

2010

OIL & GAS SECURITY

Emergency Response of IEA Countries

CANADA

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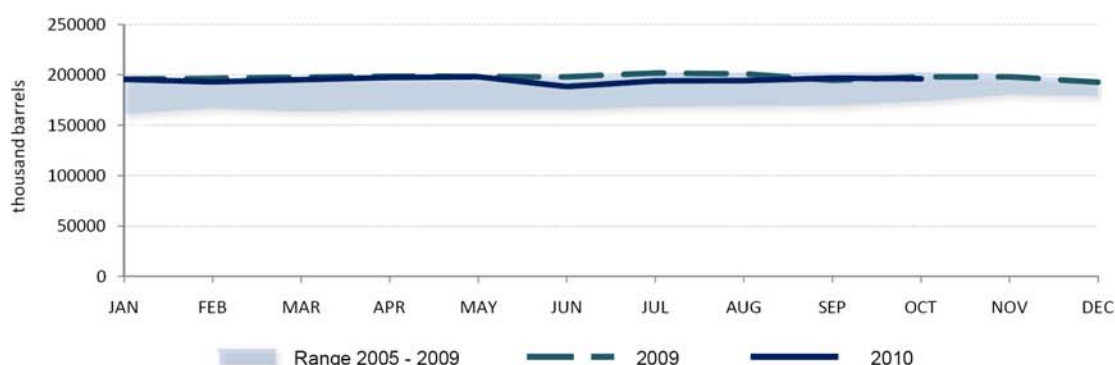
International
Energy Agency

Canada

Key Oil Data

	1985	1990	1995	2000	2005	2007	2008	2009
Production (kb/d)	1 809.0	1 964.7	2 398.8	2 722.6	3 052.2	3 322.5	3 250.7	3 216.9
Demand (kb/d)	1 525.9	1 737.5	1 817.2	2 034.9	2 341.2	2 307.4	2 241.9	2 150.6
<i>Motor gasoline</i>	562.7	583.1	602.1	656.8	701.5	724.8	715.5	726.0
<i>Gas/diesel oil</i>	399.9	409.1	432.7	499.9	542.8	565.7	562.1	511.1
<i>Residual fuel oil</i>	116.9	174.7	114.5	131.8	196.5	121.9	106.6	93.7
<i>Others</i>	446.4	570.6	667.9	746.4	900.4	894.9	857.7	819.8
Net imports (kb/d)	- 283.1	- 227.2	- 581.6	- 687.7	- 711.0	- 1 015.1	- 1 008.8	- 1 066.3
Import dependency	-	-	-	-	-	-	-	-
Refining capacity (kb/d)	1 869	1 852	1 908	1 912	2 017	2 041	1 969	2 029
Oil in TPES	35.5%	36.7%	33.0%	34.2%	35.5%	36.1%	35.8%	34.9%

End-Month Total Oil Stock Levels¹ - Five Year Range



Key Natural Gas Data

	1985	1990	1995	2000	2005	2007	2008	2009 *
Production (mcm/y)	86 123	109 071	159 205	181 673	187 341	183 803	174 580	161 289
Demand (mcm/y)	61 311	67 319	81 427	91 537	92 035	99 388	95 054	94 602
<i>Transformation</i>	1 475	3 013	7 031	10 790	11 246	13 295	12 027	-
<i>Industry</i>	23 346	24 920	27 462	28 660	26 933	31 614	29 004	-
<i>Residential</i>	13 330	13 987	16 566	16 974	16 884	17 806	17 983	-
<i>Others</i>	23 160	25 399	30 368	35 113	36 972	36 673	36 040	-
Net imports (mcm/y)	- 24 812	- 41 752	- 77 778	- 90 136	- 95 306	- 84 415	- 79 526	- 66 687
Import dependency	-	-	-	-	-	-	-	-
Natural Gas in TPES	25.4%	26.2%	28.7%	29.2%	29.4%	29.3%	28.6%	30.7%

* based on monthly data submissions to the IEA.

1 -Primary oil stocks on national territory; these exclude utility stocks and including pipeline and entrepot stocks where known.

2 -Stocks held on national territory, as reported to the IEA in monthly data submissions.

OVERVIEW

Canada is a significant net oil exporter and is the only IEA member country with growing indigenous oil production. Since 1999, production has consistently been rising, as new oil sands and offshore production have more than replaced declining production from ageing fields. Total Canadian oil resources are estimated at over 173 billion barrels, making Canada the world's second largest resource-holder after Saudi Arabia; some 95% of this oil is located in the Alberta oil sands. This places Canada in a unique position as an IEA member country. Any analysis of Canada's emergency preparedness should not overlook both the role of the country as a stable and growing supplier of oil, and the contribution that it makes to the collective security of all IEA member countries.

At the same time, Canada is not immune to the risks of a supply disruption. Despite increases in nearby off-shore production, refiners in the country's eastern provinces rely on imported crude oil, just as many refiners in other IEA countries do, and certain central provinces have experienced oil product disruptions, due to their relative geographic isolation from alternative sources of supply. Moreover, with an extensive system of pipelines moving large volumes of oil from the west towards domestic and US markets across the continent, a significant disruption to any of these pipelines could pose a serious challenge to emergency response.

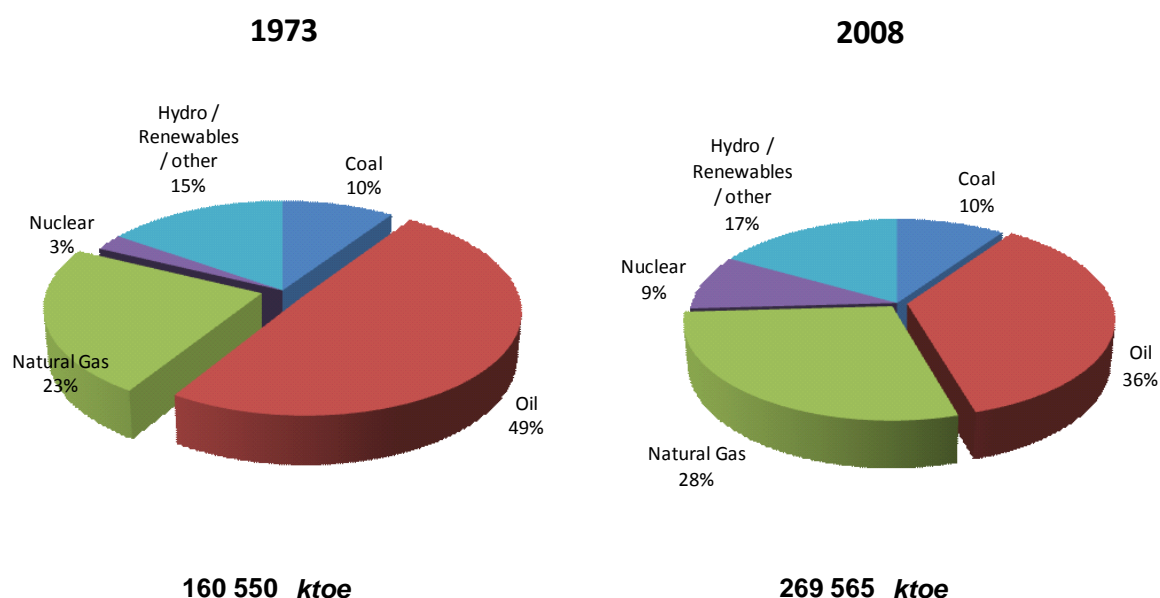
In the case of an IEA collective action under the ICRP, Canada would resort primarily to demand restraint, since, as a net exporter, Canada is not obliged to hold oil emergency stocks. Surge production would also be considered as an ad hoc measure. However, the constitutional division of power between the federal and provincial governments in Canada means that the executive powers to impose emergency measures under the ICRP typically reside with the Canadian Provinces. Only in the case of a declared national emergency does the federal government have clear executive powers to implement emergency measures.

The natural gas market in Canada and North America as a whole is resource-rich, efficient, vast, competitive and diversified, and the structure of the natural gas market provides a high degree of energy security for this fuel. Domestic production in Canada greatly exceeds domestic demand, with the majority of excess production exported to markets in the United States.

1. Energy Outlook

Canada is a net oil exporting country and is the only IEA member country with growing indigenous oil production. Energy consumption in Canada is driven by sustained economic and population growth, and by the fact that Canada remains an energy-intensive economy as a primary producer and exporter of vast quantities of primary and secondary energy. Canada is among the world's largest energy producers and exporters.

Total Primary Energy Supply

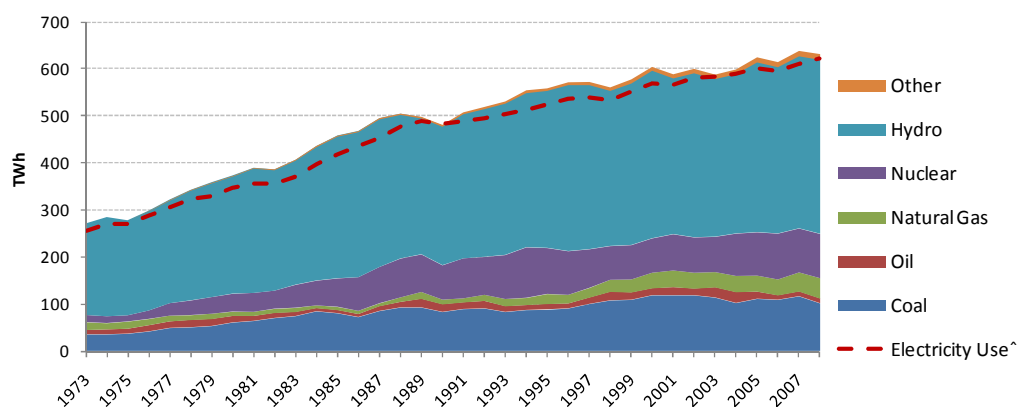


*Data excludes electricity trade.

Source: Energy Balances of OECD Countries, IEA

Oil and gas dominate Canada's total primary energy supply (TPES) mix, accounting for almost two-thirds of the total. Given Canada's vast hydrocarbon resources, oil and gas are likely to continue to account for the bulk of the country's TPES. The incremental but constant increase in oil usage is primarily due to growth in demand in the transport sector, while the growth in gas demand has been driven by the use of gas for power generation and for oil extraction, notably in the Canadian Oil Sands.

Electricity Generation by Fuel



Source: Energy Balances of OECD Countries, IEA

Canada's electricity generation continues to be dominated by hydroelectric power, which accounted for over 372 Twh in 2008, or some 59% of total generation. The other electricity sources include coal (16%) and nuclear (15%).

2. Oil

2.1 Market Features and Key Issues

Canada is a growing net oil exporter, yet it remains a dual oil market, in that crude oil is exported from the west and the Atlantic offshore, but imported in the eastern and central regions.

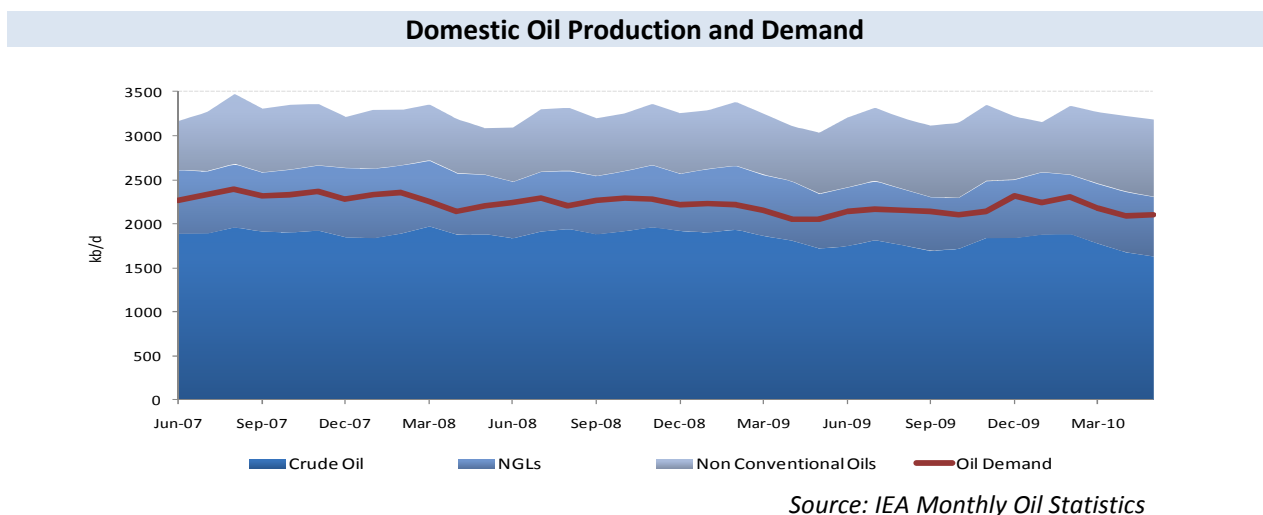
Domestic oil production

Conventional oil reserves in Canada are estimated at some 5.4 billion barrels and the proven recoverable unconventional oil reserves from the oil sands are estimated at 170.4 billion barrels. If considered together, Canadian reserves displace Iran as the world's second largest oil-resource holder, behind Saudi Arabia's 267 billion barrels. The oil sands in-place bitumen resources are vast and are estimated at 1.7 to 2.5 trillion barrels, which is considerably larger than total world oil production to date. According to Alberta's Energy Resources Conservation Board, the ultimate potential (recoverable) reserves of the Canadian oil sands are estimated at 315 billion barrels.

In 2009, conventional light, medium, heavy and offshore oil accounted for about 1.8 million barrels per day (mb/d) of production. Natural Gas Liquids accounted for a further 0.7 mb/d, and unconventional oil sands crudes (bitumen blend, synthetic bitumen blend and upgraded oil sands light) accounted for the remaining 0.8 mb/d.

Total production thus stood at some 3.2 mb/d in 2009, on par with 2008. Since 1999, production has persistently been rising, as new oil sands and offshore production have more than replaced declining production from ageing fields. The IEA's December 2009 update of the *Medium-Term Oil Market Report* estimates that Canadian oil production will reach 4 mb/d in 2015. Projects with the highest marginal costs, such as Canada's oil sands, were the most affected by the global economic recession of 2008-2009. Delays and cancellations of oil sands upgrader projects have reduced the projections of upgraded bitumen and increased the forecasts of non-upgraded bitumen.

Canadian bitumen and synthetic crude oil are used domestically and are exported to the United States. The current production trend is expected to move towards in-situ operations (instead of bitumen mining projects), which account for about 80% of the oil sands established reserves.



Oil demand

Total oil demand in Canada averaged 2.15 mb/d in 2009. The transport sector accounted for some 55% of this demand, while 23% was attributed to industrial use.

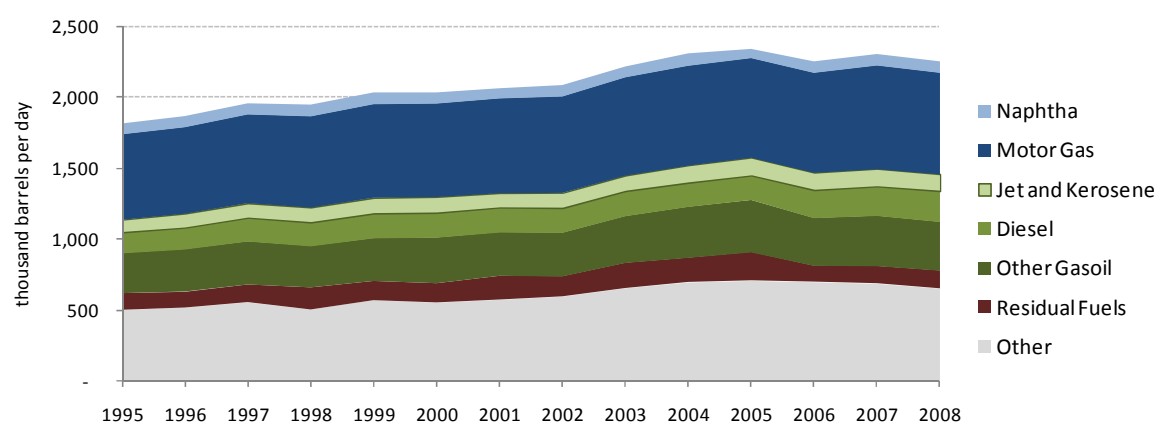
Both the IEA and the Canadian Administration do not forecast a notable increase in demand from 2010-2014. The IEA's *Medium-Term Oil Market Report* forecasts demand ebbing off marginally to 2014, dropping to 2.29 mb/d.

Oil Demand in 2009 (kb/d)

LPG and Ethane	343
Naphtha	52
Gasoline	726
Kerosene	122
Diesel	230
Heating/other Gasoil	281
Residual Fuels	94
Other Products	303
Total Products	2,151

Source: IEA Monthly Oil Statistics

Oil Consumption by Product



Source: Monthly Oil Statistics, IEA

Taxes and maximum price mechanism

Since 1991, a Federal Goods and Services Tax (GST) is levied on all petroleum products. Initially established at 7%, it was reduced to 6% in 2006 and to 5% in 2008. There are also excise taxes, which vary from product to product. Provinces also apply provincial sales and consumption taxes, which vary from province to province.

After a brief period of regulation (from the 1970s to the early 1980s), the Canadian Federal Government is now committed to a market-based approach to determine prices for crude oil and fuels such as gasoline. With the exception of a national emergency, the Federal Government of Canada has no jurisdiction over the direct regulation of retail fuel price; that authority rests with the provinces. Some provinces choose not to exercise their regulatory authority, relying instead on market forces. Others, including Prince Edward Island, Newfoundland and Labrador, Nova Scotia, New Brunswick and Quebec, regulate retail prices to some extent.

Imports/exports and import dependency

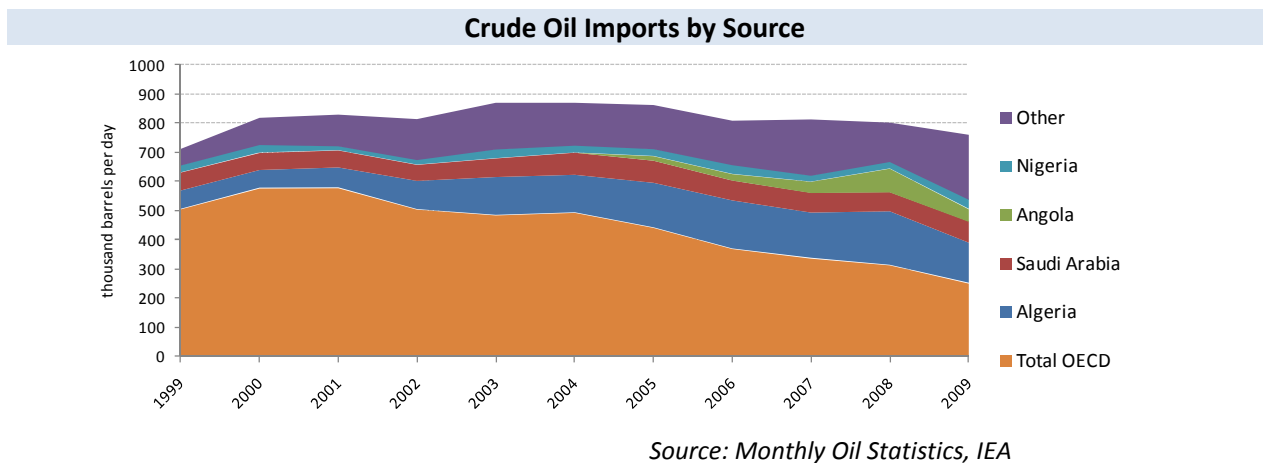
Canada is a large and growing net exporter of crude oil, and is likely to remain so for the foreseeable future. Around two-thirds of all Canadian indigenous crude, products and NGL production is exported, equivalent to over 2 mb/d in 2007 and 2008. These exports are destined almost entirely to the United

States. This made Canada the largest crude oil exporter to the United States, accounting for around 20% of total US crude imports.

However, the country has a dual oil market, with crude oil exported from the west and Atlantic offshore and crude oil imported in the eastern and central regions. Eastern Canada is dependent on foreign crude oil for a good portion of its refinery production. Due to logistics and transportation costs, the Canadian refiners located mainly in Quebec and the Atlantic Provinces import roughly half of their crude runs from overseas.

That being said, Eastern Canada's level of dependence is falling as Canada's East Coast production increases. Furthermore, the region actually exports significant volumes of refined petroleum products to the United States.

Some 799 kb/d of oil was imported into eastern Canada in 2009, down from 851 kb/d in 2007 and 834 kb/d in 2008. The main sources of imports to Canada in 2009 are outlined in the chart below, in thousands of barrels per day.



Oil Company Operations

In August 2009, Suncor and Petro-Canada merged to form the largest integrated energy company in Canada and the fifth largest in North America based on market share. The company is fully privatised as the Federal Government's last remaining stake was sold in 2005. Many major international oil companies have Canadian affiliates, such as Chevron Canada Resources, Imperial Oil Ltd. (Exxon), Shell Canada Ltd., BP Canada Energy Company, ExxonMobil Canada Ltd., and ConocoPhillips Canada Ltd.

2.2 Oil Supply Infrastructure

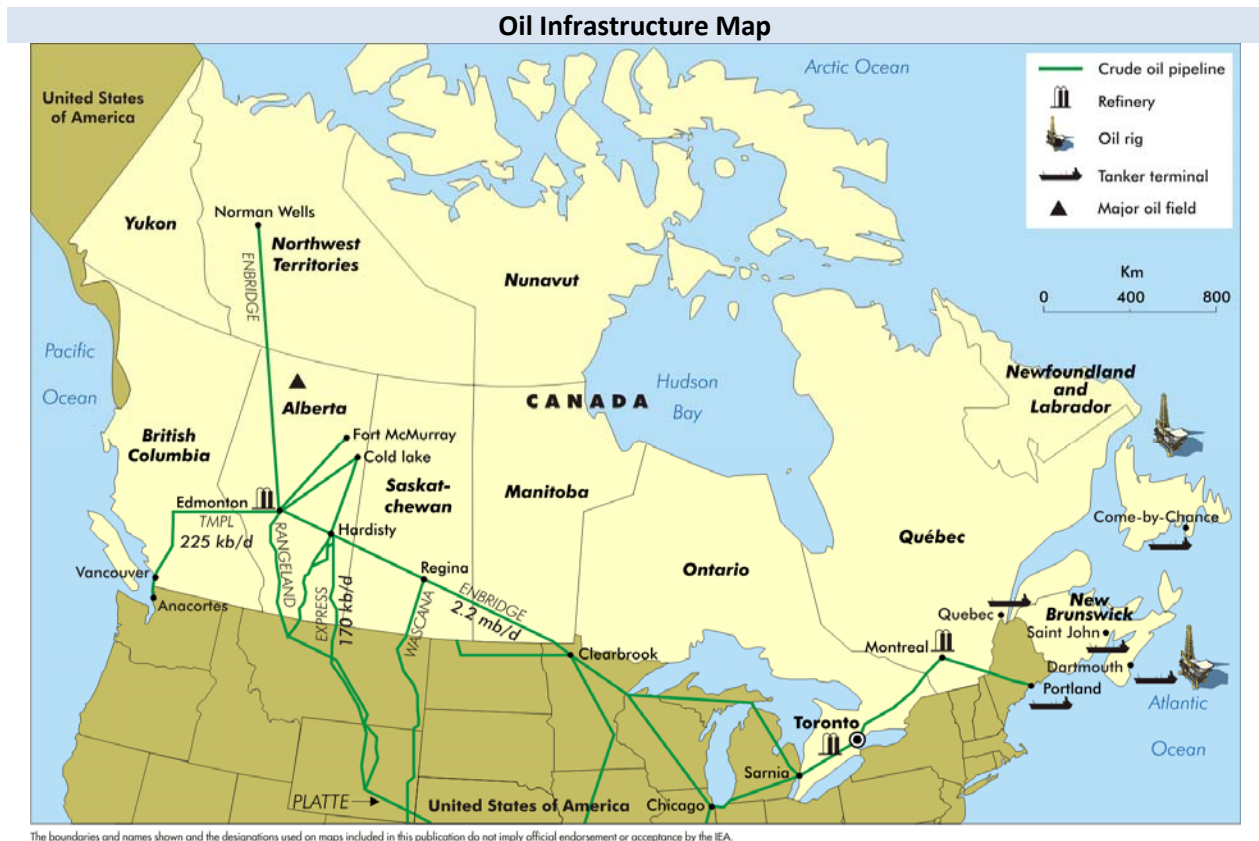
Refining

Total crude oil refining capacity stands at close to 2 mb/d. Canadian refineries have undergone significant rationalisation over the past three decades, so that the number of refineries has dropped from a high of 40 in the 1970's to the 18 operating in 2010. Since the early 1990s, refining capacity has been more stable and utilisation rates have been above 90% nationally for most of the last decade. An utilisation rate of 95% is considered optimum, as it allows for normal maintenance and seasonal turnarounds. There are three main refining centres: Edmonton (Alberta), Sarnia (Ontario), and Montreal (Québec); Manitoba, Prince Edward Island and the Territories have no refineries.

With bitumen production projected to increase and light crude oil production in decline, there is likely to be a continuing trend of refinery conversion projects in Canada. However, some planned new capacity additions have fallen off the planning horizon due to the financial downturn, shrinking margins as a result of the falling crude price, and capital availability. Regulatory and economic uncertainty will continue to play into investment decisions for the refining sector in Canada.

Ports and Pipelines

As of early 2010, Canada has about 220 000 km of oil pipelines, of which 70 000 km are regulated oil pipelines.¹



The Canadian oil produced in western Canada is shipped to domestic and US markets through three main pipeline systems:

- Enbridge Pipeline, which accounts for the bulk of Canadian exports, delivers 2.2 mb/d of oil from Edmonton into Ontario and the US Great Lakes region.
- Express Pipeline delivers crude from Alberta into Wyoming (170 kb/d) and onward into Illinois (120 kb/d) via its Platte Pipeline connection.
- Trans Mountain Pipe Line (TMPL), which can transport both crude and products (225 kb/d), delivers oil mainly from Alberta west to Vancouver and the Puget Sound region of the United States.

Canada's oil pipeline capacity will need to be expanded to match increased output forecast from the oil sands. While various pipeline expansion projects have already been completed (for example, Enbridge's Spearhead reversal, which opens the markets in the Midwest and the Gulf of Mexico to Canadian oil sands derived crude oil, and Terasen's expansion of its Express Pipeline system), there are a number of

¹ Pipelines are only regulated by the National Energy Board (NEB) if they cross provincial or international borders.

pipeline companies proposing new infrastructure in Canada. The Northern Gateway Project or Gateway is a proposal by Enbridge Inc. to construct an import/export marine terminal near Kitimat, British Columbia on the West Coast, with a 30-inch crude oil export pipeline and a 20-inch condensate import pipeline running 1 175 km between the terminal and Edmonton, Alberta, primarily to serve export routes to the Asian markets. Enbridge's Southern Lights Project is designed to bridge the gap between the available supply of diluents from US refineries and supply centres and increased demand for diluents by petroleum producers in the oil sands and heavy crude oil production regions in Western Canada. Enbridge's Alberta Clipper is a 1 000-mile (1 607-km) crude oil pipeline providing service between Alberta and Wisconsin. Designed to resolve expected capacity constraints, it is expected to be in service by mid-2010. The expansion of export capacity will benefit all Canadian crude oil producers through stronger netbacks associated with adequate export capacity and market diversification.

While a major net exporter of oil, due to logistics and transportation costs, Canada imports almost 50% of the crude oil run at domestic refineries. The imported crude is processed in the refineries of the country's Eastern Provinces, notably close to the key demand centres of Ontario and Quebec.

Imports flow by tanker into Newfoundland, Nova Scotia, New Brunswick and part of Quebec and by the Portland pipeline to Montreal and Ontario.

Major oil offloading ports exist in the following cities:

- Quebec, Quebec
- Saint John, New Brunswick
- Dartmouth, Nova Scotia
- Come-by-Chance, Newfoundland and Labrador

Storage capacity

As Canada does not have publicly-held stocks and does not require industry to provide this information, storage capacity information is not available.

2.3 Decision-making Structure for Oil Emergencies

Canada's energy policy derives, in part, from the constitutional division of power between the Federal and Provincial/Territorial governments, which gives both levels of government a major role in energy policy. The Provinces own all natural resources within their geographic boundaries and are responsible for the conservation, development and management of those resources. The Federal Government is responsible for matters relating to inter-Provincial and international trade, programmes and policies in the national interest (including national economic development and energy security), and resource management on Federal lands. Of note, the Federal Government retains control over the resources in the three northern Territories, as well as Canada's offshore production. However, because most of Canada's hydrocarbon production and demand occurs within the Provinces, the Federal Government's formulation of energy policies is closely tied to those of the Provinces.

In the event of disruptions to energy supply, Canada's Provinces and Territories have authority to implement demand restraint measures. Under certain circumstances (e.g. after declaring a national emergency – a global oil supply reduction of 7% or more), a provision exists for the Federal Government to take measures to reallocate energy supplies within Canada under the authority of the *Energy Supplies Emergency Act*, which empowers the Energy Supplies Allocation Board (ESAB). The *Emergencies Act* is another legislation that provides for special and temporary measures to ensure safety and security

when a national emergency is declared. The Federal Government, through the ESAB, can order requisitions of energy supplies or their disposal; however, this kind of process is time-consuming.

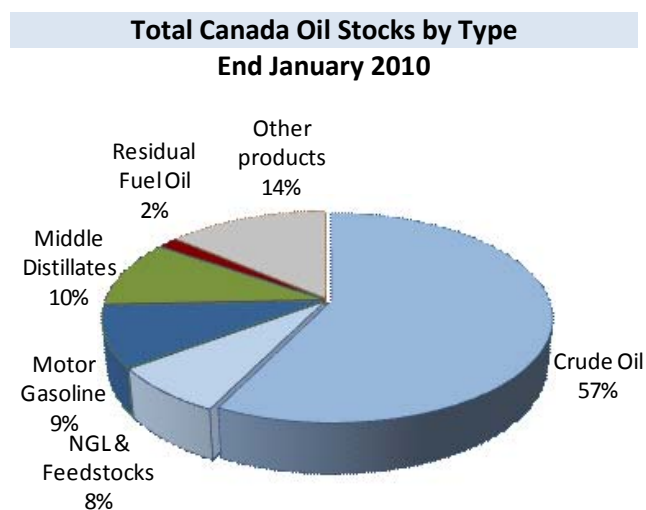
In non-emergency times, the Oil Sands and Energy Security Division of Natural Resources Canada serves as the NESO staff. In an emergency situation, when enabling legislation is activated, there is a much larger emergency organisation that could be mobilised under the ESAB. This group comprises a Chairman and five members. The Chairman is appointed by the Governor in Council and reports to the Minister of Natural Resources Canada. The Board is supported by the Oil Sands and Energy Security Division of Natural Resources Canada and includes personnel from oil companies (in the form of the Petroleum Industry Advisory Committee), transportation organisations, other Federal Government departments and the Provinces (in the Provincial Advisory Committee). The use of the Federal Government's emergency powers requires Provincial consultation before taking emergency action to address some form of market failure.

2.4 Stocks

Stockholding Structure

As a net exporter, Canada does not have an IEA emergency reserve commitment. Of note, Canada does not hold any bilateral stocks for other IEA Member countries.

All stocks held in Canada are commercially- or military-owned (although military stocks are not counted in IEA methodology). As oil companies are not required to hold emergency stocks in normal times, they maintain stocks for operational and logistical purposes only.



Source: Monthly Oil Statistics, IEA

However, in a declared national emergency, the Emergency Supplies Allocation Board (ESAB) would have the authority to regulate company stocks and to penalise companies for violation of its orders under Section 41 of the Energy Supplies Emergency Act. Under the ESE Act, Sec. 25 (d), the ESAB has the authority to regulate building, storage and disposal of stocks, including industry stocks, during a declared national emergency. The threshold level would be decided by the government in consultation with the oil industry at the time of an emergency. The mechanism requires monthly reports to the ESAB by each company on its stock situation. As the Administration's emergency policy emphasises market mechanisms and would only use heavy allocation actions as measures of last resort, it is unlikely commercial stocks would be directed in such a manner.

Crude or Products

As of early 2010, total stocks held by industry were made up of 65% crude, NGL and feedstocks, and 35% finished products.

Location and Availability

Industry holds storage facilities along the supply chain for normal operations. Industry stock levels are relatively stable in terms of demand coverage. On average, product inventories provide about 20 to 30 days of forward demand, and crude oil inventories have been in the range of 70 to 100 days.

Monitoring and Non-compliance

In normal times, oil companies are not required to hold emergency stocks. However, in an emergency, the ESAB would have the authority to regulate company stocks and to penalise companies for violation of its orders under Section 41 of the *Energy Supplies Emergency Act*. Monitoring mechanisms include the submission of data from industry, as well as the possibility of audit.

Stock Drawdown and Timeframe

In the event of a declared national emergency, the drawdown of commercial stocks could be carried out by oil companies under the mandatory allocation program. Initial data submissions would be received by the NESO, and after consultation with industry via the Administration's existing Advisory Committee, a decision would be taken (including an agreement upon the level of stockdraw required and confirmation of the timing) and a stock drawdown would be initiated. Stocks would be released into the market by companies meeting their crude oil entitlement and the product entitlements of their customers. The Board has the power to establish parameters for prices, as well as set prices, if necessary, at the time of emergency. This sequence of events would require about two to three weeks. The Administration indicated that the procedure has been tested on several occasions on paper, but never in a physical test.

Canada's emergency policy emphasises functioning market mechanisms and would avoid, as much as possible, heavy allocation actions. Thus, it is unlikely that commercial stocks would be directed in such a manner.

Financing and Fees

There are no stockholding obligations on the oil industry in Canada; all oil stocks are held by market operators for normal commercial purposes. Oil companies recoup the costs of stockholding through their normal operations and consumer pricing.

3. Other Measures

3.1 Demand Restraint

In the absence of the Administration declaring a national emergency, activities related to demand restraint come under Provincial jurisdictions. A Federal-Provincial coordinating committee would pool the knowledge and information related to demand restraint measures among the Federal and Provincial representatives. It is important to note that without the implementation of the IEP (which would only occur with a global oil supply reduction of 7% or more) a federal state of emergency could not be declared and the Federal Government would not have legal authorities in place to enforce demand restraint measures. All actions would be determined by each province with the full cooperation of the industry. At the federal level, activities would include media campaigns to encourage voluntary consumption reductions and the prevention of hoarding.

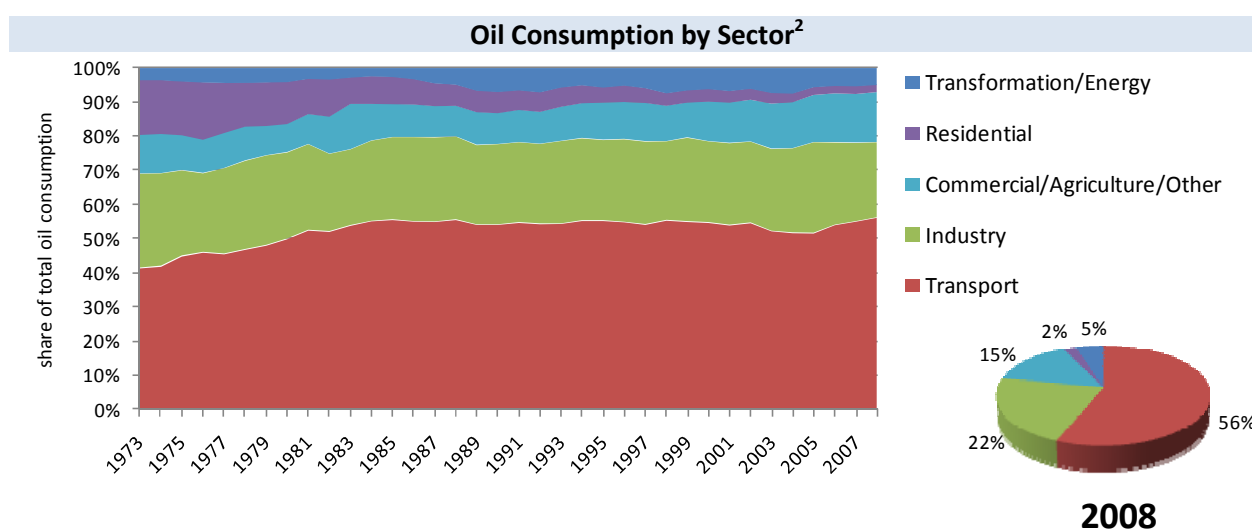
The specific procedures for demand restraint are described in the Energy Supplies Emergency Act. Additionally, the Emergencies Act, established in 1988, provides a more flexible approach to how demand restraint is achieved, allowing the Governor-in-Council the “requisition, use or disposal” of energy commodities. In the cases of either of these legal instruments, an energy-related national emergency would first need to be declared by the Governor-in-Council.

Theoretically, in a declared emergency under the auspices of the IEP, demand could be restrained by Federal mandate through implementation of the crude oil and products allocation program. Further demand restraint measures would be implemented by the provinces and territories to complement actions imposed by the federal government.

During a disruption of oil supply, and under a declared national emergency, the ESAB would activate allocation plans to ensure that crude oil and products are distributed fairly and equitably to all citizens.

- The *Crude Oil Allocation Program* apportions available crude oil from offshore and domestic sources to refineries throughout Canada, and can be used to free up crude for export, in the case of a supply obligation in the IEP’s emergency sharing system.
- The *Petroleum Products Allocation Program* controls the volume of products that refiners and other major suppliers may sell to wholesale customers. Demand restraint in petroleum products could be achieved through the issue of allocation factors which are designed to limit current sales at the wholesale level in each of three priority categories of historical sales, and the effects would be felt immediately. Progress would be monitored on a monthly basis. The three priorities of use are: (a) health, welfare and security of Canadians (e.g. hospital services, fire and police protection, national defence or public transit); (b) economic stability (e.g. most industrial and commercial activities, including public utilities, postal services, taxis and road maintenance); and (c) discretionary activities related to the maintenance of the standard of living (e.g. supplies of gasoline at the service stations and of fuels for heating commercial buildings). It would take up to 60 days after the declaration of an emergency to fully implement the mandatory products allocation and issue product entitlements.
- Rationing of gasoline and diesel fuel through coupons can be implemented as a last resort.

The decision process for activating the programme is described in the Energy Supplies Emergency Act and would involve recommendations from the Board to the Governor in Council (the Cabinet of the Federal Government).



Source: Oil Information, IEA

² Total Consumption (including refinery consumption), does not include international marine bunkers.

3.2 Fuel Switching

There are no fuel switching policies in place in Canada.

The conclusion of a study conducted in 1990-91 on heavy fuel oil switching capacity was that less than 1% of total product demand could potentially be switched to non-oil based alternatives. On a sectoral basis, off-oil switching capability was concentrated in the pulp and paper, smelting and refining industries. Since the publication of this report, there has been little or no increase in fuel switching capability in Canada.

3.3 Surge Oil Production

Surge production capacity in Canada is relatively limited, as producers generally maximise production. Moreover, surge production can only be achieved over a short period of time, as there is risk of damaging wells and reservoirs, particularly if it is maintained for more than a few weeks or months.

Furthermore, the federal government has little control over surge production because most oil resources are under Provincial jurisdictions. Best production practices – and notably the gas-to-oil ratios – would have to be relaxed, and approval from producing provincial governments would be required. Surplus capacity would also be needed on the pipeline system to transport the increased production. Moreover, whilst provincial regulatory agencies (such as the Alberta Energy and Utilities Board) could relax best production practices, they could not force oil companies to actually increase production. Approval would have to be obtained from the provincial governments of the producing provinces.

Under extreme emergencies, the Federal Emergencies Act gives authority for oil production control to the Federal Government. It is estimated that this intervention process would take a minimum of two weeks.

4. Natural Gas

4.1 Market Features and Key Issues

Gas production and reserves

Canada is the world's third largest producer of natural gas, with domestic production standing at 175 bcm (6.2 tcf) in 2008. Domestic production in Canada greatly exceeds domestic demand, with the majority of excess production exported to markets in the United States. The Western Canada Sedimentary Basin (WCSB) accounts for 98% of domestic production. Alberta accounted for 80% of WCSB production, and British Columbia and Saskatchewan 16% and 4%, respectively. The remaining 2% of domestic production is produced in Atlantic Canada, the majority from offshore.

Future supply sources in Canada include unconventional natural gas, such as shale gas in northeast British Columbia, and coal bed methane (CBM) in Alberta. The Canadian Administration's consensus forecast has unconventional production growing at an annual rate of 5.1% per year, and adding 62.3 mcm/d (2.2 bcf/d) to Canadian supply by 2020. CBM resources in Alberta alone could be as high as over 14 tcm (500 tcf). Provincial estimates of shale gas and CBM resources in British Columbia range between 7-28 tcm (250-1 000 tcf) and 2.5-7 tcm (90-250 tcf), respectively. Large undiscovered resources

are located in offshore British Columbia (estimated at 1 183 bcm, or 41.8 tcf); however, a Federal moratorium prohibits any offshore drilling. A moratorium is also in place for George's Bank, off the coast of Nova Scotia.

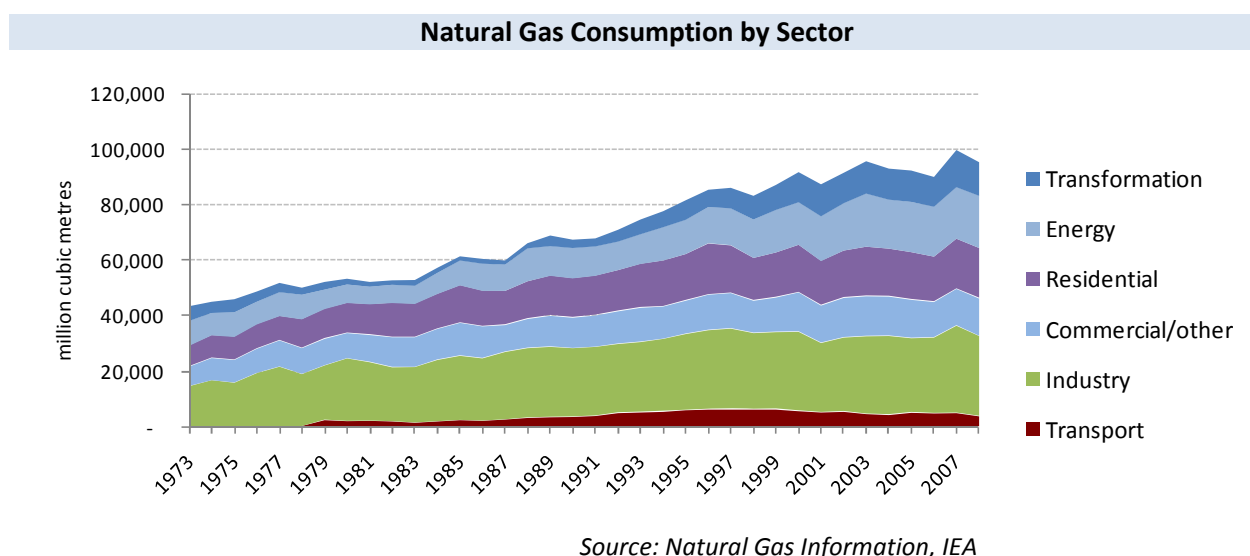
It should be noted that under the Canadian constitutional framework, Provincial governments have jurisdiction over upstream (exploration and production), and the downstream natural gas markets (distribution); while the Federal Government mainly has jurisdiction over international and inter-Provincial trade and pipelines.

Gas demand

From 1990 to 2008, demand for natural gas increased by 49%, from just 67.3 billion cubic metres (bcm) to an estimated 100 bcm (9.7 bcf/d), a compound average growth rate of 2.2% over the period.

Despite a progressive increase in demand for natural gas for transformation purposes, natural gas is not a principle source of fuel for the electricity generated in Canada. Indeed, in 2008 natural gas only accounted for some 7% of gross electricity production.

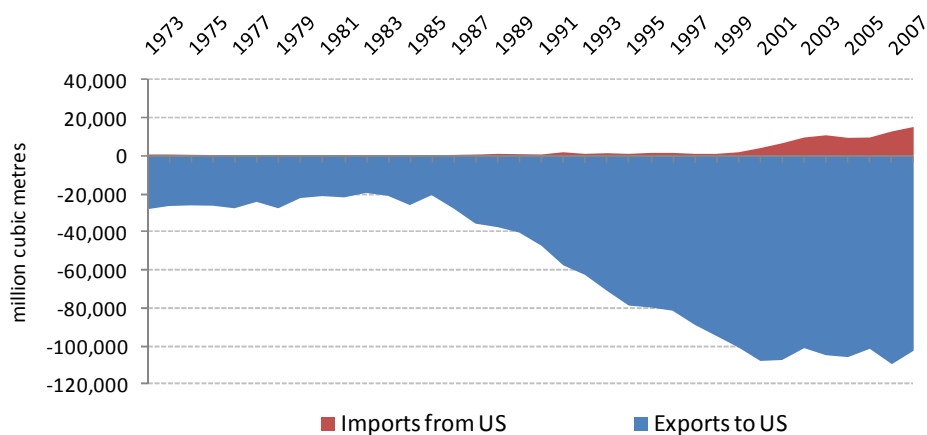
Transformation (for electricity production) thus accounts for just 13% of total gas demand (12 bcm in 2008). However, the energy sector (and the Canadian Oil Sands production, in particular) is very energy-intensive, and requires significant amounts of natural gas; the energy sector alone thus accounted for some 20% (19 bcm) of gas demand in 2008. Industry accounted for 31% of gas demand (29 bcm), and an additional 19% came from the residential sector in 2008. Natural gas is widely used for residential and commercial heating, particularly in the winter months.



Gas import dependency

Canada is not dependent on imports to meet domestic demand. Nevertheless, import points in Canada are located in Southern Ontario, where it is typically cheaper to import gas from the United States than to ship gas from Western Canada through Northern Ontario. According to the Canadian Administration, Canada imported just under 15 bcm of natural gas in 2008, while exporting 103 bcm of natural gas (all to the United States) resulting in net exports of 88 bcm. While imports have grown considerably since 2000, (largely due to the completion of the Vector pipeline in 2001); gross exports have remained relatively stable, and net exports have fluctuated between 85 and 100 bcm (3 000 and 3 500 bcf).

Natural Gas Imports and Exports by Source



Source: Natural Gas Information, IEA

Canada has a single liquefied natural gas receiving terminal at New Brunswick (Canaport LNG) which received its first LNG cargo in June 2009. The terminal has the capacity to import 28 mcm/day (1 bcf/day) of LNG. There are several other LNG import terminal proposals in Canada (and a LNG export terminal proposal in Western Canada).

Gas company operations

The natural gas industry is highly competitive in Canada, with hundreds of exploration and production firms, and no firm having a large enough market share to set prices. In 2007, the top 20 producers produced accounted for some 62% of total production (320 mcm/d, or 11.3 bcf/day), and the top 100 producers approximately 78% of total production (400 mcm/d, or 14 bcf/day).

Canada's natural gas gathering, transmission, and distribution pipeline network is predominantly owned and operated by publicly-traded companies. There are, however, a few transmission and distribution pipelines that are owned by Provincial Crown Corporations, such as SaskEnergy in Saskatchewan, and Manitoba Hydro in Manitoba.

Storage facilities in the producing region of western Canada are typically owned by pipeline companies or producers, while in eastern Canada, storage facilities are typically owned by local distribution companies. Distribution is handled by private companies which have exclusive rights to distribute gas in a given regional or local area, and are provincially regulated.

Taxes and maximum price mechanism

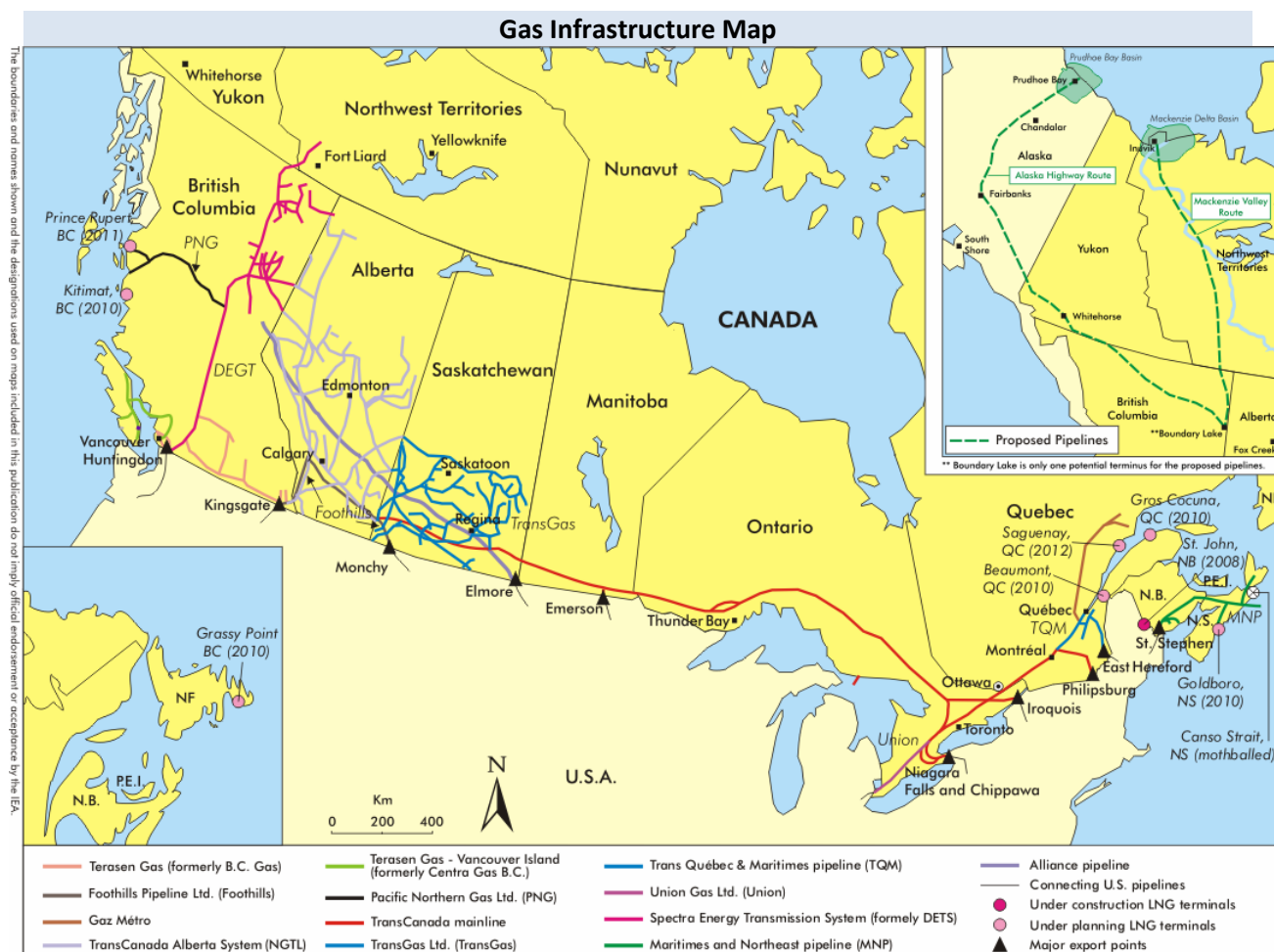
Natural gas prices received by producers have been deregulated in Canada since 1985. The price of natural gas is determined in the open market by fundamentals of supply and demand – no price floors or ceilings exist for producers. However, the tolls charged by transmission and distribution companies remain regulated.

4.2 Natural Gas Supply Infrastructure

Ports and Pipelines

Canada became an LNG importer in June 2009 when the Canaport terminal received its commissioning LNG shipment. Canaport is designed as an import terminal for re-export by pipeline to feed growing US Northeast markets, given that the natural gas demand in Atlantic Canada is completely satisfied by offshore Nova Scotia production.

There is a proposal to export domestically-produced natural gas via LNG from British Columbia to Asian markets.



Due to the significant gas production in Canada, there is an extensive network of gas pipelines throughout the country. The natural gas network in Canada is very well integrated with that of the United States. The total length of the gas pipeline network in Canada is about 360 000km, of which around 80 000 km of transmission pipelines, and around 280 000 km of distribution pipelines serving approximately 6 million customers.

Storage

Canada has significant natural gas storage reservoirs that are usually used for servicing peak winter demand. Canada has approximately 20 bcm (0.7 Tcf) of storage capacity (equivalent to about 20% of yearly demand), while the United States has an additional 85 bcm (3.0 Tcf). These storage volumes can be drawn down on very short notice to help satisfy demand or to help address a supply shortfall.

4.3 Emergency Policy for Natural Gas

As with an oil disruption, the Federal Government has considerable powers to control natural gas flows in a national emergency under the Emergencies Act. However, if a national emergency is not declared, then natural gas flows fall under Provincial jurisdiction.

Supply disruptions can be either long-term or short-term. Long-term risk is not particularly relevant for North America, as the North American natural gas market is resource-rich and is an open, well-interconnected, competitive commodity market with many buyers and sellers. Available supplies tend to clear the market; price is what fluctuates. As a result, in North America, the risk is not one of disruption in supplies, but rather that prices may be higher than expected. Due to the wide diversity of supply areas, pipelines and upstream/downstream storage in North America, an accident or weather-related problem would not affect all gas supplies. Physical supply of gas might be a problem for a small segment of the market, but the main effect would be a price increase as a result of a smaller volume of gas available.

In the case of a supply disruption, Canada has a number of options for continuing to meet natural gas demand:

- Canada has significant natural gas storage reservoirs that are usually used for servicing peak winter demand. Canada has approximately 20 bcm (0.7 Tcf) of storage capacity (equivalent to about 20% of yearly demand), while the United States has an additional 85 bcm (3.0 Tcf). These storage volumes can be drawn down on very short notice to help satisfy demand or to help address a supply shortfall.
- While Canada is a net exporter of natural gas, there are also several options for importing natural gas. In the event of a supply disruption, Canada could import additional natural gas via pipelines from the United States.
- In the event of a prolonged shortage of natural gas, Canada could also bid on spot LNG cargoes, to be received at the Canaport terminal in St John, New Brunswick.
- Many industrial natural gas consumers are on “interruptible” service contracts, with the consequence that they can be denied natural gas if it is required elsewhere. Shedding demand through interruptible service clients would help in the case of a supply disruption.

Other industrial gas consumers, including the power generation sector, have some degree (albeit limited) of fuel switching capability, which could serve to further reduce demand.

The North American Free Trade Agreement (NAFTA) prohibits the Government of Canada from imposing any export volume restrictions except under certain circumstances. These exceptions include the relief of a critical shortage of natural gas, domestic price stabilisation, the acquisition of products in short supply or conservation measures in relation to restrictions on domestic production or consumption. However, any export restriction would invoke the proportionality clause, which provides that the restriction must not reduce the proportion of Canadian production offered to export customers below the percentage of Canadian production exported over the previous 36 months. It is important to note that in the case of an IEA emergency, Canada’s IEA obligations supersede any NAFTA restrictions.

Strategic Gas Stocks and Drawdown

Canada does not possess strategic gas stocks. There are no government-imposed requirements for any market participant to hold any minimum level of stocks.

Fuel Switching

While it may be possible for some electricity generators to switch to different fuels in a scenario where natural gas is unavailable, a natural gas supply disruption would more likely be handled by using other forms of power generation to meet demand. Canada is not heavily reliant on natural gas for electricity supply, and it is likely that other supply options would be sufficient to maintain reliability. Fuel switching exists in some industrial facilities with the alternative fuel represented by oil, coal, and wood. The reason for fuel switching for natural gas consumers is actually the fuel price. Given that the Canadian/US natural gas market is flexible, well-functioning, and reliable, there are no requirements to maintain specific stocks of alternative fuels. For electricity generation, there are no requirements to maintain stocks of alternative fuels at the Provincial level, and certainly not at the Federal level, as electricity supply falls under Provincial jurisdiction.

INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its mandate is two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply and to advise member countries on sound energy policy.

The IEA carries out a comprehensive programme of energy co-operation among 28 advanced economies, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency aims to:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

IEA member countries:

Australia
Austria
Belgium
Canada
Czech Republic
Denmark
Finland
France
Germany
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Hungary
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Italy
Japan
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Netherlands
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Portugal
Slovak Republic
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International
Energy Agency

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