Canada’s Oil Sands Innovation Alliance: A Win-Win for Canada?

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Or “Tough Regulation Makes ‘Strange’ Bedfellows in the Oil Sands”

Former chairman (Mr. Dan McFadyen) of the Energy Resources Conservation Board (ERCB) stated that COSIA was partly motivated by the enactment of ERCB’s Directive 74, “Tailings Performance Criteria and Requirements for Oil Sands Mining Schemes.”

In such a case, some of the oil companies have reacted strategically to a stiffer regulation by forming a coalition to share R&D information on technologies that lower their environmental impacts.
Nov. 28, 1943 | Allied Leaders Meet at Tehran Conference

By THE LEARNING NETWORK

U.S. Signal Corps

Josef Stalin, Franklin D. Roosevelt, and Winston Churchill are pictured at the Russian Embassy during the Tehran Conference, a four-day event which began on Nov. 28, 1943.
Ducks – Syncrude
April 2008
Directive 074: February 3, 2009

This directive requires operators to

- reduce fluid tailings through fines captured in dedicated disposal areas (DDAs), and
- form and manage DDAs.
Operators are required to submit to the ERCB

- DDA plans,
- annual compliance reports for DDAs, and
- annual tailings plans and pond status reports.
Directive 074 (Continued)

“The performance criterion for fluid tailings reduction is based on fines captured in DDAs. Fines are mineral solids with particle sizes equal to or less than 44 micrometres (μm).

The criterion establishes a minimum mass of dry fines in the oil sands feed expressed as a percentage of total fines in feed that must report to the DDAs.
Directive 074 (Continued)

This requirement applies to a one-year period between surveys (expected to be July 1 to June 30 of the following year). The phase-in sequence will be as follows:

- 20 per cent from July 1, 2010, to June 30, 2011;
- 30 per cent from July 1, 2011, to June 30, 2012; and
- 50 per cent from July 1, 2012, to June 30, 2013, and annually thereafter.
Key Non-Industrial Players

GREENPEACE

ERCB Energy Resources Conservation Board

Alberta Environment and Sustainable Resource Development

Alberta Energy
The Ministry of Environment and Sustainable Resource Development amalgamates the ministries of:

- Environment & Water
- Sustainable Resource Development

ESRD's Vision:

- Environment and Sustainable Resource Development, as proud stewards of air, land, water and biodiversity, will lead the achievement of desired environmental outcomes and sustainable development of natural resources for Albertans.
Early Industrial Response: Oil Sands Tailings Consortium

- “The Oil Sands Tailings Consortium (OSTC) was formally announced in December 2010, with official sign-off of the OSTC Agreement on March 1, 2011.”

- “The seven member companies of the OSTC represent all of the companies currently engaged in, or contemplating, surface mining of the oil sands, including: Suncor Energy Inc., Syncrude Canada Ltd., Shell Canada, Canadian Natural Resources Ltd., Imperial Oil, Total E & P Canada Ltd. and Teck Resources Ltd.” (Fair, 2012, p.4)
OSTC’s Four Principles

• Eliminate monetary and IP barriers;
• Share knowledge and support public transparency;
• Collaborate on tailings R&D;
• Equitable cost sharing.
“Building on the successes of precursor organizations (including, the Canadian Oil Sands Network for Research and Development (CONRAD), Oil Sands Leadership Initiative (OSLI), and the OSTC), an organization referred to as Canada Oil Sands Innovation Alliance (COSIA) was created on March 1, 2012.”

“COSIA is a much larger collaborative initiative and includes the major oil sands operators, including the seven oil sand surface mining companies (as per the OSTC) as well as an equivalent number of in-situ operators.”

“COSIA is now the “umbrella” organization for the OSTC, CONRAD and OSLI.” (Fair, 2012, p. 5)
On March 1, 2012, twelve oil companies signed the Canada’s Oil Sands Innovation Alliance (COSIA) charter. The charter clearly states the signatories’ vision, shared beliefs and commitments.

“Our Vision is to enable responsible and sustainable growth of Canada’s Oil Sands while delivering accelerated improvement in environmental performance through collaborative action and innovation.”
“Our companies pledge to:

• Collaborate and innovate to accelerate improvement in environmental performance through the formation of COSIA.

• Provide visible leadership and accountability both within our individual companies and within our broader alliance.

• Drive to accelerate improvement in environmental performance as measured from a baseline in the priority areas of Tailings, Water, Land and Greenhouse Gas Emissions.

• Collaborate with governments and other stakeholders to execute a world-class regional environmental monitoring program.
COSIA

- Accelerate the pace and scope of environmental innovation, working with a broad range of participants within and outside of Canada.

- Allocate multi-year human and financial resources, and initiate, participate in, or lead projects within COSIA’s mandate, thereby contributing equitably to achieve our goals.

- Listen, respond to, and work with stakeholders who aspire to our vision, and address evolving regional needs and conditions.

- Assess and drive progress, remove barriers, and communicate the performance of COSIA in a transparent fashion.”
The signatory companies in COSIA were


- Together, these companies account for “…more than 80 percent of the oil sands production in Canada.”
Current COSIA Members


- Together, these companies account for “…almost 90 percent of the oil sands production in Canada.”
COSIA: Tailings

• The Tailings EPA has identified key issues facing the industry and is working to address the following:

• the accumulation of fluid fine tailings (FFT) within tailings ponds through the development of new and improved tailings management technologies;

• treatment of process affected water, the water which remains once the FFT are removed; and

• accelerating the reclamation of the resulting tailings deposits so that they can be incorporated into the final reclaimed landscape.
COSIA: Tailings Projects

http://www.cosia.ca/projects/tailings/addressing-challenging-tailings-material

http://www.cosia.ca/projects/tailings/centrifuges-used-to-release-water

http://www.cosia.ca/projects/tailings/knowledge-of-tailings-deposits

http://www.cosia.ca/projects/tailings/preventing-the-production-of-fft

http://www.cosia.ca/projects/tailings/speeding-reclamation

http://www.cosia.ca/projects/tailings/speeding-water-release

http://www.cosia.ca/projects/tailings/tailings-technology-roadmap
COSIA: Water

- The Water EPA identified key issues facing the industry and is working to address the following:
  - improving the use and management of all water resources, fresh, saline and recycled;
  - creating a collaborative regional water management solution that links mining and in situ supply/demand;
  - accelerating the development and commercialization of water treatment technologies;
  - developing game-changing steam generation technology to reduce water used to produce steam for in situ oil sands development; and
  - managing salt accumulation in water streams on mine sites during active mining.
COSIA: Water Projects

COSIA: Land

• The Land EPA identified key issues facing the industry and is working to address the following:

• footprint reduction — more efficient use of land by reducing the extent and duration of industrial footprints;

• accelerate remediation — reclaiming and restoring disturbed land in a timely manner;

• biodiversity — maintaining natural diversity including bird, mammal and fish species; and

• species of management concern — reversing the decline of wildlife species of concern.
COSIA: Land Projects

COSIA: Greenhouse Gases

- The GHG EPA is working to address the following:

  - improving energy efficiency in all aspects of oil sands operations, including the production of steam for in situ (in place) recovery of bitumen;
  - recovering waste heat for reuse;
  - design and operating best practices;
  - measurement, monitoring, and verification;
  - reducing flaring, venting, and fugitive emissions;
  - CCS of CO$_2$ from steam generators and other large oil sands facilities;
  - producing alternative energy; and
  - exploring regional opportunities to reduce GHG emissions with non-industry parties.
COSIA: Greenhouse Gases Projects

Game Theory
Game Theory Principles

Definition of a game

- To use game theory to analyze the behavior of a market, we describe the market as a game. The game is completely characterized by four elements:
  - a list of players
  - a list of strategies or actions available to each player
  - a description of the payoff received by each player for each strategy profile
  - the rules of the game
What we are ultimately interested in is the outcome of a game, which represents behavior in a market. That is, we want to solve for the **equilibrium** of the game.

The equilibrium concept we will employ is called a **Nash equilibrium**.

A **Nash equilibrium** is a strategy profile where each player’s strategy is a best response strategy to the strategies chosen by all other players.
First Research Project

The main objectives of this research projects are to demonstrate that:

(i) the formation of COSIA has been rational; and

(ii) its strategic effects should motivate:

(a) all Oil Sands’ operators to join the club, to improve their environmental performances, and to increase their production levels; and

(b) the regulator to adjust its environmental regulations.
Strategic effects investigated

(i) changes in green R&D levels;
(ii) changes in environmental performances;
(iii) changes in the degree of competitiveness; and
(iv) changes in regulatory policy instruments.
Regulation 1: Tailings
Regulation 2: Carbon Tax
The collective actions of COSIA members lead to greater collective R&D effort and improved environmental performance of the entire industry, which then generate different regulatory responses.

Cost reductions promoted by collective action also improve the degree of competitiveness of each COSIA member in the global oil market relative to the degree of competitiveness of non-members.

Each COSIA member has incentives to remain in the coalition and each non-member has incentives to join the coalition.
Research results

- COSIA will grow in size and contain all Oil Sands’ producers.

- COSIA will produce significant win-win gains for Canada – i.e., improvements in environmental performance and industrial competitiveness in the world market.

- Canada’s regulator responds by increasing the stringency of local pollution standards and reducing the stringency of the carbon tax.

- Canada’s national income will rise.
Conclusion

- Our theoretical findings demonstrate that COSIA represents a win-win strategy for Canada.

- Oil producers have incentives to join the club and share both green R&D efforts and costs.

- The Canadian industry benefits from reducing its regulatory costs and thus from becoming more competitive in the world market.

- The Canadian society benefits from the reduction of environmental impacts and the increase in income produced by industry.

- COSIA represents a remarkable institutional innovation, which should be mimicked by oil producers in other nations.