



Simple, scalable gasoline production.

Produce transportation fuels with low technical and project risk.

Energy lives here

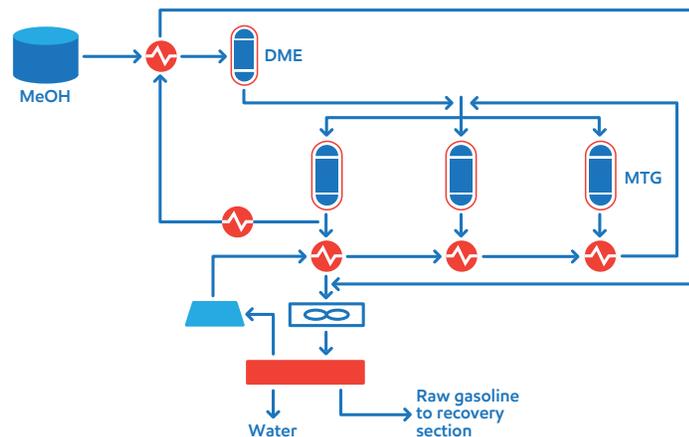
ExxonMobil's methanol to gasoline (MTG) process selectively converts methanol to a single fungible liquid fuel and a small LPG stream. The liquid product is conventional gasoline with virtually no sulphur and low benzene, which can be sold as-is or blended with ethanol, methanol or with petroleum refinery stocks. This minimizes offsite and logistic complexity and investment for synthetic fuel distribution.

Proven process

Methanol-to-gasoline chemistry was discovered by ExxonMobil scientists in the 1970s. Over years of extensive studies and pilot plant operations, ExxonMobil developed an understanding of the MTG reactions and

process conditions necessary to consistently produce motor gasoline. In 1979, a fixed bed design was completed and thoroughly demonstrated at 4 BPD capacity (today proven scalable up to 15 KBD).

MTG reactor section process flow



Key benefits



Low technical risk

- Proven technology and components



Low project risk

- Methanol front-end plants well established



Project simplicity

- Single liquid product suitable for transportation

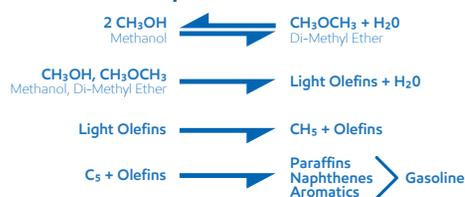


Proven scalability

- Up to 15 KBD for a range of applications

In this design, methanol is first dehydrated over an amorphous alumina catalyst to an equilibrium mixture of di-methyl ether (DME), methanol, and water. The DME reactor effluent is introduced into the MTG reactors wherein methanol and DME are completely dehydrated by a proprietary catalyst forming light olefins and water. At the MTG reactor conditions, light olefins oligomerize into higher olefins, which combine through various reaction paths into paraffins, naphthenes, and methylated aromatics. The shape-selective MTG catalyst limits the hydrocarbon synthesis reactions to about C₁₁.

MTG reaction paths



Proven plants

ExxonMobil commercialized the first gas-to-gasoline plant in New Zealand in 1985. The New Zealand plant produced 14,500 BPD of gasoline and was operated by the New Zealand Synthetic Fuels Corporation, a joint venture between the government of New Zealand and ExxonMobil, until 1995. Operation of the first coal-to-gasoline plant via 2nd generation MTG technology began in 2009 in China by Jincheng Antracite Mining Group (JAMG). This 2,500 BPD gasoline plant began operations in 2009 and successfully demonstrated the coal-to-gasoline concept. After two years of operation, JAMG and ExxonMobil agreed to license an engineering agreement for two additional MTG units at 12,500 BPD each.

Proven performance

The conversion of methanol to hydrocarbons and water is virtually complete with the product being a mixture of synthesis hydrocarbons and water with a limited amount of C₂- gases. Production yields, product qualities, and catalyst performance are stable during operation with little variation in the product. The liquid product is conventional gasoline with virtually no sulphur and low benzene, which can be sold as-is or blended with ethanol or methanol or with petroleum refinery feedstocks.

Continued technology advancement

In March 2015 ExxonMobil and Sinopec Engineering Group (SEG) announced a joint technology development agreement for advancement of a fluidized-bed MTG technology. The goal is to develop a fluidized-bed MTG design that will cost significantly less to construct and operate, and significantly improve energy efficiency versus the fixed bed design.

MTG Gasoline Properties/Composition

Octane, RON	92
Octane, MON	82
Octane (RON+MON)/2	87
RVP (psi) ¹	9
T (50) F	201
T (90) F	320
Paraffins, vol%	53
Olefins, vol%	12
Naphthenes, vol%	9
Aromatics, vol%	26
Benzene, vol%	0.3
Sulfur	nil

About us

ExxonMobil helps refiners and petrochemical manufacturers increase capacity, lower costs, improve margins, reduce emissions and operate safe, reliable and efficient facilities. Along with a commitment to helping to implement best practices and to achieve better results, we provide cutting-edge proprietary catalysts and license advantaged process technologies for refining, gas and chemical needs.

The liquid product is conventional gasoline with virtually no sulfur and low benzene, which can be sold as-is or blended with ethanol or methanol or with petroleum refinery feedstocks.

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