Acetic Acid • Vinyl Acetate

Tecnon OrbiChem Seminar at KICHEM 2012
Seoul - 2 November, 2012

Keiji Wakatsuki
KICHEM 2012
PRESENTATION OUTLINE

• Current Acetic Acid Market Conditions
• Major Downstream Markets
• Summary and Conclusions

Source: Tecnon OrbiChem
Global acetic acid markets have not been as robust in 2012 as originally expected due to ongoing economic headwinds in Europe and overcapacity in Asia. Market participants expected to retain a wait-and-see attitude in Q3-Q4.

Despite the gloomy macro-economic outlook, global acetic acid consumption was expected to increase by more than 5% in 2012 compared to 2011.

Global acetic acid prices spiked briefly in March-April 2012 but fell just as quickly as major production outages failed to offer long-term support. Production problems in the US led to moderate price increases in August.

Capacity increases are set to continue in China for next 1-2 years, but the period of seemingly non-stop acetic acid plant expansions in the country is coming to an end.

Global utilisation rates at 70-75% in 2012 as producers cut production in order to reduce supplies and maintain margins.

Source: Tecnon OrbiChem
KICHEM 2012
WORLD CAPACITY TO PRODUCE ACETIC ACID

Total 2005
10.554 Million Tons

Total 2012
17.949 Million Tons

Source: Tecnon OrbiChem
**KICHEM 2012**

**ACETIC ACID CAPACITY DISTRIBUTION**

**WORLD and CHINA 2012**

- Northeast: 3%
- Southwest: 8%
- Northwest: 5%
- North China: 24%
- Cent. China: 5%
- East China: 55%
- NE Asia: 12%
- West Europe: 6%
- ME & Africa: 4%
- South & SE Asia: 9%
- EE & Russia: 3%
- North America: 16%

**Global Capacity:** 17.9 Million Tons

**China Capacity:** 8.6 Million Tons

Source: Tecnon OrbiChem
KICHEM 2012
WORLD ACETIC ACID CONSUMPTION: 2005 vs 2012

2005 = 8.474 Million Tons

2012 = 12.489 Million Tons

Source: Tecnon OrbiChem
Consumption
12.4 Million Tons

Production
12.4 Million Tons

Source: Tecnon OrbiChem
KICHEM 2012
ACETIC ACID PRICES: Q1 2009-2012

Dollars per Ton

Source: Tecnon OrbiChem

USG Export
Taiwan Import
China Import
Euro Contract
China Export

Source: KICHEM 2012
# KICHEM 2012
## 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>Anhui Huayi Coal Chemical</td>
<td>China</td>
<td>500</td>
<td>2012</td>
</tr>
<tr>
<td>Ningxia Yinglight Chemical</td>
<td>China</td>
<td>300</td>
<td>2012</td>
</tr>
<tr>
<td>Henan Yima Gas Co</td>
<td>China</td>
<td>200</td>
<td>2013</td>
</tr>
<tr>
<td>Henan Longyu Coal Chemical</td>
<td>China</td>
<td>400</td>
<td>2014</td>
</tr>
<tr>
<td>Celanese</td>
<td>USA</td>
<td>250</td>
<td>2014(?)</td>
</tr>
<tr>
<td>Yangtze River Acetylts (YARACO)</td>
<td>China</td>
<td>650</td>
<td>2015</td>
</tr>
<tr>
<td>Reliance</td>
<td>India</td>
<td>790</td>
<td>2015/6</td>
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<tr>
<td>BP-IOC</td>
<td>India</td>
<td>1000</td>
<td>2016</td>
</tr>
<tr>
<td>Petrobras</td>
<td>Brazil</td>
<td>200</td>
<td>2017</td>
</tr>
<tr>
<td>Other projects</td>
<td>Egypt, India, US</td>
<td>~1000</td>
<td>2016</td>
</tr>
</tbody>
</table>

Source: Tecnon OrbiChem
### KICHEM 2012

**WORLD ACETIC ACID CAPACITY CLOSURES**

<table>
<thead>
<tr>
<th>Company</th>
<th>Country</th>
<th>Change (ktpa)</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>MSK</td>
<td>Serbia</td>
<td>(100)</td>
<td>2011</td>
</tr>
<tr>
<td>Shaanxi Yanchang</td>
<td>China</td>
<td>(250)</td>
<td>2012</td>
</tr>
<tr>
<td>Wacker</td>
<td>Germany</td>
<td>(100)</td>
<td>2012</td>
</tr>
<tr>
<td>Celanese</td>
<td>Singapore</td>
<td><em>(600)</em></td>
<td>2012</td>
</tr>
<tr>
<td>Celanese</td>
<td>Nanjing, China</td>
<td><strong>(300)</strong></td>
<td>2013</td>
</tr>
</tbody>
</table>

* - Celanese temporarily idled its Singapore AA plant in March 2012
** - Celanese ‘de-rating’ AA output due to ethanol production

Source: Tecnon OrbiChem
ACETIC ACID REGIONAL NET TRADE

Source: Tecnon OrbiChem
CHINA ACETIC ACID IMPORTS and EXPORTS

Import Volume
Export Volume
Import Price
Export Price

Source: Tecnon OrbiChem
KICHEM 2012
PRESENTATION OUTLINE

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Source: Tecnon OrbiChem
KICHEM 2012
TECNON ORBICHEM’S VIEW OF THE MARKET
Acetic Acid Derivatives

- Global VAM supplies remained tight overall in 2012 even though demand has been flat since the second quarter.
- Several new VAM projects scheduled for 2013-2014 are expected to ease concerns about global supply tightness.
- Global purified terephthalic acid capacity to produce will increase by about 30% between 2012-2016 due to tremendous growth expected in China and South Asia polyester markets.
- Acetic anhydride demand will increase steadily in the medium-term led by consumer goods purchases in developing nations and steady growth for acetate tow in Asia.
- Ester solvents are used in a wide spectrum of industrial and consumer applications; over-capacity in ethyl acetate supplies dampening margins.

Source: Tecnon OrbiChem
KICHEM 2012
GLOBAL ACETIC ACID CONSUMPTION 2012

Source: Tecnon OrbiChem

Total = 12.4 Million Metric Tons
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ACETIC ACID CONSUMPTION GROWTH

Source: Tecnon OrbiChem
KICHEM 2012
GLOBAL VAM CAPACITY TO PRODUCE 2012

North America 23%
North America 23%
West Europe 13%
China 32%
ME/Africa 5%
E Europe 2%
SE Asia 3%
NE Asia 22%

Total = 7.346 Million Tons

Source: Tecnon OrbiChem
PTA installed capacity in China to reach 36 million tpa during 2013/14

Source: Tecnon OrbiChem

Total = 59.6 Million Metric Tons
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ETHYL ACETATE CAPACITY TO PRODUCE 2012

China Etac plants operating close to 50% rates in 2012

Source: Tecnon OrbiChem

Total = 4.2 Million Metric Tons
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ACETIC ANHYDRIDE CAPACITY TO PRODUCE 2012

Source: Tecnon OrbiChem

Total = 3 Million Metric Tons
KICHEM 2012
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Source: Tecnon OrbiChem
KICHEM 2012
SUMMARY AND CONCLUSIONS

• Growth in downstream derivative capacity has not kept pace with acetic acid capacity growth, but expansion over the next 2-3 years in VAM, PTA and acetate esters markets are expected to make headway into lessening the oversupply of acetic acid.

• Acetic acid utilisation rates globally are forecast to remain between 70%-75% during the period of 2012-2018 based on current capacity figures. Improved business conditions and further rationalisation will impact operating rates moving forward.

• Acetic acid prices remain more sensitive to regional supply/demand problems rather than changes in feedstock prices, but not immune. Feedstock volatility is a constant threat throughout the value chain.

• US acetic acid producers currently enjoy low production costs compared with other regions. Development of shale gas supplies could help US producers maintain cost advantage over many years.

Source: Tecnon OrbiChem
Tecnor
OrbiChem

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