Acetyls Chain - World Market Overview

Chemicals Committee Meeting at APIC 2015
Seoul, 8 May 2015

Keiji Wakatsuki
APIC 2015
ACETIC ACID/ACETYLS CHAIN

Source: Tecnon OrbiChem
Global acetic acid prices increased in late 2013/early 2014 due to long-term methanol plant outages in Southeast Asia and unplanned production problems for acetic acid in Saudi Arabia and the United States.

Acetic acid prices peaked in Q2 2014 amid ongoing planned turnarounds in the US Gulf, unplanned production problems in other regions and persistent high methanol prices. An unplanned outage in the United Kingdom in Q3 supported prices in North America and Europe.


Global utilisation rates were expected to remain close to 70% from 2015-2020 as over-supply conditions persist in China and various macro-economic scenarios keep markets unsteady.

Source: Tecnon OrbiChem
APIC 2015
ACETIC ACID PRICES 2010 - 2015

Source: Tecnon OrbiChem
APIC 2015
WORLD ACETIC ACID SUPPLY & DEMAND BY REGION 2014

Production
- Total = 12.9 Million Metric Tons
- N & S America: 43%
- W Europe: 19%
- NE Asia: 15%
- S & SE Asia: 10%
- ME & Africa: 13%
- E Europe: 12%
- China: 3%
- Other: 8%

Consumption
- Total = 12.9 Million Metric Tons
- N & S America: 19%
- W Europe: 10%
- ME & Africa: 13%
- E Europe: 12%
- China: 42%
- Other: 3%

Source: Tecnon OrbiChem
APIC 2015
WORLD ACETIC ACID CONSUMPTION 2014

- VAM 32%
- Anhydride 13%
- Ethyl Acetate 13%
- Butyl Acetate 7%
- PTA 20%
- MCAA 6%
- Others 9%

Total = 12.9 Million Metric Tons

Source: Tecnon OrbiChem
APIC 2015
WORLD ACETIC ACID CONSUMPTION GROWTH

2014 = 12.9 Million Metric Tons

Source: Tecnon OrbiChem
Source: Tecnon OrbiChem
## APIC 2015
### WORLD ACETIC ACID CAPACITY ADDITIONS

<table>
<thead>
<tr>
<th>Company</th>
<th>Country</th>
<th>Change (ktpa)</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celanese</td>
<td>USA</td>
<td>150</td>
<td>2012</td>
</tr>
<tr>
<td>Anhui Huayi Coal Chemical</td>
<td>China</td>
<td>500</td>
<td>2012</td>
</tr>
<tr>
<td>Henan Yima Gas Co</td>
<td>China</td>
<td>200</td>
<td>2013</td>
</tr>
<tr>
<td>China Great Wall Energy Co</td>
<td>China</td>
<td>300</td>
<td>2014</td>
</tr>
<tr>
<td>Henan Longyu Coal Chemical</td>
<td>China</td>
<td>400</td>
<td>2014</td>
</tr>
<tr>
<td>YARACO 2</td>
<td>China</td>
<td>650</td>
<td>2016</td>
</tr>
<tr>
<td>Other Projects</td>
<td>US, India, etc</td>
<td>~500</td>
<td>2014-17</td>
</tr>
<tr>
<td>Reliance</td>
<td>India</td>
<td>790</td>
<td>2017-18</td>
</tr>
<tr>
<td>BP-Oman Oil Co.</td>
<td>Oman</td>
<td>1000</td>
<td>2019-20</td>
</tr>
</tbody>
</table>

Source: Tecnon OrbiChem
VAM prices increased rapidly in late Q1/Q2 2014 due to a combination of factors – production outages globally, several ‘force majeure’ declarations in the US Gulf, high feedstock costs and logistics/shipping delays. Spot market prices doubled over a period of 4-6 weeks.

At one point, all four major US Gulf VAM producers were either on ‘force majeure’ or sales allocation during Q2. ‘Force majeure’ declarations remained in place until December as producers carried out further maintenance during Q3/Q4.

Faced with record high prices and unsure about security of supply, consumers turned to alternative sources for VAM volumes in Q2. Large volumes of VAM were shipped from Singapore, Taiwan and China.

Chinese VAM producers looked for export opportunities despite concerns expressed by western consumers about product quality. However, as market supplies improved in Q4, spot prices plummeted and Chinese producers cut production rates to avoid end-year inventory builds.

Source: Tecnon OrbiChem
APIC 2015
VINYL ACETATE MONOMER SPOT PRICES 2011 - 2015

Source: Tecnon OrbiChem
APIC 2015
WORLD VINYL ACETATE SUPPLY & DEMAND
BY REGION 2014

Production

Consumption

Total = 5.8 Million Metric Tons

Source: Tecnon OrbiChem
APIC 2015
WORLD VAM CONSUMPTION 2014

- PVAc: 43%
- PVOH: 40%
- EVA: 9%
- Others: 8%

Total = 5.8 Million Metric Tons

Source: Tecnon OrbiChem
**APIC 2015**

**WORLD VAM CONSUMPTION GROWTH**

2014 = 5.8 Million Metric Tons

Source: Tecnon OrbiChem
APIC 2015
KEY VAM TRADE ROUTES 2014

Source: Tecnon OrbiChem
### APIC 2015
### WORLD VAM CAPACITY ADDITIONS

<table>
<thead>
<tr>
<th>Company</th>
<th>Country</th>
<th>Change (ktpa)</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Mongolia Shuangxin</td>
<td>China</td>
<td>200</td>
<td>2011</td>
</tr>
<tr>
<td>Sichuan Vinylon Works</td>
<td>China</td>
<td>300</td>
<td>2011</td>
</tr>
<tr>
<td>Inner Mongolia Mengwei</td>
<td>China</td>
<td>200</td>
<td>2011</td>
</tr>
<tr>
<td>Shaanxi Yanchang Group</td>
<td>China</td>
<td>300</td>
<td>2013</td>
</tr>
<tr>
<td>Changdai</td>
<td>Singapore</td>
<td>350</td>
<td>2013</td>
</tr>
<tr>
<td>China Great Wall Chemical</td>
<td>China</td>
<td>450</td>
<td>2013</td>
</tr>
<tr>
<td>Various</td>
<td>US, Europe</td>
<td>~150</td>
<td>2015-16</td>
</tr>
<tr>
<td>Reliance Industries</td>
<td>India</td>
<td>300</td>
<td>2018-19</td>
</tr>
</tbody>
</table>

Source: Tecnon OrbiChem
APIC 2015
ASIAN ACETIC ACID PRODUCTION CAPACITY 2014

China Total = 10 Million Metric Tons

Source: Tecnon OrbiChem
**APIC 2015**

**ACETIC ACID DEMAND NE & SE ASIA vs CHINA 2014**

**NE & SE Asia**

- Total = 3.18 Million Metric Tons

**China**

- Total = 5.38 Million Metric Tons

- Source: Tecnon OrbiChem
APIC 2015

ASIAN ACETIC ACID CONSUMPTION
BY COUNTRY 2014

1,000 Metric Tons

Source: Tecnon OrbiChem
China 61%
Taiwan 12%
Japan 13%
Singapore 10%
South Korea 4%

China Total = 3.4 Million Metric Tons

Source: Tecnon OrbiChem
**APIC 2015**

**VAM DEMAND NE & SE ASIA vs CHINA 2014**

**NE & SE Asia**
- 11% Others
- 14% EVA
- 44% PVOH
- 31% PVAc

Total = 1.45 Million Metric Tons

**China**
- 4% Others
- 4% EVA
- 30% PVOH
- 62% PVAc

Total = 1.79 Million Metric Tons

Source: Tecnon OrbiChem
APIC 2015

ASIAN VAM CONSUMPTION BY COUNTRY 2014

Source: Tecnon OrbiChem
APIC 2015

SUMMARY AND CONCLUSIONS

- World acetic acid consumption growth will average 4.0%-4.5% per annum through 2020 with China, Southeast Asia and North America setting the pace. VAM consumption growth will average 3.5%-4.0% per annum through 2020.

- Acetic acid utilisation rates globally are forecast to remain between 68%-70% during the period of 2014-2020 based on current capacity figures. Improved business conditions and further rationalisation could impact operating rates moving forward.

- Acetic acid/VAM prices remain more sensitive to regional supply/demand problems, rather than changes in feedstock prices, but feedstock volatility is a threat throughout the value chain.

- China has emerged as an important exporter of acetic acid, ethyl acetate and VAM, and will continue to export large volumes.

- Currency depreciation and exchange rate fluctuations remain troubling for major acetyls trade partners, producers.

Source: Tecnon OrbiChem
.....your source of expert chemical industry knowledge