



Methanol to Power Demonstration Project

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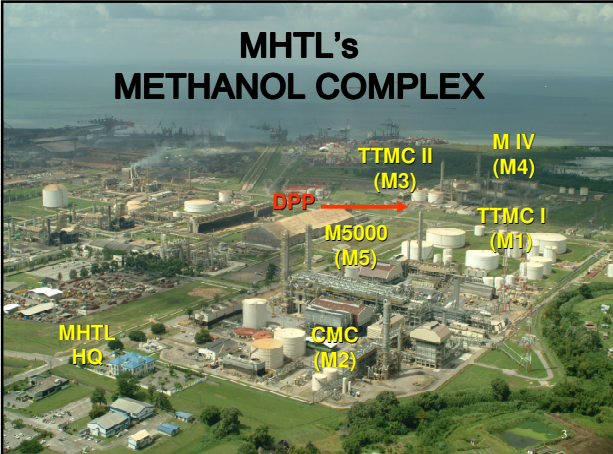
Methanol Holdings (Trinidad) Limited

- Total production capacity of 4.1 million metric tonnes per annum
 - Comprises five methanol plants
 - TTMC, CMC, MIV were amalgamated into MHTL in 2004
- Second largest producer of methanol in the world
 - MHTL Production - 12% of World Capacity
 - MHTL Sales - 11.7% of World Demand
 - MHTL Sales - 20.0% of World Trade
- The largest exporter of methanol to the US

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MHTL's METHANOL COMPLEX




MHTL Shipping Fleet





SHIPPING

CURRENT FLEET OF 10 VESSELS

- One (1) 14,000 DWT - Goodrich Bay
- One (1) 16,000 DWT - Ojars Vacietis
- One (1) 17,000 DWT - Kemerli
- Four (4) 30,000 DWT - Naparima, Nariva, Maracas Bay, Princess Naomi
- One (1) 45,000 DWT - Las Cuevas
- Two (2) 48,000 DWT - Pigeon Point, San Fernando





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Natural Gas Institute of the Americas



Vision

To be in the forefront of natural gas-related research and expertise in the Atlantic Basin Region

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Natural Gas Institute of the Americas

CO₂ Sequestration
Well Productivity

Gas Hydrates
Methanol to Power

Single Cell Protein
Gas Market Dynamics

UPSTREAM

MIDSTREAM

DOWNSTREAM

ECONOMICS, ENVIRONMENT AND POLICY

- Econometrics
- CO₂ Sectoral Study on Mitigation
- Advanced Decision Tool

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Methanol to Power Initiative

- Joint UTT- MHTL Initiative
- Commenced by MHTL
 - Conversion of small liquid fueled turbine emergency/ back-up generators to cleaner fuels in New York
 - To consider niche market in the Caribbean
- Demonstration Power Plant (DPP)
 - Completed construction
 - Currently being commissioned

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Electricity Generation Demand Trends

1973 and 2004 Fuel Shares of Electricity Generation*

1973: Coal 38.3%, Oil 24.7%, Gas 12.1%, Hydro 21.0%, Nuclear 3.3%, Other** 0.7%. Total: 6 117 TWh

2004: Coal 39.8%, Gas 19.6%, Oil 6.7%, Hydro 16.1%, Nuclear 15.7%, Other** 2.1%. Total: 17 450 TWh

*Excludes pumped storage.
**Other includes geothermal, solar, wind, combustible renewables & waste.

Source: International Energy Agency, Key World Energy Statistics, 2006

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Comparison of Gas Transportation Options

Gas Supply Options	Economic over Long Distance by Sea	Economic in Small Quantities by Sea	Simple Legal Commerical Arrangement	Standard Infrastructure/ Technology	Minimal Downstream Processing
Pipeline	Yes/No	No	No	Yes	Yes
LNG	Yes	No	Yes	Yes	No
CNG	No	Yes/No	Yes	No	Yes
Gas to Wire	Yes/No	Yes/No	No	No	Yes
Methanol	Yes	Yes	Yes	Yes	Yes

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Properties of Methanol as a Fuel

- ✓ Lower minimum air requirement
- ✓ Cleaner burning fuel
- * Lower boiling point (64.5°C) and ignition temperature

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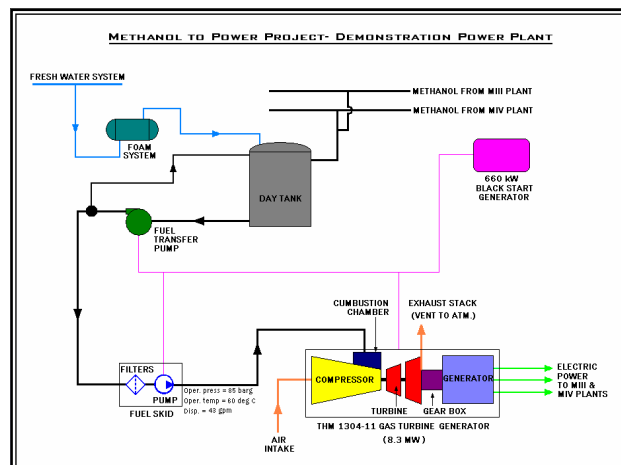
Equipment Modification



- Poor Lubrication Properties
 - Variable Speed Pump
 - Special Coating
- Low Heating Value
 - Modified fuel system
- High Flammability
 - Safety Measures

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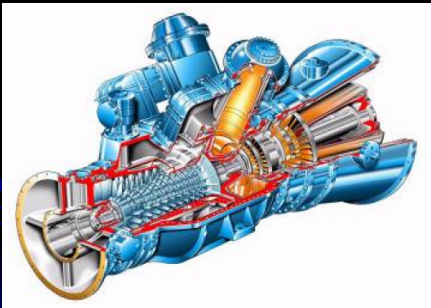
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MAN Turbo THM1304 for Methanol


8.5 MW, 28.2% efficiency, 12,770 kJ/KWh



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Gas Turbine Generating Package





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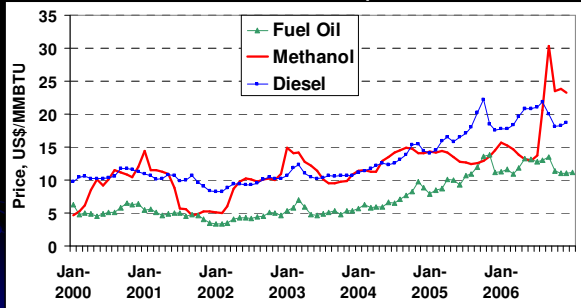

Storage Tank System



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Market Price Comparison



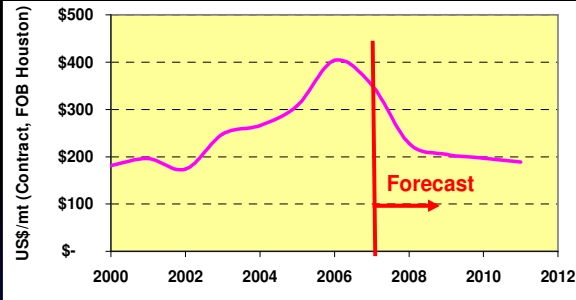
- Methanol more competitive than Diesel
- Methanol price can provide a level of diversity

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Methanol Pricing Forecast

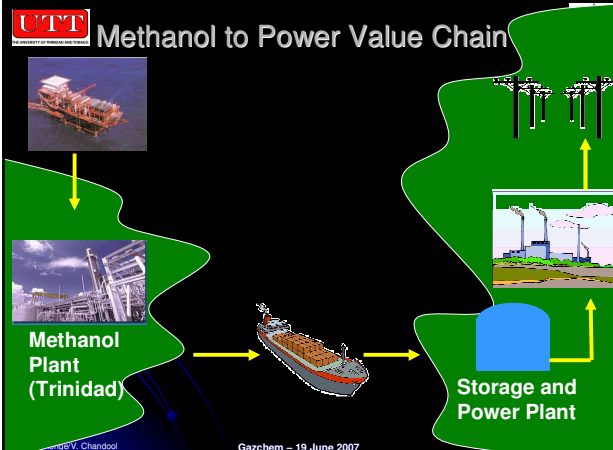
Source: CMAI





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Methanol to Power Value Chain



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Comparison of Power Generation Cost



Country	Price, US\$ per kWh
Grenada	0.2559
St. Lucia	0.2902
Barbados	0.2099
Jamaica	0.1520

- 2005 Electricity prices
- Methanol to Power Value Chain cost can be competitive

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Advantages of Methanol as a Fuel to Caribbean Islands

- Favorable Economics
- Cost is based on gas rather than oil
- Easily transportable
- Island by Island arrangement or “milk-run” delivery
- Fast implementation time

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MHTL-UTT R&D Programme

- Technical Feasibility of the Technology
 - Plant Reliability and Efficiency
 - Mechanical integrity
 - Grid synchronization
 - Process control and optimization
 - Safety
 - Environmental impact
 - Fuel switching and use of fuel-grade methanol

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MHTL-UTT R&D Programme

- Economic Feasibility
 - Detailed Costing of the “methanol value chain” versus other hydrocarbon alternatives
 - Examine factors which impact viability
 - Assess niche markets (e.g. Caribbean islands)
- Combined Heat and Power Generation Feasibility

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MHTL-UTT Alliance

Thank You!

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