The promise of Canada's oil sands

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Energy is the lifeblood of any economy. It's what heats our homes, fuels our vehicles, powers our factories – and shapes the quality of our lives. As developing countries like China and India continue to evolve their economies, the global demand for energy is rapidly growing. And despite significant efforts to develop renewable energy sources, hydrocarbons – oil, gas and coal – are expected to play a dominant and critical role in meeting energy demands for decades to come.

More than ever, the world needs a plentiful supply of clean, secure and affordable energy. But meeting that demand has never been more challenging. Consider the example of oil, which currently supplies about a third of the world's energy demand – and the vast majority of transportation fuels. The era of low-tech, easy-to-develop oil is drawing to a close in North America. Elsewhere, conventional oil supply remains abundant, but is increasingly difficult to access. Nearly 80 per cent of the world's oil reserves are owned or controlled by state companies. That leaves just over 20 per cent of reserves on the open market.

And here is one of the most pertinent statistics of all: over half (52 per cent) of the world's oil reserves still accessible to the private sector are found in Canada's massive oil sands reserves.

Oil from sand

Buried beneath the boreal forest of northern Alberta, Canada's oil sands contain 173 billion barrels of recoverable oil with current technology – the world's third largest oil reserve after Saudi Arabia and Venezuela. Future technology breakthroughs could significantly increase the amount of recoverable oil, potentially making the oil sands the largest reserve of all.

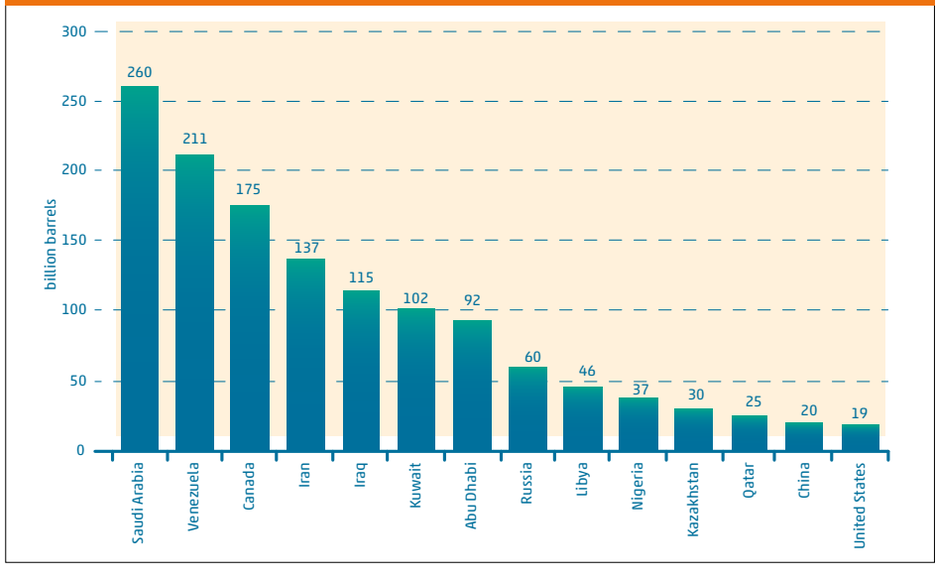
About 20 per cent of oil sands reserves are close enough to the surface to be reached by traditional mining. The remaining 80 per cent can only be accessed by in-situ drilling, which injects steam into the deposit to thin the bitumen before pumping it to the surface (in-situ projects disturb less land than a typical mining project and do not produce tailings ponds). In-situ drilling is a relatively new innovation and one of many examples of how technology is helping to unlock this resource base.

As an independent Calgary-based upstream oil and gas company, Nexen is strategically focused on three key growth areas – conventional exploration and development in some of the world's most abundant resource basins (the North Sea, the deepwater Gulf of Mexico, Yemen and offshore West Africa); shale gas; and Canada's oil sands.

Nexen has strong future prospects in the oil sands. We were proactive in assembling land in the oil sands region of northern Alberta to the point that we are now the largest landholder in the world's third largest oil reserve. Our contingent recoverable oil sands resource is currently estimated at three to six billion barrels of oil equivalent (boe).

Nexen is ramping up production at our Long Lake in-situ oil sands facility, which has an expected capacity of 60,000 barrels per day (bpd) of high quality, ultra low sulphur, synthetic crude oil. At Long Lake, Nexen pioneered a patented OrCrude™ technology that takes a portion of the barrel other oil sands operations treat as a waste byproduct (asphaltenes) and transforms it into a source of energy and hydrogen for our operations, thereby reducing our reliance on natural gas. This

Global crude oil reserves by country



Source: Oil & Gas Journal, December 2010

technology allows us to get the most energy out of every barrel of bitumen.

Our next oil sands project, known as Kinosis, is expected to develop a thick, superior quality reservoir starting with two smaller in-situ projects – each with a capacity of 40,000 bpd. We anticipate approving Kinosis in 2012. Nexen also holds a 7.23 per cent interest in the Syncrude Canada Ltd. joint venture that has been mining shallow oil sands deposits since the mid-1970s, and is Canada's largest oil sands operation.

The economics of development

One of the great advantages of Canada's oil sands is that the reserves are clearly identified and understood; we know exactly where the bitumen is, so exploration costs are very low. This allows the industry to approach production as a steady and reliable manufacturing process – and there is enough supply to keep the "oil sands factory" running for a century or more.

Another significant advantage is that the oil sands deposits are located in a province, and a country, that is very appealing to investors due to the combination of democratic traditions, an open economy and a strong record of regulatory and environmental oversight (Alberta is the only jurisdiction in North America to mandate industrial greenhouse gas emission reductions). Producers and governments alike remain focused on the goal of responsibly developing the oil sands to provide the energy our economy – and the world – requires.

All of this helps explain why the Canadian Energy Research Institute (CERI) recently projected that some US$ 2.07 trillion will be invested in building and maintaining the oil sands over the next 25 years. CERI also predicted industry-wide oil sands production will ramp up from the current 1.7 million bpd to 2.1 million bpd by 2015 and 4.9 million bpd by 2035.

Canada is already the largest energy supplier to the United States and close to half the crude exported is from the oil sands. With the right planning and infrastructure, oil sands crude also has the long-term potential to help supply energy-hungry Asian markets.

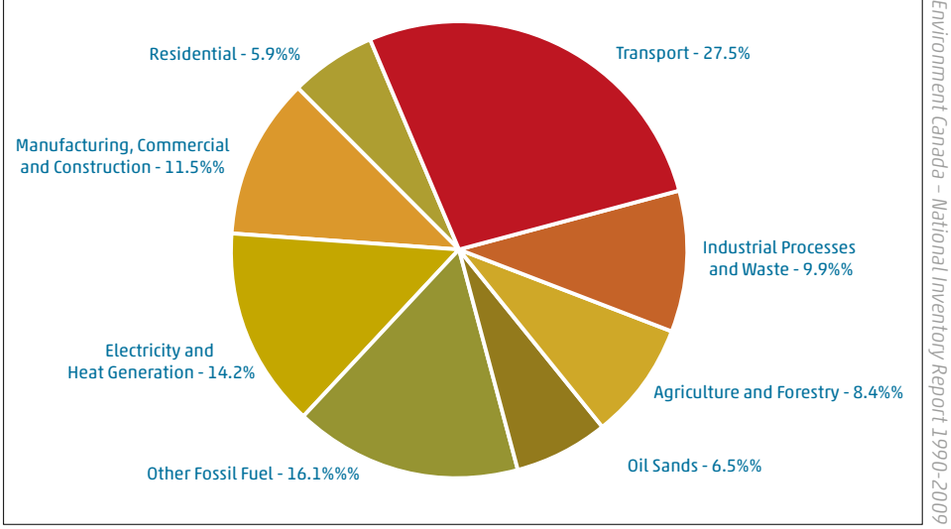
But oil sands development also faces some significant challenges. This is a very capital-intensive industry; a typical in-situ or mining project can take several years to move from conception to completion and requires billions of dollars in upfront investment. Success depends on superior planning and execution, and the ability to withstand inevitable fluctuations in commodity markets.

As a result, many companies have entered strategic partnerships. For example, the Syncrude joint venture allows the various owners to mitigate economic risks by cost sharing on infrastructure development as well as the technological expertise essential to achieving sustainable energy development.

Responsible development

The biggest challenge is managing the environmental impact of oil sands development. The industry is energy-intensive and water-intensive and involves significant land disturbance. But while some industry critics have been quite vocal in labeling oil sands crude as "dirty oil," the reality is much less sensational. For example, independent studies show that oil sands crude is not significantly more carbon intensive than other North American crude oil →

Canada's GHG emissions by sector



Source: Environment Canada – National Inventory Report 1990-2009

imports on a "wells-to-wheels" life cycle basis. Similarly, the oil sands industry is currently responsible for 6.5 per cent of Canada's total greenhouse gas (GHG) emissions – far less than the transportation (27.5 per cent), electricity (14.2 per cent) or manufacturing and heavy industry (11.5 per cent) sectors.

Moreover, whether it is emissions, water use or land disturbance, the oil sands industry has acted decisively to carry out continuous improvements in environmental performance. By harnessing technology, the industry has virtually eliminated sulphur dioxide emissions while reducing GHG emissions intensity (the amount of GHG emitted for each barrel of oil produced) by 39 per cent compared to 1990 levels. Oil sands producers recycle between 80 per cent to 95 per cent of water used and have invested billions of dollars in technology to significantly accelerate the pace of tailings ponds and land reclamation (companies are required to restore all disturbed lands to a sustainable landscape that is equal to, or better than, its original state).

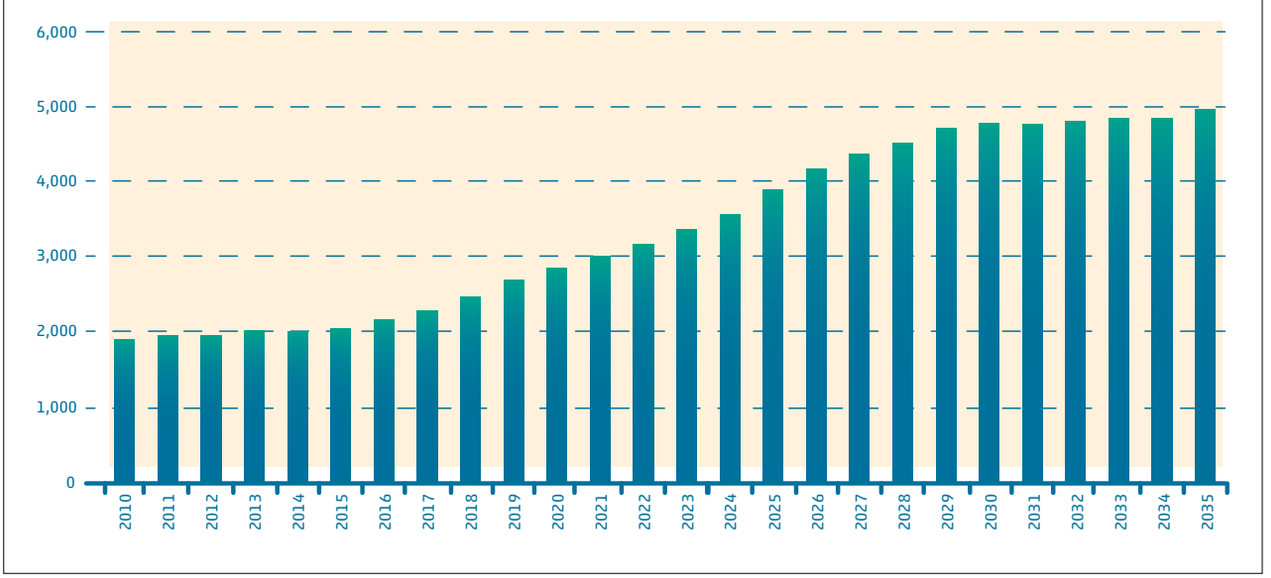
As Canada's oil sands industry grows, more must be done to manage the cumulative impacts of development. To address this, five like-minded oil sands operators, including Nexen, have teamed up to form the Oil Sands Leadership Initiative (OSLI). Each company is providing resources, sharing best practices and working together on potential technological breakthroughs to advance sustainable development. The other OSLI participants are ConocoPhillips Canada, Suncor, Statoil Canada and Total E&P Canada.

Recent initiatives undertaken by OSLI include advancing research into making in-situ oil recovery more energy-efficient (a key step to better managing GHG emissions); testing technologies to allow one oil sands operator to take another operator's tailings wastewater, treat it, and then reuse it; and collectively planting new trees (600,000 to date) across the oil sands region to improve forest cover and better protect woodland caribou from predators.

Nexen, along with other oil sands developers, remains committed to working with all stakeholders – including governments, non-government organisations, academic researchers, communities and consumers – to seek long-term solutions to environmental and social challenges.

The oil sands industry is strongly positioned to deliver the energy our growing economies require in the years and decades ahead. It is no silver bullet for meeting global energy demands but – in tandem with the responsible development of a range of conventional and unconventional energy sources – Canada's oil sands can play an important role in creating the sustainable energy future we all desire. ■

Total bitumen production ('000 b/d)



Source: OCERI