

# CANADA

## A Hub Of Innovation

A Special Report From  
*Oil and Gas Investor*  
and Global Business Reports

*Home to the world's third-largest proven reserves of oil, Canada hosts an already mature, yet continuously expanding energy sector with massive potential for further development.*

**A**t a time when a number of the largest oil and gas reserves reside in countries suffering from political or social volatility, Canada's stability enforces its current position as the world's second-largest exporter of natural gas and ninth-largest exporter of oil.

Private access to these reserves further stokes investor interest. According to a 2010 report produced by the Canadian Association of Petroleum Producers (CAPP), the majority (77%) of the world's oil reserves are owned or controlled by national governments. Only 23% of total world oil reserves are accessible for private-sector investments, 51% of which are found in Canada's oil sands.

Yet for all these advantages, Canadian oil faces one substantial challenge: the difficulty of extraction. In 2009, 49% of Canada's oil production was from unconventional sources, a figure that is steadily growing. These sources are notoriously difficult to extract economically, but account for over 97% of Canada's resources, according to some estimates.

The key to continued success in the Canadian energy is the presence of qualified and highly educated engineers, technicians and workers who have improved, perfected, and innovated new processes for oil and gas production.

In our last report on the Canadian oil and gas industry (June 2011), we explored an industry dealing with the challenges of the global economic crisis, the price collapse in gas and the volatility in oil prices. The sector had overcome internal obstacles, such as Alberta's royalty fiasco, and was recovering to become one of the world's most significant oil and gas jurisdictions. In this follow-up report, we take a more detailed look at the technologies that have enabled this recovery and how they can unlock the full potential of Canadian reserves.

## Unconventional Oil: Obstacles, Opportunities

Canada's 27.8 billion cubic meters (bcm) of estimated oil reserves are overwhelmingly unconventional. Twenty-seven bcm of these reserves are found in the oil sands, with the potential for this source possibly rising to as high as 50 bcm. These sheer volumes mean that the majority of the growth experienced by the Canadian sector in the foreseeable future will come as a result of further development of oil sands.

The potential of heavy-oil deposits in Canada, of the type found in the oil sands, is not a recent realization. Outcrops of the sands were first discovered over 200 years ago and oil and gas companies have been producing from these sources for over 100 years. However, with the current shortage of conventional oil resources worldwide, lower gas costs and small pricing differentials, heavy-oil

**This report** was prepared by Matilde Mereghetti and Jolanta Ksiezniak of Global Business Reports. For more information contact [info@gbreports.com](mailto:info@gbreports.com).

regions are increasingly attractive to producers. "For Canada, the oil sands represent a major source of investment potential," says Wes Scott, vice president, energy, of DMG Events, which organizes the Global Petroleum Show that takes place in Calgary in early June 2012.

### Technical challenges

To achieve this promise, however, a number of challenges must be overcome. Heavy oil is highly viscous and difficult to extract using conventional methods, and as such must be either mined or extracted using thermal extraction methods. According to a report of the Canadian Energy Research Institute, 19% of the recoverable bitumen in Alberta is accessible through surface mining technologies, while the other 81% will require in situ recovery methods. In other words, the majority of oil-sand reserves are too deep to be efficiently mined and must instead be extracted through costly processes of steam injection, combustion or other sources of heating the reservoir to warm the bitumen so it can be pumped to the surface through recovery wells.

"The main issue with heavy oil is that it needs to be constantly heated to be transformed from a state of molasses to a state of



Wes Scott, vice president energy, DMG Events

flow," explains Glen F. Perry, president and CEO of Altex Energy. Due to this very problem of heavy oil's viscosity, the company promotes transporting heavy oil by rail as a viable alternative to pipelines.

Nonetheless, fitting with the old saying that necessity is the mother of invention, Canadian producers have become experts in a number of technologically advanced extraction techniques, such as steam assisted

gravity drainage (SAGD). This method employs two horizontal wells. Through the upper well, high pressure steam is continuously injected into the soil, while softened bitumen continuously flows into the lower well, from which it can be pumped to the surface.

"Commercial-scale SAGD heavy-oil developments have flourished over the past decade and technology continues to improve, making these investments increasingly attractive," explains Kevin O'Brien, president of IMV Projects, one of the leading Canadian providers of technology and project-execution services for the thermal heavy-oil sector.

"Advancements in horizontal drilling and artificial lift, injection of solvents into (or instead of) steam, facilities modularization and templating, advancements in pipeline design and other emerging technologies (including the introduction of heat into the reservoir by means other than steam injection, such as subsurface combustion and electrical heating) make this an exciting time for companies like IMV Projects to be involved at the forefront of heavy-oil developments. It is still a relatively young industry here, but one that has seen some tremendous technical achievements that have positioned Alberta to be a

project management, recruitment and consultancy

**Brunel**  
access to excellence

# Passion, power and outstanding expertise



To drive successful projects in Canada's oilsands and offshore  
Let's meet at [brunelenergy.net](http://brunelenergy.net)





Kevin O'Brien, president, IMV Projects

complexity by the need to keep environmental impact to a minimum, especially as production increases. In February 2009, the government of Alberta introduced Directive 74, setting out "new requirements for the regulation of tailings operations associated with mineable oil sands."

Mature Fine Tailings (MTF) are a sludge consisting of the water and chemicals used for extraction, clay coated with residual bitumen and trace heavy metals that naturally mingle underground with bitumen, rock and clay. In the Directive 74 the Energy Resources Conservation Board (ERCB) requires operators to minimize the storage of MTF in ponds. Oil producers have until 2013 to expand the field trials of their most effective technologies and solve the complicated questions of logistics. In many cases an extremely proactive approach is being taken.

world-class energy provider and a leader in responsible, sustainable development."

With the continued development of technologies such as SAGD, companies are increasingly willing to take on the challenges of in situ extraction.

**Environmental concerns**

The technical difficulties of extraction are, however, equaled in com-

Environmental consultancies are working on innovative pilot programs with several oil and gas producers to find effective treatment systems. "One of the things we have done is that we have 'married up' our oil and gas sector with our water-treatment sector, which includes several industry-recognized experts. We have done a pilot program with several different partners where we are looking at taking the Tailings water from the oil-sands processes. This has been a six-month pilot program that has been very successful.

"Because of this success, one of the major players in oil and gas production has commissioned us to do the same for their specific facility. We definitely see a lot of opportunity for our water sector to have a meaningful impact in addressing the challenges the oil-sands



Tino DiManno, senior vice president, Canada West, Stantec



Kelly J. Gerry, vice president, Stantec



**XTREME CAN HANDLE ANY PROJECT, BIG OR SMALL.**

Xtreme Hot Oil and Pressure Service Inc. provides the energy industry with a commitment to provide the most efficient equipment, professional experience, safety and personnel to get the job done.

With the high demands of drilling and completions projects, Xtreme has had to bring a new level of well servicing to the industry. We are now leading the industry with innovative equipment that can handle the stress and demands that is required of us.

Xtreme Hot Oil & Pressure Services Inc. 366 East River Road /Hinton, AB, Bay 4, 5638- 56 St./ Drayton Valley, AB  
Contact: Doug Sparrow, General Manager, Cell: 780-817-8787 Dispatch: 877-865-5250 E-mail: doug.sparrow@xtremehotoil.com

[www.xtremehotoil.com](http://www.xtremehotoil.com)

industry faces,” says Tino DiManno, senior vice president, Canada West, of Stantec Consulting, which aims to be a “one shop stop” service provider for oil and gas producers.

MTF is not the only concern of the government and environmental groups, however.

A strict application process for projects includes assessment of all elements of a company’s environmental footprint. “There are many individuals and environmental groups that can stand in the way of a successful approval. Oil-sands mining and SAGD approvals are very expensive and time consuming to achieve,” says Ben Visser, founder and director of Visser Consulting Ltd.

One of the main challenges for oil-sands operations is related to water. As production increases, so will water use and the associated environmental concerns. The industry is developing new technologies and methods of production that are less fresh water-intensive: maximizing water recycling and reuse, incorporating groundwater-monitoring well networks at the facilities, and implementing wetland-mitigation strategies.

Another relevant issue is greenhouse-gas emissions, as substantial amounts of natural gas are used to extract the heavy oil from the mines. Gas flaring is the most obvious offender. All flare volumes are calculated, or metered and reported to the regulators monthly.

Innovative techniques ensure that a barrel of energy is produced at the lowest environmental cost possible. “Technology helps to balance economic and energy needs as well as to meet environmental requirements,” says Gary Albach, president and CEO of Alberta Innovates Technology Futures.

The continued development of ever-more advanced solutions for the technical and environmental problems facing oil-sands development, combined with Canada’s stable market conditions and the high price of oil, has already led to rapid advances in the industry. New projects are being added every year, and production is expected to increase from 1.4 million barrels per day (bpd) to 3.5 million bpd by 2025, keeping pace with global energy demand and providing a sound economic foundation for a growing market.

The potential for companies is huge. “In 1999, when IMV Projects was founded, the thermal heavy-oil industry was very immature and there was not a lot of expertise around,” says O’Brien. “IMV Projects was able to attract a lot of the talent in the industry around heavy oil and provide the talent for the few customers in town that were interested in heavy oil at the time. Things took off very fast with the industry. As a result, we were well positioned to grow from a company of 30 people when I joined in 2001 to over 700 people in Calgary by 2011.”

## Alberta’s Innovation

Alberta, with its vast oil-sands reserves, was always destined to be one of the world’s oil and gas hubs. However, a number of factors have combined to make it an innovation hub as well. Notable among these factors is the unconventional nature of its reserves and the extremities of its climate.

“Big companies come to Canada to test out new technologies with extreme temperature, and as a result, Canada has become a technology testing ground for the world in terms of technologies that will shape the way the world goes about dealing with conventional and unconventional resources,” says Ron Daye, president of Rangeland Engineering, a Calgary-based engineering, procurement and construction management company.

Another reason why different service companies come to test

their products in Canada is regulation. “Canada is a heavily regulated energy jurisdiction, both at the federal and provincial levels,” says Ben Visser, founder and director of Visser Consulting, a regulatory compliance consulting company assisting oil and gas companies in meeting the many regulations set by the various regulators such as the Energy Resources Conservation Board (ERCB). “The regulators are constantly changing their existing regulations as well as adding new ones that our clients must be in compliance with. In Alberta alone we have 78 directives, plus many other interim directives and informational letters that must be followed.”

The ERCB is the toughest regulator in the world and is one of the main filters technology trials have to pass through. “Rangeland Engineering is fortunate to be located in Alberta, which is recognized in the world as a technology center for the oil and gas industry,” says Daye. After establishing the company in Canada, he began providing services to the U.S., Eastern Europe, Africa and Latin America, entering into joint ventures with other firms.

“Alberta has a transparent environment that fosters a more innovative market place to explore and develop,” adds Daye. Moreover, for over 50 years, the University of Alberta has offered the only accredited B.S. in Petroleum Engineering degree program in Canada.

Advancements in technology have been integral to Alberta’s emergence as a premier energy exporter worldwide. “Technology is going to be the driver that turns Alberta’s lower-price natural gas into a global commodity and turns high-carbon-content bitumen into a global commodity,” says Gary Albach, president and CEO of Alberta Innovates Technology Futures.

With the potential for remarkable growth now recognized by many throughout the world, an influx of capital and increased investment has also played a role in developing Alberta’s technology hub.



### Detector Dog Services International Ltd provides unique solutions for:

- Regulatory compliance through pipeline integrity management systems using leak detection dogs.
- High-risk response detection dog teams for explosive devices on pipelines; keeping your lines flowing.
- Specialized work through our innovation puts your productivity and investors first.

[www.detectordogservices.com](http://www.detectordogservices.com)

Phone: +1 (403) 616-1356 Email: [detectordog@hotmail.com](mailto:detectordog@hotmail.com)  
Calgary, Alberta, Canada.



# The Service Sector

Canadian service and supply companies with the right technologies can expect busy times looking forward. Over the past few years, the market for engineering firms, equipment suppliers and a huge range of other players has been extremely active.

“Canada hosts a lot of engineering companies and many competitors entered the market over the last few years. Moreover, a lot of acquisitions of small and medium engineering companies with good track records took place,” says Alex Campbell, Principal of Vista Projects Ltd.

One of the few constants in this dynamic environment is that, despite the competition, if a service company has the necessary capability, the opportunities for growth are huge. GLM Industries, for example, which specializes in the fabrication of storage tanks and pressure vessels, plans to double in size within two years—a plan that would sound hopelessly ambitious in most other markets, but is highly realistic in Canada’s oil and gas sector.

“Every service company in the world is aware of the resources and money being spent on oil-sands development,” says

Trevor Hunt, vice president of sales and marketing at GLM Industries. “There are expectations that production will come onboard much faster than anyone has anticipated. We have to try to keep up. We are very excited about the prospect for growth in that part of the business in the next two years.”

Even relatively recent entrants into the market have benefited from the industry’s glowing forecasts. Snamprogetti, an Italian EPC, started working in Calgary in 2005, after winning a contract with a local player to build hydrotreaters for the Horizon Oil Sands project, owned by Canadian Natural Resources Ltd. “Since then, our Calgary office has grown from 10 to over 400 people,” says Piero Cicalese, Snamprogetti Canada’s president and CEO.

“In Canada we are quite new as a company. We do work in oil sands, but our main experience is in the heavy-oil sector, which is a benefit for us as experience in this field is very much required in Alberta,” continues Cicalese.

Snamprogetti is part of Saipem, Europe’s largest oilfield service provider, and in December 2010 won the C\$1-billion oil-sands



**Piero Cicalese, president and CEO, Snamprogetti Canada**

contract for Husky’s Sunrise Energy project. In September 2010 Saipem signed a contract with Canadian Natural Resources Ltd. for C\$500 million.

“The growing thirst for ever-larger oil and gas supplies frequently requires the design and execution of very large production and processing plants in very remote locations, with harsh environmental conditions and very challenging logistics. Snamprogetti has been ready to face this challenge



## GLOBAL EXPERTISE.

## LOCAL STRENGTH.

Stantec provides environmental, engineering, procurement and construction management services for both land based and offshore oil and gas projects. We deliver integrated solutions in support of our clients and their assets throughout the project lifecycle from planning to design to operations and maintenance.

One Team. Integrated Oil & Gas Solutions.



with the successful execution of several huge and most difficult projects in such inhospitable environments," concludes Cicalese.

While some of the EPC companies target those contracts that Cicalese calls "the mega-projects required by the market today," there is nonetheless space also for smaller- and medium-sized EPC companies. "We target projects in the C\$100-million total installed cost range and less," says Ron Daye, president of Rangeland Engineering. "The majority of our work is de-bottlenecking and facility upgrades. Whether it is good times or bad times, clients will have a requirement to complete smaller projects with a high rate of return, and that is an excellent market for us.

"The larger firms are typically more costly and not as efficient at completing smaller projects. In the end a company of our size is more efficient, operating at a lower cost, more productive and quicker in responding to our clients' needs in the smaller projects range," Daye adds.

Other companies are proud of their ability to cover all aspects of the market. "Within the oil sands, both in situ and mining, Stantec generally competes with large EPC or EPCM organizations," says Tino DiManno, senior vice president, Canada West, of Stantec Consulting, which is listed

on the TSX and the NYSE. "Within the more conventional oil and gas plays, our competition tends to be the medium-sized EPCM companies. In the end, we focus on our ability to meet clients' needs effectively and efficiently, as this is how we will be able to maintain and grow our share of the market."

Some players search out niches in the market, but already competition is increasing. "We are the most dynamic and innovative pressure truck, hydraulic-fracturing company in Canada," says Tim McGregor, president and CEO of Xtreme Hot Oil and Pressure Services, Inc., which is planning to more than double its revenue in three years. "I've operated all of the equipment myself. I've worked in the fields until I founded the company four years ago. Since then I have been in the office, focusing on directing and growing the business.

"Due to my experience in the field, I know what equipment is needed," McGregor adds. "This knowledge has been integral to the success of our business. We have a leading edge on all our competitors. However, the competition is getting tougher. The drilling and completions are getting more advanced. This has opened up a different market that our competitors are attempting to penetrate. The majority of our competitors do not have the expertise to

bring their standard of work to the level that we are at. With that being said, it is becoming more competitive. It keeps us on our toes."

An even more niche market is targeted by Detector Dog Services International. Canada's crude oil and natural gas pipeline network extends over 70,000 kilometers throughout the country. After years of use, they begin to fail. Pipeline leak detection systems can enhance productivity and system reliability thanks to reduced downtime and reduced inspection time. Detector Dog Services International uses trained dogs for leak detection.

"Dogs can be easily transported at a moment's notice to in situ and they can detect a leak by sniffing the existing components within the active pipeline or an additive such as mercaptane, placed into the damaged pipeline," explains Ron Mistafa, president of Detector Dog Services International, which also trains dogs for sniffing landmines or explosives.

"Moreover, dogs can detect a leak at ten times the speed that a service company can by digging, cutting, capping and pressurizing until a leak is found. The dog finds the leak with amazing accuracy, to a half meter of the leak, and dog detection teams are cheaper than traditional methods."

No matter what service they are provid-

**Backed by over 50 years of worldwide experience in remote heavy oil activities, we are focused on**



**snamprogetti canada**

**BECOMING CANADA'S PRINCIPLE SOURCE FOR OIL & GAS PROJECTS**



**1800, 530 8 Avenue SW  
Calgary Alberta  
T2P 3S8  
403.441.2793  
403.441.2975 (fax)  
info@snamprogetti.ca  
www.snamprogetti.ca**

**A Company of Saipem**



ing, all the players agree that the oil sands represent the major source of oil and gas contracts at present.

## Labor Solutions

**W**ith the signs for continued growth in the energy sector looking bright, many in the industry predict that a labor shortage in the province of Alberta will hinder the sector's development.

In March 2011, the Petroleum Human Resources Council of Canada released a report entitled, "The Decade Ahead: Labor Market Analysis & Projections for Canada's Oil and Gas Industry to 2020." The report forecasts three different scenarios, the first of which sees a need for 39,000 new workers by 2020 in a "low-growth" case. In an intermediate scenario, in which natural gas prices remain low and the prospect of oil sands is accomplished, the oil patch will require more than 50,000 workers. The third scenario envisages rapid growth and a need for 100,000 new workers.

According to John Dielwart, CEO of Calgary-based ARC Resources Ltd., "The labor shortage is the biggest challenge for the oil and gas industry in Canada at present."

This problem arises, however, not simply as a result of success, but by an unfortunate quirk of timing. "In 2011, the first baby boomers have retired, marking the beginning of a trend where more workers leave the workforce than enter," explains Mike McKinnon, general manager at Brunel Energy.

The first generation of aged and experienced workers is expected to retire from the oil patch between 2014 and 2028. Although the birth rate in Alberta has increased over the last few years, Canadians are having fewer children compared to the postwar generation of the baby boom, and there are not enough people to replace the personnel who retire.

The Conference Board of Canada has predicted that nationally, by 2015, there will not be enough qualified people to fill all positions vacated by mature employees, but the situation will be most acute in Alberta, where mature workers make up 16% of the present workforce.

For recruitment companies, finding qualified workers for desperate companies is both an opportunity and a challenge. "The available talent pool is the biggest challenge of the recruiting work, as talent-seeking is currently very competitive," says Daryl Henry, vice-president Southern Alberta for Executrade, a recruitment firm with offices in Calgary and Edmonton.

It is no longer solely engineers and executives that companies need. According to Mark Matters, vice president of engineering and technical at Roevin Engineering Recruitment, the industry will be hiring at every education and skill level and the most sought after are "planning people, commercially aware people, individuals who have knowledge of project-controls. We are always looking for good processing engineers, construction managers who have gained experience by working in mega-billion-dollar projects."

Attracting and maintaining talent in these circumstances can be very hard. Ken Vinge, vice president of corporate development at Bowen Workforce Solutions, a Calgary-based recruitment company, explains: "Employers have to change their way of thinking on value propositions for employees. Part of why employees change companies and positions is the value they get offered. So, the company's unique features and benefits they can offer to their staff have become a major question. It is about compensation. Employees stay

**IMV Projects**  
Canada's Go-to Project Execution Provider for the Energy Industry



### Great teams keep score.

Asking our Clients what they think is the best was to improve our project performance. Feedback surveys ensure that our project teams are aligned with your business objectives.

*Tom - Vice President Quality Assurance*

IMV Projects is part of Wood Group, a leading international energy services company, employing more than 36,000 people worldwide and operating in 50 countries.



for money, career development, and travel allowances, training opportunities and flexibility. It all depends on the individual.”

With these new criteria have come new and innovative ways of attracting employees. Aboriginals and immigrants have increasingly been recruited to fill the labor demand.

To some extent, Canada is benefiting from the economic crisis under way in the rest of the developed world. “Due to the U.S. or Ireland’s slow recovery, there is a real opportunity to relocate some of their skilled staff to Alberta,” says Henry.

Hence, recruiting companies with a global presence have great success in Canada. One such is Brunel, a Dutch listed firm with 92 branch offices in 34 different countries that is a leading provider of expertise for the oil and gas industry worldwide. Brunel’s energy division specializes in the flexible placement of professional and technical personnel to clients throughout the energy sector.

“In Canada, our expert personnel contribute substantially to projects across the country, from producing crude in Alberta’s oil sands to extracting natural gas on the East Coast,” says Mike McKinnon, general manager, Brunel Canada. “We have a database of people and we look at the Canadian first and then at expatriates. We im-



**Mike McKinnon, general manager, Brunel Energy**

port talents from a number of countries. The easiest place for us is probably the U.S., mainly because of the NAFTA agreement. It takes us somewhere in the vicinity of a week to bring in a U.S. engineer. Whereas if we’re looking at British nationals or nationals from other countries, it’s about eight to 12 weeks to bring them in and it’s a little more difficult.

“We discuss with companies to establish their needs and we like to partner with companies and be involved in their planning. This gives us longer lead times and the opportunity to find good people,” adds McKinnon.

There is certainly no shortage of jobs for Brunel or other recruitment agencies to fill.

In June 2011 alone, Alberta created 22,000 jobs versus 18,000 created by the entire U.S.

### Conclusion: What to expect?

Canada has invested heavily in providing the infrastructure and technical know-how required for large scale oil and gas operations to take place. Much of the success of oil and gas producers in Alberta, and throughout Canada, is due to the service companies that form the backbone of the industry.

Having an abundant supply of oil and natural gas, and the necessary regulatory framework and business environment for further development, the Canadian energy sector is set to continue along its path of rapid growth. Forward-thinking policies by both the private and public sector and proper care for the environmental consequences of the industry should allow for sustainable growth to continue for years to come.

*The GBR team wants to thank the following organizations and people for their support: Wes Scott, vice president energy, DMG Events, organizers of the Global Petroleum Show that will take place in Calgary from June 12-14, 2012; Bruce Graham, president and CEO, Calgary Economic Development; and Mike Dawson, president, CSUG.*

**RESOURCES AND TECHNOLOGY WORKING TOGETHER**

We have deep operational expertise in project management, process design, project development engineering and construction management. We endeavor to provide our Clients with full services from concept to start-up, resulting in cost effective and safe operating facilities.

Inquire about our domestic and international expertise at:  
[info@rangelandeng.com](mailto:info@rangelandeng.com)

[www.rangelandeng.com](http://www.rangelandeng.com)  
Suite 400, 534-17th Avenue SW calgary,  
Alberta, Canada T2S 0B1

**RANGELAND ENGINEERING**