



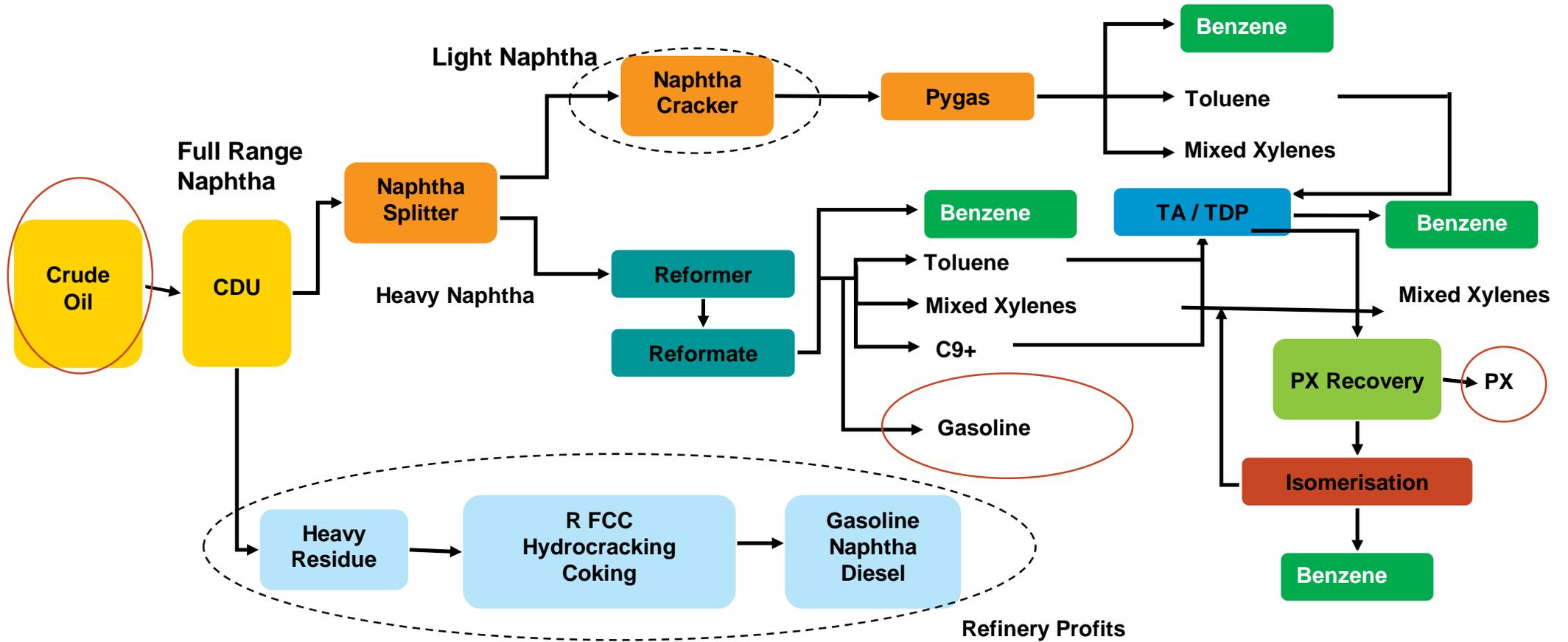
An Emerging Watershed for the Aromatics

13 September 2018 | Chengdu, China

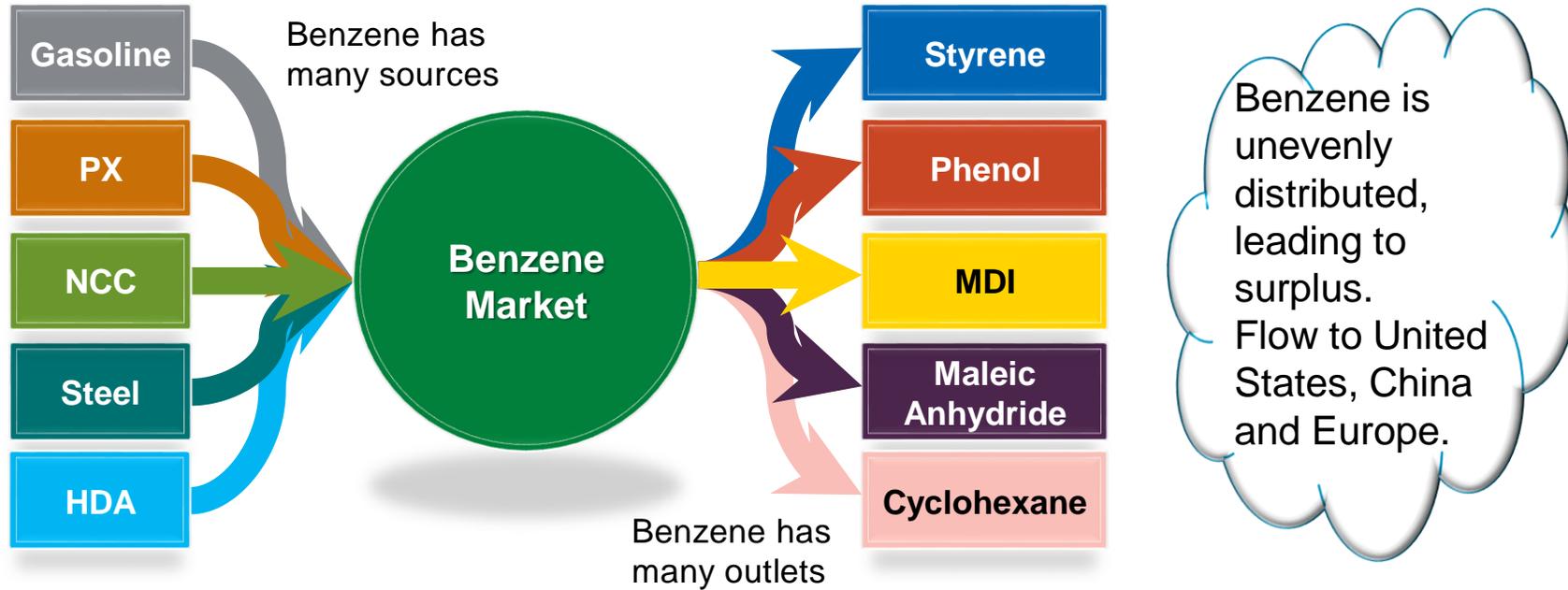
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Aromatics Complex



Complexity of Benzene Market



Key factors to watch

Strong economy & Crude Oil Prices:

Strong and evenly spread economic expansion supports
Sharp increase in crude oil prices

Gasoline Market:

Strong global demand growth

China policies – reformer additions impacting Benzene supply

Benzene
2018

Supply:

PX operations at full capacity and more capacity expected.

Naphtha crackers operations have remained strong since 2017, but low LPG prices in 2018 could affect Pygas based benzene production in 2018.

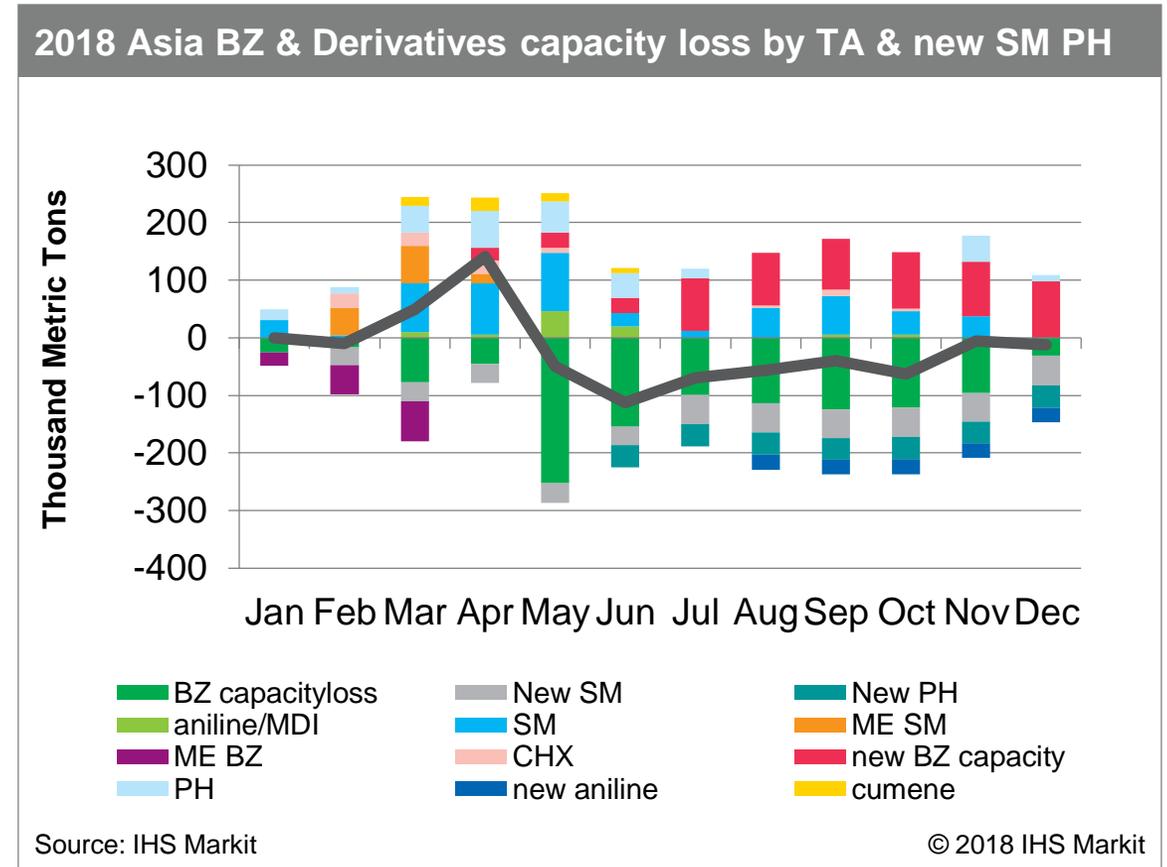
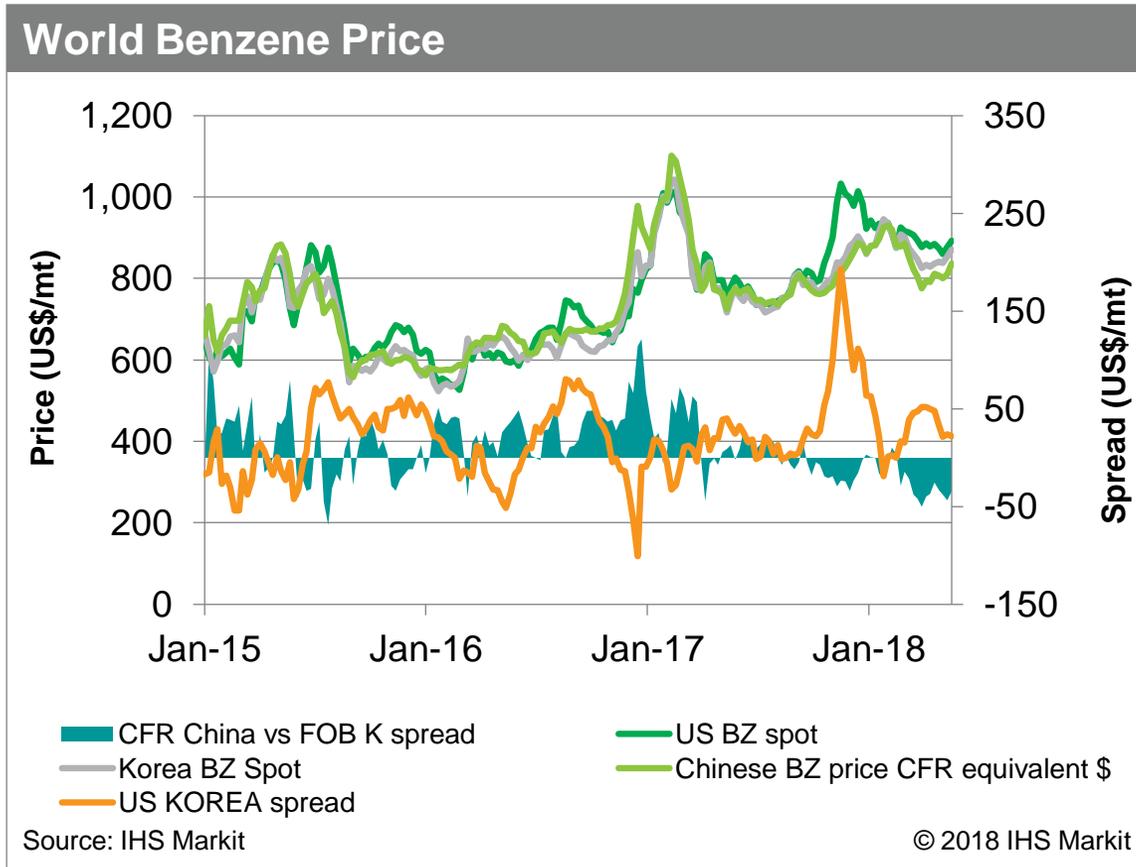
Demand:

Derivative shutdowns affect short term demand, but annual demand expected to show healthy growth.

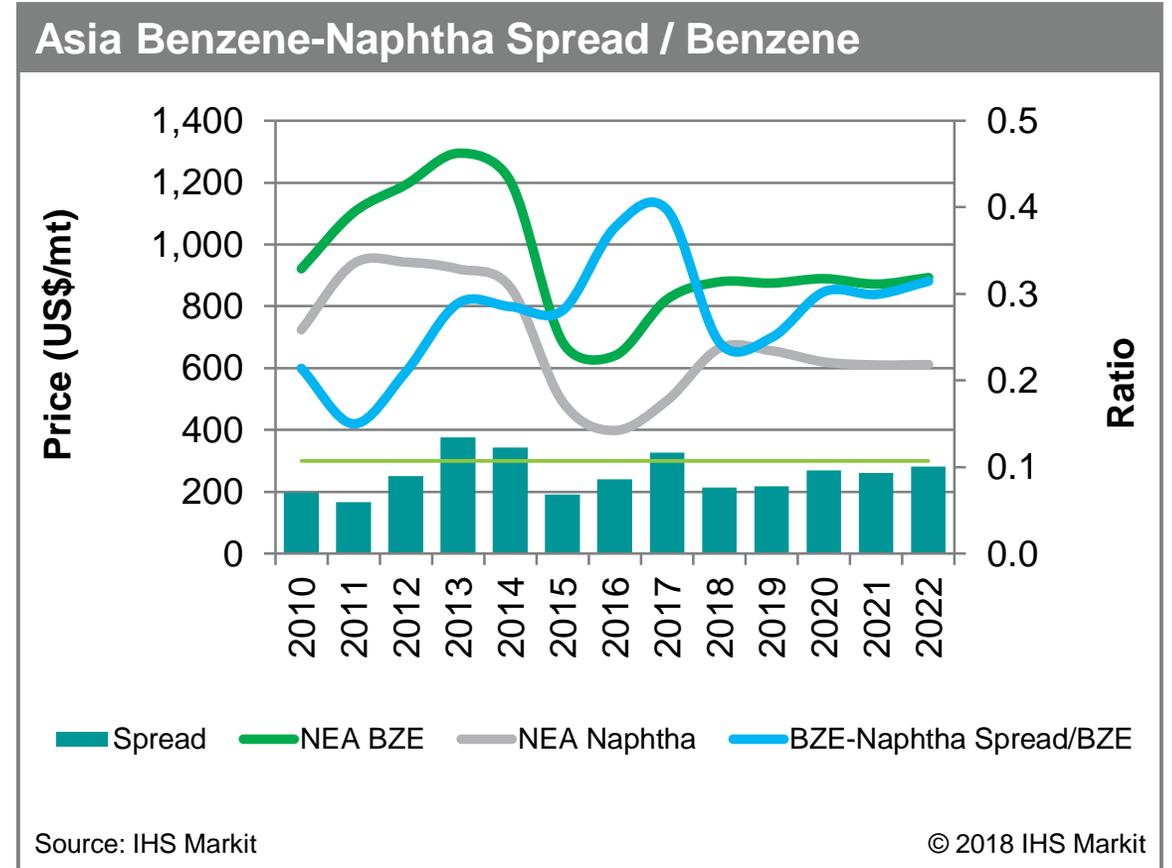
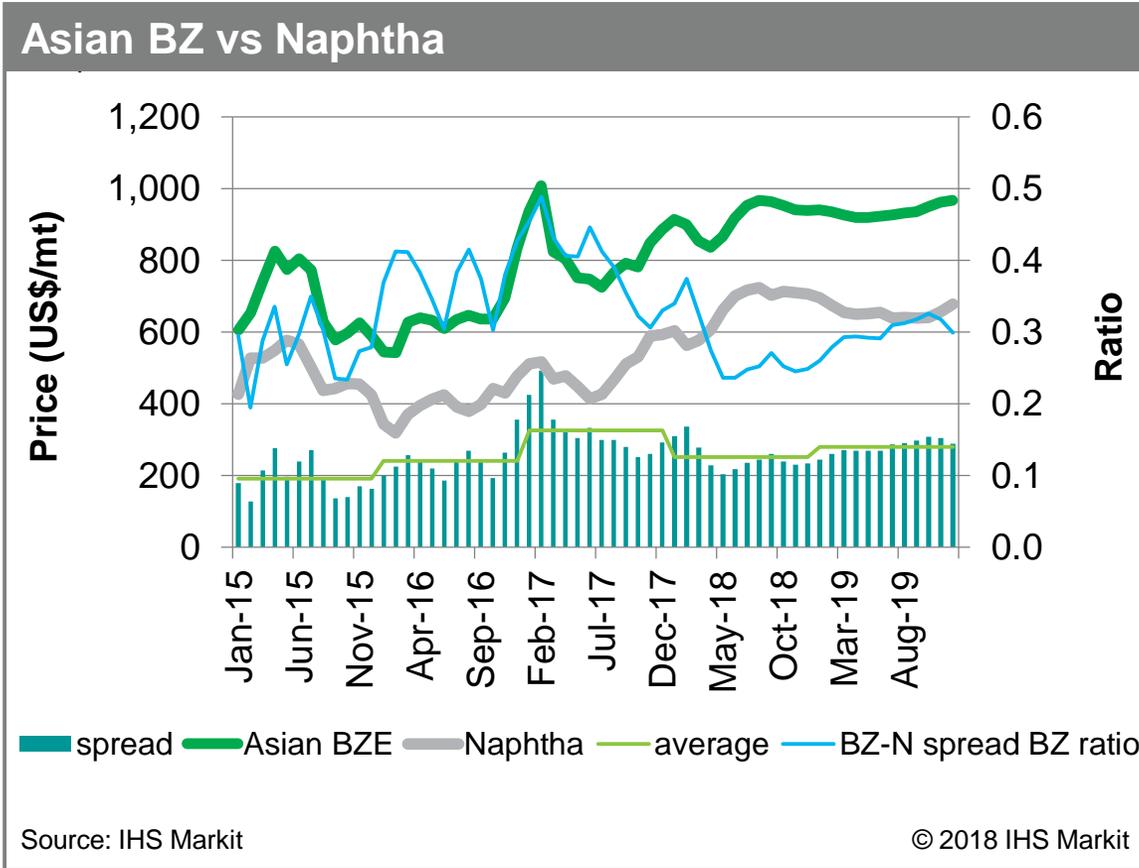
Derivatives plant shutdowns impacts Benzene demand and margins

- Benzene balance deteriorated due to heavy derivatives turnaround and outages.
- Benzene - Naphtha spread dropped from \$337 per mt in February, but reduced to only \$176 per mt in July.
- On the other hand, Benzene derivatives margin has remained strong.
- China Benzene price remained substantially lower than the import price, since the end of February. Chinese Benzene derivatives producers have been enjoying low price benzene price resulting in high margins.

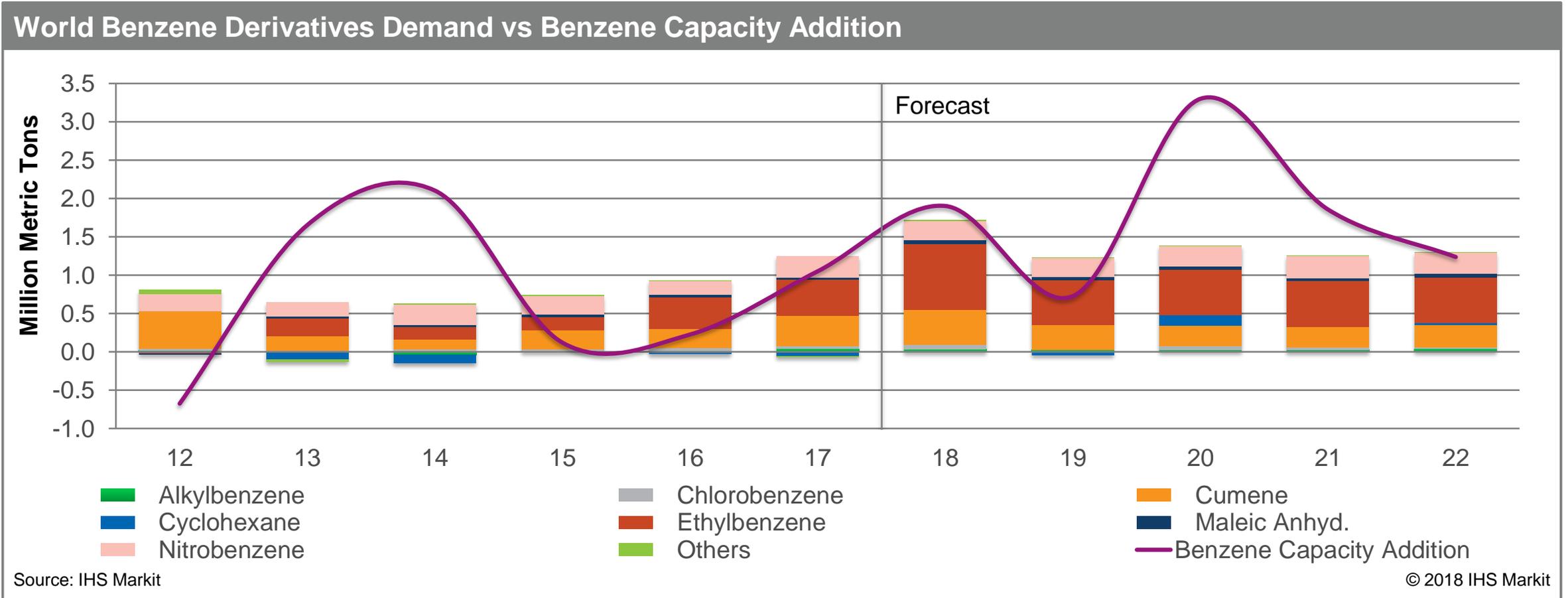
Chinese Benzene prices lowest in the World as downstream plants shut for maintenance



Annualised margins still expected to be relatively strong in 2018

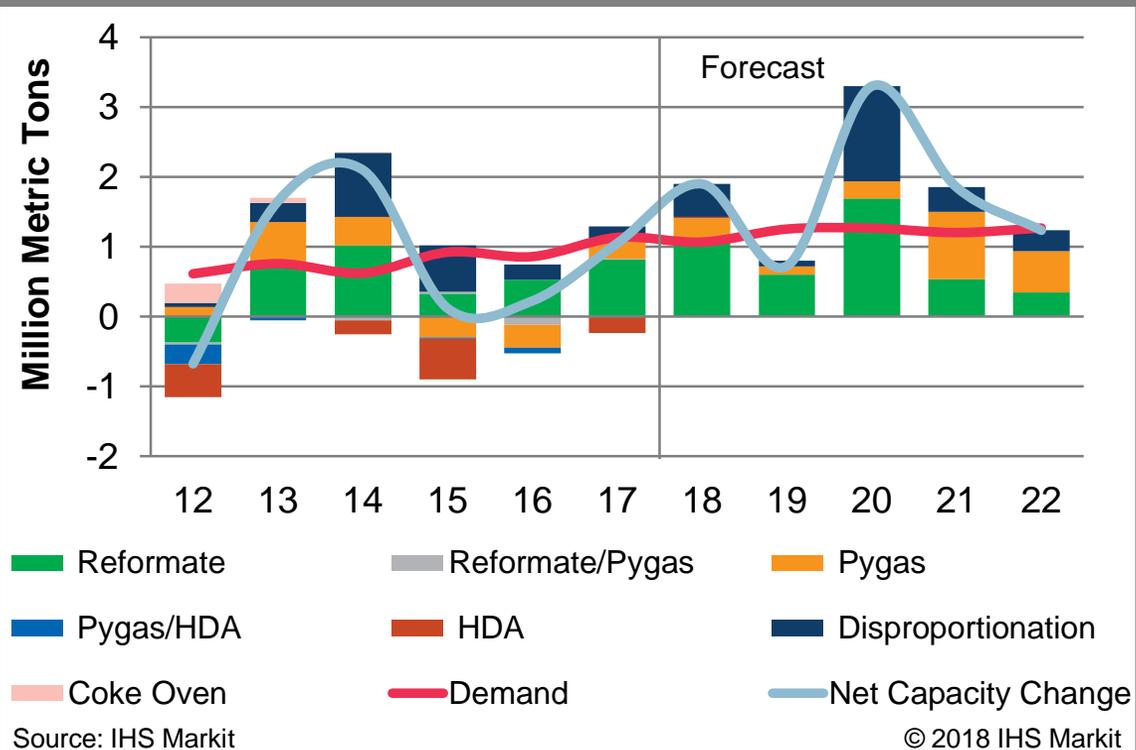


World BZ demand increase is steady in line with GDP growth but new capacity will fluctuate very much

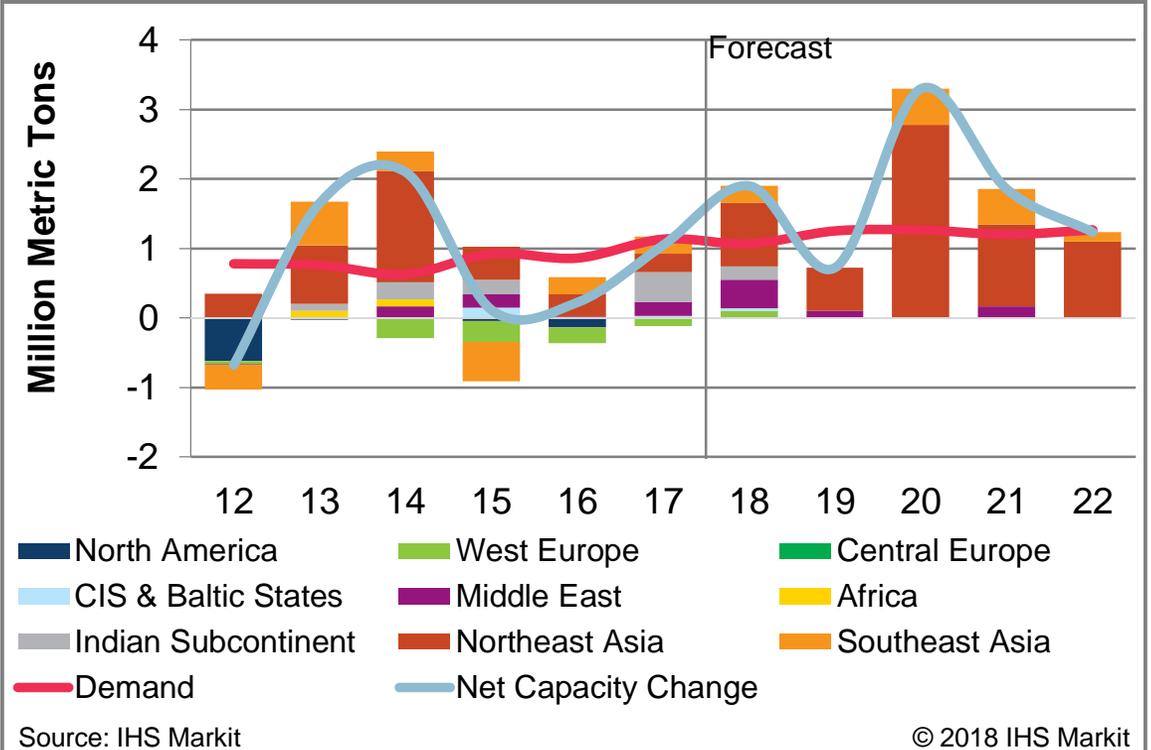


PX associated Benzene – main source of capacity addition, with China leading the investments

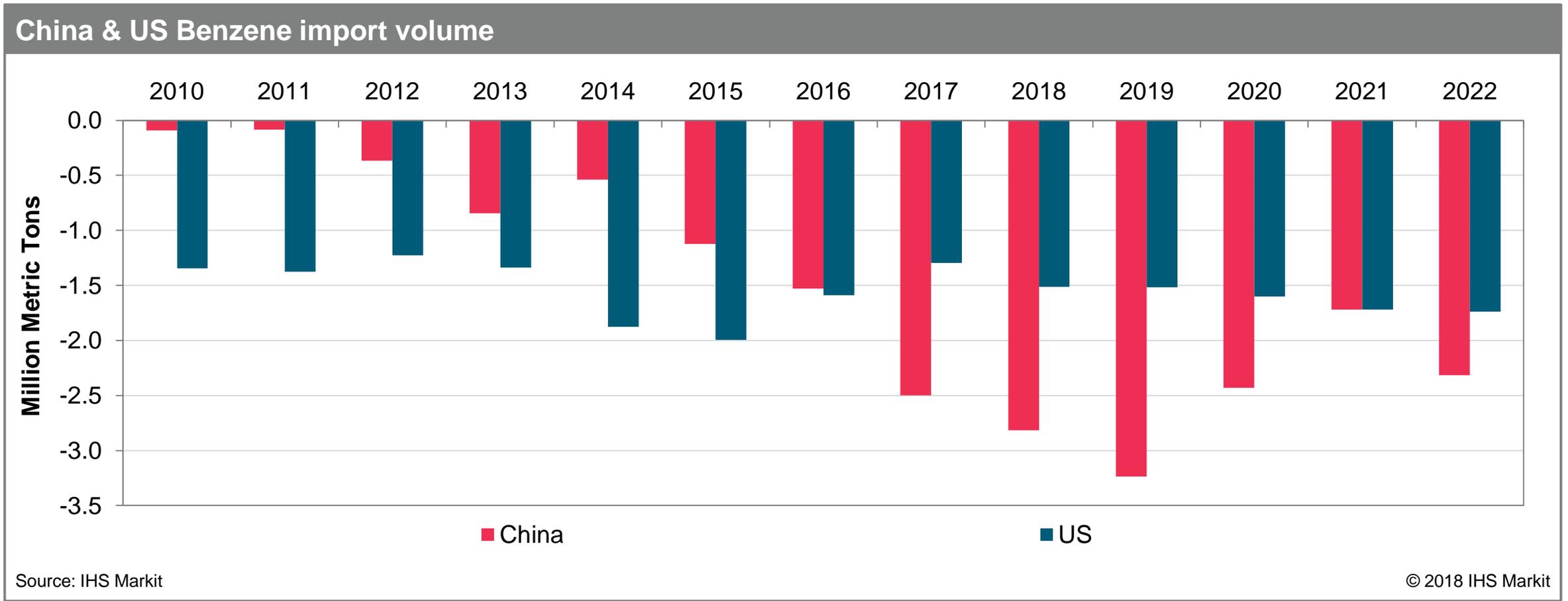
World Benzene New Capacity by Source vs Demand



World Benzene New Capacity by Region vs Demand

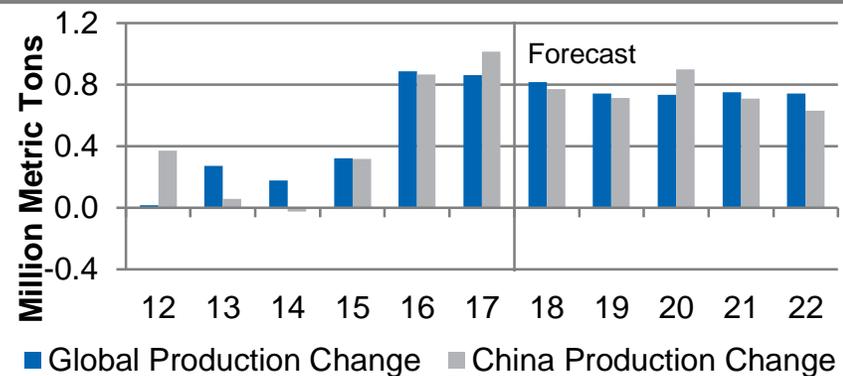


China became the largest net importer in 2017, surpassing US import volumes



China Production Overshadows Rest of the World

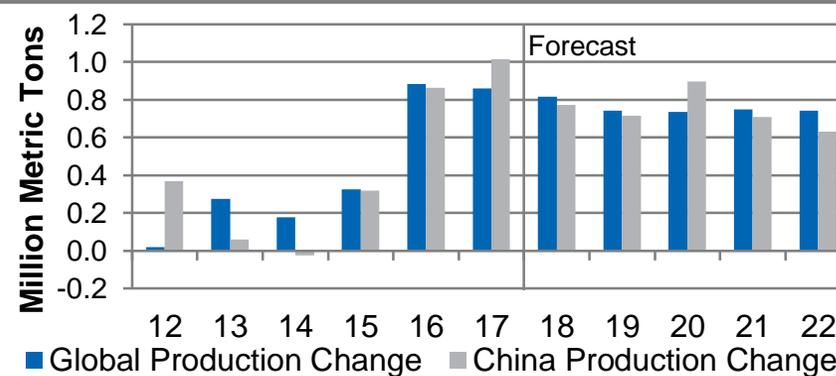
Styrene production change - World vs China



Source: IHS Markit

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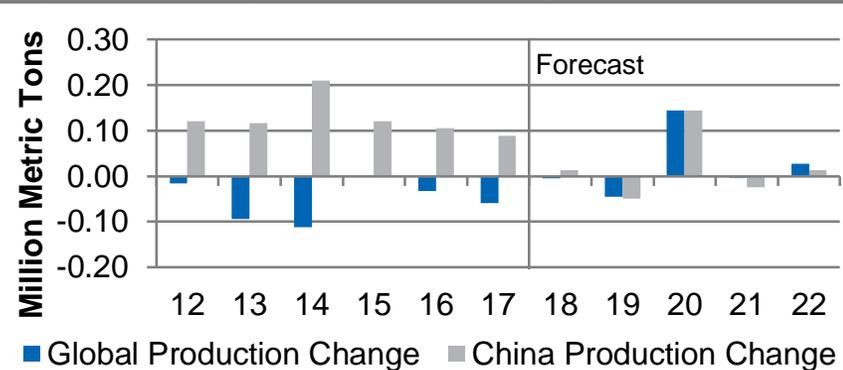
Cumene production change - World vs China



Source: IHS Markit

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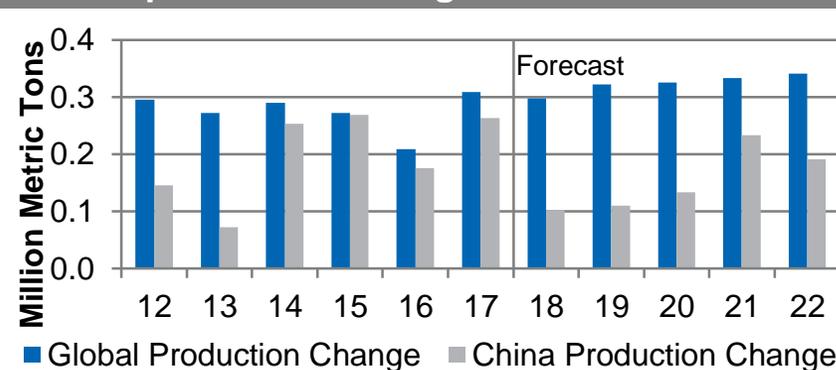
Cyclohexane production change - World vs



Source: IHS Markit

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Aniline production change - World vs China

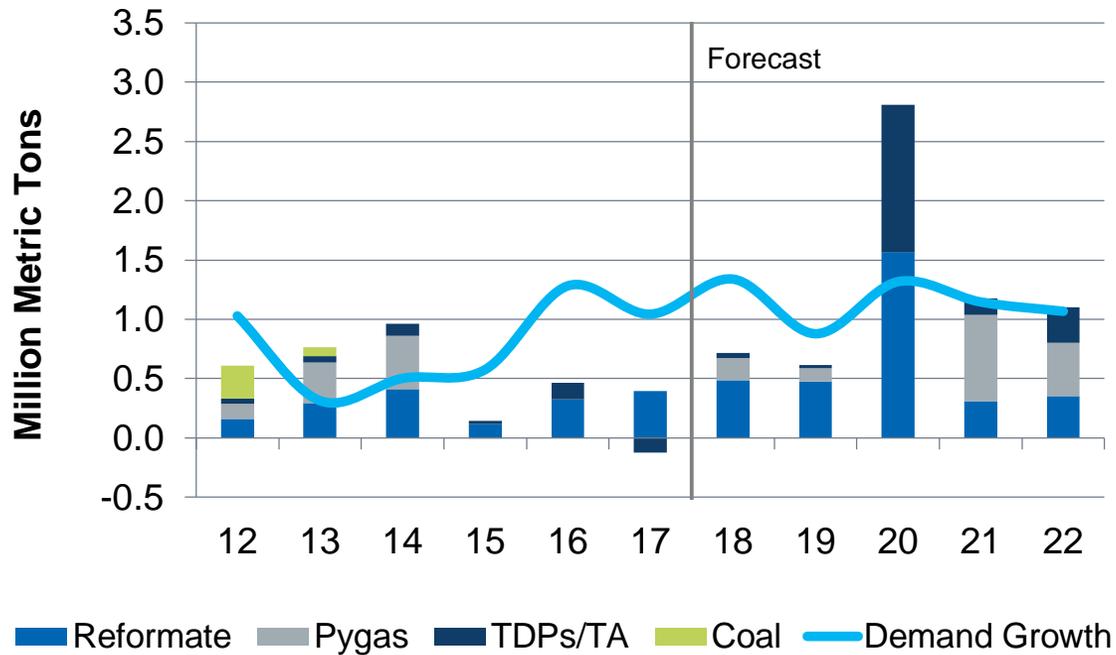


Source: IHS Markit

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China Capacity versus Demand Growth

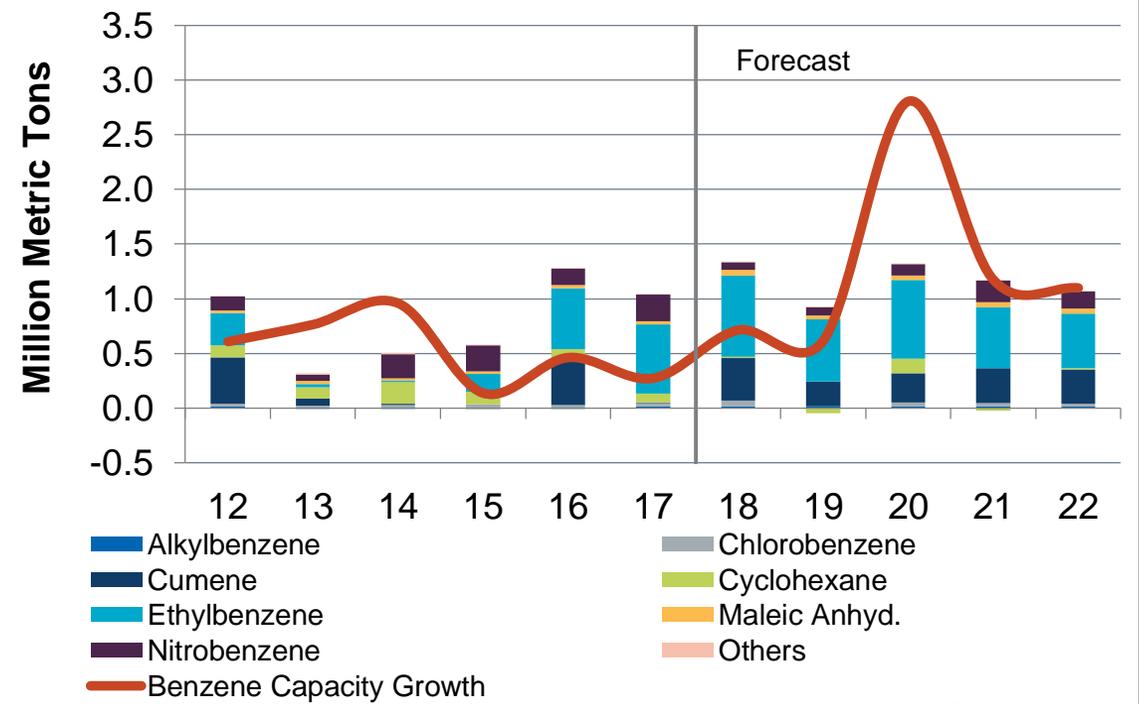
China New Benzene Capacities vs Benzene Demand



Source: IHS Markit

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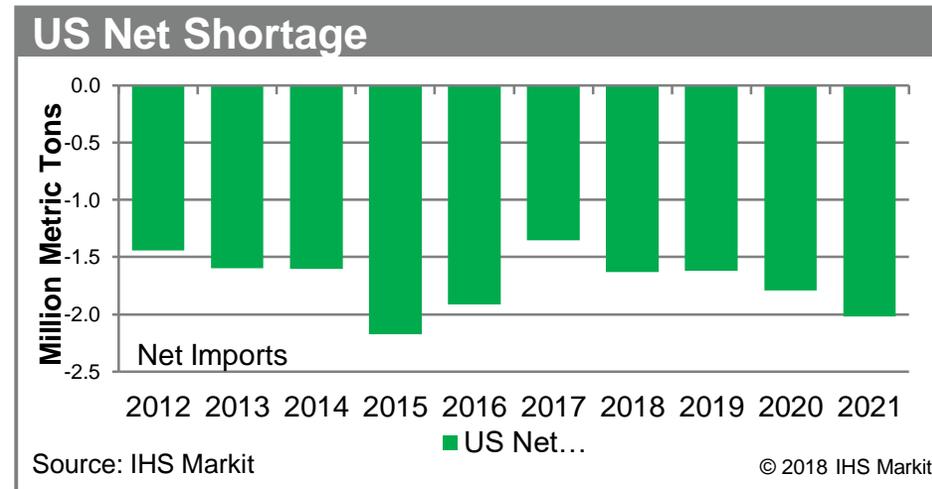
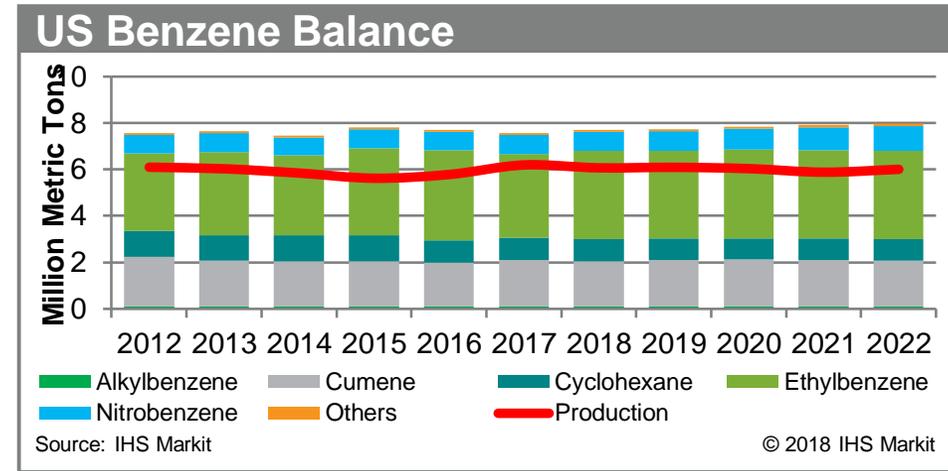
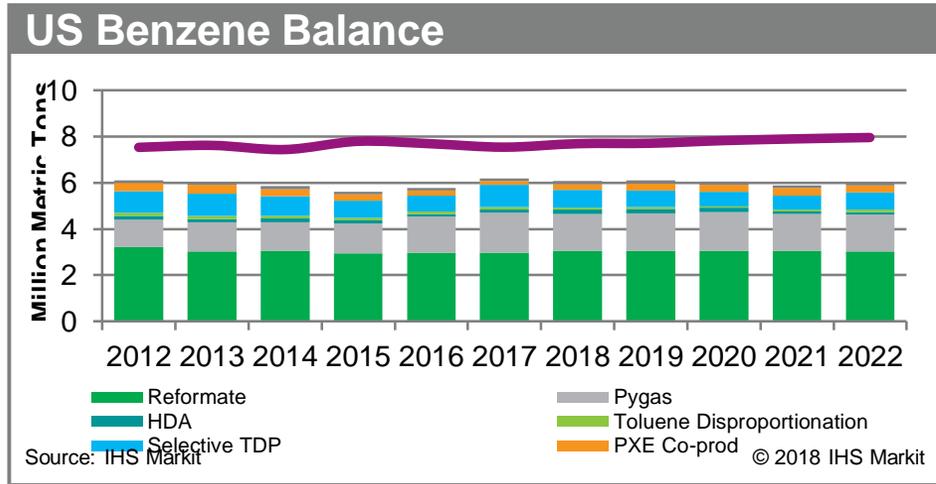
China New Benzene Capacities vs New Derivative Capacities



Source: IHS Markit

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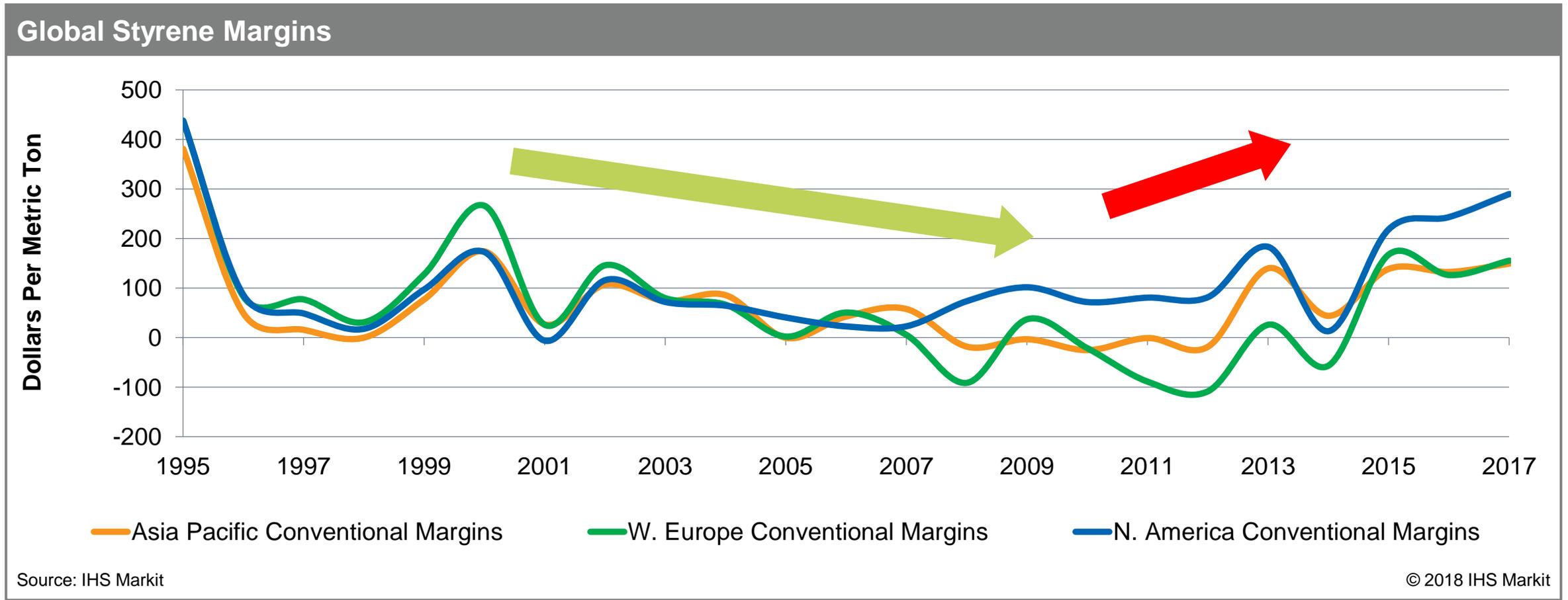
US will continue to be a major importer of Benzene



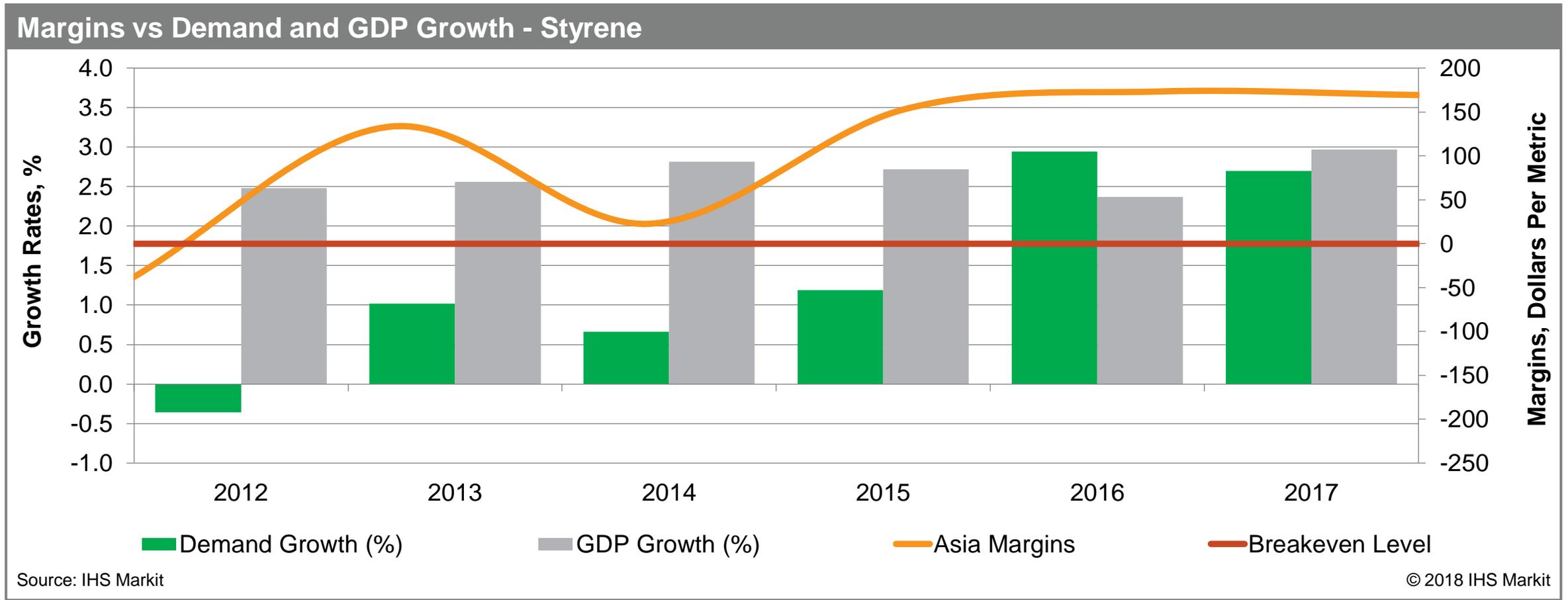
Key factors to watch



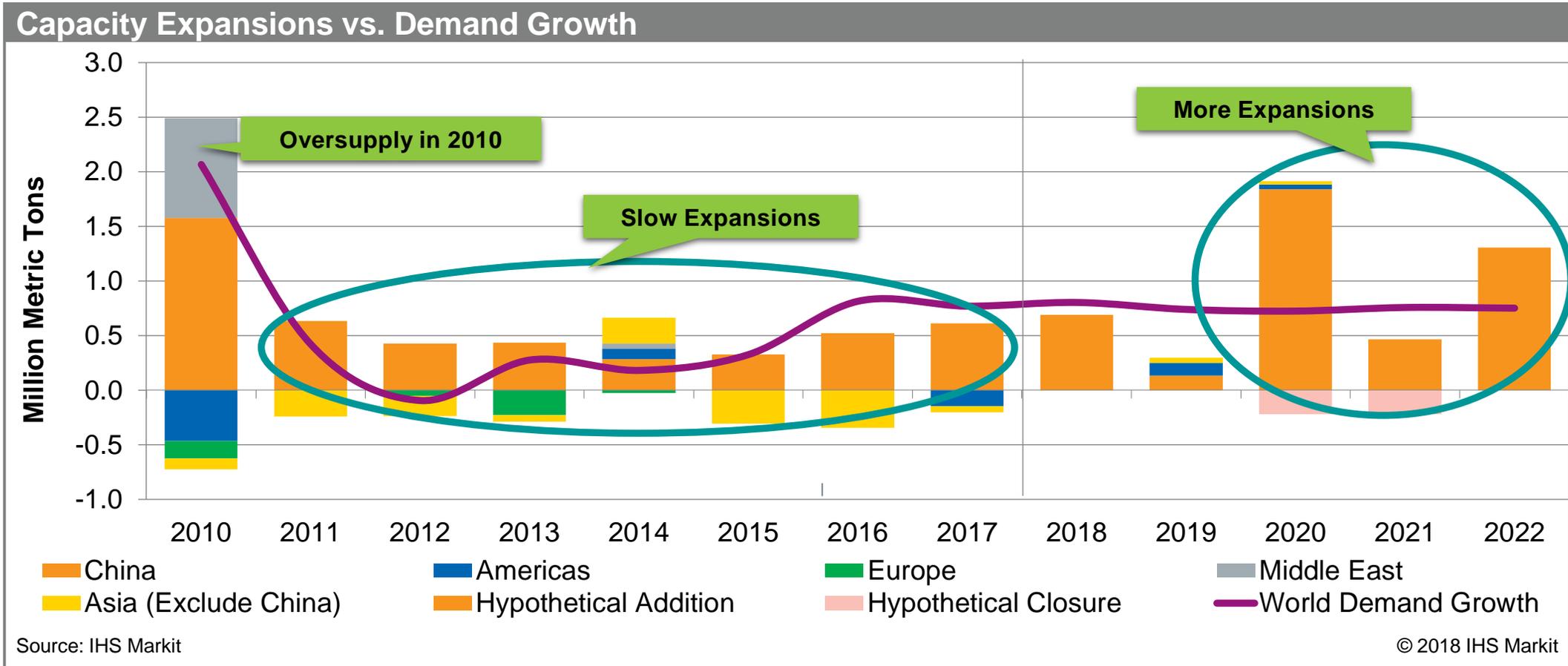
Historically, Styrene margins have been squeezed but rebounded recently



Demand growth has not been a main reason for improving margin but ...

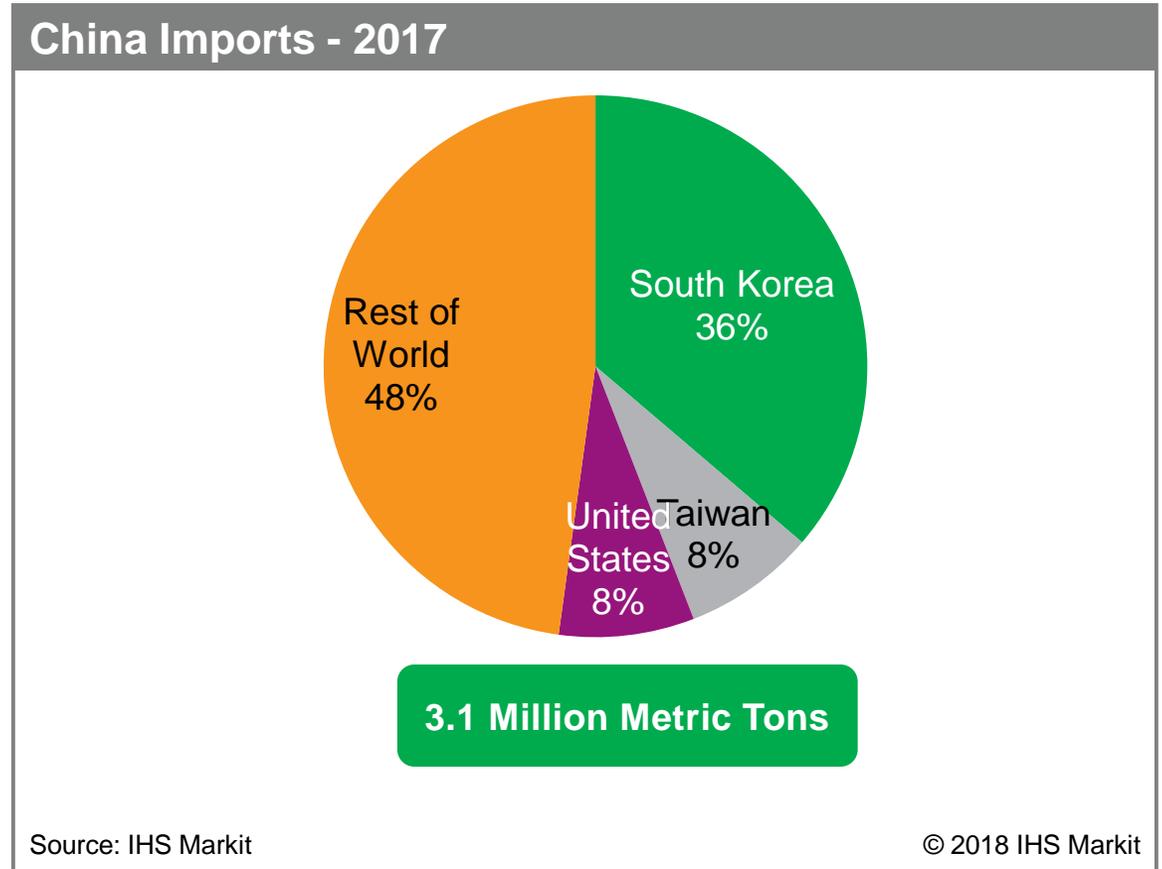


Styrene Capacity Expansions



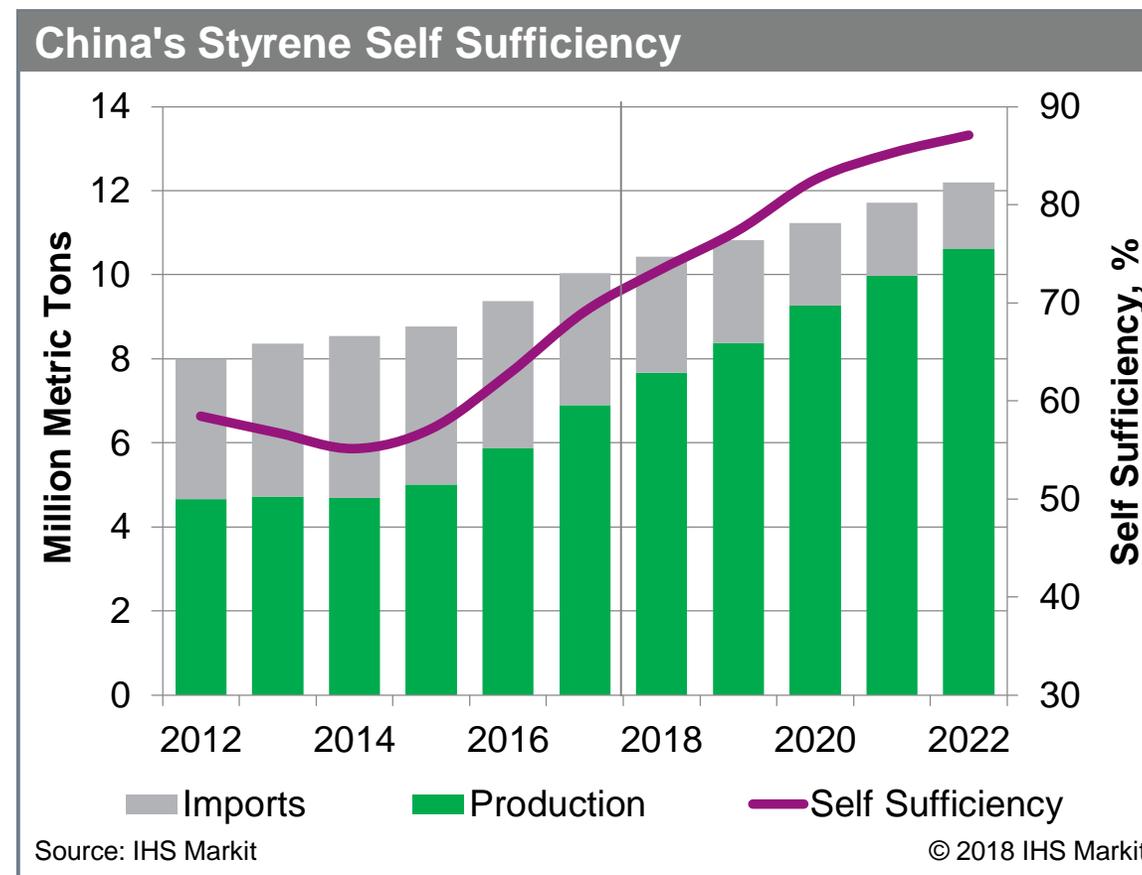
China Anti-dumping investigation

- China started anti-dumping investigation for imports from South Korea, Taiwan and The United States from June 2017.
- Preliminary ADD has been announced 12 February 2018 at rates in the range of 5.0-10.7% before the final result come out after 1 year of investigation.
- Ahead of official announcement, final rates have been notified to producers which are in the range of 3.82-13.9%.
- Lower rates than preliminary ADD from South Korea and Taiwan and higher rates from the United States.
- It has caused changes in styrene trade flows and economics for Chinese polymer producers.



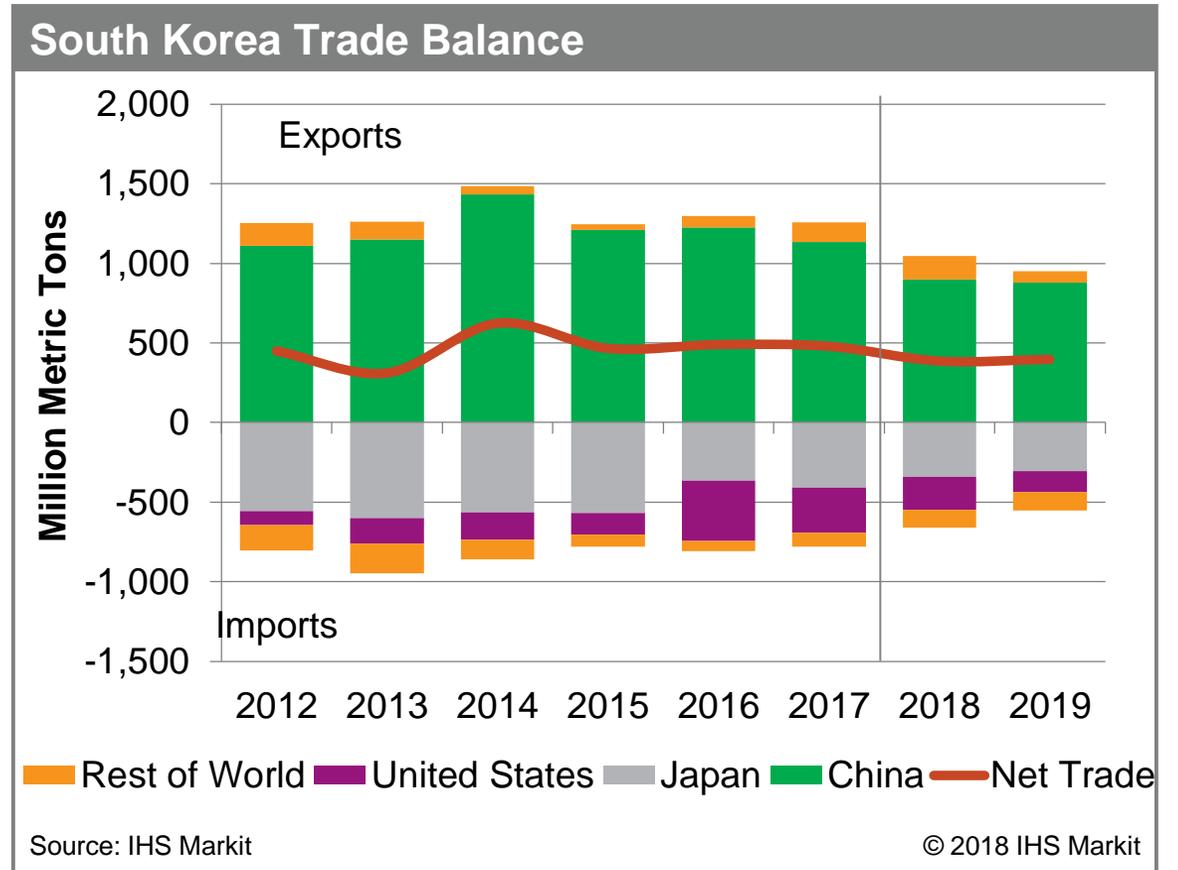
China Anti-dumping investigation and impact

- Chinese imports has been very stable at around 3.5-3.7 million tons during last 4 years.
- But start to decline from 2017 to 3.2 million tons due to limited exports availability outside China and increasing Chinese domestic capacities.
- ADD on styrene imports will accelerate Chinese self sufficiency next 5 years.
- Short term balance in China will be fluctuated by domestic producers operating rate particularly operation by non-integrated producers.
- China imports are expected to decline to around 2.7-2.8 million tons in 2018.



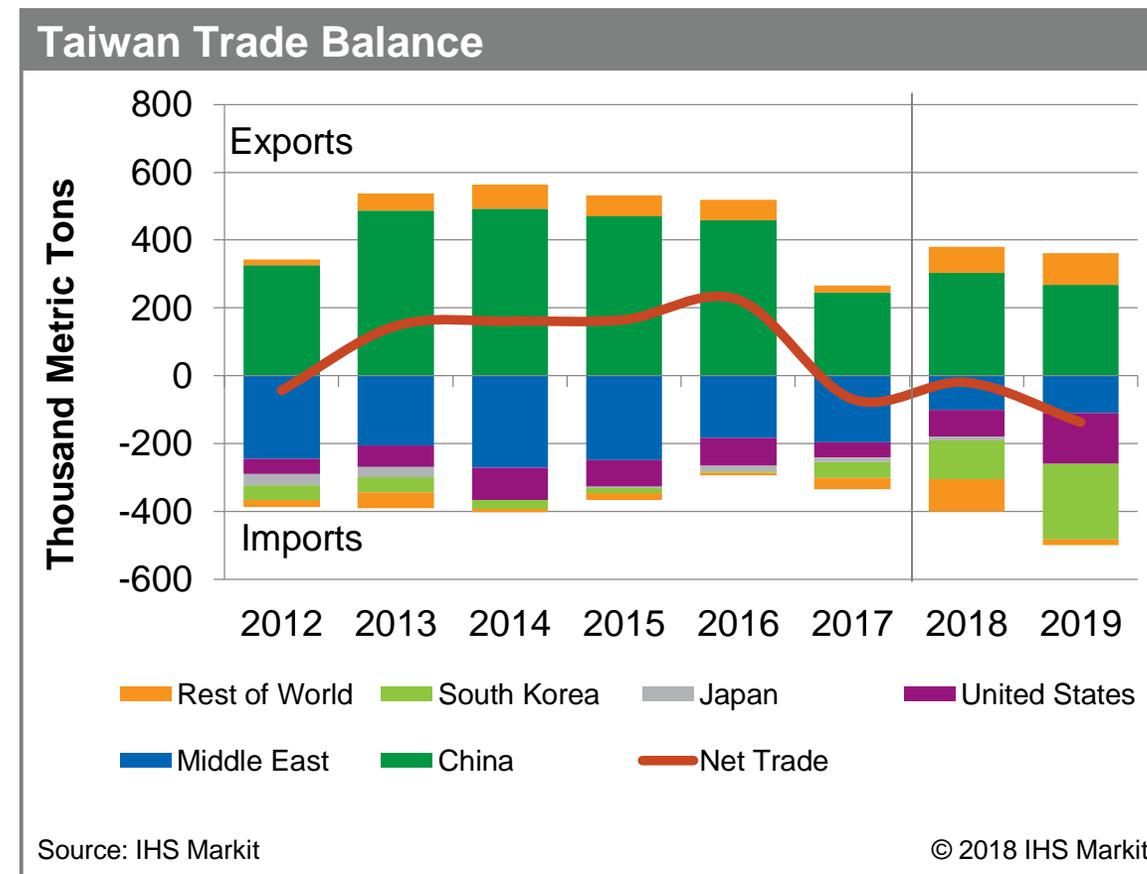
China Anti-dumping investigation and impact (South Korea)

- The preliminary ADD was in the 7.8-8.4% range but final ADD is in the range of 6.2-7.5%. Hanwha Total Petrochemical and Yeochun NCC attract the lowest rate at 6.2%, while LG Chem and SK Global Chemical are at 6.7%. Lotte Chemical has the highest rate at 7.5%.
- South Korea exports more than 1.2 mil tones but net balances are only about 0.45 mil tons due to imports at about 0.75 mil tons.
- Destination of most of South Korean exports is China utilizing favorable logistics.
- Historically, South Korean end-users have enjoyed competitive imports from Japan, US and Middle East while styrene producers focused in exports to China.
- South Korean producers will try supply more to domestic buyers as ADD from China. South Korean export to China will decline at least 0.2 million tons in 2018.



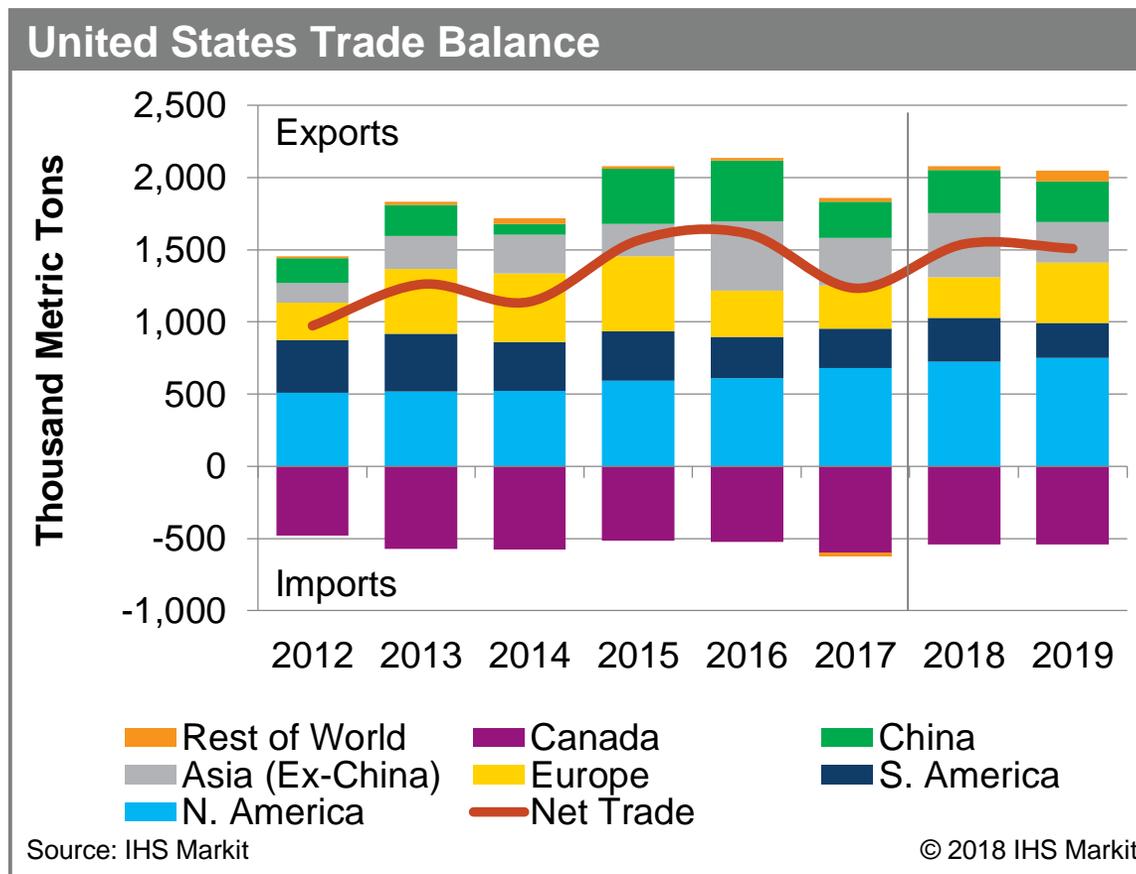
China Anti-dumping investigation and impact (Taiwan)

- The rate is 3.82% for all companies which lower than 5% of preliminary rate, including Formosa Chemicals & Fiber Corp, Grand Pacific Petrochemical Corp, and Taiwan Styrene Monomer Corp.
- Most of Taiwanese export to China by a producer's internal consumption. So, it will be less impacted by ADD from China.
- But it is possible for them to procure more from Chinese domestic supplier.
- Imports from the US and South Korea looks possible to increase and imports from M/E to be reduced.

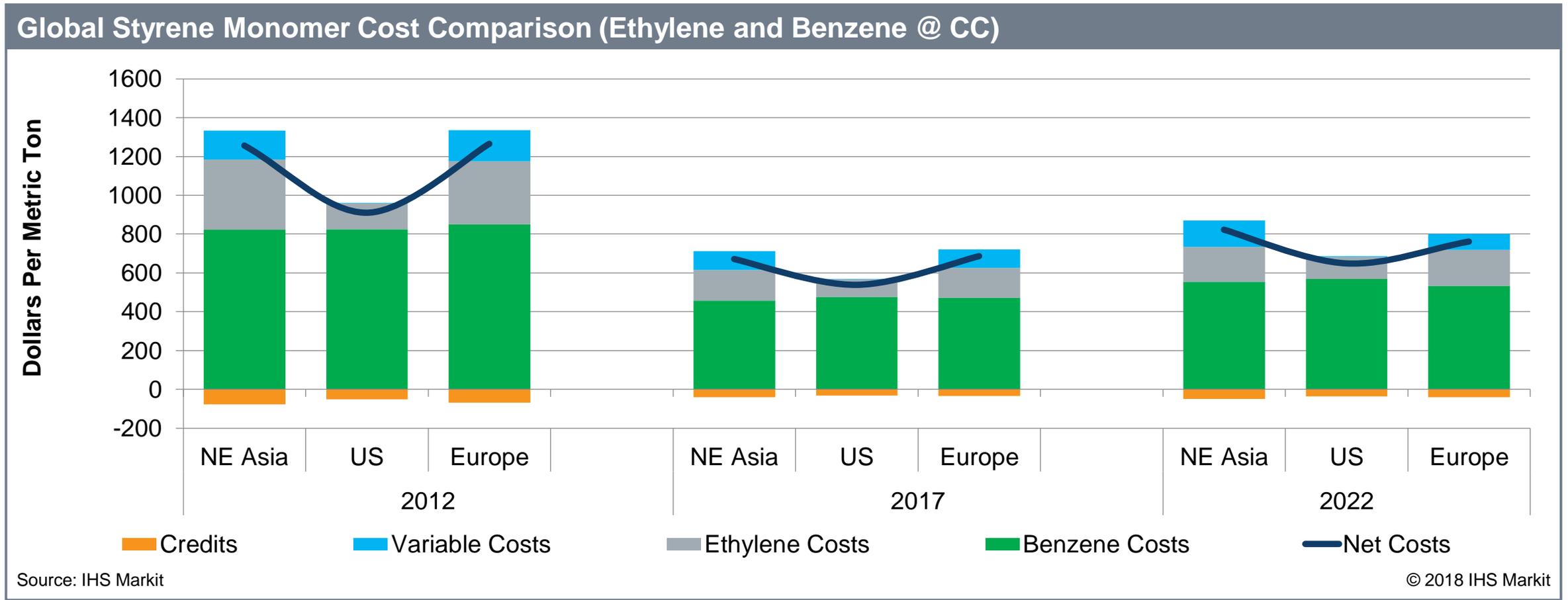


China Anti-dumping investigation and impact (United States)

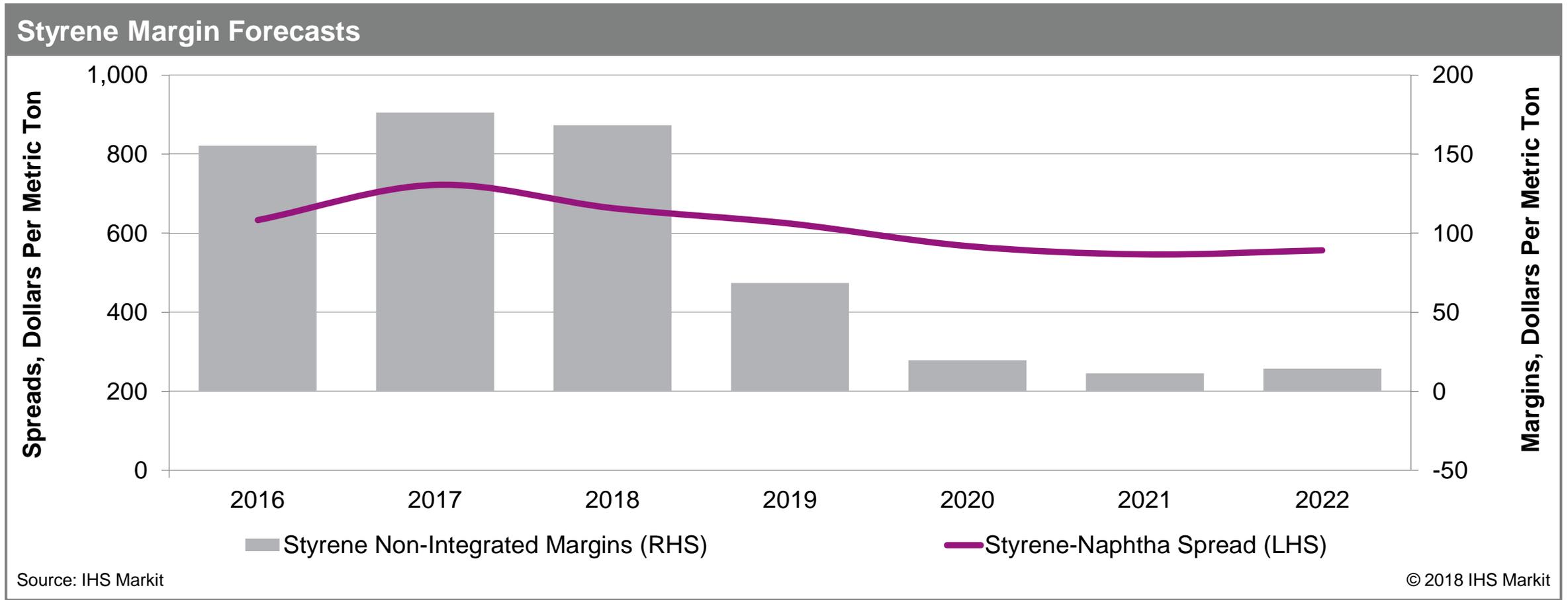
- The preliminary ADD was in the range of 9.2-10.7% but final ADD is in the range of 9.6%-13.9%. Imports from Lyondell Chemical Company will be levied an additional 13.9%, while Ineos Styrolution America and Americas Styrenics are at 9.6%. Westlake Styrene LLC (261,000 mt per year) is at 13.7% and Cosmar will have an ADD rate of 10.7%.
- Export from the U.S has increased to around 2.1 mil tons caused by feedstock competitiveness by 2016 before it declined to 1.9 mi tons in 2017 due to lots of unexpected troubles.
- Usually, around half of US exports are going to Mexico and South American. Another half are swing to Europe or Asia depend on economics.
- US exports will be steady but some of its destination is possible to change to Europe and even to India depends on ADD results.



Where Does Asia Sit in Terms of Cost?



Margin Forecast (Naphtha-Based vs Ethylene/Benzene)



Thank you

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