

British Columbia Natural Gas and Petroleum Yours to Explore 2010





TABLE OF CONTENTS

Business Information

Fiscal Competitiveness	2
Labour Force	3
Oil and Gas Activity Act	4
Environmental Management	5
Infrastructure	6
Tenure	7
Royalties	8

Resource Information

Natural Gas and Petroleum Resource Map	10
Resource Overview	11
Core Facility	13
Tight Gas	14
Shale Gas	16
Foothills	18
Coalbed Gas	20
Useful Web Links	22

FISCAL COMPETITIVENESS

British Columbia is resource rich, competitive and its resources generate significant economic wealth. The province is a reliable and environmentally responsible energy supplier for North America. As Canada's second largest natural gas producer and fourth largest crude oil producer, B.C. is well positioned to address rising energy demand.

British Columbia has a responsive and innovative government that is committed to fiscal competitiveness. The government continues to improve the tax regime and tax benefits for exploration. For example:

- ▶ The Province has cut the B.C. corporate income tax rate from 16.5 per cent in 2001 to 10.5 per cent in 2010.
- ▶ B.C. residents now pay the least income tax in Canada on incomes up to \$116,000.
- ▶ Personal income tax has been cut more than 33 per cent since 2001 on taxable income under \$121,000 per year.
- ▶ B.C. has eliminated the corporate capital tax and the provincial sales tax on production machinery and equipment.
- ▶ The government has broadened the types of parts and components that qualify for provincial tax exemption.
- ▶ The government's fuel tax reduction provides direct savings for gasoline and diesel for vehicles that were not previously exempt (e.g. pickups).
- ▶ B.C. will harmonize its provincial sales tax with the federal GST effective July 1, 2010 with the new Harmonized Sales Tax (HST) rate being 12 per cent. The HST will provide significant benefits to B.C. export industries, such as natural gas and petroleum, by further reducing operating and capital costs. For more information see: www.gov.bc.ca/hst

As well, the Province has implemented effective royalty programs and offers royalty credits to improve year-round access to key regions, increase the competitiveness of British Columbia's marginal, deep and coalbed gas resources, construct new infrastructure, and connect new and existing wells.

Pipeline projects, under the Infrastructure Royalty Credit Program, have opened new areas to development and have helped align operating costs in B.C. with competing jurisdictions. Since 2004, over \$435 million in royalty credits have been allocated to natural gas and petroleum companies, resulting in 64 new road-based projects and 70 new pipeline projects.

Getting Started in British Columbia

Doing Business in British Columbia, a free publication of the government of British Columbia, is written with the business investor in mind. Companies and entrepreneurs from abroad will find a wealth of information on starting and operating a business in British Columbia. The publication was developed in cooperation with Fraser Milner Casgrain LLP, one of Canada's leading law firms. It provides an introduction and quick reference on a number of key issues.

An electronic copy of Doing Business in British Columbia is available at: www.investbc.com/Documents/DB_in_BC_Sept0507.pdf

LABOUR FORCE

People Rich

British Columbia has an educated and skilled labour pool. The province's expanding economy and outstanding quality of life are global magnets for talent. International immigration is one key source of new skilled labour for British Columbia.

To ensure an ongoing supply of skilled workers for the natural gas sector, the Province, private industry and donors provided \$12 million to create the Oil and Gas Centre of Excellence/Jim Kassen Industry Training Centre at Northern Lights College in Fort St. John. An Oil and Gas Education and Training, Centre of Excellence, Advisory Committee, composed of natural gas and petroleum industry representatives, educational providers, Aboriginal human resource agencies, workforce development researchers and research agencies and institutions, develops strategic direction for natural gas and petroleum education, training and research.

The Ministry of Energy, Mines and Petroleum Resources has developed and funded, through the Canada–British Columbia Labour Market Agreement, innovative training and employment programs for British Columbians who want to work in the province's natural gas industry. In addition, the ministry promotes careers in the natural gas industry at career and job fairs throughout the province. Information on jobs and careers in the British Columbia natural gas service sector can be found at Energy Service BC, under careers: www.energyservicesbc.org.

The B.C. Training Tax Credit Program provides refundable tax credits for employees and employers engaged in apprenticeship programs administered through the Industry Training Authority. The basic credits, completion credits, and enhanced credits for First Nations individuals and persons

with disabilities will apply to those engaged in apprenticeship training and to their employers, including corporations, partnerships and sole proprietorships. Labour mobility between Alberta and British Columbia is facilitated by the Trade, Investment and Labour Mobility Agreement (TILMA) which came fully into effect April 1, 2009. Occupation certification of workers is recognized in both provinces for many trades and other occupations. British Columbia's high quality, diverse labour pool of 2.4 million has continuously adapted to meet the needs of high-growth sectors.

Service Sector Growth and Expertise

The natural gas industry is supported by a strong British Columbia service sector. These companies provide an increasing array of goods and services that support drilling and completion services, facilities and infrastructure construction and other natural gas and petroleum activities, such as seismic imaging and analysis, wireline services, artificial lift and stimulation services and environmental services. Focused primarily in the northeast, B.C. service sector companies provide direct goods and services to the natural gas and petroleum industry, employing over 11,000 skilled workers from entry level to highly technical positions.

Energy Services BC is the British Columbia service sector association. Headquartered in Fort St. John, Energy Services BC provides support to natural gas and petroleum service sector companies through the operation of two procurement help offices, in Fort Nelson and Dawson Creek, and through a free online database listing British Columbia companies offering goods and services to the natural gas and petroleum industry. See www.energyservicesbc.org for further information.

OIL AND GAS ACTIVITY ACT



Oil and Gas Activities Act

The Oil and Gas Activities Act (OGAA) was passed in the B.C. Legislature in May 2008. OGAA will be implemented when all of the Regulations are approved in Spring 2010.

The goals of OGAA in supporting natural gas and petroleum activities in B.C. are to:

- ▶ Encourage environmentally responsible development of natural gas and petroleum resources by setting high standards of environmental management and continuing the world-wide recognition given to B.C. for its environmental leadership and responsibility.
- ▶ Encourage socially responsible development of natural gas and petroleum resources by providing opportunities for input from stakeholders and landowners on proposed activities and providing an administratively fair and consistent decision-making process.
- ▶ Encourage a thriving and innovative industry by providing an attractive natural gas and petroleum sector that is competitive, allowing and encouraging innovation that grows the industry.

The ministry is co-leading a team with the Ministry of Environment to develop the Environmental Protection and Management Regulation. This new regulation will focus on results, sustaining water, fish and wildlife and their habitat. The regulation will enable government to establish clear and consistent environmental requirements that industry must meet. Government has empowered the Ministry of Environment to audit the effectiveness of Oil and Gas Commission inspections and enforcement activities to ensure a high standard of environmental compliance is maintained.

Through the establishment of best management practices, buffers, avoidance areas, work-timing windows, reporting requirements, and mitigation and reclamation procedures, the regulation ensures responsible environmental management for all natural gas and petroleum activities.

Further environmental improvements will be realized through other OGAA Regulations such as improvements to the existing technical regulations and strengthening compliance and enforcement through new tools such as the new Administrative Penalties Regulation.



ENVIRONMENTAL MANAGEMENT

British Columbia is committed to sustainable environmental management, and the ministry works collaboratively with industry, government agencies, communities, First Nations and environmental groups.

Carbon Capture and Storage

The ministry is identifying opportunities for Carbon Capture and Storage (CCS). The Province has contributed \$3.4 million to a feasibility project in northeast B.C. in partnership with the federal government and industry, as one of British Columbia's climate change mitigation strategies. CCS entails collecting CO₂ from large industrial sources and permanently storing it deep underground in the pore space of geological rock formations. Early implementation of CCS will likely occur in the Northeast where there are large CO₂ sources near suitable storage reservoirs, existing infrastructure, and where a wealth of knowledge and expertise is readily available. Geological storage options include injection of CO₂ into deep saltwater-filled formations, depleted gas pools, and mature oil pools to enhance ultimate recovery.

Studies are in progress to substantiate storage reservoir characteristics, site selection and monitoring protocols. The ministry is also working, in consultation with industry, to clarify issues regarding policy, regulation and long-term liability associated with CCS.

Sample projects include:

- ▶ Feasibility of utilizing deep saline formations for CCS.
- ▶ Potential for CO₂-flood enhanced oil recovery.
- ▶ Clarification of tenure requirements for CCS.
- ▶ Multi-phase characterization of acid gas re-injection sites.
- ▶ Storage potential for CO₂ in depleted hydrocarbon pools.



INFRASTRUCTURE

There are more than 16,000 miles (over 25,000 kilometres) of natural gas and petroleum gathering and transmission pipelines that link the province to North American markets.

The Province has a number of infrastructure programs to make it a globally competitive jurisdiction for responsible natural gas and petroleum development. Year-round access to new or under-developed areas of the province with natural gas and petroleum resources is a key priority.

The infrastructure programs delivered by the Province have lengthened the drilling season, opened up new areas of the province to development, and aligned operating costs in British Columbia with other competing jurisdictions.

Public Road Improvements

Since 2004, the Province has invested over \$223 million in public road improvements. This investment goes toward the maintenance and upgrading of public roads that experience heavy use by the natural gas and petroleum sector on a year round basis. Improvements thus far have covered over 298 miles (470 km) across 35 public roads.

The Award-winning Sierra-Yoyo-Desan Industrial Highway

Since 2004, \$77 million has been invested into the award winning Sierra-Yoyo-Desan (SYD) road and bridge through a Public-Private Partnership (P3) venture. The 117 mile (188 km) multi-user road is the primary corridor to 10,500

square miles (27,000 km²) of natural gas and petroleum territory located east and north of Fort Nelson. It provides a key access route to the Horn River Basin Shale Gas Play and the emerging Cordova Embayment Shale Gas Play. The Province is investing an additional \$150 million in 2010 and 2011 to complete a major upgrade of the SYD Road.

Infrastructure Royalty Credit Program

Through the Infrastructure Royalty Credit Program, natural gas and petroleum companies can apply for a deduction to the royalties they would otherwise pay to the Province. This credit can be as much as 50 per cent of the cost of constructing roads, pipelines or associated facilities.

The purpose of the program is to:

1. Facilitate increased natural gas and petroleum exploration and production in under-developed areas, and
2. Extend the drilling season (year-round activity).

Increasing Access to Resources: A Provincial Priority

The BC Energy Plan calls for the identification of new infrastructure opportunities for both resource and public road infrastructure.

Since 2004, B.C.'s Infrastructure Royalty Credit Program has allocated over \$435 million in infrastructure royalty credits to natural gas and petroleum companies resulting in 64 new road-based projects and 70 new pipeline projects.



TENURE

Natural Gas and Petroleum Rights

Almost all natural gas and petroleum rights in British Columbia are owned by the provincial government, with small percentages privately-owned or held by the Government of Canada. The ministry is responsible for issuing rights, administering rights, collecting and accounting for related natural gas and petroleum revenues. These rights are acquired through tenure agreements.

Tenure Agreements: Permits, Licences and Leases

The private sector explores, develops, produces and markets natural gas and petroleum through tenure agreements with the province. The ministry currently manages more than 14,500 petroleum and natural gas agreements covering more than 23.5 million acres. Three types of agreements are used in British Columbia:

- ▶ Permits, which carry an obligation to conduct exploration.
- ▶ Drilling licences, which convey the exclusive right for permission to drill natural gas and petroleum wells in a defined area.
- ▶ Leases, which allow production and provide exclusive drilling rights.

Although tenure agreements contain obligations to conduct exploratory or development work, approval to carry out the work is obtained through the Oil and Gas Commission (OGC).

Acquiring Rights

The process for acquiring natural gas and petroleum rights is:

- ▶ Interested parties request that natural gas rights and petroleum owned by the Province be made available

as tenures in monthly dispositions. Requests undergo a referral and notification process.

- ▶ Details of proposed tenures are posted at: www.ptonline.gov.bc.ca
- ▶ The ministry receives sealed bids and awards tenures based on the highest acceptable bids.

Landowner Notification Program

In April 2008, the ministry initiated the Landowner Notification (LON) Program in response to a recommendation by the Northeast Energy and Mines Advisory Committee (NEEMAC). The LON program's purpose is to notify landowners of natural gas and petroleum tenure sales in northeast B.C. The program is also part of the ministry's Energy Plan commitment to improve landowner notification and awareness of sales of natural gas and petroleum rights on private land. See: www.gov.bc.ca/empr/popt/oil_and_gas_lnp1.html

ePayments

The ministry has implemented a web-based, Pre Authorized Debit system to facilitate the payment of annual fees and rentals of natural gas and petroleum rights. See: www.empr.gov.bc.ca/Titles/OGTitles/Pages/default.aspx

Exploration and Development Approvals

The OGC is responsible for regulating British Columbia's natural gas and petroleum sector and for making decisions on natural gas and petroleum applications, as well as considering broad environmental, economic and social impacts. The OGC has a responsibility to consult with First Nations, engage stakeholders, ensure safe operating practices and streamline regulatory processes.

THE PETROLEUM AND NATURAL GAS TENURE DISPOSITION PROCESS

STAGE 1	Sale Posting: Industry requests parcels of natural gas and petroleum rights be made available for sale.
STAGE 2	Referral Phase: The ministry issues referral packages to First Nations, local government and government agencies seeking input and comment within 20 working days on the proposed parcels to be made available for sale.
STAGE 3	Notice of Sale or Advertisement of proposed natural gas and petroleum parcels for auction is published six weeks in advance of auction for interested parties to review prior to submitting bids.
STAGE 4	Auction, Sale and Acceptance of Bid: Proponent secures natural gas and petroleum tenure and has the right to make an application to the OGC for surface activities to explore and develop the resource.

ROYALTIES

On August 6, 2009, the ministry announced the Oil and Gas Stimulus Package (Package) designed to generate new stimulus for drilling, attract investment and produce immediate economic benefits for British Columbia, during the economic downturn. The package includes four royalty initiatives and two regulatory initiatives.

Royalty initiatives included in the package are:

- ▶ A one-year, two per cent royalty rate for all wells drilled in a 10 month window (September 2009 - June 2010).
- ▶ An increase of 15 per cent in the existing royalty deductions for natural gas deep drilling.
- ▶ Qualification of horizontal wells drilled between 1,900 and 2,300 metres into the Deep Royalty Credit Program.
- ▶ An additional \$50 million allocation for the Infrastructure Royalty Credit Program offered fall 2009 to stimulate investment in natural gas and petroleum roads and pipelines.

Regulatory initiatives included in the package are:

- ▶ Commingling in the plains area, announced by the Oil and Gas Commission in September 2009, to provide efficiencies to maximize production and resource recovery.
- ▶ Amendments to the Drilling Licence Regulation to create flexibility that will allow industry to move wells to production while not losing privileges to convert drilling licences to leases.

For further information on the Oil and Gas Stimulus Package, please visit www.empr.gov.bc.ca/OG/Pages/default.aspx

Royalty Rates in British Columbia

British Columbia offers a competitive royalty regime with programs targeting specific resource opportunities.

Because natural gas and petroleum rights in B.C. are almost exclusively held by the provincial government, the vast majority of producers pay a royalty share on natural gas and petroleum produced in the province.

Natural Gas Royalties

The royalty percentage varies depending on:

- ▶ Volume of production.
- ▶ Market prices for natural gas.
- ▶ Date of the petroleum and natural gas tenure acquisition.
- ▶ Processing, transportation and water handling costs (coalbed gas only).
- ▶ Eligibility for targeted royalty programs.

Petroleum Royalties

The royalty percentage varies depending on:

- ▶ Monthly production volumes.
- ▶ Date the oil pool was discovered (old oil, new oil, third tier oil).
- ▶ Classification or grade of the oil produced (heavy oil, light oil).
- ▶ Average sales price received by the producer.

A 36-month royalty exemption for new pool discovery wells is available.

Targeted Royalty Programs

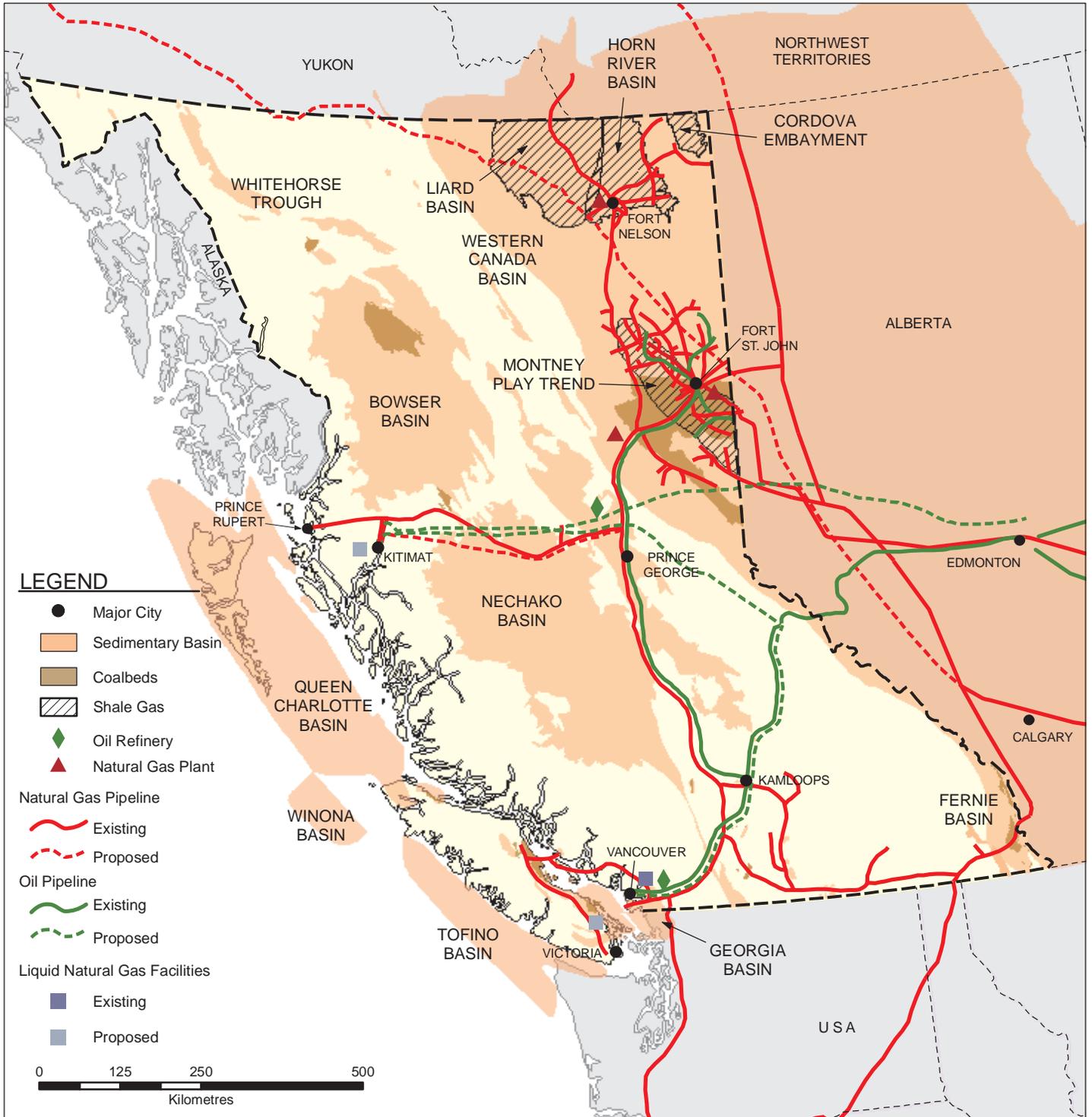
Targeted royalty programs are available for key resource opportunities including unconventional resources (e.g. tight, shale and coalbed gas) and deep well drilling. The targeted royalty programs increase the competitiveness of British Columbia's wells. See the table on page 9 for details on each program.

ROYALTIES

TARGETED ROYALTY PROGRAMS

SUMMER ROYALTY PROGRAM	<p>Summer Royalty Program provides up to \$100,000 in royalty credits for wells drilled between April 1 and November 30 and increases year-round activity, employment and business opportunities in northeast British Columbia.</p>
MARGINAL ROYALTY PROGRAMS	<p>Marginal Royalty Program provides royalty breaks for low productivity wells based on well depth and initial production rates (the average monthly well production volume must be less than 882,525 cubic feet /25,000 cubic metres during the first 12 production months and the average daily production must be less than 812 cubic feet/23 cubic metres for every metre of marginal well depth). This program is also available for re-entry wells.</p> <p>Ultra Marginal Royalty Program provides royalty breaks for low productivity shallow wells (true vertical depth less than 7,544 feet/2,300 metres based on well depth and initial production rates). It allows very small pools and very poor wells to be economically viable and improves large project economics.</p>
DEEP ROYALTY PROGRAMS	<p>Deep Royalty Program provides a royalty credit amounting to approximately 23 per cent of the drilling and completion costs for a deep well (deeper than 8,200 feet /2,500 metres for vertical wells and deeper than 6,232 feet/1,900 metres for horizontal wells).</p> <p>Deep Re-entry Royalty Program provides a royalty credit for deep re-entry wells.</p> <p>Deep Discovery Program provides the lesser of either a three-year royalty holiday or 9.9 billion cubic feet /283 million cubic metres of royalty free gas for deep discovery wells. Deep discovery wells are deeper than 13,120 feet/4,000 metres and their surface locations are at least 12.5 miles/20 kilometres away from the surface location of any well in a recognized pool of the same formation.</p>
COALBED GAS ROYALTY PROGRAM	<p>Coalbed Gas Royalty Program provides a royalty credit of \$50,000 for each coalbed gas well completed on crown land (tax credit \$30,000 for freehold mineral land). Also, the program allows produced-water handling costs to be included in the producer cost of service allowance to address the added water management costs.</p>
NET PROFIT ROYALTY PROGRAM	<p>The Net Profit Royalty Program will focus on resources that are technically complex, such as coalbed gas, tight gas, shale gas, enhanced oil recovery or resources that are remote from existing infrastructure, such as the Interior Basins in British Columbia. The program, by application, will enable producers of these resources to pay lower royalty rates in the initial stages of development and commercialization in exchange for higher royalty rates in later stages of production once projects have recovered their capital investment.</p>

NATURAL GAS AND PETROLEUM RESOURCE MAP



RESOURCE OVERVIEW



British Columbia is rich in natural gas resources. Abundant reserves exist in conventional natural gas plays and extensive opportunities are emerging from unconventional sources such as shale gas, tight gas and coalbed gas. Low drilling densities and increasing year-round activity offer excellent opportunities for exploration and development. Annual reserve additions have exceeded annual gas production for a decade.

The northwestern edge of the Western Canada Sedimentary Basin is located within northeast British Columbia. The region has seen key gas discoveries come on stream, including the Upper Devonian Jean Marie play at Greater Sierra, the Middle Devonian Slave Point play in the Ladyfern/Drake fairway, and the Lower Cretaceous Cadomin play at Cutbank Ridge.

New Exploration Opportunities

Shale Gas – exciting new play; multi-zone targets; many active project areas such as the Horn River Basin, Cordova Embayment, Liard Basin and Upper Montney plays.

Tight Gas – extensive resource with active plays in northeast B.C. (e.g. Greater Sierra, Deep Basin).

Foothills of the Northern Rocky Mountains – relatively unexplored with high potential. Initial flow rates in these regions can exceed 70 Mmcf per day.

Coalbed Gas – emerging play with many prospective areas.

Interior Basins – frontier regions with new data and available tenure.

Offshore – significant potential (moratorium under review).

2008 GAS PRODUCTION AND ACTIVITY

ANNUAL PRODUCTION	Raw Natural Gas Production – over 1.1 Tcf
RESERVE NUMBERS	Natural Gas (remaining marketable reserves) – 17.6 Tcf
RESOURCE NUMBERS	British Columbia has an undiscovered resource potential of about 93 Tcf in all B.C. basins combined. In addition, our unconventional gas resource potential includes: <ul style="list-style-type: none"> ▶ 300 Tcf of tight gas ▶ 250 Tcf of shale gas ▶ 100 Tcf of coalbed gas
WELL ACTIVITY	Wells authorized – 1,412 Wells drilled – 922

RESOURCE OVERVIEW

Energy Efficiency

The British Columbia government is developing an Industrial Energy Efficiency Program specifically to address the challenges and issues faced by B.C.'s industrial sectors. Through both the Industrial Energy Efficiency Working Group and the Oil and Gas Climate Change Working Group, the Province is working closely with industry to develop programs and policies which will encourage and support greater energy conservation and efficiency as well as greenhouse gas emission reductions. A number of incentive programs are already accessible to B.C. companies, through BC Hydro and Natural Resources Canada, to assist with energy management and promote specific end-use best practices.

In March 2009, B.C. Ministry of Energy, Mines and Petroleum Resources, the Climate Action Secretariat and the Canadian Association of Petroleum Producers signed a Memorandum of Understanding (MOU) on energy efficiency. The MOU is the first step toward a detailed Energy Efficiency Agreement which supports developing a strong culture within the industry around energy efficiency and continuous improvement. As a next step to the MOU, a joint government/industry workshop is planned for early 2010 in northeast B.C. which will focus on fuel gas best management practices and integrated energy management. To view the BC Energy Plan, visit: www.energyplan.gov.bc.ca

2008 INVESTMENT PROFILE

CAPITAL SPENDING	\$5.0 BILLION
PUBLIC ROAD IMPROVEMENTS since 2004	\$176 MILLION
TOTAL SALES VALUE OF NATURAL GAS AND PETROLEUM PRODUCTION	\$6.9 BILLION

Supporting Geoscience

B.C. has made its geoscience data publicly available. The core facility, located near Fort St. John, houses 6,500 cores and chip samples from 20,000 wells. The well-file library in Victoria contains reports, tour sheets and analysis from all wells drilled in B.C. Numerous petroleum geoscience reports and maps are available online for free download at www.empr.gov.bc.ca/OG/oilandgas/statistics/Pages/default.aspx

Southeast

Exploration is focused on unconventional gas with coalbed gas the major target of exploration activity; to date about 40 wells have been drilled for coalbed gas in southeast B.C. The potential coalbed gas resource in southeast B.C. is estimated to be 13.7 Tcf.

Central Interior and Northwest

B.C.'s interior sedimentary basins have significant petroleum resource potential. Current interest is focused on coalbed gas in the Bowser Basin and conventional natural gas and petroleum targets in the southern Nechako Basin.

Offshore

Currently the Province is working to have the moratorium on exploration and development of offshore resources lifted. Any future development will be scientifically sound and environmentally responsible.

Resource Assessment from the Geological Survey of Canada (estimates):

- ▶ Georgia Basin – 6.5 Tcf in-place natural gas.
- ▶ Queen Charlotte Basin – 25.9 Tcf in-place natural gas and 9.8 Bbbl of oil.
- ▶ Tofino-Winona Basins – 9.4 Tcf in-place natural gas.

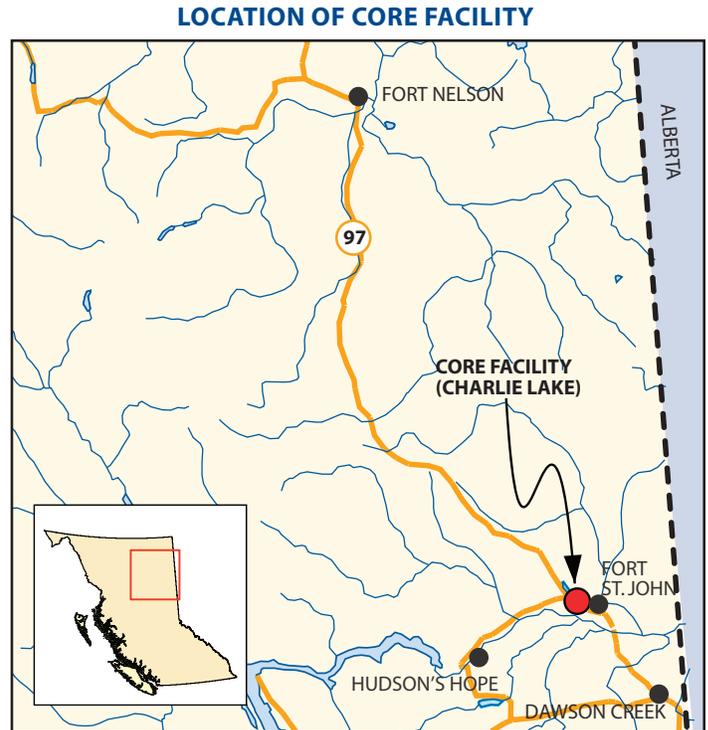
CORE FACILITY

Charlie Lake, British Columbia

The Core Facility is located at Charlie Lake in the heart of British Columbia's natural gas and petroleum region, six miles (10 km) north of Fort St. John on the historic Alaska Highway. This has been a central storage and research examination facility since the 1950s. The cores and cuttings provide an important source of natural gas and petroleum information for the advancement of the petroleum industry in British Columbia.

Over 6,500 cores and cuttings from more than 20,000 natural gas and petroleum wells drilled are available year-round to government, industry and the public in British Columbia. The 50,000 ft² facility has heated viewing areas with 10 roller tables for core examination and sliding table trays for microscopes, examination tools, and note taking. An area with examination tables also can be reserved so company staff can view and examine confidential core.

To contact the core facility, please call (250) 262-3309 or visit www.empr.gov.bc.ca/OG/oilandgas/corefacility/Pages/default.aspx



INT. 933-2 - 951-2 Rec. 17.4 / 18

TIGHT GAS

Northeast British Columbia

Tight gas production in northeast British Columbia has significantly increased in recent years due to advances in drilling and completion technology, utilization of large-scale project management, and higher commodity pricing.

To date, most activity has focused on exploiting "sweet spots" where fracturing or lithological factors have enhanced the reservoir quality, creating characteristics more typical of conventional deposits.

Considerable resource potential exists for additional tight gas reserves.

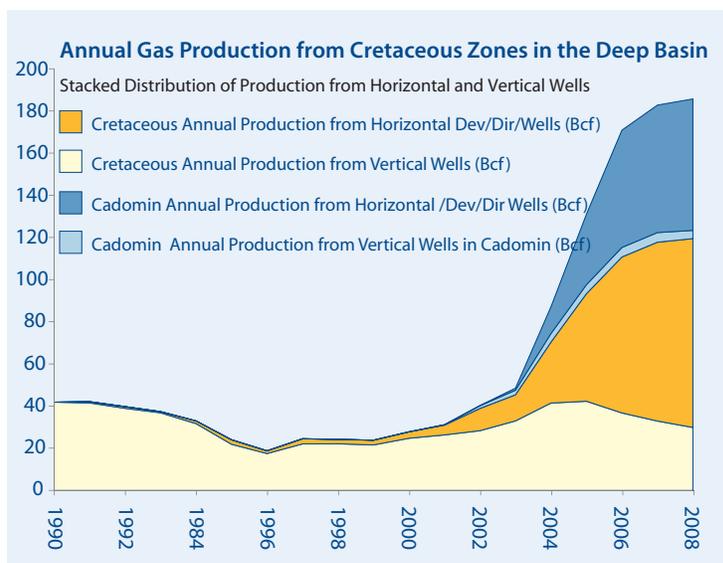
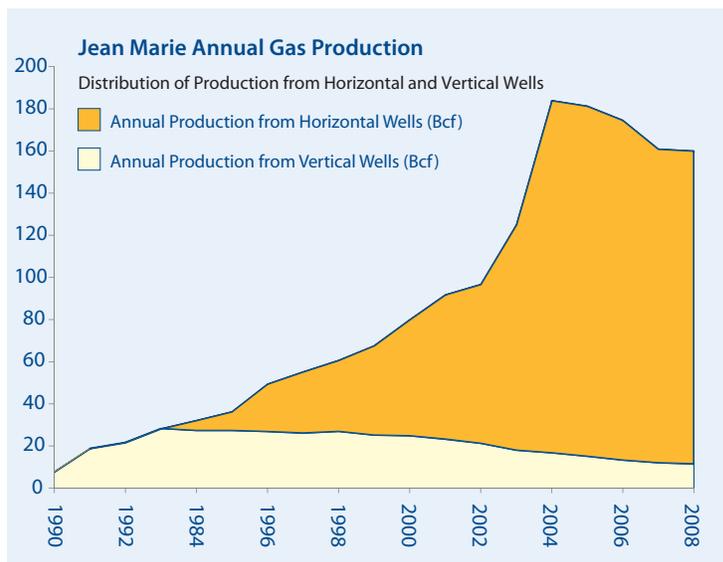
TIGHT GAS RESOURCE POTENTIAL

Ultimate Gas Resource Estimate (Tcf)

DEEP BASIN	75 - 200
NORTHERN PLAINS (INCLUDING LIARD BASIN)	50 - 175
FOOTHILLS	100 - 250
TOTAL	225 - 625

Tight gas production in British Columbia is currently 500 Bcf/year primarily from the Jean Marie and Cadomin formations.

The graphs highlight the dramatic increase in production for these two key tight gas plays as a result of improvements in drilling (horizontal/directional/underbalanced) and completion (advanced fracture stimulation) technology.



TIGHT GAS

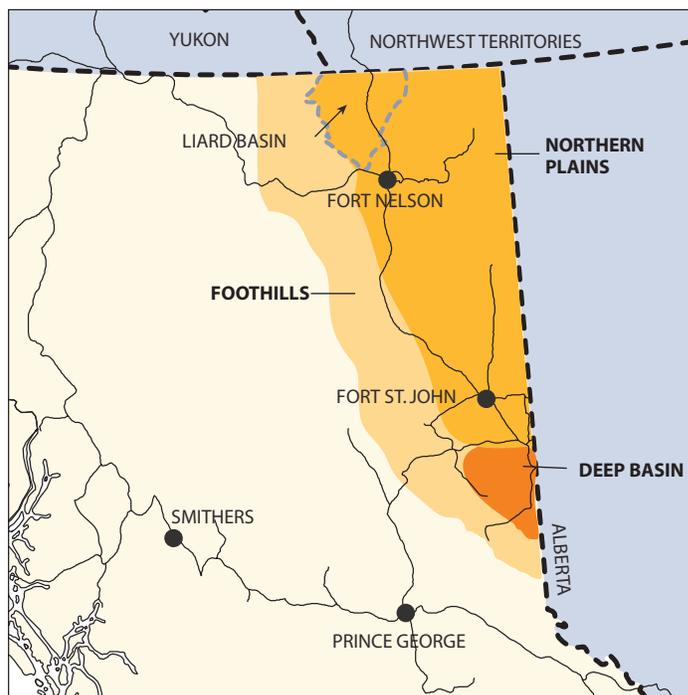
Northeast British Columbia

Continued technological advances will extend existing plays into adjoining areas, as well as stimulate new opportunities in regions with appreciably thicker, gas-saturated strata.

Tight gas in northeast British Columbia occurs in three separate geological settings. Most commonly associated with the Deep Basin, tight gas reservoirs are also present in the Northern Plains and Foothills area.

- ▶ **Deep Basin** – stacked Mesozoic clastic reservoirs, each regionally extensive and gas saturated, with production mainly from isolated stratigraphic "sweet spots".
- ▶ **Northern Plains** (including Liard Basin) – most economic production is attained from regionally extensive Devonian shelf carbonates that are naturally fractured to a relatively minor degree.
- ▶ **Foothills** – prolific production where fracturing enhances deliverability from otherwise tight to moderate quality clastic and carbonate reservoirs.

TIGHT GAS REGIONS, NORTHEAST BRITISH COLUMBIA



RESOURCE POTENTIAL OF MAJOR TIGHT GAS PLAYS

Values are estimated for order of magnitude comparison

	Formation (Age)	Bcf/DSU	Total Gas Resource (Tcf)	Reservoir Type	Comments
Deep Basin	Cardium/Dunvegan (U. Cret.)	1 - 3	11 - 25	Shoreface/deltaic ss.	Shallow; little production
	Cadotte/Spirit River (L. Cret.)	3 - 12	36 - 75	Shoreface ss.	Established "sweet spot" production
	Cadomin/Gething (L. Cret.)	2 - 7	20 - 50	Alluvial ss.	Established production
Northern Plains	Cadomin/Gething (L. Cret.)	2 - 7	10 - 20	Alluvial ss.	Some production; fractures possible
	Buick Creek (L. Cret.)	2 - 6	12 - 25	Deltaic ss.	Fracturing required - local fold trends
	Jean Marie (U. Dev.)	1 - 10	25 - 100	Shelf carbonate	Widespread production; moderate fracturing
Foothills	Baldonnel (Triassic)	3 - 20	35 - 100	Shelf carbonate	Production from fractured reservoirs; water risk
	Halfway (Triassic)	1 - 7	25 - 100	Shoreface ss.	Production from fractured reservoirs; potential in thick tight sections (including Deep Basin)

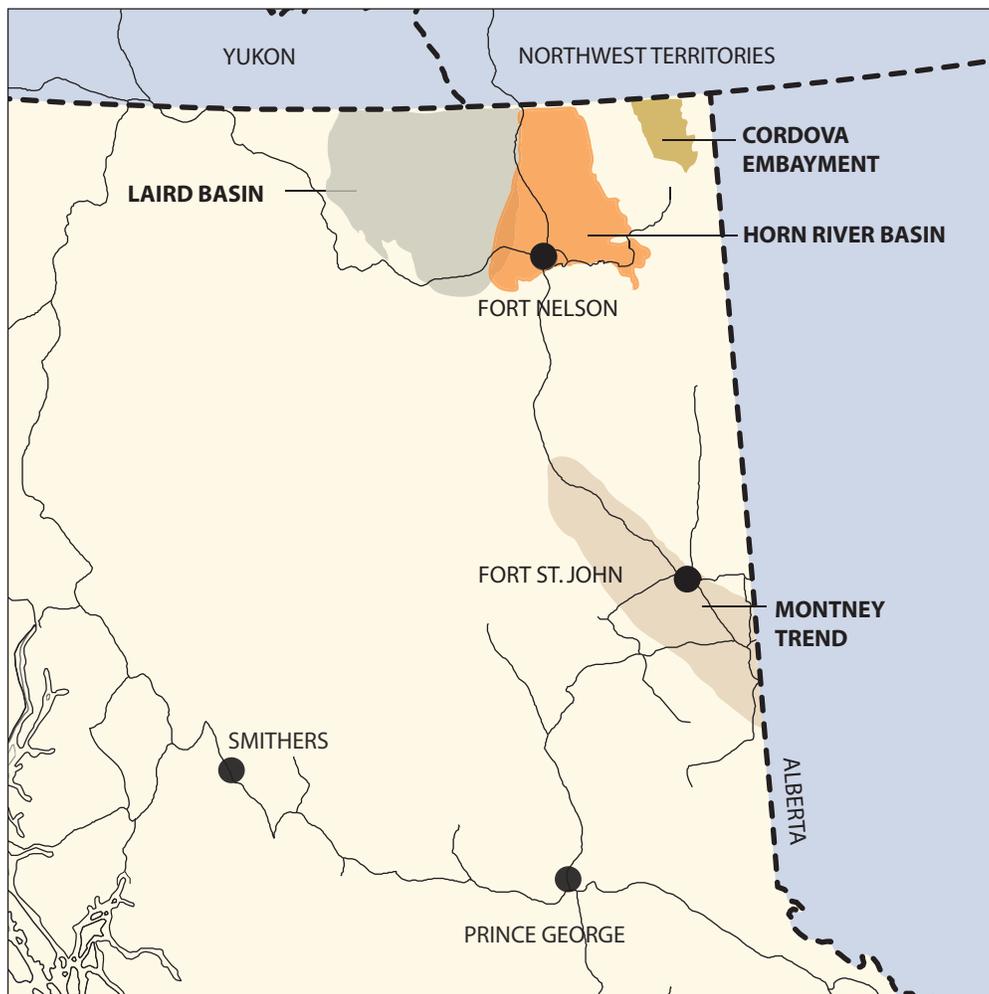
SHALE GAS

Northeast British Columbia

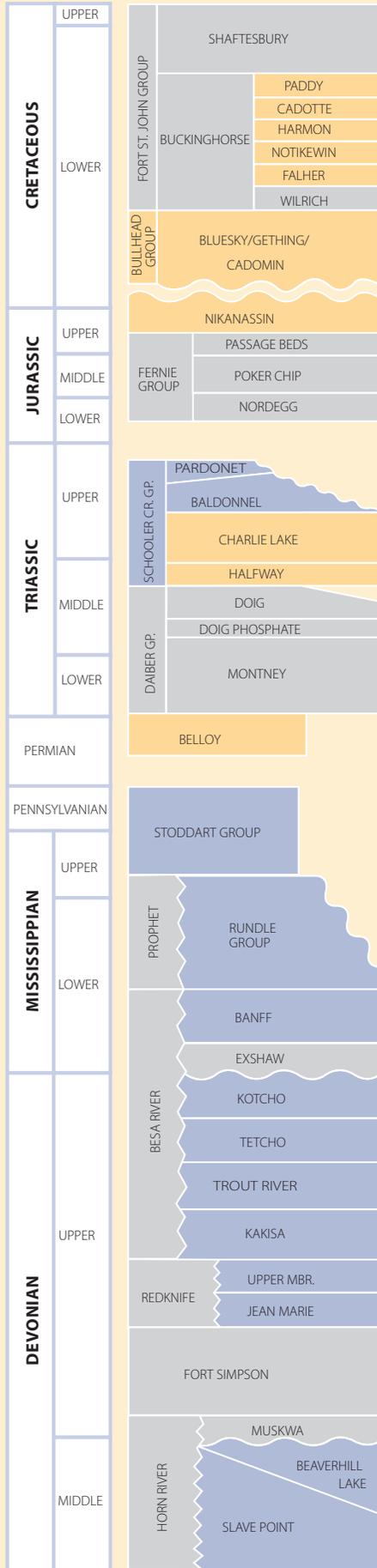
Shale Gas Play Potential

- ▶ Shales are the most commonly occurring type of sedimentary rock in northeast British Columbia and are now being recognized as potential reservoirs.
 - ▶ Preliminary in-place estimates have shale gas potential at more than 250 Tcf.
 - ▶ There are many prospective horizons with good total organic carbon, thermal maturity and moderate porosity.
- ▶ There has been considerable interest by several companies in the shale gas potential of British Columbia.
 - ▶ Several experimental shale gas schemes have been approved by the Province.
 - ▶ Several studies on shale gas potential are available for download at: www.empr.gov.bc.ca/OG/oilandgas/petroleumgeology/UnconventionalOilAndGas/Pages/Shale.aspx

SHALE GAS PLAY AREAS



**NORTHEAST BRITISH COLUMBIA
GENERALIZED STRATIGRAPHY**



**SHALE GAS
Northeast British Columbia**

PROSPECTIVE HORIZONS

	Formations	Description	Depth	Average Thickness	Total Organic Carbon	Gas in Place
LOWER CRETACEOUS	Wilrich and Buckinghorse shales	Potential interbedded sand/siltstone	800 to 1,200 metres	100 metres	2.3%	60 Bcf per section
JURASSIC	Nordeg and Fernie shales	Recognized source rocks	1,200 to 2,500 metres	Up to 30 m organic rich section	up to 14%	>20 Bcf per section
TRIASSIC	Doig, Doig Phosphate and Montney	Montney turbidites may increase permeability Phosphate units have high TOC and are excellent source rocks	1,200 to 3,000 metres	300 to 500 metres	0.5 to >10%	10 to 110 Bcf per section
DEVONIAN	Exshaw, Besa River, Fort Simpson and Muskwa	Exshaw and Muskwa are widely distributed organic shales Fort Simpson and Besa River are thick basin-filling shales	1,800 to 3,500 metres	Huge thicknesses are common with some high TOC intervals	0.5 to >10%	10 to 100 Bcf per section

GEOLOGIC ANALOGUE

MISSISSIPPIAN	Barnett Shale (Fort Worth Basin)	Marine-shelf deposit	2,000 to 2,500 metres	100 metres	4.5%	140 Bcf per section
----------------------	----------------------------------	----------------------	-----------------------	------------	------	----------------------------

- CARBONATES
- COARSE GRAINED CLASTICS
- FINE GRAINED CLASTICS

FOOTHILLS

Northeast British Columbia

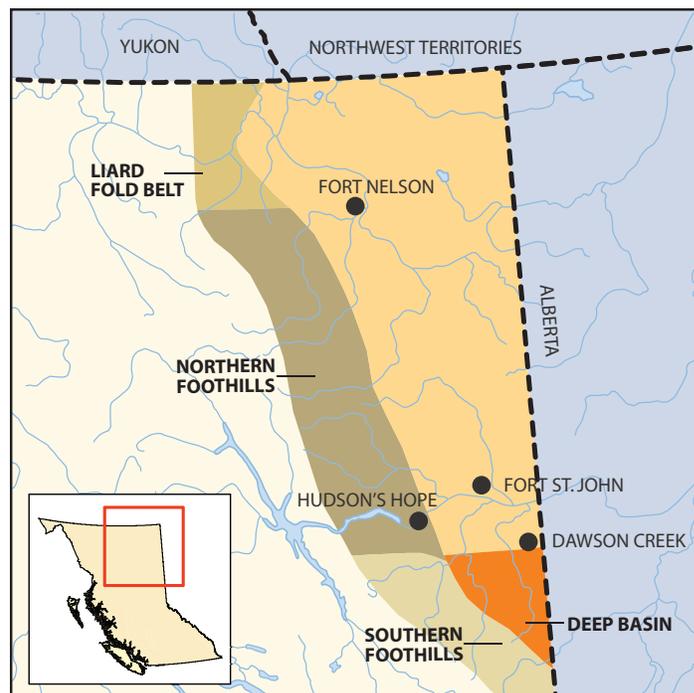
Foothills plays continue to be attractive in British Columbia due to high rates of production and large pool sizes.

The foothills of British Columbia are subdivided into northern and southern regions reflecting differences in depth to main targets and underlying geology.

Southern Foothills – adjacent to Deep Basin. There is prolific production from fractured Triassic Baldonnel, Halfway and Charlie Lake formations. New highly productive wells tap deeper Pennsylvanian to Permian Stoddart-Belloy sections, along the western margin of the Foothills, and fractured Cretaceous clastics of the Deep Basin, along the eastern, outer foothills area.

Northern Foothills – occurs north of Peace Reach. The main targets include the Triassic Baldonnel, Charlie Lake and Halfway formations, together with the Mississippian Debolt Formation.

FOOTHILLS, NORTHEAST BRITISH COLUMBIA



RESOURCE POTENTIAL

Formation	Southern Foothills Total Resource (Tcf)	Northern Foothills Total Resource (Tcf)	Reservoir Type
Cadotte (L. Cretaceous)	0.11 - 0.22	-	Shoreface sandstone
Spirit R./Notikkewin/Falher (L. Cret.)	0.41 - 1.66	-	Shoreface sandstone
Cadomin (L. Cretaceous)	-	-	Alluvial fan/plain
Nikanasin (U. Jur. - L. Cretaceous)	0.17 - 1.44	0.16 - 0.31	Deltaic
Baldonnel (U. Triassic)	4.52 - 11.32	0.36 - 8.6	Shallow marine to shelf carbonates
Charlie Lake (U. Triassic)	0.04 - 0.07	0.05 - 0.1	Shallow marine sandstones/carbonates
Halfway (M. Triassic)	0.36 - 0.71	0.25 - 4.7	Shallow marine carbonates
Debolt-Belloy (Miss.-Permian)	1.61 - 22.14	1.57 - 4.54	Clastics and carbonates

Total resource values are gas-in-place estimates and are sourced from National Energy Board and B.C. Ministry of Energy, Mines and Petroleum Resources Northeast British Columbia's Ultimate Potential for Conventional Natural Gas; Report 2006-A.



FOOTHILLS

Northeast British Columbia

GAS RESOURCE POTENTIAL

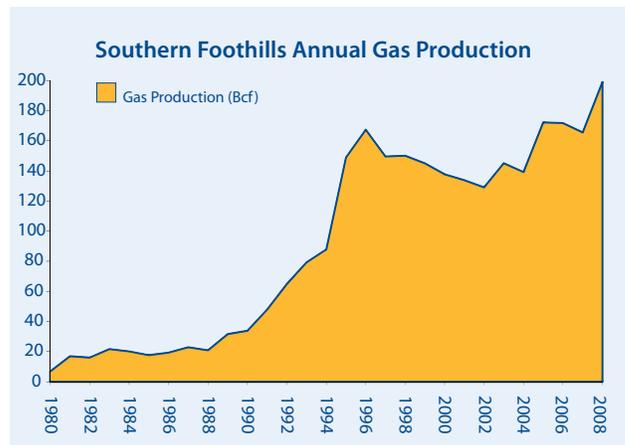
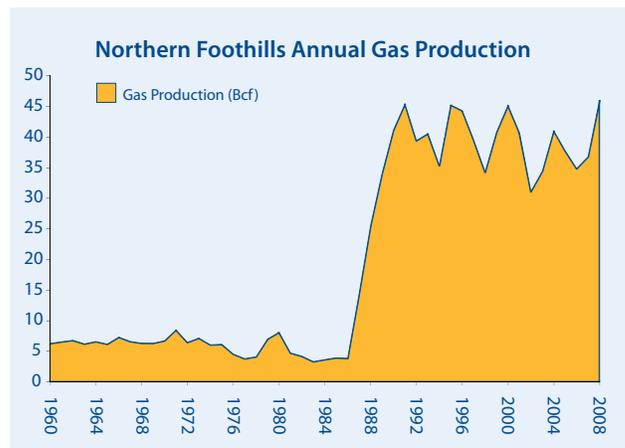
Ultimate Gas-in-place Estimate (Tcf)

NORTHERN FOOTHILLS	6.3
SOUTHERN FOOTHILLS	16.3

Although considerable resource potential occurs within traditional targets of the foothills belt, recent discoveries and conceptual targets suggest new potential.

In the Southern Foothills, interest has focused on the Pennsylvanian to Permian Stoddart-Belloy section where industry had several successes with initial flow rates of up to 85 mmcf/d at the Seneca Brazion b-58-E well, suggesting upwards of 200 Bcf of gas-in-place.

New targets in the Northern Foothills could potentially include westward extensions of the Devonian, ancient barrier reef and atoll complexes, represented by the Keg River and Slave Point formations.



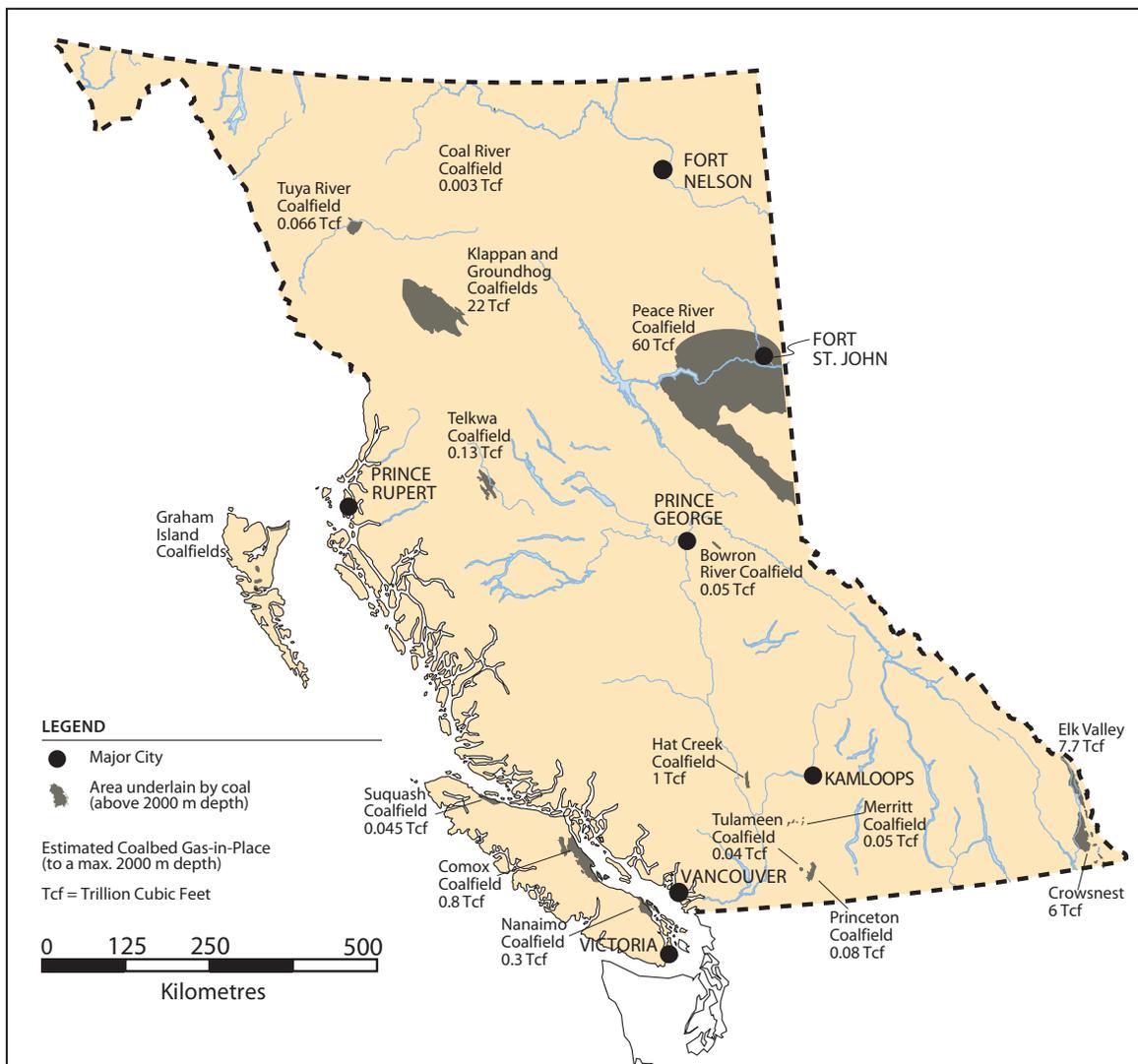
COALBED GAS

Coalbed gas is a promising unconventional source of natural gas in British Columbia.

Coalbed gas, found in coal seams, consists of 90 to 100 per cent methane with little to no hydrogen sulphide. It is one of the cleanest-burning fossil fuels and can be found in almost every coalfield across the province.

British Columbia has a coal resource in excess of 200 billion tonnes in the prospective depth window. The estimated in-place coalbed gas resource is approximately 100 Tcf. Coalbed gas basins exist in all parts of the province. There are active pilot projects in northeast and southeast British Columbia.

ESTIMATED COALBED GAS-IN-PLACE (TCF)



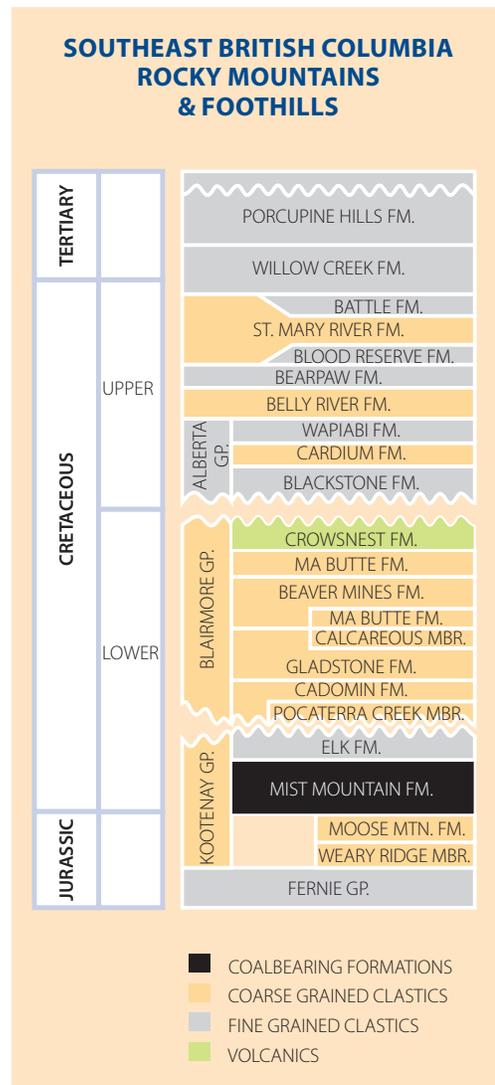
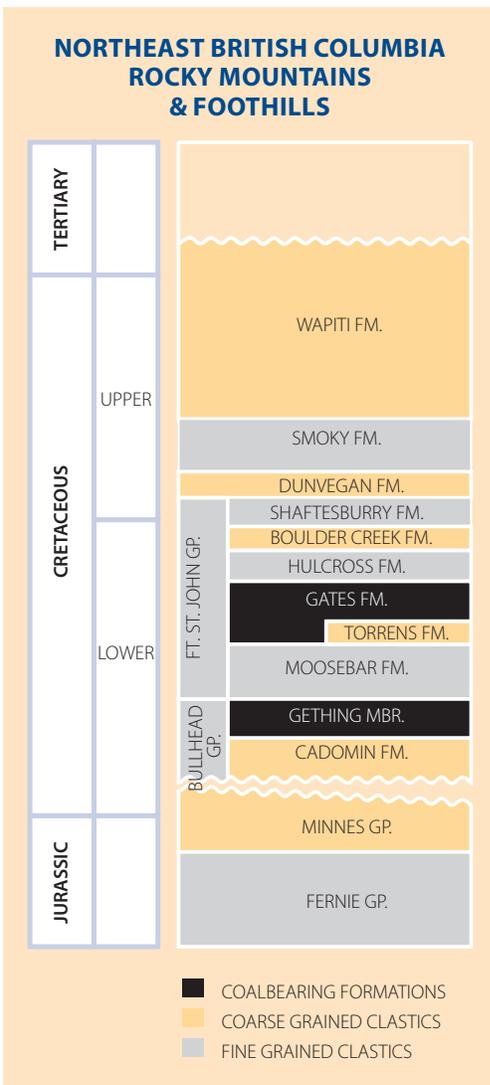
COALBED GAS

Coal-bearing rocks range in age from Jura-Cretaceous to Tertiary. They occur in a wide range of sedimentary and structural settings.

Northwest British Columbia – Some of the highest gas contents in the province are found in the anthracite coals of the Klappan area in northwest British Columbia. Measured gas contents range from less than 2 cc/g (68 scf/t) to over 20 cc/g (680 scf/t) depending largely on coal rank.

Canadian Rocky Mountains Foothills – The foothills have three major coalfields, the Peace River in the north and the Elk Valley and Crowsnest fields in the south. Exploration activity is underway in all of these areas.

Vancouver Island – Upper Cretaceous coals on Vancouver Island have been mined since 1847 and underground mining continues. These coal seams present an untapped opportunity for coalbed gas resource development.



USEFUL WEB LINKS

British Columbia Government Sites

Ministry of Energy, Mines and Petroleum Resources
www.gov.bc.ca/empr

Ministry of Energy, Mines and Petroleum Resources,
Oil and Gas Division
www.empr.gov.bc.ca/OG/Pages/default.aspx

Ministry of Energy, Mines and Petroleum Resources,
Titles Division
www.empr.gov.bc.ca/titles

Government of British Columbia
www.gov.bc.ca

Environment Assessment Office
www.eao.gov.bc.ca

Ministry of Small Business, Technology and Economic
Development
www.gov.bc.ca/tted

Ministry of Environment
www.gov.bc.ca/env

Associations and Commissions

Canadian Association of Petroleum Producers
www.capp.ca

Canadian Gas Association
www.cga.ca

Canadian Society for Unconventional Gas
www.csug.ca

Energy Services BC
www.energyservicesbc.org

Oil and Gas Commission
www.ogc.gov.bc.ca

Petroleum Services Association of Canada
www.psac.ca

Investment Sites

Invest British Columbia
www.investbc.com

British Columbia Securities Commission
www.bcsc.bc.ca

Invest in Canada
www.investincanada.gc.ca

The System for Electronic Document Analysis and
Retrieval (SEDAR)
www.sedar.com

Other Groups

Crown Publications
www.crownpub.bc.ca

Geological Survey of Canada
www.gsc.nrcan.gc.ca

Geoscience British Columbia
www.geosciencebc.com

National Energy Board
www.neb-one.gc.ca

Natural Resources Canada (NRCAN)
www.nrcan.gc.ca

For more information, please contact:

Ministry of Energy, Mines and Petroleum Resources
Oil and Gas Division
PO Box 9323 Stn Prov Govt
1810 Blanshard Street
Victoria, British Columbia
V8W 9N3 Canada

Tel: (250) 952-0115

Email: RDGB@gov.bc.ca



Ministry of
Energy, Mines and
Petroleum Resources