IHS Markit™

Second Generation Biofuels

PEP Report 278A

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Abstract

With an intent to reduce the use of fossil fuels for energy production, renewable energy from biomass is being aggressively pursued by industry, academic researchers, and governments, to support the overall goal of decarbonization. First generation biodiesel, fatty acid methyl ester (FAME), was introduced about two decades ago. However, it faces limited demand growth potential because it can be blended with conventional fuels only in small proportions. Renewable diesel produced by hydroprocessing of bio-derived feedstock has recently emerged as the preferred option, with higher cetane number, high energy density, practically no oxygen content, and superior cold flow fuel properties. It can be used as a drop-in fuel or blended with petrodiesel in all proportions, in conventional internal combustion engines. A variety of renewable biomass sources have been utilized. including vegetable oils from agricultural crops, animal fats, and waste residues such as recycled cooking oils. The biofuels industry is intrinsically influenced by the environmental, social, and political factors. Growing societal support for sustainability initiatives and increasing government regulations targeting the environmental decarbonization goals are driving the growth of global biofuels industry. This report presents the techno-economic analysis of the four current industrial processes to produce renewable diesel by hydroprocessing. These processes are:

- Vegan™ process by Axens
- Ecofining™ process by UOP/Eni
- Hydroflex™ process by Haldor Topsoe
- NEXBTL™ process by Neste

The production economics assessment in this report is based on a US Gulf Coast location. However, an iPEP Navigator module (an excel-based computer costing model developed by IHS Markit) is attached with this report to allow a quick calculation of the process economics for three other major regions also—Germany, Japan, and China. For every process, the module also allows production economics to be reported in English or metric units in each region.

The technological and economic assessment of the processes is IHS Markit PEP's independent interpretation of the companies' commercial processes based on information presented in open literature, such as patents or technical articles, and may not reflect in whole or in part the actual plant configuration. IHS Markit PEP believes that they are sufficiently representative of the processes and process economics within the range of accuracy necessary for economic evaluations of the conceptual process designs.

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