

# **EMD Canadian Section Councilor's Report**

## **For the EMD Mid Year Meeting Nov. 2010**

**By Jock McCracken**

This report will summarize each of the commodities and any EMD Canadian related business for the Mid-Year Report.

### **AAPG 2010 International Conference & Exhibition (ICE) 12-15 September being held in Calgary.**

This very successful conference was held in Calgary a few months ago with between 2,250 - 2,275 people attending making it one of the most highly attended international AAPG conferences on record, second to the Perth conference of 2006. Over 300 technical presentations, special forums and sessions and an active exhibition floor kept attendees busy and engaged during the proceedings.

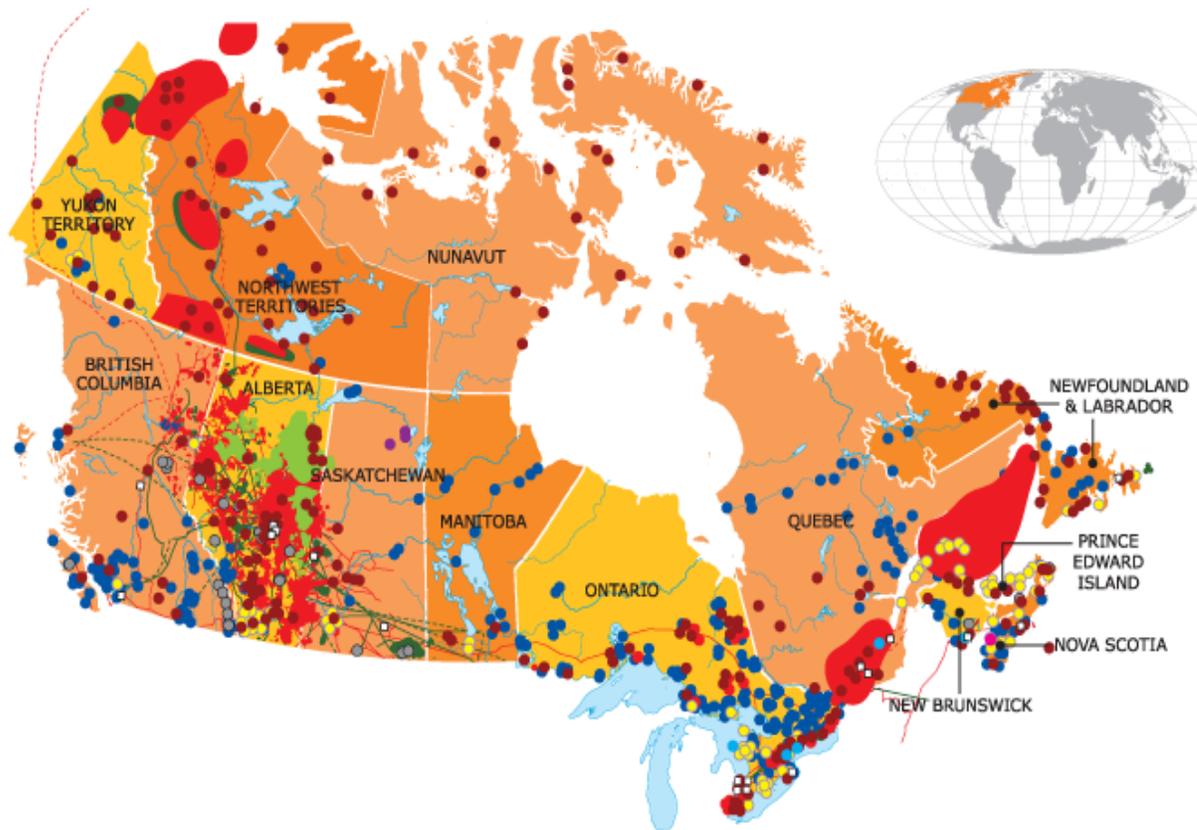
Fran Hein (EMD Vice-President 2009-2010; Secretary 2010-2012) had a major part in the conference organizing committee as the AAPG Energy Minerals Division (EMD) Co-Chair for the conference, with responsibility for the extensive technical program. EMD sponsored sessions included a full day on unconventional, with dedicated morning and afternoon sessions on Heavy Oil/Bitumen and the Bakken, North and South of the 49<sup>th</sup> Parallel (Canada –USA border).

### **Canada and Energy: Sources of Information**

The energy situation in Canada is nicely summarized by the Canadian Center for Energy <http://www.centreforenergy.com/AboutEnergy/> is a not-for-profit organization that is guided by independent advisors and directed by an executive board representing a diverse cross-section of sectors and energy stakeholders. Their funders include energy associations, government and energy companies. I will include at the end of this report links that are useful in accessing data on energy in Canada.

Enclosed below is their map showing all the locations of energy sources in Canada.

<http://www.centreforenergy.com/FactsStats/MapsCanada/CA-EnergyMap.asp?print=1>



## Canada

Click below to view

- |  |   |
|--|---|
|  CRUDE OIL            |  REFINERY                  |
|  NATURAL GAS          |  HYDRO ELECTRIC PLANT      |
|  OIL SANDS            |  COAL MINE                 |
|  NATURAL GAS PIPELINE |  WIND FARM                 |
|  CRUDE OIL PIPELINE   |  THERMAL ELECTRIC FACILITY |
|  NUCLEAR              |  URANIUM MINES             |
|  TIDAL                |   |

## Coal

Canada's coal reserves in 2008 totaled 3.47 billion tonnes of anthracite and bituminous coal and 3.11 billion tonnes of sub-bituminous coal and lignite, for a total of 6.58 billion tonnes or 0.8% of the world's total. The Canadian Coal Association estimates that that figure may be 10 billion tonnes. Natural Resources Canada estimate that the number is 8.7 billion tonnes of proved resources which 6.6 billion are deemed as recoverable. At today's production rate, these recoverable resources will last 100 years.

This geological resource in Canada is far larger, however. In addition to the proved resources, there are 190 billion tonnes of estimated resources of coal-in-place, which is the indicated and inferred tonnage with foreseeable economic interest. This estimate includes amounts that could exist in unexplored extensions of known deposits or in undiscovered deposits in known coal-bearing areas, as well as amounts inferred from favourable geological conditions. Speculative amounts are not included.

British Columbia, Alberta and Saskatchewan have the largest reserves and resources. Coal is also mined in Nova Scotia and New Brunswick. Coal reserves and resources have been identified in Yukon, Ontario, Newfoundland and Labrador, Northwest Territories and Nunavut, but these resources are not currently mined.

Annual coal production has remained relatively steady since 1990, hovering between 65 and 75 million tonnes. Canada produces both thermal and coking coals. Thermal coal production has been steady, but coking coal production has been fluctuating due to demand changes on the global coking coal market. In 2007, 70 million tonnes of coal were produced.

There were 22 coal mines operating in Canada at the end of 2007. British Columbia and Alberta hosted 17 of these mines and were the two highest producing provinces, together accounting for more than 80% of Canada's coal production.

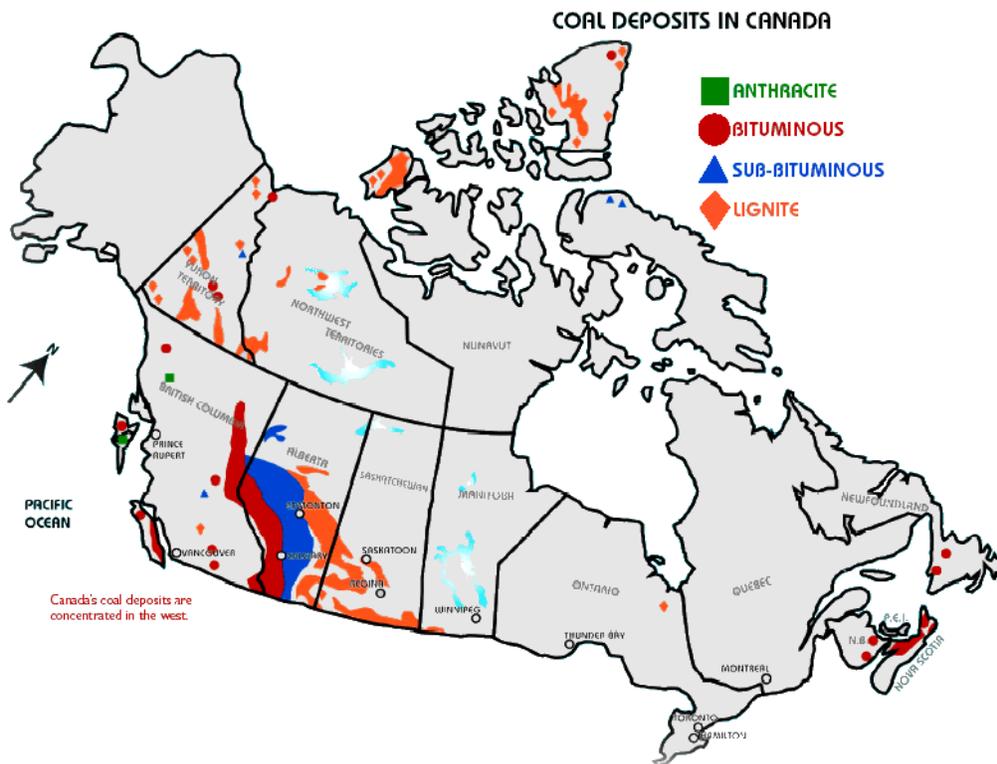
Almost all of Canada's metallurgical coal, the coal produced in British Columbia and some of the coal produced in Alberta is exported. Almost all of its thermal coal (all of Saskatchewan's, New Brunswick's and Nova Scotia's coal and most of Alberta's coal) is consumed domestically for coal-fired power generation.

Canada consumed 58 million tonnes of coal in 2006. Most of this coal (51 million tonnes) was used to generate electricity. Coal's availability and low cost make it the main fuel for electricity production in many provinces. Coal is used to produce about 74 per cent of the electricity used in Alberta, 63 per cent in Saskatchewan, 60 per cent in Nova Scotia, and 18 per cent in Ontario. The coal not used to generate electricity is consumed by Canada's steel, cement and other industries.

Canada is the world's second largest metallurgical coal supplier. Canada's metallurgical coal production and exports will benefit from the growing global demand for metallurgical

coal in the short to medium term, as global demand is forecasted to exceed supply. Long-term growth will depend on the global economy and steel-industry development because Canada's metallurgical coal is export oriented. Thermal coal production is expected to be stable.

Canada's coal consumption could eventually decline as a result of measures to reduce greenhouse gas emissions, such as the closure or retrofitting of existing coal-fired generation facilities. The development and implementation of new technologies such as carbon capture and storage and clean coal could, however, help sustain the use of coal for electricity generation in a carbon-constrained future



## Coal Meetings

Mining – Your Foundation for a Better World May 9-12, 2010, Vancouver, BC

48<sup>th</sup> Canadian Conference on Coal, Sept 11-14, 2010, Whistler, BC

49<sup>th</sup> Canadian Conference on Coal in Autumn 2011, Vancouver, B.C.

## Coal Sources of information

Natural Resources Canada – Coal <http://nrcan.gc.ca/eneene/sources/coacha-eng.php>

Coal Association of Canada <http://www.coal.ca/content/>

## **Coal Bed Methane**

Most of the Coal Bed Methane production comes from Alberta. The Alberta Geological Survey estimates there may be up to 500 Tcf of natural gas in Alberta's coals. However, it is not yet confirmed what portion of this resource may be recoverable.

The Energy Resources Conservation Board (ERCB) estimates the remaining established reserves of CBM to be approximately 860 billion cubic feet (Bcf) in areas of Alberta where commercial production is occurring. Coal seams with CBM potential are found underneath much of Alberta, especially in southern and central Alberta. When measurements of gas content from coal samples are mapped along with the thicknesses and areal extents of the various coal seams, estimates of Alberta's in-place volumes of CBM can be made. The Alberta Geological Survey of Alberta recently estimated there could be as much as 14 trillion cubic metres (about 500 trillion cubic feet or Tcf) of coalbed methane held in Alberta coal. For comparison, a joint study by the Alberta Energy and Utilities Board (ERCB) and the National Energy Board in 2006 estimated the ultimate potential of marketable conventional natural gas in Alberta to be between 5.7 and 7.1 trillion cubic metres (205-253 Tcf), with 2.8 trillion cubic metres (101 Tcf) being the estimate of remaining ultimate potential after consideration of past gas production.

Though the amount of CBM in-place that will ultimately reach market is presently unknown, the sheer potential size of the in-place resource estimates strongly suggests that CBM will make a significant contribution to Canada's energy security in the future. In 2005, the ERCB estimated the initial established reserves of CBM to be 22.9 billion cubic metres, but this estimate only considered the areas of commercial CBM production up to that time. This number is expected to increase with further evaluation to include areas of known resources drilled but not yet producing. Production of CBM in Alberta was 2.9 billion cubic metres in 2005 and is forecast to increase to 19.6 billion cubic metres in 2015. This would represent an increase from less than 2 per cent in 2005 to about 16 per cent in 2015 of total Alberta marketable gas production.

As of December 31, 2006, 10,723 CBM wells were drilled in Alberta, with approximately 2,000 CBM wells drilled in 2005. The total number of producing conventional gas wells in Alberta in 2005 was 97,900, with 13,248 conventional gas wells drilled in 2005, slightly less than 12,000 of these were connected and producing.

### **Coal Bed Methane Sources of Information**

Alberta Dept of Energy <http://www.energy.alberta.ca/>

Alberta Dept of Energy <http://www.energy.alberta.ca/NaturalGas/561.asp>

Alberta Geological Society <http://www.ags.gov.ab.ca/>

Canadian Society of unconventional Gas <http://www.csug.ca/>

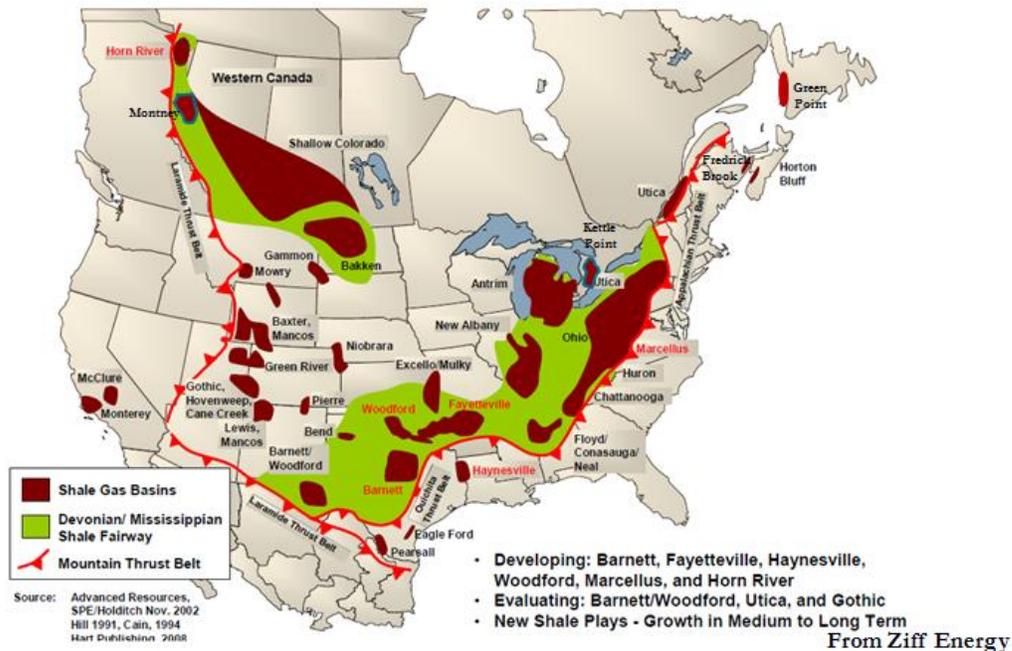
Alberta Energy Resources Conservation Board <http://www.ercb.ca/portal/server.pt>

Canadian Association of Petroleum Producers  
<http://www.capp.ca/Pages/default.aspx#cS6o1XRiqTR0>

## Shale Gas

Shale gas production in Canada is now more than two years old after the announcement of new discoveries at the beginning of 2008. Therefore, the state of development for the shale plays still range from speculative to exploratory to emerging with only two giant plays in N.E. B.C. being considered developing and under increasing production. In most cases, the majority of these wells are still confidential so production numbers are limited.

Two significant wells were drilled and tested in the St. Lawrence Lowlands of Québec and New Brunswick. These could be a game changer in these plays. So far there is action and/or interest in 9 provinces of Canada out of the 10. Our smallest province of Prince Edward Island is our last holdout. Recently the issue of fracking is being raised by the press and governments. For more details on these shales please refer to the Shale Gas Committee Report.



## British Columbia

The Devonian Horn River Shales and the Triassic Montney Shale, with estimated resources of 250 to 1000 Trillion cubic feet of natural gas in place, have dominated the announcements in shale gas in Canada. These plays are located in N.E. B.C. where the remoteness could be a challenge but existing and growing infrastructure and the current and past economic conditions have not significantly slowed down the experimentation and development.

The Horn River has been billed as one of the better shales in North America where the rock quality has been suggested as being better than the Barnett. This helpful since the remoteness from market is one of its negatives. As with all these plays the technology has been constantly improving where 14 stage fracs are common place and up to 18 horizontals are being drilled from one pad. Typically IP rates of 10 MMCF/D are common where an IP rate of 24MMCF/D was reported.

The Montney Play has brought in a multitude of players, large and small, exploiting these thick mixed clastics with this shale. Multi-stage fracs and pad drilling have brought down the completions costs so production is ramping up rapidly. There have been reports of IP rates up to 17 MMCF/D. These N.E. B.C. plays are so new hence a number of the wells are still on tight status, but some production numbers are starting to roll out. Currently at the end of 2009 the Horn River is producing at 80 MMCF/D and the Montney Trend is now at 572 MMCF/D.

B.C Shale information link: There is a wealth of data on these websites.

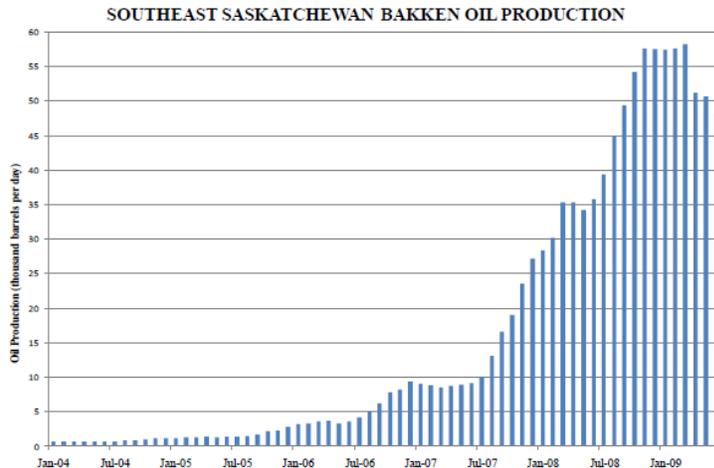
<http://www.empr.gov.bc.ca/OG/oilandgas/petroleumgeology/UnconventionalOilAndGas/Pages/Shale.aspx>

<http://www.empr.gov.bc.ca/OG/oilandgas/petroleumgeology/UnconventionalOilAndGas/Documents/Summary%20of%20Shale%20Gas%20Activity%20in%20NEBC%202008%2009.pdf>

### **Alberta/Saskatchewan/Manitoba**

These provinces share the Western Canada Sedimentary or Alberta Basin as well as the Williston Basin. Shale gas production is coming from the co-mingled Cretaceous Colorado Group. Rates are typically very low from these biogenically-derived gases but shallowness, pervasiveness of this formation as well as down-spacing might make it more attractive when the gas price recovers. There are few other shales being explored in Alberta: Jurassic Nordegg, Devonian Muskwa and Duvernay.

The Mississippian Bakken in Saskatchewan and Manitoba is continuing its very similar success story as it is south of the border.



The ERCB is the regulator for Alberta. <http://www.ercb.ca/portal/server.pt>

Saskatchewan Government Energy and Resources is the regulator.

<http://www.er.gov.sk.ca/Default.aspx?DN=4c585c56-193a-485a-91fd-7c49f0104a60>

The Manitoba Oil and Gas is the regulatory agency.

<http://www.gov.mb.ca/stem/petroleum/index.html>

## Ontario

The Devonian equivalent of the Michigan Basin, Antrim Shale has drawn little attention but some operators are building a large land base for the future exploitation of these biogenic gases. There is some potential of the Ordovician as well. The Ontario government plans the drilling of two stratigraphic wells this year to access the Devonian Kettle Point formation. The Ministry of Natural Resources of Ontario is the regulator:

[http://www.ogsrlibrary.com/government\\_ontario\\_petroleum.html](http://www.ogsrlibrary.com/government_ontario_petroleum.html)

<http://www.ogsrlibrary.com/>

## Quebec

The Upper Ordovician Utica/Lorraine shales drew great excitement with the announcement of an IP rate of 12 MMCF/D which stabilized at about 5 MMCF/D. This shale gas corridor of 100 km wide stretches 300 km from Montreal to Quebec within a pre-existing widespread pipeline system. A number of companies have positioned themselves within this area and have been just drilling the experimental vertical wells so far but the above rate was the first one to be announced by some of the horizontal recently completed.

Quebec's much-touted "shale gale" has been put on hold after the leading developers postponed a planned drilling program, citing high costs and public criticism of shale gas development. The

move comes as the Quebec government and the industry face an uproar at public hearings over fears that an anticipated increase in drilling could threaten local water supplies.

<http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/quebec-shale-gas-project-grinds-to-halt/article1757870/>

<http://www.montrealgazette.com/Shale+hearings+raucous+start/3833336/story.html>

Ministère des Ressources naturelles et de la Faune de Québec is the regulator.

<http://www.mrnf.gouv.qc.ca/english/energy/oil-gas/oil-gas-potential.jsp>

## **New Brunswick**

There have been a limited number of companies going after hydrocarbons in this province but just a month ago the experimentation with the shales is starting to pay off. An IP rate of 11.7 MMCF/D stabilizing at 3MMCF/D created some excitement in these Mississippian Fredrick Brook Shales. Recently two large US based companies, Apache and Southwestern Energy have participated in a farm-in and a 2.5 million acre land sale.

New Brunswick Natural Resources, Minerals and Petroleum is the regulator for this province.

<http://www.gnb.ca/0078/minerals/index-e.aspx>

## **Nova Scotia**

The Devonian Horton Bluff Shales in the Kennebec Basin have yet to be successfully fraced and produced. Understanding this play is continuing.

The Nova Scotia Department of Energy is the regulator for the province.

<http://www.gov.ns.ca/energy/oil-gas/onshore/>.

## **Newfoundland**

The Lower Ordovician Green Point Shale is continuing to be evaluated for its Shale Oil Potential.

The Newfoundland Department of Natural Resources is the regulator for the province.

<http://www.nr.gov.nl.ca/mines&en/>

## **Shale Gas Sources of Information**

Canadian Society for Unconventional Gas <http://www.csug.ca/>

National Energy Board (NEB), November 2009, A Primer for Understanding Canadian Shale Gas [http://www.neb.gc.ca/clf-](http://www.neb.gc.ca/clf-nsi/rnrgynfmitn/nrgyrprt/ntrlgs/prmrndrstndngshlgs2009/prmrndrstndngshlgs2009-eng.pdf)

[nsi/rnrgynfmitn/nrgyrprt/ntrlgs/prmrndrstndngshlgs2009/prmrndrstndngshlgs2009-eng.pdf](http://www.neb.gc.ca/clf-nsi/rnrgynfmitn/nrgyrprt/ntrlgs/prmrndrstndngshlgs2009/prmrndrstndngshlgs2009-eng.pdf)

<http://www.aapg.org/explorer/2010/01jan/shale0110.cfm>

<http://www.aapg.org/explorer/2010/10oct/regsec1010.cfm>

<http://www.aapg.org/explorer/2010/08aug/fredrick0810.cfm>

## **Gas Hydrates**

The Canadian Council of Academies released a report on past, current and future directions for gas hydrate research in Canada. NRCan/GSC and JOGMEC are continuing to prepare scientific contributions resulting from their extended production test at the Mallik site and NRCan/Energy Sector began a modest two year program of new funding for government based research into realizing gas hydrate production for the Canadian North, and to position the Government of Canada to prepare for a response to the Canadian Council of Academies report. There is discussion of reviving interest in gas hydrates in both Nunavut and Newfoundland and Labrador, in part because of other new funding aimed primarily at conventional resources, but also with potential to contribute to the characterization of gas hydrate resources. Work continues at NRC (Ripmeester and Co.) and at several universities (notably UBC, U of C, U of T, McGill and UVic), focused on both gas hydrates as a material of interest and on the characterization of the natural gas hydrate resource.

## **Gas Hydrates Sources of Information**

[http://gsc.nrcan.gc.ca/gashydrates/canada/index\\_e.php](http://gsc.nrcan.gc.ca/gashydrates/canada/index_e.php)

## **Tight Sandstone**

The deep basin of Alberta has been exploited for years. Currently there has been a flurry of activity drilling horizontally around older oil fields for previously uneconomic hydrocarbons using this new technology.

## **Oil Shale**

There a number of recognized oil shales in Canada but only the Saskatchewan Pasquia Hills is being currently? being assessed

## **Oil Sands**

Canada has 5 billion barrels of conventional oil reserves and 173 billion barrels of oil sands reserves for a total of 178 billion barrels, second only to Saudi Arabia.

In Canada in 2008, 1,350,000 barrels per day of crude oil were extracted by conventional production compared to 1,204,115 million barrels per day of crude oil from the tar sands Please refer to the EMD Fran Hein's report.

## **Geothermal**

Canada's first commercial geothermal generating facility is to be built in British Columbia

and has the potential of generating 100 MW of electricity. In June 2004, the BC government granted drilling permits for two deep production wells to confirm the commercial viability. South Meager has been classified as a "high temperature" geothermal field with maximum temperatures to date up to 275 deg C. The site has a potential development capacity of 200 MW. This facility may be on hold.

The Province of British Columbia has seen a renewed interest in geothermal energy and is working to make more land available for development. The October Auction is the second in 2010 by the B.C.'s Ministry of Energy, Mines, & Petroleum Resources. CanGEA has been active in working with the BC government to expedite the land tenure process

More than 30,000 earth energy installations are in place in Canada for residential, commercial, institutional and industrial applications. The present goal is to have 5000 mw produced by 2015.

### **Geothermal Sources of information**

<http://www.empr.gov.bc.ca/Titles/OGTitles/geothermal/Pages/GeothermalResourcesMap.aspx>

<http://www.empr.gov.bc.ca/Titles/OGTitles/geothermal/Pages/default.aspx>

Canada Geothermal Energy Association <http://www.cangea.ca/>

<http://www.bcsea.org/learn/get-the-facts/renewable-energy-technologies/geothermal-power>

BC Geothermal Map [http://www.em.gov.bc.ca/dl/GeoTherm/GeoThermRes\\_small.pdf](http://www.em.gov.bc.ca/dl/GeoTherm/GeoThermRes_small.pdf)

Alberta Shallow Geothermal <http://www.aapg.org/explorer/2005/12dec/geothermal.cfm>

### **Geothermal Meetings**

Canadian Geothermal Code Investment Seminar and Reception, Toronto, ON, March 3, 2010

National Capital Geothermal Power Policy Forum, Ottawa, ON June 17, 2010

CanGEA Geothermal Energy Conference, Vancouver-Whistler, BC Summer 2010 - Date TBA

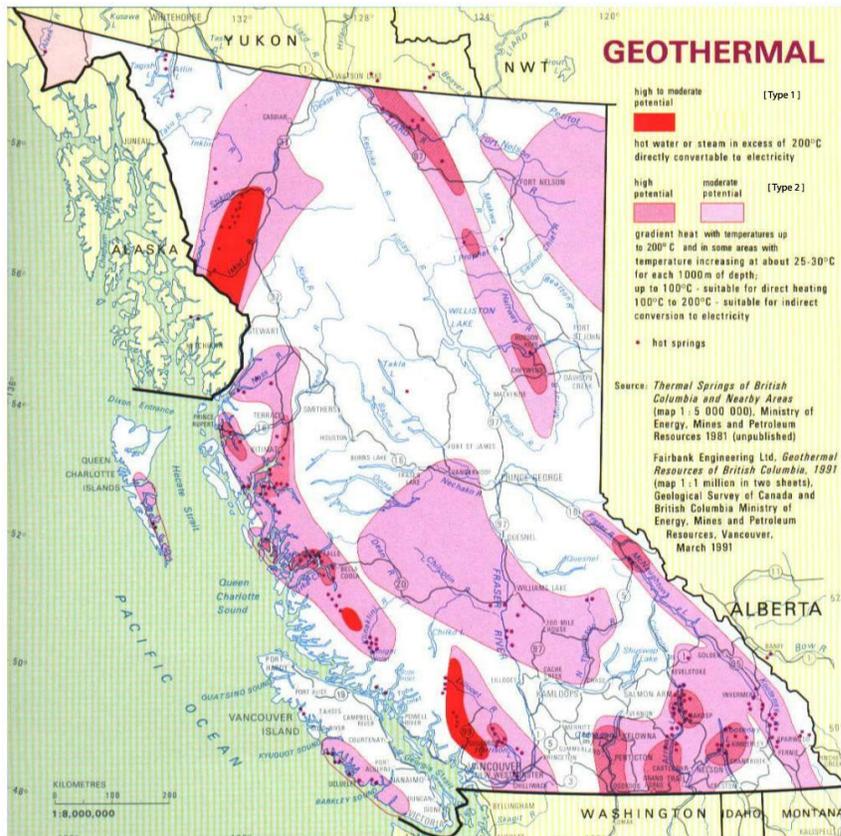
Toronto Geothermal Power Investment Workshop and Networking reception

Toronto, ON, September 14, 2010

Calgary Geothermal Power Investment Workshop and Networking reception, Calgary, Dec 2, 2010

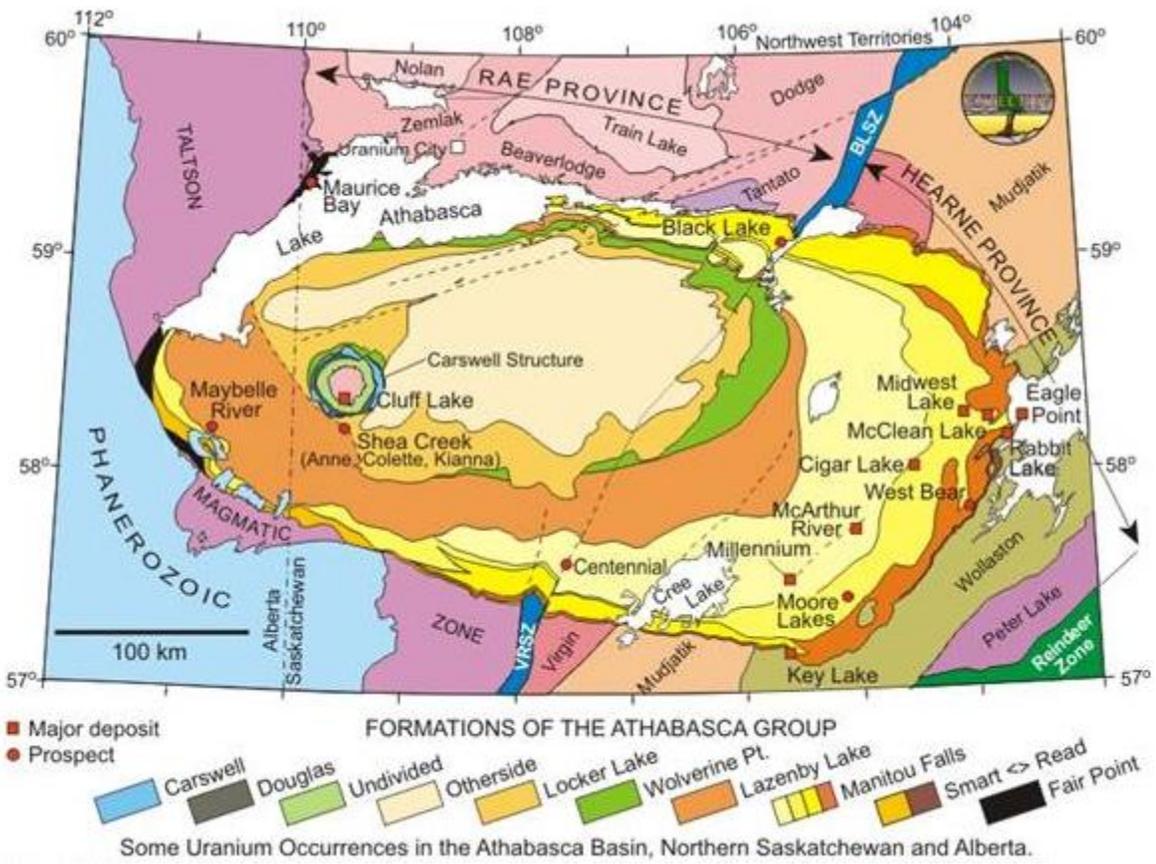
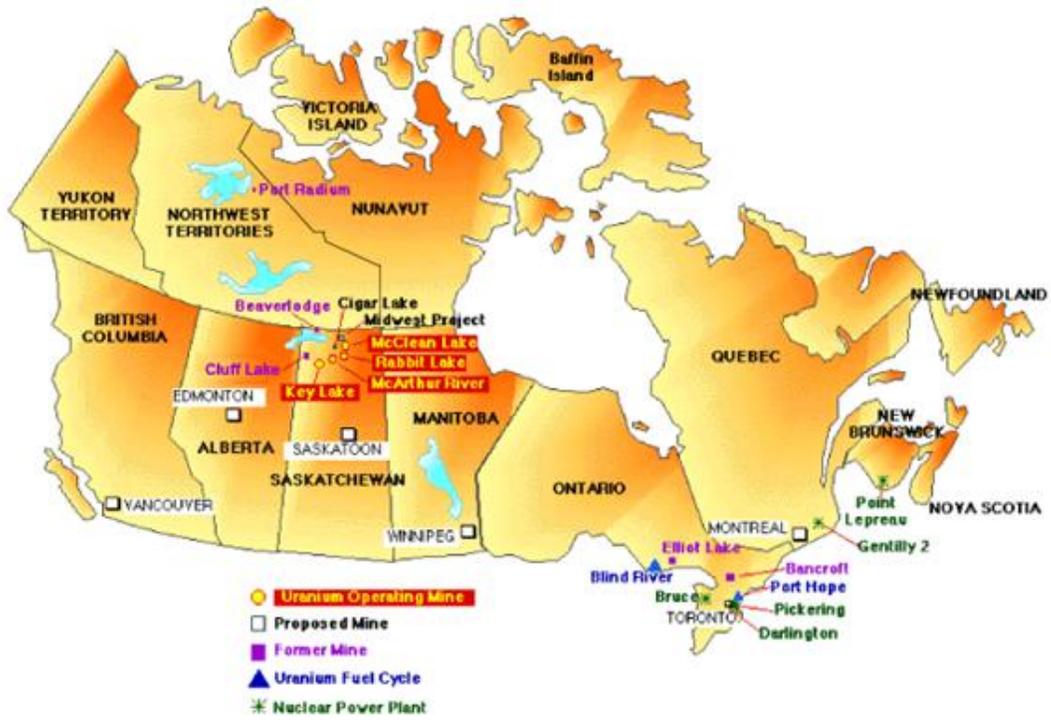
CanGEA 3rd Annual Geothermal Investment Forum and Networking Event, Toronto, Ontario, September 14, 2011

Annual Calgary Geothermal Power Forum and Networking Reception, Calgary, November 9th, 2011



## Nuclear Minerals (Uranium)

Canada has the world's largest reserves of high-grade low-cost uranium, located mostly in northern Saskatchewan. Canada is also the world's largest producer of uranium, with 30% of global production in 2007. In 2008 18 of 22 Candu reactors were in service, generating about 15% of Canada's electricity. Canada has produced electricity from these Candu reactors for 47 years... Its installed capacity in 2008 was 13,379 MW. This nuclear energy is a \$6.6 billion per year industry, providing 21,000 direct jobs and 10,000 indirect jobs, 150 firms being involved and \$1.2 Billion in exports and growing. The total amount of nuclear fuel produced from nuclear power plants in Canada would fill six hockey rinks up to the height of the boards. Ontario, New Brunswick and Quebec are the only provinces that produce electricity from nuclear energy.



## **Uranium/Nuclear Sources of Information**

Canada Nuclear Association <http://www.cna.ca/>

Canadian Nuclear Society - <http://www.cns-snc.ca/home>

## **Biofuels**

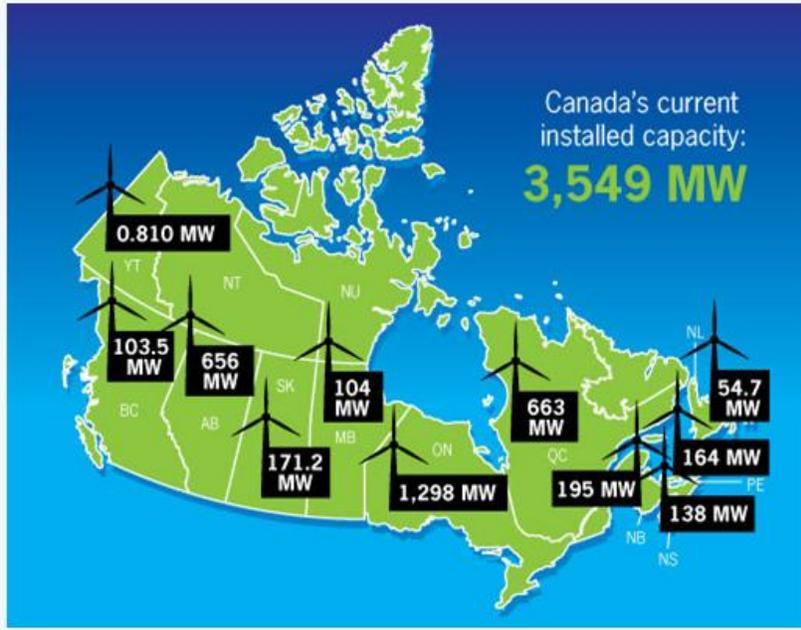
In 2009, Canada had 19 ethanol plants operating or under construction with a total capacity of 1,731 million litres per year. They also had 11 biodiesel plants operating with a capacity of 456 million litres per year. About 6% of Canada's energy needs are met by bioenergy. The most important type of biomass in Canada is industrial wood waste, especially waste from the pulp and paper industry, which is used to produce electricity and steam bioenergy. Biomass, commonly composed of sawmill wood waste, produces more than 600 MW of power in British Columbia, mostly for industrial use at pulp and paper mills on Vancouver Island and the British Columbia coast.

<http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/eng/bioenergy/publications/200846.html>

## **Wind Energy**

Canadian Wind Energy Association CanWea feels that wind energy can supply 20% of Canada's energy requirements by 2025 enough to power 17 million homes. In 2006 wind energy powered 315,000 homes. 950 MW of new wind energy capacity was installed in eight provinces across Canada in 2009 – a record year for this industry. These projects, representing more than \$2 billion in investment, increased Canada's installed wind energy capacity by 40 per cent in one year to reach a new total of 3,549 MW. In 2010, Canada's existing wind farms will produce enough electricity to power one million Canadian homes or about 1% of the energy consumed.

Canada has a total of 92 wind farms. Ontario has the largest installed capacity at 1,298 MW, Quebec is second with an installed capacity of 663 MW and Alberta has the third largest installed capacity of wind generated electricity at 656 MW. In Canada, commercial wind turbines (there are about 1,800 across the country) exist in ten provinces and the Yukon, with plans underway for the development of more turbines across the country.



## Wind Energy Sources of Information

[http://www.canwea.ca/index\\_e.php](http://www.canwea.ca/index_e.php)

[http://www.windatlas.ca/en/EU\\_50m\\_national.pdf](http://www.windatlas.ca/en/EU_50m_national.pdf)

## Wind Energy Meetings

CanWEA Wind Energy Forum, Sheraton Toronto Airport Hotel and Conference Centre  
Toronto, Ontario, April 13-14, 2010

April 2010, CanWEA will be holding its first ever Wind Energy Forum.

CanWEA 2010 26th Annual Conference and Exhibition Palais des congrès de Montréal  
Montreal, Quebec November 1-3, 2010

## Solar Energy

### Solar Thermal

Solar thermal technologies (also known as active solar systems) involve the conversion of solar radiation into heat and include the use of pumps or fans to actively transfer the heat to storage or for distribution directly to its intended use. The key component of any active solar system is the solar collector, which absorbs the sun's radiant energy and transforms it into usable heat.

Seventy percent of the energy used in the residential and commercial/institutional buildings sector is used for heating. Canada also has a very large potential for solar energy use and it has excellent solar resources. Since 2007, there are an estimated 544,000 m<sup>2</sup> of solar collectors operating in Canada. They are primarily unglazed plastic collectors for pool heating (71%) and unglazed perforated solar air collectors for commercial building air heating (26%), delivering about 627,000 GJ of energy and displacing 38,000 tonnes of CO<sub>2</sub> annually.

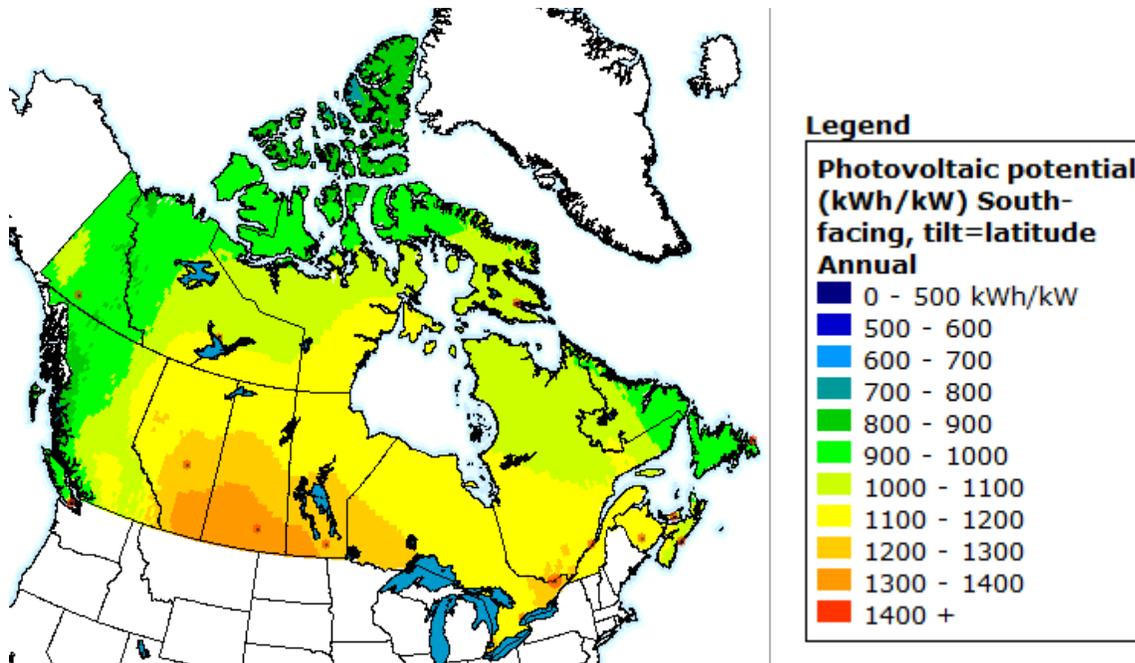
### **Solar Voltaic**

Photovoltaic (PV) technology has become a favoured form of renewable energy technology. In Canada's many remote regions, solar photovoltaic cells are increasingly used as stand-alone units to generate electricity to power homes, cottages, telecommunications equipment, oil and pipeline monitoring stations, and navigational devices

Inuvik, with an average 12.59 daylight hours per day, receives the highest average number of daylight hours in Canada for solar power generation. During the summer, Inuvik receives 24 hours of daylight per day, which compensates for 24 hours of darkness during the winter. However, Calgary is not far behind, at an average 12.26 daylight hours per day, and Toronto receives an average 12.02. Sarnia Photovoltaic Power Plant near Sarnia, Ontario as of September 2010 the world's largest photovoltaic Plant with 80 MW. 20 MW Phase I was completed in December 2009 and 60 MW Phase II in September 2010. Plant consists of over 1,000,000 panels. The project is developed by Enbridge.

Solar Voltaic Maps of Canada are available at

[https://glfc.cfsnet.nfis.org/mapserver/pv/pvmapper.phtml?LAYERS=2700,2701,2057,4240&SETS=1707,1708,1709,1710,1122&ViewRegion=-2508487%2C5404897%2C3080843%2C10464288&title\\_e=PV+potential+and+insolation&title\\_f=Potentiel+photovoltaïque+et+ensoleillement&NEK=e](https://glfc.cfsnet.nfis.org/mapserver/pv/pvmapper.phtml?LAYERS=2700,2701,2057,4240&SETS=1707,1708,1709,1710,1122&ViewRegion=-2508487%2C5404897%2C3080843%2C10464288&title_e=PV+potential+and+insolation&title_f=Potentiel+photovoltaïque+et+ensoleillement&NEK=e)



### **Solar Sources of Information**

Canadian Solar Industries Association <http://www.cansia.ca/>

### **Solar Meetings**

Cansia Western Solar Conference 2010, Calgary, Alberta, 25-26 May, 2010

<http://www.cansia.ca/solar-conference>

Solar Canada 2010 Conference and Exposition, Toronto Dec 6-7 2010,

<http://www.cansia.ca/solar-conference/solar-canada-2010-conference-exposition>

### **Tidal Energy**

Canada is home to one of three tidal power plants in the world and the only one in the Western Hemisphere. Nova Scotia's Annapolis Tidal Generating Station in the Bay of Fundy has an installed capacity of 20 megawatts and annually produces about 50 gigawatt-hours of electricity.

The federal government has just committed to spending \$20-million on tidal energy projects in the Bay of Fundy. This money will be used by the Fundy Ocean Research Centre for Energy, whose partners include utility Nova Scotia Power Inc., Minas Basin Pulp and Power of Hantsport, N.S., and Alstom, a energy and transportation giant based in France. The partners have also signed an \$11-million contract for production and installation of four subsea cables that will connect tidal turbines to the province's electrical grid. Each of these cables will have a capacity to carry up to 16 megawatts of electricity, enough power for more than 20,000 homes.

<http://www.theglobeandmail.com/news/politics/ottawa-to-spend-20-million-on-nova-scotia-tidal-energy-project/article1798501/>

### **Tidal Sources of Information**

<http://www.pembina.org/re/sources/tidal>

### **Selected Sources of Information about Energy in Canada**

<http://www.centreforenergy.com/AboutEnergy/>

#### **Alberta Energy:**

<http://www.energy.gov.ab.ca/>

#### **Canadian Gas Association:**

<http://www.cga.ca/>

#### **Canadian Geothermal Energy Association:**

<http://www.cangea.ca/what-is-geothermal/>

#### **Canadian Geo-Exchange Coalition**

<http://www.geo-exchange.ca/en/>

#### **Canadian Heavy Oil Association:**

<http://www.choa.ab.ca/>

#### **Canadian Nuclear Association:**

<http://www.cna.ca/>

#### **Canadian Society of Unconventional Gas (CSUG)**

<http://www.csug.ca/>

#### **Canadian Solar Industries Association (CSIA)**

<http://www.cansia.ca/>

#### **Canadian Wind Energy Association (CWEA):**

[http://www.canwea.ca/index\\_e.php](http://www.canwea.ca/index_e.php)

**Natural Resources Canada – Energy Sector**

<http://nrcan.gc.ca/eneene/index-eng.php>

<http://nrcan.gc.ca/eneene/infocenvede-eng.php>

**Renewables etc**

<http://nrcan.gc.ca/eneene/renren/index-eng.php>

**Ocean Renewable Energy Group**

<http://www.oreg.ca/>

**Oil Sands Developers Group (OSDG)**

<http://www.oilsandsdevelopers.ca/>

**Oil Sands Discovery Centre**

<http://www.oilsandsdiscovery.com/>

**The Coal Association of Canada**

<http://www.coal.ca/content/>

**Canadian Society of Petroleum Geologists (CSPG)**

<http://www.cspg.org/>

**Geological Association of Canada**

<http://www.gac.ca/index.php>

**Canadian Society of Exploration Geophysicists (CSEG)**

<http://www.cseg.ca/>

**National Energy board of Canada**

<http://www.neb-one.gc.ca/clf-nsi/rcmmn/hm-eng.html>

**Canadian Energy Research Institute**

<http://www.ceri.ca/>

## **Provincial Government Geological Surveys and Regulatory Agencies Etc:**

### **ALBERTA**

**Alberta Geological Survey**

<http://www.ags.gov.ab.ca/>

**Energy Resources Conservation Board**

<http://www.ercb.ca/portal/server.pt>

**Alberta Energy**

<http://www.energy.gov.ab.ca/>

**Alberta Innovates**

<http://www.albertainnovates.ca/energy/introduction/>

### **BRITISH COLUMBIA**

**B.C. Oil and Gas Commission**

<http://www.ogc.gov.bc.ca/>

**B.C. Ministry of Energy**

<http://www.gov.bc.ca/empr/>

**B.C. Ministry of Energy – Division of Oil and Gas**

<http://www.empr.gov.bc.ca/OG/oilandgas/Pages/default.aspx>

**B.C. Ministry of Energy Mines and Petroleum Resources - Geothermal**

<http://www.em.gov.bc.ca/Geothermal/GeothermalResources.htm>

**Geoscience BC**

<http://www.geosciencebc.com/s/AboutUs.asp>

## **MANITOBA**

### **Manitoba – Energy and Mines - Petroleum**

<http://www.gov.mb.ca/stem/petroleum/index.html>

### **Manitoba – Energy – Renewables**

<http://www.gov.mb.ca/stem/energy/wind/>

### **Manitoba Geological Survey**

<http://www.gov.mb.ca/stem/mrd/geo/>

## **NEWFOUNDLAND AND LABRADOR**

### **Newfoundland and Labrador Natural Resources – Oil and Gas**

<http://www.nr.gov.nl.ca/mines&en/oil/>

## **NEW BRUNSWICK**

### **New Brunswick Department of Energy**

<http://www.gnb.ca/0085/index-e.asp>

### **New Brunswick Department of Energy - Renewable**

<http://www.gnb.ca/0085/Renewable-e.asp>

### **New Brunswick Natural Resources**

<http://www.gnb.ca/0078/minerals/index-e.aspx>

## **NOVA SCOTIA**

### **Nova Scotia Department of Energy – including Oil and Gas and Renewables**

<http://www.gov.ns.ca/energy/>

### **Nova Scotia Department of Natural Resources – Minerals**

<http://www.gov.ns.ca/natr/meb/>

## **ONTARIO**

### **Association of Power Producers of Ontario**

<http://www.appro.org/>

### **Ontario Petroleum Institute**

<http://www.ontpet.com/>

### **Ontario Energy Association (OEA)**

<http://www.energyontario.ca/>

## **PRINCE EDWARD ISLAND**

<http://www.gov.pe.ca/eef/index.php3?number=77985&lang=E>

## **QUÉBEC**

### **Ministère des Ressources naturelles et de la Faune - Québec**

<http://www.mrnf.gouv.qc.ca/english/energy/>

## **SASKATCHEWAN**

### **Saskatchewan Energy – Oil and Gas**

<http://www.er.gov.sk.ca/oilgas>

### **Saskatchewan Minerals – Uranium**

<http://www.er.gov.sk.ca/Uranium-Facts>

### **Saskatchewan Uranium Forum – Nov 29 to Dec 1, 2010**

[http://er.gov.sk.ca/adx/asp/adxGetMedia.aspx?DocID=10803,3632,3538,3385,5460,2936,Documents&MediaID=29223&Filename=Uranium\\_Forum.pdf](http://er.gov.sk.ca/adx/asp/adxGetMedia.aspx?DocID=10803,3632,3538,3385,5460,2936,Documents&MediaID=29223&Filename=Uranium_Forum.pdf)

### **Saskatchewan Geological Services**

<http://www.er.gov.sk.ca/Default.aspx?DN=93ef01b2-1853-4dbc-8e5d-19240a6c3082>

## **NUNAVUT**

**Division of Minerals and Petroleum Resources**

<http://www.lookupnunavut.ca/oil.html>

## **NORTHWEST TERRITORY**

**Government of the Northwest Territories – Minerals, Oil & Gas**

<http://www.iti.gov.nt.ca/mineralsoilgas/index.shtml>

## **YUKON**

**Energy, Mines and Resources – Oil and Gas**

<http://www.emr.gov.yk.ca/oilandgas/>

**General Publications of Interest:**

<http://www.aapg.org/explorer/2010/08aug/canadian0810.cfm>