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## **Methanol Blending in China - Trip Report**

On May 21-23, 2012, IAGS co-director Gal Luft visited China's Shanxi Province to learn about China's experience with methanol fuel blending. He spoke at the 2012 China International Alcohol and Ether Fuels Industry Development Conference in Shanxi's capital Taiyuan (pop. 5 million) and met with officials and industry leaders. The visit was organized by the China Association of Alcohol & Ether Clean Fuels and Automobiles (CAAEEFA), Shanxi New Energy Automobiles Leadership Office, the Methanol Institute and Methanex.

Below are the main findings from the visit:

- Methanol is now blended and tested in 26 out of China's 31 but in no province has methanol made as deep a penetration as in Shanxi (pop. 36 million), the hub of China's coal industry. (Unlike in the rest of the world in China methanol is produced from coal.)
- China's methanol annual production capacity has grown from 2 billion gallons in 2003 to 15 billion gallons today, about the size of America's ethanol industry. China has more than 200 methanol factories nationwide.
- Within less than a decade China's methanol use in the transportation sector grew from virtually zero to a point it replaced five percent of the country's gasoline demand.
- M15 is offered widely throughout the province. Light duty vehicles fuel regularly with M15 without any impact on the engine. A co-solvent is used to improve combustion and prevent phase separation.
- Roughly 70,000 taxis were converted to run on M100 and M85. Current conversion capacity is 30,000 vehicles per year. By 2015 200,000 additional light duty vehicles will be converted to use methanol.
- Hundreds of buses and commercial vehicles already run on M100 and M85 and 50,000 methanol heavy duty trucks are planned to be introduced.
- Chinese automakers like Cherry, Geely, Shanghai Automotive, and Maple have rolled out cars that can run on M100 or M85. GM China is ambivalent about M15 (though most vehicles including GMs are using it) but is interested in M85.
- In Shanxi alone more than 1,200 service stations offer methanol blends. The number of refueling stations offering alcohol fuel will double by 2015. The use of M15 requires a change of O-ring in the pump.
- There have been over 100 million refuelings with methanol. No health problems were observed among the thousands of workers who deal with methanol on a daily basis and the motorists fueling their cars.

- Ten provincial specifications on methanol fuel have been published; There is no national specification for M15 but there is one for M85 and M100.
- Shanxi is also planning to add additional blends and use a billion gallons as M30 and M50.
- Methanol prices: M100: RMB 2.8/liter; Regular gasoline RMB 8.30/liter. M100 price is therefore 34% that of gasoline.
- In terms of vehicle range the Chinese report that the replacement gasoline-methanol ratio is 1:1.6. That implies that as long as the price of a gallon of methanol is less than 62.5% of the price of a gallon of gasoline, methanol is less expensive per mile.
- Taxi drivers report cost-saving of \$1,500-\$5000 per year due to the use of methanol.
- Air quality: Shanxi officials reported 20 percent decrease in CO, NOX and Benzene emissions and 70 percent reduction in particulate matter. The use of methanol did show an increase in formaldehyde but according to the Chinese, even with this slight increase the blends still meet EPA emissions regulations.
- The Chinese are very interested in the renewed interest in methanol in the U.S. CAAEFA honorary Chairman Wang Maolin issued a report about his visit to the March 2012 Washington Methanol Policy Forum (co-hosted by the Methanol Institute, IAGS and the U.S. Energy Security Council). The report was presented to China's Vice Premier, the National Development and Reform Commission (NDRC) and the Ministry of Industry and Information Technology. Chinese officials are keen to include methanol in framework of the DOE's US-China Clean Energy Cooperation program and are eager to host a DOE delegation in Shanxi to explore new avenues for Sino-American cooperation.

#### Meetings:

- Gao Jianming, Shanxi's Vice Governor
- He Guangyuan, Former Minister of Machine Building
- Hu Qianlin, Chairman of CAAEFA
- Wang Maolin, Former Secretary of Shanxi Provincial Party Committee
- Peng Zhigui, Former Vice Governor of Shanxi
- Ni Weidou, Chinese Academy of Engineering
- Zhou Zhuye, Vice Chairman, Petroleum and Chemical Industry Federation
- Li Gang, former President of China National Automotive Industry Corporation
- He Xiao Chi, Vice President, China Association of Alcohol & Ether Clean Fuels and Automobiles
- Sun Maohua, Secretary General of National Technical Committee on Alcohol Ether Fuel of Standardization Administration of China and President of Shanxi Huadun Industry.
- Xu Dingming, Counselor of The State Council
- Zhao Kai, Center for Global New Energy Strategy Studies
- Ting Zhang, GM China Group
- Prof. Liu Shengquan, Vice Chairman of Xian Energy Society
- Prof. Ge Yunshan, Beijing Institute of Technology