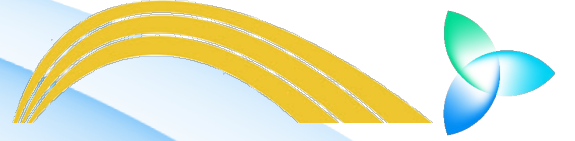


Resin Markets in Focus: Demand, inflation concerns take center stage

October 2022

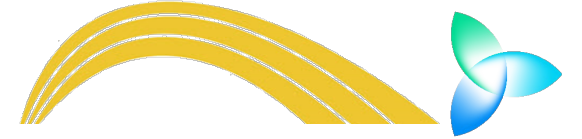
Jeremy Pafford

Head of North America, Market Development, ICIS



Setting the Scene

In the midst of the Big Squeeze



Stubbornly high energy, feedstock costs due to structural changes to global markets



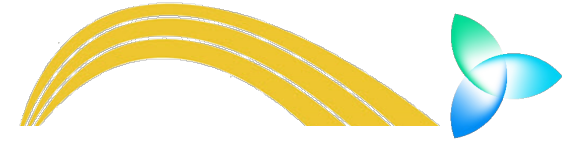
Supply chain participants stuck between high upstream costs and consumers who cannot/will not accept pass-through of high costs



Central bank policies aimed at cooling consumer demand to curb inflation

Net result: Profit margins for converters and brand owners in the middle to end of the plastics supply chain get squeezed as downstream demand decelerates faster than upstream cost pressures relent

ICIS LBB pointing towards recession

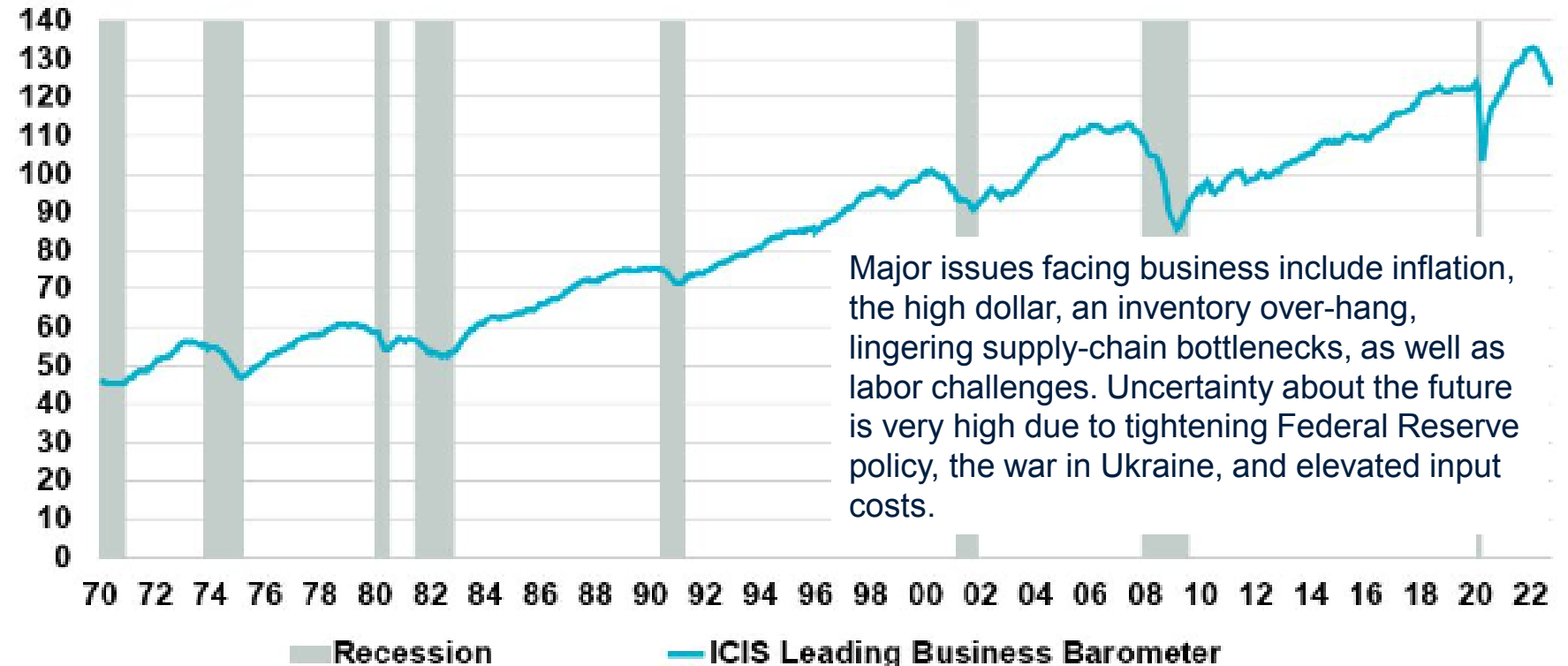


Cumulative decline in the barometer is 5.9% from its February peak, exceeding the cumulative 3% threshold that has signaled past recessions

“The latest reading is consistent with recessionary conditions, and a turn in the economic cycle is likely.”

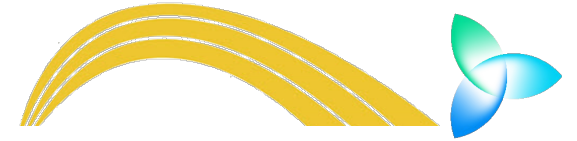
Kevin Swift,
senior economist for
global chemicals, ICIS

Index where 2012 = 100



The ICIS leading business barometer is derived from 17 indicators relating to the following: production of materials and other industries sensitive to cyclical fluctuations; raw material and input prices; selling prices; hours worked; relative equity prices; industry sales-to-inventories; other broader economic leading economic measures

Chicago PMI says Midwest manufacturing contracting



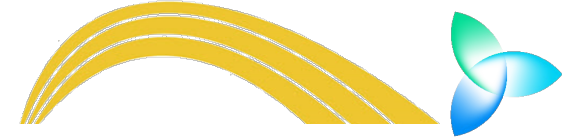
- New orders falling at a faster pace and inventories continue to gain
- Prices paid are still expanding but at slower pace
- Chicago is a geographical focus for plastics processing and the report suggests that the manufacturing sector in this region is falling

Diffusion Index



Note: An index of 50 or over indicates that the sector is expanding, while an index below 50 indicates that it is declining.

Consumer confidence teetering



- Latest survey shows consumers concerned about inflation and the overall economy but still feeling better than in the early days of the pandemic
- Interestingly, despite higher interest rates, intentions to purchase homes, autos and other big-ticket items rose in September
- Still, consumer expectations data in the index consistent with recession

Index where 1985=100

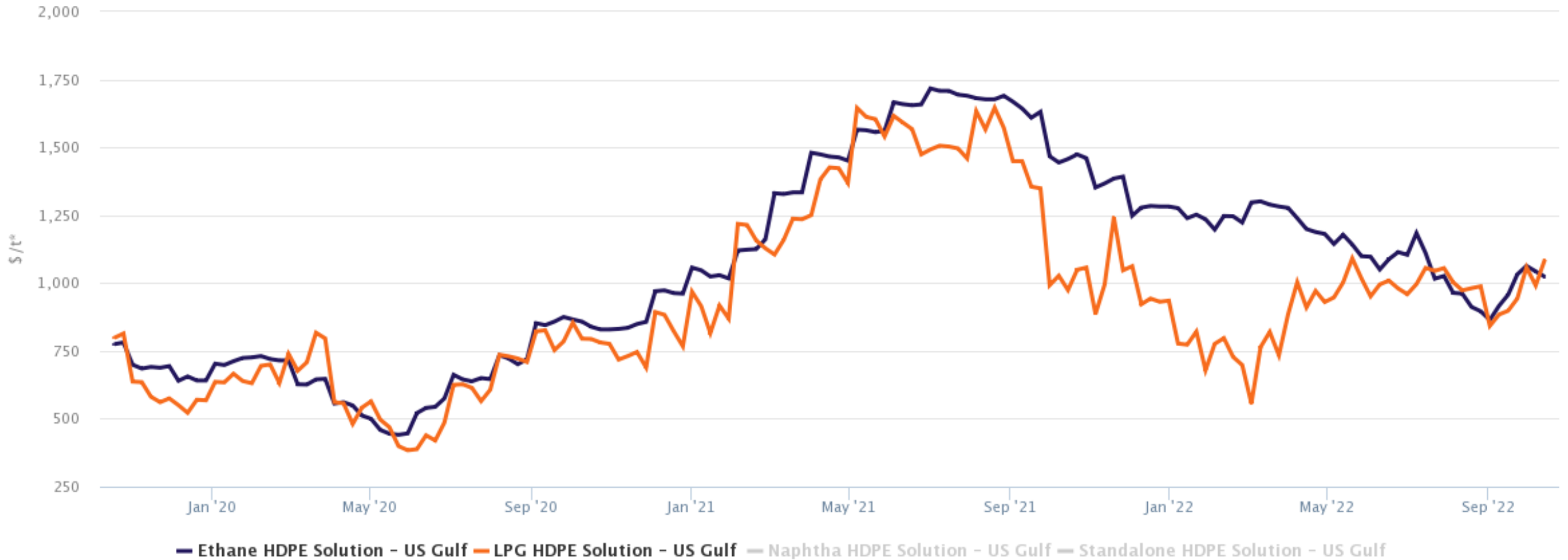
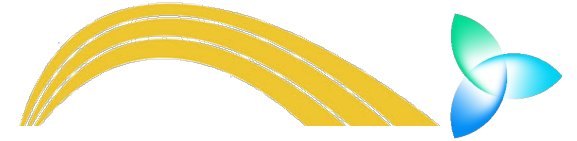


Consumers increasingly expect a recession, and are acting accordingly for the most part. This has direct effects on resin markets.

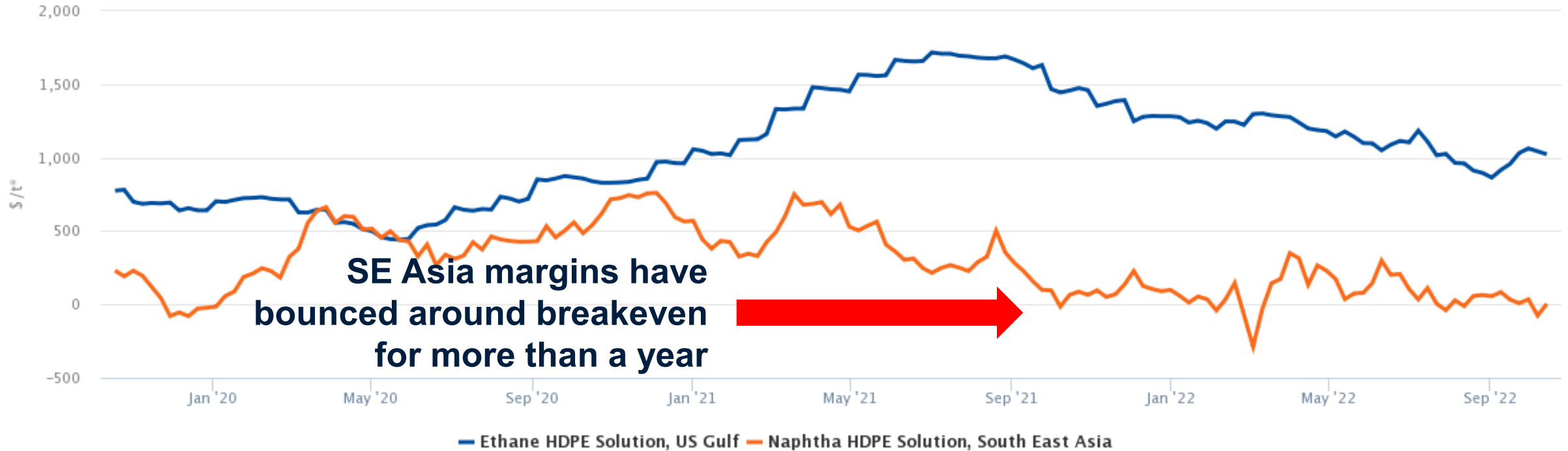
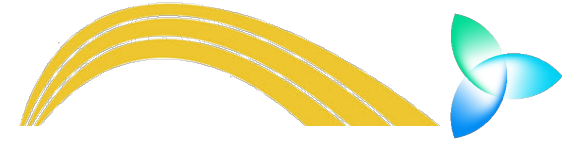


Polyethylene

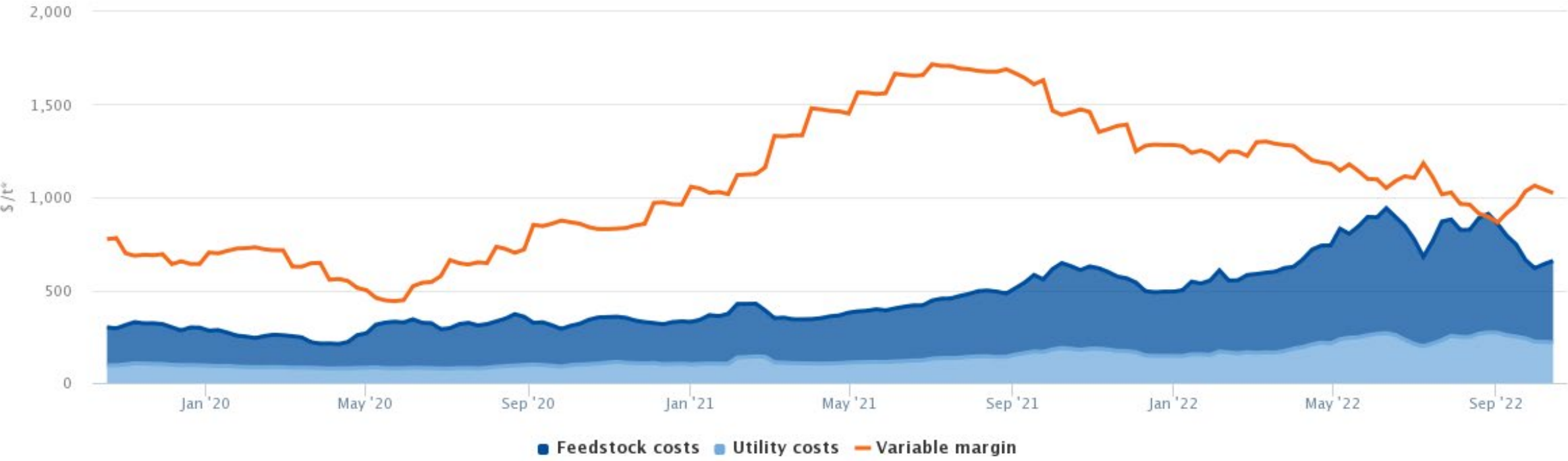
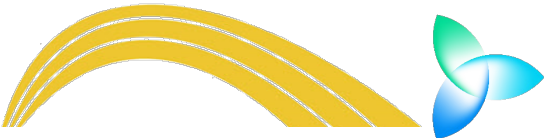
PE at Present: NAm producer margins down from last year's highs but still above pre-pandemic levels



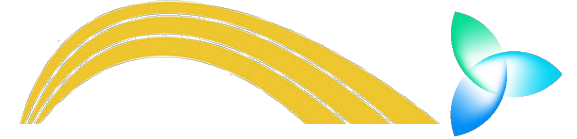
PE at Present: NAm advantage cannot be overstated



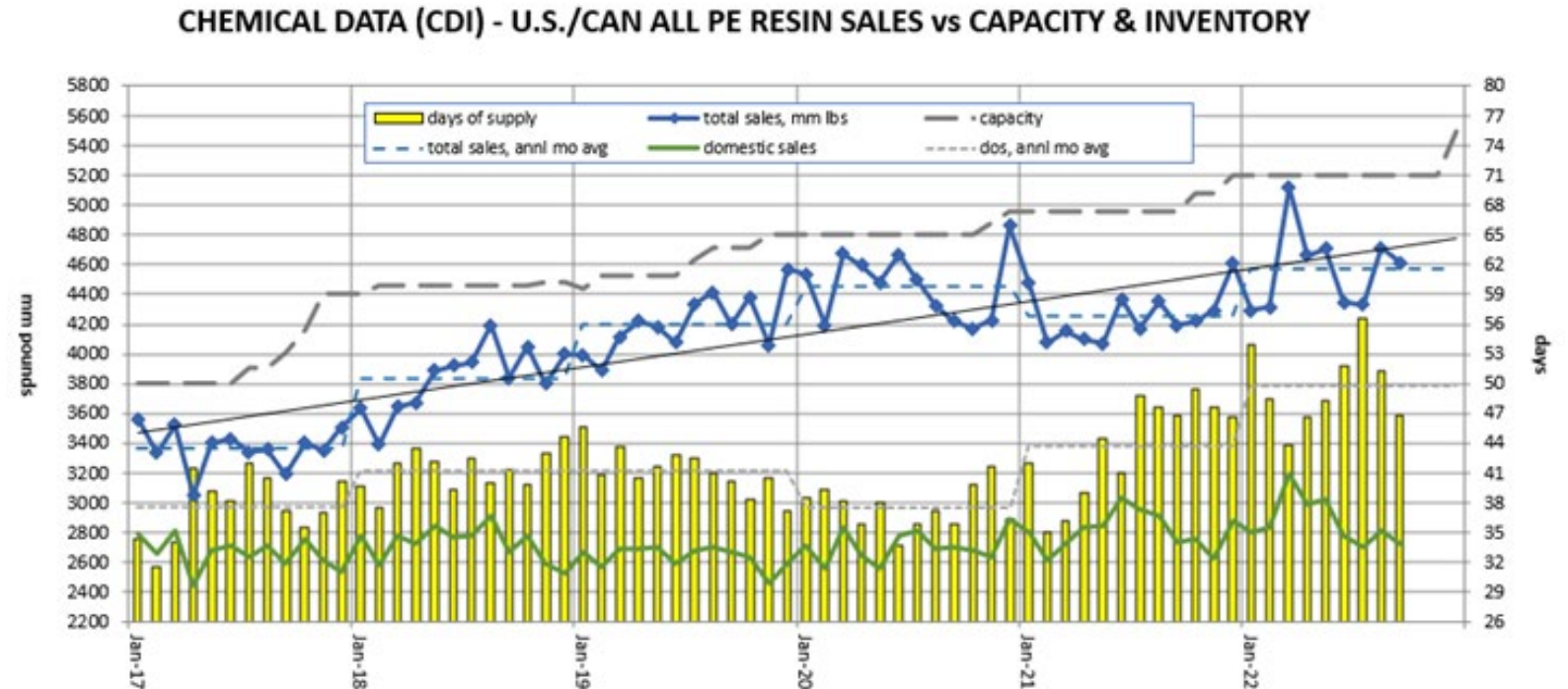
PE at Present: Input cost rises fueled by natural gas run-up's knock-on effects on ethane and electricity



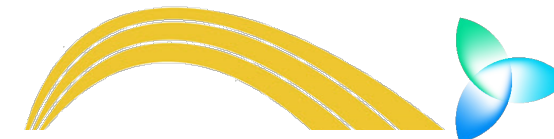
PE at Present: Days of supply normalizing



- After months of record-high inventories, cuts in operating rates have trimmed oversupply considerably
- HDPE DOS in September to 34.4 days, which was only 0.4 days above the prior 4-year average. Two months prior, HDPE DOS was 9.0 days (+27%) above normal
- Combined PE inventories fell in September to 46.9 DOS, which is 4.3 days (10%) above normal



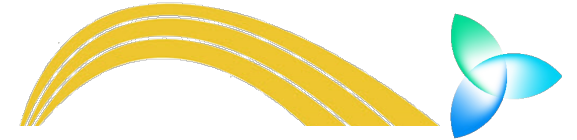
The final stretches of the second PE wave



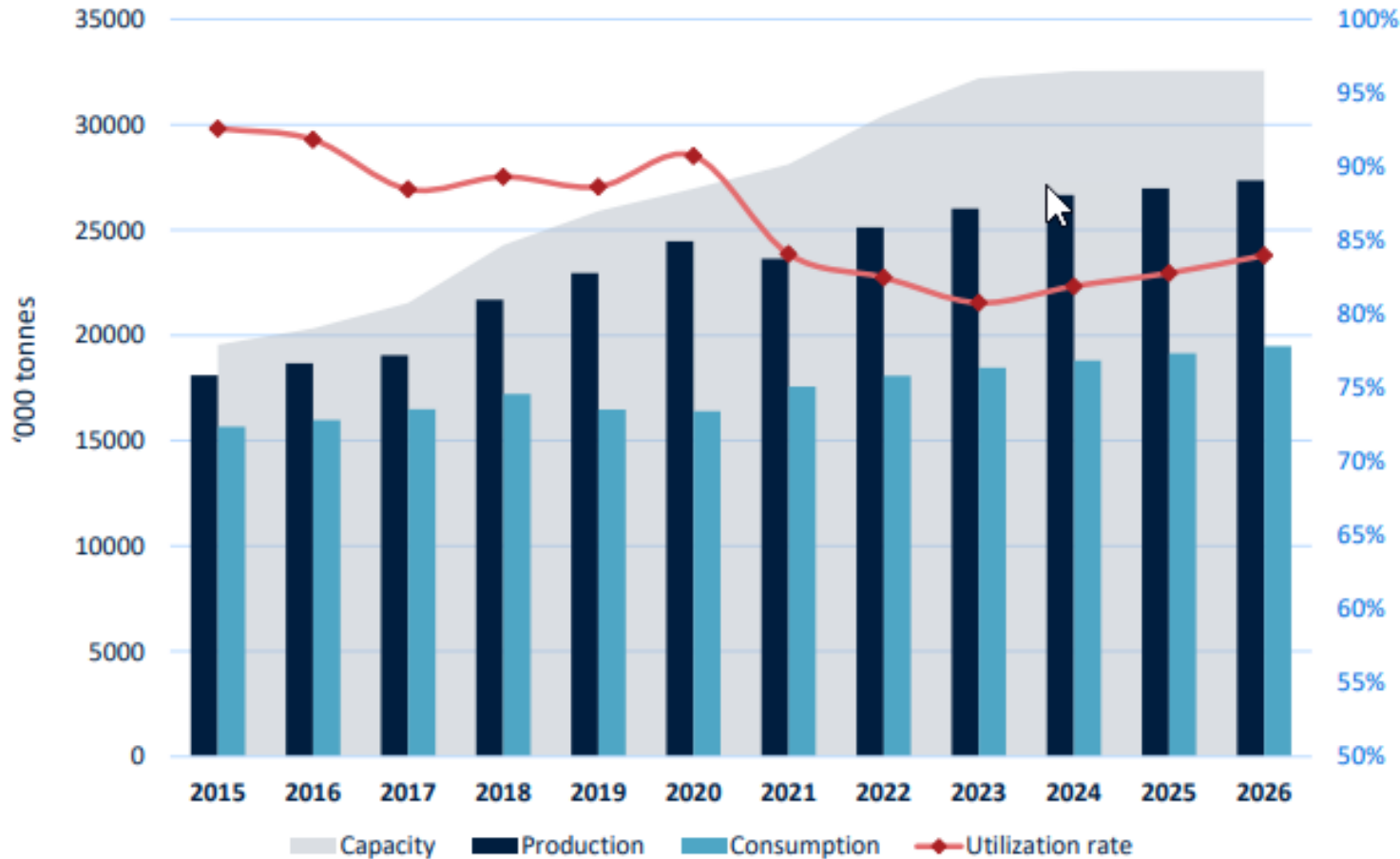
Company	PE capacity (kt/year)	PE type	Location	Start-up
Dow	400	ELITE PE	Freeport, Texas	Q3 2017
Dow	350	LDPE	Plaquemine, Louisiana	Q4 2017
Chevron Phillips	1,000	Bimodal HDPE (500), mLLDPE (500)	Old Ocean, Texas	Q3 2017
ExxonMobil	1,300	mLLDPE plus LLDPE (650 x2)	Mont Belvieu, Texas	Q4 2017
INEOS/Sasol	470	HDPE	La Porte, Texas	Q4 2017
ExxonMobil	650	mLLDPE plus LLDPE	Beaumont, Texas	Q3 2019
Sasol	890	LLDPE (470), LDPE (420)	Lake Charles, Louisiana	Q1 2019/Q4 2020
LyondellBasell	500	Hyperzone HDPE	La Porte, Texas	Q1 2020
Formosa Plastics	800	HDPE (400), LDPE (400)	Point Comfort, Texas	Q3 2019/Q4 2020
SABIC/ExxonMobil	1,300	LLDPE	Corpus Christi, Texas	Q4 2021
Total/Borealis	625	Borstar PE	Bayport, Texas	Q1 2023
Shell	1,600	HDPE/LLDPE (2x 550), HDPE (500)	Monaca, Pennsylvania	End 2022
NOVA	430	LLDPE	Sarnia, Ontario	H1 2023
FG LA LLC (Formosa) – Phase 1	800	LLDPE (400), HDPE (400)	St James Parish, Louisiana	FID pending
PTTGC	1,600	HDPE (700), HDPE/LLDPE (450), LLDPE/mLLDPE (450)	Belmont County, Ohio	FID pending
CP Chem/Qatar Petroleum	2,000	HDPE (2x1,000)	US Gulf Coast	FID postponed
Motiva (Saudi Aramco)	N/A	Unspecified	Port Arthur, Texas	FID pending

Through 2020 = 6.5m tonnes/year
 Through 2024 = 14.6m tonnes/year

PE Macro View: Utilization rates to fall, exports key

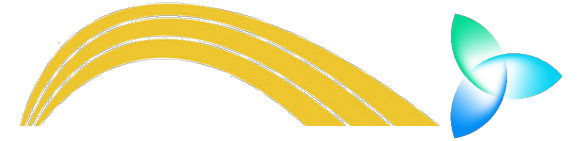


PE supply and demand outlook (2015-2026)

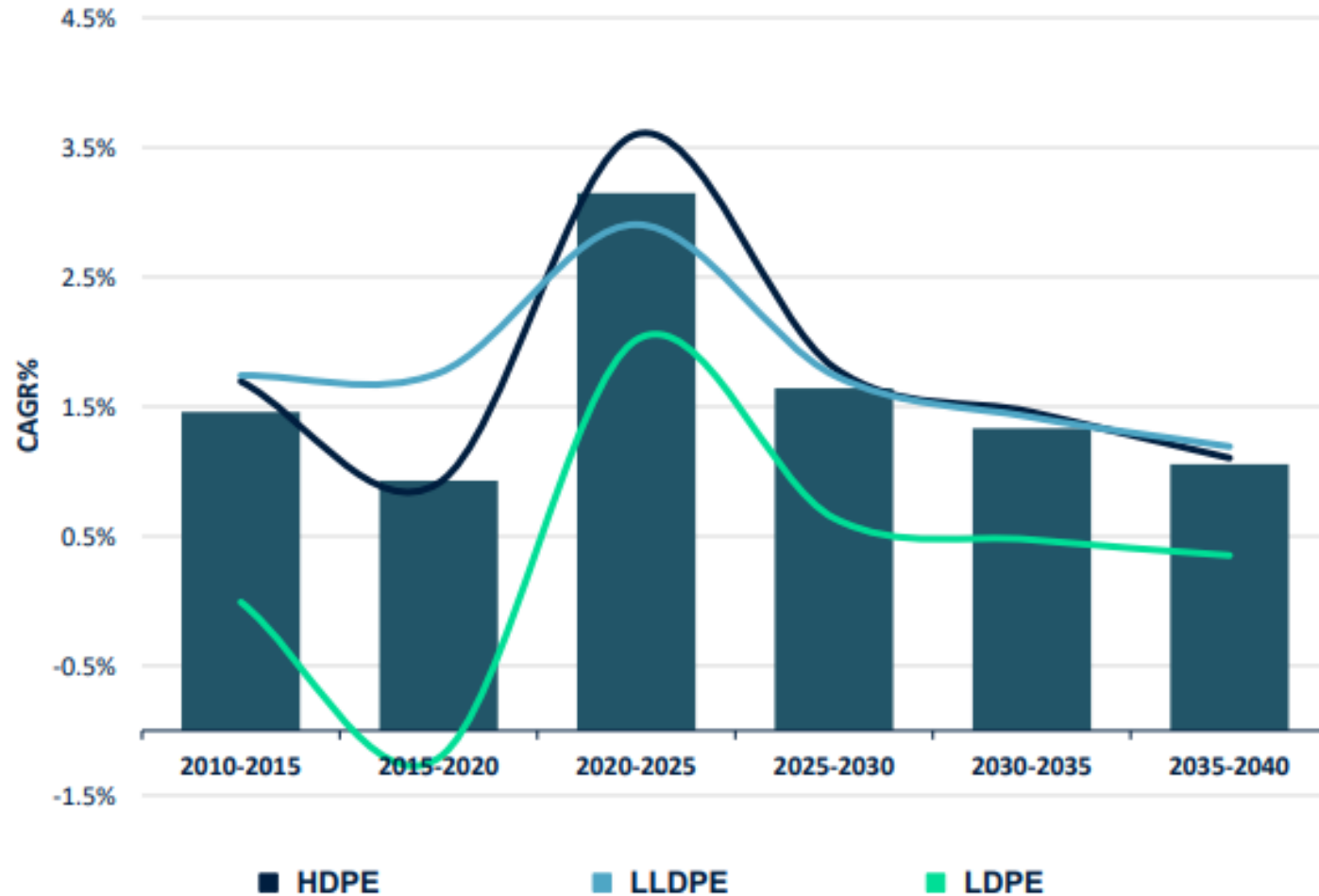


- PE capacity in the region increased from around 2M tonnes to 3M tonnes in 2021 with increasing output and exports
- UR% increased also in 2020 as the region could increase its exports allocation
- PE output and UR% in the region were impacted by two factors in 2021: the Big freeze in Texas at the beginning of the year and issues with logistics from Q2 2021
- As PE capacity in the region is forecast to continue to grow in the forecast period, UR% is expected to decrease again in 2022 and 2023

PE Macro View: NAm market maturity slows growth

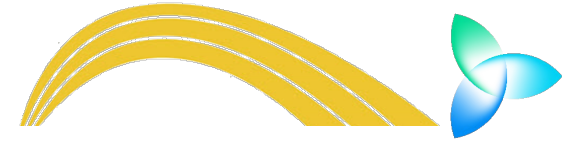


PE demand CAGR% by polymer

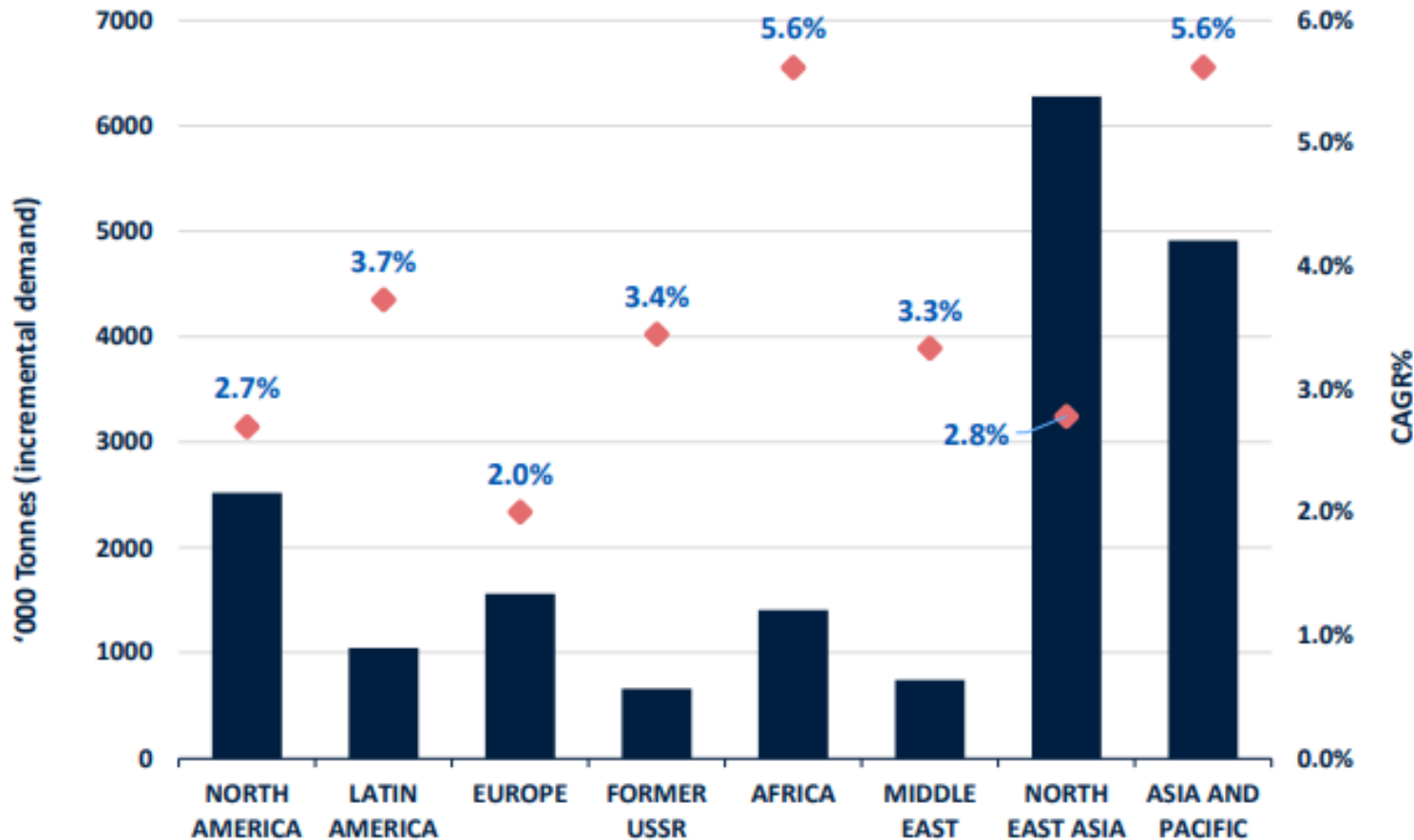


- Strong investments in PE capacity incentivized also developments in PE transformation downstream, bringing to strong demand growths in North America in recent years
- LLDPE and HDPE demand growths are still particularly high for a region that includes very mature markets like the US and Canada
- LDPE consumption is low in the region and growth rates for this polymer are well below the PE average in the same period
- Overall, PE demand should follow a downtrend in the forecast period with declining CAGR% values from 2030 onwards

PE Macro View: Asia, Africa to lead future growth

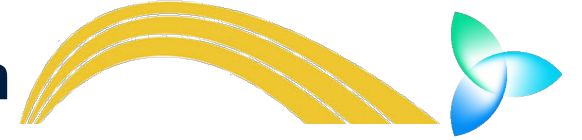


Regional HDPE demand CAGR% 2020-2030



- Even with a lower CAGR% value, compared with many other regions, NEA is forecast to show the biggest regional demand increase: more than 6 million tonnes between 2020-2030
- SEA shows the highest CAGR% in the same period, as per capita consumption in the region is still low: 2.8 Kg per person in 2021, projected to become 4.2 by 2030
- The second highest CAGR% for HDPE demand in the same period is forecast for Africa, but the region represented only 4% of the global consumption in 2021.

PE's Near Term: Supply to lengthen, upstream a concern



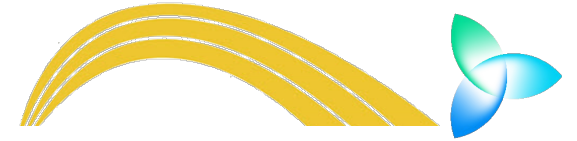
- Factors coloring the rest of this year and into 2023:
 - Weakening consumer demand
 - Reduced operating rates
 - Upstream volatility in the natural gas/ethane markets
- Current ICIS analyst view is for flat PE pricing in Q4 followed by 5-7% increase in Q1 2023 on higher gas/ethane costs, then a drop in Q2 as gas prices fall as the weather warms
- However, there's a real possibility such pricing conditions don't materialize
 - Warm winter in Europe as well as curtailments on industrial energy use could prevent expected winter supply crunch, leading to lower upstream costs for PE
 - PE startups in NAM produce at relatively high rates in attempt to gain market share, leading to bearish pricing environment
- Only near-certainty: Supply tightness in NAM highly unlikely (just don't freeze over again, Texas)



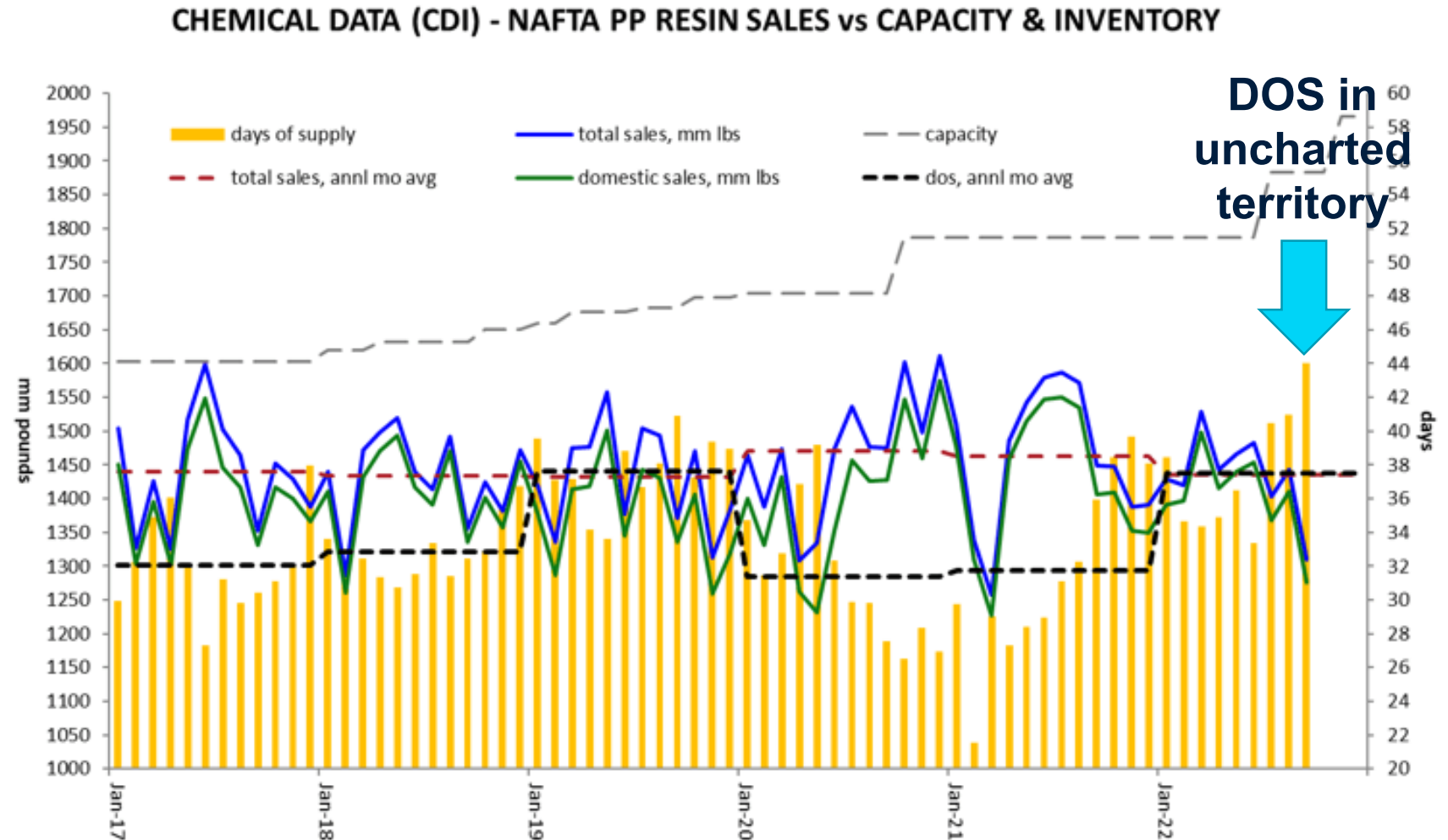


Polypropylene

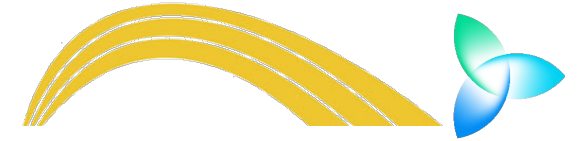
PP at Present: From undersupply to oversupply



- PP plant outages and logistics constraints dominated early 2022 headlines
- Now poor demand does, leading to PP inventory builds even as operating rates fall
- PP domestic demand is 2.9% lower YTD versus 2021 through September.
- Factoring in the fact imports are down 20-25% so far this year, then real PP domestic demand is off by 5% YTD.

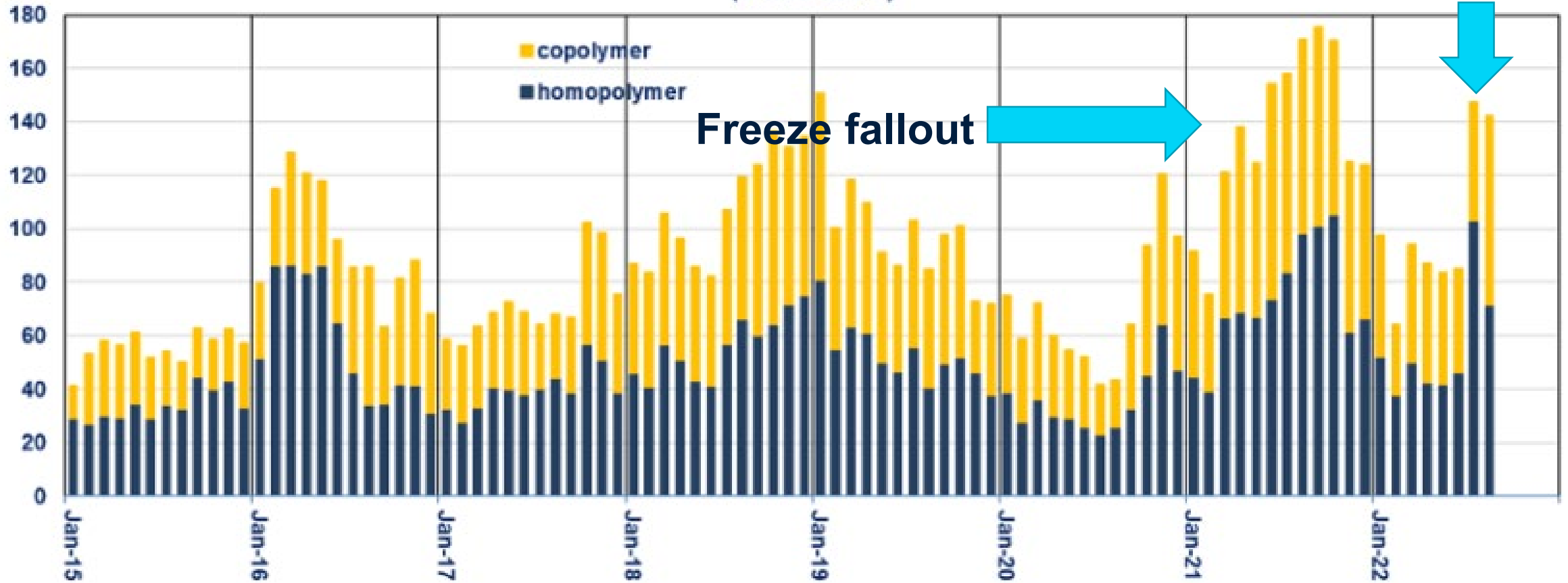


PP at Present: From undersupply to oversupply

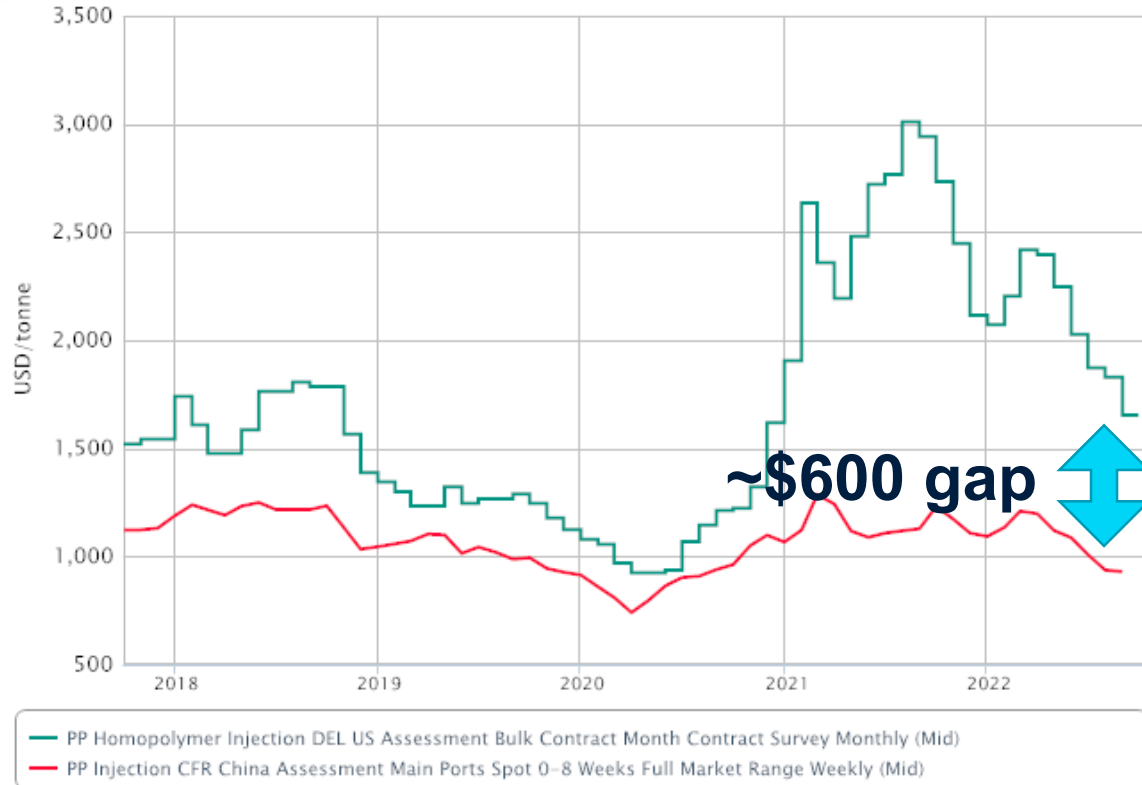
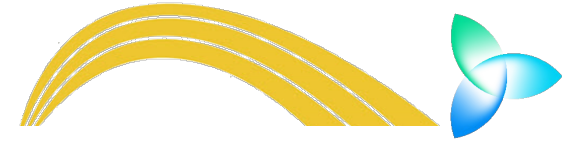


CHEMICAL DATA (CDI) - US PP HOMOP + COPOLY RESIN IMPORTS (MMLBS/MO)

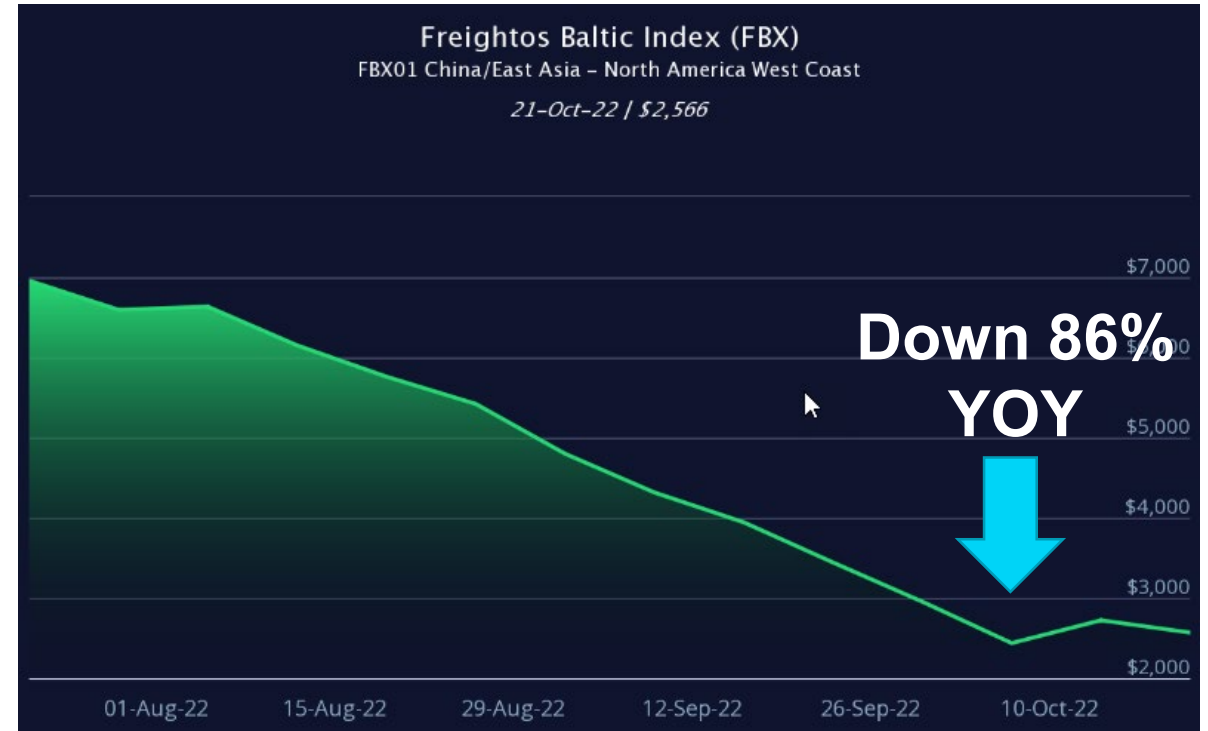
So what's this about?



PP at Present: A tale of two graphs

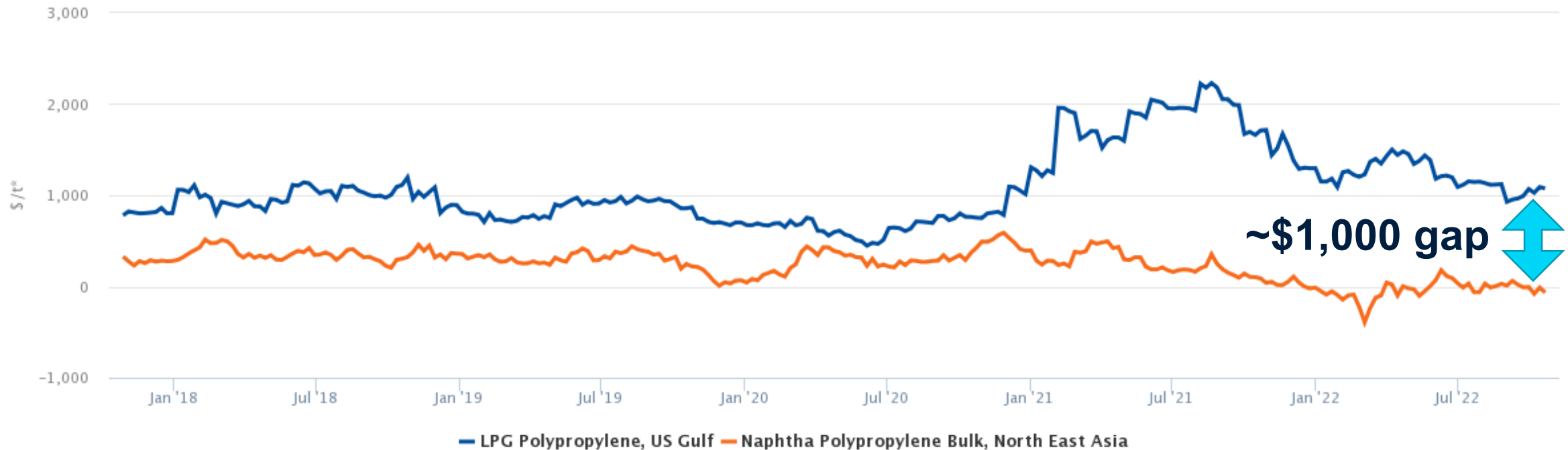
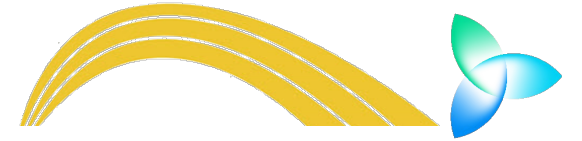


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Yawning arbitrage gap between Asia and US PP pricing now met with container shipping rates that have come off their record highs. That has led to increased imports from countries such as South Korea even at a time of tepid PP demand in North America.

PP at Present: Arbitrage amplified



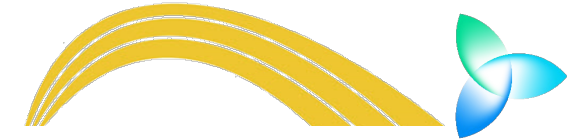
With PP production margins in Asia at or below zero, the NAM PP market looks especially juicy with container rates now allowing for consistent trade.

North American PP capacity additions

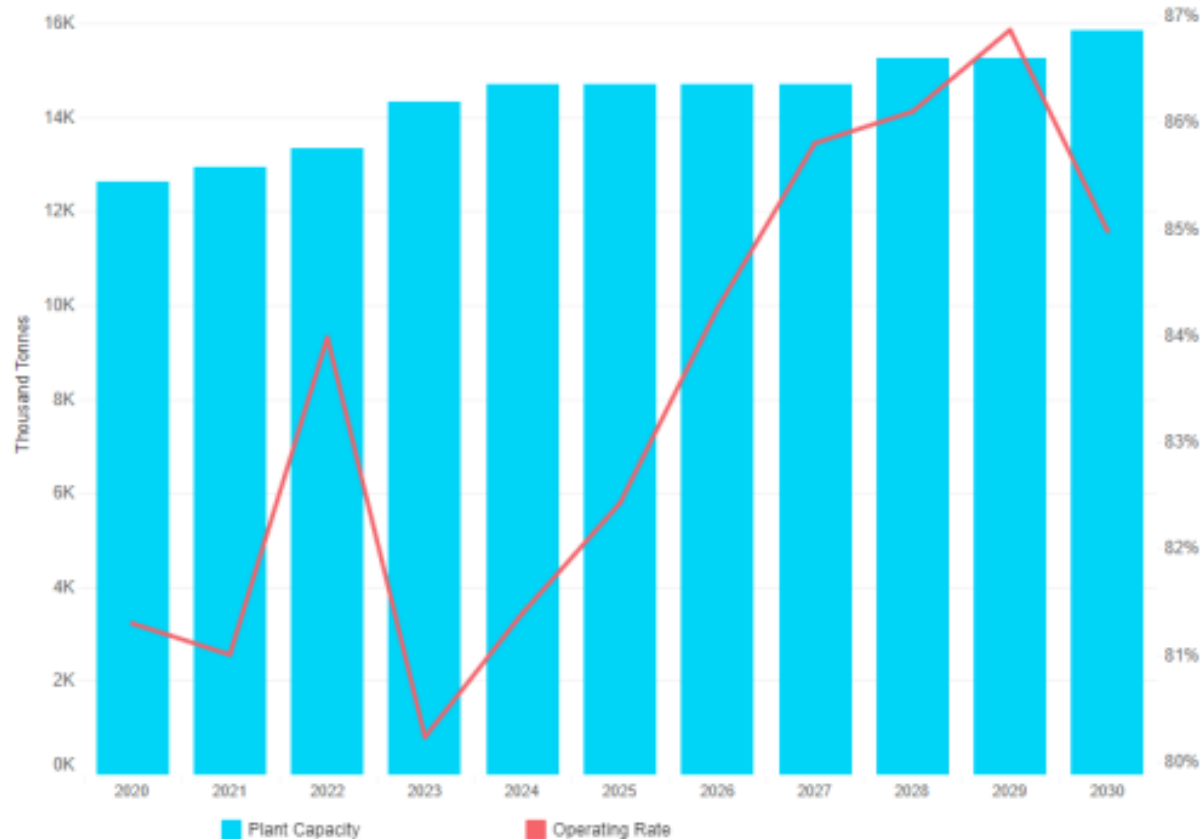


Company	Location	Capacity (KTA)	Start-up	FID Made
Braskem	La Porte, Texas	450	2020	Y
Heartland Polymers	Alberta, Canada	525	2022	Y
ExxonMobil	Baton Rouge, Louisiana	450	2022	Y
Formosa Plastics	Point Comfort, Texas	250	2023	Y
FG LA LLC (Sunshine Project)	St. James, Louisiana	600	2026	N

PP Macro View: Operating rates to improve gradually

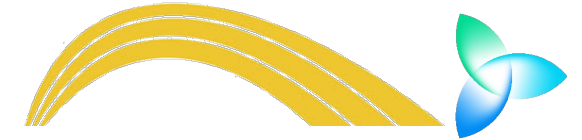


Installed capacity and operating rates

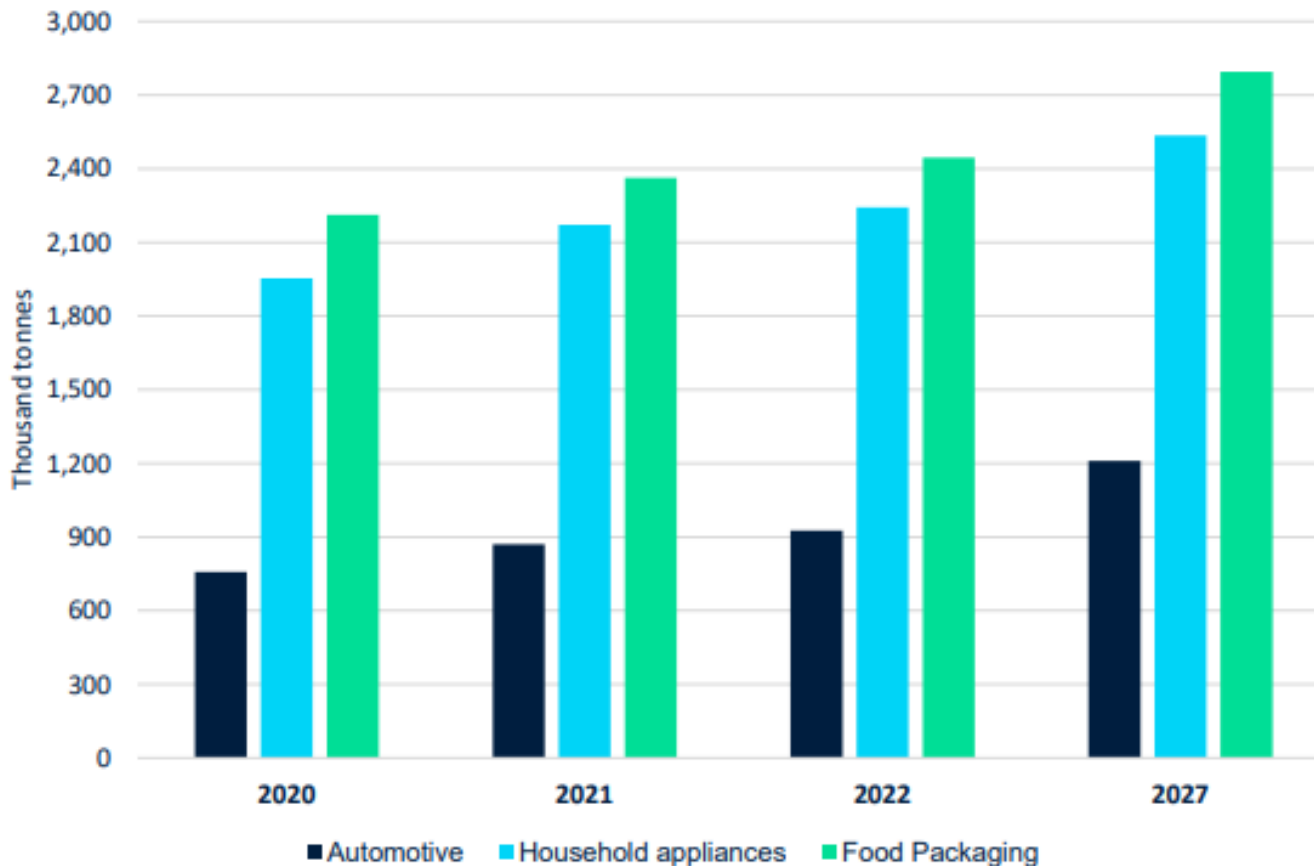


- The Americas installed PP capacity reached 12.9 million tonnes/year in 2021, including pro-rata for the plants starting (or ceasing) operations during the year to reflect the effective available capacity. The average operating rate was particularly low that year because of the several unplanned outages in the US due to the winter storm in Texas in Q1 2021.
- The 2022 milestone is the start-up of the 525 KTPY Inter Pipeline project in Canada (Redwater). Additionally, a 50 KTPY expansion at Essentia's Cartagena site occurred in Q2 2022.
- In 2023, several projects are expected to come onstream in the US, adding more than 1 million tonnes of installed capacity. For this reason, the regional operating rate will barely surpass 80% that year.
- No more projects have been announced for Latin America in the future, and ICIS foresees some additional capacity to be deployed in Canada and the US by the end of the present decade.

PP Macro View: Automotive to lead CAGR

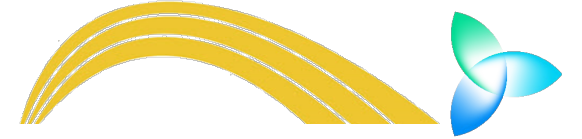


Consumption trend for selected PP applications



- A demand recovery in Household Appliances and Automotive took place in 2021. Year-on-year growth of both categories was 11.2% and 14.8%, respectively. Governments' liquidity stimulus boosted consumption of durable and tangible goods in the region.
- A 2022-2027 CAGR of 5.5% is expected for the automotive industry, since the region may materialise the effect of the ICE to EV transition, increasing the car replacement rates as well as the specific PP use per vehicle.
- A CAGR of 2.7% over 2022-2027 is expected for the food packaging industry (rigid and flexible). This value is slightly lower than the overall demand CAGR of 2.8%, banking on a plastic content reduction in food packaging and the growing trend towards mono materials packaging, pursuing recyclability goals.

PP Outlook: Price drivers amid weak demand



- Factors to determine PP pricing pathway:
 - Does weak consumer demand rebound?
 - How will the market deal with record-high inventories?
 - How long can historically volatile propylene pricing stay bearish?
- ICIS present view is that PP pricing will meander around current levels throughout 2023
- Absent an uptick in demand from autos or other major PP consumers, propylene and imports seem to be 2023's price drivers





Thank you

For more information on markets, contact me at jeremy.pafford@icis.com