Aromatics Markets in 2020 and beyond

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Agenda

01 Current market overview
02 Overcapacity and other issues
03 Integration & margins
04 What’s next?
State of the aromatics markets 2020

• PX capacity increased by ~14m tonnes/year since 2018

• 2020 demand impacts

• Variable margins negative
Global PX demand history

Source: ICIS Supply & Demand Database

5%
Annual growth in global capacity 2015-2019

5.8%
Annual growth in global demand 2015-2019
China PX import demand growth

Source: ICIS Supply & Demand Database
Benzene supply & demand

- Benzene demand fall in 2020
- Continued capacity increase
- Weak spreads over naphtha since 2018
- China remains large scale importer
Weak demand, oversupply and stockpiling

Over 6 months of rising inventories in 2020

[Graph showing East China Benzene Inventory with data for 2020, 2017, 2018, and 2019 from January to December.]
Benzene derivative demand

Net balance is capacity to produce – capacity to consume
Styrene margins and oversupply

- Increased capacity – high inventory levels, reduced margins
- Fall in global demand
Global styrene supply & demand forecast

- Average global utilization expected to stay below 80%
- Demand expected to recover by 2022
PET chain feedstock spreads

• Where is the margin?
Intergration down chain has increased in % terms.

However, the actual capacities involved have increased significantly – Integrated PX capacity in 2020 is more than total capacity was in 2010
New Asian COTC complexes' likely to have a better return than the best existing refineries, but also affected under current pricing.

Capacity, location and downstream integration levels effect the relative performance of the COTC complexes’

A number of projects are now being delayed or cancelled due to the uncertainty from COVID-19 and the push for the energy transition.
Leading Chinese PET chain companies

Capacity of PX, PTA, PET of China’s leading PET companies

- Hengyi PC/Rongsheng PC
- Hengli PC
- Shenghong Group
- Tongkun Group

mt/year
Planned paraxylene projects

- North East Asia from 59% to 65% of global capacity by 2024
- Other projects announced in China include Ningxia Boata, Tangshan Risun and Hebei Jiurui
- Other projects in India and Middle East

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Capacity (tonnes)</th>
<th>Estimated timeframe</th>
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</thead>
<tbody>
<tr>
<td>CNOOC</td>
<td>Huizhou</td>
<td>1.5 million</td>
<td>2022</td>
</tr>
<tr>
<td>Dongying Weilan</td>
<td>Dongying</td>
<td>1 million</td>
<td>2023</td>
</tr>
<tr>
<td>Petrochina</td>
<td>Jieyang</td>
<td>2.6 million</td>
<td>2H 2022</td>
</tr>
<tr>
<td>Shenghong</td>
<td>Lianyungang</td>
<td>2.8 million</td>
<td>2H 2022</td>
</tr>
<tr>
<td>Zhejiang Petrochemical</td>
<td>Zhoushan</td>
<td>4 million</td>
<td>By 2023</td>
</tr>
<tr>
<td>Huajin Aramco</td>
<td>Panjin</td>
<td>1.4 million</td>
<td>Late 2024</td>
</tr>
</tbody>
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Recycled vs virgin raw materials

15% of total PET polymer is from recycled material

- Sustainability somewhat takes a back seat
  - Low virgin prices relative to recycled products, at a time of economic survival, takes precedence over environmental aspirations
Recycled vs virgin raw materials

• Packaging/One time applications for cleanliness become the priority
  • The reluctance to reduce packaging use diminishes
  • On-line sales uses more packaging

HOWEVER…

• Styrenics – numerous chemical recycling initiatives – now with industry involvement

• Phenolics & Polyurethanes – little impact from single-use legislation on monomer demand, but various end-use initiatives
Summary

• PX & PTA stockpiling during 2020. Benzene & styrene oversupply in Asia

• Overcapacity more than just a threat now
  • Where will all the benzene go? Can it all be absorbed by potential derivatives?

• Weak production economics
  • Projects will be re-evaluated, postponed, cancelled resulting in the industry getting back in balance
  • Accelerates the eventual outcome of older & inefficient units

• Expected recovery in demand to healthy growth rates will take time
  • Low prices stimulate demand

• Short and longer term impact of sustainability measures
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Thank you