

# Margins redefined: Looking beyond the steam cracker

Bernardo Fallas  
Associate Editorial Director – Americas  
S&P Global Platts



---

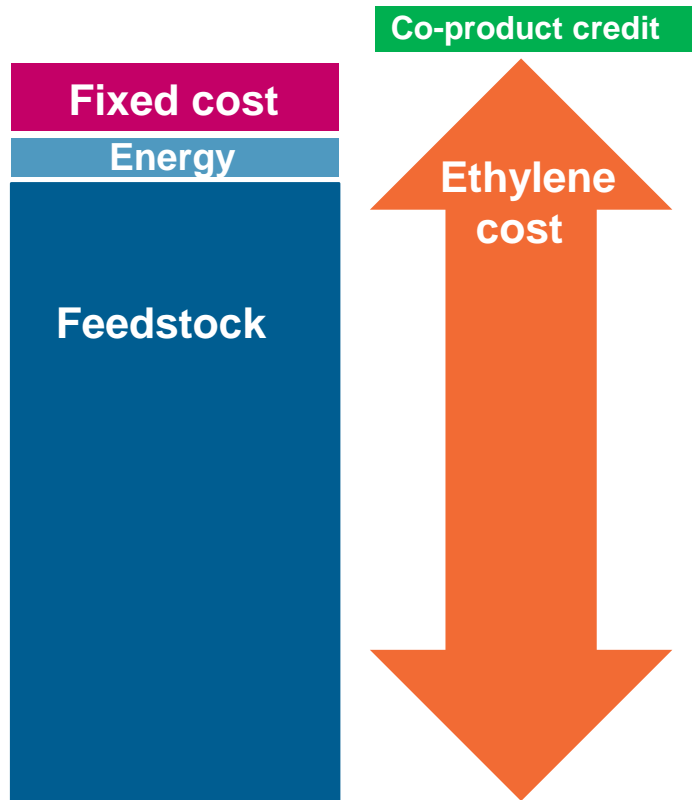
**S&P Global**  
Platts

# Agenda

US Gulf Coast projects at a glance  
C2, ethylene impact on cracker margins  
Shifting profits to polymerization unit  
Resin exports as the end game



# US cracker margins at a glance

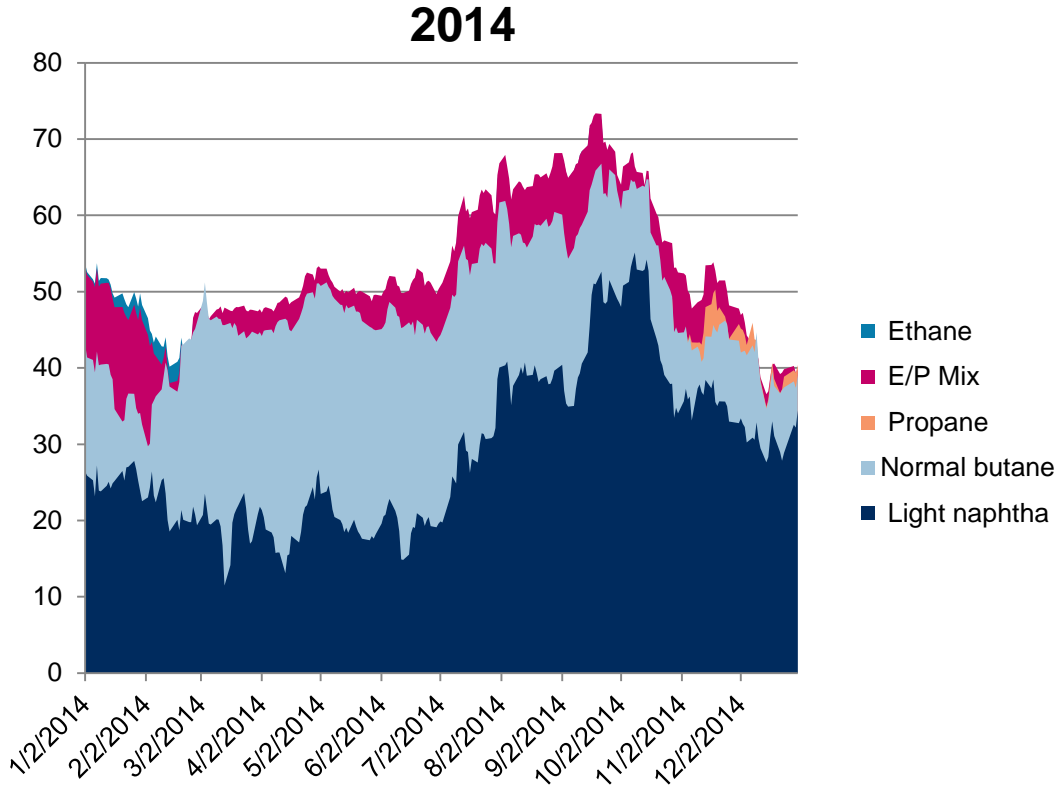
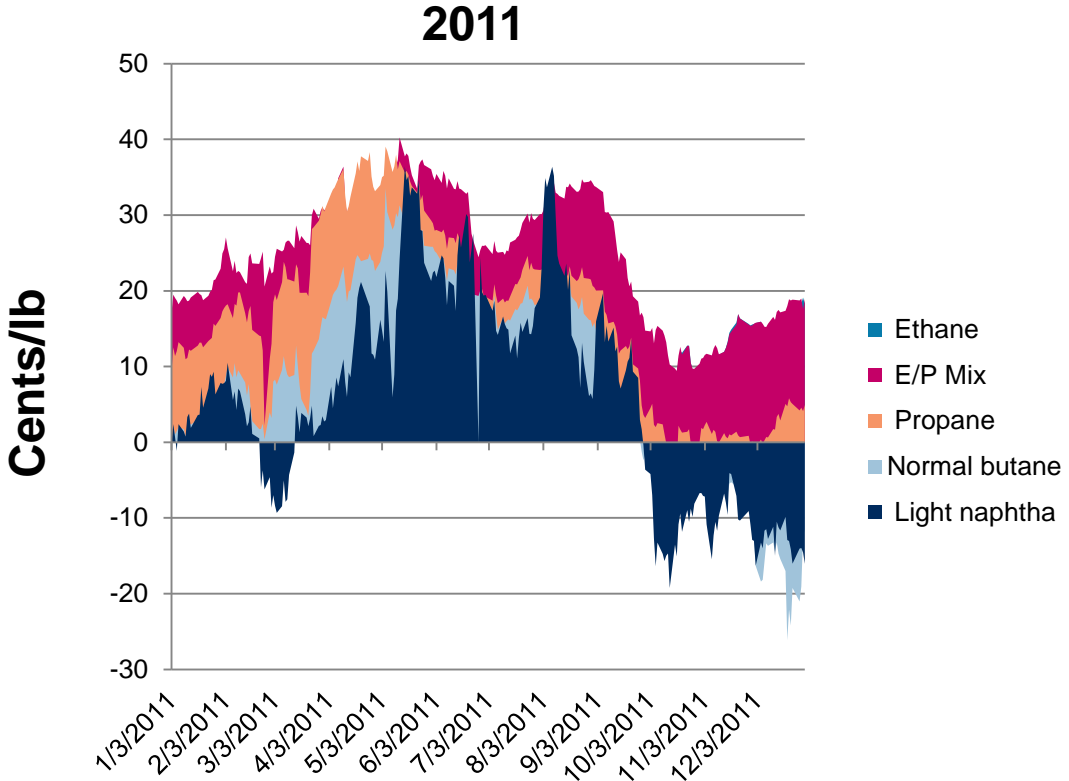


**Cracker margin:** Calculation showing the value for producing a unit of ethylene from a specific feedstock, inclusive of co-product credits and fixed and variable costs

**Did you know?** In 2004, the US had the highest ethylene production costs of any major producing region, with many forecasting that chemical and polymer imports from the Middle East would become customary

**And just 10 years ago,** with the financial crisis in full swing and demand and prices plummeting, US producers resorted to shutting/mothballing crackers and derivative units

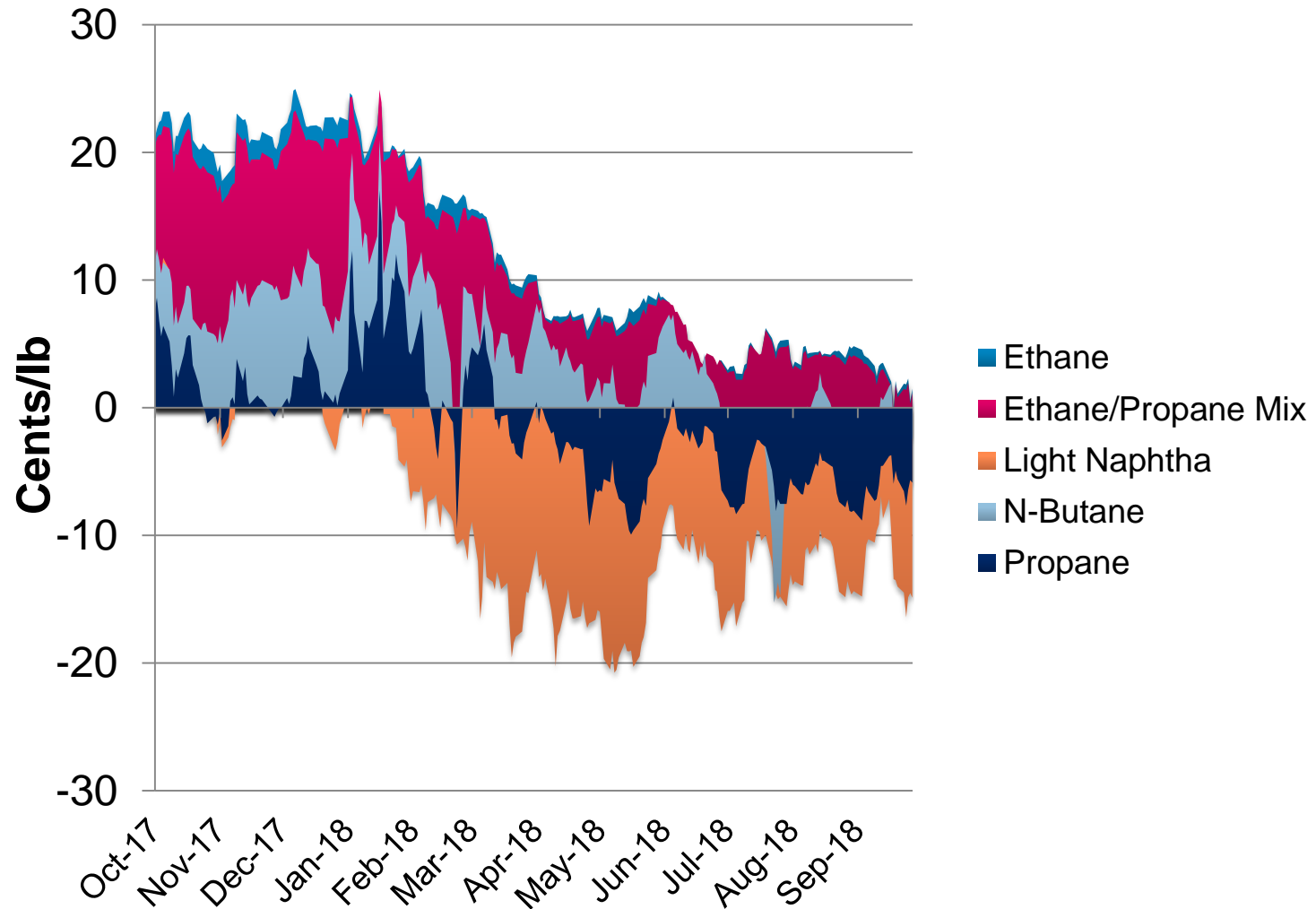
# Cracker margins: From rags to riches – to rags again?



In 2011, a wise man told me: *“Remember when 10 cents/lb was a good margin?”*

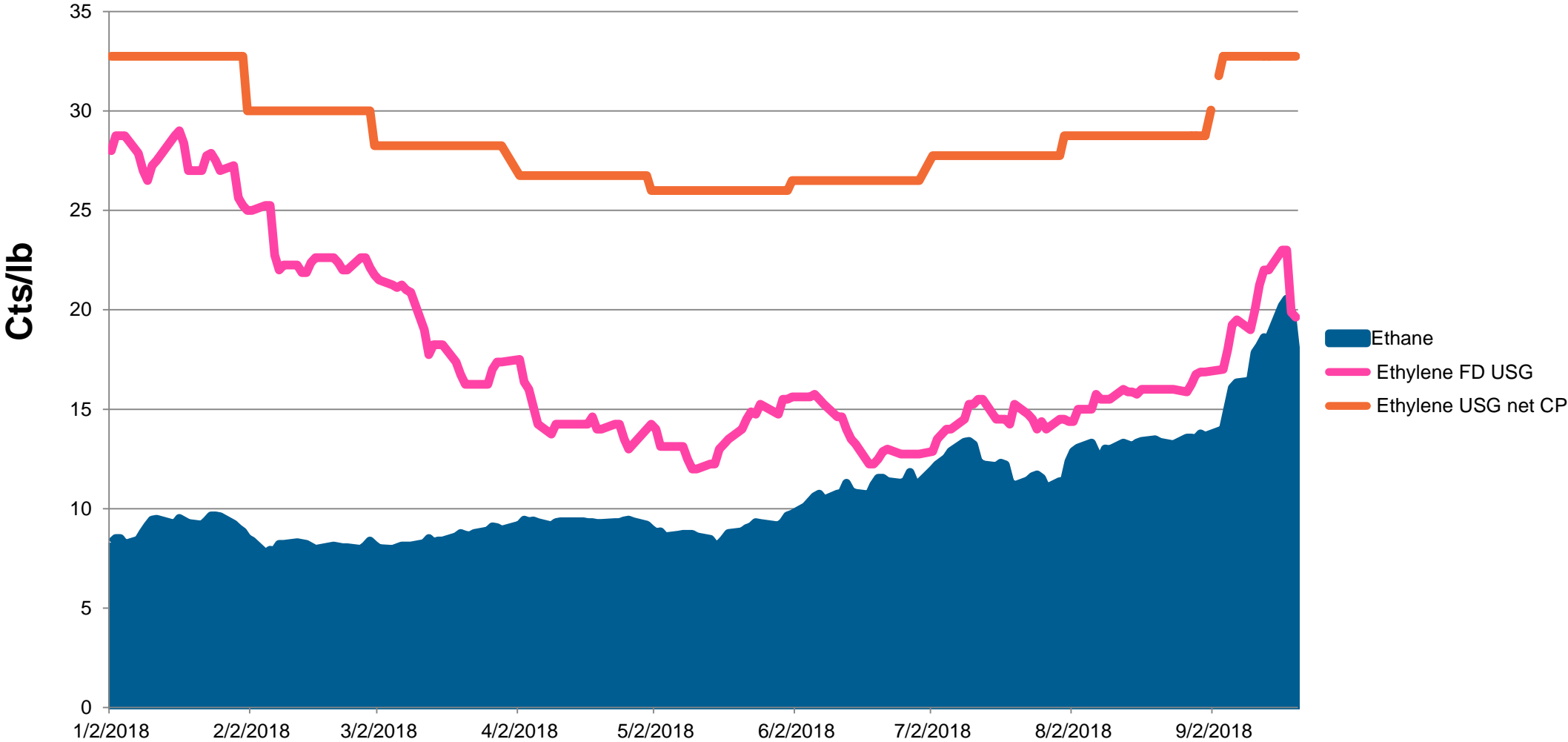
In 2014, another wise man told me: *“It is almost as if we are printing money, but we will take it – while it lasts”*

# 2018 US cracker margins sink on ethylene glut

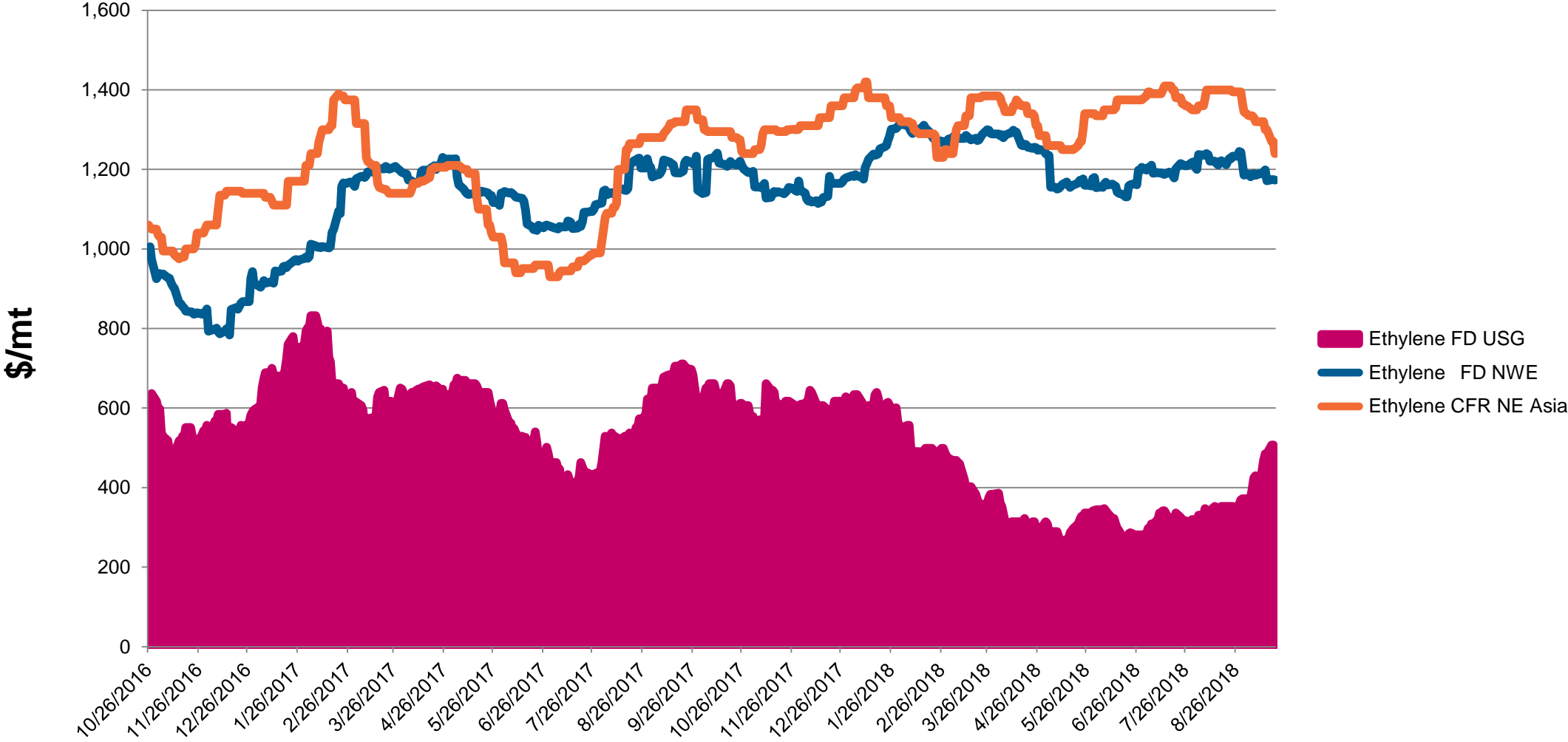


- With ethylene sub-20 cents/lb (\$440/mt) but spot PE for export around 50 cents/lb (\$1,102/mt), integrated producers are not sweating it
- ROI, however, remains consideration
- Depressed margins are affecting merchant sellers, such as Nova and Flint Hills Resources
- Some rationalization under way in the form of shutdowns, extended turnarounds/retrofits and reduced rates

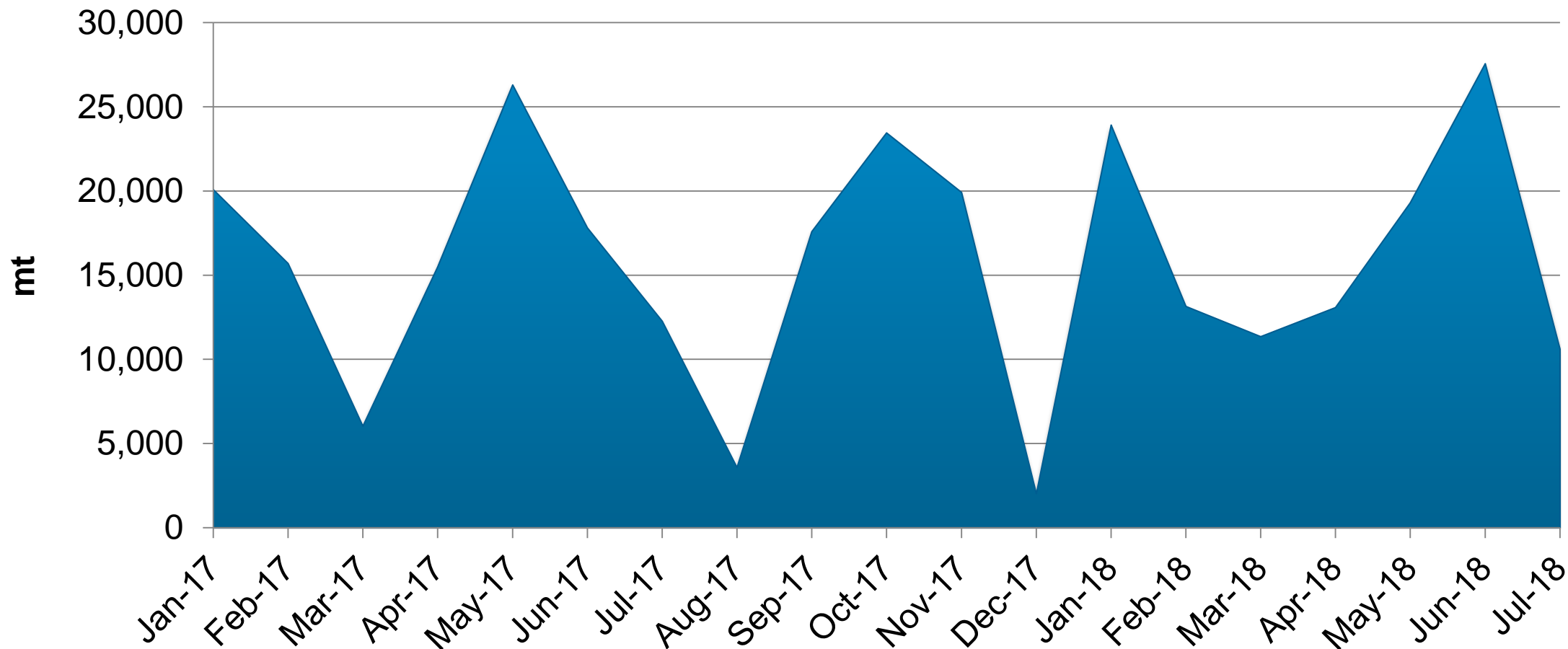
# US ethylene long; nearly 7 million mt/year of additional capacity through 2020



# Despite ethane-driven rebound of late, US ethylene deeply discounted to Asia, Europe



## US ethylene exports maxed out – for now; new terminal(s) on tap



Source: USITC

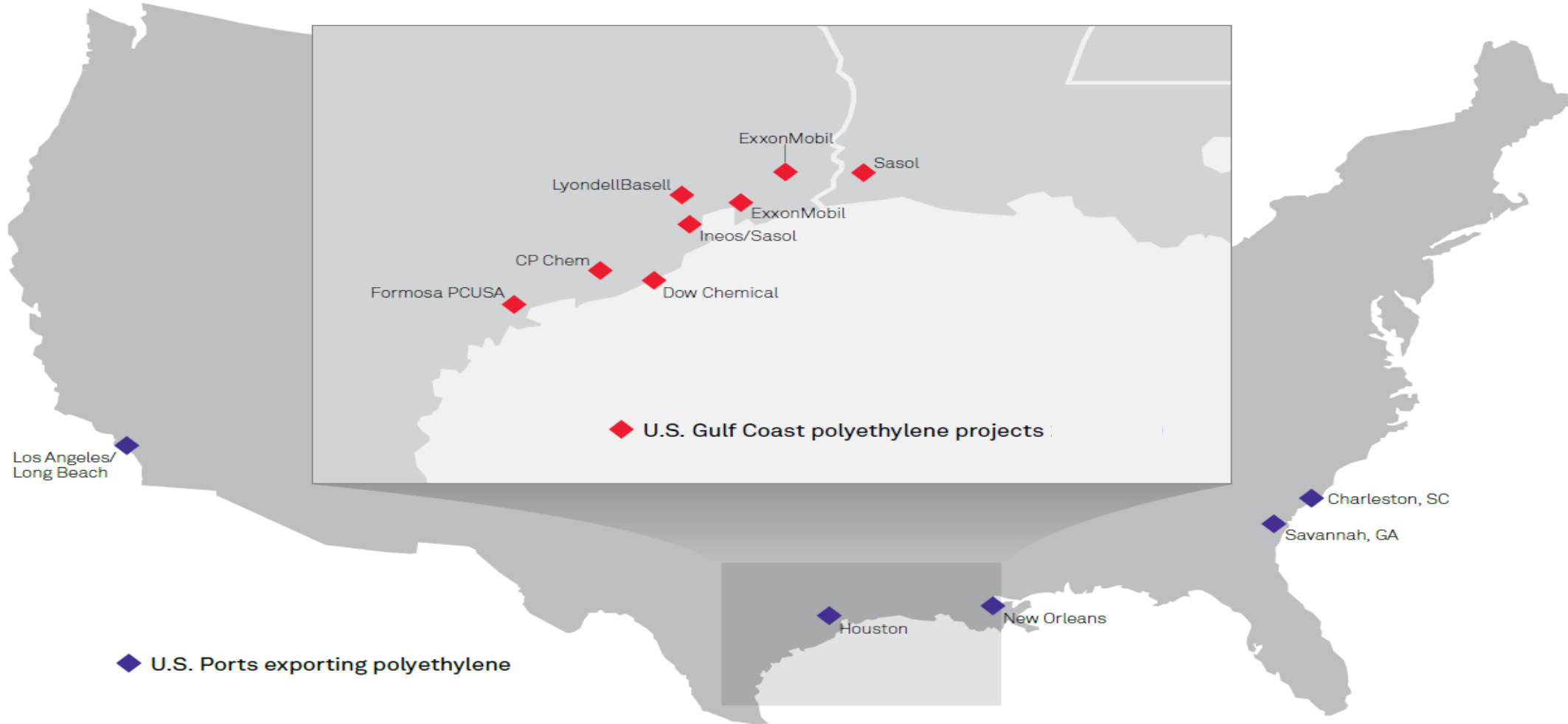


# Ethylene exports: Competing projects at Houston Ship Channel



- 1 million mt/year export-capacity terminal under construction; 1,000 mt/hour loading rate
  - 30,000 mt on-site refrigerated storage
  - Long-term contracts from anchor shippers include Flint Hills Resources; startup 1Q 2020
  - Converting ethane cavern to hold up to 272,000 mt ethylene; operational 1Q 2019
  - 24-mile bilateral ethylene pipeline connecting Mont Belvieu and Bayport, startup 2020
- 750,000 mt/year export capacity and 900 mt/hour loading rate
  - 2,000 mt/day chilling train to liquefy ethylene
  - 45,000 mt on-site refrigerated storage
  - Facility would be at Odfjell's Bayport terminal
  - Terminal is near ethylene pipelines run by Shell, Chevron, INEOS, Lyondell and FHR
  - FID pending commitments; CEO said in early 2018 if EPD goes forward, Odfjell less likely

# Ethylene/PE projects in USG 2017-2020: Zoomed in on exports



© 2017 S&P Global Platts, a division of S&P Global. All rights reserved.

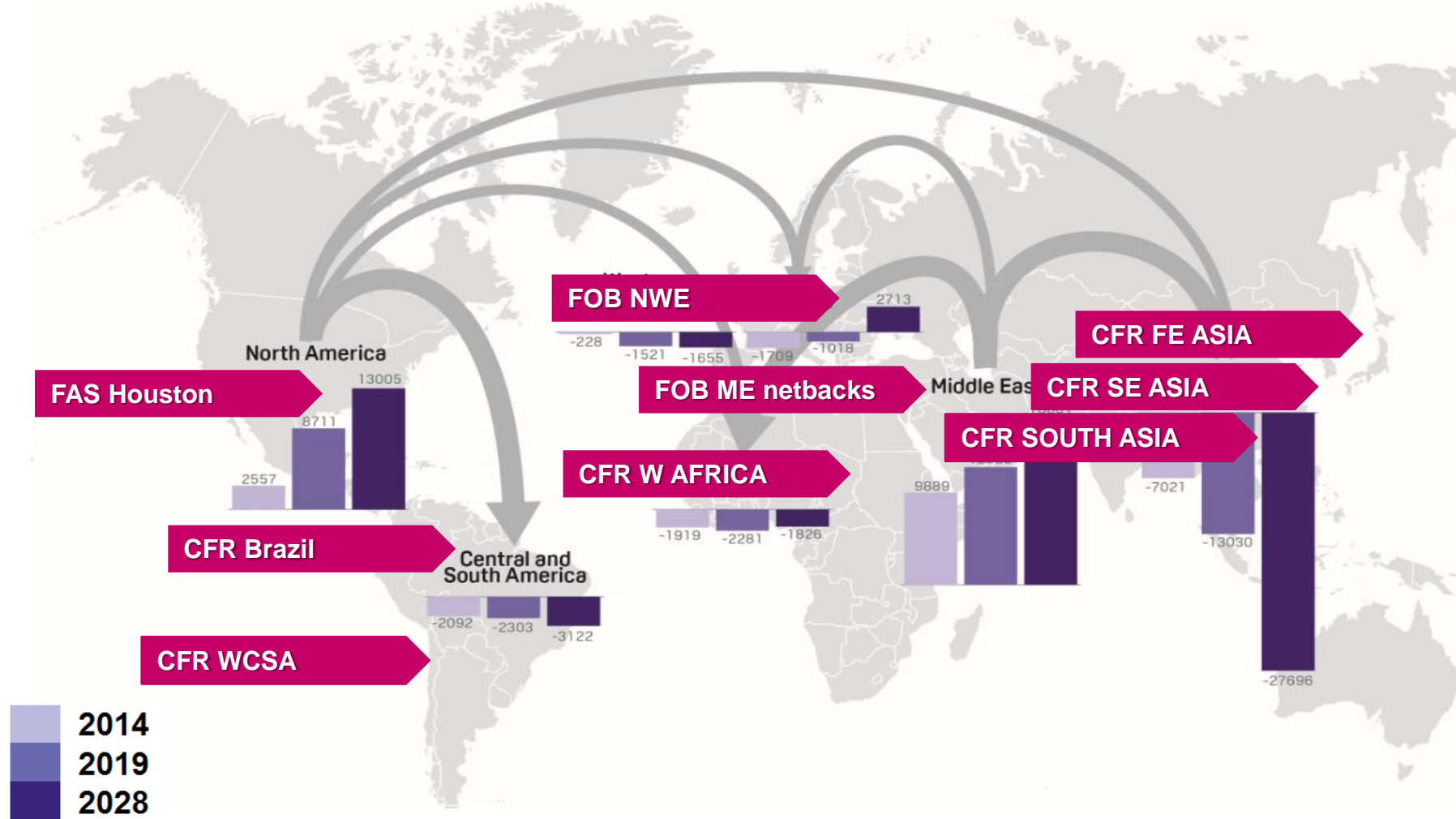
# US PE capacity expansions to triple surplus by 2028

## US PE PROJECTS 2017-2020s

Company	Location	Capacity (mt/yr)	Product	Startup	Status
<b>OPERATIONAL</b>					
Dow Chemical	Freeport, Texas	400,000	LLDPE	Sep-17	Operational
Chevron Phillips	Sweeny, Texas	500,000/500,000	HDPE/LLDPE	Sep-17	Operational
Exxon Mobil Chemical	Mont Belvieu, Texas	650,000/650,000	LLDPE/HDPE	Oct-17/Q-4	Operational
Ineos/Sasol	La Porte, Texas	460,000	HDPE	Nov-17	Operational
Dow Chemical	Plaquemine, Louisiana	350,000	LPDE	Q1-18	Operational
<b>CONSTRUCTION</b>					
Sasol	Lake Charles, Louisiana	450,000/450,000	LLDPE/LDPE	H2-18/H1-19	Construction
Formosa Plastics	Point Comfort, Texas	400,000/400,000	LDPE/HDPE & LLDPE	H1-19	Construction
LyondellBasell	La Porte, Texas	549,000	HDPE	2019	Construction
Exxon Mobil Chemical	Beaumont, Texas	650,000	LLDPE	2019	Construction
Shell Chemical	Monaca, Pennsylvania	550,000/550,000/500,000	HDPE/LLDPE/LLDPE	2021/2022	Construction
<b>PLANNING</b>					
NOVA Chemical/Borealis	Bayport, Texas	625,000	HDPE	2021	Planning
PTTGC/Daelim	Belmont County, Ohio	TBD	TBD	2021	Planning/FID-18
Exxon Mobil/SABIC	Corpus Christi, Texas	TBD	TBD	2020s	Planning/FID-18
Dow Chemical	US Gulf Coast	600,000	TBD	2020s	Planning
FG LA LLC	St James, Louisiana	400,000/400,000	HDPE/LLDPE	2022	Planning
FG LA LLC	St James, Louisiana	400,000/400,000	HDPE/LLDPE	2027	Planning

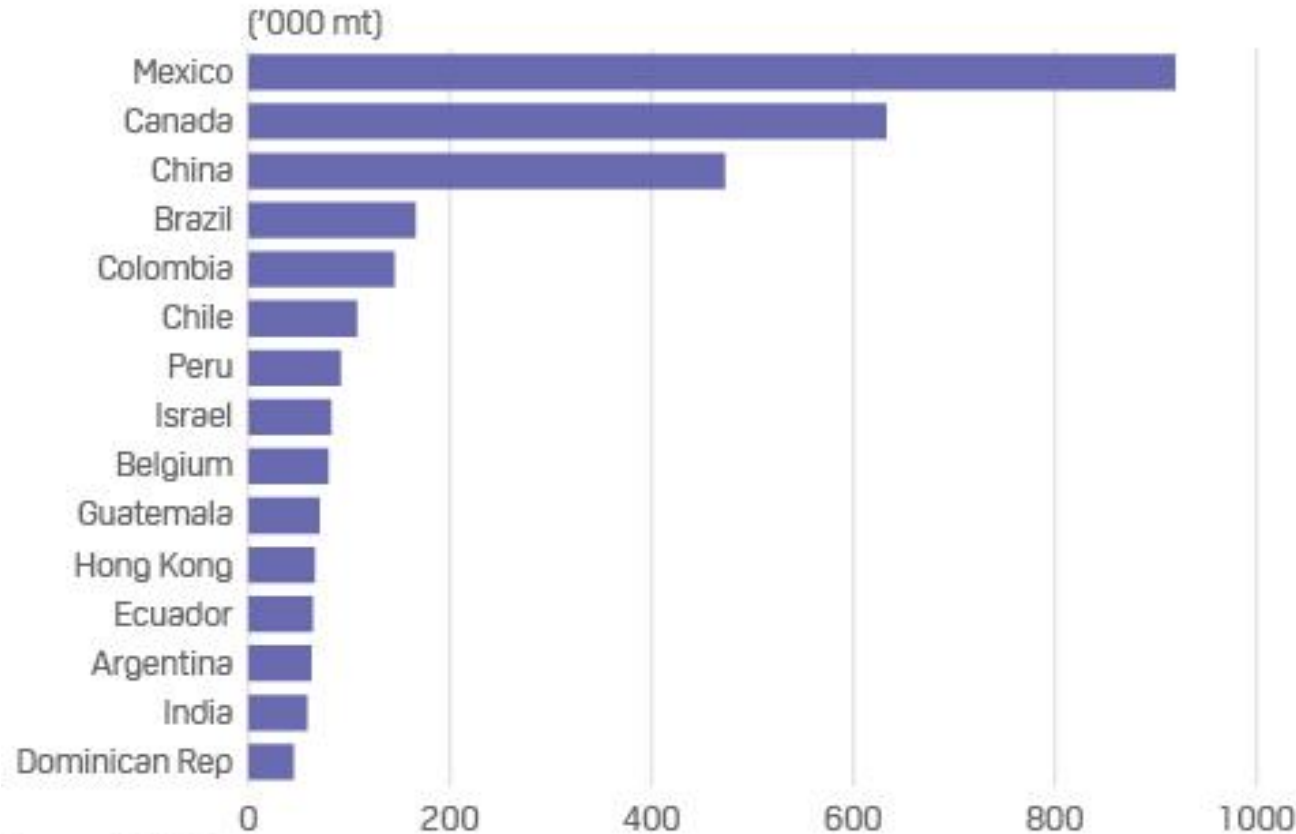
Source: Company announcements, regulatory filings

# Understanding global PE pricing, trade flows is key



# Latin America to remain key destination for US exports

## TOP DESTINATIONS FOR US PE IN 2017

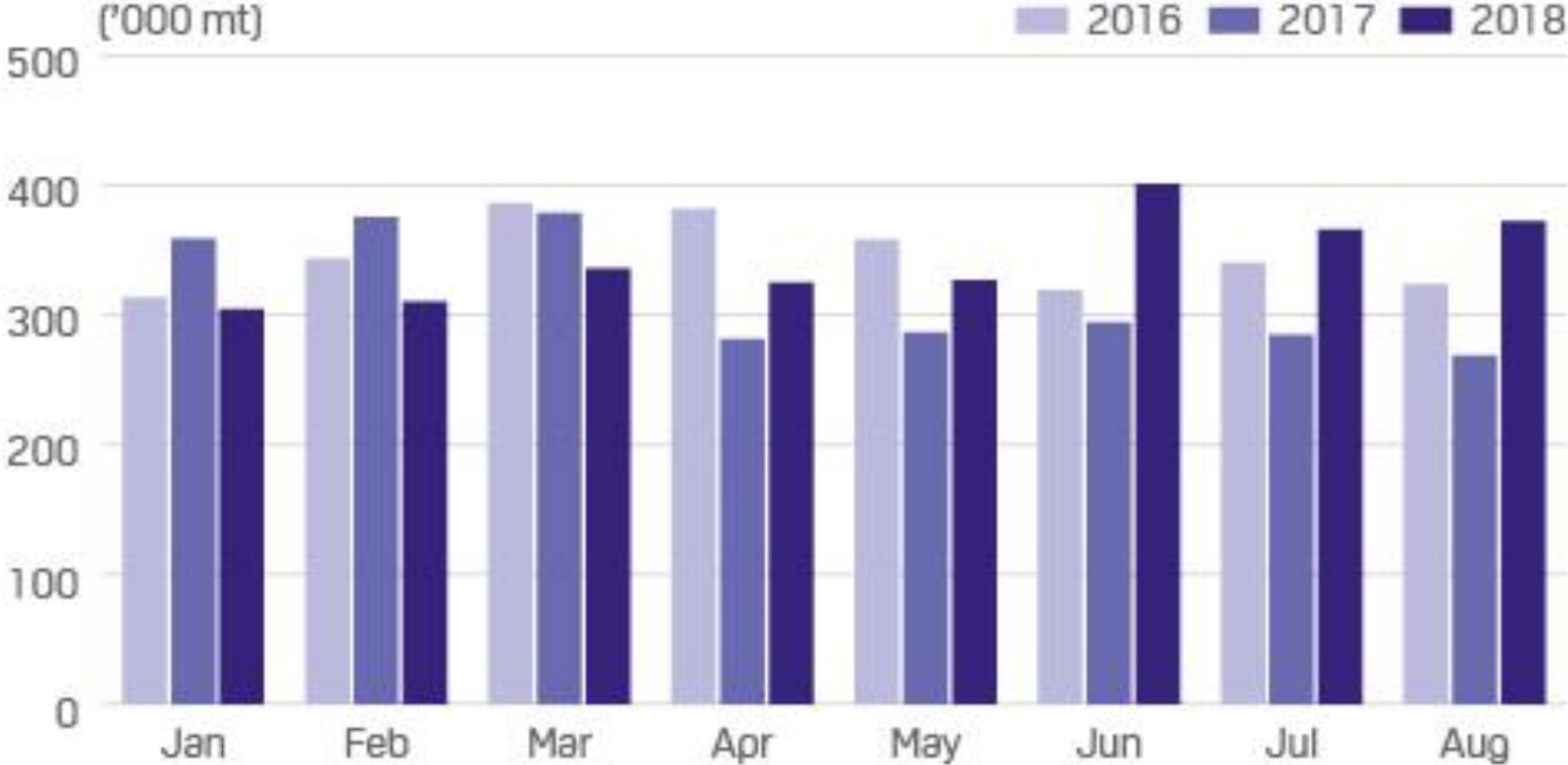


Source: USITC

- Mexico remains top buyer; nearly 1 million mt/year despite recent capacity addition (Braskem Idesa)
- China third at 18% in 2018; US market share was expected to grow
- Six of 15 top destinations are in South America; Central America cracks Top 5, led by Guatemala
- In 2017, US exported 3.5 million mt, down from 2016 because of Harvey
- First wave of PE expansions adding nearly 6.5 million mt/yr through 2019

# US exports on the rise as PE capacities come online

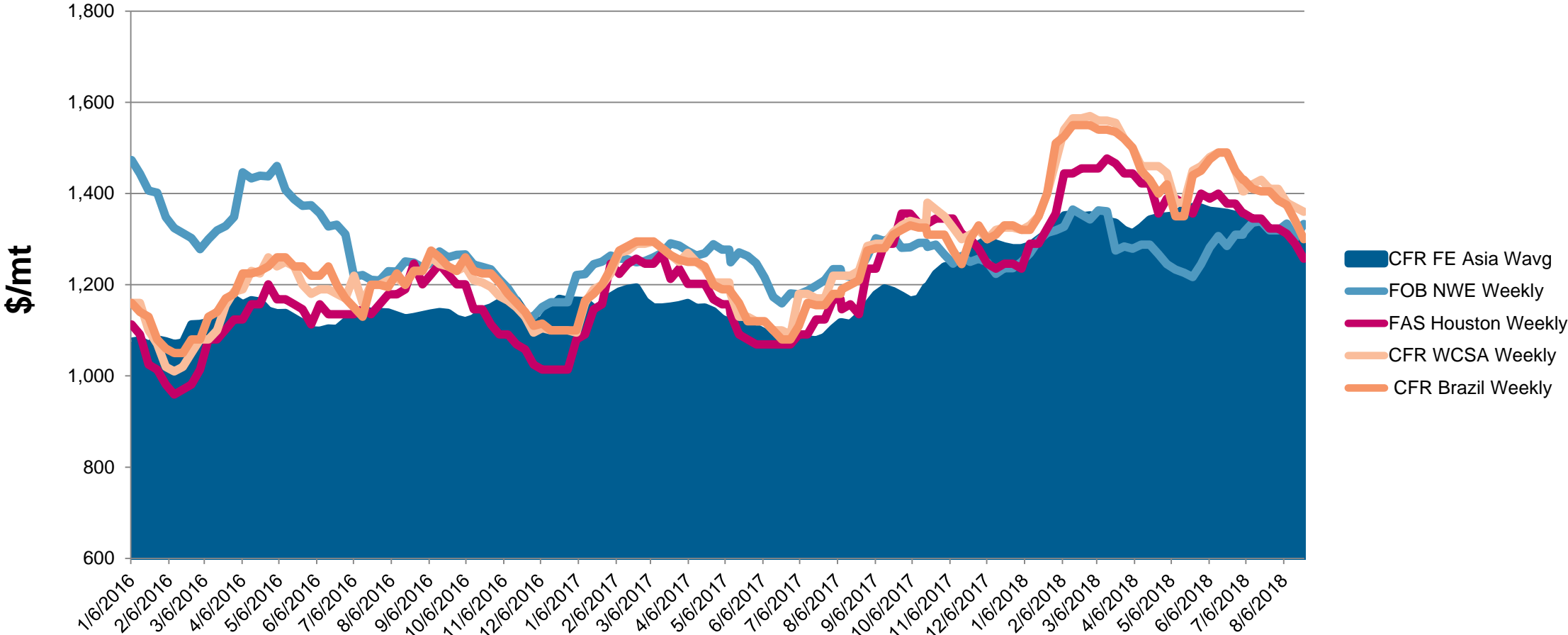
## TOTAL US PE EXPORTS



Source: USITC

# Naphtha-based regions set global PE price

## HDPE film spot pricing



# US-China trade tensions add potentially huge wrinkle to PE strategy

## TARIFFS AFFECTING US-CHINA PETROCHEMICAL TRADE

US \$250 billion in Chinese goods includes:

Petrochemicals	Uses
Caustic soda	Alumina, pulp, paper feedstock
Ethane	Ethylene feedstock
Butane	Lighter fuel, aerosol propellant
Ethylene	Resin feedstock
Propylene	Resin feedstock
Butadiene	Precursor to rubber
Benzene	Chemical feedstock
Toluene	Gasoline additive
Mixed xylenes	Octane enhancer
Styrene	Fiberglass, rubber, plastic feedstock
Cumene	Chemical feedstock
Normal butanol	Coatings, adhesives, solvent
Ethylene glycol	Precursor to PET
Ethylene oxide	Precursor to ethylene glycol
Acetic acid	Feedstock for industrial chemicals

China \$110 billion in US goods includes:

Petrochemicals	Uses
High-density polyethylene	Milk jugs, grocery bags, combs
Linear low density polyethylene	Plastic wrap, detergent bottles
Ethylene	Feedstock for resins
Butadiene	Precursor to rubber
Benzene	Chemical feedstock
Styrene	Fiberglass, rubber, plastic feedstock
Ethylene dichloride	Precursor to polyvinyl chloride
Acetone	Solvent
Purified terephthalic acid	Plastic bottles
Acrylonitrile	Synthetic rubber, fibers, plastics
Methanol	Fuel, antifreeze, solvent
Propylene	Precursor to polypropylene
Toluene	Gasoline additive
Paraxylene	Precursor to PET, polyester fiber
Mixed xylenes	Octane enhancer
Propane	Heating, propylene
Paraffin wax	
Petroleum asphalt	

### FINISHED PRODUCTS FROM CHINA NOW FACING US TARIFFS

Vinyl flooring	Conveyor belts	Handbags	Toilet tissue
Sacks and bags	Rubber hoses	Insulated lunch bags	Synthetic fibers
Spools	Truck and bus tires	Bamboo flooring panels	Carpet
baseball gloves	Trunks and suitcases	Cork	Floor and wall tiles
Rainwear			

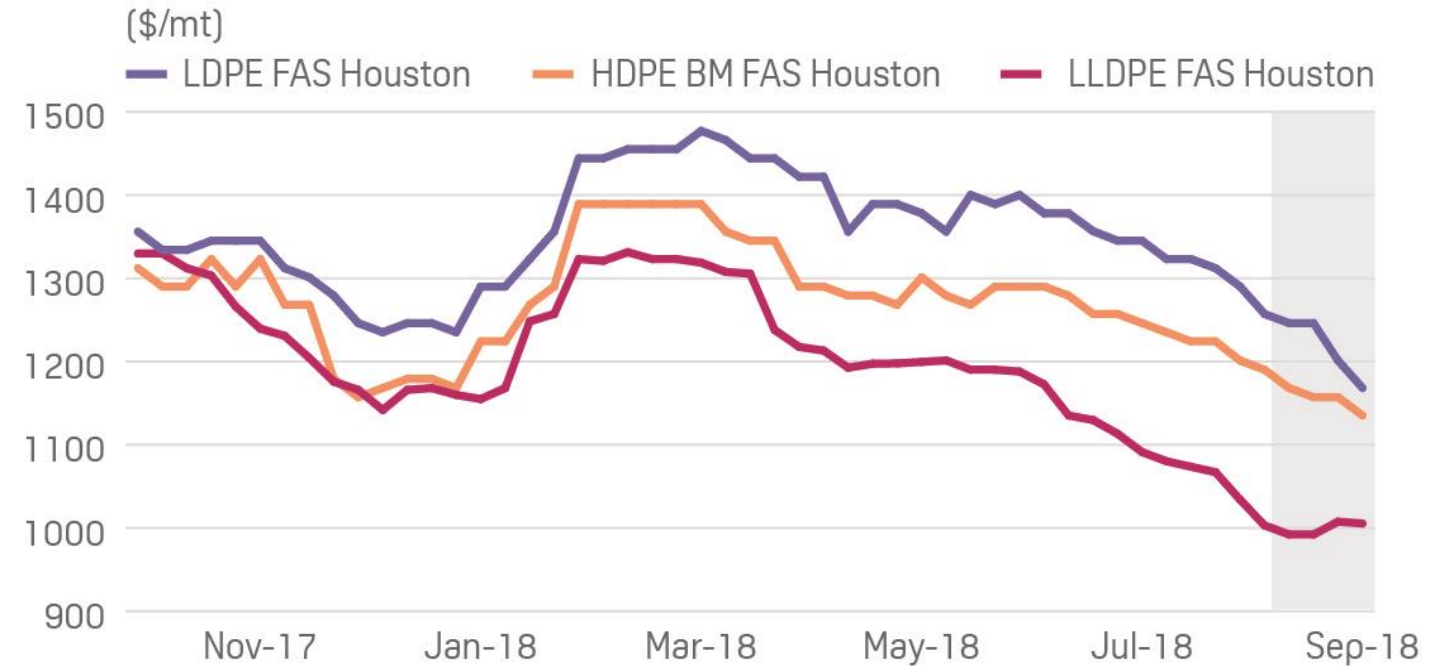
Source: Office of the US Trade Representative, American Chemistry Council



# US export prices already under pressure from surplus

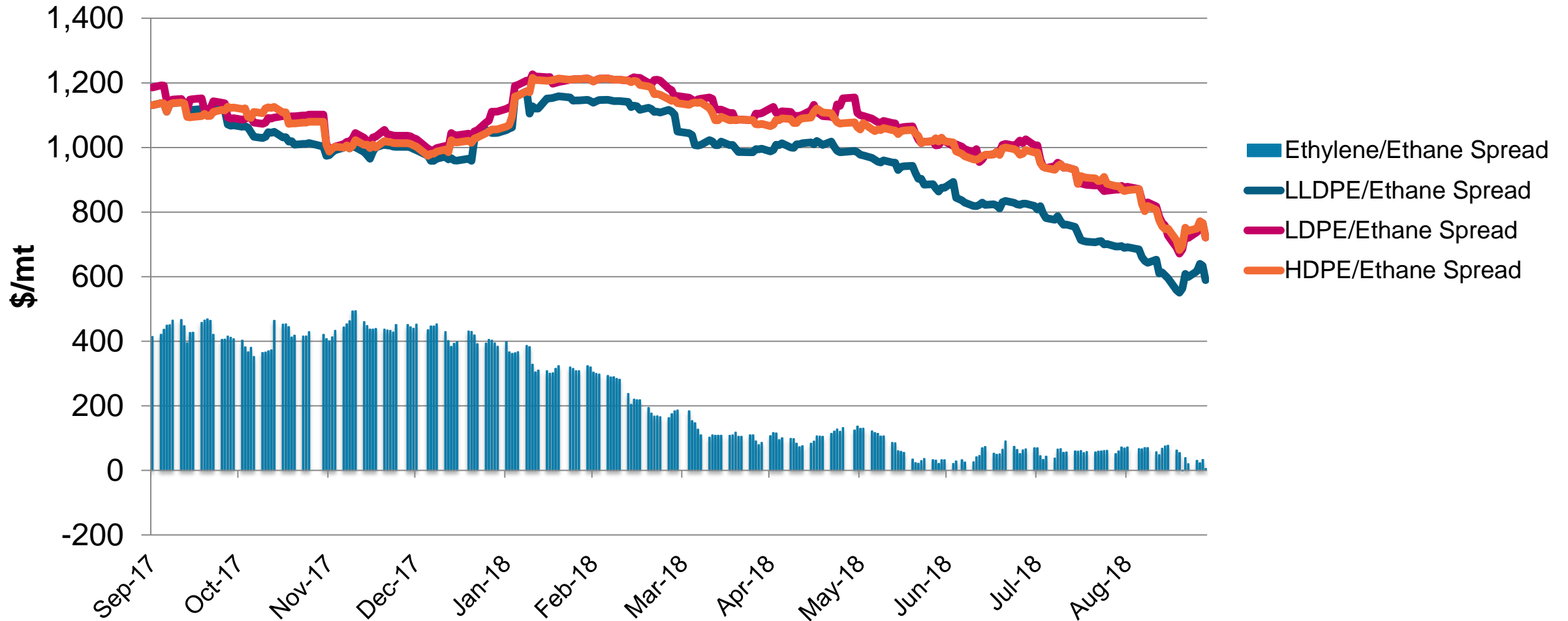
- US export pricing of key PE grades has fallen 13-17% since early June; domestic pricing has remained range-bound
- Trend has continued since tariff enforcement by China; has affected grades beyond listed
- Some US producers argue drop will be temporary, perhaps 6 months, as trade flows adjust
- Buyers, particularly in Latin America, feel emboldened, await further decreases in Q4

## US PE EXPORT PRICING



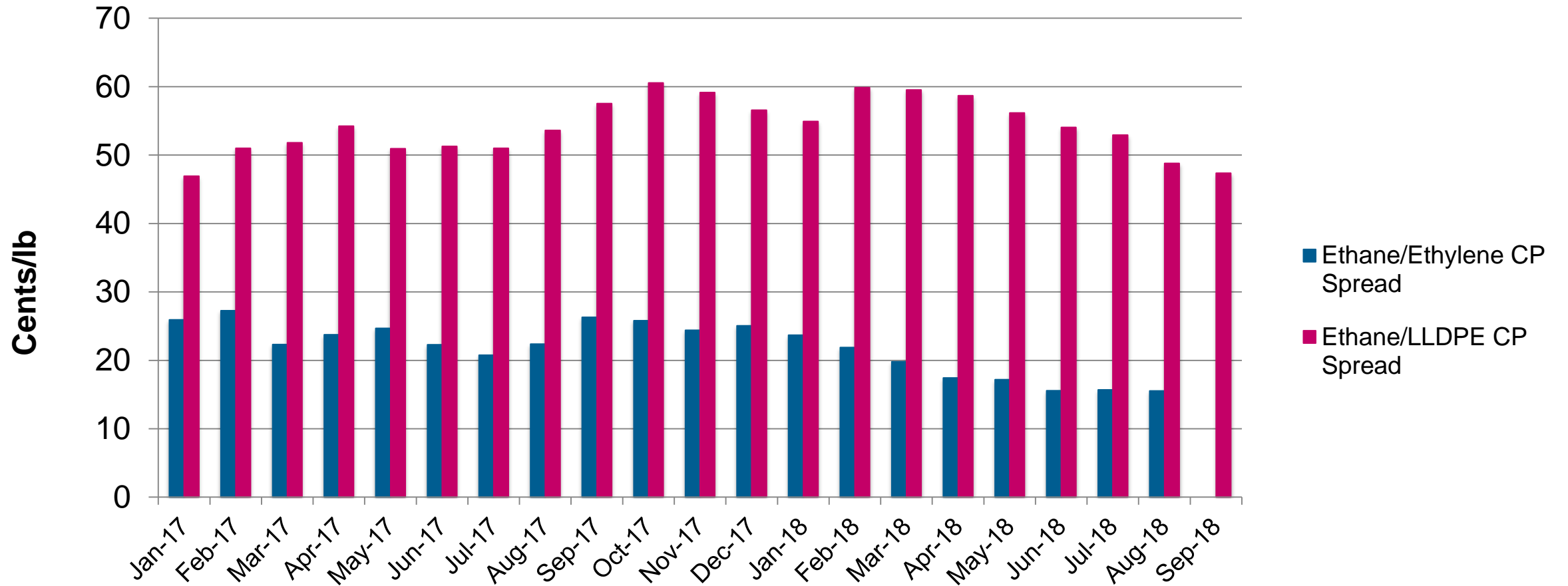
Note: Shaded area refers to China's implementation of tariffs on select US PE grades  
Source: S&P Global Platts

# Derivative spreads still healthy, but slipping



Source: S&P Global Platts

# US producers look to protect PE margins



Source: S&P Global Platts

## Key takeaways

- C2, ethylene fundamentals yielding major margin compression at cracker level
- Margin shifts to polymerization unit, with integrated PE producers benefiting most
- PVC, other downstream producers in USGC also seek to back-integrate
- Higher-cost, naphtha-based regions including Asia set global PE pricing
- However, margin erosion evident as capacities ramp up, US market lengthens
- Further, US-China tensions have global markets on edge (HD, LLDPE)
- CFR LLDPE pricing in Latin America falls to record lows, other grades also slide
- Dollar strength stifles imports in South America, boosts appetite for domestic product
- Bottom line: Monitoring of global polymer markets critical going forward



# Innovative market **insights**

Driven by analytics, powered by fundamentals