

Chemical Profile: Methanol

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Uses

Methanol's intermediate uses are 30% Formaldehyde, 12.2% gasoline/fuel, 10% acetic acid, 9.8% dimethyl ether, 8% MTBE/TAME, 6% TPA/DMT, 5.5% MTO/MTP, 5% solvent, 3.8% methylamines, 1.8% methyl methacrylate and 1% chloromethanes. The use in formaldehyde is expected to fall to 23% by 2018 with gasoline/fuel becoming the largest demand sector, totaling 33%. Methanol to olefins (MTO) and methanol to propylene (MTP) demand is anticipated to become a high growth sector, increasing from 5.5% in 2013 to 25% by 2018, most of which will take place in China. Global end uses is shown in the chart.

Supply and demand

Global capacity was 88.73m tons/year in 2013, with 41.68m tons/year in Asia Pacific, 15.32m tons/year in Asia/Middle East, 13.96m tons/year in Latin America, 5.53m tons/year in Eastern Europe, 3.76m tons/year in Western Europe, 3.2m tons/year in Africa, 2.46m tons/year in Australia/New Zealand and 2.36m tons in the US.

Asia Pacific is the largest consumer, at about 35.59m tons/year, followed by Western Europe at 7.66m tons/year and the US at 6.59m tons/year. Eastern Europe, Asia/Middle, Latin America, Japan consume 4.77m tons/year, 3.89m tons/year, 2.04m tons/year and 1.94m tons/year, respectively. Global demand in 2013 was 65.58m tons/year.

Prices

Spot prices in China peaked in December 2013 at \$525/ton on the back of supply tightness as a result of outages/shutdowns. Spot prices have since decreased steadily and in August 2014 was about \$350/ton. The global equilibrium price setting mechanism is driven by Middle East producers seeking the optimum netback value. Contract prices according to Methanex in August 2014 for Asia Pacific, Europe and North America were \$420/ton, \$435/ton and \$482/ton, respectively.

Technology

All commercial methanol technologies feature three process sections and a utility section as: 1) synthesis gas preparation (reforming); 2) methanol synthesis; 3) methanol purification; 4) utilities. All carbonaceous materials such as coal, coke, natural gas, petroleum, and fractions obtained from petroleum can be used as starting materials for synthesis gas production. The majority of methanol is produced today from natural gas or coal. Natural gas extracted from shale gas has become the fastest-growing source of gas in the United States and could become a significant new global energy source. In China, coal based production is the dominant method.

In the design of a methanol plant the three process sections may be considered independently, and the technology may be selected and optimized separately for each section. The normal criteria for the selection of technology are capital cost and plant efficiency. The capital cost for methanol production is substantial.

The methanol preparation/purification and conversion of methanol to DME typically accounts for about 50% of the investment for the integrated natural gas to propylene process. In synthesis gas production, Auto thermal Reforming (ATR) at low steam to carbon (S/C) ratio is the preferred technology for large scale plants, currently at 5,000 MTPD, by maximizing the single line capacity and minimizing the investment and improving efficiency.

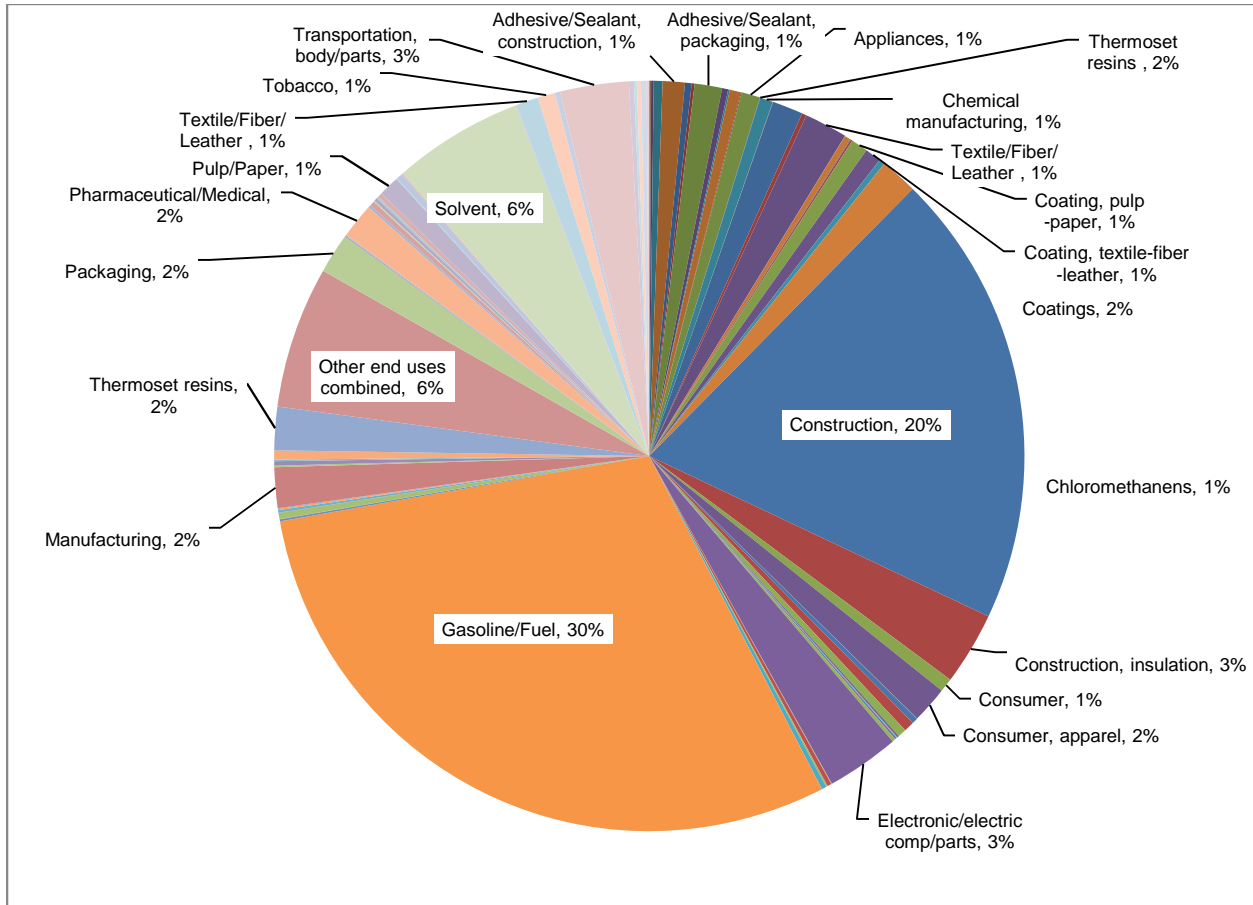
In coal as raw material, it is reacted with oxygen and steam in a gasification reactor. Purified syngas is then compressed and fed to the reactor, where it is converted to methanol over a copper catalyst.

The charts show the site-specific/technology specific production and investment costs for two most competitive processes, one based on the natural gas in Saudi Arabia and the other based on coal in China.

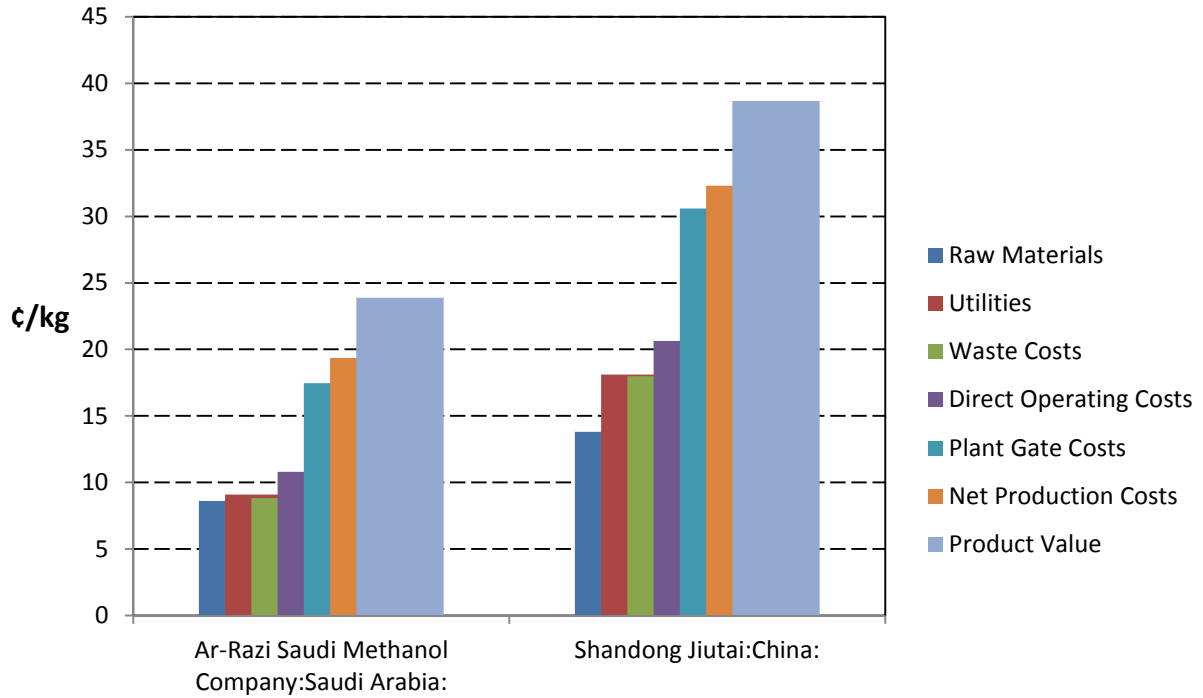
Outlook

Global demand growth is put at 7.7%/year to 2018. Within this period, the Chinese market will grow around 12%/year. From broader perspective, China, being the key driver of global growth in the methanol, will see a slowing down in traditional downstream applications. These sectors are expected to grow in line with China's GDP, which is estimated at 7%/year through 2018. Demand for non-traditional sectors led by MTO/MTP and the energy sector will grow 20%/year in this time period. Additional capacity is needed to satisfy the demand by 2016.

Methanol Global End Use, 2013

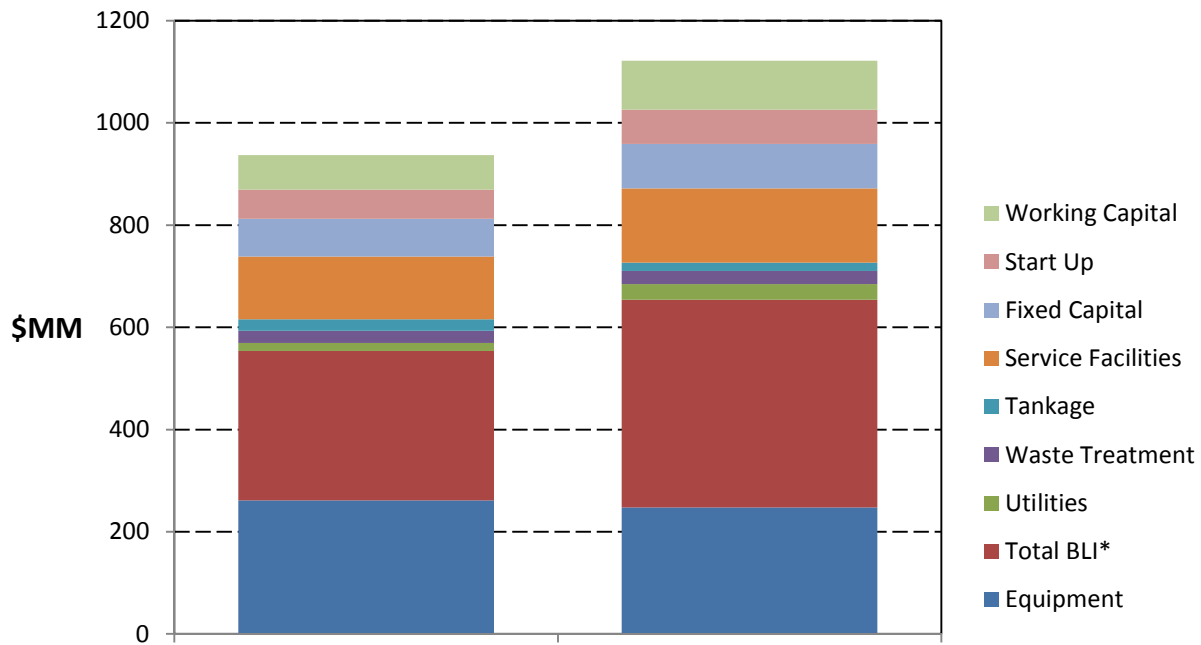


Production Cost Breakdown for Methanol



Ar-Razi in Al-Jubail based on Topsoe ATR Technology, Natural Gas at Subsidized Price of 11.44 c/kg
 Shandong Jiutai in Ordos Inner Mangolia based on GE High Presure Technology, Coal at 6.8 c/kg
 ROI set at 10%

Process Investment Breakdown for Methanol



Ar-Razi Saudi Methanol
Company: Saudi Arabia:

Shandong Jiutai:China:

Ar-Razi in Al-Jubail based on Topsoe's ATR Technology with Capacity of 1.8m tons/year
Shandong Jiutai based on GE's High Pressure Technology with Capacity of 1.5m tons/year

Global Methanol Capacity, '000 Ton/Year, 2013^(a)

Company	Location	Capacity
Ar-Razi	Al Jubail, Saudi Arabia	4900
Atlantic Methanol	Equatorial Guinea	1000
BASF	Ludwigshafen, Germany	480
BioMCN	Delfzijl, Netherlands	1000
BP/Veba	Gelsenkirchen, Germany	300
Brunei Methanol Company	Darelsalam, Brunei	850
Changqing Shaanxi	Changqing, China ⁽¹⁾	100
China Chemical Engineering Group-Yiye Investment	Shaanxi, China	2400
CNOOC-Kingboard	Dongfang, China	1400
	Changqing, China ⁽²⁾	450
CNPC	China ⁽³⁾	200
Daqing Oil	Daqing, China	2200
Datang International	Inner Mongolia, China	1660
DEA Shell	Wesseling, Germany	400
Eastman Chemical	Kingsport, USA	645

Germu refinery	Quinghai, China	300
Gulf Petrochemical	Manama, Bahrain	425
Huadian Yulin Natural Gas	Yulin, China	610
Ibn Sina	Al Jubail, Saudi Arabia	950
Inner Mongolia Boyuan United Chemical	Erdos, China	2000
JSC Metafrax	Perm, Russia	1000
Kaltim Methanol	Bontang, Indonesia	660
Legend Holdings (Shenda Chemicals)	Zaozhuang, China	1000
Lutianhua Group	Lazhou, China	545
LyondellBasell	Bayport, USA	782
MEDCO Group	Bunyu, Indonesia	330
Methanex	Medicine Hat, Canada ⁽⁴⁾	470
	Damietta, Egypt	1300
	Waitara, New Zealand	2400
	Point Lisas, Trinidad	1725
	Punta Arebas, Chile	800
	Punta Arebas, Chile ⁽⁵⁾	1000
	Plaquemine, LA, USA ⁽⁵⁾	2000
	Point Lisas, Trinidad	900
	Point Lisas, Trinidad	4000
Methanol Holdings Trinidad LTD	Jose Venezuela	1600
Metor (Mitsubishi and Pequiven JV)	Leuna, Germany	660
Midner-Helm	Bandar Imam, Iran	1290
National Petrochemical (Fanavaran Petrochemical)	Kharg, Iran	660
	(Kharg Petrochemical)	
	(Zagros Petrochemical)	
Ningxia Baofeng Energy	Assaluyeh, Iran	3300
NPSP	Ningdong, China	1750
OCI Nitrogen	Novocherkass, Russia	400
Oman Methanol Company	Beaumont, TX, USA ⁽⁶⁾	750
Other Producers of China	Sohar, Oman	1050
Petronas	China	4432
Pingmei & Lantian Chemicals	Lebuan, Malaysia	2364
Qatar Fuel Additives Company	Zhumadian, China	759
Ras Lanuf Oil & Gas Processin Co	Mesaieed, Qatar ⁽⁷⁾	1077
Repsol	Ras Lanuf, Libya	660
Salalah Methanol Co	Complejo Industrial Plaza, Argentina	400
Schekin Azot	Salalah, Oman	1031
Shandong Jiutai	Schekin, Russia	450
	Erdos, China ⁽⁸⁾	750
	Guangzhou, China	1800
Shandong Yanzhou Coal Mining	Shaanbei, China	700
Shanghai Coking & Chemical	Chauhu, China	800
	Shandong, China	360
	Shanghai, China	800
Shenhua Group	Baotou, China	1818

Shenhua Ningxia Coal	Yinchun, China	2500
Shenyang Coal Industry Group	Shenyang, China	600
Sibur (Tomskneftekhim)	Tomsk, Russia	825
Sichuan Jiuyuan Agrochem	Sichuan, China ⁽⁹⁾	500
Sinopec	Sichuan, China	970
	Chongqing, China ⁽¹⁰⁾	350
Sonatrach	Arsew, Algeria ⁽¹¹⁾	120
Taisei Methanol Kogyo	Yeosu, South Korea	340
South Louisiana Methanol	South Louisiana, USA ⁽⁹⁾	1818
Statoil	Tjelbergodden, Norway	900
Supermetanol	Jose, Venezuela	1055
Togliatti Azot	Tolyatti, Russia	1000
Veniran	Assaluyeh, Iran ⁽⁹⁾	1650
	Guiria, Venezuela ⁽⁹⁾	1650
Xinjiang Guanghui Industry	Hani, China	1200
Yankuang Yulin	Shanxi, China	600
Zhejiang Jiangshan Chemical	Ordos, China	600

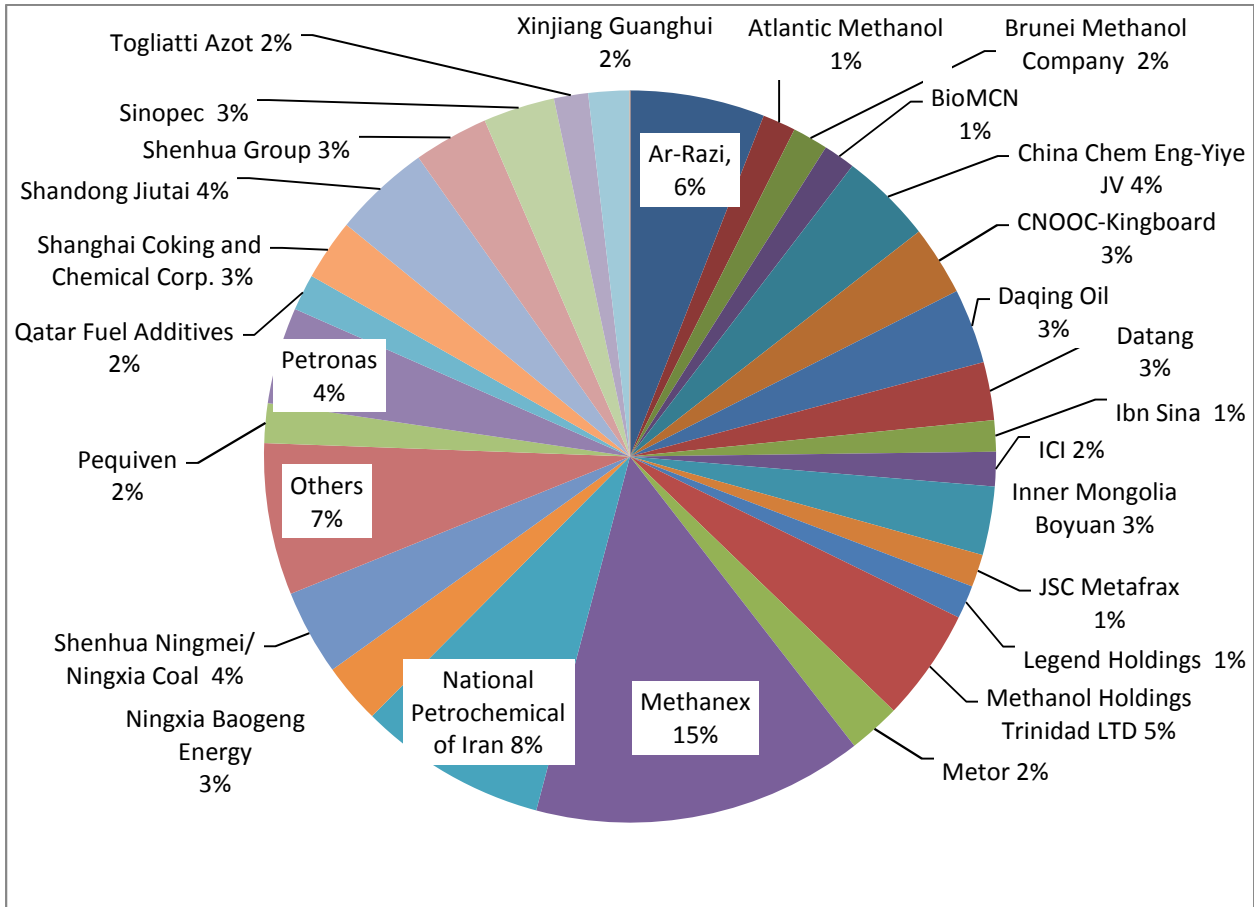
Expansions, 2014-2016: (1) 1,100 kt; (2) 750 kt; (3) 300 kt; (4) 580 kt; (5) moved 2,000 kt from Chile to the US in 1/2014;

(6) 913 kt; (7) 3,035 kt; (8) 1,500 kt; (10) 1,120 kt

New, 2014-2016; (9)

(a) Over 300 kt, there are 210 methanol plants in ChemPlan database.

Methanol Global Market Shares, 2013



For more information about market and site-specific/technology-specific investment and production cost data for methanol and some 1000 more chemicals, please send your inquiries to trantech@chemplan.biz

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