



The Catalyst Group Resources

(a member of The Catalyst Group)

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Dear Colleagues:

The estimated volume of technically recoverable heavy oil (434 billion barrels) and natural bitumen (651 billion barrels) in known accumulations is about equal to the Earth's remaining conventional (light) oil reserves, according to a US Geological Survey Report. With this tremendous, virtually untapped, energy reserve in heavy oil and bitumen along with the recent crude oil economic drivers and supply concerns, *it is not surprising that major global corporations are making significant investments in this area. Nonetheless, there is not a lack of hydrocarbon resource(s); rather the challenge is to develop them, consistent with global priorities. These are weighty issues and affect not only industrial/commercial decisions, but government-, country- and region-specific concerns about future supplies.*

TCGR's study "A Strategic Assessment of the Commercial and Technical Progress in International Oil Sands and Heavy Oil Upgrading" will move beyond publicly available documentation, including the Alberta Chamber of Resources; "Oil Sands Technology Roadmap: Unlocking the Potential" to show how international oil companies (IOCs), national oil companies (NOCs), refining and petrochemical companies, as well as energy investors (both established and venture capitalists) can manage the technological and financial uncertainties associated with this market segment. In addition, an assessment of the climate for foreign investment, along with the role (if any) for government incentives, are factors that need consideration.

Critical issues to be addressed include:

- ? In Alberta, there are clearly major labor, technical capacity and infrastructure challenges to the Province's ability to support development there. How will Alberta, and Canada, respond to this challenge to work with international oil companies (as this will be critical for the path and pace of development)?
- ? Natural gas availability in the region, for hydrogen production via Steam Methane Reforming (SMR), will become limiting to heavy oil upgrading. This will increase the supply/demand price for natural gas; current prices of \$2-3 MIL BTU are tolerable but at \$6-7 MIL BTU, they are not. What alternative sources of hydrogen exist (e.g., gasification) and to what degree are they being pursued? To what degree is this a factor in other regions?
- ? A new slate of technologies will be needed to change methods of oil sands/bitumen production and upgrading, to reduce future costs. Depending on who adopts which direction(s) first, there are numerous paths that need to be considered and a number of options which need to be reviewed. What R&D and piloting initiatives are required to achieve the projected production goals over the next 10+ years of less than \$US 30 BOE equivalent?

- ? An overriding issue faced by all international oil companies and investors is the processing logistics and associated asset management decisions. Where should the upgrading be done and how should geographical “integration” of the various processes be handled? These decisions impact the economics directly and will be influenced by a number of “interested parties,” not only the IOCs and the NOCs but the governmental and regulatory concerns as well.

As a strategic analysis with significant implications on technical and commercial investments, TCGR/TCG proposes to address the critical changes in technology, the competitive landscape (participants, activities), external factors and business/financial considerations required for successful participation in the areas of heavy oil, oil sands development and upgrading to products.

Attached is a study proposal and proposed Tables of Contents for the report. *Sign up now as a “charter member” in order to have your individual interests and issues included as part of the study scope, and to take advantage of a substantial pre-publication discount price.*

The study is available in printed format as well as electronically (as a PDF file), allowing unlimited use/distribution of the report on a site-license basis. For more information, see our website at <http://www.catalystgrp.com> or contact Jeanne Drahos (jmd@catalystgrp.com) or John J. Murphy (jjm@catalystgrp.com) at 215-628-4447.

The Catalyst Group Resources (TCGR), a member of The Catalyst Group, is dedicated to monitoring and analyzing technical and commercial developments in catalysis as they apply to the global refining, petrochemical, fine/specialty chemical, pharmaceutical, polymer/elastomer and environmental industries. The Catalyst Group Resources' assessment is based on information obtained from the public domain as well as internal sources and industry interviews. TCGR's analysis will report factual information, as well as hypotheses/interpretations based on this information, in order to derive a reasonable set of expectations. Factors could cause actual results to differ from our forward-looking statements and The Catalyst Group Resources