



# **Canadian Petroleum Product Market Outlook Fall 2008**

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## **Overview**

As we head into the 2008-2009 winter heating season, Canadian consumers should expect petroleum product prices—as they have thus far this year—to fluctuate and reflect the price of crude oil. Crude prices spiked considerably this summer but lost close to two third of their value between July and November. While the rapid appreciation of the dollar shielded Canadian consumers from some of the price shock late last year and early this spring, the recent depreciation against the US dollar has meant that Canadian consumers have not seen the same percentage decrease in prices as our neighbours to the South. Decreased world demand for both crude oil and petroleum products has led to lower utilization rates and forecasts of lower investment in new capacity.

## **Highlights**

Canadian gasoline prices spiked to record levels this summer with the price of regular gasoline averaging \$1.28 per litre in July. Recently, prices have dropped significantly with gasoline averaging \$0.88 per litre in November. In the same month, fuel oil and diesel prices dropped considerably as well to \$0.94 and \$1.12 respectively.

Heating oil prices are at comparable levels to last year heading into the winter heating season. However, where crude oil prices were on the rise last year at this time, the opposite is true this winter. If crude oil prices remain in the US\$45-60 per barrel range, furnace oil prices can be expected to remain fairly stable and somewhat lower than last year.

Reflecting a slowing of gasoline demand, as well as a rise in global commercial and transportation demand for diesel, the price differential between distillate and gasoline has increased substantially.

As Canadian refiners typically purchase crude oil in US dollars, the recent depreciation of the Canadian dollar against the American dollar has meant that Canadian consumers have not seen the full impact of softening crude oil prices at the pump in domestic currency.

In contrast to an increase between 2006 and 2007, demand for petroleum products has remained virtually unchanged, increasing only slightly by less than 0.1%, when comparing the first eight months in 2007 to the first eight months in 2008. This may indicate that higher prices are having an effect on Canadian consumer behaviour. The full impact of a softening economy remains to be seen.

The incentive to build new refining capacity in Canada, and around the world, has decreased with depressed gasoline margins. Shell recently announced that it will not be proceeding with its new refinery in Southern Ontario. Irving Oil recently announced it is delaying the construction of its new refinery in Saint John, New Brunswick.

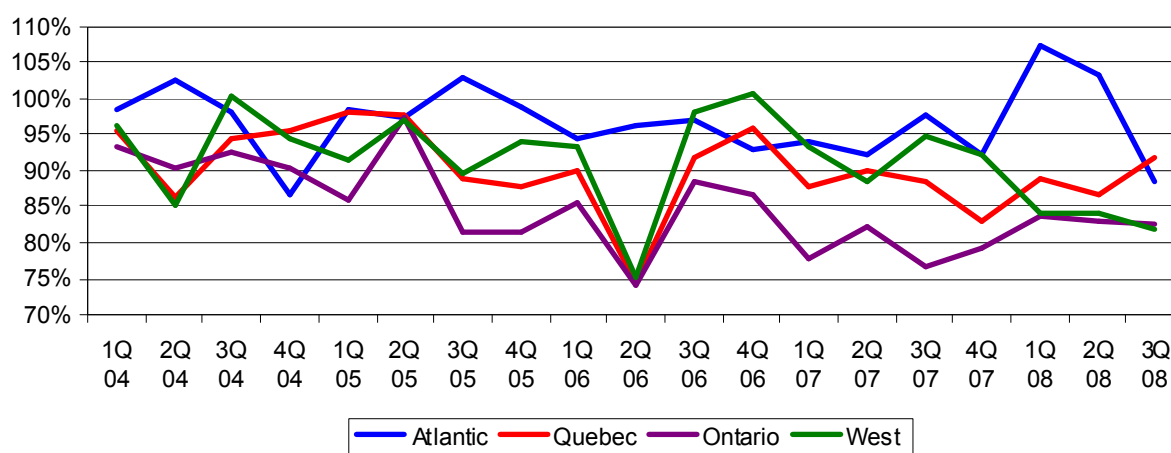
Refiners are currently focused on distillate production and inventories are expected to build as facilities return to full production capacity. Distillate inventories in the West will likely remain relatively tight throughout the winter heating season because of tight global supply and unplanned interruptions early this fall. The supply problems are expected to ease by the end of December.

Provincial introduction of renewable energy to the transportation fuel mix in the form of ethanol continues to add another level of complexity to the petroleum product distribution network, and could have implications for fuel availability in some regions.

## Refinery Utilization Rates

Based on weekly crude oil runs, as reported to the National Energy Board, the Canadian refining industry typically operates at over 90% of capacity.<sup>1</sup> At this rate, the industry is essentially operating at full capacity, with deviations relating to unplanned shutdowns and extended refinery maintenance turnarounds. As the refining infrastructure ages and becomes more complex due to increasingly stringent regulations aimed at protecting health and the environment, unplanned shutdowns are becoming more common. In addition, due to the geographically disperse nature of the country and the limited number of refineries in some regions, a single refinery outage can lead to a significant decrease in local supply. These two factors have led regional utilization rates to be less uniform than in the past. Figure 1 illustrates the regional variations.

**Figure 1: Refinery Utilization Rates**



Source: National Energy Board

Decreased utilization rates in Western Canada this year can be attributed to greater than normal planned turnarounds and some unplanned shutdowns. Of particular note is Petro-Canada's extended slowdown to convert their facility to use oil sands-derived crude as 100% of their feedstock. This conversion is projected to be completed by the end of 2008.

High utilization rates in the East are a result of the Irving Oil refinery operating above its rated capacity of 250,000 bbls/day. The subsequent drop in utilization can be attributed to unanticipated slowdowns in this region.

The dip in Ontario refinery utilization rates during February and March of 2007 demonstrated in Figure 1 can be attributed to the temporary closure of Imperial Oil's Nanticoke refinery. This dip reinforces the fact that a single outage can have a considerable impact on utilization rates. Following that dip, low utilization rates in Ontario until the third quarter of 2007 were due to a number of

<sup>1</sup> Due to regularly scheduled maintenance shutdowns and other short-term unplanned events that reduce utilization, 95% is considered to be the optimum refinery utilization rate. However, because this number also takes into account normal refinery maintenance turnarounds, by delaying normal maintenance schedules, it is sometimes possible to achieve a utilization rate greater than 100% for a short period of time.

refineries undergoing routine maintenance. Once this work was completed and refineries were back online, utilization rates again increased.

Regular maintenance turnarounds and other more extensive refinery upgrade projects are again ongoing this fall. As regularly scheduled maintenance turnarounds are planned well in advance, refiners generally arrange alternative sources of supply to supplement their reduced rates of production during shutdown. However, this year, some unplanned shutdowns in Alberta in late summer depleted inventories and left several companies rushing to find supply. Markets are more vulnerable to short-term price spikes because the flexibility of the system to respond to unplanned events is significantly reduced during these periods.

These fall turnaround projects are nearing completion and refinery production is expected to return to full capacity by the end of the calendar year. Through the fall, refiners are focused on distillate production and begin building heating oil inventories for the winter season. As facilities complete their fall maintenance programs and return to full production, inventories are expected to build.

## **Canadian Petroleum Product Supply and Demand**

With increasing demand for diesel products and decreasing profit margins for gasoline, in the short - to medium - term, it is expected that refiners will try to find ways to maximize their production of distillate. Canadian refiners currently produce about two parts distillate (diesel fuel, heating oil, jet fuel, etc.) for every three parts of gasoline.

### **Gasoline**

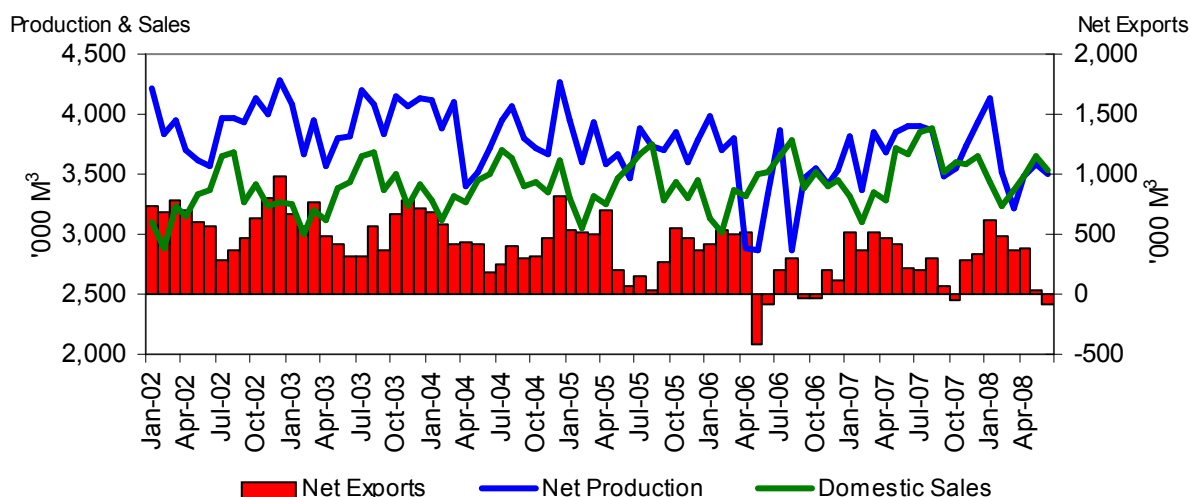
Figure 2 depicts the relationship between Canadian production of gasoline and domestic sales. The graph clearly illustrates the seasonal nature of gasoline consumption and the fact that while production has historically been substantially higher than consumption, at times, the two have recently converged. Typically, this is only in the case of a short-term disruption requiring imported product. Occasionally, however, imports have been required to balance domestic markets. Canada does export significant volumes of gasoline—primarily from Atlantic Canada refineries to the U.S. Eastern Seaboard (the trend is similar for diesel fuel). With the recent decline in demand resulting from a worldwide economic slowdown, production and sales are projected to drop in the coming months and possibly lead to increased exports or decreased Canadian production.

In 2007, in spite of an increase of about 4% in gasoline prices, Canadians increased their consumption of gasoline from 41 billion litres to 42 billion. In the first eight months of 2008, gasoline demand remained virtually unchanged, increasing by less than 0.1% when compared to the same period in 2007. It would seem that high pump prices may have helped to curb demand.

### **Diesel Fuel**

In the first eight months of 2008, diesel prices have increased by close to 34%, compared to the same period in 2007. This is reflective of the significant increase in the price of crude oil as well increased domestic and worldwide demand for diesel fuel. During this period, Canadian consumption of diesel fuel increased by 1.5%.

**Figure 2: Gasoline Supply vs. Demand**

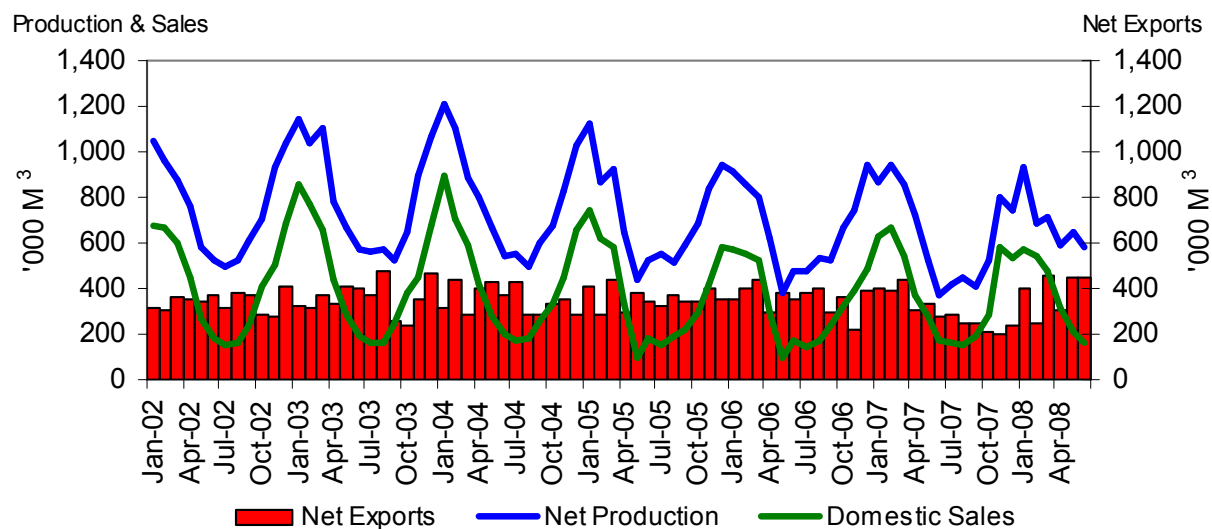


Source: Statistics Canada

### Heating Oil

Figure 3 depicts the relationship between Canadian production of fuel oil and domestic sales. Because of a series of abnormally warm winters and increased use of alternative energy sources, Canada's consumption of heating oil has decreased significantly. In fact, during the winter of 2007/2008 (September to April) Canadians consumed 3.5 billion litres of fuel oil—10% below the 3.9 billion litres consumed during the winter of 2002/2003. With Environment Canada forecasting normal or above-normal temperatures for much of Eastern Canada this winter, fuel oil sales may decrease. As fuel oil use is directly related to temperature, colder or warmer than anticipated winter weather can significantly influence heating oil consumption, and prices.

**Figure 3: Heating Oil Supply vs. Demand**



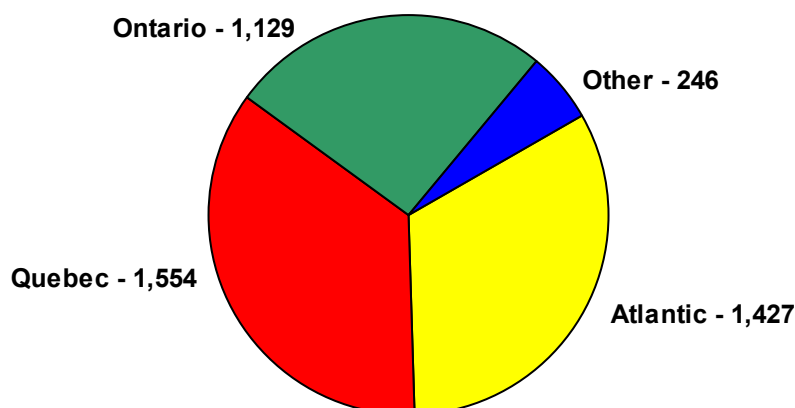
Source: Statistics Canada

As of 2005, only 10% of Canadian homes were using furnace oil for heat. Heating oil sales are concentrated in Eastern Canada, with Atlantic Canada accounting for about 33% of domestic sales, Quebec at 36%, Ontario at 26% and the rest of Canada at 6%. Figure 4 shows the volume of heating oil consumed by region in Canada in 2007.

Although Atlantic Canada accounts for only 30% of Canadian sales, it has the greatest dependence on oil for heating, with just over half of all homes using fuel oil to meet at least a portion of their heating needs (398,000 households). Prince Edward Island is by far the most dependent, with close to 85% of all households using heating oil. Despite the small percentage of households in Quebec and Ontario using heating oil to meet their space heating needs, as of 2005, some 846,000 homes heated with oil in the region. Heating oil sales in these provinces represent two thirds of Canada's fuel oil consumption due to the size of the markets.

In Western Canada, natural gas is the dominant fuel for home heating. Only minimal volumes of fuel oil are consumed in the Prairies and fuel oil accounts for only about 6% of the home heating market in British Columbia (108,000 households).

**Figure 4: Heating Oil Consumption by Region (millions of litres) - 2007**



*Source: Statistics Canada*

### **Regional Market Situation**

Canada has four distinct supply/demand regions for petroleum products: Western Canada, Ontario, Quebec and Atlantic Canada. At times, product imports and exports play a significant role in balancing supply and demand in each of these regions. Typically these regions operate independently of each other. However, the Ontario and Quebec markets have become more integrated in recent years.

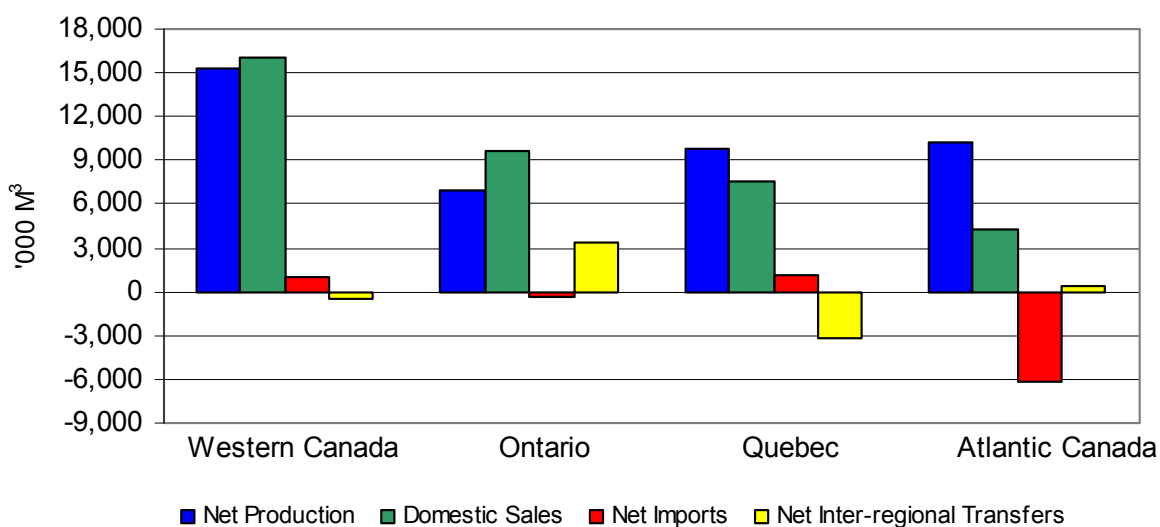
There is very little change in the mix of production, sales, imports and exports year over year. The introduction of biofuels through provincial or federal regulation continues to have a considerable impact on the distribution of products between, and within, these regions. Figures 5 and 6 show the regional supply and demand for gasoline and middle distillate in Canada.



Refineries in Atlantic Canada produce a surplus of petroleum products. In fact, Atlantic Canada exports more than half of its production, representing almost three quarters of Canada's total net exports of petroleum products. Atlantic Canadian refiners have been very successful in marketing ultra low sulphur products into the United States, with some cargoes reaching destinations as far away as California. Despite being a large net exporter of petroleum products, companies in Atlantic Canada have been looking at opportunities to expand the region's production capacity to capitalize on the proximity of the very large Northeast United States market. With slowing demand in the U.S. these plans may be put on hold for economic reasons.

Although Atlantic Canada is a significant consumer of heating oil, Figure 5 shows that the region exports significant volumes of distillate. This excess production capacity acts as a buffer to help ensure that the region is not short of heating oil during the winter heating season.

**Figure 5: Regional Middle Distillate Supply/Demand Balance - 2007**

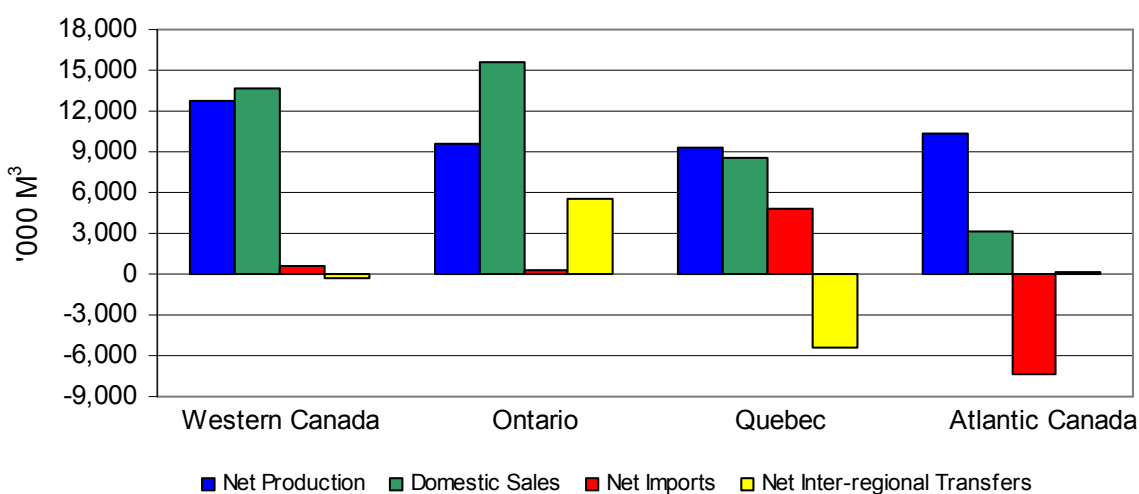


Source: Statistics Canada

Following the closure of PetroCanada's Oakville refinery in March 2005, Ontario became a large net importer of petroleum products. When refineries are producing at their optimal levels, Ontario is short of both gasoline and diesel fuel. Last year, transfers from other provinces and imports, accounted for more than 37% of gasoline sales and 43% of distillate sales. Most of this product comes from Quebec via the Trans-Northern Pipeline. Any unexpected interruptions of this pipeline could cause significant supply problems in southern Ontario.

Although Figure 6 shows that Quebec is a significant net importer of gasoline, it is important to note that Quebec refineries produce more than sufficient product to meet the province's needs. Most of the imports into Quebec either flow directly through to Ontario or replace domestic production that is sold into Ontario. Because Quebec is self-sufficient in petroleum product production and has a well-established infrastructure to import product, the Quebec market remains well supplied.

**Figure 6: Regional Gasoline Supply/Demand Balance - 2007**



Source: Statistics Canada

Ontario refiners have indicated that they normally do not have significant problems obtaining sufficient gasoline imports to meet Canadian specifications. However, this takes some advance notification and the product is more expensive. To date, industry inventories have been sufficient to fill the gap between the occurrence of an unplanned refinery shutdown and the receipt of imported product.

In 2007, Ontario passed a law requiring 5% ethanol content in the gasoline pool. While this transition was smooth at the retail level and resulted in little inconvenience to consumers, refining companies and ethanol producers have had varying degrees of difficulty adhering to the targets which has resulted in some station closures.

As there is very little domestic production of ethanol, transportation of it has proven to be the biggest hurdle for industry in the Ontario region. Many companies are importing ethanol and plan to continue to do so. As ethanol cannot be transported through pipelines because of contamination issues, most of this product is being moved by truck or rail. With increasing demand for both rail and trucking (rail capacity in Canada is currently tight), obtaining transportation has proven difficult or impossible in some instances. Infrastructure issues will continue to be a major concern across the country as biofuels become a larger part of the energy mix.

In Western Canada, the supply and demand for petroleum products remains very tight. Refineries have been operating at, or near, full capacity for several years and, because much of Western Canada is landlocked, there is limited access to supplies from other regions. Often the industry imports diesel and jet fuel into the Vancouver market from refineries in Washington State. (See Figure 5.) This permits the Edmonton refiners, who normally supply a substantial volume of product into the Vancouver market, to free up additional volumes for the Prairies. Although the volumes of petroleum product imports and exports are not very large, they have been playing an increasingly significant role in balancing supply and demand. Shrinking net exports in this region over the last decade reinforce the fact that Western Canadian supply is becoming increasingly tight.

Refinery capacity additions have not kept pace with the growth in fuel demand that has accompanied the rapid economic growth in the region (particularly in the mining and oil sands sectors). Typically, Western Canadian refineries operate at full capacity to meet normal product demand. In recent years, the Trans-Mountain Pipeline system, which transports crude oil and petroleum products from Edmonton into British Columbia, has been operating at near capacity. Increased crude oil exports by Canadian oil producers have reduced the line space available for refined petroleum products.

In the summer and early fall of 2008 there were a series of unplanned refinery closures caused by technical problems. Some of these temporary interruptions to production overlapped with a major planned turnaround at Petro-Canada's Edmonton refinery to retool the facility to run on oil sands-derived crude oil. This conflux of events has created severe shortages of diesel fuel in the western provinces and required suppliers to go far a field to find alternate supplies. The majority of these problems have been resolved and the market is now coming back into balance.

Refiners have indicated that, barring any further unforeseen problems, Western Canada will remain adequately supplied this winter despite tight inventories resulting from the recent disruptions.

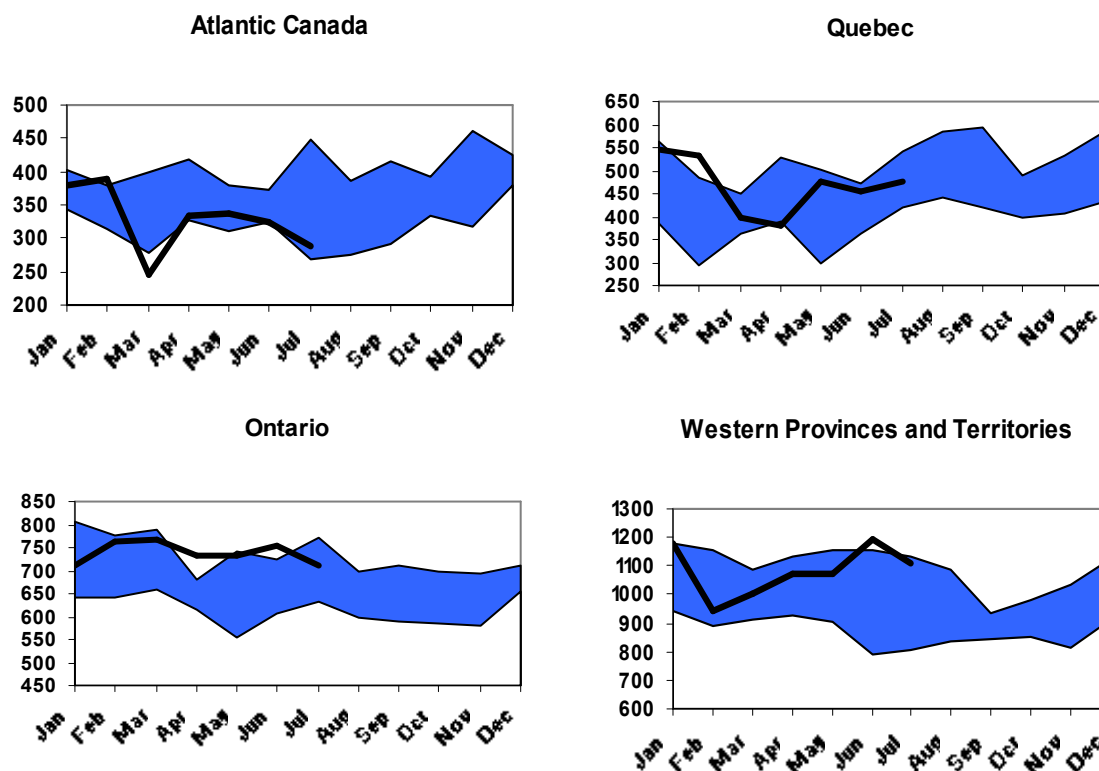
## **Gasoline and Diesel Inventory Levels**

Over the last decade, refiners have been rationalizing their operations in order to reduce costs and improve rates of return. A key element of this process has been the reduction of inventory levels to the minimum required to maintain normal operations. Under this just-in-time inventory philosophy, inventory levels have declined substantially for most products.

Figure 7 shows regional distillate (fuel oil, diesel and kerosene) inventories for 2008 as well as the historical 5-year high-low range. As these products have similar properties and can be interchanged with little modification, they are typically grouped together for analysis purposes. Fuel oil inventories are difficult to manage because demand for the products is so weather dependant. Stocks are built up in the fall in anticipation of a normal winter. If winter weather is warmer than expected, companies can be left with excess product, which occupies storage space needed for gasoline in the summer months. Similarly, with a colder than normal winter, inventory levels will be drawn down below desired levels. Assuming that winter 2008-2009 is not significantly colder than projected, petroleum refiners have indicated that fuel oil and distillate stocks will be sufficient to cover demand.

Inventory levels in the United States have a significant impact on petroleum product prices across North America; in Canada, inventories play a more important role in balancing supply and demand and have a marginal effect on regional prices.

**Figure 7: Canadian Middle Distillate Inventory Levels for 2008 and Historical 5-Year High-Low Range ('000 M<sup>3</sup>)**



Source: Statistics Canada

## Petroleum Product Prices

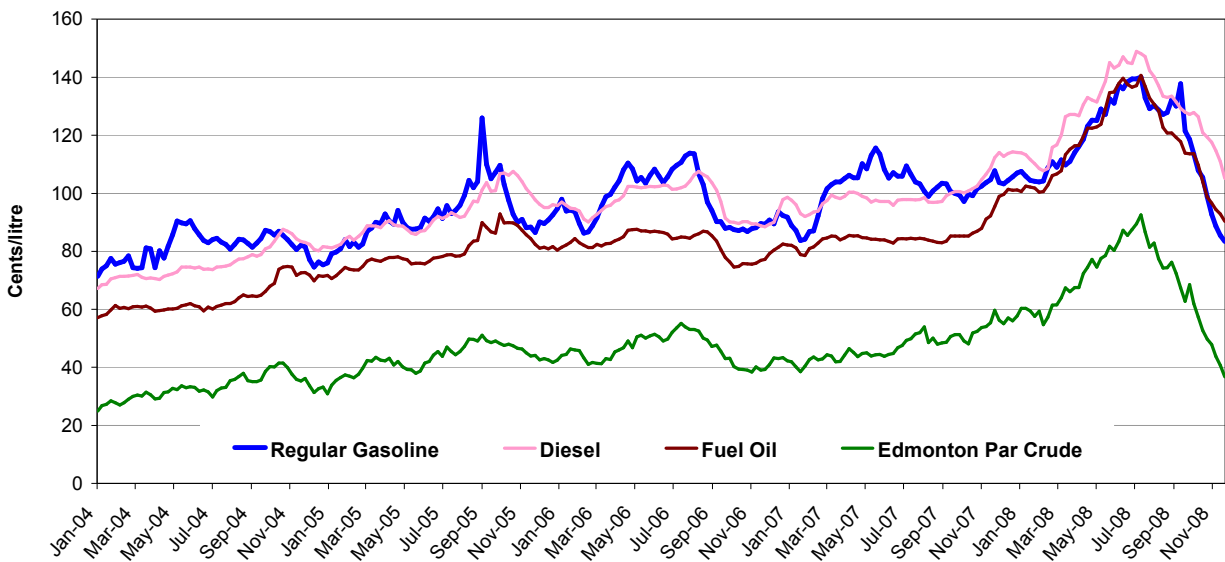
Canadian average gasoline prices have fallen from a temporary high of about \$1.40 per litre in mid-July to just over \$0.83 per litre at the end of November, a decline of \$0.57 per litre. Gasoline prices averaged \$0.88 per litre that month. It is interesting to note that distillate prices have increased relative to gasoline; over the past year, diesel fuel has consistently been more costly than gasoline. This is due to increasing demand for diesel across the globe in both industrial and light transportation sectors. This trend is expected to continue as automakers start to offer more diesel transportation options in the North American market. In November, Canadian diesel fuel and fuel oil averaged approximately \$1.12 and \$0.94 per litre respectively. Figure 8 compares the price of gasoline, crude oil, diesel and fuel oil.

According to the United States Energy Information Administration's (EIA) November 2008 *Short-term Energy and Winter Fuels Outlook*, retail gasoline and diesel prices in the United States are expected to average US\$2.37 per gallon (62US¢/l) and US\$2.73 per gallon (72US¢/l) in 2009.

At the retail level, U.S. heating oil prices are expected to average \$2.75 per gallon (0.73US¢/l) for the 2008-2009 heating season (October to March), about US\$0.56 per gallon lower than last year. Reflecting a weakening of the very high wholesale distillate-crude oil margins seen this past summer, heating oil price projections were adjusted downward. During the 2007-08 heating season, Canadian

heating oil prices averaged \$1.00 per litre.<sup>2</sup> Assuming current market conditions continue, Canadian fuel oil prices will likely follow U.S. trends and can be expected to be lower than last winter.

**Figure 8: Gasoline, Diesel, Fuel Oil and Crude Oil Price Comparison**



Source: Natural Resources Canada

Consumers should be aware that fuel oil price forecasts could change significantly if crude oil prices begin to rise again or temperatures this winter are colder than expected. Colder than normal winter weather could quickly deplete product inventories and lead to higher consumer prices. As petroleum product prices in Canada are heavily influenced by wholesale prices at New York Harbour, price movements in the United States have a strong influence on Canadian prices.

Last fall, Canadians were shielded from substantial crude oil price increases, due in part, to an appreciating Canadian dollar. More recently, the Canadian dollar has declined relative to that of our U.S. neighbours. As Canadian refiners purchase most of their crude oil in U.S. dollars, a decline in the Canadian dollar makes their primary feedstock more expensive in domestic currency. This increased cost is passed on to consumers in the form of higher prices. As the price of crude oil has dropped alongside the Canadian exchange rate, the two drivers have, to some extent, cancelled each other out.

Although the EIA is projecting a significant decrease in fuel oil prices in the United States for the winter of 2008-09, markets remain unpredictable. For more information on Canadian fuel prices visit Natural Resources Canada's (NRCan) Fuel Focus website at [www.fuelfocus.nrcan.gc.ca](http://www.fuelfocus.nrcan.gc.ca).

## The Cost of Heating a Home with Oil

Table 1 illustrates, for several different types of homes and for both low - and medium - efficiency furnaces, the average cost of heating a home for a range of fuel oil prices. These heating costs are national averages, based on average temperature and degree-day calculations. Costs in specific

<sup>2</sup> Based on September-April heating season, due to Canada's comparatively longer winters.

centres will vary. Many factors can influence a homeowner's annual heating costs. Even with stable fuel prices, a consumer's annual heating bill can fluctuate significantly depending on the weather, the desired indoor temperature, whether a programmable thermostat is used, and the general age and condition of the house, particularly the insulation. Table 1 assumes that all these other factors remain constant and that only the fuel price changes.

**Table 1 - Impact of Rising Fuel Oil Prices on Annual Heating Costs**

	Fuel Price	Average Fuel Consumption (litres)	Heating Cost 2007/08*	----- Estimated Average Heating Costs ----- (2008-2009 Season)		
			<u>\$1.00/l</u>	<u>\$0.80/l</u>	<u>\$0.90/l</u>	<u>\$1.20/l</u>
Townhouse						
Low-efficiency furnace		1530	\$1,530	\$1,224	\$1,377	\$1,836
Mid-efficiency furnace		1320	\$1,320	\$1,056	\$1,188	\$1,584
Old Detached						
Low-efficiency furnace		3,900	\$3,900	\$3,120	\$3,510	\$4,680
Mid-efficiency furnace		3360	\$3,360	\$2,688	\$3,024	\$4,032
New Detached						
Low-efficiency furnace		2790	\$2,790	\$2,232	\$2,511	\$3,348
Mid-efficiency furnace		2400	\$2,400	\$1,920	\$2,160	\$2,880

Townhouse, inside unit - approximately 93 m<sup>2</sup> (1,000 square feet)

Calculated based on NRCan OEE publication *Heating with Oil*

\*Based on 2007/08 Heating Season (Sep-Apr)

Even though prices are the main factor in increased oil heating costs, other variables also come into play. As home heating is weather dependent, an unusually cold winter would result in increased fuel oil consumption and an additional burden on homeowners. On the other hand, as was seen in 2005/2006, a milder winter could help offset the impact of rising prices.

There are few options for users of heating oil to reduce heating bills in the short-term. However, as Table 1 indicates, at \$1.20 per litre, an upgrade from a low-efficient to a mid-efficient oil furnace might reduce costs by as much as \$648 annually in an older detached home. Though this is not sufficient to cover the costs of the new upgrade in the short term, in the long term, such an investment could lead to significant savings. While switching to other energy sources such as electricity or natural gas has proven to be a viable option for some homeowners, these alternatives are either not available or not economically viable for many others. With energy efficiency savings of \$648 per year, it would take about seven years to pay for a \$5,000 furnace upgrade.

In some areas of the country, Canadian companies have started to sell home heating oil with a biofuel component. These products are currently close to being price competitive with conventional fuels. As the technology continues to improve, alternatives such as these will become more economical.

## **Summary**

The recent distillate supply problems in Western Canada are expected to ease by the end of December. Refiners are currently focused on distillate production and inventories are expected to build as facilities return to full production capacity. Refiners have indicated that barring any unforeseen refinery closures, there will be adequate distillate supply across the country this winter.

Heading into the winter heating season, heating oil prices are at comparable levels to last year. However, where crude oil prices were on the rise last year at this time, the opposite is true this winter. If crude oil prices remain in the \$US50-60 per barrel range, heating oil prices can be expected to remain fairly stable and somewhat lower than last year.