ABSTRACT
Process Economics Program Report 247A
ADVANCED GAS-TO LIQUID PROCESS
(October 2006)

PEP previous reports on gas-to-liquid technologies (GTL) — PEP 135C, Opportunities for Gas-to-Liquid Technologies (February 2000) and PEP 247, Gas to Liquids Update (December 2002) — presented techno-economic evaluation of the GTL technologies of Sasol, Shell, Synthroleum, ConocoPhillips and British Petroleum. The analyses in those reports were based upon the development status of the technologies in late 1990s and early 2000s. In the past five or six years, more technological advancements have taken place, which has improved the economic position of GTL products with respect to the conventional fuels. Indeed, high oil prices of recent years have played a very significant part in escalating GTL to where we are seeing it in future.

The areas that received the maximum attention in the way of studies and R&D work include reactor design and Fischer-Tropsch (F-T) catalysts. Past industrial experience on GTL plants also extended the learning curve. The result of above is: increased productivity, higher selectivity, and enhanced working life of F-T catalysts; larger sizes and more productive designs of F-T reactor; higher production-train capacities; more efficient use of process waste-energy; plant integration capabilities, etc.

Based on recent catalysts properties and F-T-reactor design parameters described in patents and other information sources, our current report evaluates the following technologies:

1. **Syntroleum slurry-reactor based technology.** The previous report presented Syntroleum fixed-bed technology that was current in the late 1990s. That technology is no more in use. This report presents a slurry-reactor based technology, which is especially suited to offshore barge- or platform-mounted plants, though the technology is good for land-based plants as well.

2. **Syntroleum slurry-reactor based technology (with power block).** This is an enhanced or advanced version of GTL technology in which a (land-based) conceptual model of the Syntroleum GTL plant is integrated with an electric power generation facility.

3. **ExxonMobil AGC-21 technology.** This part demonstrates our interpretational design and process economics of the ExxonMobil AGC-21 GTL technology.

Our evaluation indicates that fixed capital cost and production cost for Syntroleum GTL plant are about 10% lower than those for ExxonMobil GTL plant. Syntroleum plant (with power block) has the lowest production cost but the highest product value.
ADVANCED GAS-TO-LIQUIDS PROCESS

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