



THE CATALYST GROUP RESOURCES, INC.

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**GAS-TO-LIQUIDS (GTL) –  
A STRATEGIC ASSESSMENT OF THE TECHNOLOGIES,  
MARKETS AND COMPETITIVE LANDSCAPE**

**- STUDY PRESENTATION -**

**A Multi-Client Study  
Completed in October 2004**

**October 2004**

*Gas-to-Liquids (GTL) – A Strategic Assessment of the Technologies,  
Markets and Competitive Landscape*

**I. BACKGROUND**

The recent announcements by many of the major companies involved in the production of gas liquids from stranded gas reserves have made GTL (gas-to-liquids) an increasingly important consideration. Although much has been written about the technologies involved and the finances required (in the multi-billion \$US), a strategic assessment of the “landscape” in GTL has yet to be produced. In this study, *Gas-to-Liquids (GTL) – A Strategic Assessment of the Technologies, Markets and Competitive Landscape*, The Catalyst Group Resources (TCGR) has undertaken a detailed and comprehensive analysis of the competitive and strategic factors, questions and elusive answers about the growing industry. These include:

- What led ConocoPhillips to commit early (December 2003) in Qatar?
- What’s involved in QP’s and Sasol Chevron’s commitment to expand Ras Laffan’s 34,000 BPD unit eventually to 100,000 BPD, with a third train to start-up by 2009 and reaching 65,000 BPD capacity?
- What’s behind the new commitment by Sasol Chevron on a new 130,000 BPD (six train facility) to service the North field?
- What factors have held back commitments from BP and others? What factors led ExxonMobil to commit in Qatar?
- Based on this new picture, what are the consequences on the size and growth of the GTL catalyst markets, now and in the future?
- Who are the key suppliers (and what are their relationships) in this new catalyst market? Which catalyst producers are in the best position to supply which candidates’ plants and what are the strengths/weaknesses of industry positions?
- Why has Qatar been deemed the “GTL Capital of the World” in the Middle East and how might this affect alternative projects in other Middle Eastern countries (or those in Russia or elsewhere in the world)?
- What are the drivers to be understood in exploiting this business opportunity?

The GTL business is clearly here to stay! The subject area is indeed hot! This timely study goes well beyond typical situational analysis (i.e., capacity and plans, R&D or technical reports) to take on the most important business and strategic issues.

## **II. THE NEED FOR THE STUDY**

The current environment for investment in GTL projects is more fertile than it has been for the past 50 years. The reason is actually a confluence of factors that provide a number of drivers from several directions. Some of the most important of these drivers are economic, strategic, market and environmental, as follows:

### **Economic Drivers**

- crude oil price at historically high levels;
- peaking of oil production in many regions.

### **Strategic Drivers**

- gains access to abundant gas reserves;
- provides a means to monetize stranded and remote gas reserves;
- need to forge alliances with governments and energy companies in resource rich countries to assure future supply;
- physical as well as environmental limits on the ability to re-inject associated gas to stimulate oil production;
- a source of clean, synthetic crude oil to blend with heavier/dirtier crudes to gain benefits in both transportation and refining;
- synthetic crude and fuels can be integrated easily into existing infrastructure.

### **Market Drivers**

- global growth in demand for clean diesel fuel;
- markets for energy are remote from abundant, cheap sources of energy reserves, requiring a transportable (liquid) form.

### **Environmental Drivers**

- legislation mandating low sulfur, lighter, clean-burning fuels;
- inability to flare associated gas, requiring some way to dispose of gas to allow continued oil production;
- the U.S. Energy Policy Act of 1992, which designates GTL from natural gas to be considered an “alternative fuel.”

Although the technical, strategic and market drivers are important, the environmental drivers are particularly critical, both from a compliance and public image point of view. Although the strictest regulations originate in certain geographic regions, the protection of the environment and the warding off of climate changes are global problems. Therefore, it is fair to assume that energy production throughout the world (eventually) will be restricted by comparable protective legislation.

Although a number of these drivers are not new, what is somewhat unique is the fact that they all seem particularly critical at this point in history. Therefore, the circumstances are right for GTL projects to finally begin to realize their long-promised potential.

### **III. SCOPE & METHODOLOGY**

TCGR's study addresses the developments in GTL from a strategic perspective, asking the critical questions regarding the need and importance of GTL in the 21<sup>st</sup> century. Its emphasis is on the "major" players, both commercial and technical, in GTL.

In this study, the major efforts in advancing GTL, on a commercial basis, have been reviewed and analyzed. A listing of the projects which are in evaluation or development have been assessed for potential impacts. Critical attention has been given to companies which have not yet made commitments in GTL and the question "why not?" has been asked.

In order to provide justification for particular activities in GTL, a section has been dedicated to prototypical economic assessments. A number of economic scenarios are also presented, with differing assumptions for capacity, catalyst activity and product work-ups delineated. Additional factors included were: capital expenditure, gas prices and consumption, transfer price considerations, etc. An especially insightful analysis has been provided on improving GTL economics (via scale, energy efficiency and others). Market factors affecting decisions, such as end-uses, growth rates and competitive products were also important in the overall evaluation.

TCGR's study goes beyond those of others by providing forecasts on catalyst usage by the different types of units and discusses potential suppliers of catalysts and process technologies. We quantify this growth in terms of both volume and value. Despite the fact that this new market has yet to develop, we analyze and discuss the evolving competitive landscape for the new and replacement catalyst markets.

In our study conclusions and recommendations, we have taken both a top-down as well as a side view of how different companies have (and can) positioned themselves to best take advantage of this new and rapidly growing industry.

The actual Table of Contents from the final study, including the List of Figures and List of Tables, are presented on the following pages.

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#### IV. QUALIFICATIONS

The Catalyst Group (TCG), and its sister-company The Catalyst Group Resources (TCGR), have maintained a unique place in the history of GTL. Since Mobil's MTG plant in Taranaki, New Zealand, Clyde Payn, CEO of TCG/TCGR has been tracking technology developments. In the 1970's, Mr. Payn lived in South Africa for 14 months, where he met Dr. Mark Dry of Sasol, the technical leader in GTL, and has had a relationship with Sasol and many others in GTL development ever since. TCG/TCGR has performed numerous studies in technology and economics in GTL around the world over the last twenty (20) years and is considered the leading benchmarking source of information and analysis in the subject area.

#### V. DELIVERABLES & PRICING

This report is very timely and strategically important to those refiners considering investment, as well as to catalyst companies considering supplying the market. TCGR's report, based on market interviews with key players, goes beyond public domain information. As a result, subscribers are requested to sign a company secrecy agreement (as part of the "Order Form and Secrecy Agreement" on the following page).

The study, *Gas-to-Liquids (GTL) – A Strategic Assessment of the Technologies, Markets and Competitive Landscape*, was produced during the third quarter of 2004 and became available to subscribers in October 2004.

<u>Participation</u>	<u>Deadline</u>	<u>Price</u>
Post-publication subscribers		\$9,000
Report in PDF format (in addition to subscription price)		\$2,000

\*\*\* Notice to Members of TCGR's **Catalytic Advances Program (CAP)** \*\*\*

*This multi-client report is distinct from, and addresses issues different than, the recently completed CAP technical report entitled **GTL Technology: 21<sup>st</sup> Century Advances**. Whereas the CAP report was a detailed assessment of the "state-of-the-art" in GTL process and catalyst technologies (with sections dedicated to advances in syngas production methods, improvements in syngas conversion technologies, and direct conversion processes to chemicals/oxygenates), this study takes a strategic, business and market-oriented approach. The emphases are on catalyst suppliers, the competitive landscape and factors for success in the future market.*

*Due to the complementary nature of this study to the CAP technical report, we are offering a discounted price to CAP members. Study fees have been reduced by \$1,000. Please make sure to indicate your company's membership in CAP when placing your order.*

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The Catalyst Group Resources, Inc.  
Gwynedd Office Park  
P.O. Box 680  
Spring House, PA 19477

Tel: 215-628-4447  
Fax: 215-628-2267  
e-mail: [tcg@catalystgrp.com](mailto:tcg@catalystgrp.com)  
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