their recent highs

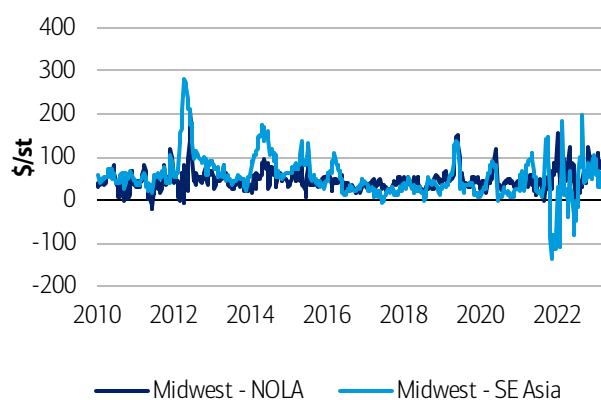


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 35: US urea price differentials (\$/st)

US Midwest urea prices are above NOLA import price

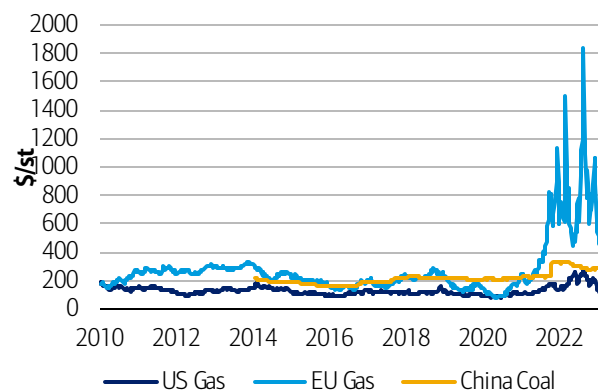


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 32: Global granular urea cash cost (\$/st)

US gas costs at bottom of cost curve

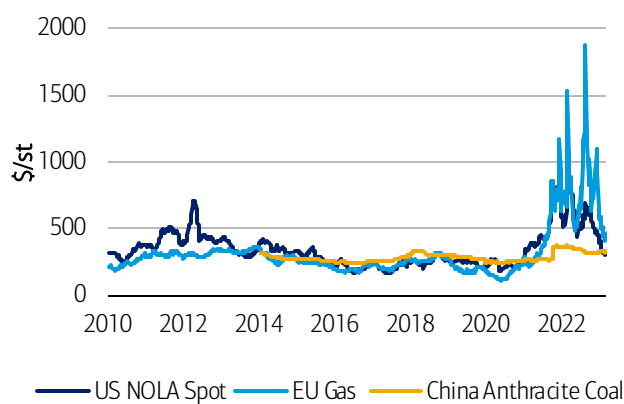


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 34: US NOLA urea vs delivered costs (\$/st)

Product costs remain elevated

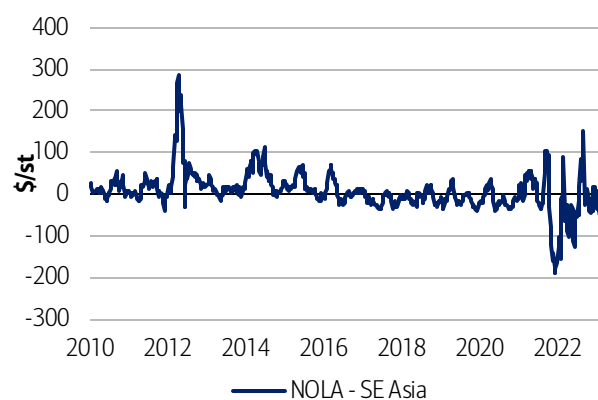


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 36: US NOLA - SE Asia urea price (\$/st)

US NOLA urea price is below Asia prices

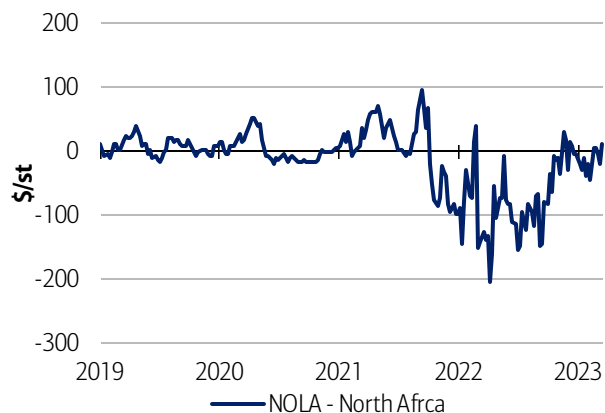


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 37: US NOLA - North Africa urea price (\$/st)

US NOLA urea price is now above North Africa prices

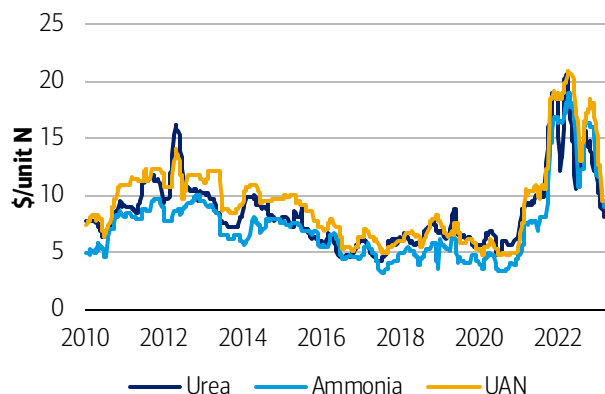


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 39: US Midwest prices (\$/unit N)

Midwest UAN prices have surpassed urea on a unit N basis

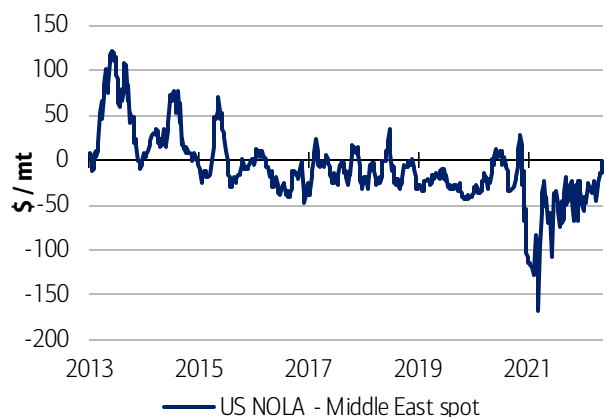


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 41: US NOLA implied vs. Middle East urea price spread

US NOLA urea price is now comparable to Middle East levels

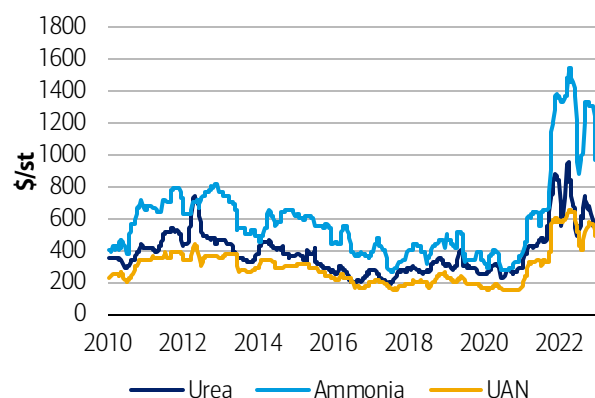


Source: CRU, BofA Global Research

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Exhibit 38: US Midwest prices (\$/st)

All nitrogen fertilizer products have increased sharply



Source: CRU, Bloomberg, BofA Global Research

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Exhibit 40: US NOLA implied vs. Middle East urea prices (\$/mt)

Middle East urea prices have risen sharply

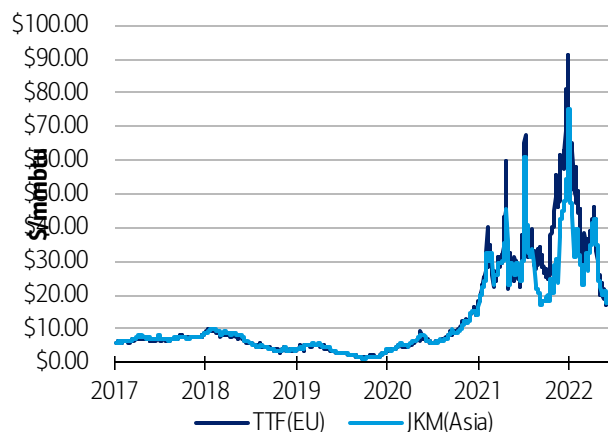


Source: CRU, BofA Global Research

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Exhibit 42: EU vs. Asia NatGas Prices (\$/mmBTU)

Asian nat gas prices are well below EU prices

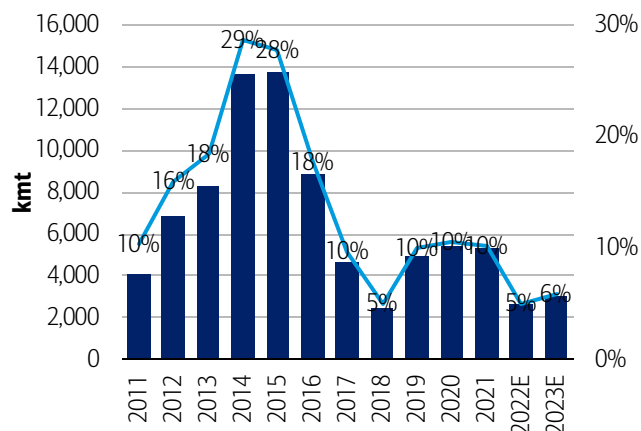


Source: Bloomberg, BofA Global Research

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Exhibit 43: Chinese urea exports & % of world total

Chinese urea exports are well below prior peak levels

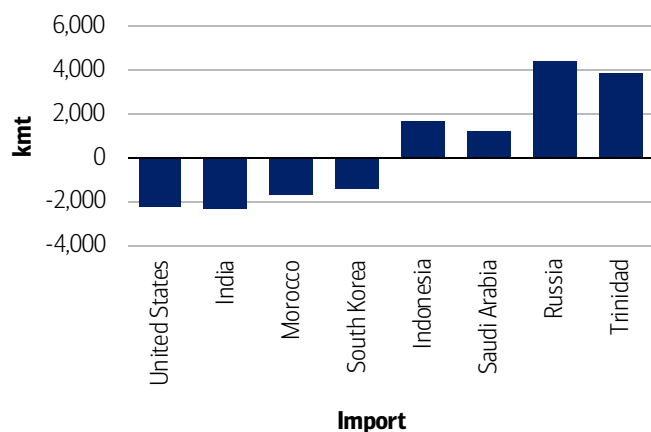


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 45: Global urea trade balance 2021

Middle East is the largest urea exporter

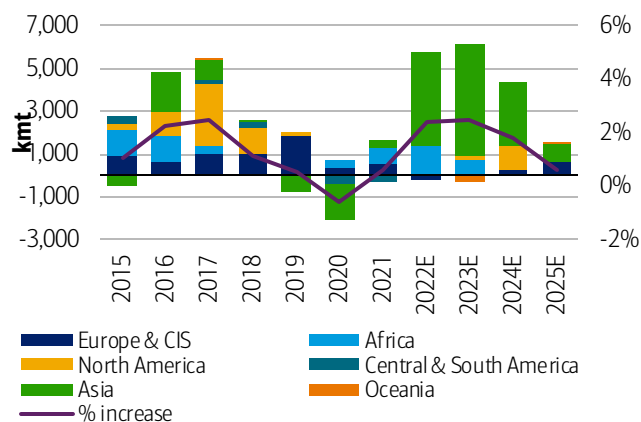


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 47: Global NH3 capacity additions by region

New global ammonia coming in 2022

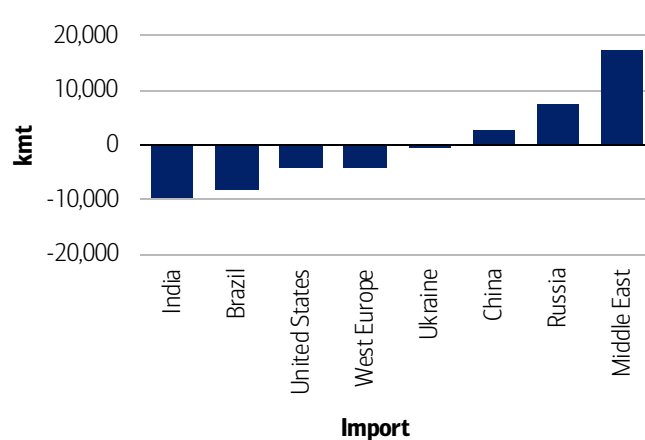


Source: CRU, BofA Global Research

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Exhibit 44: Global NH3 trade balance 2021

Russia is the largest ammonia exporter

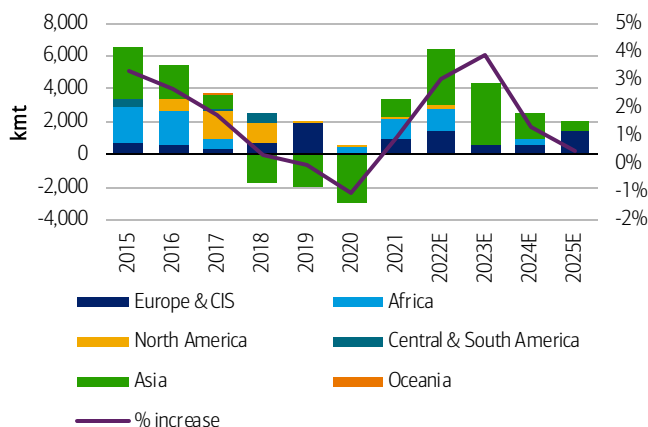


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 46: Global urea capacity additions by region

Global urea capacity additions are set to increase sharply in 2022

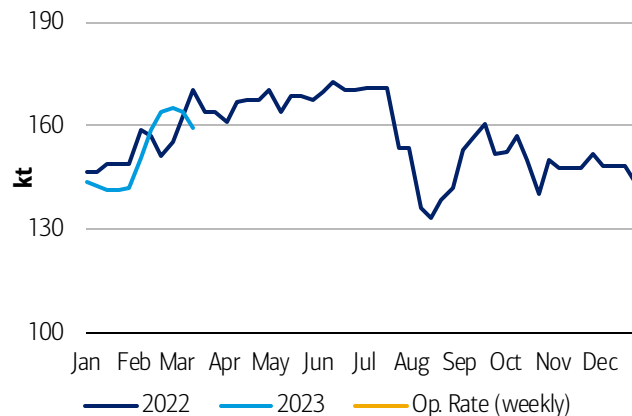


Source: BofA Global Research

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Exhibit 48: Chinese urea daily production (weekly kmt)

China's urea production has dipped below year-ago levels

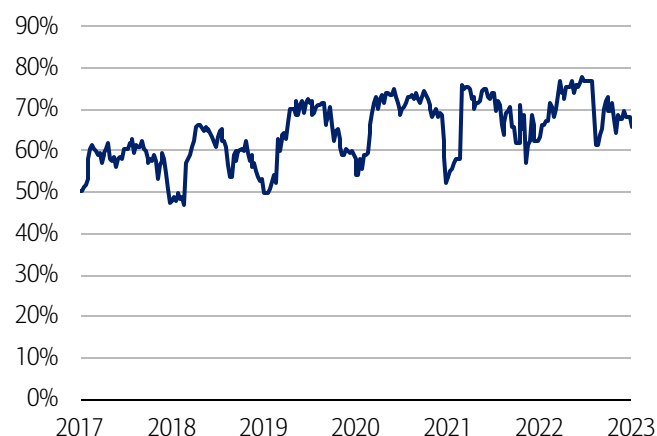


Source: CFMW, Bloomberg, BofA Global Research

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Exhibit 49: Chinese urea daily production as a % of 5-yr max Daily production (weekly kmt)

China's urea production is seasonally strong

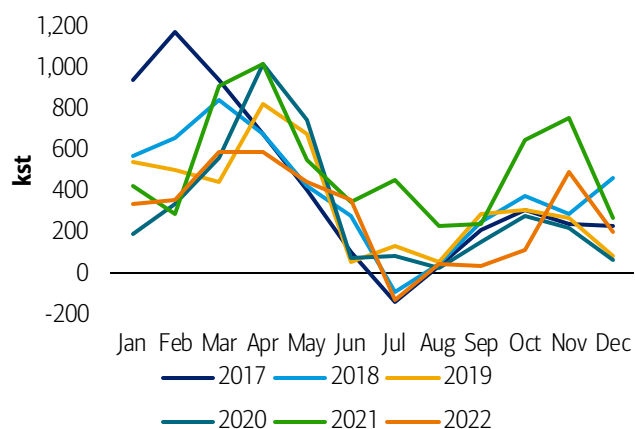


Source: CFMW, Bloomberg, BofA Global Research

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Exhibit 51: US urea net imports (kst)

Net imports running at low levels year-to-date

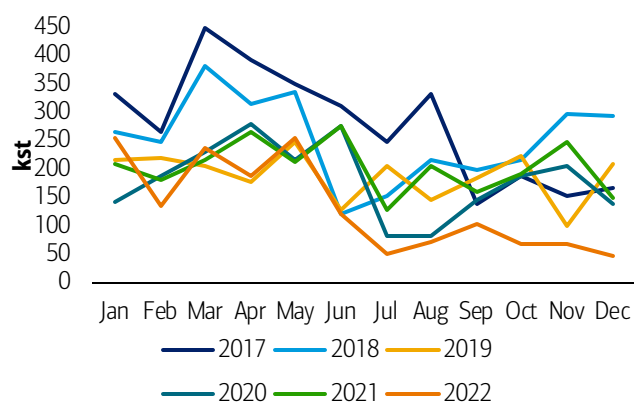


Source: TFI, Bloomberg, BofA Global Research

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Exhibit 53: US ammonia net imports

The US is a net importer of ammonia all year

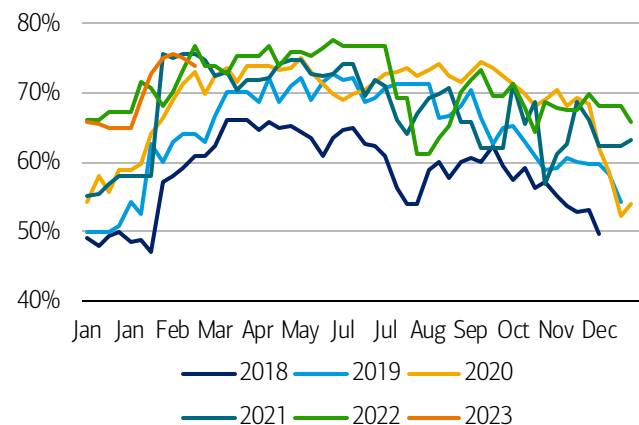


Source: TFI, Bloomberg, BofA Global Research

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Exhibit 50: Chinese urea operating rates

Operating rates have collapsed recently

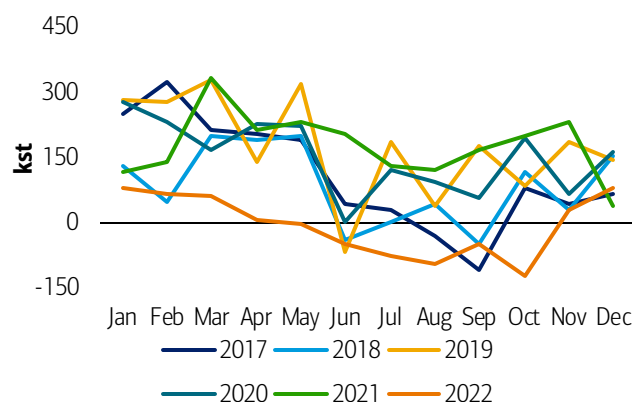


Source: CFMW, Bloomberg, BofA Global Research

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Exhibit 52: US UAN net imports

UAN net imports are down sharply



Source: TFI, Bloomberg, BofA Global Research

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Potash

Exhibit 54: Potash pricing overview

Potash fertilizer prices have continued to rise

	2017	2018	2019	2020	2021	2022	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22
Potash Prices														
Midwest Spot (\$/mt)	277	311	333	282	569	799	372	431	655	797	830	875	808	684
Brazil Spot (\$/mt)	263	321	329	239	539	850	283	383	674	788	877	1115	844	565
Southeast Asia Spot (\$/mt)	241	279	293	245	393	814	248	281	449	580	656	935	933	730
Vancouver Spot (\$/mt)	244	281	295	229	432	795	239	289	526	653	755	985	828	611
China Contract (\$/mt)	224	247	290	242	244	550	236	247	247	247	432	590	590	590
India Contract (\$/mt)	262	319	329	238	533	850	283	383	674	761	877	1115	844	565

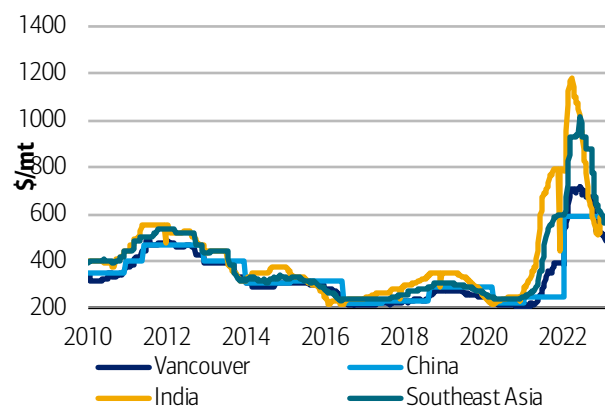
	12/8	12/15	12/22	12/29	1/5	1/12	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9	3/16
Potash Prices															
Midwest Spot (\$/mt)	661	592	592	592	592	526	518	515	515	493	493	507	477	477	477
Brazil Spot (\$/mt)	515	510	515	515	515	515	515	515	515	515	510	510	490	470	460
Southeast Asia Spot (\$/mt)	640	640	610	610	610	610	595	595	595	588	560	560	560	560	560
Vancouver Spot (\$/mt)	530	530	528	528	520	521	516	513	513	508	505	500	483	483	483
China Contract (\$/mt)	590	590	590	590	590	590	590	590	590	590	590	590	590	590	590
India Contract (\$/mt)	515	510	515	515	515	590	590	590	590	590	590	590	590	590	590

Source: CRU, Bloomberg, BofA Global Research

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Exhibit 55: Global Standard Potash Prices (\$/mt)

Standard potash prices are holding up near all-time highs

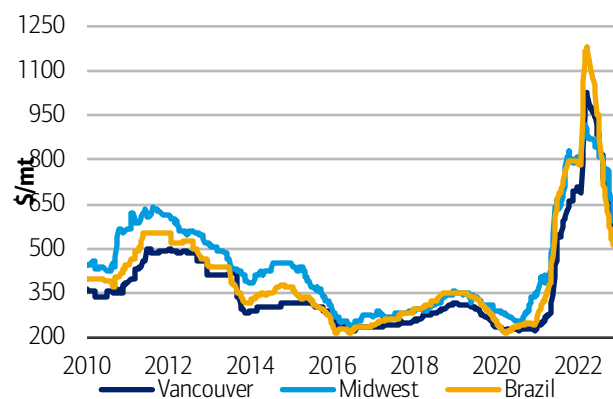


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 56: Global Granular Potash Prices (\$/mt)

Granular potash prices are off their highs

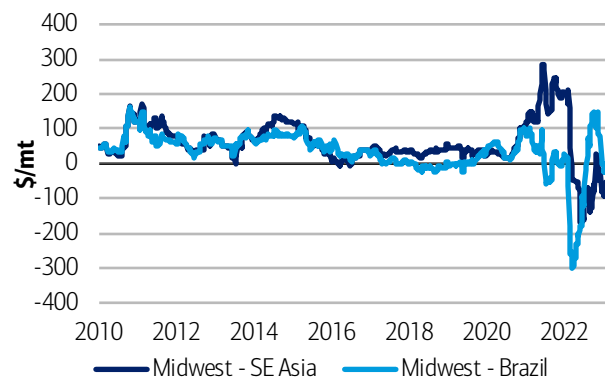


Source: CRU, Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 57: Potash Price Differentials (\$/mt)

US Midwest potash prices trade at a discount to global ones

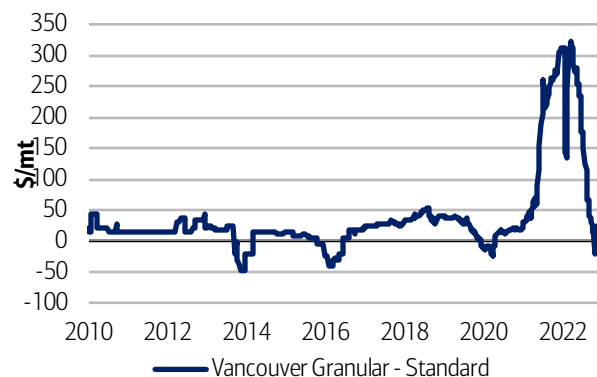


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 58: Granular Premium over Standard (\$/mt)

Granular potash is at a steep premium

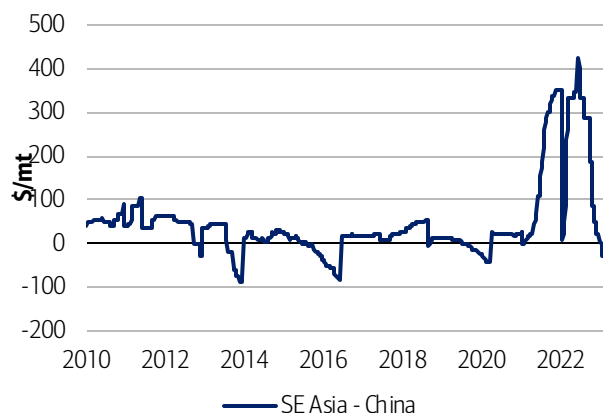


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 59: SE Asia Spot vs. China Contract (\$/mt)

SE Asia spot potash market is well above the contract price

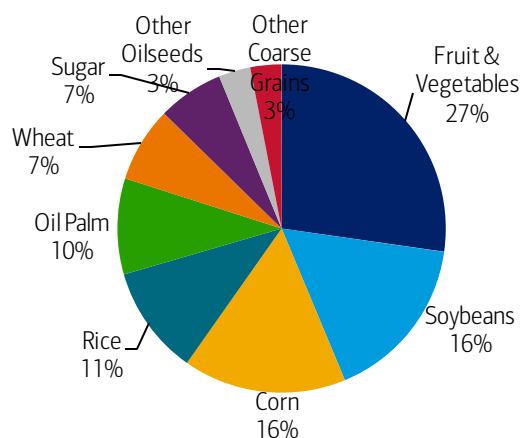


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 61: Global Potash Demand By Crop(2018)

Potash is used on all crops



Source: CRU, Bloomberg, BofA Global Research

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Exhibit 60: US NOLA vs. Brazil potash price spread

US NOLA urea price is now far below Brazil levels

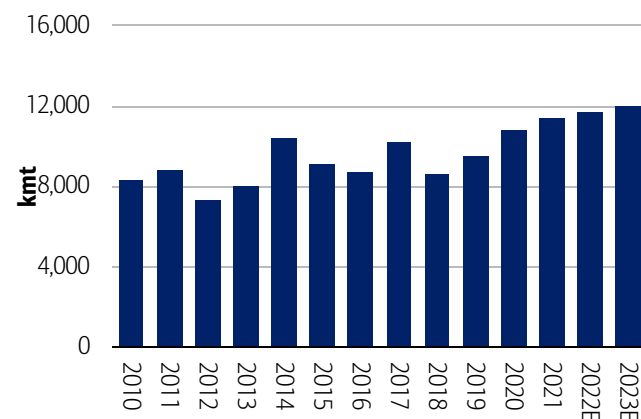


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 62: Russian Potash Exports (kmt)

Russia remains a large potash exporter

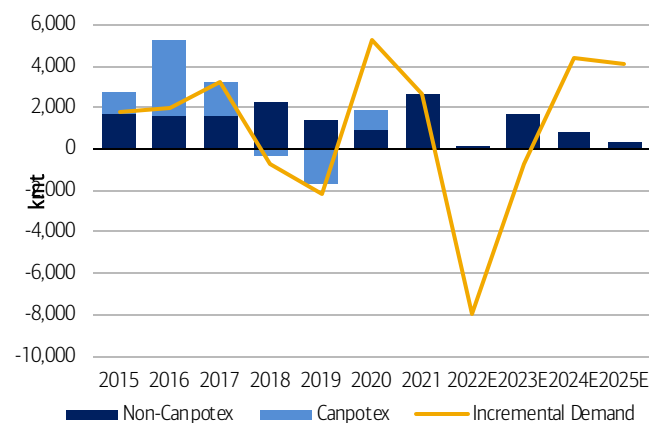


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 63: Global Capacity addition and demand growth

Most capacity additions were expected to come from Russia

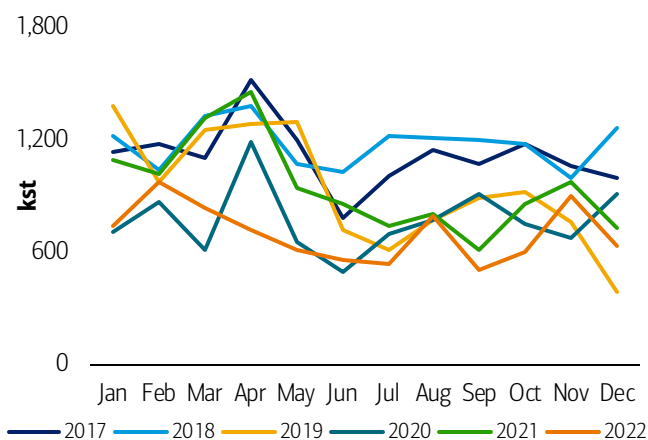


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 64: US MOP Net Imports

The US normally imports roughly 1mnt of potash per month

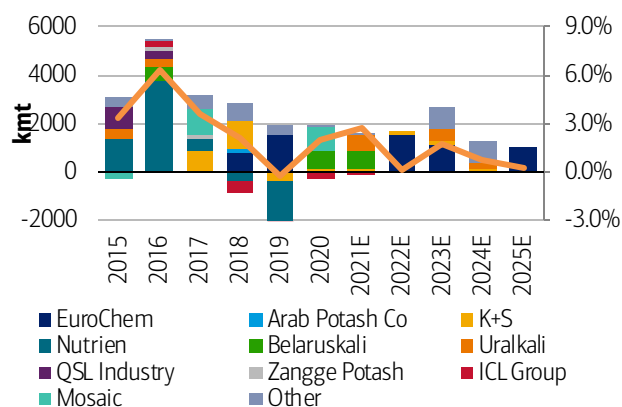


Source: TFI, Bloomberg, BofA Global Research

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Exhibit 65: Net Potash Capacity Addition by Company

Eurochem has significant Potash capacity to provide to the market

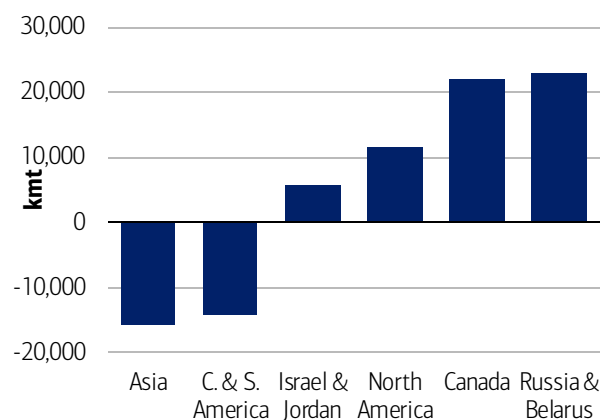


Source: CRU, BofA Global Research

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Exhibit 66: Global Potash Trade Flows

Canada & FSU are key potash supply regions



Source: CRU, BofA Global Research

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Phosphate

Exhibit 67: Historical pricing data for phosphate fertilizer

Phosphate pricing is four-fold higher than mid-2020 levels

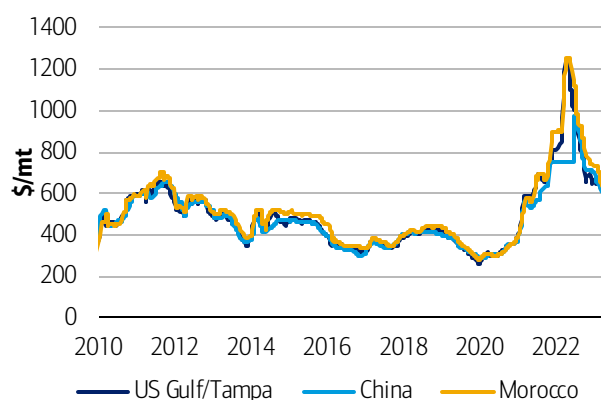
	2017	2018	2019	2020	2021	2022										
	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22								
Phosphate Prices																
DAP (US Midwest, \$/mt)	393	468	403	384	695	904	583	667	724	797	928	1000	888	800		
DAP (US Gulf/Tampa, \$/mt)	355	419	344	324	644	894	521	605	676	763	950	1115	838	674		
DAP - barge (New Orleans, \$/mt)	324	394	306	313	605	766	498	569	622	720	798	845	756	665		
DAP (China, \$/mt)	324	394	306	313	605	766	498	569	622	720	798	845	756	665		
DAP (Morocco, \$/mt)	358	412	347	323	595	779	497	543	606	727	755	805	845	709		
MAP (US Gulf/Tampa, \$/mt)	368	429	361	323	655	964	502	594	680	831	979	1203	917	759		
MAP - barge (New Orleans, \$/mt)	355	418	344	322	659	898	522	613	706	783	959	1114	845	674		
MAP (Morocco, \$/mt)	335	403	307	323	640	788	532	602	664	751	822	877	788	663		
MAP (Brazil, \$/mt)	364	427	361	326	679	964	530	628	719	823	1008	1195	934	720		
Feedstock Costs																
Phosphate Rock (N. Africa, FOB, \$/mt)	89	91	95	90	137	277	102	122	149	172	212	286	320	290		
Ammonia, (Tampa, CFR, \$/mt)	279	312	247	233	604	1160	362	545	614	876	1168	1272	1089	1110		
Sulphur, (Tampa, FOB, \$/mt)	79	122	83	53	166	313	94	185	194	183	297	481	362	110		
	12/8	12/15	12/22	12/29	1/5	1/12	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9	3/16	
Phosphate Prices																
DAP (US Midwest, \$/mt)	816	755	755	368	744	744	744	766	761	744	744	733	733	728	719	
DAP (US Gulf/Tampa, \$/mt)	660	645	670	670	660	650	650	650	650	650	650	650	650	635	635	
DAP - barge (New Orleans, \$/mt)	635	623	613	613	610	620	635	640	635	597	587	610	608	608	603	
DAP (Morocco, \$/mt)	740	740	735	735	735	730	730	730	710	700	700	665	660	650	640	
MAP (US Gulf/Tampa, \$/mt)	660	645	670	670	660	650	650	650	650	650	650	650	650	635	618	
MAP - barge (New Orleans, \$/mt)	630	618	610	610	610	605	605	598	588	568	553	563	565	560	560	
MAP (Morocco, \$/mt)	685	685	685	685	675	680	680	680	680	680	680	680	670	655	653	
MAP (Brazil, \$/mt)	619	625	635	635	650	658	658	658	658	658	658	658	653	643	638	
Feedstock Costs																
Phosphate Rock (N. Africa, FOB, \$/mt)	290	290	290	290	290	290	290	290	290	290	290	300	300	300	300	
Ammonia, (Tampa, CFR, \$/mt)	1030	1030	1030	1030	975	975	975	790	790	790	790	790	590	590	590	
Sulphur, (Tampa, FOB, \$/mt)	90	90	90	90	90	90	130	130	130	130	130	130	130	130	130	

Source: CRU, Bloomberg, BofA Global Research

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Exhibit 68: Global DAP prices

DAP prices globally are up sharply

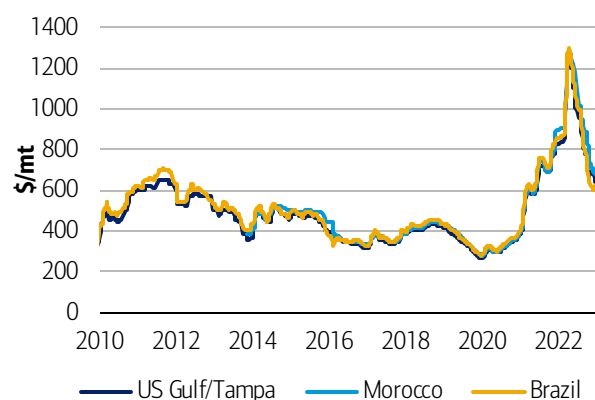


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 69: US MAP Prices (\$/mt)

Brazil has the highest MAP prices

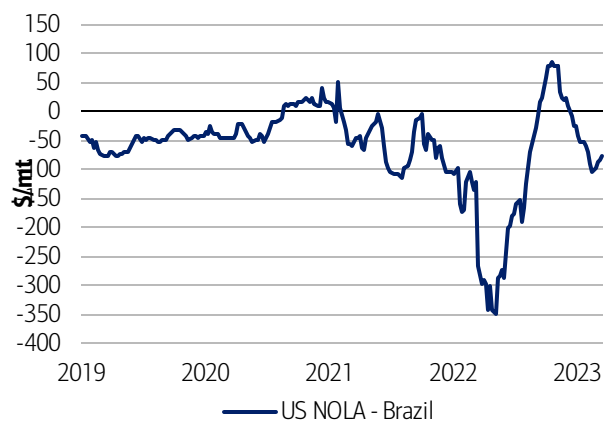


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 70: US NOLA vs Brazil phosphate price spread

US NOLA phosphate prices is below Brazil levels

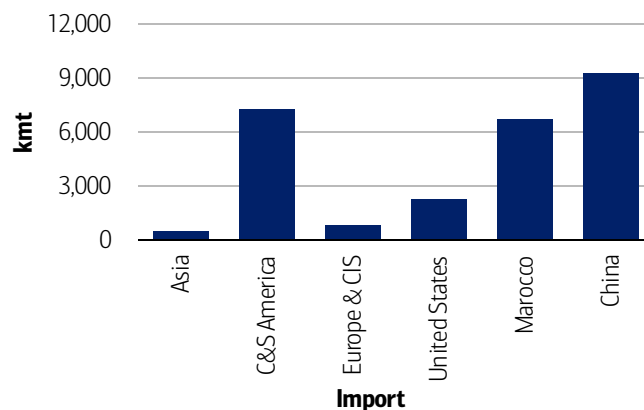


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 71: Global Phosphate Trade Flows 2021

China is the largest phosphate importer

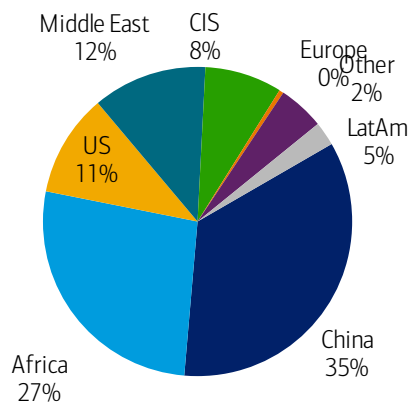


Source: CRU, Bloomberg, BofA Global Research

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Exhibit 72: Phosphate Rock Production by Region

China is the largest phosphate rock supplier



Source: CRU, Bloomberg, BofA Global Research

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Important Disclosures

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster ^{R1}
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

^{R1} Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

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