

Petroleum Product Market Outlook

Oil Division
Natural Resources Canada

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Summary

The Canadian petroleum industry has taken the necessary steps to ensure that adequate supplies of gasoline and diesel fuel will be available to consumers this fall. However, given the recent disruption to U.S. refinery production, the supply of petroleum products in Canada will be very tight heading into this winter.

Persistently high crude oil prices will continue to add extra upward pressure on petroleum product prices and markets are vulnerable to unanticipated supply disruptions such as an unplanned refinery closure or a supply distribution problem. Such market disturbances could result in further price increases but it is unlikely that such spikes would be sustained for long periods of time.

Highlights

- Petroleum product prices in Canada have reached record highs due to persistently high world crude oil prices and strong demand growth. This has been exacerbated by the recent loss of refinery production in the U.S. Gulf Coast attributable to the extensive damage to U.S. oil infrastructure caused by Hurricane Katrina.
- Canadian refineries are operating at full capacity.
- Lack of spare capacity has reduced the flexibility of the North American refining system to respond to unexpected disruptions.
- Refineries in Atlantic Canada produce a surplus of petroleum products. Net exports from Atlantic Canada represent more than 50% of their production and over 72% of Canada's exports of petroleum products.
- Refinery problems this summer in Ontario have depleted inventory levels in Ontario and Quebec. Overall the Ontario/Quebec region is short of gasoline and must import gasoline to cover the shortfall. Last year net imports accounted for 10% of gasoline sales and have been averaging about 16,000 m³/day (100,000 bbls/day) this summer.
- A series of refinery and upgrader problems has left the market for diesel fuel in Western Canada very tight. The situation is expected to begin to improve with the restart of Suncor's Millennium Upgrader in mid-September.
- Canadian gasoline and distillate prices are expected to remain high and will be vulnerable to upward pressures. A combination of the disruption to U.S. refining capacity, high crude oil prices and increased demand are expected to result in higher more volatile prices.

Introduction

The petroleum product supply available to consumers in Canada is determined mainly by domestic refinery production, the adequacy of inventories, and the efficiency of the infrastructure in place to deliver products to where they are needed. Fortunately, Canada produces more of these products than it consumes, and we have an efficient commercial storage and supply system. At this time, there is no reason to expect that any Canadian region will have inadequate supplies to meet consumers' needs. Nonetheless, NRCan continues to closely monitor market conditions.

Following the recent events and disruption to markets in the United States, Natural Resources Canada officials have consulted with Canadian refiners to provide a short-term outlook for petroleum product markets similar to the outlooks done in anticipation of the summer driving season and the winter heating season.

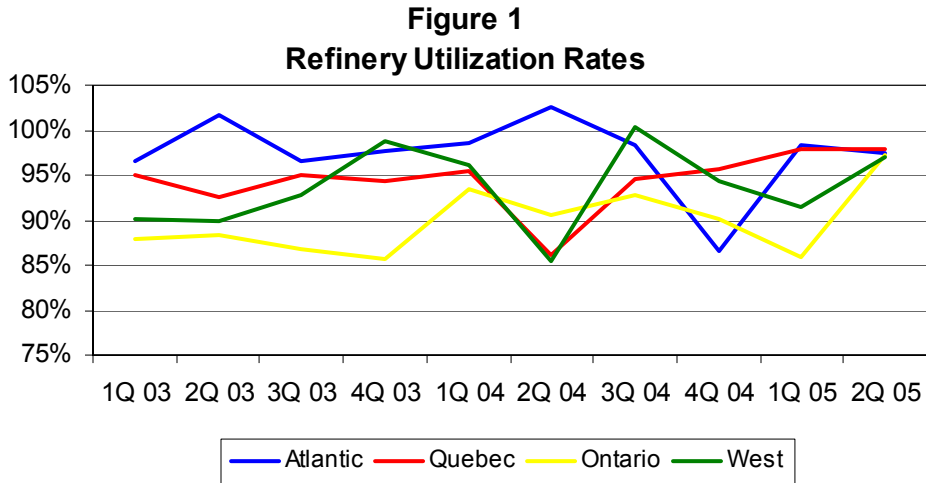
The refiners were asked to provide information on four areas of their operations:

- Refinery utilization rates and capability to increase production
- Any planned refinery turnarounds that would affect petroleum product supplies
- Inventory levels compared to levels in previous years
- Any logistical problems that could affect product distribution

This report incorporates the information from the refiners with internal Natural Resources Canada analysis of the Canadian petroleum product market.

Refinery Utilization Rates

Based on weekly crude oil runs, as reported to the National Energy Board, Canadian refineries have been operating at full capacity¹ this summer. Figure 1 illustrates the regional variations.



Source: National Energy Board

When utilization rates approach 95%, a refinery is considered to be operating at maximum capacity as crude runs are sometimes constrained by the capacity of other units further along in the refining process. The lack of spare capacity reduces the flexibility of the refining system and makes it more vulnerable to unexpected disruptions. The lack of spare capacity in North America has substantially increased the volatility of gasoline prices.

Canadian refiners have the ability to switch some production between gasoline and middle distillates (heating oil and diesel fuel). During the summer driving season they maximize gasoline production and during the heating season they maximize distillate production.

This spring several refinery maintenance turnarounds took place across the country and more are planned for this fall. Despite the severe disruption to U.S. refining capacity in the wake of Hurricane Katrina, Canadian refiners have indicated that they cannot delay their current maintenance schedules. Refinery maintenance plans for this fall range from total refinery shutdowns, where there will be no refinery production, to smaller shutdowns of secondary units that will have very little impact on production. These shutdowns are necessary for general maintenance and catalyst replacement. Given the lack of spare refinery capacity in Canada and unplanned refinery problems this summer,

¹ 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.

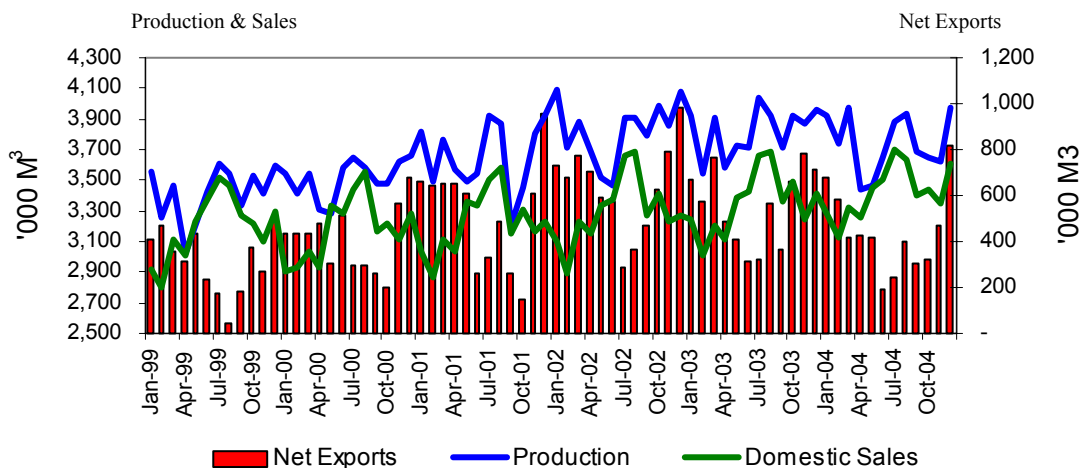
refineries have already been forced to delay maintenance plans to ‘end of catalyst life’ where refiners cannot delay further without reducing production capability and increasing the probability of component failure. Refinery turnarounds are planned well in advance and must be coordinated among oil companies, as often these companies must compete for available contractors and arrange for alternate supply while shut down. Further delays to refinery maintenance are not possible without significant risk of an unplanned shutdown, which would have a much larger impact on the Canadian supply situation.

As these regularly scheduled maintenance turnarounds are planned well in advance, refiners have already arranged alternative sources of supply to supplement their reduced rates of production during this time. Although no problems are anticipated as a result of these shutdowns, markets are more vulnerable to short-term price spikes during these times as flexibility in the system to respond to unplanned events is significantly reduced.

Canadian Petroleum Product Supply and Demand

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 production is substantially higher than consumption. Canada also exports significant volumes of gasoline, primarily to the U.S. eastern seaboard from Atlantic Canadian refineries. The story is very similar for diesel fuel.

Figure 2
Gasoline Supply vs Demand

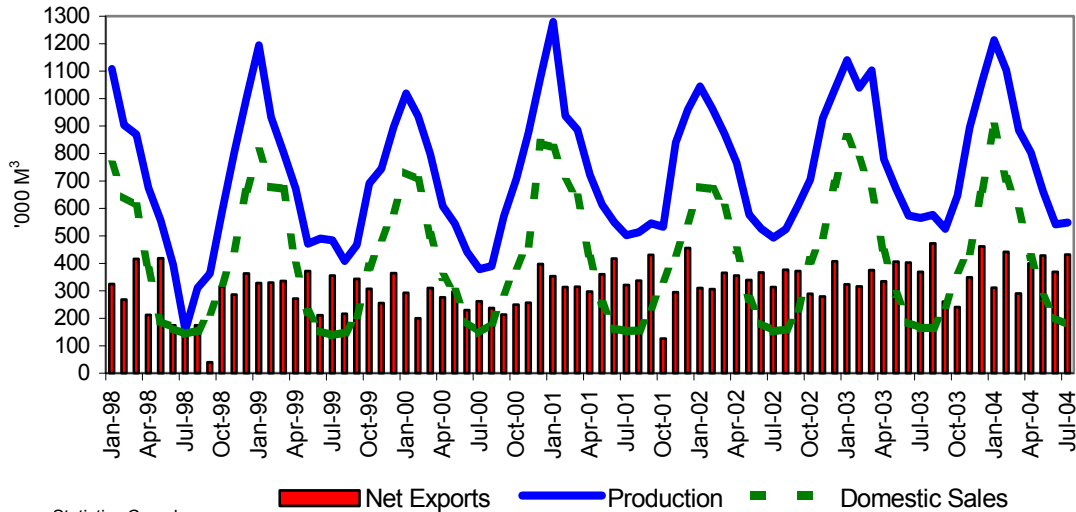


Source: Statistics Canada

In 2004, Canadians consumed more than 41 billion litres of gasoline and 25 billion litres of diesel fuel. Gasoline demand in Canada grew by 2.1% from 2003 while growth in the demand for diesel fuel significantly outpaced that for gasoline last year at 6.2%, reflecting the strong growth in the Canadian economy. Demand for gasoline and diesel fuel is expected to continue to grow in 2005 as high prices have had a limited impact on demand growth.

In 2004, Canada's consumption of heating oil was just over 5.1 billion litres. Heating oil sales are concentrated in Eastern Canada, with Atlantic Canada accounting for 31% of domestic sales, Quebec at 38%, Ontario at 26% and the rest of Canada at 5%. In 2004, Canada exported 49% of its net heating oil production, mostly to the U.S. east coast.

Figure 3
Canadian Furnace Oil Supply vs Demand



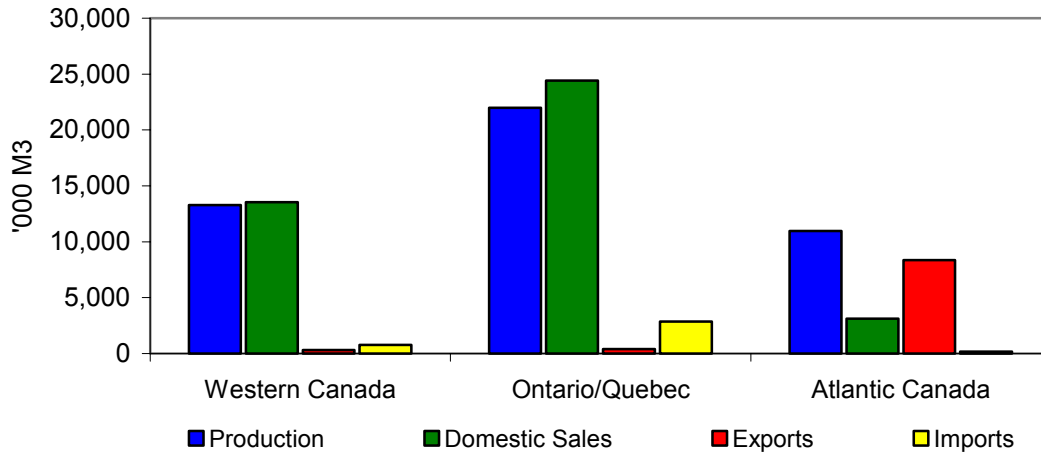
Although Atlantic Canada accounts for only 31% of Canadian sales, it has the greatest dependence on oil for heating, with over half of all homes using fuel oil to meet at least a portion of their heating needs. Prince Edward Island is by far the most dependent with over 85% of all households heating with fuel oil. In Nova Scotia, Newfoundland & Labrador and New Brunswick, the percentage of households using fuel oil are 60%, 33% and 22% respectively, compared to only 16% in Quebec and 11% in Ontario.

In Western Canada, natural gas is the fuel of choice for home heating. Only minimal volumes of furnace oil are consumed on the prairies and fuel oil accounts for less than 6% of the home heating market in British Columbia.

Canada has three distinct supply/demand regions for petroleum products: Western Canada, Ontario/Quebec and Atlantic Canada. At times, product imports and exports play a significant role balancing supply and demand in each of these regions.

Refineries in Atlantic Canada produce a surplus of petroleum products. In fact, net exports from Atlantic Canada represent more than 50% of their production and over 72% of Canada's exports of petroleum products. Atlantic Canadian refiners have been very successful in marketing their ultra low sulphur products into the United States, with some cargoes reaching destinations as far away as California. Despite being a large exporter of petroleum products, refineries have not indicated a noticeable increase in demand for exports following the refinery disruptions in the U.S. Gulf Coast.

Figure 4
2004 Regional Gasoline Supply/Demand Balance



The Ontario/Quebec region has recently been fully integrated with the reversal of the Trans-Northern Pipeline from Montreal to Toronto. A decade ago, the pipeline operated almost exclusively in a west to east mode with refineries in Southern Ontario delivering products to Eastern Ontario. However, due to changing refinery economics, the preferred (lower cost) source of supply for the Eastern Ontario market shifted towards the Quebec refineries, leaving the Trans-Northern Pipeline system severely under-utilized. As a result, this past winter Trans-Northern Pipelines completed an expansion and reversal of their pipeline system, permitting up to 10,500 m³/day (65,000 bbls/day) of refined petroleum products to be delivered to Toronto from refineries in Quebec.

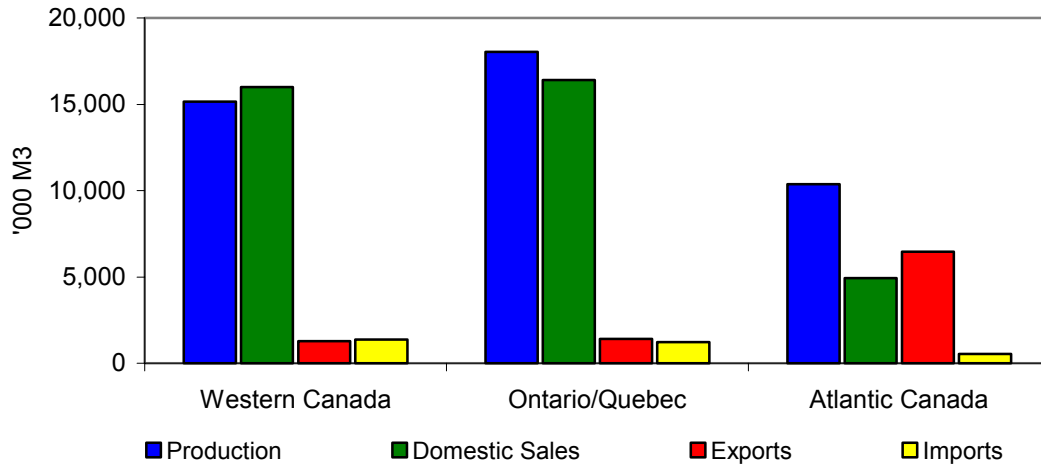
These changes were partially driven by the implementation of Canada's low-sulphur fuel regulations and Petro-Canada's subsequent decision to close their Oakville, Ontario refinery in favour of supplying its Ontario customers from Montreal. This was considered more cost effective than upgrading the Oakville refinery to meet the new regulations, which came into effect on January 1, 2005. Refinery expansions at Ultramar's refinery in St-Romuald, Quebec and Petro-Canada's refinery in Montreal together with increased term imports will offset the lost production associated with the Oakville refinery closure.

Overall the Ontario/Quebec region is short of gasoline and must import gasoline during the summer months to cover the shortfall. Last year net imports accounted for 10% of gasoline sales within this region and due to the recent changes to the distribution system, the level of imports were expected to increase this summer. Early indications this summer show gasoline imports into Ontario and Quebec have averaged 16,000 m³/day (100,000 bbls/day). Imports are expected to continue at these levels through September as refiners have already secured these supplies and made arrangements for shipping. Beyond September, the availability of imports is uncertain. Canadian companies will have to compete on world markets for additional supplies. Large price increases will be

necessary to encourage transportation of products from other regions in to order to rebalance supply and demand and prevent product outages.

The impact of Hurricane Katrina is not limited to gasoline. Canadian companies have been importing between 4,500-8,000 m³/day (30,000-50,000 bbls/day) of jet fuel to airports in Montreal and Toronto. Normally these supplies come from refiners in the U.S. Gulf Coast. However, these imports are no longer available and demand is expected to grow as U.S. airlines increase their fuel purchases at Canadian airports because of shortages in the U.S. Europe does not generally have a surplus of jet fuel; so increased supplies from Europe are unlikely. These tight supply conditions will increase the upward pressure on prices and could result in higher costs to travelers.

Figure 5
2004 Regional Middle Distillate Supply/Demand Balance



Source: Statistics Canada

Because much of Western Canada is landlocked, the impact of Hurricane Katrina on markets in western Canada will be more limited. Infrastructure is not available to transport large volumes of petroleum product from the prairies to other regions. Therefore, Western Canada is more self-sufficient than other regions and very little product is moved to or from the prairies.

However, supply and demand for petroleum products in Western Canada is very tight. Refineries have been operating at near full capacity for several years and there is limited access to supplies from other regions. Under normal operating conditions, as was the case in 2004, Western Canada imports small volumes of gasoline and exports small volumes of diesel fuel and although the volumes of petroleum product imports and exports are not very large, they can play a significant role in balancing supply and demand in this region.

This has been the case thus far in 2005. Since late last fall, a series of refinery and upgrader problems has left the market for distillate in Western Canada very tight. Since December 2004, the industry has been importing diesel and jet fuel into the Vancouver market from refineries in Washington State. This has permitted the Edmonton refiners, who normally supply a substantial volume of petroleum products into the Vancouver market, to free up additional volumes for the prairie market. The market for diesel fuel in Western Canada is expected to return to more normal operations this fall, when Suncor is expected to restart their upgrader after an early January fire reduced production at their oil sands facility.

Western Canada is also vulnerable to short-term price spikes in the gasoline market. Capacity constraints on Terasen's Trans Mountain Pipeline are, from time to time, limiting the volume of crude and products available to the Vancouver market. As adjacent US gasoline does not readily meet Canadian sulphur specifications, large price increases may be necessary to encourage transportation of products from other regions in order to rebalance supply and demand and prevent product outages. The situation could be exacerbated in the event an unplanned refinery shutdown occurs.

Inventory Levels

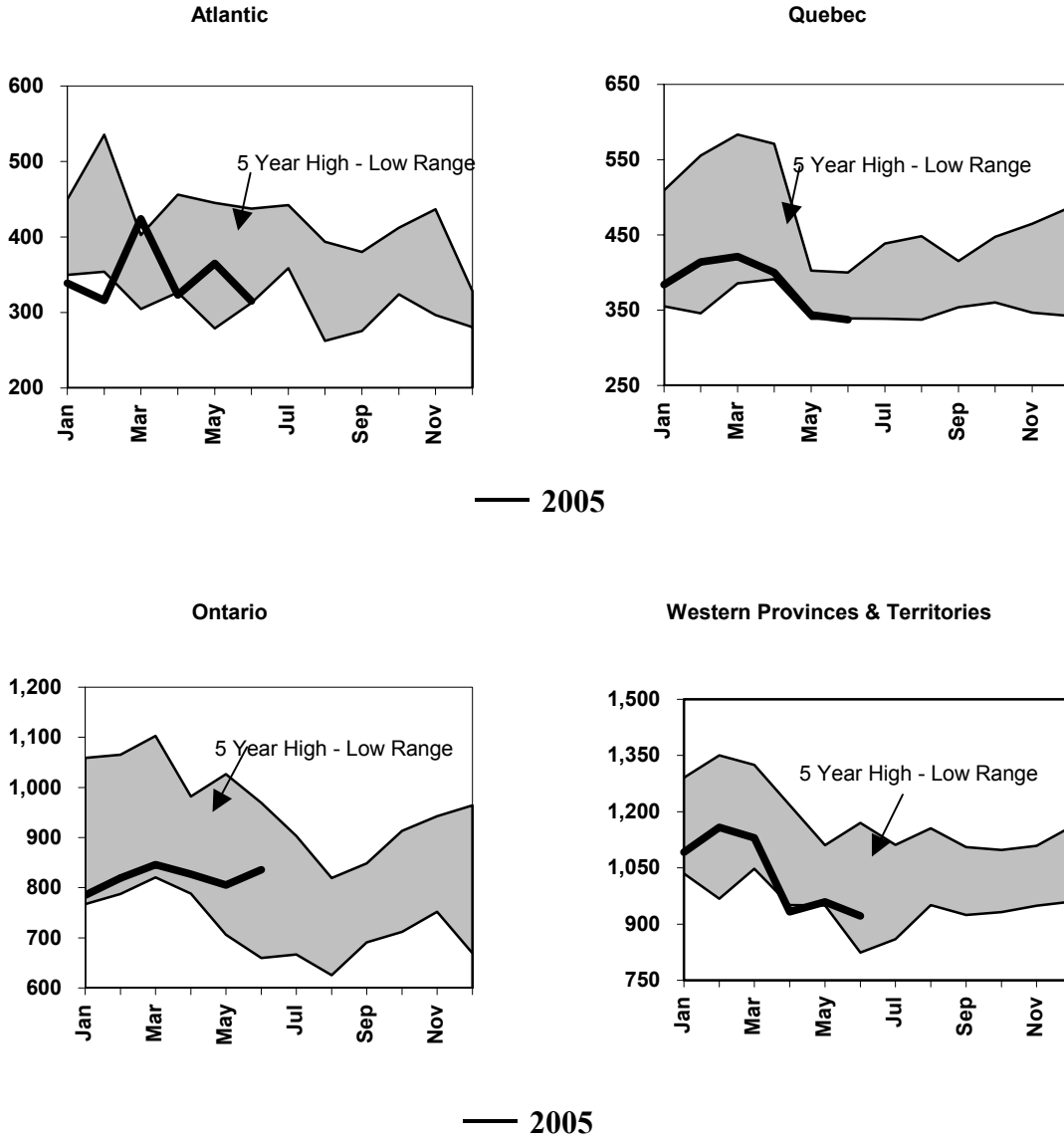
Over the last decade refiners have been rationalizing their operations in order to reduce costs and improve rates of return. A key element of this process has been the reduction of inventory levels to the minimum required to maintain normal operations. Under this just-in-time inventory philosophy, inventory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

Furnace oil inventories are more difficult to manage because demand for the products is so weather dependant. Stocks are built up during the fall in anticipation of a normal winter. If the weather is warmer than expected, companies can be left with excess product, which they must carry throughout the summer. Similarly, with a colder than normal winter, inventory levels will be drawn down below desired levels.

Figures 6 and 7, on the following pages, show the regional inventory levels for gasoline and distillate for the second quarter 2005. These levels are compared to the highest and lowest levels that were recorded over the last five years in each month. Anecdotal information from Canadian refiners indicates that current inventories are generally at levels needed to maintain normal operations, however, continued access to imports will be an important component to satisfying product demand, especially in Ontario and Quebec where refinery problems this summer have reduced inventory levels.

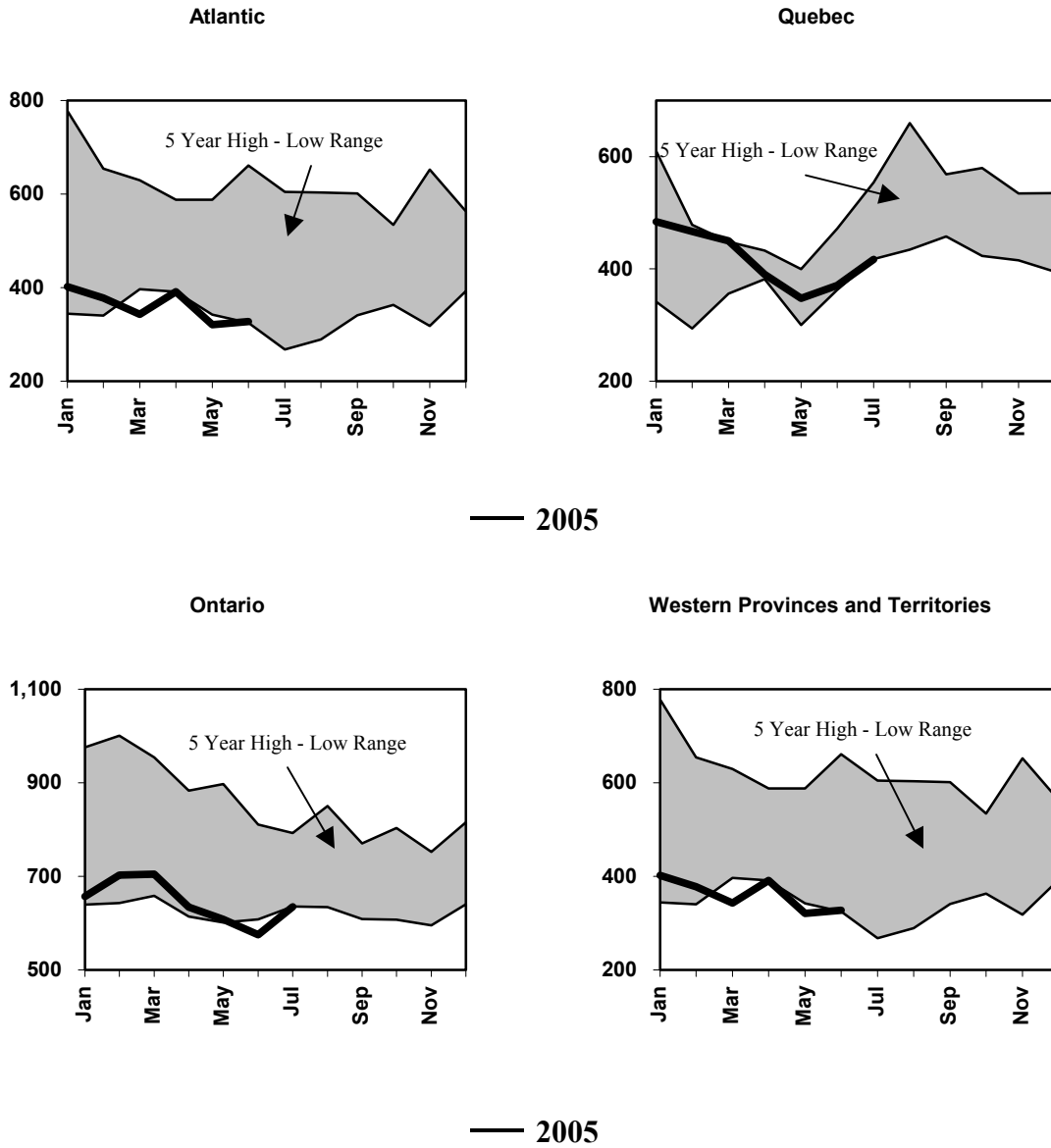
In Western Canada, refiners have indicated that although distillate inventories are slightly above the level experienced in 2003, current inventories are at the minimum level needed to maintain normal operations. The inventory situation in Western Canada is not expected to improve significantly until the Suncor upgrader is restarted in mid-September.

Figure 6
Gasoline Inventory Levels
 ('000 M³)



Source: Statistics Canada
 *May & June 2005 figures are preliminary based on early estimates

Figure 7
Middle Distillate Inventory Levels
 ('000 M³)

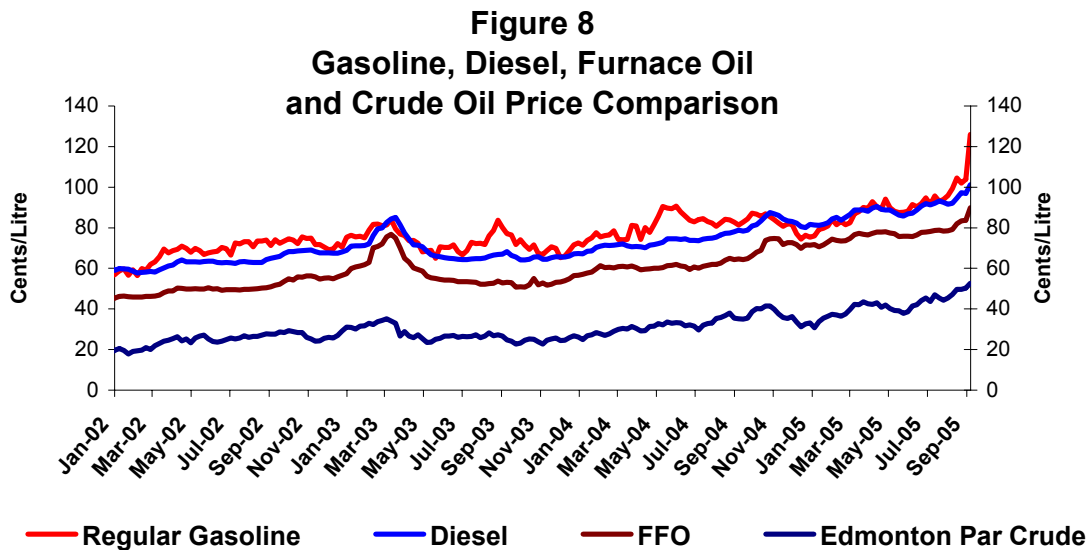


Source: Statistics Canada
 *May & June 2005 figures are preliminary based on early estimates

Petroleum Product Prices

Hurricane Katrina has caused significant damage to offshore rigs, refineries, pipelines, and ports in the Gulf of Mexico, with wide-scale electricity outages and flooding exacerbating the already devastated infrastructure, compounded by the evacuation of thousands of employees. Fourteen refineries have been affected by the storm with four flooded. Based on current information, this has the potential to reduce U.S. gasoline production by 103,000 m³/day (650,000 bbls/day) over the next two months – but a more detailed assessment is still required. Between Friday, August 26 and Tuesday, August 30, the spot price of gasoline in New York Harbour rose by \$0.78 US per gallon.

The Canadian refining industry was not directly impacted by Hurricane Katrina. However, because of the integrated nature of North American petroleum product markets, disruptions to the U.S. market will have significant ramifications here in Canada. The Canada average price of regular gasoline reached an all time high earlier in September at \$1.26/litre, with many centres in eastern Canada reporting prices over \$1.40/litre, more than 30 cents/litre higher than at the end of August. Gasoline prices have already started to recede, but prices are expected to remain high for the next several months.



Source: MJ Ervin & NRCan

As petroleum product prices in Canada are heavily influenced by wholesale prices at New York Harbour, supply problems in the U.S. will continue to put pressure on Canadian prices. According to the U.S. Energy Information Administration's (EIA) *Short-term Energy Outlook* released September 7, 2005, U.S. gasoline prices are expected to average \$3.00 US per gallon in September and \$2.57 US per gallon for the third quarter, up 36% from the third quarter of last year. However, improvements in the supply situation should result in substantial pump price decreases by the end of the year.

U.S. heating oil prices averaged \$1.83 per gallon during the 2004-2005 heating season, which was a 34% increase from the year before. Sharp increases are expected again for the 2005-2006 heating season. Average U.S. heating oil prices rose by 34% in the first half of 2005 over the same period in 2004, reflecting not only high crude oil prices, but also strong global demand for distillate. The EIA projects heating oil prices will be about 30% higher this winter compared to 2004-2005 and Canadian consumers should expect to see price increases of the same magnitude.

Impact of Higher Oil Prices on Consumers

Gasoline and heating oil prices in August 2005 are already 30 ¢/L higher than January 2002 levels. With investment banks like Goldman Sachs and CIBC World Markets developing scenarios that include a further spike in world crude oil prices to levels near \$100US/bbl, car ownership and home heating have obviously become more expensive and this trend may continue. Will these price increases change consumer habits?

The Cost of Operating a Vehicle

Table 1 shows, for a variety of car types, the increased fuel cost for consumers since 2002. Estimates of fuel consumption and fuel cost are based on a driving distance of 20,000 km annually, with a mix of 55% city and 45% highway driving. The 2002 base case uses the annual average gasoline price of 68.8 ¢/L and shows the annual fuel cost for a variety of vehicles. The subsequent columns show the increased cost of higher gasoline prices to consumers in each successive year.

Table 1
The Impact of Rising Gasoline Prices on Annual Fuel Costs

	Avg. Fuel Economy* litres/100km	Base Case - 2002 68.8 ¢/L	Increase in Average Annual Fuel Costs		
			2003 73.2 ¢/L	2004 81.3 ¢/L	2005** 87.8 ¢/L
Subcompact (Toyota Echo)	6.4	\$881	56.32	160.00	243.20
Compact (Honda Civic)	7.0	\$963	61.60	175.00	266.00
Mid-size (Chevy Malibu)	8.8	\$1,211	77.44	220.00	334.40
Full-size (Ford Five-Hundred)	10.6	\$1,459	93.28	265.00	402.80
Van (Dodge Caravan)	10.4	\$1,431	91.52	260.00	395.20
Pickup Truck (Chevy Silverado)	13.0	\$1,789	114.40	325.00	494.00
SUV (Dodge Durango 4X4)	15.4	\$2,119	135.52	385.00	585.20

*source: NRCan's Energuide *Fuel Consumption Guide 2005*

**January - July

Rising gasoline prices have increased annual fuel costs substantially, even for drivers of fuel-efficient vehicles. As illustrated by the above table, the 19 cent per litre increase in gasoline prices experienced since 2002 has added between \$243 and \$585 to annual fuel costs. If Canadian average gasoline prices remain above \$1.00 per litre, consumers could

pay between \$400-\$1000 more for gasoline in 2005 than they did in 2002, depending on the type of vehicle driven.

These increases could have a significant impact on the driving habits of Canadians, especially households with more than one automobile. If gasoline prices remain at current levels, we may not see consumers immediately trade-in their large SUVs for smaller, more efficient vehicles, but over the longer term, gasoline price increases could be reflected in consumer driving habits and vehicle purchase decisions. However, many motorists, particularly in rural areas, consider their use of gasoline to be non-discretionary, with very little room to reduce the number of miles driven.

The Cost of Heating a Home with Oil

Table 2 illustrates, for several different types of homes and for both low and medium efficiency furnaces, the average cost of heating a home with oil in 2002 and 2004. These heating costs are national averages, based on average temperature and degree-day calculations. Costs in specific centers 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 2 assumes that all these other factors remain constant and that only the fuel price changes. In addition, average increase in the total heating costs have been estimated for a range of furnace oil prices from 80¢/L to 130¢/L.

Table 2
Impact of Rising Fuel Oil Prices on Annual Heating Costs

House Type	Average Heating Costs		Increase in Estimated Average Heating Costs (Compared to 2002)				
	Fuel Price 50 ¢/l	2004 60 ¢/l	80 ¢/l	90 ¢/l	100 ¢/l	110 ¢/l	130 ¢/l
Townhouse							
Low-efficiency furnace	\$770	\$920	\$460	\$610	\$770	\$920	\$1,230
Mid-efficiency furnace	\$660	\$790	\$400	\$530	\$660	\$800	\$1,060
Old Detached							
Low-efficiency furnace	\$1,920	\$2,340	\$1,210	\$1,600	\$1,990	\$2,380	\$3,160
Mid-efficiency furnace	\$1,680	\$2,020	\$1,010	\$1,350	\$1,680	\$2,020	\$2,690
New Detached							
Low-efficiency furnace	\$1,400	\$1,680	\$840	\$1,120	\$1,390	\$1,670	\$2,230
Mid-efficiency furnace	\$1,200	\$1,440	\$720	\$960	\$1,200	\$1,450	\$1,930

Townhouse, inside unit - approximately 93 m² (1,000 square feet)

Old Detached House built in 1989 or earlier - approximately 186 m² (2,000 square feet)

New Detached House built in 1990 or later - approximately 186 m² (2,000 square feet)

Calculated based on NRCan's OEE publication: *Heating with Oil*

The increase in crude oil prices in the last two years has resulted in a significant rise in the average heating bill. With heating oil currently (September 2005) selling for about 80¢/L a litre, consumers can expect to pay anywhere from \$400 to \$1,200 more this winter (compared to 2002) to heat their home, depending on the size of their home and the type of furnace they use.

These increases could have very significant impacts on homeowners. It has long been recognized that rising energy prices, particularly for heating fuels, may have disproportionate effects upon low-income Canadians, who have less discretionary income to cope with sudden increases in the cost of essential services.

Although high furnace oil prices result in increased heating costs, other variables also come into play. As home heating is weather dependent, an unusually cold winter would result in increase fuel oil consumption, adding a further burden on homeowners. On the other hand, a milder winter could help offset the impact of rising prices.

Other than turning down their thermostat to reduce consumption, there are few options for heating oil users to reduce heating bills in the short-term. As Table 2 indicates, at 80¢/L, an upgrade from a low-efficient to a mid-efficient oil furnace, might reduce costs by as much as \$200 annually, which in the short term, is not sufficient to cover the costs of the new upgrade. While switching to other energy sources such as electricity or natural gas might be an option for some homeowners, these alternatives are either not available or not economical for many homeowners.

Summary

The Canadian petroleum industry has taken the necessary steps to ensure that adequate supplies of gasoline and distillate will be available to consumers this fall and winter. Refineries across North America that were not impacted by Hurricane Katrina are operating at full capacity to meet consumer demand. If demand for gasoline and diesel fuel continues to rise despite higher prices, petroleum product supplies in Canada will remain tight and prices will remain significantly higher than year ago levels. Motorists and homeowners who heat with oil will bear the burden of higher consumer prices this winter with a disproportionately greater share of this burden placed on fixed and low-income earners.