



BASE INFORMATION: PEMBINA INSTITUTE, PETRO-CANADA

The life cycle value assessment tool is designed to look at a project's metrics and impacts in a holistic manner.

FROM THE CRADLE TO THE GRAVE

Triple-bottom-line planning tool makes its place in the oilsands industry

by Diane L.M. Cook



SCOPING

**INVENTORY
ASSESSMENT**

It is no wonder that oilsands projects—unique in size, scope, cost, and life cycle—have been dubbed “megaprojects.” The bitumen production installations can cost billions of dollars in total, take an average of three years to construct per phase, and have a lifespan of up to three decades. No wonder the planning process boggles the mind. It can take years for several teams of professionals of myriad disciplines to plan and execute.

But a relatively new planning tool has revolutionized how some oilsands operators plan their projects. Developed by the Pembina Institute, with input from TransAlta Utilities, Suncor Energy, and Petro-Canada, the life cycle value assessment (LCVA) planning tool was rolled out in 1995.

LCVA helps oilsands operators plan their projects from “cradle to grave,” specifically addressing the triple-bottom-line issues of economics, social impacts, and environmental footprint. This thinking is integrated into decisions on design, construction, and operation practices.

Pembina sees LCVA as the key business decision-making tool in the oilsands sector. Greg Powell, an eco-efficiency analyst with the environmental firm, says true sustainability requires decisions based on all three bottom lines, something an LCVA accomplishes.

“LCVA is a tool that helps project teams increase the confidence in their decision-making process when faced with multiple project options. It’s a process whereby key risks and benefits associated with multiple project options are identified much earlier than they typically would be under normal business decision-making practices. Sometimes the impact of these decisions is short-lived, and sometimes these decisions will impact the entire project for the rest of its life,” Powell explains.

Oilsands Review recently talked with three oilsands operators that have implemented the LCVA process.

PETRO-CANADA

Petro-Canada adopted the LCVA methodology nearly a decade ago. Peter Symons, director of communications of oilsands says, “Based on the parameters of each of our projects, the inclusion of LCVA in our total loss management standards and our project delivery model, we have employed LCVA for numerous projects throughout each of our business units.”

Petro-Canada first applied the LCVA planning tool to its MacKay River steam assisted gravity drainage (SAGD) installation in 1998. The intent was to look at design improvement and technology selection. Since then, the company has applied LCVA to its Lewis and Meadow Creek in situ projects (looking at strategy), its Edmonton refinery conversion (for technology selection), and its Fort Hills mining project (for strategy and design improvement). The company has also used LCVA in a number of conventional, downstream, and offshore projects. ▶

The LCVA process

During life cycle value assessment (LCVA) workshops, participants are led through a series of six steps that result in a recommendation for the decision at hand. The effectiveness of

the LCVA ultimately depends on the team making the decision. It is the team's input that results in the final recommendation upon which the decision is based.

The six steps

Goal definition Scoping

Participants define the objective of the workshop. They answer questions such as "What is the desired outcome of the LCVA?" and "What is the context around the decision?" Participants then develop a list of possible project options.

Inventory assessment

The facilitator leads participants through a series of inputs and outputs, and the group decides which are relevant and which might become risks or benefits at some point during the project.

Impact analysis

Participants bring relevant data to the table. To conduct this step, project team members will already have done their homework and have gathered all the relevant data. Data related to energy use, water use, number of jobs created, and so forth, will all help inform the decision and become part of the inventory.

Design improvement

Potential stressors are tracked right through to potential impacts. For example, water use would be examined to understand possible impacts to the aquatic ecosystem. Similarly, air emissions would be analyzed to understand the impact on acid rain or smog.

Reporting

Some companies incorporate a design improvement component into the LCVA process or participate in related workshops. During these workshops, participants are forced to answer broad questions such as "How can we eliminate all of the waste from the system?" "How can we eliminate the risk of safety incidents?" and "How can we eliminate carbon emissions to the atmosphere?" Sometimes, project team members are eager to share some revolutionary ideas that outright challenge conventional designs.

The ultimate result of the LCVA is a report that recommends a specific project option based on the results of the LCVA workshop.



Symons says Petro-Canada will continue to conduct LCVAs as relevant projects are identified. Currently, strategy level and option selection LCVAs are most common within the company. As projects are further developed, design improvement LCVAs will also become more prevalent.

"By using LCVA, we have found better integration of functional input through the involvement of a cross-functional team and a quicker decision-making process by obtaining participant buy-in throughout the LCVA working sessions," Symons explains. "In general, we have seen improved focus on full life cycle impacts through increased awareness."

In the long term, Petro-Canada expects to see better in-house co-operation and improved triple-bottom-line decision making by continuing to use LCVA. Symons says when used holistically in the project decision-making process, the LCVA methodology encourages the co-operation of cross-functional teams from various disciplines. It also yields an improved eco-efficiency in the design of facilities.

NORTH AMERICAN OIL SANDS (STATOIL)

Claes Palmgren, manager of reservoir process technology at North American Oil Sands (recently acquired by Norway-based Statoil), says the company has applied the LCVA planning tool to evaluate the possibility of a three-well-pair solvent co-injection pilot as part of the Leismer SAGD demonstration project.

"Based on our experience with LCVA, we have a better understanding of the differences and, therefore, the improvements that could be made should we commercially apply the technology versus conventional SAGD technology," says Palmgren.

North American Oil Sands' experience in evaluating this planning tool provided the company with a coherent picture of the three major elements of its demonstration pilot project—technical, economical, and environmental.

"It has helped us to better understand the importance of life cycle analysis," says Palmgren.

He explains that life cycle analysis is built into the company's philosophy with respect

to health, safety, and environment namely to ensure safe operations that protect people, communities, the environment, and assets.

"The analysis helped bring the environmental aspects of the solvent co-injection pilot project to the foreground during the planning phase."

SUNCOR ENERGY

Dianne Zimmerman, senior manager in the sustainable development group at Suncor, says the company adopted the LCVA planning tool in 1998.

"LCVA was developed in partnership with the Pembina Institute, and the institute has continued to provide training and advice on its implementation in our business since then," she says. Suncor also supports the Pembina Institute's LCVA Clearinghouse; a web-based tool that houses Suncor's LCVAs and provides guidance material for employees and contractors.

Suncor incorporated LCVA into its project management process which is used on all major capital projects. Zimmerman says that as

of May 2007, the company has conducted 56 LCVAs and hosted 35 training sessions.

“Specific projects we have used LCVA for range from sustainable service stations and our ethanol production facility to location of pipelines and natural gas facilities.”

Zimmerman says LCVA has helped Suncor make better decisions and plan for the future. “LCVA helps us make better decisions by providing a broader and longer term view of our projects rather than focusing exclusively on short-term paybacks. It also allows us to weigh a range of social, economic, and environmental impacts and benefits of all phases of a project’s development, from planning and design through to construction, operation, decommissioning, and reclamation. For instance, an LCVA might tell us when an upfront investment in eco-efficiency measures may lead to greater cost savings over the life of a project.”

To date, LCVA has already helped Suncor make important decisions regarding the environment. A recent example of how LCVA helped Suncor guide and support its efforts to enhance the sustainability of its operations was when the company assessed the environmental benefits of its proposed ethanol plant. Some critics of the plant questioned the net environmental benefit of ethanol-blended fuel versus conventional gasoline.

The Pembina Institute sees LCVA as the key decision-making tool in the oilsands sector.

“Given the controversy of this plant, it was important we understood the full picture. Using the LCVA tool, we were able to estimate that our Sarnia-Lambton ethanol production plant would offset approximately 300,000 tonnes of greenhouse gas emissions per year. This was based on an evaluation of all phases of the ethanol life cycle, from production and transportation of the corn feedstock, through to combustion of ethanol-blended gasoline. This initial LCVA was conducted using estimates and was verified by Argonne Laboratories, the foremost ethanol LCVA experts in the United States. Now that the plant has been operating for a year, we are conducting a second LCVA using actual production data,” says Zimmerman.

AN IMPORTANT PIECE OF THE PUZZLE

With so many issues facing the oilsands sector today—soaring capital expenditures, a staggering lack of skilled workers, and public outcry for better environmental stewardship—oilsands operators need a planning tool such as the LCVA so they can see into the future and make the right decisions today for tomorrow. **OSR**