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Special Reports

Bio-Naphtha: Missing Link to the Green Chemicals Value Chain

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Section 1 Executive Summary

1.1 OVERVIEW

Currently, bio-naphtha production is largely uneconomical for steam cracking purposes compared to conventional naphtha, with the exception of Chinese used cooking oil and potentially municipal solid waste (MSW)-based processes if costs see some reductions (or an increase in tipping fees). However, the scales of such processes are significantly lower than quantities required to realistically compete with conventional processes due to the sheer novelty of the technologies. Therefore, bio-naphtha technologies will only be able to provide a partial feed to a steam cracker to produce partially renewable products at this stage in its development. In addition, conventional chemicals, especially those derived from booming technologies such as gas-fed crackers and methanol-to-olefins, are selling at extremely competitive prices, placing additional pressure on bio-based technologies to perform.

Moving forward, the competitiveness of bio-naphtha is in the hands of the producers as well as federal governments. Product slates and yields, and the flexibility thereof, are the major contributors to the economics and scales of bio-naphtha production and will continue to be if the production picture does not change significantly. Furthermore, government incentives and mandates are currently focused on ground transport fuels, not chemicals or jet fuel, which promotes development of the diesel fraction as opposed to the jet or naphtha fractions. The future of bio-naphtha will be tied to the production of bio-jet and renewable diesel, as these are produced from the same technology and are receiving significantly more support. Federal implementation of green premiums, purchasing mandates, or otherwise are likely to be required by producers to generate larger quantities of bio-naphtha that are able to have an impact on the chemicals value chains.

1.2 INTRODUCTION

Fossil fuels and petrochemicals form the building blocks of modern society. They are the raw materials for food, energy, cooking, and heating fuels, as well as durable goods such as clothing and furniture. However, in an environment of high crude oil prices, concerns are mounting about the economic costs of the world's reliance on non-renewable fossil fuels. Consequently, some of the world's biggest players in the energy and petrochemical industries are seeking to develop new feedstocks and products derived from bio-based materials.

In addition to high costs associated with petroleum-based chemicals, environmental and sustainability issues are no longer fringe, but mainstream concerns. This has helped generate a broad popular base of support for the development of bio-based fuels, feedstocks, chemicals, and renewable plastics.

Globally, naphtha is one of the most important feedstocks for the production of chemicals. While ethane and other light feedstocks are the predominant feedstock for steam cracking to olefins in the United States and the Middle East, naphtha is the dominant feedstock for steam cracking to olefins in Asia, Europe, and South America. Production of bio-naphtha would allow for many different products to be derived from bio-content. A number of these chemicals and polymers are already under development from sugars. While bio-ethylene from ethanol is a