

THE PERFORMANCE OF SMDS DIESEL FUEL MANUFACTURED BY SHELL'S GtL TECHNOLOGY

Richard H. Clark
Shell Global Solutions (US)

The Royal Dutch/Shell Group's (Shell's) Gas to Liquids (GtL) technology, better known as the Shell Middle Distillate Synthesis (SMDS) process, converts natural gas into diesel and other products via a modern improved Fisher-Tropsch synthesis. The diesel cut has very good cetane quality, low density, and virtually no sulphur and aromatics; such properties make it valuable as a diesel fuel with lower emissions than conventional automotive gas oil.

Shell's GtL production plant at Bintulu, Malaysia is currently producing up to its design capacity of 12,000 b/d (barrels per day) of products. Building on the experience gained in operating a commercial scale GtL plant, Shell has recently announced its intention to build a "world-scale" GtL plant producing 70,000 b/d of products.

This presentation focuses on recent studies of the performance and properties of the diesel product.

Key Points

- Shell's GtL production plant in Malaysia is currently producing 12,000 barrels a day of product, following the successful restart in May 2000.
- In June 2000, Shell announced their intention to build a "world-scale" plant of 70,000 barrels a day of product and is currently reviewing a number of potential investment opportunities. Shell has recently entered into exploratory discussions with the Indonesian Government and Pertamina to examine the possibility of a new GtL plant.
- Comprehensive research has assessed the performance of the diesel component of the fuel. This has confirmed the superior emissions performance of such a diesel fuel.
 - in Light-duty (passenger vehicles): - Particulates, HC and CO are reduced by 20 -40 %
 - in Heavy duty vehicles: - Particulates, NO_x, HC, and CO are reduced by 10-20 %
- In practice, in the marketplace, SMDS diesel can be used in different ways. As a 100% product, it would give the emissions performance improvements quoted above, but existing diesel engines would require some modification. Alternatively, SMDS diesel can be used as a blend with standard fuel, producing some gains in emissions but with no need for engine retuning.
- Field trial opportunities are being explored in the EU and US, with a view to demonstrating the benefits of the product in the marketplace.
- Due to the low availability of SMDS fuels, the average properties of the world diesel pool will not change significantly and therefore SMDS cannot be the only solution to all diesel fuel emission issues. However, for specific local circumstances, SMDS diesel can contribute to improvements in local diesel emission performance.

Shell in talks to build gas plant

By Robert Corzine

Royal Dutch/Shell, the Anglo-Dutch energy group, and Pertamina, Indonesia's state oil company, are in talks that could lead to the construction of the world's biggest plant to convert natural gas to high-quality transportation fuels and chemical feed stocks.

The proposed plant, which would cost about \$1.5bn, would consume 600m standard cu ft of gas a day to produce 70,000 barrels a day of mainly high-quality middle distillates, such as kerosene and diesel. The diesel has no sulphur or aromatics, and so is ahead of the regulatory trend for a reduction in those pollutants.

Leading oil companies around the world are eager to commercialise gas to liquid (GTL) fuel technology in order to exploit the large reserves of remote gas that are too far from markets to be developed economically.

Although the underlying technology to convert non-oil energy sources such as gas and coal to liquid fuels has existed for decades, the high cost of doing so has until now deterred its use.

Jack Jaconetti, the executive in charge of the Shell

middle distillates synthesis programme, said technological breakthroughs, especially in the performance of catalysts, and economies of scale had helped drive down "capital expenditure requirements to around \$20,000 per b/d, making a 70,000 b/d plant an attractive investment proposition, even at crude price levels at around \$15 a barrel".

Until now the only option for developing remote gas reserves was to build expensive liquefied natural gas plants. But such developments are only possible when the bulk of the output is sold under long-term contracts of 20 years or more.

Asian Liquid Natural Gas markets are expected to be in surplus for some years, so new LNG projects face significant hurdles in securing long-term markets.

Most of the synthetic fuel is expected to be used as a blending stock to improve the quality of conventionally refined oil-based products. Shell executives believe the growth of GTL plants may enable refiners to avoid costly upgrades to their facilities and instead to lift the quality of their output through the increased use of gas-based synthetic fuel.