



# ALBERTA OIL & GAS INDUSTRY QUARTERLY UPDATE



## WINTER 2015

Reporting on the period: Oct 1, 2014 to Dec 18, 2014

# All about oil and gas

**Technological advancement** has set the stage for another boom in Alberta's non-oil sands oil and natural gas industry. Until the last few years, the sun had slowly been setting on Alberta's conventional oil and natural gas industry. Oil production had declined from a peak of 1.43 million barrels per day in 1973 to a low of around 460,000 barrels per day in 2010.

But things are changing for the better, as increased implementation of long horizontal wells and multistage fracturing in tight oil plays across the province—not to mention new provincial royalty incentives to encourage drilling—has crude oil drilling activity and production on the upswing.

In fact, the tight oil revolution that began in the United States and gradually moved north into Alberta marks the dawning of a new day for oil and natural gas exploration and production in the province.

In Alberta, the new technology is being used in an increasing number of oil plays. Among the most advanced plays are the Cardium in west-central Alberta, the Beaverhill Lake Carbonates near Swan Hills, the Viking in east-central Alberta, at Red Water north of Edmonton, the Pemiscot at Princess in southern Alberta and at Judy Creek in northwestern Alberta.

Additionally, emerging liquids-rich plays like the Montney and Duvernay shale show great promise. In fact, the Duvernay play may have the most potential going forward.

At the end of 2013, industry giants such as Chevron Canada Limited and Encana Corporation reported strong liquids yields, particularly for valuable condensate, and producers are preparing to ramp up activity this year.

The Duvernay is often compared to the prolific Eagle Ford of Texas because they are both shale plays that offer a full spectrum, from dry gas through liquids-rich gas to oil. Many other shale plays, such as the Horn River Basin in British Columbia and the Marcellus or Barnett south of the border, are much more gas-focused.

In terms of the potential size of the play area, the richness of the source rock and even some of the early production results, the Duvernay "is well on its way to being as big or bigger than the Eagle Ford," Canadian Discovery Ltd. has proclaimed.

The increase in horizontal drilling activity is expected to offset the steep decline in Alberta conventional production that would otherwise be expected.

The Alberta Energy Regulator estimates the remaining total established reserves of conventional crude oil in Alberta to be 1.8 billion barrels, representing about one-third

of Canada's remaining conventional reserves. This is a year-over-year increase from 2012 of five per cent, resulting from all reserve adjustments less production in 2013.

Alberta's production of conventional crude oil totalled 213 million barrels in 2013, an increase of five per cent.

The province is also the largest contributor to Canadian oil and equivalent production and is the only contributor of upgraded and non-upgraded bitumen, which are the marketed components of raw bitumen production.

Alberta is Canada's largest producer of marketable natural gas. In 2013, Alberta produced 69 per cent of Canada's total production, down from 70 per cent in 2012. Over the same period, Canada's second-largest contributor, British Columbia, increased its share from 25 per cent to 26 per cent.

Although relatively low natural gas prices have reduced drilling activity in Alberta for that commodity the past few years, when prices rebound, the province will be well positioned to capitalize.

Canada is the third-largest natural gas producer in the world, with the majority of the country's gas being produced in Alberta. According to provincial figures, at the end of 2012, remaining established reserves of conventional natural gas stood at 33 trillion cubic feet, while remaining established coalbed methane gas reserves stood at 2.4 trillion cubic feet. The province estimates the remaining ultimate potential of marketable conventional natural gas at 74 trillion cubic feet.

Although conventional natural gas remains a very important part of Alberta's natural gas supply, horizontal drilling and multistage fracturing now allow for development of natural gas from a new source—unconventional natural gas resources.

Aside from coalbed methane, Alberta's unconventional natural gas resources include tight gas (natural gas trapped in low-permeability sedimentary rocks, such as sandstone or limestone) and shale gas (trapped in shale rock). ■

## TABLE OF CONTENTS

### 3 Oil plays

### 4 Natural gas plays

### 5 Government update

### 7 What's new in the oil and gas industry

### 9 Technology update

### 10 Labour update

### 11 Oil and gas statistics

### 14 Focus on the Duvernay

### 16 Contacts

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**NOTE:** This publication contains information about Alberta's oil and gas industry, excluding the oil sands. For information on the oil sands, please refer to the *Alberta Oil Sands Industry Quarterly Update* on this [website](#).

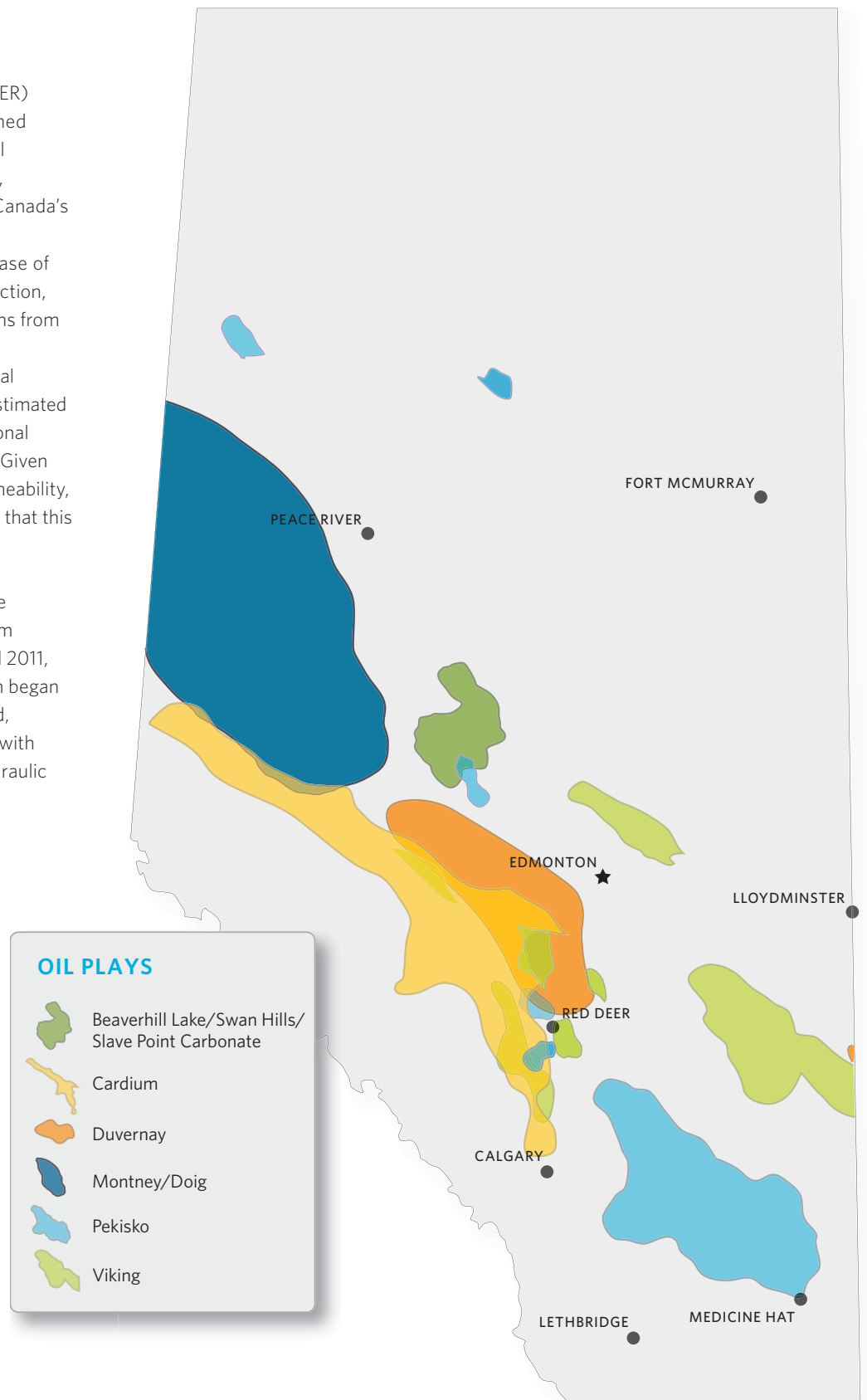
## OIL PLAYS

The Alberta Energy Regulator (AER) estimates the remaining established reserves of conventional crude oil in Alberta to be 1.7 billion barrels, representing about one-third of Canada's remaining conventional reserves.

This is a year-over-year increase of 9.5 per cent, resulting from production, reserves adjustments and additions from drilling that occurred during 2011.

In 1994, based on the geological prospects at that time, the AER estimated the ultimate potential of conventional crude oil to be 19.7 billion barrels. Given recent reserve growth in low permeability, or tight oil plays, the AER believes that this estimate may be low.

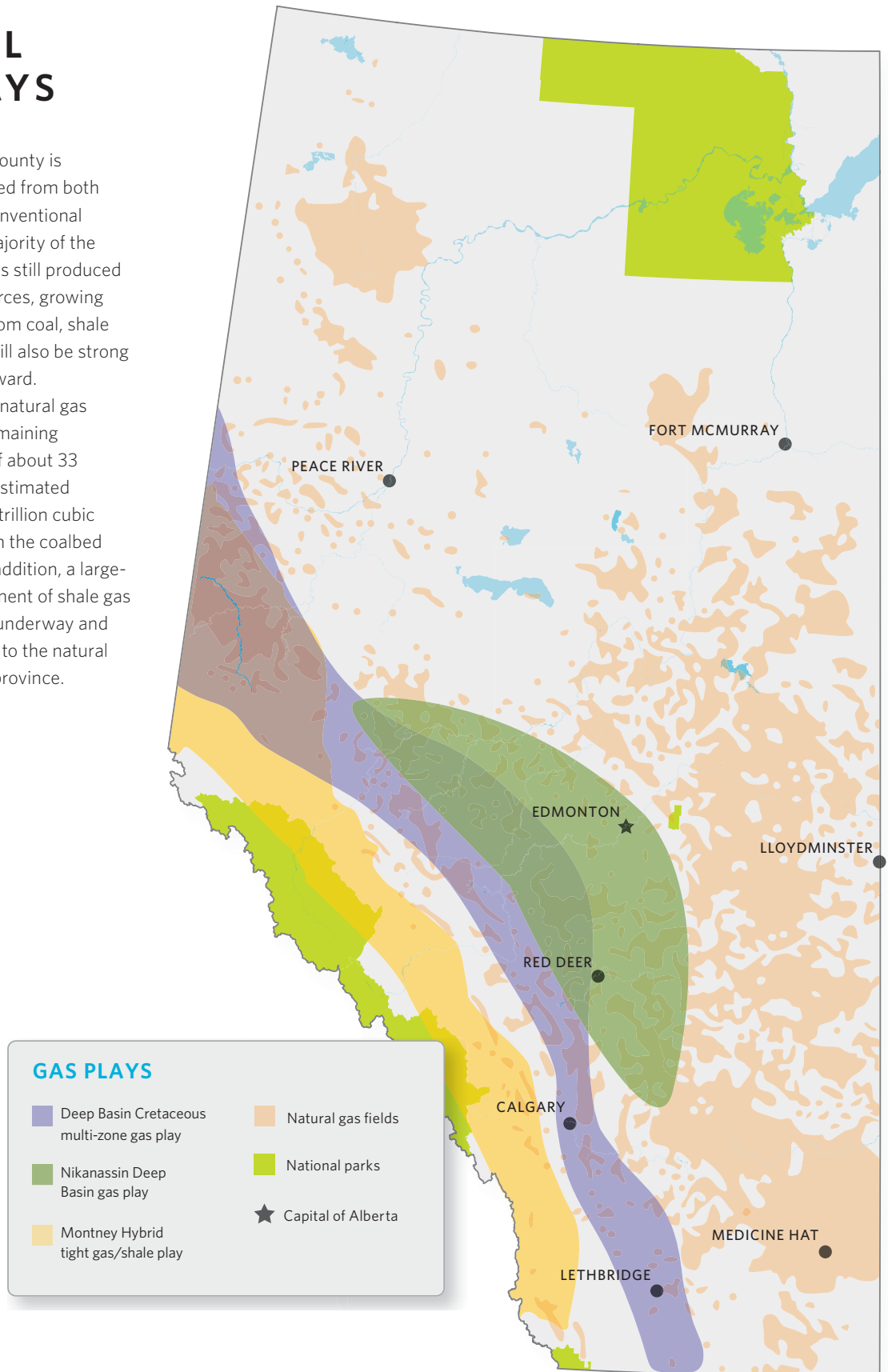
Starting in 2010, total crude oil production in Alberta reversed the downward trend that was the norm since the early 1970s. In 2010 and 2011, light-medium crude oil production began to increase as a result of increased, mainly horizontal, drilling activity with the introduction of multistage hydraulic fracturing technology.



## NATURAL GAS PLAYS

Alberta's natural gas bounty is plentiful and is produced from both conventional and unconventional reserves. While the majority of the province's natural gas is still produced from conventional sources, growing natural gas volumes from coal, shale and tight formations will also be strong contributors going forward.

Alberta has a large natural gas resource base, with remaining established reserves of about 33 trillion cubic feet and estimated potential of up to 500 trillion cubic feet of natural gas from the coalbed methane resource. In addition, a large-scale resource assessment of shale gas potential in Alberta is underway and could significantly add to the natural gas prospects for the province.



# GOVERNMENT UPDATE



## AER STRIVES TO BE TOP OF CLASS

The Alberta Energy Regulator (AER) says it is undertaking a \$1.35-million project that will provide it with the necessary tools and framework to become a best-in-class energy regulator.

"We recognize it is not enough to do our job well and simply declare ourselves as best-in-class," Jim Ellis, AER president and chief executive officer, says in a news release. "To be collaborative and transparent, we must define what that means, ensure that our stakeholders agree with that definition and take the necessary steps to improve our regulatory performance."

Following a competitive bidding process, the AER selected the University of Pennsylvania's Penn program on regulation to undertake the best-in-class project, which is to be completed by the summer of 2015.

The project has three main objectives:

- To identify the key attributes of a best-in-class regulator;
- To understand how the AER can adopt these attributes; and
- To identify how to measure the concept of "best in class" in a credible manner.

"The AER's interest in an independent process and an evidence-based model is truly distinctive," Cary Coglianesse, a University of Pennsylvania law professor, director of the Penn program and best-in-class project leader, says in a news release.

"This project provides a unique opportunity to apply research from multiple disciplines to help define and identify ways to measure the best regulators as they pursue vital societal goals."

The program is not looking at the AER itself but at identifying the best-in-class principles in the world of regulation, says Bob Curran, an AER spokesman. "Dr. Coglianesse is one of the leading experts in the world on regulatory processes, so U Penn was an ideal fit for what we were after."

The initiative will generate research papers and reports, culminating in a final report detailing the initiative's independent findings and recommendations that will be presented to the AER's senior leadership and its board. A draft of the final report will be subjected to a peer-review workshop involving other experts on regulations from around the world.

The AER will compare the findings with what it is currently doing and see if there are practices it can adopt and ways it can improve its processes, says Curran. "Really, it's about improving the way we regulate in Alberta."

## ALBERTA CONTINUES TO ADD ITS VOICE TO GLOBAL CLIMATE CHANGE DIALOGUE

Alberta representatives participated in two recent international conferences on energy and environmental issues.

Kyle Fawcett, Alberta's environment and sustainable resource development minister, travelled to Lima, Peru, December 7-14 as part of the Canadian delegation at the annual United Nations Framework Convention on Climate Change conference. Political leaders, officials, researchers, environmentalists and industry representatives from around the world attended the event to discuss collective action on the complex challenge of climate change.

"The world needs to know the great work we've done to combat climate change. At the same time, we know more can be done. This conference provides us the opportunity to share our successes, connect with other jurisdictions and inform our future actions on climate change," says Fawcett.

In addition, from December 4 to 7, MLA Cal Dallas represented Alberta at the Energy Council's Global Energy and Environmental Issues conference in Point Clear, Ala. Dallas promoted Alberta's strengths in energy regulation, with an emphasis on collaboration on clean-energy technologies and climate change.

"This is important work that supports Alberta's priority of opening new markets for our energy products. This conference provides opportunities ➤

## GOVERNMENT UPDATE CONTINUED



for Alberta to demonstrate its commitment to responsible resource development and environmental leadership, as we continue to work with partners to address market barriers,” he says.

Reducing greenhouse gas emissions is a global issue that requires solutions from jurisdictions all around the world, including Alberta. Collaboration and partnerships are key to combating climate change. These conferences help foster cooperation on an international scale.

Right now, Alberta’s story focuses on regulations, carbon pricing, carbon offset markets, technology investment and regional land-use planning. The government wants to add more chapters and can learn from others in areas like energy efficiency, transportation and adaptation.

### **B.C. AND ALBERTA FOCUS ON ECONOMY AND CULTURE AT PREMIERS’ MEETING**

The foundations for a new working relationship were established November 3 between the premiers of Alberta and B.C.

“Increasingly, B.C. and Alberta are the economic engine of Confederation—a role both Premier Prentice and I embrace. We’re working together to ensure our provinces are able to make even greater economic and

cultural contributions to Canada,” says Christy Clark, premier of B.C.

As neighbours with vibrant, diverse economies and a healthy resource sector, both provinces are focused on maximizing exports into the Asia Pacific and beyond. Premiers Clark and Prentice discussed responsible energy development, natural resource exports to the Asia Pacific, reducing barriers to trade and mobility between provinces, fiscal responsibility, and cooperation toward a new partnership with First Nations.

“Canada’s western economies are driving growth right across the country. Premier Clark and I are focused on building a relationship aimed at capturing the potential of new markets abroad, creating wealth at home and building higher quality of life for everyone,” Prentice says.

### **PRENTICE WEIGHS IN ON ENERGY EAST PIPELINE PROPOSAL**

Alberta Premier Jim Prentice issued the following statement regarding TransCanada Corporation’s Energy East Pipeline application to the National Energy Board.

“The Energy East Pipeline represents a true nation-building project. Today’s application for approval is a significant step towards getting full market value for Canada’s resources and will help the country realize its economic potential,” he said October 30.

“Not only will it connect the oil resources of western Canada with refineries in eastern Canada and to global markets, it will connect Canadians by creating jobs and supporting businesses from coast-to-coast. Energy East will also improve Canada’s self-reliance by significantly reducing the amount of oil that we import.

“Energy is a unifying theme across Canada, whether it be oil, hydroelectricity or other forms. And for Canada to prosper, this energy needs to get to markets. Alberta supports all safe and viable options to diversify and expand market access for Canada’s resources.

“We respect the National Energy Board hearing process and have full confidence that the panel will make its decisions based on science and factual evidence.” ■

## WHAT'S NEW IN THE OIL & GAS INDUSTRY



### PREMIER ADVOCATES FOR TIDEWATER ACCESS

As the province of Alberta faces challenging economic times ahead in light of lower crude prices, Premier Jim Prentice said while his government might not have much control over the global market, it can still control its attempts to achieve greater access to that global market, thus realizing better returns.

"Our ability to seize opportunities in the Asia-Pacific Basin, where all of the future incremental demand resides, will fundamentally shape how we are going to be able to build the quality of life in this province, continue to build schools, continue to invest in roads and public transit, hospitals and so on," he told a Calgary Chamber of Commerce luncheon.

"Alberta will weather this period of low prices, because we are innovative, and because the investments we are making in this province, whether in the public sector or energy industry, are long-term investments."

However, he noted during his first speech before the chamber since becoming premier, the change to the province's bottom line has been swift with the fall in commodity prices and the government is moving quickly to adapt its forecasts to reflect these changes.

"For the remainder of this year, we will be basing our forecasts in the \$65 to \$75 per barrel range, and the implications of this are important. Oil prices of \$75 per barrel represent a very significant reduction in terms of the government's revenues in the province of Alberta, especially if the price remains this low for an entire year," Prentice said.

"Last year, the Alberta government earned more than \$9 billion from its royalties, amounting to about 21 per cent of the province's budget. With every dollar drop in the price of oil per barrel over a year, Alberta loses directly over \$250 million in revenue."

According to Prentice, the government will have to take measures that mitigate its lost revenue, with "being prudent in our public expenditures" as one of those things the province can control when the global price of oil falls. Those changes, he said, would respect the province's competitive tax regime.

"We have the lowest effective personal income taxes in the country, we have no sales tax, we have amongst the lowest corporate income taxes in the country and when

you look at other aspects such as gasoline tax, we are the most competitive in Canada," he told reporters, following his presentation.

### SURVEY RANKS ALBERTA HIGH FOR OIL AND GAS INVESTMENT

Thanks largely to its plentiful proved reserves, Alberta was ranked Canada's most attractive province for oil and gas investment in a recent survey of industry executives.

Globally, jurisdictions were grouped by the size of their oil and gas reserves. Of 27 jurisdictions with large reserves, the five ranked most attractive and with the least deterrent to investment are Texas, Alberta, Norway's North Sea, the United Arab Emirates and Qatar, according to 710 oil and gas executives and professionals who participated in the Fraser Institute's annual "Global Petroleum Survey."

This year's survey ranks 156 jurisdictions worldwide on their relative attractiveness for investment. Barriers to investment mentioned by respondents included high taxes, costly regulatory obligations and uncertainty over environmental regulations, among other issues.

"Alberta's wealth of petroleum reserves continue to attract investment, which creates jobs for scores of Canadians," says Kenneth Green, senior director of Fraser's Centre for Natural Resources.

In ranking countries, as well as states, provinces and other jurisdictions, the survey considered both respondents' answers and the size of oil and gas reserves of each jurisdiction. Of 44 jurisdictions with medium-sized reserves, the state of Oklahoma ranked number one, Newfoundland & Labrador stood 15th, while B.C. ranked 19th.

Of the remaining 69 jurisdictions that have relatively small proven reserves, seven other Canadian jurisdictions were included, as well as some U.S. states. Mississippi topped this list, followed by Saskatchewan and Manitoba, Alabama, Kansas and the Netherlands' offshore region.

### RAIL AN OPTION FOR KEYSTONE XL PROPONENT

Given the ongoing hurdles facing the Keystone XL pipeline project, rail remains an option for moving Canadian oil ►

WHAT'S NEW IN THE OIL & GAS INDUSTRY CONTINUED 

across the Canada-U.S. border, TransCanada Corporation executives say.

During a November 19 presentation, TransCanada executives were asked if the company would consider adding railway lines on either side of the border to allow Canadian oil to cross without the need for such a permit.

"I think [President Barack Obama] is going to be put on the spot here relatively quickly," said Alex Pourbaix, TransCanada executive vice-president and president of development, noting a pending lawsuit in Nebraska Supreme Court over the pipeline route has added to other delays facing the proposed US\$8-billion project.

"[Obama] has been very explicit that he's waiting to see what the outcome of the Nebraska lawsuit is. Hopefully we'll have that answer by year-end. Assuming it's positive, if the president doesn't act on his own, I would not be surprised to see a Republican-led Senate immediately [table] a bill."

Another TransCanada executive also discussed the rail option, saying management is nonetheless "generally optimistic" about the company's prospects for getting a presidential permit for Keystone XL.

"In regards to using rail over the border, once you have crude oil on the track, going an extra [500] or 600 kilometres doesn't add much more cost," said Paul Miller, executive vice-president and president, liquids pipelines. "If we were to pursue a rail solution as an interim [measure] until Keystone XL is built, [we] would load the crude at a central hub here in Alberta and transfer it to a central hub...in the U.S.

"Typically...as part of our rail strategy...we'd be able to ship from Alberta to a location in the U.S., inject [oil] into one of our existing [U.S.] pipelines and take it ultimately to the marketplace," he told industry analysts attending TransCanada's investor day.

### ALBERTA ENERGY MINISTER STRESSES NEED FOR RESPONSIBLE DEVELOPMENT

While Alberta is in no danger of running out of its energy resources any time soon, it will run out of its social licence to access those resources if it doesn't do a good job of also protecting the environment, the province's newly appointed energy minister has warned.

"As the Premier [Jim Prentice] likes to say: if you are in the energy business, you are in the environment business," Frank Oberle said October 21 during a luncheon presentation to the Canadian Association of Petroleum Land Administration. "To be in those two

businesses, we have to understand the balancing act between responsible land use and energy development, or any resource development."

In order to preserve its social licence, Albertans cannot simply be leaders in resource development—although they are, he said. "We also must lead the world in environmental protection," said Oberle in his first speech to an industry group since his appointment in September.

An important part of that, he said, is Alberta's integrated resource management system.

"There has to be a way to integrate users, to coordinate users that manages the industrial footprint on the landscape and allows for ecological, as well as economic, benefits for our province," said Oberle. "Whether we are talking about road networks or water usage or reclamation, there are things that we can and must do."

While in the past, the government's efforts were divided across different agencies that worked separately on the same geographic and social space, it needs to coordinate and adopt comprehensive land-use planning, environmental monitoring and regulations, he said. "We are getting there."

### DRILLING ACTIVITY EXPECTED TO DECLINE IN 2015

The Canadian Association of Oilwell Drilling Contractors (CAODC) has released its 2015 drilling activity forecast, which projects a 10 per cent decrease in activity from 2014.

Canadian land-based drilling rigs will drill 10,354 wells in 2015. This well count will generate 119,578 operating days for land-based drilling contractors (based on spud-to-rig-release data).

The uncertainty around pipeline construction was a determining factor in the activity outlook, the industry group stated.

Each active rig generates between 135 and 200 direct and indirect jobs, but this economic activity is currently limited due to the inability of the Canadian industry to access overseas markets.

"The B.C. government is weighing decisions that will have significant impact on industry activity. The current uncertainty has been factored into this forecast. If a direction is established regarding pipeline construction or LNG terminals, then we will definitely revisit these projections," said Mark Scholz, president of the CAODC.

In October, the Petroleum Services Association of Canada forecasted a total of 10,100 wells drilled (rig releases) across Canada for 2015, a slight decrease from the expected final tally of 10,830 rig releases for 2014. ■



# TECHNOLOGY UPDATE



## INNOVATION AND COLLABORATION KEY FOR THE ENERGY SECTOR

If there is one key “game-changing” energy sector modification coming down the pipe, it will not come from any single piece of technology, but rather an innovation in how industry innovates, says Richard Adamson, managing director of Carbon Management Canada.

“There is this broad spectrum of connecting the connected networks together and increasing leverage into each other’s capacities,” he told the Canadian Energy Supply Chain Forum in Calgary in late October.

“Right now, we are starting to see the change to the innovation system, and five to 10 years out is when the wave will really hit the shore for the industry.”

Adamson says organizations such as Canada’s Oil Sands Innovation Alliance and the Low Carbon Innovation Alliance represent the mere “tip of the iceberg” for the sorts of collaborative efforts that will occur in the future. In addition, there is an ongoing transformation away from companies secretly innovating in favour of more integration with industry research partners.

“There is recognition that we can’t build all the capacity, and we can’t build these silos where we have everything from top to bottom and where we are going to hunker down with nobody seeing what we are doing.”

According to Gandeephan Ganeshalingham, leader of the innovation centre for oil and gas at General Electric Canada, collaboration is key for the industry’s future. However, there are paradoxes: There are intellectual property protection concerns and a lack of collaborative trust, and there exists no credible process for teamwork between companies.

He suggested that companies invest in a space that eliminates the mental and physical barriers to collaboration, which instead pulls people away from their day-to-day environments and takes them into a new realm in order to engage in new dialogue.

“We’re doing this at the centre and we have invested in the centre to help our customers do this, and we have found our customers are coming in every day, arms crossing, wondering ‘What am I going to get out of today?’ and they leave with just wildly different assumptions.”

## NEW TECHNOLOGY SUCCESSFULLY TREATS SOUR WATER

HydroSphere Energy Solutions says it has cost-effectively removed hydrogen sulphide (H<sub>2</sub>S) from frac-flowback and produced-water sources to a non-detectable level.

HydroSphere says it has now completed several on-site sour-water treatment jobs reducing H<sub>2</sub>S concentrations from up to 12,000 parts per million to zero parts per million.

The company says its client has estimated its net savings are in excess of \$100,000 per well, including savings from reusing the treated water in subsequent fracs.

The mobile treatment process employs a powerful, liquid, chemical-free combination of sciences that provides a very high-rate treatment for bacteria, scale, organics and H<sub>2</sub>S, while producing a fluid that is more compatible with other chemicals being used in the completions process, says HydroSphere.

Unlike traditional scavengers that coat the outer walls of H<sub>2</sub>S molecules, the Ozonix advanced oxidization process fully oxidizes H<sub>2</sub>S, creating a safer fluid that can be recycled and reused in the fracturing process, it says.

“We knew from our research and our pilots that HydroSphere could treat sour water successfully and economically, so it’s great to see the commercial performance outcomes exactly as planned,” says Scott Donahue, HydroSphere’s chief executive officer.

## DIGITAL MAGAZINE LOOKS AT MULTISTAGE FRACTURING TECHNOLOGY

Multistage fracturing of horizontal oil and gas wells is big business in North America. In the race to unlock unconventional plays and ramp up production, companies are investing billions to secure land positions, drill and fracture, and research and develop better technology.

A special digital issue of *New Technology Magazine* examines many of the newest multistage fracturing technologies recently introduced to the Canadian market and looks at the impact they are having across the industry. This interactive issue is available at [newtechmagazine.com](http://newtechmagazine.com). ■

# LABOUR UPDATE



## SURVEY EXAMINES WORKFORCE CHALLENGES AND RECRUITMENT STRATEGIES

This fall, 31 oil and gas companies responded to a survey on current workforce challenges and trends within Canada's oil and gas industry. These companies, representing over 63,300 workers, provided information on their hiring activities, in-demand jobs and hiring locations.

The survey, conducted by the Petroleum Human Resources Council of Canada, found that the majority of respondents are actively hiring and are faced with critical workforce challenges. The top three of these challenges are:

- Attracting and retaining workers in hard-to-recruit locations;
- Skill shortages; and
- Employee turnover/retention.

The "HR Trends and Insights: Fall 2014 Survey Results" infographic ([available now](#)) summarizes the responses from 31 companies in the Canadian oil and gas industry. Please note: the industry changes quickly, and the survey results reflect a "moment in time" snapshot.

## GREATER LABOUR MOBILITY FOCUS OF PREMIERS' MEETING

Premier Jim Prentice issued the following statement in December after meeting with Nova Scotia Premier Stephen McNeil and signing two labour mobility agreements:

"Alberta and Nova Scotia have engaged in ongoing work to improve apprentice mobility between our provinces. Today, we signed agreements designed to improve apprentice mobility and promote the mutual recognition of pre-employment training between our provinces. Labour mobility is a key element of a strong labour market and contributes to economic growth, innovation and productivity.

"Whether it's at the Council of the Federation or one-on-one meetings, Alberta and Nova Scotia have a long history of working together. I look forward

to working with Premier McNeil on areas of mutual interest for our provinces."

## THIS YEAR'S IMMIGRATION QUOTA FILLED, BUT ALBERTA STILL NEEDS WORKERS

In mid-December, Alberta's Immigrant Nominee Program (AINP) was full for 2014, as all 5,500 certificates for the year had been issued. However, more workers continue to be required as the province moves into 2015.

The AINP certificates allow workers, along with their spouse and dependent children, to be nominated by the Government of Alberta for permanent residence in Canada. Provincial nominees may then apply for permanent residence with the federal government.

"Alberta's challenge remains finding permanent workers for permanent jobs. We need to meet our growing economic needs by training Albertans and attracting workers from across the country and around the world. While the federal government currently caps the amount of people Alberta can nominate, we continue to work with them to find long-term solutions that better respond to Alberta's labour demand," said Ric McIver, minister of jobs, skills, training and labour.

Alberta remains a worldwide destination of choice for people to live, work and raise their families.

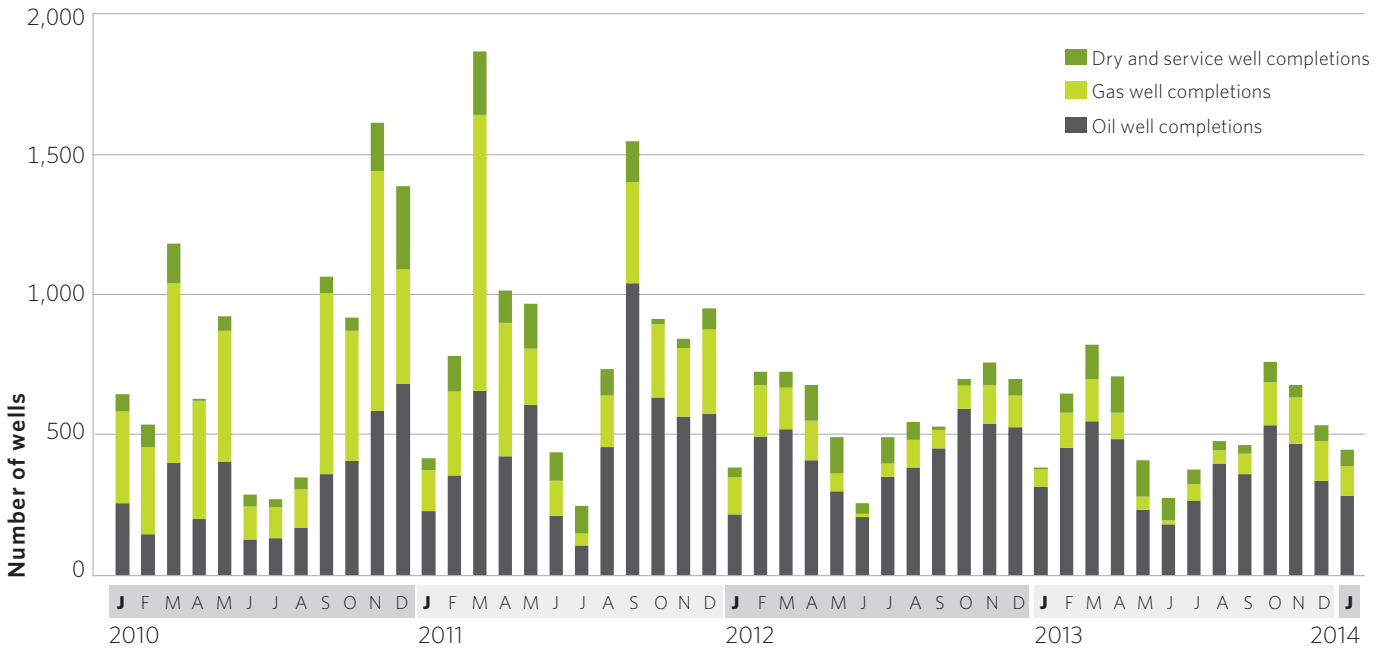
- In 2013, Alberta welcomed 36,366 new permanent residents, accounting for 14.1 per cent of Canada's total of 258,619.
- That places Alberta third in the country for immigrants, after Ontario and Quebec.
- From 2006 to 2013, annual immigration to Alberta steadily increased from 21,000 people to over 36,000.
- Alberta also continues to attract 100,000 newcomers annually.

The AINP is an economic immigration program operated by the Government of Alberta in conjunction with the federal government. It supports Alberta's economic growth by attracting and retaining work-ready immigrants to the province and is a vital tool in developing a permanent workforce. ■

# OIL & GAS STATISTICS



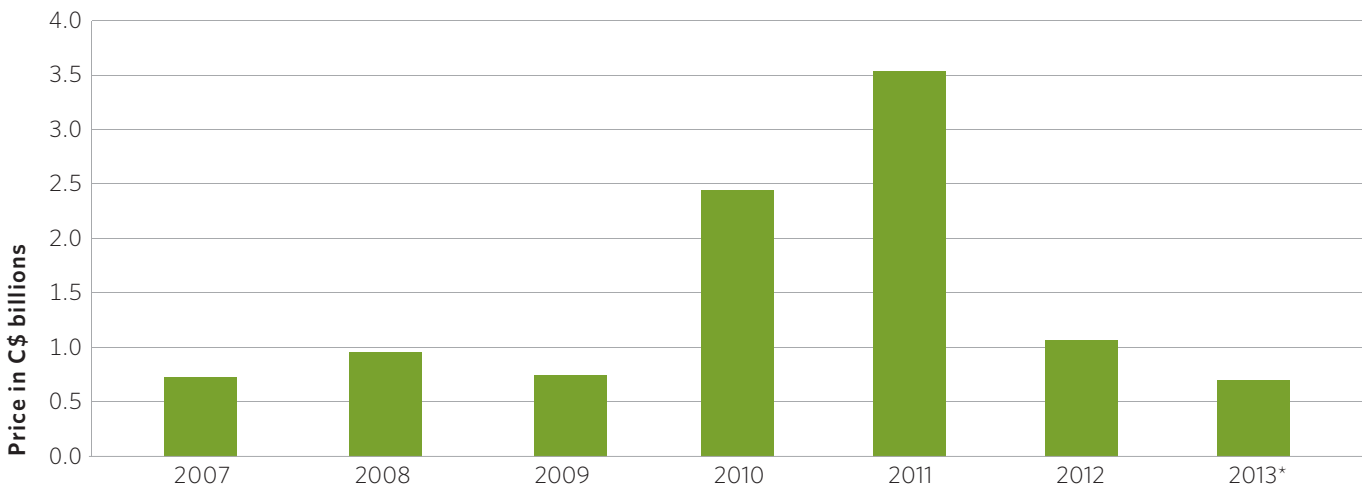
## ALBERTA WELL COMPLETIONS



Source: JuneWarren-Nickle's Energy Group

## ALBERTA CROWN LAND SALES

Petroleum and natural gas rights, excluding oil sands



\*\$698.32 million

Source: Alberta Energy Regulator

STATISTICS CONTINUED

DRILLING RIG COUNT BY PROVINCE/TERRITORY

December 2, 2014

	ACTIVE	DOWN	TOTAL	ACTIVE
<b>Western Canada</b>				(Per cent of total)
Alberta	312	251	563	55
Saskatchewan	80	69	149	54
British Columbia	58	11	69	84
Manitoba	14	10	24	58
WC total	464	341	805	58
<b>Northern Canada</b>				(Per cent of total)
Northwest Territories	0	0	0	0
<b>Eastern Canada</b>				(Per cent of total)
Quebec	1	0	1	100
<b>Canada total</b>	<b>465</b>	<b>341</b>	<b>806</b>	<b>58</b>

Source: JuneWarren-Nickle's Energy Group

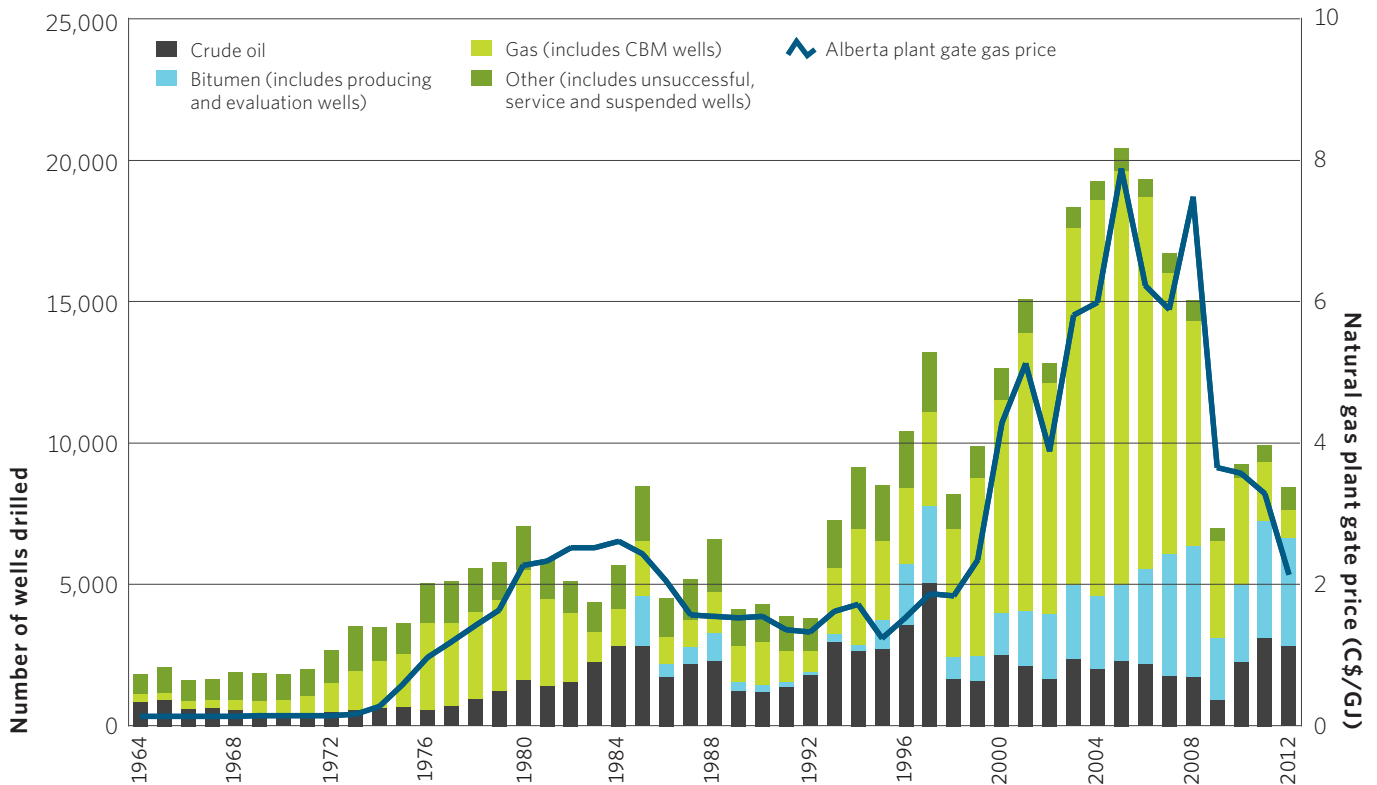
OIL AND GAS WELL COMPLETIONS BY PROVINCE

November 2014

	OIL WELLS		GAS WELLS	
<b>Western Canada</b>	NOV '13	NOV '14	NOV '13	NOV '14
Alberta	454	354	167	197
British Columbia	4	4	54	58
Manitoba	45	40	0	0
Saskatchewan	339	307	0	2
<b>Total</b>	<b>842</b>	<b>705</b>	<b>221</b>	<b>257</b>

Source: JuneWarren-Nickle's Energy Group

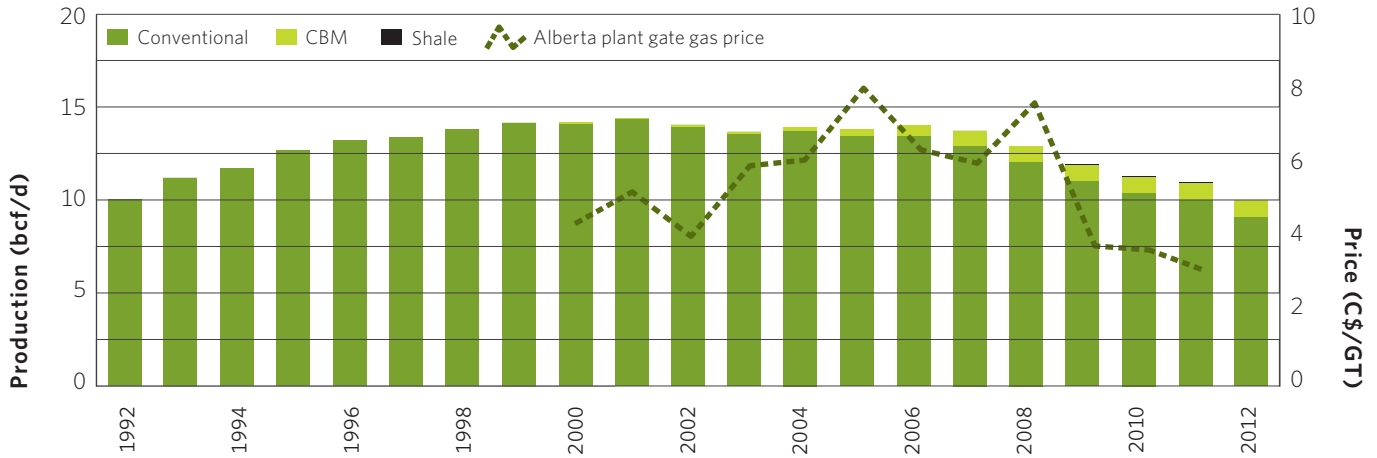
DRILLING ACTIVITY IN ALBERTA, 1964 - 2012



Source: Alberta Energy Regulator

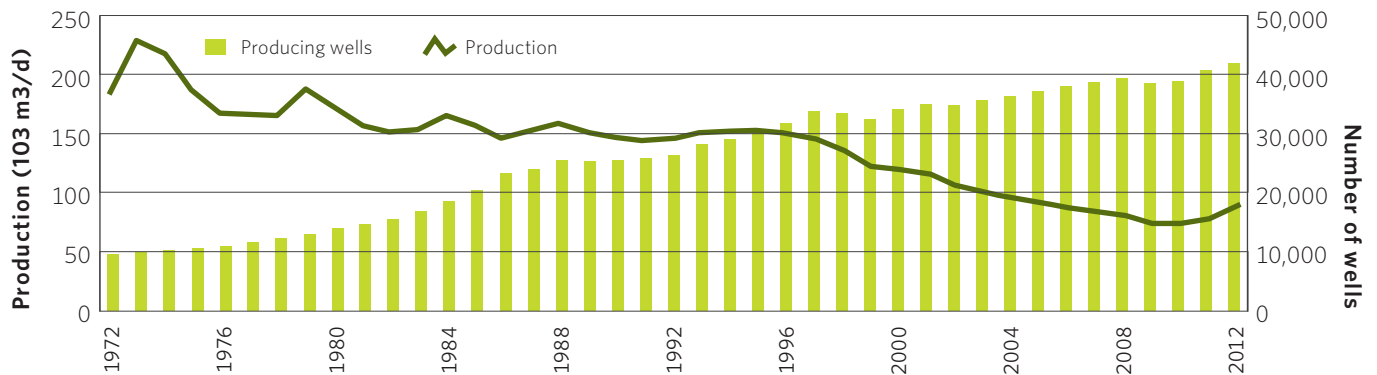
STATISTICS CONTINUED

ALBERTA MARKETABLE GAS PRODUCTION



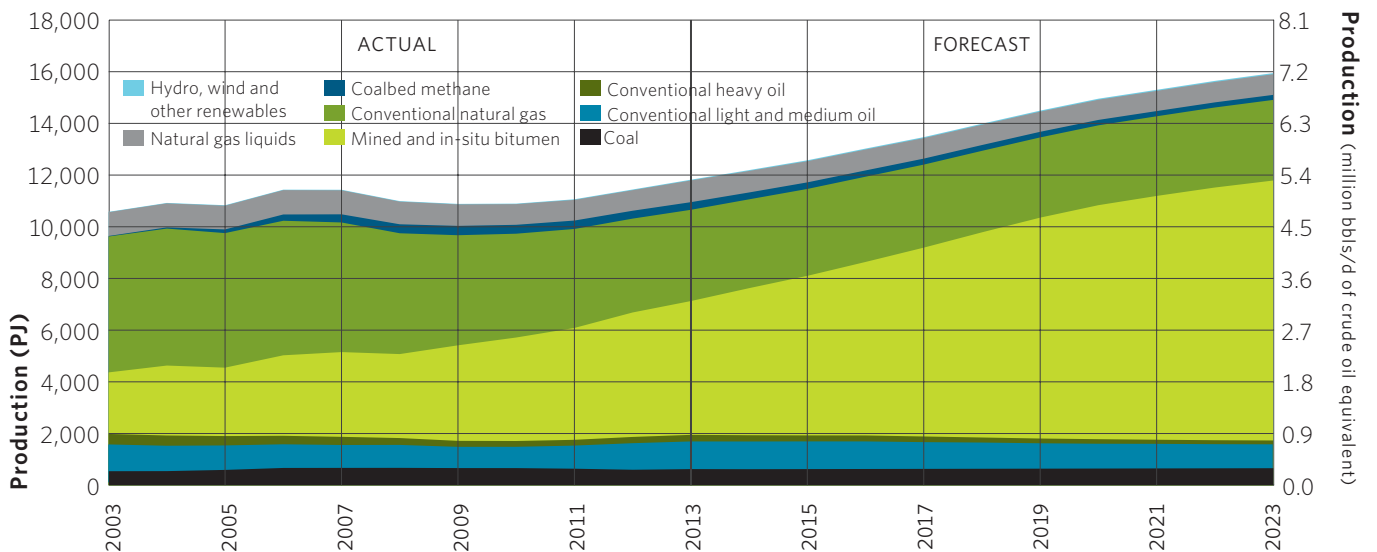
Source: Alberta Energy Regulator

ALBERTA CRUDE OIL PRODUCTION AND PRODUCING WELLS



Source: Alberta Energy Regulator

TOTAL PRIMARY ENERGY PRODUCTION IN ALBERTA



Source: Alberta Energy Regulator

## THE DUVERNAY: A RISING STAR?

In December 2009, the Alberta government's final land sale of the year generated an eye-widening \$384.3 million—a bright spot in what had been, to that point, a pedestrian year for provincial Crown auctions.

The Duvernay play in Alberta's Deep Basin was identified as a chief reason for the high bonus bids paid at this sale, and this was merely the opening act—it kicked off an over-two-year boom in Crown land spending. The apex came on June 1, 2011, when Alberta attracted a massive \$843.03 million—an all-time high for a single sale—fuelled by the Duvernay.

With most of the prospective land spoken for, the question now is, Will the Duvernay fulfill its promise as the next star play of North America, or were those billions in land-acquisition dollars spent in vain?

According to a November 2013 study by BMO Capital Markets, drilling results over the last 1.5 years have confirmed the existence of multi-phase windows—dry gas, liquids-rich gas, volatile oil and black oil—and the ability of the reservoir to behave as a true, over-pressured shale reservoir and, from most windows, deliver hydrocarbons economically.

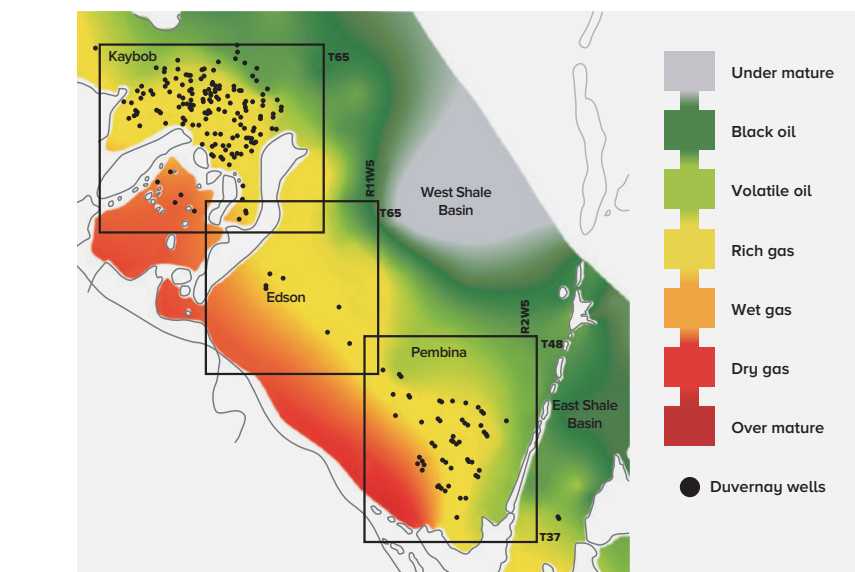
The Alberta government's royalty regime favours Duvernay gas wells over Duvernay oil wells, which suggests activity, at least in the near term, will be relegated to defining and drilling in the condensate- and natural gas liquids-rich windows, the study notes.

"It is with this continued investment that the Duvernay shale has emerged as a highly sought-after, world-class unconventional shale play, with a focus now on condensate—the new gold," BMO stated.

### EARLY WELL RESULTS

Canadian Discovery Ltd. identified 59 wells that report production from the Duvernay in Alberta, with 50 of these wells still on stream at Aug. 31, 2013.

The well with the highest oil rate is at that time was a Royal Dutch Shell plc well



### DUVERNAY FAIRWAY TODAY

Sources: GeoEDGES; GeoSCOUT; BMO Capital Markets

in the Kaybob field at 15-09-063-20W5, which averaged about 200 barrels of oil per day during that month. The best condensate rate was from an Encana Corporation well at 06-09-063-23W5 in the Waskahigan field, which averaged 480 barrels per day. And the best gas rate came from a Chevron Canada Limited well at Kaybob South 02-16-062-20W5, which averaged about 2.5 million cubic feet per day in August.

It's still too early to declare the play a commercial success, Canadian Discovery admitted, as operators are currently experiencing a range of successes.

"However, indications are that after operators determine the areas with the greatest potential and which completion programs work effectively in those areas, the project costs will come down significantly enough to provide long-term strong economics," the firm said.

### FUTURE DEVELOPMENT

Brad Hayes, president of Petrel Robertson Consulting Ltd., said that while 2014 will be an important year for the Duvernay, he did not characterize it as a pivotal one.

Companies will continue to optimize their drilling and completions practices, and some, such as Chevron and Encana, will ramp up development in areas they see as economic.

"The play will progress, but it's unlikely there will be any pivotal events that will suddenly change the course of overall development—we're a few years into it, and there are many more to go," he said. "Duvernay lands in the areas where commerciality is reasonably envisioned—around the liquids-rich part of the fairway—are quite tightly held.

"There are some land opportunities in areas of uncertain economic merit—in the dry gas or oil areas—but there is unlikely to be much more land activity in these areas until their productive and commercial merits are proven up."

BMO said the type well economics show that liquids-rich Duvernay gas wells are profitable and that the condensate has the greatest impact on value. This has led to operators pushing the play boundaries further into the oily phase window in their quest for higher condensate yields. ■

## A SNAPSHOT OF SOME OF THE MAJOR PLAYERS IN THE DUVERNAY



For more on the Duvernay, see the [Daily Oil Bulletin's special digital magazine](#) of the play.

### ENCANA CONTINUES TO MOVE DUVERNAY PROGRAM FORWARD

A leading participant in the liquids-rich emerging play, Encana Corporation drilled 19 net wells in the Duvernay in the first nine months of this year, up from eight in the same period last year.

Capital spending in the play totalled US\$210 million in the first nine months of this year, up from \$87 million in the same period last year.

In the third quarter, Encana's Duvernay gas production averaged 15 million cubic feet a day, up from five million cubic feet a day in the third quarter of last year. Oil and natural gas liquids output averaged 2,600 barrels a day during the quarter, up from 700 barrels a day in the third quarter of 2013.

However, many of the wells aren't on stream yet. Given how busy the company has been in the play, an analyst on Encana's third-quarter results conference call asked: "When can we look forward to the coming out party in the Duvernay?"

Mike McAllister, Encana's executive vice-president and chief operating officer, replied it would probably be on the conference call in February, presumably referring to the release of fourth-quarter results.

Encana president Doug Suttles also replied: "We'll see those [as-yet uncompleted Duvernay wells] coming on early in the new year." He later added: "I hope [in the first quarter] we can start talking about more well results."

The company has two eight-well pads and one nine-well pad in the Duvernay.

However, a delay in getting a frac water pit filled delayed the completion of the nine-well pad and one of the eight-well pads, McAllister said.

"And so we're just into [fracturing] those pads right now," he said, adding that Encana is "probably looking at early next year to get those pads on stream."

### TALISMAN EXCITED ABOUT THE POTENTIAL OF DUVERNAY

Given recent well results, Talisman Energy Inc. president and chief executive officer Hal Kvisle said November 4 that the company is "excited" about the liquids-rich potential of the Duvernay and reducing costs in the play will continue to be an area of focus for the producer.

In the Duvernay, two Ferrier wells in the company's southern acreage were completed in the third quarter, and a

Bigstone well in the North Duvernay drilled in the first quarter was completed and brought on stream, the company reported.

"Talisman holds extensive and very attractive acreage in the South Duvernay, and our two Ferrier tests confirm that we have very liquids-rich acreage in Ferrier," Kvisle said during a conference call.

The Bigstone well, meanwhile, recorded a 24-hour raw gas test rate of 11.3 million cubic feet per day of gas and 670 barrels per day of wellsite liquids. This well is now on stream but will be produced at lower rates while the company debottlenecks liquids-handling facilities at its Bigstone plant.

"We drilled and completed our most recent Duvernay wells with 2,000-metre horizontal laterals with 20-stage fracs of 140 tonnes of sand per stage," Kvisle said. "We plan to increase frac tonnage substantially in our upcoming completions.

"We've also piloted the ball drop completion technique on the second Ferrier well, which reduced our completion costs by approximately 30 per cent; we're now looking into expanding this method to more of our operations in the Duvernay."

Going forward, the company will begin drilling on its liquids-rich Waskahigan and Pine Creek acreage.

"We'll also leverage our infrastructure in Edson to service our northern Duvernay position," Kvisle said. "The challenge in the Duvernay is cost reduction; we expect to get our cost structure down to \$10 [million] to \$12 million per well over the long-term.

"We've made significant progress already with our best wells running in the \$15-million range," with improvements expected to come from larger programs with multi-well pads.

On December 16, Talisman entered into an agreement that would see the company acquired by Spain's Repsol S.A. for US\$13 billion. ■



## INDUSTRY ASSOCIATIONS

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