

08.14.2012 @ De-Sanding Pilot Test Facility

Robert Siy

SENIOR RESEARCH ASSOCIATE

“Syn crude has developed a new technology that removes settling solids from our oil sand slurry and we’re testing it in this field pilot. It has great potential to simplify mining, extraction, tailings management and land reclamation. It will make it much easier to transport slurry and recover bitumen. This means we will use less energy for pumping and extracting the bitumen, along with less chemicals and water. We also expect to help reclaim land and water more quickly.

Canadians expect us to responsibly manage our business and this is something that could have a significant positive change.

Ron Cleminson

TECHNOLOGY DEVELOPMENT ASSOCIATE

Continuous technology improvement is good for the company and the industry as a whole. Oil sand de-sanding is a technology innovation that could mean higher production yield at a lower unit cost, along with associated environmental benefits. Even if it does not turn out as hoped, there will be lessons learned, which in turn will move us forward toward achieving the same goals.”



ROBERT / RON

CLIMATE CHANGE

Performance Overview

- Energy intensity averaged 1.27 million BTUs per barrel
- Greenhouse gas emissions intensity averaged 0.104 tonnes CO₂e per barrel
- Paid \$38 million to Alberta Government Climate Change and Emissions Management Fund over reporting period

Our Position

The global need for energy is growing and all sources, including conventional oil, oil from oil sands and renewable energy forms, will be needed. As a contributor to this energy mix, Syncrude recognizes public concerns related to the greenhouse gas emissions (GHGs) stemming from oil sands development and believes every sector of our economy needs to do its part to help Canada realize its objectives in reducing our carbon footprint.

Our focus on energy efficiency and conservation will minimize the growth of GHGs that stem from production of synthetic crude oil at our operations. We will achieve this through operational reliability, as well as continued investment in research to develop incremental and breakthrough technologies that reduce our GHG emissions per barrel.

Energy Efficiency Stewardship

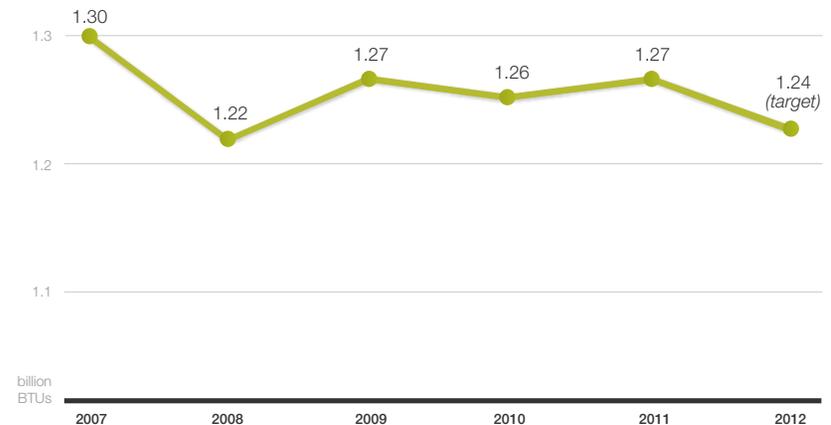
Syncrude has a long history of energy conservation. For example, our operations incorporate extensive cogeneration processes in order to recover waste heat for reuse. We also developed [oil sands hydrotransport and low energy extraction](#). These processes enabled us to move away from the energy-intensive draglines and bucketwheel reclaimer system, and reduce extraction water temperatures by around 50 percent.

These types of step-change advancements not only improve our energy efficiency, while correlating directly to lower greenhouse gas emissions, they also provide significant benefit to the bottom line. As we continue to pursue the next generation of oil sands technologies and reliability improvements, energy efficiency remains a key factor when evaluating capital and maintenance projects.

As part of our adoption of ExxonMobil processes, Syncrude is currently implementing new operations management systems – the Operations Integrity Management System (OIMS) and the Global Reliability System (GRS) – to improve reliability and environmental performance. Regarding specific energy efficiency projects, our current focus is on improved monitoring of Key Energy Variables (KEVs), which typically are instrument tags or process parameters that panel operators and contact engineers can use to identify energy conservation opportunities. Additional initiatives include optimizing furnace operations, reducing flaring and repairing steam leaks. Our 2012 energy use target is 1.24 million BTUs per barrel.

Energy management is a component of variable incentive compensation for executive and senior leaders. It is also incorporated into our Impact 21 program in which employees are financially rewarded for achieving goals in operational performance areas. For further information, see discussion on [Management Systems](#).

Energy Conservation – Energy Intensity



Syncrude generates its own electricity and is a net exporter to the Alberta grid. In fact, we exported an average 237,000 MWh annually over the last two years – enough to supply the city of Calgary’s electrical needs for 10 days.

Energy Conservation

	2007	2008	2009	2010	2011
Total energy consumption (billion BTUs)	146,647	131,028	131,247	136,883	134,970
Energy intensity (million BTUs per barrel)	1.30	1.22	1.27	1.26	1.27
Energy intensity improvement (% as compared to year prior)	11.6	6.3	-3.5	0.3	-0.9
Energy return ratio (million BTUs of SCO product per million BTUs of energy consumed)	4.3	4.6	4.4	4.4	4.4

Greenhouse Gas Emissions

	2007	2008	2009	2010	2011
GHGs – millions of tonnes (as per Environment Canada quantification guidelines) ^{1,4}	12.736	11.775	11.666	12.721	12.873
GHGs – millions of tonnes (as per Specified Gas Emitters Regulation) ^{2,3,4}	11.097	10.404	10.007	11.091	11.236
GHGs – tonnes CO ₂ e per barrel produced ^{2,3,4}	0.099	0.095	0.097	0.102	0.106

1 As reported to Environment Canada. Emission calculations for the purpose of provincial and federal regulatory reporting will differ, as certain sources of emissions are excluded.

2 CO₂ equivalent emissions reported include all Syncrude sources (net of industrial process, biomass, and waste and wastewater emissions) as reported to the Government of Alberta under the Specified Gas Emitters Regulation (SGER). These estimates have been restated from previous years due to Alberta Environment calculation methodology changes. At the direction of the Climate Change Secretariat, Syncrude estimated the amount of hydrogen that was either vented, flared, or combusted and reallocated emissions attributable to the production of hydrogen.

3 Syncrude's GHG emission estimates were subject to two independent audits in 2009, the first by the Alberta Auditor General and the second to satisfy the 'Third party Review' required by the SGER.

4 Syncrude is a large producer of electricity and is a net exporter to the Alberta grid. Syncrude exported 274,000 Megawatt hours of electricity in 2010 and 201,000 hours in 2011. Emissions from electrical power generation are included in the Syncrude total and are part of the intensity calculated on a per-barrel produced basis.

Alberta Carbon Tax and Off-Set System

The [Alberta Specified Gas Emitters Regulation](#), established in 2007, set aggressive intensity targets for Large Final Emitters of carbon dioxide. It requires Syncrude to reduce per barrel emissions of greenhouse gases by 12 percent from the average of per barrel emissions between 2003 and 2005. If Syncrude does not meet this target in any reporting year, we must purchase offset credits or pay into a government fund dedicated to the development of emissions reduction technology. Both these options are assessed at \$15 per tonne of CO₂ that is in excess of reduction targets.

Syncrude did not meet the reduction target for 2010 or 2011. We offset the remainder by purchasing \$16 million and \$22 million respectively in Government of Alberta Technology Fund Units.

Monitoring Development of Federal Regulations

To date, the Canadian government has pursued a sector-by-sector approach to climate change regulation, beginning with the electricity and transportation sectors. No broad climate change legislation has been introduced yet that focuses on the oil sands sector.

Syncrude believes every sector of our economy will need to do its part to help reduce our nation's carbon footprint, and the oil sands industry should neither receive preferential or detrimental treatment in any legislation. The evolution of climate change policy in Canada and North America is actively monitored by our Joint Venture participants, and developments are reported through the Syncrude Management Committee.

Creating and Sharing Best Practices

Toward sustained progress in energy conservation and reduced GHG emissions, Syncrude draws on the experience and expertise of others through its participation in the following external groups:

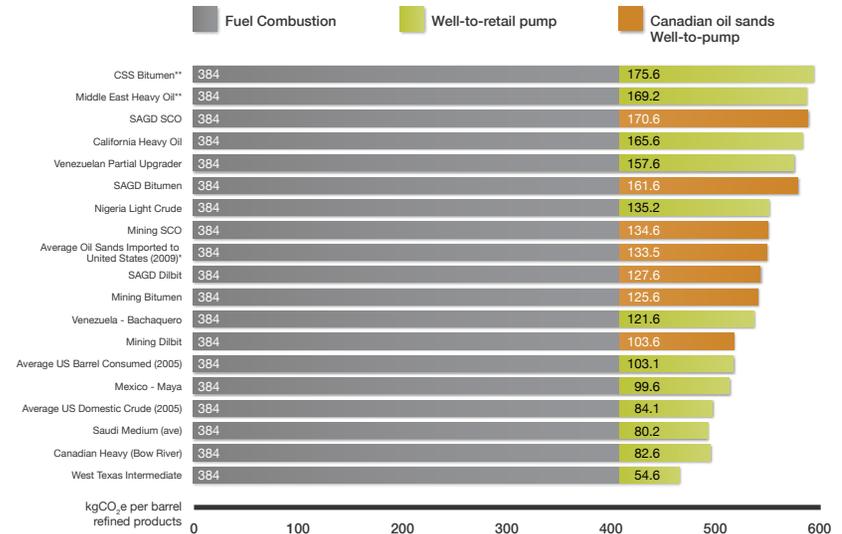
- **Canadian Industry Program for Energy Conservation (CIPEC).** This collaboration between government and business is aimed at improving the energy efficiency of industries across the country. Syncrude is one of two oil sands industry members.
- **Mining Association of Canada, Towards Sustainable Mining (TSM).** Syncrude reports its progress on energy and greenhouse gas emissions management annually. Results are externally verified once every three years.
- **Integrated CO₂ Network (ICO₂N).** This industry association represents a cross-section of western Canada's industrial CO₂ emitters; Syncrude is a Tier 2 member. ICO₂N provides input to government policy about carbon capture and storage (CCS) and advocates for CCS as a part of Canada's climate change plans. The group is also helping shape a regulatory framework for CCS.

Oil Sands Emissions Comparable to Other Crude Oils

An independent study by IHS CERA (www.ihs.com) estimates the well-to-wheels life-cycle GHG emissions of crude oil from the oil sands are in the same range as those of the other crude oil products refined in the United States. The studies found that direct greenhouse gas emissions from oil sands are similar to other heavy oils and about six percent higher than emissions from the U.S. crude supply average.

About 20 to 30 percent of GHG emissions from a barrel of oil are created during the production, refining and transportation to market of the product while 70 to 80 percent comes from consumption.

Well-to-Wheels Greenhouse Gas Emissions for Oil Sands and Conventional Crude Oils



Source: IHS CERA

Results of a meta-analysis of 13 publicly available life-cycle studies.

Assumptions:

*Assumes 55 percent of exports to the United States are dilbit blends and 45 percent are SCO (source: NEB 2009 oil sands exports).

**Steam injection is used for projection.

***Assumes SOR of 3.35.

12 percent loss of volume upgrading bitumen to SCO.

All SAGD crude production cases assume an SOR of 3.

All oil sands cases marked "Dilbit" assume that the diluent is consumed in the refinery, with no recycle of diluents back to Alberta, and only 70 percent of the barrel is from oil sands.

All oil sands cases marked "Bitumen" assume that the diluent is recycled back to Alberta, and all of the barrel processed at the refinery is from oil sands.

As an integrated mining and bitumen upgrading operation, Syncrude's greenhouse gas emissions profile most closely correlates to Mining SCO on the above chart.

A Perspective on GHGs

The oil sands account for approximately seven percent of Canada's total GHG emissions and 0.1 percent, or 1/1000th, of global emissions.