Phenol Asia Scenario

16th International Conference INDIAN Petrochem 2014

By Petrochemical & Feedstock Trading Dept.
PTT International Trading PTE LTD

October 30, 2014
Agenda

- Phenol Value Chain
- Global overview of Phenol & Acetone
- Development of Phenol & Acetone in China & India
- We must survive
- Who are we, “PTT Public Company Limited”
Phenol Chain Derivatives

Upstream:
- Benzene
- Propylene

Intermediate:
- Phenol
  - Cyclohexanone
  - Cyclohexanol
- Bis-Phenol A
  - Epichlorohydrin*

Downstream:
- Alkylphenol
- Phenolic Resin
- Nylon 6
- Nylon 6,6
- Polycarbonate
- Epoxy Resin
- Solvent
- PMMA
- Acrylate
- MIBK
- IPA

Source: IHS (CMAI)  Note: * co-feedstock
- Phenol global demand is about 4-5% while operating rate will maintain only 80% in average because of feedstock constrain and supply glut.
- Nylon chain will be the important factor to boost demand of Phenol, especially in NEA.
- USA would resume to export Phenol but reducing caused by refinery issue.
- WEU will turn from exporter to importer due to feedstock constraint.
- Asia (NEA & SEA) will turn to be the key supplier since 2014.
- India is the most impressive importer by continuous growth of domestic demand.
Global Acetone Demand by Application

- Yearly demand from 2009 to 2019
- Categories: MMA, BPA, MBK, Chem Dir, Solvent, Others
- Graphs showing demand trends and contributions by category for each year
Global Acetone Production

![Chart showing global acetone production from 2009 to 2019 across different regions. Each year's production is represented by a bar chart with color-coded regions: NAM, SAM, WEU, EEU, MEA, India, NEA, and SEA. The chart indicates a steady increase in production over the years.]
- BPA & MMA is key driver for Asia demand, however, SEA demand grows in slow pace.
- India is the most impressive importer by continuous growth of domestic demand, especially Pharmaceutical field.
DEVELOPMENT OF PHENOL & ACETONE IN CHINA & INDIA
Mostly, PH/AC expansion takes place in Asia especially 2014-2016.
Deep dive of Asia Development

NEA Capacity Development

SEA Capacity Development

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Taiwan
S. Korea
Japna
China

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Thailand
Singapore
Phenol Consumption

Acetone Consumption

5,800  global demand
### Phenol & Acetone Capacity Expansion 2014-2017

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Country</th>
<th>Phenol</th>
<th>Acetone</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinopec Yanshan</td>
<td>Beijing</td>
<td>China</td>
<td>(+) 125</td>
<td>(+75)</td>
<td>Q3, 2014</td>
</tr>
<tr>
<td>Kingboard</td>
<td>Huizhou</td>
<td>China</td>
<td>(+75)</td>
<td>(+45)</td>
<td>Q3, 2014</td>
</tr>
<tr>
<td>Sinopec Mitsui</td>
<td>Caojing</td>
<td>China</td>
<td>250</td>
<td>150</td>
<td>Oct 2014</td>
</tr>
<tr>
<td>FCFC</td>
<td>Ningbo</td>
<td>China</td>
<td>300</td>
<td>180</td>
<td>Q1, 2015</td>
</tr>
<tr>
<td>Cepsa Quimica</td>
<td>Caojing</td>
<td>China</td>
<td>250</td>
<td>150</td>
<td>Q1, 2015</td>
</tr>
<tr>
<td>Kumho</td>
<td>Yeosu</td>
<td>S. Korea</td>
<td>300</td>
<td>180</td>
<td>Q3, 2015</td>
</tr>
<tr>
<td>PTT Phenol II</td>
<td>Maptaphut</td>
<td>Thailand</td>
<td>300</td>
<td>155</td>
<td>Q3, 2015</td>
</tr>
<tr>
<td>Ineos</td>
<td>Nangjing</td>
<td>China</td>
<td>400</td>
<td>250</td>
<td>2016</td>
</tr>
<tr>
<td>CNOOC Huizhou</td>
<td>Huizhou</td>
<td>China</td>
<td>220</td>
<td>130</td>
<td>2017</td>
</tr>
<tr>
<td>PTT Phenol I</td>
<td>Maptaphut</td>
<td>Thailand</td>
<td>(+50)</td>
<td>(+30)</td>
<td>2017</td>
</tr>
<tr>
<td>Mitsui Chemical</td>
<td>Chiba</td>
<td>Japan</td>
<td>-250</td>
<td>-150</td>
<td>Sep 2014</td>
</tr>
</tbody>
</table>
BPA Capacity Expansion 2014-2015

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Country</th>
<th>Capacity</th>
<th>Start-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nanya Plastics</td>
<td>Ningbo</td>
<td>China</td>
<td>150</td>
<td>End 2014</td>
</tr>
<tr>
<td>Changchun Plastic</td>
<td>Jiangsu</td>
<td>China</td>
<td>135</td>
<td>End 2014</td>
</tr>
<tr>
<td>Shandong Lihuayi</td>
<td>Shandong</td>
<td>China</td>
<td>120</td>
<td>2014</td>
</tr>
<tr>
<td>Sinopec-Sabic Tianjin</td>
<td>Tianjin</td>
<td>China</td>
<td>200</td>
<td>2014</td>
</tr>
<tr>
<td>Kingboard</td>
<td>Yangzhou</td>
<td>China</td>
<td>120</td>
<td>2014</td>
</tr>
<tr>
<td>Sinopec-Mitsui</td>
<td>Shanghai</td>
<td>China</td>
<td>150</td>
<td>2015</td>
</tr>
<tr>
<td>Bayer Shanghai</td>
<td>Shanghai</td>
<td>China</td>
<td>200</td>
<td>2015</td>
</tr>
</tbody>
</table>

1 M.TON of BPA consumes Phenol 0.87 M.TON & Acetone 0.29 M.TON
China will more self-sufficient, while India becomes the key importers of Phenol & Acetone

Phenol

China may not able to export due to incentive tax concern

Acetone

India | China
ADD will justify the trade flow of Phenol to India

**2012**

- USA: 57%
- Taiwan: 20%
- S. Africa: 8%
- S. Korea: 6%
- Thailand: 6%
- Other: 3%

**2013**

- USA: 23%
- Taiwan: 29%
- S. Korea: 17%
- S. Africa: 9%
- Thailand: 6%
- Singapore: 6%
- Other: 6%

Source: the Ministry of Commerce
<table>
<thead>
<tr>
<th>Supplier</th>
<th>ADD</th>
<th>Import Duty</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPCL (via MBK)</td>
<td>$0</td>
<td>6%</td>
<td>Import duty will become 5%</td>
</tr>
<tr>
<td>PPCL (PPCLshipper)</td>
<td>$10</td>
<td>6%</td>
<td>Import duty will become 5%</td>
</tr>
<tr>
<td>PPCL (Others)</td>
<td>$172</td>
<td>6%</td>
<td>Import duty will become 5%</td>
</tr>
<tr>
<td>MPS</td>
<td>$0</td>
<td>6%</td>
<td>Import duty will become 5%</td>
</tr>
<tr>
<td>Korea</td>
<td>$0</td>
<td>7.5%</td>
<td>ADD withdrawn on Feb 2012</td>
</tr>
<tr>
<td>Taiwan</td>
<td>47.29-78.97</td>
<td>7.5%</td>
<td>Depends on Producer/Exporter</td>
</tr>
<tr>
<td>USA</td>
<td>$159.63</td>
<td>7.5%</td>
<td>New ADD investigation start May 2013</td>
</tr>
<tr>
<td>EU</td>
<td>$0</td>
<td>7.5%</td>
<td>ADD withdrawn on May 2013</td>
</tr>
<tr>
<td>Sasol</td>
<td>$119</td>
<td>7.5%</td>
<td></td>
</tr>
<tr>
<td>Japan (MBK shipper)</td>
<td>$468</td>
<td>7.5%</td>
<td></td>
</tr>
<tr>
<td>Japan others</td>
<td>$547</td>
<td>7.5%</td>
<td></td>
</tr>
</tbody>
</table>

Note: [http://antidumpinglaws.com/content.php?id=Notification432014](http://antidumpinglaws.com/content.php?id=Notification432014)
Graphically Indian Phenol Flow

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Phenol Capacity</th>
<th>Acetone Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindustan Organic Chemicals Ltd (HOCL)</td>
<td>Kochi, Kerala</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td>SI Group India Ltd</td>
<td>Mumbai, Maharashtra</td>
<td>37</td>
<td>21</td>
</tr>
</tbody>
</table>

- Due to constraints of propylene, India still has no firm plan to build new phenol.
- Hence, India shall rely on import with International price, especially China.

Phenol tanks categorized into two types

1. Molten (Heated Phenol); 15,000 MTA
2. Hydrate; 15,000 MTA

Tank located in Hazira/ Mumbai/ JNPT/Kandla

India Phenol demand is 22,000 – 23,000 MT/Month; however, India must to import about 17,000 – 18,000 MT/Month
“It’s not that I’m so smart;
It’s just that I stay with problems longer.”

- Albert Einstein

WE WILL SURVIVE!!!
PH/AC compared with Feedstock Price

Spread (PH-BZ) is calculated by PH CFR CHINA – 0.9 of BZ FOB KOR
Additional Supply of Phenol & ambiguous demand will limit the production in range of 80 – 85%
Summary

- Capacity expansion in Asia will accelerate the closure of inefficient PH/AC plants.
- Feedstock (especially Benzene) will severely push the pressure for PH/AC production especially in Europe.
- Acetone will relieve the painful of PH/AC complexes.
- However, the operation rate should maintain only 80 – 85% to encounter the pressure of feedstock and poor demand.
- Market expects demand from CXanone will improve the sentiment since 2017-2018.
PTT Public Company Limited
PTT Overview

Shareholders Structure

Total foreign shares must not exceed 30%, each foreign shareholder not exceed 5%

- Minority shareholders Local Investors & Institutions
- Foreign, 11.859
- Vayupak, 15.268
- Others, 21.728
- GOV, 51.145

PTT is State Enterprise Co. Government through MOF is majority shareholder
PTT Overview

Business Chain

Upstream

Intermediate

Downstream

End Customers

Gas Chain

Oil Chain

Petrochemical Chain

Gas

Pipeline

Gas Separation Plants

Power Plants

Industry

NGV

PTT Stations

Diesel

LPG

Lubra Base Plant

Export Markets

Natural Gas

Crude Oil

Crude Oil Procurement

Transportation

Refinery

Thin Film

Plastic Resin

End Products

PTTEP

Natural Gas Mix

Gas Products

Petroleum Coke

Intermediate Plants

Export Markets

Plastic Resin
PTT Overview

PTT Public Co., Ltd.
International Trading Business Unit
Petrochemicals & Feedstock Trading Department

Petrochemical & Feedstock Trading Department
Mr. Pichairat / Vice President

Head of Operation
Ms. Sudaluk/Manager

Olefins
Ms. Patchariya
Mr. Mongkol
Ms. Tuangporn

Aromatics
Mr. Settawat (settawat.t@pttlc.com)
Mr. Rawin (rawin.v@pttplc.com)
Mr. Waranyu (waranyu.w@pttplc.com)
Mr. Sujirote (sujrote.t@pttplc.com)
Mr. Thanapoom (thanapoom.s@pttplc.com)

Feedstock & By Products
Mr. Nattapee
Ms. Vathu
Ms. Jitlada

Other Chemicals
Mr. Wiroon
Mr. Monthat

Other
## Business Activities

**Feedstock**  
**Upstream**  
**Intermediate**

<table>
<thead>
<tr>
<th>Light Naphtha Raffinate</th>
<th>Ethylene</th>
<th>MEG</th>
<th>Polyester resin &amp; fiber, Antifreeze</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia Sulphuric Acid</td>
<td>Propylene</td>
<td>Ethanolamine (Di, Tri) Ethoxylate</td>
<td>Fertilizer</td>
</tr>
<tr>
<td>Butene-1</td>
<td></td>
<td>MMA</td>
<td>Coating, Resins, Latex paint, Oil additive</td>
</tr>
<tr>
<td>Iso, N-Butane</td>
<td></td>
<td>MTBE</td>
<td>Octane booster</td>
</tr>
<tr>
<td>Pygas</td>
<td>Benzene</td>
<td>SM</td>
<td>PS</td>
</tr>
<tr>
<td>Toluene</td>
<td></td>
<td>Cyclohexane</td>
<td>Solvent, Fiber, Nylon 6 &amp; 66</td>
</tr>
<tr>
<td>Mixed Xylene</td>
<td></td>
<td>Phenol</td>
<td>Resins, Plywood adhesives</td>
</tr>
<tr>
<td>Ortho Xylene</td>
<td></td>
<td>Acetone</td>
<td>Solvent, Pharmaceutical</td>
</tr>
<tr>
<td>Paraxylene</td>
<td></td>
<td>BPA</td>
<td>Coating, Adhesives, Resins, Sheet&amp;Film</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PTA</td>
<td>Polyester</td>
</tr>
<tr>
<td>MEK</td>
<td>IPA</td>
<td></td>
<td>Solvent</td>
</tr>
<tr>
<td>Ethanol</td>
<td></td>
<td></td>
<td>Solvent, Octane booster</td>
</tr>
<tr>
<td>Methanol</td>
<td></td>
<td></td>
<td>Solvent</td>
</tr>
</tbody>
</table>

**January 2014**