

Oilsands industry must step up pace of innovation to solve environmental challenges, GLOBE conference hears

By Mark Lowey

Alberta's oilsands companies have a history of innovation but they're now working more closely together to ramp up the deployment of new environmental technologies, industry experts told a **GLOBE 2014** session.

"We've had a tremendous history of innovation" in commercializing the oilsands, but we have to step up the pace in solving environmental challenges, **Gordon Lambert**, executive advisor, sustainability & innovation to **Suncor Energy Inc.**, told delegates to the international environment business conference and trade show, held in Vancouver in March.

Lambert, one of four panelists in a session titled, "Canada's Oil Sands: Technology & Collaboration," said there are critically important "issues of the commons," such as the cumulative impacts of oilsands development, that the industry needs to address together.

"We can't afford to duplicate effort," he said, pointing to a recently discovered example where four companies were testing the same centrifuge equipment for tailings treatment – unbeknownst to each other.

Panelist **Harbir Chhina**, executive vice-president, oil sands at **Cenovus Energy**, said the industry needed to be innovative to make the steam-assisted gravity drainage (SAGD) technology work. He said he worked on 26 pilot projects trying SAGD, and 25 of them failed.

The industry's environmental impact now is much less than when oilsands development first began, he said.

Chhina pointed to several technologies that are reducing the industry's environmental footprint, including:

- Exploring use of solvents with steam in SAGD operations, to reduce greenhouse gas emissions;
- Using air to displace water in bitumen reservoirs;
- Deploying a helicopter-borne drilling rig ("SkyStrat," a technology developed and pioneered by Cenovus in the oilsands) to drill stratigraphic test wells while reducing surface impact by 50 per cent and water use by up to 50 per cent.

James Cleland, global general manager, heavy oil solutions at **General Electric** in Canada, told GLOBE delegates that the global oil and gas industry spends \$1 trillion per year.

About \$20 billion of this total is on research and development spending, including about \$500 to \$600 million in the oilsands, he said.

GE's innovations for the industry include its "mobileFLEX" engines that replace diesel with natural gas to deliver lower-cost, lower-emission power to drill rigs, artificial lift, enhanced oil recovery and oilfield equipment, Cleland said.

The company says its Waukesha mobileFLEX technology reduces operational costs by up to 80 per cent compared with diesel, and cuts emissions by up to 88 per cent.

GE also is partnering with **Statoil** on a low-cost prototype to capture flared natural gas in the Bakken field in North Dakota and use the fuel in drilling rigs that have already been converted to replace 40 per cent of the diesel they burn with gas.

Statoil calculates that if all the rigs in the Bakken were converted to run even partly on natural gas, more than 60 million cubic feet of gas – roughly a fifth of the gas now being flared – could be saved every day. ([See New York Times story](#)).

GE is also experimenting with using carbon dioxide as a fluid for hydraulic fracturing operations, replacing water as the fluid of choice for fracking.

Cleland said GE thinks that the **Canada's Oil Sands Innovation Alliance (COSIA)**, launched in March 2012, is an excellent model for collaboration to develop and deploy innovative technologies.

GE has pledged more than \$20 million to COSIA to tackle issues around greenhouse gas emissions and water, Cleland said.

ALLIANCE FOCUSED ON ENVIRONMENTAL PERFORMANCE

COSIA, according to its website, is “an alliance of oil sands producers focused on accelerating the pace of improvement in environmental performance in Canada’s oil sands through collaborative action and innovation.”

Session panelist **Dan Wicklum**, chief executive of COSIA, said the 13-company alliance, representing almost 90 per cent of oilsands production, now has four precedent-setting joint venture agreements that set out the scope for sharing environmental technologies across four key areas: land, water, tailings and greenhouse gases.

COSIA’s member-companies have so far shared 560 distinct technologies that cost more than \$900 million to develop and which are now accessible to all of COSIA’s members, he said.

COSIA’s members are moving forward 185 projects at a cost of nearly \$500 million, with new initiatives coming on stream regularly, Wicklum added. ([Click here](#) to watch a short video on COSIA’s 2013 Performance Update).

Key projects include: the reclamation of seismic lines in the boreal forest to restore caribou habitat; the study of end pit lakes as a method to integrate tailings ponds into the final reclaimed landscape; numerous technologies to accelerate the drying of tailings; and using algae to reduce greenhouse gas emissions and produce biofuel to power oilsands facilities.

COSIA is developing “challenge statements” and is trying to be as explicit as possible about current knowledge and R&D gaps, Wicklum said.

The alliance also is committed to setting measurable environmental performance goals, and will be publicly speaking about these goals by the end of June, Wicklum added.

Lambert noted that COSIA also now has an associate member category, which currently includes 24 associate members and more than 60 expressions of interest globally.

Session moderator **John Wiebe**, president and CEO of GLOBE Group, asked the panelists what they thought the next big technological breakthrough in the oilsands would be.

Chhina from Cenovus said the use of solvents (such as steam with butane) for SAGD would reduce a lot of the infrastructure currently required in these operations, which typically rely on steam generated by huge volumes of water.

Cenovus invests \$150 million to \$200 million annually on R&D, he noted.

In terms of innovations to come, “I think we’ve just finished the first inning in the oilsands,” Chhina said.

PUBLIC PERCEPTION DOESN’T MATCH INDUSTRY’S ACTIVITIES

A GLOBE delegate, who started his question by saying: “The product you’re putting in the market is the problem,” asked how the oilsands industry was offsetting its greenhouse gas emissions – the fastest-growing GHGs in Canada.

Wicklum replied that some COSIA oilsands companies (such as Suncor Energy and **Shell Canada Energy**) are investing heavily in renewable energy sources.

As part of [“The Algae Project,”](#) **Canadian Natural Resources Limited** (CNRL), a COSIA member, will be testing technology using algae to convert carbon dioxide into biofuel and biomass products, at a pilot-scale biorefinery scheduled to be operating by mid-2014, he said.

CNRL hopes the project will reduce emissions by 15 per cent at its **Horizon** oilsands operation and by 30 per cent or more at its **Primrose** operation.

Wicklum said there are also several COSIA companies that are exploring offering a lucrative X-type prize for technologies that significantly reduce carbon emission and water usage.

Cleland from GE said the company is trying to find uses for the carbon dioxide emitted by the oilsands and other industrial operations, rather than just permanently sequestering it underground in a geological formation.

Chhina noted that carbon capture and sequestration only starts to become economically viable at \$80-plus per tonne of CO₂. Alberta’s carbon levy on large emitters is \$15 per tonne of CO₂.

Enovus has [invested \\$2.5 million in Skyonic Corporation](#), based in Austin, Texas, which is developing technology to turn CO₂ into profitable products such as solid carbonate and bicarbonate which is used in the livestock and food industries, Chhina said.

A GLOBE delegate asked why the public perception of the oilsands industry doesn’t match the industry’s activities as described by the four panelists.

Lambert replied that in addressing the industry’s challenges, all sides need to get beyond having a polarized, rhetorical debate and work together to find solutions.

Moderator Wiebe asked the panelists why the oilsands industry is often seen by the public as not doing enough to address environmental issues.

Wicklum said that new projects take five to eight years to become fully operational.

In terms of communicating the industry’s progress, COSIA’s member-companies have asked the alliance’s managers and staff to focus on fostering collaboration in technological innovation rather than on communications and advertising, he said. “We’ve been asked to stick to our knitting.”

Chhina replied that “We are going very fast in my mind” in developing innovative technologies, but it does take time to get them implemented in the field.

“We don’t want to over-promise and under-deliver,” Lambert said, adding that COSIA will be using third-party validation to verify that the alliance is delivering on its performance targets.

Cleland said that independent validation will become increasingly important, because a lot of critics just aren’t going to listen to what the industry has to say.

IS THE INDUSTRY SLOW TO INNOVATE?

EnviroLine notes that it is not only environmental activists and a large segment of the public that perceive the oilsands industry as being slow or reluctant to innovate, especially to find solutions to environmental problems.

For example, a 12-member team of **University of Calgary** researchers recently received funding for a project to “identify the technical and social factors that contribute to the slow rate

of innovation in the oilsands industry and offer strategies to stimulate the pace of future innovation.” (See May 6, 2014 story at <http://www.enviroline.ca/news-analysis/technology-reports/>).

The **Alberta Economic Development Authority** (AEDA) commissioned, multi-year study of the province’s competitiveness compared with 14 “peer jurisdictions” – five other Canadian provinces, six U.S. states, Norway, Finland and Queensland, Australia.

In its initial report in 2010, the AEDA study found that Alberta ranked second to the bottom in research and development spending, according to a May 23, 2014 story in *The Globe and Mail*.

EnviroLine’s view is that until the last few years (during which international public scrutiny of the oilsands reached unprecedented levels), innovation in the oilsands industry – with the exception of companies like Cenovus and Suncor – has largely focused on the production side of the business (i.e. innovations to increase bitumen extraction, production and upgrading).

The **Council of Canadian Academies**, in its 2013 expert panel report, [*The State of Industrial R&D in Canada*](#), prepared for the federal government, identified one of Canada’s four industrial R&D strengths as “oil and gas **extraction**” (emphasis *EnviroLine’s*).

It is true that there has been some innovative work done in the oilsands to reduce fresh water usage and greenhouse gas emissions per barrel of oil produced, and some promising first steps toward accelerating tailings ponds reclamation.

But the industry as a whole, along with stepping up its pace of innovation, now needs to focus its efforts on tackling its biggest environmental problems. These are the massive tailings ponds and the rapidly increasing greenhouse gas emissions – both of which will continue to be bulls’ eye targets for critics around the world until these problems are solved. *EnviroLine*