Global Methanol Market Review

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Presentation Agenda

- Methanol global and regional balance
- Methanol global trade
- Methanol price mechanisms and regional feedstock costs
- Key methanol derivatives
Value Chain - Methanol

Feedstocks
- Natural Gas
- Coal

Product
- Methanol

Derivatives
- Formaldehyde
- Acetic Acid
- MMA
- MTBE
- DME
- Gasoline
- MTO/MTP
- Biodiesel

Products / End Uses
- UF/PF Resins
- Polyacetals
- MDI
- VAM
- Acetate Esters
- Acetic Anhydride
- PTA
- Gasoline Additive
- Olefins
- Fuels

Sectors
- Construction
- Automotive
- Electronics
- Appliances
- Paints/Coatings
- Insulation
- Pharma
- Packaging (PET Bottles)
- Solvents
World Crude Oil Price Trends

U.S. Dollars Per Barrel

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World Methanol Supply & Demand

Million Metric Tons

Operating Rate

Demand (7.3/11.8)  Total Capacity (14.8/5.5)  Operating Rate

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Global Methanol Nameplate vs. Effective Capacity

Million Metric Tons

Operating Rate


Nameplate Capacity
Effective Capacity
Total Operating Rate
Effective Operating Rate

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Currently around 32 percent of methanol is consumed in the production of formaldehyde. This is anticipated to fall to 25 percent by 2016 with Gasoline/Fuel applications becoming the largest demand sector, totalling 31 percent.

Formaldehyde uses are very diverse, common applications are into the wood industry as adhesives, disinfectant / biocide and photographic industries

Methanol to Olefins (MTO) and methanol to propylene (MTP) demand is anticipated to become a high growth sector, rising from 6 percent of end use demand in 2011 to 22 percent by 2016, the vast majority of which is forecast to take place in China
World Methanol Demand By Region

Million Metric Tons

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Global Methanol Demand – China vs. ROW

China Demand AAGR 2006-2011: 23.8%
ROW Demand AAGR 2006-2011: -0.15%

China Demand AAGR 2011-2016: 19.5%
ROW Demand AAGR 2011-2016: 3.1%
World Methanol Consumption

Million Metric Tons

- Fuel Demand AAGR 2006-2011: 14.2%
- MTO/MTP Demand AAGR 2006-2011: 0%
- Other Demand AAGR 2006-2011: 3.3%

Fuel Demand AAGR 2011-2016: 9.2%
MTO/MTP Demand AAGR 2011-2016: 61.2%
Other Demand AAGR 2011-2016: 4.6%

Percent Fuel Use

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West Europe
West Europe Methanol Supply & Demand

Million Metric Tons

- Production (-0.6/-1.3)
- Domestic Demand (-2.6/2.6)
- Total Capacity (0.3/0.0)
- Operating Rate (% AAGR = 06-11/11-16)

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Middle East
Middle East Methanol Supply & Demand

Million Metric Tons

Production (12.9/0.9)
Domestic Demand (3.4/3.2)
Total Capacity (14.6/0.0)

Operating Rate

(% AAGR = 06-11/11-16)
Southeast Asia Methanol Supply & Demand

Million Metric Tons

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (14.7/6.1)</th>
<th>Domestic Demand (1.6/3.8)</th>
<th>Total Capacity (15.3/3.1)</th>
<th>Operating Rate (% AAGR = 06-11/11-16)</th>
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<tbody>
<tr>
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<td>2.0</td>
<td>2.0</td>
<td>4.0</td>
<td>50%</td>
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</tr>
<tr>
<td>2016</td>
<td>2.0</td>
<td>2.0</td>
<td>4.0</td>
<td>50%</td>
</tr>
</tbody>
</table>
Numerous Coal to Olefin Projects Are Coming

- **Shenhua Baotou**
  - MTO: 600 KTA
  - On-stream: Aug 2010

- **Shenhua Ningmei**
  - MTP: 500 KTA
  - Q2/2011
  - 2nd Phase MTP: 500 KTA
  - Mid/2014

- **Datang Intl**
  - MTP: 500 KTA
  - Q1/2012

- **Zhongyuan PC**
  - MTO: 200 KTA
  - On-stream: Oct 2011

- **Shaanxi Yanchang**
  - MTO: 900 KTA
  - Mid/2014

- **Yankuang**
  - MTO: 600 KTA
  - End 2014

- **Wison**
  - MTO: 300 KTA
  - End 2012

- **Shanxi Coking**
  - MTO: 600 KTA
  - End 2014

- **Shenhua/Dow JV**
  - Integrated complex
  - 2016

- **CPI/Total JV**
  - MTO: 800 KTA
  - 2016

- **Pucheng Clean Energy**
  - MTO: 680 KTA
  - Mid/2013

- **Yili Meidianhua**
  - MTO: 600 KTA
  - 2016

- **Yulin Energy & Chem**
  - MTO: 600 KTA
  - Q2/2013

- **Sinopec**
  - MTO: 600 KTA
  - End 2014

- **Shenhua/MTO**
  - MTO: 600 KTA
  - 2016

- **Zhejiang Heyuan**
  - MTO: 600 KTA
  - Q1/2013

- **Zhongyuan**
  - PC
  - MTO: 200 KTA
  - Q1/2013
Americas
South America Methanol Supply & Demand

Production (-6.6/6.6)
Domestic Demand (6.9/5.5)
Total Capacity (-2.7/1.8)
Operating Rate

(\% \text{ AAGR } = 06-11/11-16)
North America Energy Price Trends

Dollars Per MMBtu

Gas as % of Crude
BTU Basis

Crude (WTI)  Natural Gas  Gas as % of Crude
North America Methanol Supply & Demand

Million Metric Tons


Production (-7.6/27.2)
Domestic Demand (-2.6/2.2)
Total Capacity (-7.1/25.0)
Operating Rate

(% AAGR = 06-11/11-16)
North America Methanol Demand Forecast

Million Metric Tons

- Formaldehyde
- Methyl Methacrylate
- Solvents
- Acetic Acid
- Gasoline/Fuel
- MTBE/TAME
- Methylamines
- DMT/Others
- Operating Rate

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Price
The global equilibrium price setting mechanism is driven by Middle East producers seeking the optimum netback value. Regional adjustments may occur due to transient regional Supply/Demand imbalances.
Regional Feedstock Pricing

Dollars Per MMBtu

<table>
<thead>
<tr>
<th>Region</th>
<th>Fuel Type</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>Nat Gas</td>
<td>7.02</td>
<td>4.14</td>
<td>4.32</td>
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<tr>
<td></td>
<td>Fuel Oil</td>
<td>2.70</td>
<td>5.70</td>
<td>5.39</td>
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<tr>
<td>WEP</td>
<td>Nat Gas</td>
<td>5.99</td>
<td>9.19</td>
<td>11.51</td>
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<tr>
<td></td>
<td>Fuel Oil</td>
<td>2.70</td>
<td>5.70</td>
<td>5.39</td>
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<tr>
<td>China</td>
<td>Nat Gas</td>
<td>3.78</td>
<td>7.53</td>
<td>7.78</td>
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<td></td>
<td>Coal</td>
<td>2.61</td>
<td>5.85</td>
<td>7.33</td>
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<tr>
<td></td>
<td>Coking Gas</td>
<td>0.50</td>
<td>0.50</td>
<td>0.50</td>
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<tr>
<td>MDE</td>
<td>Nat Gas</td>
<td>0.91</td>
<td>1.36</td>
<td>1.59</td>
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<tr>
<td>SAM*</td>
<td>Nat Gas</td>
<td>2.94</td>
<td>3.41</td>
<td>4.57</td>
</tr>
</tbody>
</table>

* South America Price based upon Margin Sharing Formula
2011 Average Methanol Production Costs

Dollars Per Metric Ton

Middle East
Inner Mongolia Coal
South America
United States
East China Coal
East China Natural Gas

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2012 Global Methanol Demand = 60.2 MMT

China & East Europe

North America

Advantaged Gas (China Coking, Saudi Arabia, Iran)

Advantaged Gas (ME & SA)

China NG & Coal

Cumulative Production Capacity, Million Metric Tons
Equivalent Price of Energy Products Valued as Methanol for the World

Dollars Per Metric Ton Methanol

Industry Spot Methanol Price

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Equivalent Price of Energy Products Valued as Methanol for Asia

Dollars Per Metric Ton Methanol

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Equivalent Price of Energy Products Valued as Methanol for North America

Prices for Gasoline, No. 2 Oil, LPG and Crude Oil are based upon their energy value converted to the equivalent methanol energy value.

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Five Key Points for the Methanol Industry

• Methanol demand tracks GDP on average 1.7x

• Conventional derivatives drive base demand
  – Fuels have potential for step-out growth
  – Energy differentials drive fuels applications

• MTO/MTP bring potential balance shocks

• Economic volatility creates price volatility through end-use demand patterns, inventory management, and credit availability

• Process technology advancing with feedstocks diversity, increased scale, yield improvement, and integration options

• Feed stock dynamics affect supply location
  – End-use options for feedstocks
  – Sustainability criteria for option selection
Methanol Derivatives

• Formaldehyde
• Acetyls
Global Formaldehyde Supply/Demand

Million Metric Tons

Operating Rate

Demand (3.3/5.3)  Total Capacity (6.5/0.8)  Operating Rate

(% AAGR = 06-11/11-16)
Global Acetic Acid Regional Operating Rates Vary Significantly

Million Metric Tons

Operating Rate, Percent

Global Demand
Global Operating Rate
US Operating Rate
WEP Operating Rate
China Operating Rate

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Acetic Acid Regional Net Trade Is Declining In The Future

<table>
<thead>
<tr>
<th>Region</th>
<th>2011 Thousand Metric Tons</th>
<th>2016 Thousand Metric Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia</td>
<td>167</td>
<td>160</td>
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<tr>
<td>Europe</td>
<td>849</td>
<td>758</td>
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<tr>
<td>North America</td>
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<tr>
<td>South America</td>
<td>380</td>
<td>563</td>
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<tr>
<td>Australia</td>
<td>469</td>
<td>256</td>
</tr>
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Acetyls Value Chain - Conclusions

• Acetic Acid & VAM market dynamics driven by: Cost position Regional discipline.

• Acetyls economics driven by Feedstock position, Scale & Integration, Technology.

• Methanol will tighten through 2016. Iranian trade position & feedstock cost shifts will have greatest effects on supply balance and price.

• Coal to ethanol through acetic acid is a potential growth engine for the acetyls chain.