

DRIVING Competitive Advantage

Helping Clients Improve Profits
and Achieve Pacesetter Performance

KBC provides independent consulting services and implemented solutions to improve the sustainable profitability of our clients worldwide in the process industries.

Our Services Include:

Process Improvement

Energy Services/
Linnhoff March

Planning and Scheduling

Reliability, Availability
and Maintenance (RAM)

Process Simulation
Software

PEL Market Services

CASE STUDY

Beating the Odds with KBC'S Business Venture Risk Management Program

by Haije Stigter, KBC Consultant

In today's environment when companies consider new hydrocarbon processing facilities or modification, they are faced with ever increasing investment risks and a smaller margin of error. Companies are forced to take a more holistic view of all of the risks associated with these large investments. As a result, more sophisticated risk management tools are critical to evaluate and manage the risks in new ventures.

A large international petroleum refining company recently decided to embark on a new business venture that exploits new technology for recovering petroleum resources. A major refinery upgrade is under consideration as part of the overall project, which includes upstream and downstream developments. It is necessary to ensure that the projected throughput availability will justify the large capital investment required, while meeting corporate financial hurdle rates. Senior management's primary concerns were centered around the ability to produce, transport and process sufficient volumes of feedstock to satisfy a future projected market demand both in terms of volume and quality specifications.

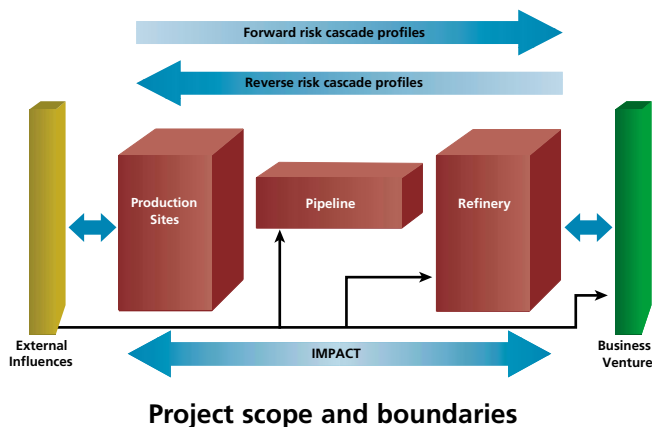
Given the size and risk associated with this investment, KBC was commissioned to help identify and quantify the risks associated with

this venture and suggest cost-effective means for risk mitigation. With each new endeavor, a company's approach to risk management and their understanding of the level of exposure will ultimately determine the venture's likelihood of delivering its projected returns.

KBC implemented its new Business Venture Risk Management (BVRM) program that was developed for the oil, gas and petrochemical industries. It combines RAM (Reliability, Availability and Maintenance) and process simulation technology with KBC's other proprietary tools, methodologies and expertise in the RAM, Risk, Process and Marketing sectors.

BVRM is a strategic application of risk management tools with economic analysis at key points in the senior level decision making process. It ensures risk concerns are first identified and then cost-effectively managed to promote the highest likelihood of meeting the strategic business objectives. The BVRM program involves benchmarking the internal programs and external influencing factors against the company's stated business plan objectives. BVRM is useful for clients wishing to perform an assessment of a proposed system, thereby identifying and quantifying system improvements

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FACTOIDS

Where did the idea for Vaseline Petroleum Jelly come from?

Robert Augustus Cheesebrough.

In 1859 when oil was first found in Pennsylvania, Cheesebrough was a 22-year-old chemist in Brooklyn who had become an expert at extracting kerosene from cannel oil.

He realized that petroleum products would be the fuel source of the future so he headed to Pennsylvania to get his piece of the action.

He noticed that a colorless film called "rod wax" collected around the pump rods on the oil wells, gumming up the works until it was removed. He also observed oil workers who would slap the stuff on a cut, instead of a bandage. Not only did it stay on the skin and stop the bleeding, but it seemed to help cure the wound.

Cheesebrough returned to Brooklyn with some rod-wax and spent months creating a clean form of rod-wax, which he called "petroleum jelly." He began making so much of this stuff that every beaker in his laboratory was full, so he threw out his wife's flowers and filled the vases with his creation.

After awhile, he added the popular medical term "line" to the word "vase" and he called the product "Vaseline Petroleum Jelly."

Where was Canada's first oil boom?

Most people think the initial activity in Canada's oil industry occurred in Oil Springs, Ontario, or Turner Valley, Alberta, where oil was discovered in 1857 and 1904, respectively. If you are talking about a petroleum oil boom, you are right.

A boom involving another kind of oil, however, took place in the Labrador fisheries off Canada's east coast, hundreds of years earlier. In the sixteenth century, a full-blown whale-oil industry existed on the coast of Labrador for about five generations, between the first voyages of Jacques Cartier in 1534 and those of Samuel de Champlain in 1603.

The 1970s scholar Selma Barkham found the remains of the fisheries and primitive refineries established by the Spanish Basques in Red Bay, Labrador. Nine whaling stations employed about two thousand whalers, who for six months of the year, hunted about twenty thousand bowhead and right whales, refined their oil, and supplied the product to the ports of Bristol, Southampton, London and Flanders.

(source: www.coolquiz.com)

CASE STUDY

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and weighing it against capital and operating costs in an economics model. Methodology to manage and control residual risk is captured in an operations plan.

KBC assisted by:

- validating assumptions and operating policies of modifications under consideration.
- providing realistic component failure and repair frequencies.
- creating realistic models for the way process equipment operates.
- accurately estimating impact of component failure on system.
- providing value improvement opportunities.
- determining the system performance impact of these changes, allowing quantified cost benefit analysis to be performed.
- providing relevant global operating experience.

The engineering and management teams were able to use results of the analysis to quantify combined effects of reliability, maintenance, operating practices and constraints, capacity limits (or bottlenecks) and reservoir performance projections to see if they were in line with business objectives. Historically, these concerns have only been analyzed independently or with cursory accounting for the complex interactions among them due to the difficulties involved in an accurate treatment. Throughput predictions coupled with capital and operating costs provided the detailed basis for design and operations revisions. With KBC's simulation technology, realistic models were created which provided accurate

treatment of all these concerns and complex interactions. These results were critical inputs to a financial model, which the project team used to evaluate investment decisions.

Project economics were improved by:

- applying the appropriate technology selection to meet system requirements.
- designing optimization around system bottlenecks.
- adopting optimized maintenance strategies.
- focusing investments in intermediate storage capacity.
- allowing for alternate operating modes.
- determining realistic feedstock availability and the requirement to buy alternates.
- providing realistic market assessments for the sale of intermediates and end products.

For a fraction of the investment, the client received comprehensive reports and analyses identifying and quantifying the strengths and weaknesses associated with this venture, in addition to recommendations for improvement. The implementation of any one of the recommendations made by KBC would return benefits greater than the cost of the BVRM services provided by KBC.

As in all cases, when embarking upon a new business venture it is imperative to ascertain the risks involved, and the BVRM assessment proved to be a cost-effective tool to help our client make more informed business decisions. KBC's BVRM can be applied to all capital projects to help management beat the odds in complex new business ventures.

NEWS & INNOVATION

Unit performance monitoring requires tools, work processes and experience to know what key performance indicators should be tracked on each refinery process and what data to gather to calculate them. KBC's Best Practice Unit Performance Monitoring program combines KBC's unit specialist's expertise with state-of-the-art process simulation and unit monitoring tools to ensure that your process engineers can monitor their unit's performance on an ongoing basis.

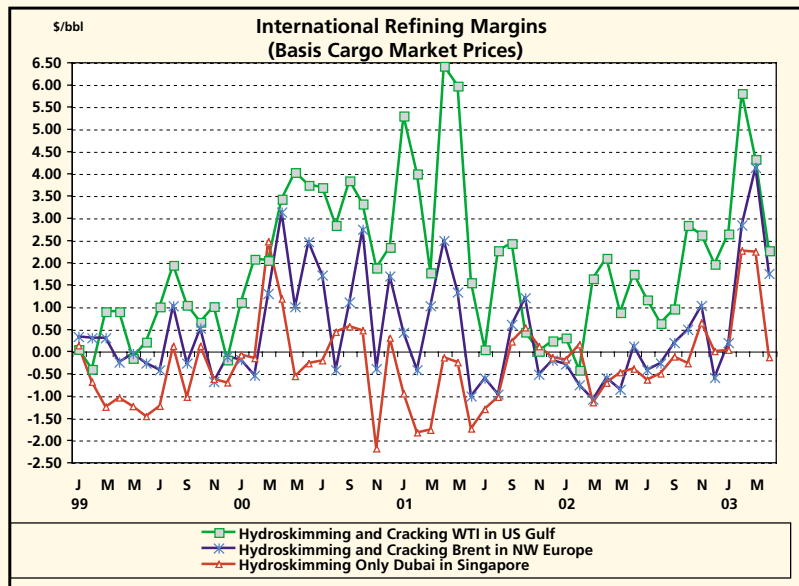
KBC's Strategic Planning offering is designed to provide an integrated operational and capital investment plan that provides the right balance between "compliance" investment for clean fuels or environmentally legislated requirements, and margin improvement projects. With the addition of PEL Market Services, KBC can provide both the forecast for market growth potential and the technical expertise to optimize long-term investment strategies and improve return on capital employed.

International Refining Margins

Refining margins improved dramatically in all main centers in the first quarter of 2003, but this proved to be relatively short-lived.

Over the past four years, marginal cost breakeven has acted as a ceiling to hydroskimming only operations at Singapore. This has been due to the low levels of utilization in the region resulting in effective spare refining capacity. Thus, although margins were well supported due to supply security issues associated with the Iraq war, margins quickly fell back to around breakeven as utilization picked up in response.

In US and Europe, product stocks have been tighter and consumer stockbuilding is believed to have been less prevalent than in Asia. Much of the support during the first quarter was a result of cold weather, most notably on the US East Coast, and the end of the winter season removed one of the key supports to margins. The outlook for the next few months is critically dependent on the US gasoline season. Currently, there seems little concern over availabilities, particularly as Venezuelan exports appear to have resumed. However, any problems with these supplies or any unscheduled US refinery downtime could prompt price spikes and see margins moving back to higher levels.



KBC Saves \$17.8 MM/Year North America

KBC consultants performed a strategic energy assessment study for a client to determine available improvement opportunities. KBC kicked off the six-month program by first administering a benchmark study using KBC's Best Technology (BT) approach.

KBC developed a comprehensive fuel, steam and power model of the plant, as well as an Energy Gap Analysis to identify low and no cost energy improvements in the areas of fired heaters, shaft work efficiency and onsite power generation potential. A heat integration analysis was conducted on several key units to identify opportunities to improve heat recovery.

The energy study resulted in an 11 EII point reduction through low/no cost initiatives and 24 EII point reduction through capital investment projects for a total of 35 EII point reduction, representing \$17.8 MM/yr. (US) in savings. The average payback period on capital projects is 3.1 years. KBC identified a point in the implementation sequence where fuel gas containment limit was hit, and made recommendations for improved C3+/Hydrogen recovery to make room in the fuel system for additional energy projects.

Bankers Gain Better Knowledge from Independent Technical Advisor

Supporting the Bankers

Both bankers and refining companies require the expertise of a Technical Advisor when facing the sale or privatization of a facility. KBC can provide an independent viewpoint since it understands the strengths, weaknesses and subtleties of a plant, and can plausibly quantify the effects of the various driving forces in international and local markets.

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Industrial Energy Technology Conference (IETC) May 13-16, Houston

Optimizing the Day-to-Day Operation of Utility Systems by Alan Eastwood and Chris Bealing – Energy Services/ Linnhoff March

At the 2002 IETC, Energy Services presented an overview of spreadsheet-based software packages to rigorously model site utility systems. Chris Bealing will discuss advanced software products that enable optimization at this year's conference.

ERTC Computing June 23-25, Milan

Information technology remains an area of dynamic and rapid growth in the oil and petrochemical sector. Meet with KBC at our booth in the exhibition area to see how our suite of industry-leading proprietary software could lead to improved profit potential.

Office move – KBC's Japanese office moved from Tokyo to Yokohama.

www.kbc.com

COMPLETED PROJECTS

(Continued from p. 3)

In a recent study, KBC (in conjunction with its division PEL Market Services) derived the value of a refinery using present values of long-term cash flows. International market price scenarios were established, and refinery gate product netbacks were generated based on local logistics and quality requirements. The impact of improved product quality specifications were recognized, as well as the factors affecting the refinery's value – mainly in marketing, refining and financial areas.

Many asset transactions tend to involve processing arrangements and joint venture structures. KBC has been contacted many times to advise on the structure of operating agreements and the details of contractual terms.

KBC has also been involved in some large studies when the need for major investment has been uncertain.

In one instance, KBC's technical analysis uncovered the need for capital investment in the millions, which turned into a significant factor in the pricing negotiations.

KBC Increases VGO Recovery by 11% Germany

KBC consultants recently performed a feasibility study and detailed process design for a German client who needed to replace an aging vacuum tower. The client also wished to improve performance by recovering conversion unit feed from fuel oil, while maintaining crude capacity in the integrated crude and vacuum unit.

Detailed process and basic engineering started in August 2002 with a proposed start-up date of December 2003. KBC worked closely with the client and their local engineering contractor in order to

meet the very tight schedule. The new tower shell was ordered in October 2002 with a 12-month delivery. The unit will be located in the middle of the refinery so factors such as crane lifts and delivery paths were important. The heights of the bridges on the Rhine were also a constraint if delivery required water transportation.

The KBC team also solved the challenge to connect the new unit to the flare system (which had little spare capacity), when the old unit was not connected.

Once the unit launches in December 2003 and has achieved constant crude rate, VGO recovery will increase by 11%. An additional benefit of the study was to remove the unit's main bottleneck, the crude heater firing, resulting in a 7% reduction of energy usage, with a simple payback of less than one and a half years.

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KBC Advanced Technologies Inc.

14701 St. Mary's Lane
Suite 300
Houston, TX 77079
USA
Telephone: +1 281 293 8200
Facsimile: +1 281 293 8290

KBC Process Technology Ltd

KBC House
42-50 Hershaw Road
Walton on Thames
Surrey KT12 1RZ
UK
Telephone: +44 1932 242424
Facsimile: +44 1932 224214

KBC Advanced Technology Pte Ltd

435 Orchard Road #16-04
Wisma Atria
Singapore 238877
Telephone: +65 6735 5488
Facsimile: +65 6736 4759

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**Beating the
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Venture Risk
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Web site: www.kbcat.com
E-mail: kbc@kbcat.com

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