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## Special Report - Coal to Chemicals – Visiting and Revisiting the Future

Coal appears to be on the verge of once again attaining a key role in the global chemical industry. Coal lost its dominance to low priced oil and gas in the middle of the 20th century, but it is enjoying a comeback due to technology advances and the desire of the Chinese government to exploit its coal resources as a means of reducing its reliance on petrochemical imports.

Gasification of coal is a well-proven technology with a long history of applications ranging from the earliest uses of coal gas for heating and lighting in urban areas, progressing to the production of synthetic fuels such as liquid hydrocarbons and synthetic natural gas, chemicals, and most recently to large-scale integrated gasification combined cycle power generation. Essentially all of the important first-stage organic petrochemicals were made from coal during the period of about 1900 to 1930. However, the chemical industry switched almost completely to natural gas and petroleum liquids over the 1940 to 1965 period, driven by their low cost and ready availability.

Coal currently is enjoying resurgence as a chemical feedstock, especially in China. Drivers of Chinese coal use in petrochemicals include technology advances, the desire to stimulate employment in under-developed regions with coal reserves, government objectives to reduce reliance on imported petrochemical products, and the relatively low price of coal relative to competing fuels in China. For China, coal now offers a realistic and available chemicals starting point when compared to the alternatives of importing LNG, LPG, naphtha or crude oil.

Nexant's just published multi-client report gives subscribers a solid grasp of the state of develpment of coal to chemicals technologies, including an update on the status of such technologies as currently practiced in China. The study provides a snapshot analysis of the most favorable coal to chemicals economics, on a mine-mouth basis, as compared to alternative cases from conventional routes. The two sets of economics are are contrasted on a delivered "Coastal China" basis.

The report also covers upstream technologies, focusing on the technology of coal gasification and acetylene production from coal. The technology of carbide-based acetylene is examined in depth alongside alternative sources of acetylene such as partial oxidation, recovery from steam crackers, and other important sources. Coal gasification technologies are also treated in depth,

Next, Nexant examines the technologies for coal to chemicals by reviewing and evaluating the processes and economics for the production of major petrochemicals, including:

- From syngas: methanol, ammonia, ammonium nitrate, urea, MEG (from dimethyl oxalate), MTO/HDPE, MTP/PP, acetic acid, ethanol (via Celanese's TCX technology)
- From acetylene: vinyl acetate, VCM/PVC, butanediol, acrylic acid, and acrylonitrile

Finally Nexant reviews the economic and strategic outlook for each chemical in light of competitive market dynamics and current policy drivers.

Coal to Chemicals – Visiting and Revisiting the Future is useful to both producers and consumers of chemicals who seek to understand the rapidly emerging production opportunities afforded by advances in coal to chemicals technology.

For information regarding Nexant's ***"Coal to Chemicals – Visiting and Revisiting the Future"*** report, please contact STMC@nexant.com. This report was published in late 2013, and is available immediately to subscribers.

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