Canadian Petroleum Product Market Outlook
Spring 2008

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Natural Resources Canada
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Canada

The petroleum product supply available to consumers in Canada is determined mainly by domestic refinery production, inventories, and the efficiency of the infrastructure in place to deliver products to where they are needed. There continue to be a number of challenges facing the industry that could have a significant impact on petroleum product markets this summer.

Natural Resources Canada officials work closely with industry to identify risks and challenges facing the market. This report incorporates information provided by the Canadian refining industry with internal analysis of Canadian petroleum product markets from NRCan's Oil Division.

Overview

The fall of the U.S. dollar and rising trading activity in futures markets coupled with continued geopolitical uncertainty have led to record breaking crude oil prices this spring. While crude prices have increased substantially since last spring's report, gasoline prices in April were only about 13% higher than what they were the same month last year. Since Canadian refiners purchase their crude oil in U.S. dollars, Canadian consumers have been partially shielded from the increase, when filling up their fuel tanks, due to a strengthening domestic currency. To add to this, inventories of gasoline have been above the average for this time of year pushing refining margins down for this product.

While gasoline prices did not increase substantially (compared to crude oil), diesel fuel prices have certainly risen to record highs. Increasing global demand for both commercial and personal use has caused a dramatic decrease in inventories and a subsequent spike to record high diesel prices that significantly exceed the price of gasoline.

The increasing complexity of refineries and distribution networks will continue to bring challenges. The petroleum industry makes every effort to ensure that adequate supplies of gasoline and diesel fuel are available to consumers year round. All Canadian jurisdictions continue to face challenges related to the introduction of new regulations affecting fuel specifications, facility emissions and tight regional inventories.

Highlights

- Petroleum product prices in Canada have been exceptionally high this past year due to high world crude oil prices, refinery capacity constraints and resilient consumer demand.

- After two years of decreasing demand for petroleum products, total Canadian demand in 2007 increased by close to 4%.

- Strong economic growth in Canada is driving up the consumption of diesel, primarily through the agricultural, transportation and construction sectors. Over the last few years, this has led to higher annual growth in diesel fuel demand compared to more moderate growth in gasoline demand. As refiners cannot typically switch from gasoline to diesel production without significant investment, the increased demand has caused the price of diesel to exceed that of gasoline.

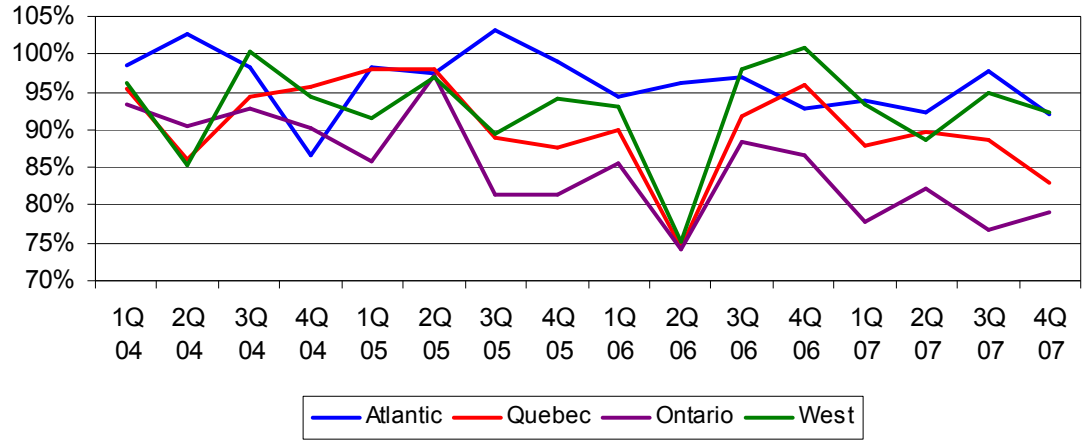
- The Canadian refining industry is operating at close to maximum capacity. The lack of spare capacity has reduced the flexibility of the market, making it more vulnerable to unexpected supply disruptions and substantially increasing the volatility of petroleum product prices. This was especially evident when a number of refineries had production problems last winter.

- This summer, Canadian gasoline and diesel fuel prices are expected to remain high all across Canada and will be vulnerable to upward pressures. By the end of April, retail gasoline prices had not reflected the full effect of record-setting crude oil prices, resulting in lower refiner margins. As gasoline inventories start to decline approaching the summer driving season, prices could increase.

Refinery Utilization Rates

Based on weekly crude oil runs, as reported to the National Energy Board, the Canadian refining industry typically operates at approximately 90% of capacity[1]. Essentially, the industry is operating at full capacity, with deviations relating to unplanned shutdowns and extended refinery maintenance turnarounds. With increasingly complex refineries, unplanned shutdowns have become more common than in the past few years – particularly in Ontario.

Figure 1: Refinery Utilization Rates



Source: National Energy Board

This became evident in southern Ontario in early February 2007 when refiners struggled to maintain supply to this region. As is illustrated in Figure 1, Ontario's refinery utilization was much lower than other regions of the country. Ontario refiners have continued to have problems keeping their utilization rates sustained since that time.

The second quarter 2006 drop in utilization rates (in most regions) can be attributed to the implementation of ultra low sulphur diesel (ULSD). At that time, many refineries were shut down while maintenance was performed, and new equipment installed, to enable the production of diesel with sulphur levels below 15ppm. The significant drop in utilization in the Quebec region in the fourth quarter can be attributed to an unplanned slowdown at Shell's Montreal refinery.

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. In preparation for the summer driving season, refiners are maximizing gasoline production with little ability to further increase supplies. With increasing diesel

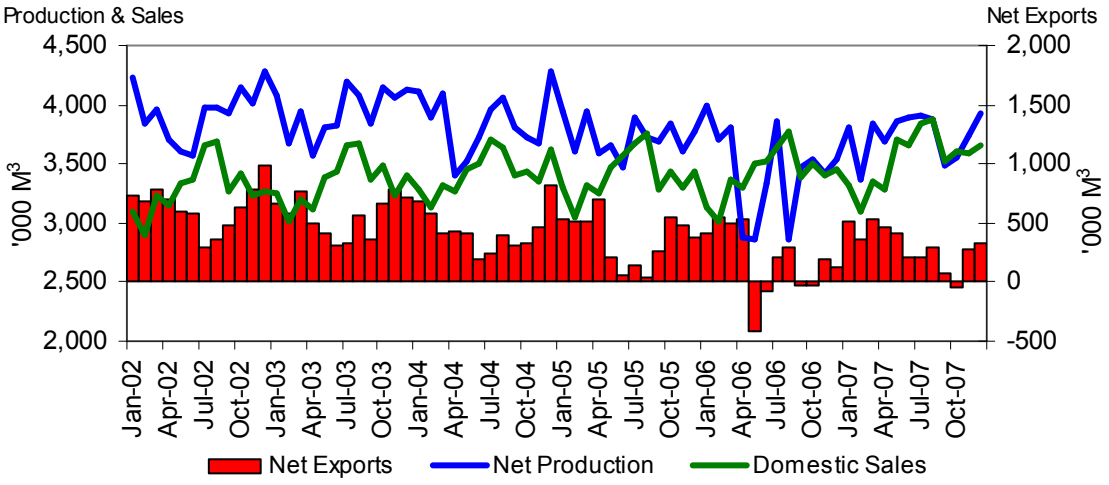
[1] Due to regularly scheduled maintenance shutdowns and other short-term unplanned events that reduce utilization, 95% is considered to be the optimum refinery utilization rate. However, because utilization rates also take into account normal refinery maintenance turnarounds, by delaying normal maintenance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

demand, refiners have found themselves maximizing diesel production at times when they would typically have maximized gasoline production.

Gasoline and Diesel Fuel Supply and Demand

Figure 2 depicts the relationship between Canadian production of gasoline and domestic sales. The graph illustrates the seasonal nature of gasoline demand and the fact that production has typically been substantially higher than consumption. Canada also exports significant volumes of gasoline, primarily to the U.S. eastern seaboard from Atlantic Canadian refineries. Although this continues to be the case, with increasing demand and decreasing net production, net exports have decreased over the last five years. The situation is very similar for diesel fuel. The introduction of ULSD in 2006 required many refineries to shut-down operations for longer than normally required for summer and fall maintenance. This, along with tight North American product supply, caused Canada to be a net importer of gasoline for a number of months in 2006.

Figure 2: Gasoline Supply vs. Demand



Source: Statistics Canada

In 2007, in spite of an increase of about 4% in gasoline prices over 2006, Canadians consumed 43 billion litres of gasoline, an increase of about 4% over 2006 following a marginal increase in demand during 2006. Given higher prices, one may have expected demand to decline. Whether demand will continue to be resistant to these price increases is uncertain. However, even if demand growth slows this year, growth is still anticipated.

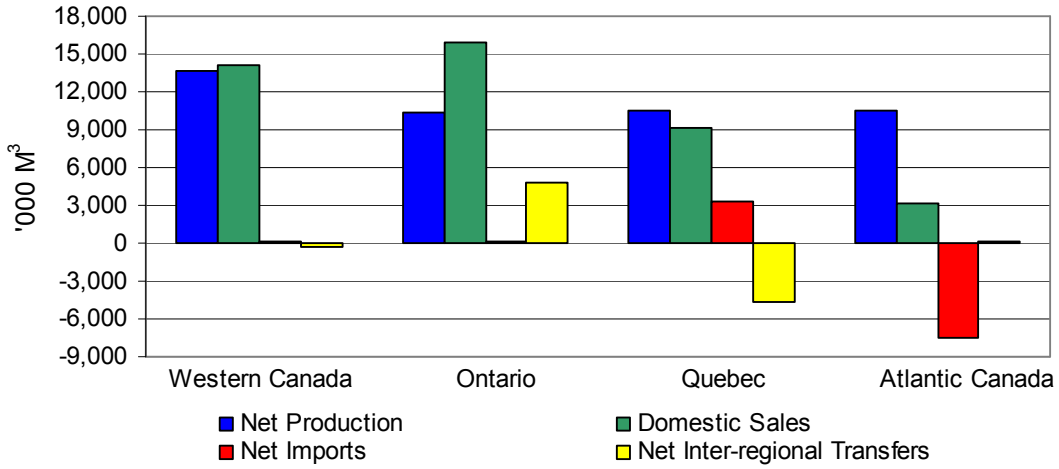
Unlike gasoline, domestic sales of diesel have been increasing since 2003. Despite significant price increases in 2007, diesel demand grew by 5% over 2006, reflecting the strong growth in the Canadian economy and a growing proportion of diesel-powered vehicles in the fleet. Most of this growth can be attributed to increased diesel use in the agricultural, mining and energy sectors of western Canada. However, with increasing fuel efficiency standards being imposed on vehicle manufacturers by governments, automobile companies have indicated that they will be introducing more diesel-powered vehicles in order to adhere to the regulations. Demand for diesel fuel is expected to

continue to grow in 2008 as retail consumers (non-commercial) start to take notice of the efficiency and durability of diesel engines.

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

Refineries in Atlantic Canada produce a surplus of petroleum products. In fact, in 2007, 65% of the products manufactured in Atlantic Canada were exported, accounting for over 70% of Canada's total exports of refined petroleum products. Atlantic Canadian refiners have been very successful in marketing their ultra-low sulphur products into the U.S., with some cargoes reaching destinations as far away as California. Currently, two companies, Irving Oil and Newfoundland and Labrador Refining Corporation, are evaluating the possibility of building new refineries in the region which would further expand exports to the U.S. Despite being a large exporter of petroleum products, Atlantic Canada also has good access to imports. Domestic refiners must compete with supplies from the northeastern U.S. and Europe.

Figure 3: 2007 Regional Gasoline Supply/Demand Balance



Source: Statistics Canada

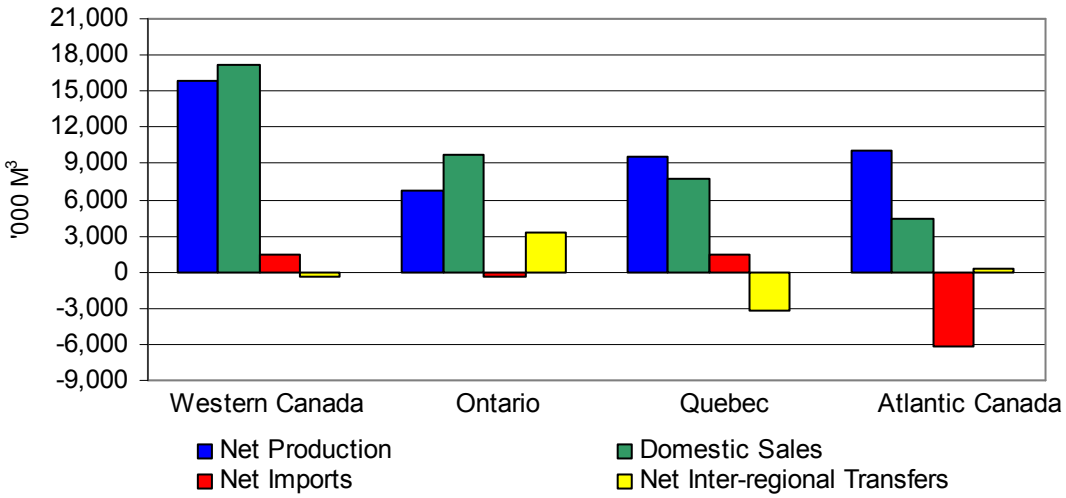
The Quebec and Ontario markets are becoming increasingly integrated with significant Quebec production being transported to Toronto via the Trans-Northern pipeline. Quebec also serves as a gateway to Ontario for imported products. Although Figure 3 indicates that Quebec is a large net importer, much of that product is ultimately consumed in Ontario.

Since the closure of the Petro-Canada Oakville refinery in March 2005, Ontario has become quite dependent on imports and inter-regional transfers. During normal times, Ontario is short both gasoline and diesel fuel. Last year, imports and transfers from other provinces (mainly Quebec) accounted for close to 35% of gasoline sales and 40% of distillate sales. Most of this product comes from Quebec via the Trans-Northern Pipeline.

With the Oakville refinery now closed and Trans-Northern Pipeline utilized at full capacity, the Ontario market remains vulnerable to short-term price spikes in the event of an unplanned refinery shutdown. Differing fuel specifications between Ontario and adjacent U.S. markets have compounded the problems as gasoline imports must be arranged well in advance. Any unplanned refinery shutdowns can require significant price increases to encourage the re-routing of supplies destined for NY Harbour (during the summer months when the Seaway is open) or to encourage specialty blending by refiners in adjacent U.S. states.

Ontario refiners have indicated that they normally do not have significant problems obtaining sufficient gasoline imports, which can be blended to meet Canadian specifications on request. However, this takes some advance notification and is more expensive. With the divergence of fuel specifications between jurisdictions, obtaining alternate supplies that meet regulatory requirements may become more difficult. 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.

Figure 4: 2007 Regional Middle Distillate Supply/Demand Balance



Source: Statistics Canada

In Western Canada, the supply and demand for petroleum products continues to be very tight. Refineries have been operating at 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 (also a very tight market). 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 play a significant role in balancing supply and demand in this region. In 2007, imports of gasoline increased substantially in the region indicating an increasingly tight market for not only distillate, but other products as well.

Gasoline and Diesel Fuel 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. This said, refiners have ensured that there are sufficient inventories to cover short-term supply interruptions.

Although diesel inventories have remained relatively stable, gasoline inventories have seen a drop in recent years. Canadian refiners have indicated that inventory levels for gasoline and diesel fuel appear adequate heading into the summer driving season; refiners usually build inventories in the months leading up to peak demand periods. Several planned and unplanned refinery closures in western Canada this winter and spring have put a strain on inventories which may be difficult to replenish heading into the summer driving season.

The drop in Quebec gasoline inventories can be attributed to the draw on inventories required to meet demand as a result of the unplanned slowdown mentioned in the previous section.

As is normal for this time of year, many companies are performing seasonal maintenance on their refineries. These turnarounds are typically planned well in advance, and as such, companies build inventories to levels that can meet demand throughout the shutdown period. Typically, a turnaround will last anywhere from 1-4 weeks and does not always affect the entire refinery's operations.

Refiners have arranged for alternate supply during these shutdowns, but large inventory drawdowns could be necessary if shutdowns last longer than anticipated or if problems arise during re-start.

Inventories in the U.S. have been abnormally high this spring but are now seeing signs of decline. While Canadian inventory levels determine the adequacy of supply in Canadian markets, it is U.S. inventory levels that drive prices across all of North America.

Figure 5: Canadian Gasoline Inventory Levels for 2007 and Historical 5-Year High-Low Range ('000 M^3)

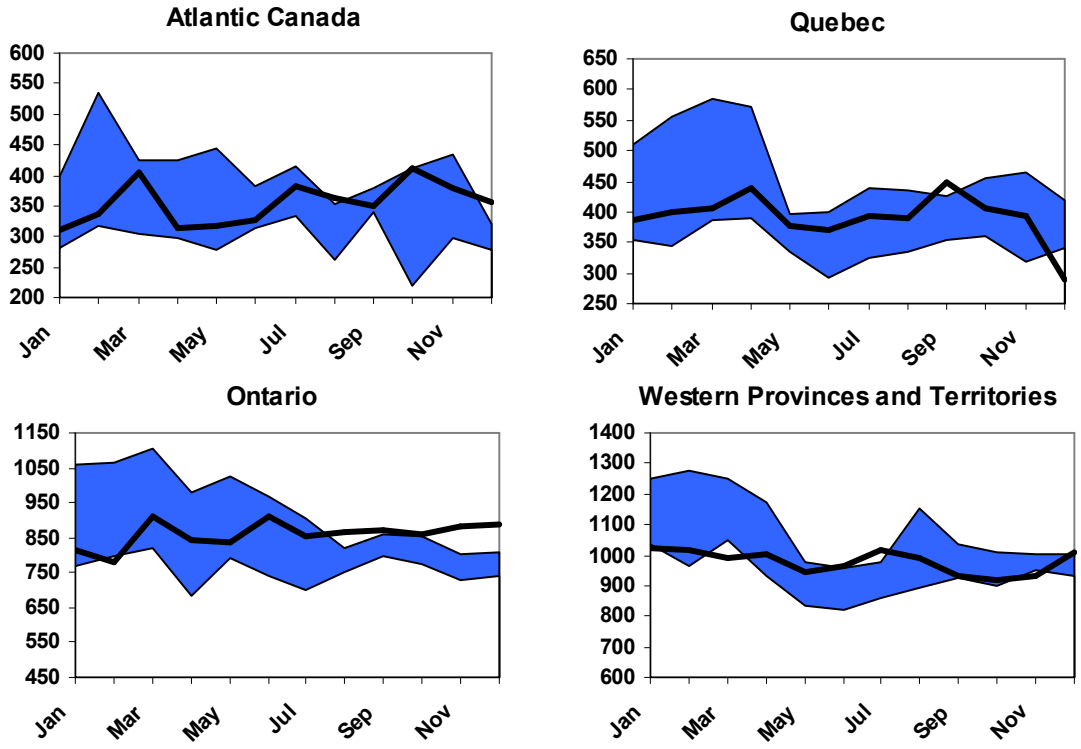
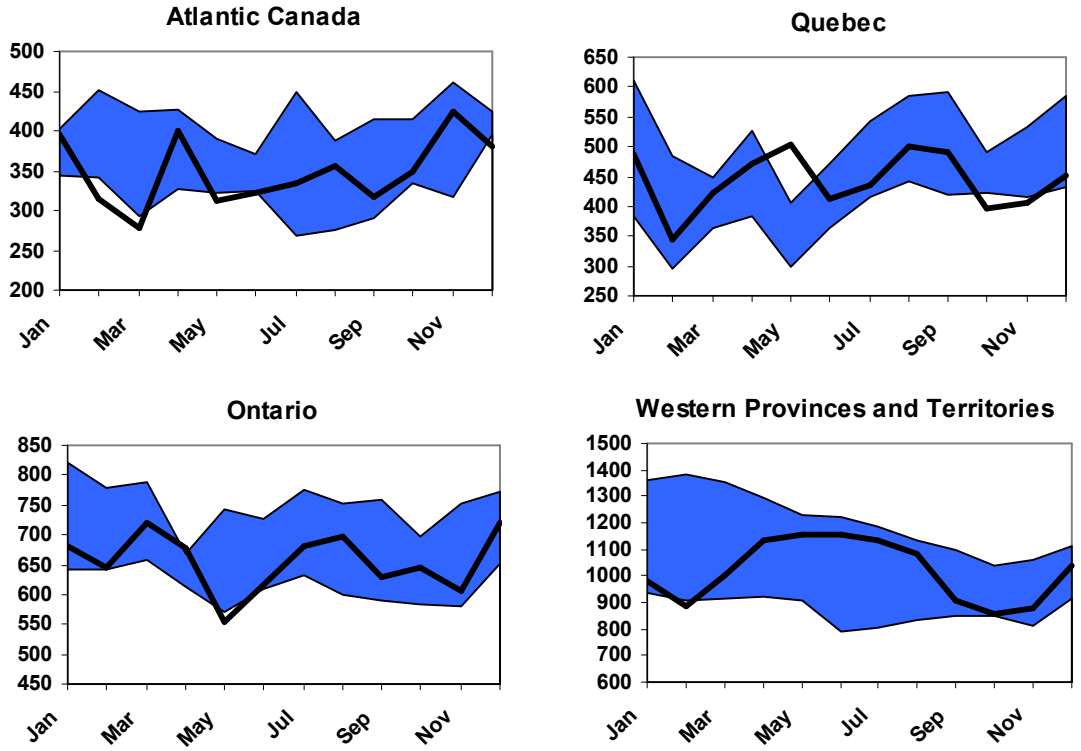


Figure 6: Canadian Middle Distillate Inventory Levels for 2007 and Historical 5-Year High-Low Range ('000 M^3)



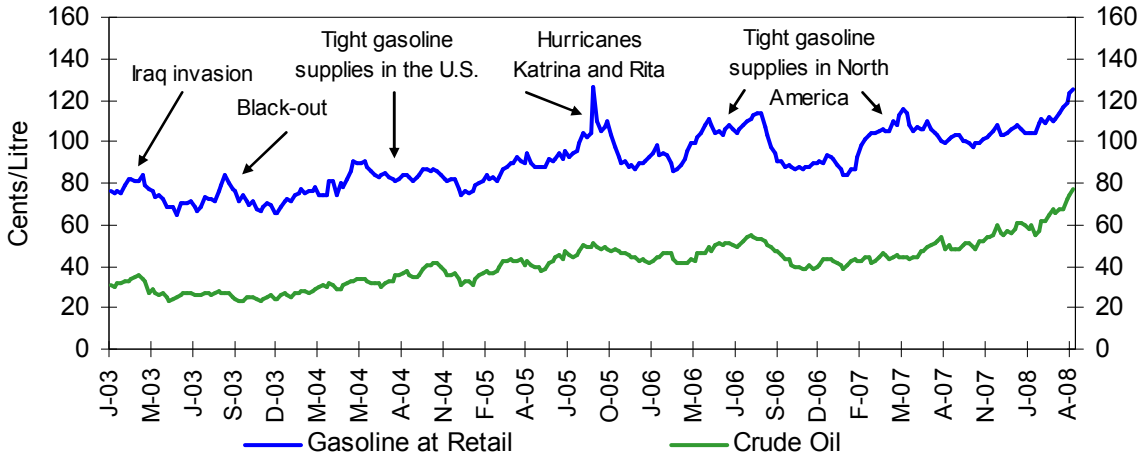
Petroleum Product Prices

Crude oil prices have been quite volatile over the last two years. While it is hard to say precisely why prices are at current levels, many factors have contributed to a near doubling of prices since this time last year. The most apparent of these factors are: the decline of the U.S. dollar, increased investment in the futures market, increasing demand in non-OECD countries, the increasing cost of producing oil, consumer subsidies in key growth areas (e.g. China) as well as geopolitical activity in producing countries.

The Canadian average gasoline price in April 2008 was 119.4 cents per litre. This compares to an average price in April of last year of 105.5 cents per litre. Figure 7 provides a graph of recent crude oil and gasoline price trends in Canada.

The seasonal increase in gasoline demand, April through September, traditionally results in higher gasoline prices during the summer. As Canadian wholesalers base their rack price on New York Harbour, anything affecting the price of gasoline in the U.S. typically affects Canadian prices.

Figure 7: Gasoline and Crude Oil Price Comparison



Source: Natural Resources Canada

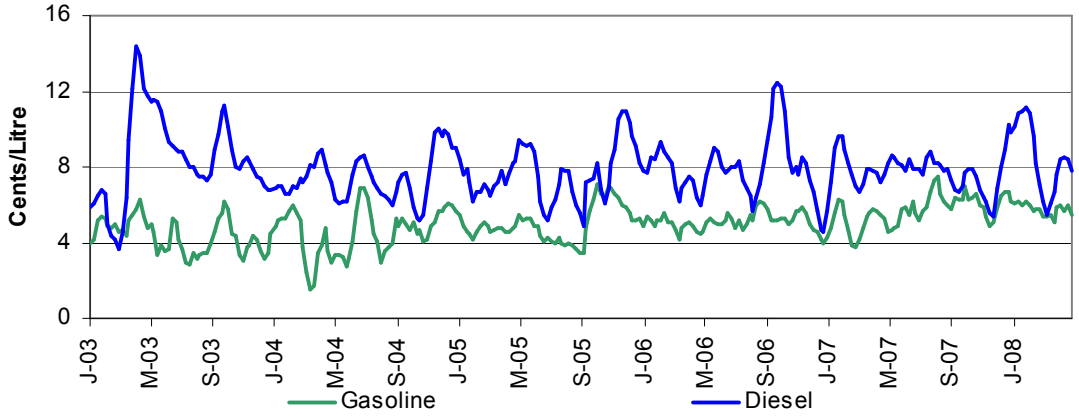
Strong demand for oil and refined products from developed and emerging economies like China and India continues to put upward pressure on prices.

In April 2008, crude oil costs and consumption taxes represented about 88% of the retail price of gasoline. The remaining portion corresponded to industry margins. These margins cover the costs of producing and distributing gasoline as well as provide a profit for the refiner and retailer.

Traditionally, there is a 5-6 cent/litre difference between the peak summer prices and lower winter prices, all other components being equal, which reflects the strong up-take in demand during the summer driving season and the higher costs associated with producing summer grade gasoline. Last year, the price of gasoline increased earlier in the spring than is typical, due in part to a tight supply. This year, a surplus in gasoline

inventories have helped keep prices depressed. The seasonality of marketing and refining margins is reflected in Figures 8 and 9.

Figure 8: Canadian Marketing Margins



Source: Natural Resources Canada

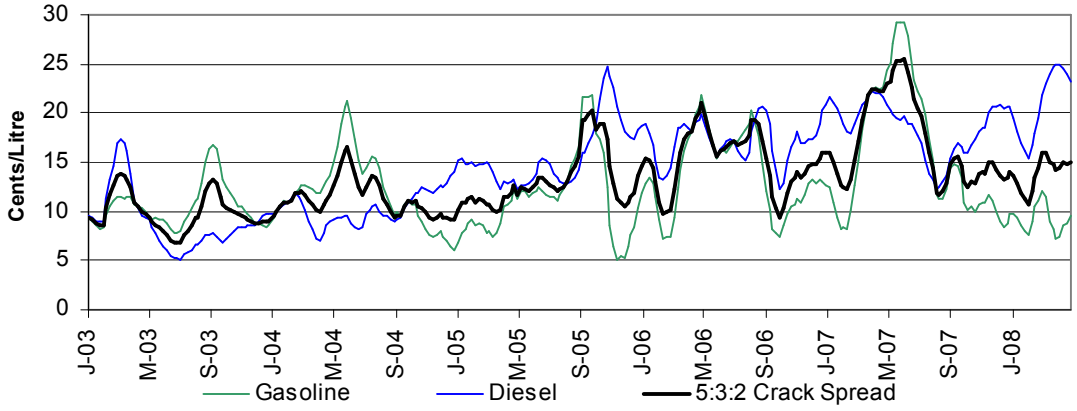
Ignoring seasonal fluctuations, marketing margins have only increased slightly over the past several years. As gasoline retailing is extremely competitive, these margins are expected to remain at current levels for quite some time.

On the other hand, refining margins have seen a gradual increase over the past five years. Recent environmental and fuel quality regulations coupled with aging equipment have forced refining companies to invest billions of dollars to upgrade their existing facilities. As the environment becomes more of a concern, both nationally and internationally, and refiners invest in capacity expansion, it is expected that high refining margins will be a long-term reality. The main driver of increased volatility in refining margins seen over the past few years is the tight North American supply of petroleum products and significant unplanned refinery downtime. Despite higher prices at the pump, in March and April of this year, refining margins for gasoline were lower than normal, but due to strong distillate demand pushing up the prices of diesel, average refining margins are still within the historical range.

A refining margin which takes into account the revenue from multiple product streams shows a better picture of industry revenues than one that is only representative of gasoline. On average, for every 5 litres of crude oil, Canadian refiners produce about 3 litres of gasoline and 2 litres of distillate. For this reason, figure 8 uses a weighted average representation of Canadian gasoline and diesel production to calculate refining margins – known to industry as a 5:3:2 crack spread. It must be noted that these are total refining margins which have to cover all costs to the refiner before any profit is made.

According to the U.S. Energy Information Administration's *Short-Term Energy Outlook* (STO) released in April 2008, U.S. gasoline prices are expected to average $3.54 U.S. per gallon this summer, up from last summer's average of $2.93 U.S. per gallon. It can be expected that these prices will be reflected in the price of gasoline in Canada.

Figure 9: Canadian Refining Margins



Source: Natural Resources Canada

Diesel fuel prices in Canada rose to $1.30 per litre in April 2008 from 98.4 cents per litre for the same period in 2007. According to the STO, U.S. retail diesel fuel prices are expected to average $3.73 U.S. per gallon over the summer. Last summer, U.S. diesel prices averaged $2.20 U.S. per gallon. Prior to 2005, gasoline typically sold at a premium to diesel in both Canada and the United States.

Historically, Canadian gasoline prices have been higher than diesel prices at the retail level due in large part to the preferential tax treatment for diesel[2]. However, strong world demand growth for diesel fuel vis-à-vis other petroleum products has put significant upward pressure on distillate prices so that diesel fuel often sells for a higher retail price than gasoline, despite the difference in tax treatment. Given the current challenges and increased costs associated with producing ULSD and the push for increased diesel use in marine applications, diesel prices are likely to continue to exceed gasoline prices throughout the summer.

The Cost of Operating a Vehicle

Table 1 shows, for a variety of car types, the increased fuel cost for consumers over the course of a year. 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 base case, using gasoline prices of 101.8 ¢/L (the 2007 Canadian annual average) shows the annual fuel cost for a variety of vehicles. The remaining columns indicate the increased/decreased fuel costs for a number of price scenarios.

As illustrated by the table, an increase in annual average prices to $1.40/L could add as much as $1,200 to annual fuel costs for a vehicle. If April 2008 prices were to prevail for the rest of the year, annual vehicle operating expenses could increase by between $130 and $520 over 2007, depending on the type of vehicle driven.

[2] The federal excise tax on gasoline is 10 cents per litre compared to only 4 cents per litre for diesel fuel, giving diesel a comparative price advantage at the retail level.

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

		Avg. Fuel Economy* litres/100 km	Base Year 2007	Change in Average Annual Fuel Costs from 2007	
			$1.02**	**$1.20**	**$1.40**
Hybrid	Toyota Prius	4.1	$834	$147	$311
Subcompact	Pontiac Wave	7.6	$1,579	$279	$588
Compact	Ford Focus	7.4	$1,484	$262	$553
Mid-size	Honda Accord	7.9	$1,642	$290	$612
Full-size	Chrysler 300 AWD	11.7	$2,315	$409	$863
Van	Dodge Grand Caravan	10.9	$2,291	$404	$853
SUV	BMW X5	13.3	$2,380	$420	$887
Pickup Truck	Nissan Titan 4x4	14.9	$3,140	$554	$1,170

Source: NRCan's Fuel Consumption Guide 2008
*55% city, 45% highway
**Average retail price for regular unleaded gasoline in 2007

With the popularity of diesel vehicles on the rise, one way that consumers can lower their fuel costs is to purchase a diesel vehicle. While the price of diesel is certainly on the rise (to the point where it is more expensive than gasoline), the increased energy content in diesel fuel still makes this type of vehicle an economical alternative. For example, a 2006 Volkwagen golf TDI gets 5.5 litres/100 km which would result in annual fuel costs (given the same assumptions as in the chart above) of about $1,000 at the 2007 price of $1 per litre for diesel. Using the same assumptions, a 2008 model year full size GMC Sierra truck running on diesel gets 12.3 litres/100 km and has an annual fuel cost of about $2,500. At $1.20/litre, annual fuel costs for these two vehicles would be about $1,300 and $3,000 respectively.

Conclusion

This April, despite record prices for crude oil, gasoline prices only increased marginally compared to last April. This has led many analysts to believe that prices this summer may rise. On the other hand, diesel prices reacting to a tight world supply, have increased. Persistently high crude oil prices, stricter fuel specifications, the tight North American supply situation and increased demand are all expected to contribute to high prices this summer.

Gasoline and diesel fuel supplies appear to be adequate heading into the summer driving season. Nonetheless, markets continue to be vulnerable to an unanticipated supply interruption such as an unplanned refinery closure or supply distribution problems.