



The Conference Board of Canada
Insights You Can Count On

CHANGES IN THE CANADIAN DIESEL INDUSTRY AND THEIR IMPACT ON TRUCKING AND FARMING

HIGHLIGHTS

The end price for diesel products is strongly affected by external factors beyond the control of the industry.

Size matters. Discounts based on volume may be negotiated, particularly in the trucking industry.

Service above all. Farmers are concerned that the high level of service and dependability they expect may be threatened by increasing diesel industry rationalization.

- Better fuel management by users will be required in the future.





The Conference Board of Canada
Insights You Can Count On

About The Conference Board of Canada

The Conference Board of Canada is an independent, not-for-profit research organization with affiliates in the United States and Europe. Our mission is to help our members anticipate and respond to the increasingly changing global economy. We do this through the development and exchange of knowledge about organizational strategies and practices, emerging economic and social trends and key public policy issues. Since 1954, the Board has been committed to researching innovative practices, designing new strategies and providing our members with the most up-to-date information, analysis and expertise to help them excel in Canada and around the world.

About the Economic Services Group

The Economic Services Group is a research division at The Conference Board of Canada. The Group's purpose is to address the specific information requirements of the Conference Board's members by conducting financed research. Services include customized economic forecasting at the municipal, provincial and national levels; economic impact analysis; custom-tailored econometric models; consumer and business attitudes surveys; and analysis of the economic implications of changes in public policy.

Authors Michael Sperber, Principal Research Associate • Stephen Vail, Senior Research Associate • Frédéric Clavet, Research Associate

Editing Julie Swettenham • **Layout** Sophie Tremblay

©2001 The Conference Board of Canada*

Special Report

Printed in Canada • All rights reserved • ISBN 0-88763-508-3

*Incorporated as AERIC Inc.



Contents

Glossary . . . . .	.ii	Exhibits	
Executive Summary . . . . .	.v	Exhibit 1—Bulk Fuel Terminals in Canada that Post Rack Prices for Diesel . . . . .	.4
Introduction . . . . .	.1	Exhibit 2—Import Alternatives . . . . .	.8
The Diesel Industry in Canada . . . . .	.3	Exhibit 3—Asymmetry at the Wholesale Level . . . . .	.8
Overview . . . . .	.3	Exhibit 4—How far can a truck travel on a tankful of diesel? . . . . .	.14
Wholesale . . . . .	.3	Tables	
Production of Diesel . . . . .	.3	Table 1—Diesel-Producing Refineries in Canada . . . . .	.4
Diesel Fuel . . . . .	.5	Table 2—Applied Taxes on Diesel in 2000 . . . . .	.9
Diesel Pricing . . . . .	.6	Table 3—Financial Returns of the For-Hire Trucking Industry . . . . .	.12
Taxes . . . . .	.9	Table 4—Rack Price for Regular Sulphur Diesel . . . . .	.44
Trucking . . . . .	.11	Table 5—Rack Price for Low Sulphur Diesel . . . . .	.44
Overview . . . . .	.11	Table 6—Results of the Analysis on Price Asymmetry, 1992–2000 . . . . .	.45
Relationship with the Diesel Industry . . . . .	.13	Table 7—Results of the Analysis on Price Asymmetry, 1992–99, for Regular Sulphur Diesel . . . . .	.45
Diesel Purchasing Arrangements . . . . .	.17	Charts	
Farming . . . . .	.21	Chart 1—Diesel Consumption by Sector for 1999 . . . . .	.6
Overview . . . . .	.21	Chart 2—Average Refiner Margin in Canada for Regular Sulphur Diesel . . . . .	.7
Relationship with the Diesel Industry . . . . .	.21	Chart 3—Trucking Industry Structure and Revenues . . . . .	.12
Case Studies . . . . .	.27	Chart 4—Cardlock/Keylock Locations by Brand . . . . .	.15
Moncton, New Brunswick . . . . .	.27	Chart 5—Rack Price for Regular and Low Sulphur Diesel and Price for Crude Oil . . . . .	.43
Saint-Hyacinthe, Québec . . . . .	.29	Chart 6—Rack Price for Regular Sulphur Diesel and Furnace (Heating) Oil in Canada . . . . .	.46
Winnipeg, Manitoba . . . . .	.31	Chart 7—Rack Price for Regular Sulphur Diesel and NYMEX Heating Oil . . . . .	.46
Regina, Saskatchewan . . . . .	.33		
Guelph, Ontario . . . . .	.35		
Conclusions . . . . .	.39		
Appendix A—Empirical Analysis . . . . .	.43		

Glossary

Ad valorem tax—an indirect tax that is expressed as a percentage of the price of a commodity, e.g., Goods and Services Tax (GST), Provincial Sales Tax (PST) and Harmonized Sales Tax (HST)

Branded agency—a distributorship that sells the products and carries the banner of one particular refiner-marketer. Branded agents are generally delivery or contract haulers for their supplier.

Bulk plant—a storage facility used in the wholesale segment of the petroleum industry, comprised of a gathering of small- to medium-sized tanks

C.O.D.—cash on delivery

c.p.l.—cents per litre

Cardlock—fuelling facility for trucks that operates with an access card

Courier—transporters of small packages, generally providing door-to-door service or combining different transportation services, such as intercity bus, air cargo or less-than-truckload services

Crude oil—the raw material from which petroleum products are manufactured

Dealer—a generic term referring to an operation that sells diesel product to the end user

Diesel fuel—crude-oil based product that is used for non-heat applications, primarily in the industrial, trucking and farming sectors

Downstream—the segment of the oil industry involved in refining and/or marketing of petroleum products such as diesel

Excise tax—the federal or provincial tax on diesel fuel purchased by end users, established at a certain level of cents per litre. An excise tax is a flat tax and does not change as diesel prices change.

For-hire—a trucking company that offers transportation services for compensation

Full-load (TL)—a shipment that comprises a full truckload

GDP—Gross Domestic Product

Independent broker—another term for an owner-operator

Independent reseller—marketers with no branded affiliation with a regional or major refiner who sell diesel under their own brand name. They secure their supply of diesel from refiners or large wholesalers.

Integrated oil company—a fully integrated oil company is involved in the upstream and downstream segments of the industry. A partially integrated oil company is involved in all the aspects of the downstream segment only.

IFTA—International Fuel Trade Agreement

Keylock—fuelling facility for trucks, usually located in front of a bulk plant that operates with an access key to activate the fuel pump

Less-than-truckload (LTL)—cargo that is less than a full truckload. A shipper that carries LTL loads usually requires warehousing, handling and consolidation facilities.

Load broker—a company or agent that locates cargo loads for the trucking industry. Load brokers are often used to avoid empty backhauls by trucking companies.

Logistics company—a company that handles the transport and cargo handling requirements for a client company. Logistics companies often have their own trucks or else contract out the shipping to for-hire companies.

Low sulphur diesel (LSD)—diesel that is used primarily in the transportation sector. LSD has the same characteristics as regular sulphur diesel (RSD) but has a lower sulphur content, less than 500 parts per million.

Majors—multinational and national integrated oil companies (Imperial Oil, Petro-Canada and Shell)

Marketer—any operation that sells diesel or other products to the end user, such as refiner-marketers, independent resellers and distributors

On-site storage—storage tank for diesel fuel located on the premises (i.e., on the farm or on the property of the trucking company)

OPEC—the Organization of Petroleum Exporting Countries

Owner-operator—a trucker who typically works under contract for either for-hire or private carriers, generally using his/her own tractors

Private carrier—a trucking division of a larger company, such as a retailer or manufacturer, which hauls its own goods

Rack price—the posted wholesale price of diesel

Refiner—an organization that produces a range of petroleum products from crude oil suitable for consumer use, such as diesel fuel

Refiner margin—the difference between the rack price of diesel and the price of crude oil, the amount the refiner receives to cover its operating costs

Regionals—regional integrated oil companies (Irving, Ultramar, Sunoco, Parkland, Federated Co-operatives, Husky, Chevron and Arco)

Regular sulphur diesel (RSD)—diesel fuel used for off-road applications such as farming. RSD contains the same amount of standard sulphur as furnace fuel, but it has additives so that it does not gel under lower temperatures. RSD contains less than 5,000 parts per million of sulphur.

Reseller—a fuel supplier who buys his diesel from a refinery, on-the-spot market or through imports and resells this product to end users

Supplier—an organization that supplies diesel products to end users

Terminal—storage facility used in the wholesale segment of the oil industry, usually comprised of a gathering of large-capacity tanks

Throughput—the volume of diesel sold at an outlet such as a cardlock or truck stop in a given period, usually expressed in litres per month or per year

Truck stop—fuelling facility, usually with facilities for truck drivers (i.e., convenience store, restaurant, showers, etc.) at which any customer can fuel his/her truck

Upstream—the segment of the oil industry involved in the exploration and/or production of crude oil

CHANGES IN THE CANADIAN DIESEL INDUSTRY AND THEIR IMPACT ON TRUCKING AND FARMING

The purpose of this report is to examine changes in the Canadian diesel industry and to look at how these changes are affecting two of the most important users of diesel fuel—Canadian truckers and farmers. The study does not attempt to be exhaustive, but rather attempts to present a clear overview of how the diesel industry and its distribution network function while at the same time identifying preoccupying issues for both the agricultural and trucking sectors relating to fuel. Research was conducted through an in-depth examination of five typical regions in Canada.

The diesel industry in Canada, as is the case for all petroleum-based products, follows economic rules of supply and demand, over which it has minimal control. The price of diesel's major input, crude oil, is determined outside Canada on a world market. Similarly, diesel prices themselves are more strongly influenced by continental and world conditions than they are by cost, supply or demand factors within Canadian borders. Consumers of diesel experienced this in September 2000 when low U.S. home heating fuel inventories pushed diesel prices for Canadian truckers and farmers to record levels.

The trucking industry in Canada has been growing rapidly over the past several years due to increased demand for trucking services as well as the ease of entry into the sector. This has resulted in a highly competitive industry, with thousands of players both small and large. The large number of competitors has meant that there have been few rate increases over the past decade. As a result, increases in fuel costs can have an impact on the financial viability of both trucking carriers and independent owner-operators.

Trucking companies get their diesel fuel in a number of ways. Some maintain on-site storage tanks while others rely heavily on roadside cardlocks, operated by the major and regional oil companies, or independent truck stops. Often a trucking carrier will rely on a combination of these sources. National supply networks are increasingly important for trucking carriers as interprovincial and international business grows. Modern trucks have a fuel range that can average over 3,220 kilometres (2,000 miles). This allows companies to seriously consider supply options in different regions as well as across the U.S. border, depending on the routes being travelled. Volume is an important

factor when it comes to setting fuel prices. Carriers using large volumes of diesel receive better prices for their fuel than smaller carriers or independent owner-operators.

The farming sector has different needs than the trucking industry regarding diesel fuel. Farmers use smaller quantities of diesel and, unlike trucking, they are not mobile consumers; that is, they rely on fuel being delivered to their farms where it is kept in relatively small on-site storage tanks. Service is a most important consideration for farmers in that they cannot afford to run out of fuel during intense times, such as at harvest. The elimination of local suppliers as part of a rationalization of distribution points by oil companies has caused some farmers concern as to whether this will lead to a decline in the responsive service they have come to expect. Farmers are very reluctant to increase their on-site fuel storage capacity, so they will likely have no choice but to devote more time to fuel-management issues.

Diesel fuel is a much more significant cost input for Canadian grain producers than for other types of farmers. Increases in the price of diesel are having a serious impact on grain farmers. In addition, grain farmers are being required to transport their crops greater distances to more efficient grain terminals, while at the same time they have been receiving very low world prices for their harvest. Generally, diesel prices for farmers are affected by the volume purchased. Most farmers are not locked into long-term contracts and are more responsive to a change in service than a change in price.

Canadian farmers and truckers raised several concerns relating to the various relationships that exist between diesel prices and external factors. These preoccupations can be summarized in four specific questions that the study examined both qualitatively and from an empirical point of view.

1. Does the price of diesel follow the price of crude oil?

The study finds a *strong correlation between crude prices and diesel prices* at the wholesale level. The price of crude oil makes up approximately 75 per cent of the ex-tax wholesale price distributors paid for diesel. As crude

oil prices change, diesel prices follow suit. A one-cent increase (decrease) in the cost of a litre of crude oil normally leads to a price increase (decrease) of one cent in a litre of diesel.

2. Does the price of diesel adjust faster to an increase in the price of crude oil than to a decrease?

In economic terms, this behaviour is referred to as asymmetry. The study found that by looking at data from 1992 to 2000, diesel prices at the rack or wholesale level rise more quickly than they fall during the first few days that follow a crude price increase. However, at the end of a one-month period, the full price change in crude oil has been reflected in wholesale diesel prices, whether it is an increase or a decrease. The pattern at the end-user level may differ because of prices that may be guaranteed to customers for a set period of time regardless of wholesale diesel price changes.

3. Why does the price of heating fuel have an impact on the price of diesel?

Regular sulphur diesel fuel and heating oil can both be used for home heating. *A shortage in heating oil affects the demand for, and subsequently the price of, diesel fuel.* The study found that the prices track each other very closely.

4. Is the price of diesel influenced by prices in the United States?

Our study of the data since 1997 confirms that *American and Canadian markets are closely tied to each other.*

Diesel products can both be exported and imported freely between Canada and the United States as well as other countries. Canadian refiners are particularly sensitive to competition from American refiners and take U.S. rack prices into account when they set their own wholesale prices.

Another factor that underlines the importance of U.S. diesel prices on Canadian prices is the fuel range of modern trucking fleets. Much of Canada's trucking takes place on north-south routes between Canada and the United States. If diesel prices were much more expensive in Canada than the United States, trucks would purchase the majority of their fuel south of the border. This U.S. influence on prices affects all diesel purchasers in Canada, whether they are involved in cross-border transport or not.

The diesel industry in Canada has a limited number of players. Particularly in relation to on-road fuel and the trucking industry, only the three major integrated oil companies sell diesel fuel across Canada and across all the major trucking routes. Regional refiner-marketers are

expanding their presence into other provinces, but at present they cannot serve the complete interests of national transport companies. The farming community is serviced both by the major and regional refiner-marketers, as well as by specialized networks of agricultural input providers that are generally tied to agricultural co-operative movements. Independents play an important role in the lives of both truckers and farmers in certain localities and definitely affect competition in the diesel marketplace.

The report has tried to present a balanced view of the industry as well as the opinions of the trucking and farming communities. Below are some of the study's major observations:

- The wholesale and ultimately the end price for diesel products is strongly *affected by external factors*—world crude prices, U.S. rack prices, continental inventories and weather conditions.
- The rapid increase *in recent world crude oil prices is the major culprit behind the increase in diesel prices*, which Canadian truckers and farmers, among others, must pay.
- The petroleum industry has been going through a period of *rapid rationalization* of operation with the goal of increasing efficiency. This has included activities related to diesel. There are currently 19 diesel-producing refineries, down from 40 in the 1970s. Large numbers of secondary terminals and local fuel distributorships have been closed or amalgamated, particularly in rural areas.
- *Truckers and farmers have no major preoccupations about the service they have been receiving from the petroleum industry.* Although prices are at relatively high levels, there is competition at the price level and supply is readily available. Ex-tax prices in Canada are very close to those in the United States, once they have been adjusted for the exchange rate. In fact, taking into account the lower federal excise tax in Canada, truckers hauling on north-south routes find it advantageous to buy their fuel in Canada. The co-operative movement in Canada has been an important factor in ensuring that farmers' specific requirements are met.
- *Cardlock systems for on-road diesel will expand across Canada.* Refiner-marketers are finding cardlocks to be a low-cost alternative to truck stops. They can use these installations to pump large volumes of diesel at low overhead. The price spread between delivered fuel and the cardlock has fallen dramatically as trucking firms are encouraged to move to on-road rather than on-site supply.
- *Price transparency does not exist at the end-user level with diesel.* While rack diesel prices are publicly available, truckers and farmers are not generally aware of the prices that their competitors are paying for their products. Discounts are negotiated individually and vary from

customer to customer. Prices can be compared informally, but there are no six-foot signs at cardlocks advertising the final diesel price to the end user in the way that gasoline prices are advertised at service stations.

- *Size matters.* Discounts in the diesel industry are based on the potential volume consumed. Large users, particularly in the trucking industry, are able to negotiate significant discounts based on volume compared to their smaller competitors. Competition for the business of large users is also more intense. Volume discounts exist too for farm fuel, although the quantities and discounts involved are much smaller.
- *Information is power.* The more knowledge an end user has about diesel prices, the better his/her ability to negotiate a greater discount. This factor is increasingly being recognized by the trucking and farming industries in order to negotiate the best possible prices.
- *Better fuel management by users will be required in the future.* Truck and farm operations that devote attention to fuel management (e.g., strategies to reduce consumption, monitor supply and price) appear to have lower fuel costs than those that have not done so.
- *Differences in credit terms between diesel resellers and end users are not advantageous to the reseller.* Truck stops and independent resellers usually purchase their supply from refiner-marketers based on daily rack prices and on credit terms that seldom exceed 10 days. On the other hand, the refiner-marketer's best customers in both the trucking and agriculture sectors generally purchase their fuel on 30-day terms with price guarantees that provide them with less price volatility. As the majors and resellers compete for the same clients, the difference in credit terms places the resellers at a distinct disadvantage.
- *The ability to pass on higher fuel costs varies.* Trucking companies, particularly smaller carriers, assert that fuel surcharges have met with limited success due to the highly competitive nature of trucking. Some farmers can recover increased input costs when marketing boards cover their products. Others, whose crops are priced by world markets, have little ability to recoup cost increases.
- *Service above all.* Farmers require fuel in the quantities they need, when they need it. There is serious concern that rationalization in the fuel industry will compromise the service they have come to expect.

Changes in the Canadian Diesel Industry and Their Impact on Trucking and Farming

In October 2000, Industry Canada and Natural Resources Canada gave The Conference Board of Canada a mandate to study the Canadian wholesale diesel industry and, in particular, its relation to Canadian trucking and farming. The goal of the study is to provide an up-to-date understanding of how the wholesale diesel industry functions as well as how it interacts with truckers and farmers.

Objectives of the Study

The main objectives of The Conference Board of Canada study were to examine:

- The structure, conduct and performance of the wholesale diesel industry in Canada;
- The competition in the Canadian diesel industry;
- The components that make up the final cost of diesel fuel;
- The factors that affect diesel prices;
- The influence of continental factors on the Canadian diesel industry;
- The different modes of distribution of diesel fuel to Canadian truckers and farmers; and
- Whether trucking and farming are well served by the diesel distribution network as it currently exists in Canada.

This study did not cover the economics of trucking and farming in Canada. These sectors are affected by a wide range of factors that are well beyond the mandate of The Conference Board of Canada. In addition, the study does not cover detailed comparisons between diesel markets in Canada and those in the United States.

Approach to the Study

At the outset of the study, The Conference Board of Canada undertook consultations with representatives of important stakeholders in the wholesale diesel industry as well as national and provincial trucking and agricultural associations and federal and provincial government ministries. The purpose of these discussions was to gain a

fuller appreciation of how the industry functions and the most important issues facing the wholesale diesel industry.

A limited amount of quantitative data exists on the Canadian wholesale diesel industry. In addition, most supply contracts are negotiated individually and are confidential. In order to build a qualitative picture of how the diesel industry functions and interacts with farmers and truckers, the consultations were followed up by a look at specific case studies. Researchers from The Conference Board of Canada travelled to five Canadian centres in 2001 to meet with interested parties in the diesel industry, trucking and agricultural associations, as well as end users in the trucking and farming sectors. They visited:

- Moncton, New Brunswick; (January 17–19)
- Saint-Hyacinthe, Québec; (January 29–31)
- Winnipeg, Manitoba; (February 12–14)
- Regina, Saskatchewan; (February 15–17)
- Guelph, Ontario; (February 26–28).

Over 100 individuals were interviewed as part of the study—farmers, truckers, government officials and industry representatives. In addition, 17 private carriers responded to a written questionnaire. In order to maintain the confidentiality of those interviewed, this paper does not include a list of stakeholders.

The researchers would also like to acknowledge the petroleum industry's participation in, and contribution to, this study. Clearly, when examining an industry as complex as the petroleum industry, one must talk to those most involved in the process. The industry as represented by its members and through the Canadian Petroleum Products Institute (CPPI) was most helpful in providing background information as well as an understanding of how prices are determined and decisions are made. It should be noted, however, that this report's analysis does not reflect the views of any of the stakeholders, but was derived through an independent assessment of the data and information presented as well as the observations offered to us by stakeholders and end users across Canada.

The Diesel Industry in Canada

Overview

The petroleum industry in Canada, including the production of diesel, is highly concentrated. Three major integrated companies—Imperial Oil (Esso), Petro-Canada and Shell—are active across Canada, have a presence in oil exploration and extraction and are a dominant force in refining, wholesaling and retailing. Adding in the regional refiner-marketers (Irving, Ultramar, Federated Co-operatives, Arco, Chevron, Parkland and Sunoco), they comprise virtually the entire refining and wholesale sectors, as well as the major portion of direct sales to end users.

Over the last decade, the industry has undergone considerable rationalization. During that time, the number of diesel-producing refineries has been reduced by half. Distribution outlets, particularly in rural areas, have declined dramatically and been replaced by larger, more centralized facilities. The Canadian experience has been consistent with that of the United States, where major refiner-marketers, in particular, have been trying to increase performance and efficiencies by closing less efficient distribution centres and under-utilized refineries.

Canada produces approximately two million barrels of crude oil per day, while total world production is about 74 million barrels per day. That means that Canadian producers have no influence over world prices because total domestic production is a small fraction of total world production (less than 3 per cent). Canadian producers of crude oil are therefore referred to as “price takers” as opposed to “price setters.” Oil prices are set in the international marketplace and reflect global conditions rather than ones that are particularly Canadian.

Crude Oil Prices

In 2000, the cost of crude oil made up approximately 75 per cent of the rack price (ex-tax) that distributors pay for a litre of diesel (the remaining 25 per cent represents the refiners’ margin, which covers the cost of transforming crude oil into diesel fuel). The crude price’s portion of the final price of diesel to the end user varies according to the tax status of the use. The crude oil component would likely range from 48 per cent of the diesel price for truckers consuming fuel in Newfoundland to 67 per cent for farmers across Canada, as the latter pay only federal excise tax on their diesel. A one-cent per litre change in the price of crude oil generally results, within a month, in

a one-cent change in the ex-tax price of a litre of diesel. Consequently, rising crude oil prices are the most important factor in the steep rise of diesel prices since 1998. For example, since early 1999, the price of a barrel of crude oil has risen by approximately Can. \$29. A barrel of crude oil represents 159 litres of petroleum product. The increase in the price of crude alone accounts for over 18 cents per litre.

Crude prices are determined internationally by fluctuations in worldwide demand and supply as well as speculation about future crude prices. As explained earlier, Canada is a price taker and has no influence on prices. Crude oil markets have been shaken over the last three years as a result of a severe recession in East Asia and excess oil production. Prices fell by more than 30 per cent in 1998, and in the early part of 1999 the price of a barrel of oil dropped to approximately Can. \$19 (U.S. \$13). Substantial oil production cutbacks by world producers, especially Organization of Petroleum Exporting Countries (OPEC) members, and strong demand in many recovering Asian countries and in North America have pushed prices back up to an average above Can. \$44 (U.S. \$30) per barrel in 2000.

Wholesale

Production of Diesel

The refining sector is the manufacturing stage of the conversion of crude oil into various products. Refineries take crude oil and manufacture a range of refined petroleum products, including gasoline, diesel, heating fuels, jet fuels and lubricants. The mix of products produced is called the product slate. Different products are created at different temperatures or during different stages of the refining process. Gasoline is the largest single product; it comprises about 40 per cent of total refinery production. The distillate pool, which comprises products such as home heating oil, regular sulphur diesel (farm fuel), low sulphur diesel (transportation fuel) as well as jet A fuel, makes up an additional 40 per cent of the average refinery slate. The remaining 20 per cent is comprised of liquefied petroleum gas and heavy fuel oil.

Canada currently has 21 refineries. Two of these refineries, located in Lloydminster, Alberta, and Moose Jaw, Saskatchewan, do not manufacture diesel. Therefore, 19 refineries in total (see Table 1) manufacture diesel and

other distillates, mostly for domestic consumption, but also for export. All of the output from the North Atlantic refinery in Come By Chance, Newfoundland, is either used domestically in Newfoundland or exported to non-Canadian markets. This is because of a restrictive covenant signed by the purchasers of Come By Chance when the mothballed refinery was bought from Petro-Canada and reopened. This arrangement was recently contested and a settlement has been reached between North Atlantic and Petro-Canada that may eventually see Come By Chance product sold in other regions of Canada.

The modern refinery is a sophisticated work of engineering with a high capital cost that typically involves an investment of over one billion dollars, excluding property costs. Plant operations are similarly costly and involve high levels of energy, labour and maintenance. In addition, refineries require regular upgrading and high investment to maintain worker safety and meet changing environmental standards and new regulations. While there are a number of different refineries, the two major types are referred to as “coking” and “cracking.” Both refineries take crude oil and produce gasoline, diesel and other fuels. However, the coking refinery requires larger invest-

ments because it has the capability of producing more lighter-end products (e.g., gasoline) from a barrel of heavier crude oil. Cracking refineries, which are the dominant type in Canada, have not made the investment to process heavier crude and, as a result, rely on lighter (and subsequently more expensive) crude oil.

Twenty Canadian cities across the country have bulk terminals that publish rack prices where marketers can purchase diesel and other products (see Exhibit 1). Some of the terminals are located at the refinery site, while most are located at storage facilities where gasoline and diesel are received from product pipelines. It should be noted that not all refiners offer their products at the wholesale level. Diesel production at the Irving Oil and Chevron refineries, for example, is generally limited to supplying their own distribution networks. This situation, however, may change over time.

Rationalization

The 19 diesel-producing fuel refineries that currently operate in Canada represent a sharp reduction from the

Table 1
Diesel-Producing Refineries in Canada

Company	Refinery Location	Capacity (barrels of crude per day)
Imperial Oil	Dartmouth, N.S.	84,000
Irving Oil	Saint John, N.B.	237,500
North Atlantic Refinery	Come By Chance, Nfld.	99,750
Ultramar	St-Romuald, Qué.	155,000
Petro-Canada	Montréal, Qué.	105,000
Shell	Montréal, Qué.	129,900
Imperial Oil	Nanticoke, Ont.	112,000
Imperial Oil	Sarnia, Ont.	122,000
Petro-Canada	Oakville, Ont.	83,000
Shell	Sarnia, Ont.	71,400
Suncor	Sarnia, Ont.	82,400
Co-op	Regina, Sask.	52,000
Imperial Oil	Edmonton, Alta.	179,600
Parkland Industries	Bowden, Alta.	6,000
Petro-Canada	Edmonton, Alta.	120,000
Shell	Scotford, Alta.	94,350
Chevron	Burnaby, B.C.	52,000
Novacor	Sarnia, Ont.	80,000
Husky Oil	Prince George, B.C.	10,250
Total		1,876,150

Source: Natural Resources Canada.

Exhibit 1
Bulk Fuel Terminals in Canada that Post Rack Prices for Diesel

City	Company
Saint John, N.B.	Esso, Petro-Canada
St. John's, Nfld.	Ultramar
Halifax, N.S.	Esso, Ultramar, Petro-Canada
Québec City, Qué.	Esso, Ultramar, Shell, Petro-Canada, Olco
Montréal, Qué.	Esso, Ultramar, Shell, Petro-Canada, Olco
Ottawa, Ont.	Esso, Ultramar, Shell, Sunoco, Petro-Canada, Olco, Coastal
Toronto, Ont.	Esso, Ultramar, Shell, Sunoco, Petro-Canada, Olco
Hamilton, Ont.	Olco, Sunoco
London, Ont.	Esso, Ultramar, Shell, Sunoco, Petro-Canada, Olco
Sarnia, Ont.	Esso, Ultramar, Shell, Sunoco, Petro-Canada, Olco
Thunder Bay, Ont.	Petro-Canada
Winnipeg, Man.	Esso, Shell
Regina, Sask.	Esso, Shell
Calgary, Alta.	Esso, Shell, Petro-Canada
Edmonton, Alta.	Esso, Shell, Petro-Canada
Kamloops, B.C.	Esso, Shell, Petro-Canada
Vancouver, B.C.	Esso, Shell, Petro-Canada
Nanaimo, B.C.	Petro-Canada
Victoria, B.C.	Esso
Barepoint, B.C.	Shell

Source: Bloomberg.

number of refineries that existed 30 years ago. The rationalization brought radical changes in the refining industry during the period 1979 through 1987. In effect, the number of refineries dropped from 40 in the 1970s, to 36 in 1980 down to 27 by 1990. This rationalization tended to close either smaller or older, less efficient refineries, allowing the utilization rates of newer, larger, more efficient refineries to be increased and new larger refineries to be built. During that period, mergers and acquisitions also reduced the number of companies operating refineries. The result is that, currently, there are 12 companies operating refineries in Canada, down from 16 in the 1970s. None the less, although the number of refineries has dropped by half, the total refining capacity in Canada in 2000 reached approximately 1.9 million barrels per day (303,000 cubic metres per day), an increase from the 1.4 million barrels per day (215,000 cubic metres per day) in the 1970s.

The extensive rationalization was a result of decreased profitability due to under-utilized capacity, increased competition and reduced demand for gasoline and home heating oil. Throughout the early 1980s, demand for gasoline dropped sharply due to weak economic conditions and high crude prices following the oil price shocks in 1973 and 1979. Gasoline consumption in Canada fell by 18 per cent between 1981 and 1987. In the late 1970s and early 1980s, demand for heating oil fell as well because of increased competition from natural gas and electricity. Also, the fuel efficiency of most cars improved, and this too reduced the demand for gasoline. The fall in demand for distillate products was not as severe as that for gasoline as the demand for on-road diesel in particular continued to grow in line with Canada's economic recovery.

Part of the effect of refinery closures has been mitigated by product exchange agreements that exist between refiner-marketers. Basically, oil companies and regional refiners will arrange to receive product supply at their rivals' refineries in return for a similar amount of product to be delivered to their competitors at their own refineries. For example, Ultramar may provide product to Petro-Canada at its St-Romuald refinery to service Petro-Canada's diesel requirements in the Québec City region. In return, Petro-Canada would provide a similar amount of diesel to Ultramar for its Montréal-area market. Companies would then add their formulated additives to their product before delivery to their own consumers. Swap arrangements are advantageous to refineries—they keep major companies present in regions where they do not have refining capacity and may benefit the end user by reducing transportation costs.

In the present decade, environmental regulations pose the biggest challenge to the refining industry. Huge investments will be required, incurring costs that must be recovered by

the refiners. For example, new sulphur regulations for gasoline will require Canadian refiners to invest approximately \$2 billion over the next few years. Environmental changes in diesel specifications have also added to refinery costs in recent years and are expected to have another significant impact when sulphur levels in on-road diesel are reduced from 500 parts per million (ppm) to 15 ppm in 2006.

Diesel Fuel

What Is Diesel Fuel?

Most liquid fuel, such as diesel and gasoline, is derived from crude oil. By boiling crude oil (distilling), it can be separated into different end products. The separation occurs at different boiling point temperatures. Light-end product, such as propane and butane, boil at a lower temperature than gasoline, followed at higher temperatures by the middle distillates, such as kerosene, jet fuel and diesel; then heavier distillates like heating oil; and finally the thick and heavier product, such as asphalt products.

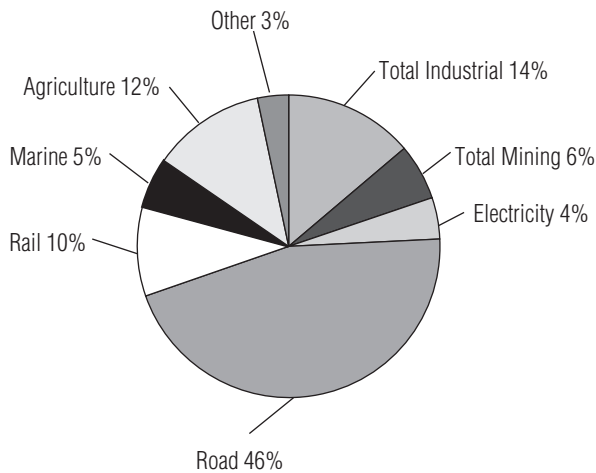
Diesel is a generic term used to describe the fuel that is burned in a diesel engine. The term "diesel" refers to any mixture of fuel that will run a diesel engine. This engine ignites the fuel by compression and not by the use of spark plugs. Diesel engines will run, more or less, on any distillate product. Lighter products are best for ignition and warm-up, while heavier, slower-burning products give increased mileage. The right mixture of these components is the key to a good diesel fuel. Fuels that boil in the range of 150°C to 330°C are the best products to use because they are completely consumed during combustion.

Who Uses Diesel Fuel?

Diesel fuel is important to the nation's economy. It is used to transport goods across the continent, to produce agricultural products and to generate electricity. Diesel fuel is used mainly for on-road transportation, farming, rail transportation, marine transportation, off-road uses (mining, logging, construction) and electric power generation.

Chart 1 shows the different percentages of consumption by sector. In 1999, on-road transportation consumed 10.1 billion litres of diesel fuel. On-road transportation includes primarily trucking but also urban transit and private vehicles. This represents approximately 46 per cent of total diesel consumed in Canada. Other types of transportation, like railways and marine, consumed 2.1 and 1.2 billion litres of diesel respectively. Railways represent 10 per cent of diesel consumption, while marine represents 5 per cent. Agriculture is also a sector that consumes diesel fuel, particularly at seeding and harvest times.

Chart 1
Diesel Consumption by Sector for 1999



Source: Statistics Canada

Farmers burned 2.7 billion litres or 12 per cent of the total diesel consumed in 1999. The mining industry, including oil and natural gas extraction, consumed approximately 1.3 billion litres, or 6 per cent, of diesel consumption. Diesel fuel is also used in electricity production. In 1999, approximately one billion litres of diesel was used to produce electricity in Canada. This represents approximately 4 per cent of Canadian consumption. The forestry sector, construction, paper industry and other industrial sectors are counted as part of total industrial consumption and were evaluated at 3.1 billion litres in 1999. This represents approximately 14 per cent of total consumption. Finally, other sectors consumed 3 per cent of diesel.

Different Grades of Diesel

Two types of diesel exist in Canada, the difference between them being the quantity of sulphur found in the fuel. The two grades are regular sulphur diesel and low sulphur diesel. Low sulphur diesel contains less than 500 parts per million (ppm) of sulphur while regular sulphur diesel contains more without going over the sulphur limit of 5,000 ppm. Low sulphur diesel is required for on-road use by government regulations that were put in place in January 1998. Regular sulphur diesel can be used only for off-road purposes like farming, logging, fishing, mining, etc. Regular sulphur diesel is usually dyed purple to differentiate it from clear low sulphur diesel. Regular sulphur diesel or purple diesel can carry a lower tax structure than clear diesel.

Diesel fuel is also adjusted for seasonal effects. Cold weather can cause wax crystals to form in diesel fuel, which plugs an engine's fuel filter. In order to make diesel fuel work efficiently in a diesel engine, oil companies adjust the properties of seasonal diesel all year round. These adjustments are based on historical temperature data and on the region where the fuel is sold.

The base to measure the cloud point (the temperature at which wax crystals are formed) of diesel fuel is furnace oil No. 2. Furnace oil No. 2 has little-to-no low pour components. This means that it has a relatively high cloud point and cannot be used in cold temperatures. The reason is that furnace oil No. 2 is used for home heating and is usually stored indoors.

Diesel No. 2 has a higher amount of low pour components compared to furnace oil No. 2. The low pour components added in diesel lowers the cloud point of the fuel compared to furnace oil No. 2. Diesel No. 2 can have low sulphur or regular sulphur content.

Diesel No. 1 also comes with a low or regular sulphur content. It has a lower cloud point than diesel No. 2, thus, it has more low pour components. Furnace oil No. 1 is also available. It also has a lower cloud point compared to furnace oil No. 2. Both are most suitable for mid-winter conditions.

Diesel 50 represents the top end of the distillate product. It is used in regions with extremely low temperatures, up to minus 50°C. Diesel 50 has the highest level of low pour components and, therefore, the lowest cloud point compared to the other products. Diesel 50 is found only in Canada and is also referred to as Arctic diesel. It too is available with either low or regular levels of sulphur.

Diesel Pricing

Refiners are responsible for setting the approximate wholesale price that is the basis for what users pay for various grades of diesel, or what is referred to as the posted rack price. The rack price provides a reference for the wholesale price of diesel purchased at the terminal locations. There are usually between three and five different oil companies that post rack prices at each terminal. Rack prices are reviewed on a daily basis at each terminal, with changes generally made weekly. The refiners provide rack-pricing information to their customers either directly or in the Bloomberg Oil Buyers' Guide publication, OPIS (Oil Price Information Service), Reuters, as well as other industry services.

The integrated petroleum companies give their largest diesel customers better prices than lower volume purchasers. Prices may vary by several cents on a litre of diesel. These are based on the customers' volumes and long-term supply arrangements. The amount over rack

price can be affected by other factors as well. For instance, if the supplier has too much inventory in a terminal and faces a containment problem, the amount over rack may be decreased in order to move the product quicker and reduce inventory levels. The reverse may occur in the case of a supply shortage. Prices actually paid are not made public and are subject to negotiation between the supplier and the customer.

Every day, each supplier of wholesale diesel determines what the appropriate rack price should be for his or her terminals. The factors that are considered in the setting of their rack price include:

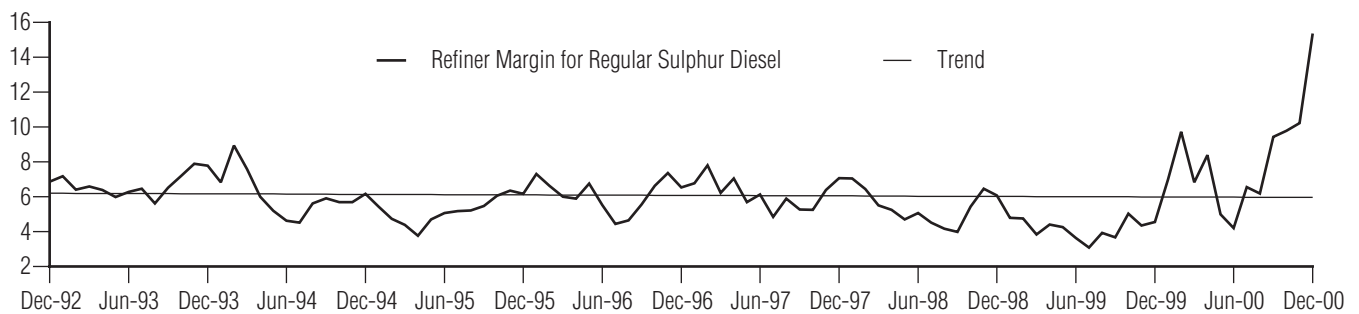
- **Crude Oil**—The reference point for North American crude oil markets is the price of West Texas Intermediate crude oil landed at either the U.S. Gulf coast or Chicago. Possible changes to the underlying trend in crude are monitored closely by the majors.
- **Refiner Margin**—The refiner margin is the difference between the price of wholesale diesel and crude oil. High or low refiner margins provide a good indication of supply conditions in the different markets across the country. For instance, a high refiner margin would indicate that supply is tight in a particular market. This factor is an important input into determining what the daily rack price should be. Average refiner margins for diesel in Canada are shown in Chart 2. Much of the fluctuation in the refiner margins is likely caused by factors of seasonality. Demand for home heating fuel, an important distillate product, is much higher in the winter months. Not surprisingly, as Chart 2 indicates, refiner margins tend to be higher in winter and much lower in summer.

Chart 2 shows a steep increase in the average refiner's margin in the period from September to December 2000. The petroleum industry argued that this steep

increase was a result of the low levels of crude oil and distillate inventories in North America, which resulted from delays in purchasing crude because of continued high prices on the world market. As the heating season approached, home heating oil prices rose dramatically because of low inventories and high demand. Other distillate prices were pulled up at the same time. The increase in wholesale prices resulted in a dramatic spike in the refining margin at the end of 2000. If the industry's contention were correct, one would expect to see a decline in margins as the inventory situation returns to normal.

- **Competing Posted Rack Prices**—The majors also consider the rack prices of their competitors when determining the appropriate price. These prices are publicly available through the many services to which most wholesalers subscribe. Competitors' rack postings sometimes differ due to the unique market conditions that a particular competitor has to contend with or to their different interpretations of market forces. However, due to the high sensitivity of buyers to price changes, prices generally are very competitive. End-user prices generally are based on rack prices, but with a volume discount system that varies from supplier to supplier. Refiners can generally tell if their rack price or discount system varies significantly from their competitors' by whether they are gaining or losing business.
- **U.S. Rack Locations**—For terminal locations in eastern Canada and the lower mainland of British Columbia, the U.S. rack price for product is an important factor in determining their own rack prices because of the possibility of importing diesel and other distillates from the United States. Demand for distillate products is extremely price sensitive and, as a result, if rack prices in Canada are not competitive, customers can import diesel

Chart 2
Average Refiner Margin in Canada for Regular Sulphur Diesel



Sources: *Bloomberg Oil Buyer's Guide*, Natural Resources Canada and M.J. Ervin.

and other distillates from the U.S. border rack locations. In the case of Ontario, border rack locations such as Buffalo, Detroit and Duluth are viable customer alternatives for obtaining product. In Québec and Atlantic Canada, the rack price in New York harbour is closely watched. The import alternative is not as important a factor in the three prairie provinces because of the greater distances involved. Consequently, factors like crude oil costs and refining margins are more important in determining rack prices. In Vancouver, however, where imported product is a viable alternative, the U.S. rack price in Seattle must be monitored on a daily basis.

- Rack prices of related distillate products—Distillate products are produced in one segment of the refining slate and there is a fair degree of interchangeability between the products. Therefore, for example, an increase in the price of home heating oil, either in Canada or the United States, will directly or indirectly have a bearing on Canadian diesel prices.
- Domestic and local competitive conditions at both the wholesale and end-user levels.

In general, U.S. rack prices are the most important factor in determining Canadian wholesale prices. Distillates can be freely exported and imported between Canada and the United States (see Exhibit 2). The result is that the wholesale industry regards American product and American refineries as its competition. As a result, prices are determined more by supply and demand factors in the relevant U.S. markets than by actual conditions in Canada. For example, in early 2000, the northeastern coast of the United States experienced colder-than-average conditions, which resulted in an increased demand for heating oil and thus reduced available supplies of other distillates. This engendered a sharp increase in northeastern U.S. rack prices. Although central Canada had a much milder winter, diesel prices were nevertheless pushed up as a result of the high U.S. prices.

A positive aspect of this continental competition from the consumer's point of view is that wholesale prices are influenced by the much larger U.S. market rather than by the limited number of players who operate in the Canadian refining industry.

The decision to change the rack prices is based on trends in the U.S. rack prices, the price of crude oil, refining margins, as well as local market conditions. Sometimes the indicators all move in the same direction and, consequently, the new setting for the rack price is relatively straightforward. However, in many cases, the indicators move in different directions and a great deal of judgement may be required to establish a competitive rack price.

Refiner margins for diesel declined in Canada in the early 1990s, stabilized from 1993 to 1999 at approximately

Exhibit 2 ***Import Alternatives***

It is well known that Canada both exports and imports crude oil. At the same time, refined product, such as diesel, also crosses the border freely between Canada and the United States.

In 1999, Canada exported just over 2.9 billion litres of diesel while importing approximately one billion litres. Most of Canada's distillate trade is with the United States, although, on a continental basis, it also exports distillate to Europe, particularly home heating oil.

The fact that Canada and the United States exchange distillate supports the Canadian refiners' argument that they need to remain competitive with their American counterparts. If Canadian rack prices for diesel were significantly higher than rack prices in neighbouring U.S. markets, Canadian refineries could lose much of their business to imports, and could become economically unviable.

For Canadian consumers, the U.S. import alternative and the Canadian wholesale industry's need to remain competitive on a continental basis translate into competitive prices, which in turn lead to lower prices at the cardlock and the storage tank.

6 cents per litre, and have been rising since the beginning of 2000 (see Chart 2). As discussed above, margins spiked towards the end of 2000, it is argued, as a result of low inventories brought on by unseasonably high crude prices. Profitability has been maintained by rationalization and by drastically reducing operating costs. Because the wholesale price of diesel in Canada is in large part determined by U.S. wholesale prices and crude prices are determined on

Exhibit 3 ***Asymmetry at the Wholesale Level***

Both trucking and agricultural representatives observed that prices seemed to rise when there was a change in crude oil prices much more quickly than they fell when there was a decrease. In economics, this phenomenon is referred to as asymmetry. It can be a result of market power or other reasons, such as inventory management or end-user response to changing prices.

As detailed in Appendix A, the study found asymmetry at the wholesale level for both regular and low sulphur diesel prices when compared to price changes in crude oil. Rack prices were used because end-user prices are unknown but are generally based on rack prices. When examining the data from 1992 to 2000, the study found that wholesale prices go up immediately by over 90 per cent of the crude oil price increase, while only about one-half of a decrease is reflected instantaneously. Omitting the 2000 data as possibly atypical, the immediate effect of a one-cent increase in crude oil was an increase in wholesale diesel prices by 0.73 cent per litre. With a decrease of one cent per litre in the crude oil price, wholesale diesel prices declined by 0.55 cent per litre over the first few days. Over a one-month period, the full magnitude of the change, up or down, has been reflected in the wholesale price of diesel.

It is important to note that asymmetry patterns at the wholesale level may not be duplicated at the end-user level. Many suppliers have guaranteed price arrangements with their clients and are unable to change prices until the guarantee period is over. Therefore, end users generally would experience a greater lag before crude price changes are reflected in their own prices.

world markets, the refiner margin in Canada is heavily influenced by outside factors, as opposed to internal costs or the local supply and demand situation.

Taxes

While taxes are an important component of diesel prices in Canada, the largest users, truckers and farmers, are reimbursed a significant amount of the taxes they paid.

Table 2 shows the range of taxes for diesel in Canada. Taxes vary by province and by use. It is only a retail purchaser of diesel who pulls into a gasoline station to fill up his or her diesel vehicle who will pay the full range of taxes shown in the table.

There are two types of taxes—flat taxes and *ad valorem* taxes. The federal excise tax on diesel is a flat tax and is currently 4 cents per litre. Because it is a flat tax, by definition, it does not vary when the price of diesel goes up or down and is levied across Canada. This tax is added on to the total of the other price components of diesel.

Provincial consumption taxes are also flat taxes and vary by province (see Table 2). The lowest provincial consumption tax is found in the Yukon (7.2 cents per litre) while the highest is in Newfoundland (16.5 cents per litre).

The last tax component is the *ad valorem* tax, which is a percentage of the cost of diesel and varies with changes in the price. In Canada, *ad valorem* taxes are the federal Goods and Services Tax (GST) and provincial (PST) and harmonized sales taxes (HST).

While all consumers pay these *ad valorem* taxes, farmers and truckers can claim a full refund for them. Therefore, the amount of tax paid in these industries does

not vary on a per litre basis as prices change. The PST in Québec is the only one of these taxes that is not universally reimbursed. Trucking companies that are not based in the province of Québec are not reimbursed the PST of 7.5 per cent that they paid when fuelling up their trucks in the province. Thus, Québec-based trucking companies have a clear advantage over out-of-province carriers. As a result, many trucking companies based in other provinces try to avoid purchasing their fuel in Québec.

Fuel taxes for farmers

Farmers pay the 4 cents per litre federal excise tax on diesel, but they are exempt from paying provincial consumption tax on their farm fuel. Diesel used for agricultural purposes is coloured to differentiate between off-road and on-road product.

In most provinces, farmers must apply to their provincial government for a permit or a tax exemption card to be excused from paying provincial consumption tax. In other provinces, farmers must fill out a refund application form to have the provincial consumption tax they have paid refunded to them. The Government of Alberta also gives a subsidy of 6 cents per litre to farmers for diesel fuel.

As mentioned above, farmers are reimbursed their GST as well as PST or HST where applicable.

Fuel taxes for truckers

Truckers pay the 4 cents per litre federal excise tax as well as the provincial consumption tax for the province (or state) in which the diesel is consumed. In the trucking

Table 2
Applied Taxes on Diesel in 2000

Provinces	Federal Excise Tax (c.p.l.)	Provincial Consumption Tax (c.p.l.)	GST (%)	PST (%)	HST (%)
British Columbia	4.0	11.5 (regular) 3.0 (coloured)	7.0	0	0
Alberta	4.0	9.0	7.0	0	0
Saskatchewan	4.0	15.0	7.0	0	0
Manitoba	4.0	10.9	7.0	0	0
Ontario	4.0	14.3	7.0	0	0
Quebec	4.0	16.2	7.0	7.5	0
New Brunswick	4.0	13.7	0	0	15.0
Nova Scotia	4.0	15.4	0	0	15.0
Prince Edward Island	4.0	13.5	7.0	0	0
Newfoundland	4.0	16.5	0	0	15.0
Yukon	4.0	7.2	7.0	0	0
Northwest Territories	4.0	9.1	7.0	0	0

Sources: M.J. Ervin, Agriculture and Agri-Food Canada.

industry, an agreement exists between the Canadian provinces and American states called the International Fuel Tax Agreement (IFTA). Under IFTA, provinces and states collect fuel taxes from interstate or interprovincial truckers based in their jurisdiction and distribute the taxes due to other jurisdictions. The provincial or state consumption taxes are therefore pro-rated in accordance with the mileage driven in the province or state. For example, if a trucker fills up his truck in one province but consumes it in another, he/she will pay the provincial consumption tax to the province where the fuel is consumed. There is therefore no tax advantage to purchasing diesel fuel in a certain province rather than in another (with the exception of Québec, as discussed earlier). This also applies to the United States.

All 10 Canadian provinces and 48 states are members of IFTA. The only exceptions are the Northwest Territories, Yukon, Alaska, Hawaii and the District of Columbia.

The major difference between Canada and the United States exists at the federal level because federal excise tax is applied in the country where a trucker purchases fuel. While fuel bought in Canada is taxed at 4 cents per litre, in the United States the federal excise tax is approximately 10 cents per litre (U.S. 24.4 cents per gallon). Truckers, therefore, have a tax advantage to buying their diesel fuel in Canada.

Like farmers, truckers can apply for a full reimbursement of their GST and HST where applicable. Québec-based trucking companies are also reimbursed their PST.

Trucking

Overview

It is often said that as goes the state of Canada's trucking sector, so goes the growth of the country's economy. The trucking industry has seen incredible change and growth over the past decade, often mirroring growth rates in the Canadian economy. Approximately 80 to 90 per cent of all shipping in the country is now done via truck. According to Statistics Canada, trucking is the largest source of male employment in every province, and it accounts for 31 per cent of transportation GDP. In 1999, revenues for the trucking industry were estimated to be over \$42 billion. The trucking industry posted real growth of 13 per cent in 1997.

A number of factors lie behind this growth. One factor is the move by retailers and manufacturers to reduce on-site inventories while relying more on trucking to provide buyers and assembly lines with goods via "just-in-time" delivery systems. These delivery systems require the flexible and responsive transportation and distribution networks that trucking can provide.

The growth in international trade and the introduction of the free trade agreements have been a boom to the trucking industry. Most of the trucking companies interviewed had a substantial portion of their business involving international deliveries between Canada and the United States, sometimes with connections to Mexico. According to Transport Canada figures, total tonnage moved between the two countries by for-hire carriers increased by 233 per cent between 1991 and 1999. While transborder traffic was 32 per cent of total traffic in 1991, by 1999 it represented 48 per cent of total traffic for for-hire carriers. Over 80 per cent of Canada's trade with the United States is moved by truck. The impact of this increase is particularly marked in Ontario, Québec and Atlantic Canada. In 1999, almost 70 per cent of all international for-hire truck traffic occurred in central Canada.

The increased reliance on trucking transcends north-south trade. In western Canada, for example, there has been an increase in the trucking of grain-related products due to the elimination of rail transportation subsidies and the consolidation of grain elevator and rail branchline services.

Over this time, competition within the trucking industry has been intense, with a proliferation of new companies and thousands of owner-operators entering the marketplace. The level of growth and the competitive nature of the trucking sector have meant an increased demand

for diesel fuel as well as greater attention to fuel economy and measures to keep fuel costs as low as possible. The trucking sector features many players both big and small. Entry into the industry is relatively easy. Industry margins are small due to competitive factors. However, studies by Transport Canada have found that four to five per cent margins are sufficient to cover the long-term cost of capital. This means, though, the margin of error for carriers is very small, especially if they have high debt levels.

Freight rates have remained virtually unchanged over the past decade. At one time Canadian rates were set at par with rates in the United States in order to be competitive. However, the growing spread between the Canadian and American dollars has meant that Canadian rates have actually declined in comparison with those in the United States. The low freight rates have forced carriers to find innovative approaches to maintain their profitability. For example, most carriers utilize a "triangulation" approach that strives to eliminate empty return trips. For example, a truck may leave from its base in Moncton, New Brunswick, to deliver a load in Baton Rouge, Louisiana. It would then, through brokers or its own resources, find a load to transport to a different destination back in Canada, such as in southern Ontario (Canadian carriers are not permitted to transport between U.S. destinations). Finally, a load would be found for a destination in Atlantic Canada or perhaps to the northeastern United States before once again returning to Moncton.

In the meantime, trucking operators noted that their operating costs have been increasing over the past decade due in part to the declining Canadian dollar and its impact on important cost factors that are denominated in U.S. funds. The recent increase in fuel costs has also been a factor. Recent Transport Canada figures, however, show that while operating costs did rise over the past decade, operating revenues have increased at a higher rate (see Table 3).

However, Transport Canada figures for 1999 and preliminary data for 2000 suggest that the financial performance of the trucking industry has declined slightly from previous years.

According to Transport Canada figures, fuel costs throughout the 1990s were approximately 12-13 per cent of for-hire carriers' total costs since their costs would also include administration and salaries, physical plant maintenance and depreciation. However, for carriers who rely more on owner-operators (who pay for their fuel themselves), a lower proportion of their costs go to fuel. Fuel

Table 3
Financial Returns of the For-Hire Trucking Industry*

		1991	1992	1993	1994	1995	1996	1997	1998	1999
Fixed Assets	\$ million	2,155	2,081	2,208	2,638	3,701	3,235	3,546	3,980	4,302
Operating Revenues	\$ million	8,007	8,157	8,935	10,872	11,986	12,763	14,061	14,600	15,970
Operating Costs	\$ million	7,755	7,963	8,651	10,282	11,402	12,325	13,293	13,788	15,207
Required Margin	\$ million	326	308	314	369	407	410	436	437	462
Operating Ratio	(%)	96.9	97.6	96.8	94.6	95.1	96.6	94.5	94.4	95.2
Return on Assets	(%)	11.7	9.3	12.8	22.4	19.0	13.5	21.7	20.4	17.7
Cost of Capital	(%)	15.1	14.8	14.2	14.0	13.2	12.7	12.3	11.0	10.7

* Excludes household movers.

Source: Transport Canada.

costs for owner-operators, on the other hand, represent approximately 20 per cent of their total costs. Based on preliminary data for the first half of 2000, Transport Canada estimates that fuel costs have increased by 25 per cent, thereby increasing trucking carriers' total costs by approximately 3.4 per cent.

Players in the Trucking Industry

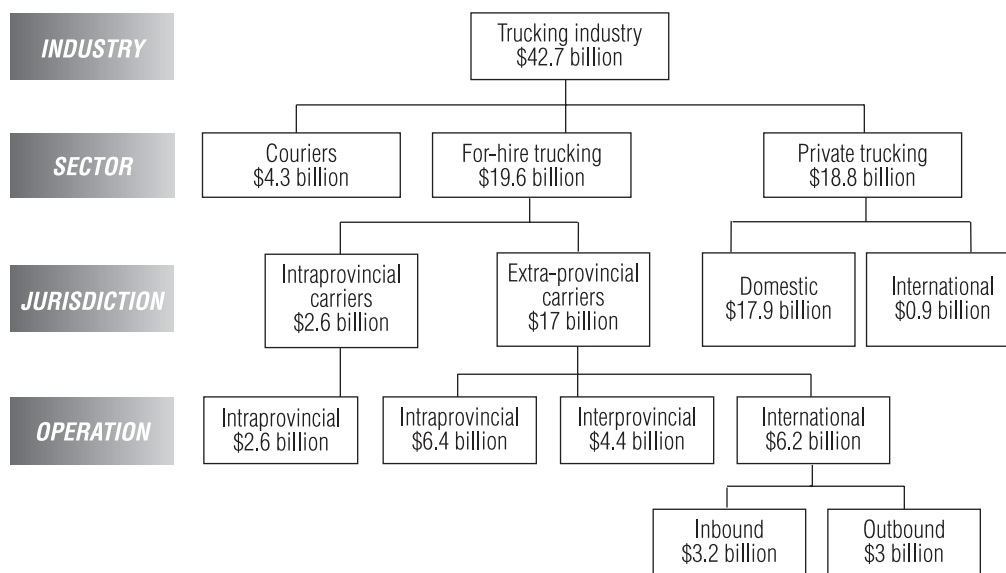
As shown in Chart 3, the trucking industry is comprised of a number of players:

- *Private carriers:* These are companies whose principal occupation is not trucking and who maintain their own

fleet of vehicles for transporting their own freight. The company pays fuel costs and drivers' wages. Private trucking is most prevalent in moving urban goods (85 per cent of all urban movements), but represents approximately 25 per cent of hauling up to a distance of 500 kilometres according to the Private Motor Truck Council of Canada. There has been a general trend for companies to downsize or eliminate their private fleets and increase the use of for-hire carriers or logistics companies.

- *For-hire carriers:* These are trucking companies that transport goods for a variety of companies. They may employ their own drivers, utilize the services

Chart 3
Trucking Industry Structure and Revenues
(1999)



Source: Transport Canada.

of independent owner-operators, or use a combination of both. For-hire carriers are the largest transporters of commercial freight. According to Transport Canada, approximately 300,000 people worked in the for-hire trucking industry in 1998. Some for-hire carriers undertake LTL (less than truckload) business, which means that they are also involved in warehousing and shipment consolidation and forwarding.

- *Owner-operators:* These are independent owners of one or more tractors (power units) that haul trailers for a company or a for-hire carrier (usually via a long-term contract). Just over 80 per cent of owner-operators are under contract to for-hire carriers. While an owner-operator may be hauling for a particular for-hire carrier for a long period of time, he/she is still considered to be an independent operator. For-hire fleets are three times more likely to use owner-operators than private fleets, and owner-operators are used more frequently for long hauls. According to Statistics Canada, approximately one in five Canadian truck drivers is an owner-operator. Owner-operators are also referred to as independent brokers.
- *Couriers:* They are considered part of the trucking sector and usually are involved in transporting small packages. Their transport network often involves a range of vehicles, such as small trucks, large trucks and aircraft. According to Transport Canada, in 1998 there were approximately 450 large private fleets, 10,300 for-hire trucking companies (annual revenues exceeding \$25,000), and 2,400 courier companies. In addition, there were approximately 40,000 owner-operators (annual revenues exceeding \$25,000).

In addition to the players already mentioned, there are also logistics companies that manage the shipping/transport needs of client companies. These companies may contract the services of for-hire carriers to handle the trucking portion of their service or may have their own trucking capacity.

Major Developments in Trucking

Recent developments have affected the trucking industry and ultimately affect the demand for diesel fuel.

Among these are:

- *Deregulation and free trade:* Deregulation started in 1987 and reduced restrictions on a carrier's flexibility to compete in the trucking market. Increased trade with the United States, particularly through the Free Trade Agreement and North American Free Trade Agreement (NAFTA), has increased trucking to southern destinations.
- *Level of competition:* The level of competition in the trucking sector is very high. There have been few rate

increases over the past decade. At the same time, there has been growth in the number of carriers and owner-operators entering the industry over the past decade. It has been relatively easy for new drivers to purchase a power unit and enter the market, thereby increasing competition.

- *Improved technology:* Satellite technology can link all of a company's trucks and terminals to a central dispatch, thereby improving scheduling, locating backloads, reducing communication time, and informing drivers on the best places to fuel. In addition, improvements in engines' fuel consumption mean that trucks have longer ranges and can travel greater distances before fuel stops.
- *Environmental regulations:* Increasingly rigid environmental regulations have led some carriers to avoid taking on the responsibility for storing fuel on site and has encouraged the use of fuel suppliers' cardlocks.

Also, a number of factors can influence fuel consumption in trucking, including vehicle configuration, the commodity being shipped, road conditions and driver attitude and expertise.

The trucking carriers interviewed for this study ranged from very small operations (less than 10 power units) to very large enterprises (more than 500 power units). Their fuel consumption ranged from less than a million litres of fuel to over 60 million litres of diesel per year.

Relationship with the Diesel Industry

Accessing Diesel

Trucking companies can fill up their trucks with diesel fuel in basically four ways, by using on-site storage, cardlock, truck stops or retail. Many companies rely on a combination of these options. Most of the larger companies have on-site storage, in addition to cardlock arrangements that give them access to the network of outlets that cover the major routes. Each option is outlined below.

On-site Storage Tanks

On-site storage consists of having a reservoir located on the trucking company's premises for fuelling purposes. Different types of supply agreements can exist between the trucking company and the supplier. The types of agreement usually depend on who owns the tanks.

Some oil companies will install storage tanks at no initial cost to the client. In return, the trucking company must purchase its fuel from only that oil company. The distributor may figure in that cost when calculating his/her price for fuel. Delivery of the diesel fuel depends on the

size of the storage tank and the volume consumed by the trucking company. The supplier may come once a week to fill up the storage tank, or the trucking company might have to call the supplier when it is getting low on diesel. The price system in this case can depend on many factors.

If the trucking company owns the tank, it can choose any supplier it wishes. It can have an agreement for supply with a distributor or refiner, purchase the fuel on the spot market, or it can ask refiners or distributors to make a bid for supply of a certain quantity of diesel or even submit weekly prices. In this instance, a supplier with excess capacity might propose a relatively good price for diesel fuel. Bid prices are not by and large explicitly based on rack prices, although the rack price generally underlies the price. A certain price is generally offered until notification of a change. Notification will indicate either an immediate change of price or a change that may come into effect in a certain number of days.

On-site storage provides large carriers with an opportunity to obtain lower fuel prices (usually two to four cents lower than the cardlock price) based on the large volumes purchased and somewhat greater stability in fuel prices. The price a trucking company pays for its fuel can depend on the volume they are expected to purchase over the year.

Major and regional refiner-marketers as well as independent resellers all compete for the on-site storage market. With the major refiner-marketers as well as independent resellers, the delivered price is usually based on some negotiable margin over rack price. Some regional refiners base their price on an index of crude prices. Discounts or lower margins are generally based on volumes sold. Prices based on rack may use daily rack for a selected site as its reference, an averaged weekly rack price, or a moving average monthly rack price for the previous month. For medium-sized and larger companies, prices are generally guaranteed for a week, but for the best clients they may be guaranteed for a month. Owner-operators working for a carrier usually pay cost price for on-site fuel, but in some instances are charged an administrative fee.

Independent resellers' acquisition price for their diesel is usually based on the daily rack. Having guaranteed a price to their largest customers, major refiner-marketers usually have a longer lag time for increasing and decreasing their prices than do independent resellers, who tend to adjust their prices daily. The result is that when prices are increasing, trucking companies may find it advantageous to buy from refiner-marketers. Independents are often a more attractive option when prices in the market are decreasing.

Refiner-marketers also offer trucking companies using on-site storage different credit terms than they do independent resellers. While large trucking companies generally

have 30 days to pay their bills, the terms for resellers are by and large net 10 days or cash at the terminal. This means that independent resellers cannot match the credit terms of the majors and must move their product quickly, usually on a C.O.D. or reduced credit-term basis. In order for independent resellers to offer an attractive alternative to trucking companies, they must price their product at least 0.5 cent per litre cheaper than their competitors to compensate for the lack of credit extended.

Depending on the trucking company's destinations and the distance of its average haul, the operator may rely heavily on on-site fuelling. For example, a regional carrier might depend entirely on filling up on its own premises, whereas a national carrier might rely more on a national cardlock system (outlined below). Alternatively, some national carriers might have on-site storage at a number of centres located across the country. Nevertheless, those

Exhibit 4

How far can a truck travel on a tankful of diesel?

There are a variety of trucks used in the trucking industry, ranging from a two-axle straight truck to a five- or six-axle semi trailer to an eight-axle Super B Train. Fuel consumption varies depending on a number of elements, such as road conditions, mechanical condition, speed, tire inflation and the commodity being transported. Nevertheless, a six-axle semi trailer typically has a 1,135-litre (300-gallon) tank and consumes on average 3.04 kilometres per litre (7.15 miles per U.S. gallon). As a result, the semi trailer can travel over 3,220 kilometres (2,000 miles) before refuelling, thereby giving it considerable range to take advantage of the best diesel prices.

companies with on-site storage cite as distinct advantages the lower cost of delivered diesel, their ability to shop around on a daily basis for the lowest price, and the increased control it gives them over fuel costs.

Many trucking companies, however, no longer store fuel on their premises because of concerns about environmental legislation and liabilities. They believe that there is too much risk associated with underground tanks. If a leak of diesel fuel should occur, the trucking company would be responsible for the cost of cleaning up the site, which could be significant. There is also a capital investment and maintenance cost associated with on-site storage. The cost has been estimated at 1.5 cents per litre, but varies depending on the size and condition of the storage facility.

Refiner-marketers are encouraging trucking companies to become less dependent on on-site storage and to increase their use of cardlock fuelling. Some carriers reported that the price advantages of bulk storage over cardlocks have been decreasing: some reported a reduction from about 6 cents per litre to about 2.5 cents per litre.

Cardlock Networks

Cardlock networks are similar to automated self-service retail pumps at gasoline stations, although they do not have listed prices. The only other differences are that drivers need a card to access the pump and the trucking company is billed directly using a pre-negotiated pricing formula. The driver does not see the price that is being charged. The price paid at the cardlock may vary from day to day and from trucking company to trucking company. To receive an access card, a trucking company must apply to and be accepted by an oil company. Usually, the only prerequisite is a good credit rating. The supplier and the trucking company then negotiate their cardlock pricing formula.

Cardlocks, which are usually owned by refiner-marketers, are becoming similar to truck stops along key routes. More driver-oriented facilities such as showers, restaurants, bank machines and other services are being added. Some fuel suppliers in Canada have agreements with truck stops in the United States to accept their cards so that a separate card for U.S. fillings is not required. The choice of a cardlock supplier mainly depends on how well the location of cardlock stations fit the carriers' main routes.

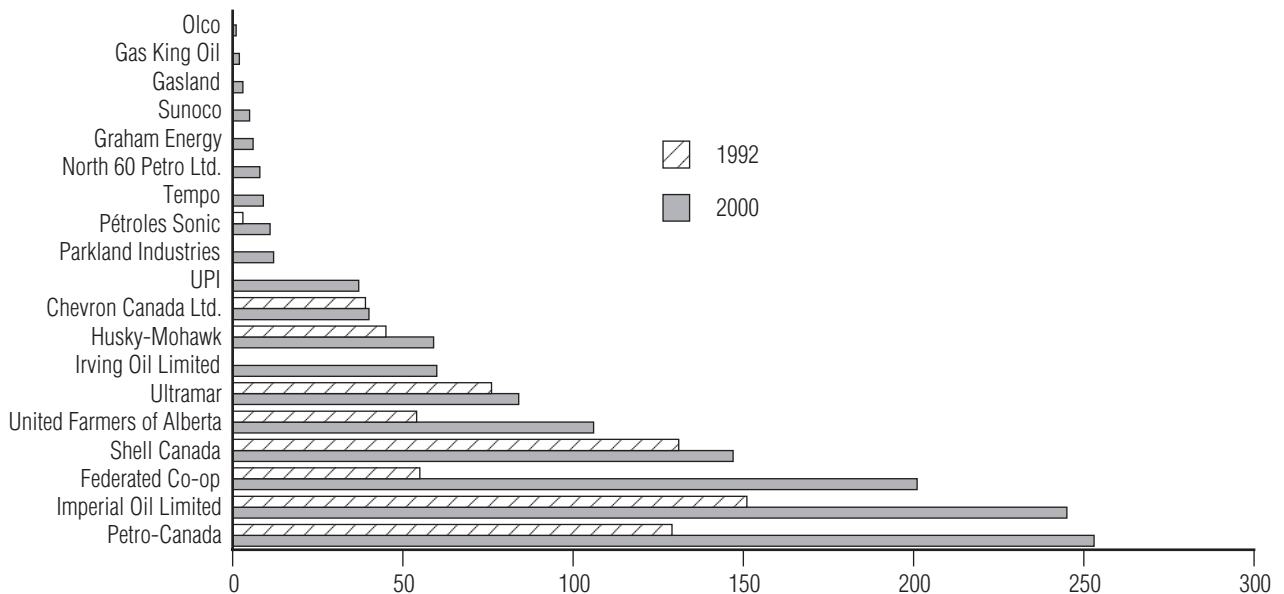
Cardlock networks have been growing in Canada over the past decade. Chart 4 compares the number of cardlock and keylock locations in Canada for 1992 and 2000. The locations are shown by brand. In 1992, there existed approximately 680 locations across Canada. In 2000, that number had almost doubled to 1,290 locations. Major oil

companies led the way in the number of networks, owning approximately 50 per cent of all locations. Almost all new installations are cardlocks—keylocks are still being used only in small and remote locations.

Some trucking companies have more than one card in order to permit daily decisions on which location or dealer has the lowest prices. Several cards may also be needed to operate in regions where the primary fuel supplier may not be present. The main reason, however, why a trucking company will have more than one card is to purchase fuel at the lowest possible price along the chosen haulage route. By having more than one card, the trucking company does not limit its access to supply and retains the option of buying from the lowest priced supplier on a daily basis in both Canada and the United States. However, this could mean less of a discounted price from suppliers since volume will be distributed over two or more diesel suppliers rather than one. In addition, few companies provide drivers with more than two fuel company cards for logistical reasons.

The price of diesel at the cardlock tends to fluctuate often, particularly for smaller companies that do not have a weekly locked-in price. Cardlock prices are more closely related to rack prices which, in turn, can change several times in a single week. Carriers usually get a discount based on the rack price, depending on the anticipated annual volume to be purchased—the same pricing approach used for on-site storage applies, except that extra differentials are added for the supplier margin, physical facility costs and

Chart 4
Cardlock/Keylock Location by Brand



Source: Transport Canada.

distribution. Prices are usually set weekly, with firms getting prices faxed to them for the upcoming week. Drivers employed by for-hire carriers are usually instructed where to purchase their fuel on their routes, particularly if they possess more than one card. Owner-operators who are responsible for paying for their own fuel and who then bill the carrier may be encouraged to purchase their fuel at specific locations, but are not obligated to do so.

Trucking companies are not officially aware of what their competitors are paying, and the prices actually paid are not listed at cardlock sites. As a result, there is less market knowledge and pressure to consistently match the lowest price. In addition, the trucking company's decision on where its drivers should fill up is based not only on price but also on location, convenience and driver preferences.

According to some of the carriers, a drawback of the cardlock system is that it can be an onerous task to switch cards in the event that a different supplier is chosen. It may require exchanging fuel cards with hundreds of drivers and possibly changing routes to ensure access to the new supplier's network. It can also involve changes to the electronically integrated payment system to fit with that of the new supplier.

Many trucking company officials note that the cardlock pricing system has very little transparency. Unlike retail gasoline stations, there are no posted prices at cardlock operations. This was identified as an issue particularly for owner-operators, who are responsible for their own fuelling, and would benefit from more knowledge about the prices they are being charged.

As in other regions of Canada, smaller owner-operators without a contract to a larger company are the most vulnerable to highest prices. It was mentioned that some small operators are unable to obtain access to cardlock networks for financial reasons and they thus have to purchase their fuel at retail outlets. This makes it more difficult for them to compete with other carriers and threatens their viability in the industry.

Truck Stops

Truck stops have traditionally been owned either by refiner-marketers or by independent operators. Truck stops try to attract drivers with a range of innovative loyalty incentives and services. They usually feature a variety of services including a restaurant, lodging, showers, telephones, bank machines and a convenience store. It is not uncommon for truck drivers to forego stopping at a basic cardlock site with a lower diesel price in order to stop at a truck stop that offers more services. The differences between truck stops and cardlock stops, however, are clearly decreasing in terms of the services offered.

A larger proportion of truck stops are independently operated, either as branded establishments or establishments with their own brand. Truck stops post diesel prices and are not generally part of an integrated billing network, although branded dealers will accept the credit card of that brand. Payment at truck stops is by and large on a cash or credit card basis, although terms may often be negotiated for frequent and higher volume customers. Truck stops generally obtain their product under an arrangement with a refiner but may also take advantage of the spot market, independent resellers or imported product.

Canadian truck stop operators tend to buy their fuel on relatively short credit terms. As mentioned above for independent resellers providing on-site deliveries, this often puts them at a disadvantage against the refiner-marketers who offer longer credit terms. Truck stop operators continue to look for new and innovative approaches to differentiate themselves in the marketplace and allow them to maintain or increase their market share. They focus their efforts on service to companies, convenience and greater appeal to the drivers themselves.

Truck stops are much more prevalent in the United States and are used by most trucking companies, both large and small. U.S. truck stops are mainly independently owned, that is, they are not owned by refining companies. They offer a wide range of services and are very attractive to truck drivers, who commonly can meet all their needs during these stops. Most truck operators functioning in the United States possess credit cards specifically accepted at their usual truck stops.

Unlike in Canada, truck stops in the United States are very high throughput centres that depend on the sale of large volumes of fuel at low margins. Larger companies can negotiate discounts at these stations, but they tend to be limited due to the low margins already in place. Not surprisingly, volume discounts with U.S. suppliers appear to be less frequent than with Canadian suppliers. Canadian trucking carriers operating in the United States reported that diesel prices tended to vary more between U.S. truck stops than between cardlock stops in Canada.

Negotiations with U.S. truck stops tend to centre on billing arrangements and service fees, and throughout these negotiations the trucking company aims to give the drivers more convenience. Retail prices are posted at truck stop locations, and some transactions are made at these levels. However, most of the large carriers have negotiated a price formula in advance, usually a discounted margin of the retail pump price. Some U.S. truck stops will communicate their prices to Canadian customers in advance. However, drivers let each other know by word of mouth which truck stop has the best prices. In some cases, the quality of truck stop tends to be a much larger factor than price when choosing where to purchase diesel in the

United States than in Canada. Whenever possible, Canadian truckers will fuel up in Canada rather than the United States because of the lower excise tax.

One of the larger U.S. truck stop operators, Flying J, has started limited operations in central Canada (one stop is located west of Montréal, while the other is near Napanee, Ontario), building on their success in capturing market share in the United States. They have brought their aggressive pricing policies with them and have had a strong influence on prices in the regions in which they are present.

Service Stations

Our survey of private fleet operators, many of which have smaller trucks, found that approximately 25 per cent purchased some of their diesel fuel at service stations. A number of small carriers and owner-operators also purchase diesel fuel from service station outlets because they do not have access to a cardlock system, usually due to poor credit ratings. In this instance, fuel is usually purchased with a major credit card. Service station outlets will often negotiate a retail price discount with their largest customers. Discounts will generally range from 0.5 cent per litre to 2 cents per litre based on monthly volumes. Owner-operators, who have to buy their fuel from this most expensive of alternatives, find themselves at a disadvantage in the marketplace as they absorb higher fuel costs than their competitors.

Diesel Purchasing Arrangements

Some of the trucking companies reported having exclusive supply agreements with a single supplier in the past. However, when they reviewed their diesel purchasing options, they discovered that by opening their supply to several possible suppliers, they received bids that varied from one to two cents per litre less than they would otherwise have been paying. Over the course of a year, depending on volumes used, this can save a trucking company anywhere from \$100,000 to \$400,000. This does not mean, however, that trucking companies necessarily buy from a multitude of suppliers. The fuel manager may generally maintain a relationship with one or two favoured suppliers to assure the company a reliable diesel supply and to facilitate its management and bookkeeping. On the other hand, the wider the knowledge of the market, the greater the possibility of saving money on diesel purchases.

Pricing

Trucking carriers commonly remarked on how the purchasing of diesel had changed since the 1980s and early

1990s. Many used to have long-term contracts with fuel suppliers where the price would be set for an extended period of time, sometimes as long as six months. This type of arrangement is no longer the case. No carriers mentioned that they had a long-term contract with a fuel supplier with a set price. Fuel companies will no longer guarantee their prices for long periods except in cases where the price is based on futures speculation. The best and largest customers may still be able to obtain a firm price for a two-week or one-month period, but it is much more common for prices to last no more than a single week.

In many cases today, an agreement exists to provide diesel to a carrier for a specified discount, such as the rack price plus a percentage or retail price minus a percentage. Under this type of arrangement, the price may change frequently, but the discount would remain fixed. Half of the private fleet operators that were surveyed indicated that they purchased their diesel based on a rack price. Diesel purchasing arrangements vary according to the access method (i.e., on-site storage or cardlock).

Price differentials between competitors are relatively minor for any given size of customer, particularly at the cardlock level. Companies with on-site storage can obtain better prices depending on particular suppliers' situation.

As outlined previously, the credit terms provided by suppliers to end users such as truckers are not the same as the terms provided to fuel resellers such as independent distributors or independent truck stops. Trucking companies have learned how to use this situation to their advantage. When prices are increasing, the guaranteed prices they have from the majors allow them several additional days of protection from the higher prices. At this time, larger trucking companies may be paying prices for their diesel that are lower than the wholesale price the distributors themselves paid. On the other hand, when prices are decreasing, the independent distributors have an advantage as their price adjusts more quickly to the rack price and the price drop is more quickly reflected in the price to their clients.

It is clear that national supply and distribution networks are increasingly important, as so much trucking is now interprovincial or international. Thus, a lack of supply or higher prices in one region can be offset somewhat by relying on fuelling in regions where the prices are lower.

Trucking company operators are increasingly better informed about diesel prices. Some actively track important benchmark prices, such as world crude and rack prices at relevant U.S. locations. They are aware of international futures prices, and the largest companies sometimes use the futures derivatives market to guarantee the price of their supply. This approach, however, is seen to encompass certain risks, given the recent volatility of world crude prices, and is used rarely. Generally, carriers

that devote resources to carefully monitoring fuel prices and negotiating with suppliers are getting better prices.

Carriers and owner-operators expressed frustration with the lack of a clear explanation by suppliers in the way that prices are determined. Much of the concern centred on fluctuating prices and a perceived inability to influence price with suppliers.

Competition for Business

In every jurisdiction visited, there were approximately three to five different suppliers servicing the trucking sector. Almost 60 per cent of the surveyed private fleets indicated that diesel dealers “somewhat” actively compete for their business, while approximately one-quarter indicated that diesel dealers do not vie at all for their business. Some for-hire carriers that were interviewed, particularly in Atlantic Canada, felt that price competition among suppliers for on-site purchasing was not strong. Some carrier representatives remarked that prices between suppliers that had exchange agreements were usually identical in those markets.

When competing for a transporter’s business, refiner-distributors are most interested in the company’s annual fuel consumption. The industry clearly targets the largest carriers, whose annual diesel consumption may top 60 million litres. Medium-sized carriers are also able to negotiate advantageous prices, but they do not have the market clout of the largest carriers. Smaller carriers have much less flexibility in the marketplace and receive lower discounts.

The major oil companies do not actively court smaller companies and independent owner-operators. This limits the pricing options available. A small number of companies that may not meet the credit requirement of the oil companies do not have access to cardlocks. They become dependent on retail diesel outlets or other options that may be much more expensive. They therefore must pay more for fuel than their competitors, and this diminishes their ability to compete within the trucking industry.

Few examples were witnessed indicating that existing diesel suppliers are aggressively attempting to increase their market share. However, there are some signs of new entrants in the market such as the U.S.-based company Flying J.

Market competition does not appear to be as important a factor in price fluctuations as one would see in the retail gasoline market. The direct diesel sales sector does not have the same access to information that is provided by the six-foot signs that advertise gasoline prices at local service stations. As a result, there is less market knowledge and pressure to consistently match the lowest price, which often results in complete price uniformity within a

gasoline market. In addition, the physical location of cardlocks is an important factor in deciding which supplier a trucker will use. There may be time and monetary costs involved in deciding to use a slightly cheaper supplier whose location may not be as convenient.

Most carriers are undertaking strategies of their own to try to get lower prices from diesel suppliers. These include considering group purchasing, buying fuel on the futures market, or buying fuel from more than one supplier.

Owner-operators

The owner-operator segment of the trucking industry is the most vulnerable to fuel cost increases. While some owner-operators are protected by guaranteed fuel prices or lower negotiated prices under their contracts with trucking firms, other operators are responsible for their own fuel. These drivers have little power in negotiating lower prices and often pay close to the retail price at retail outlets and truck stops.

The major oil companies do not court independent owner-operators as actively unless they have succeeded in forming some type of association. This limits the pricing options available. Co-operatives are one option available to owner-operators, as long as they are able to meet credit requirements. Otherwise, drivers who are not contracted to large companies may not have access to cardlocks and may become dependent on retail diesel outlets or other options that are generally more expensive. Retail outlets may charge several cents more than a negotiated cardlock price. This naturally increases the owner-operators’ cost of fuel relative to their competitors and affects their economic viability.

Group Purchasing

Most regions reported attempts by small carriers to organize diesel-purchasing groups. The idea is to pool demand to create enough volume to get a better price than one would by purchasing fuel on an individual basis. In one instance, a group of owner-operators was able to reach a deal with a supplier for a discounted price at cardlocks. There are difficulties in organizing a purchasing group in the trucking industry. For example, what happens if one carrier falls behind in payments? Are the other members of the group penalized? In most cases, those carriers who are interested in participating in purchasing groups find that there is little interest among diesel suppliers.

Credit Terms

Many carriers noted that credit terms for their fuel have changed. Best clients generally have 30 days to pay

for their fuel. Increasingly, smaller companies may be required to pay upon delivery or fill-up or within 10 to 15 days. This can be problematic when carriers are allowing their clients up to 30 days to pay for deliveries. Adding to this cash flow problem is the fact that it can take longer than 30 days to recover the GST tax rebate.

Diesel fuel is a commodity that is consumed and cannot be recovered if a bill is not paid. As a result, those without good credit ratings find themselves using cash or a credit card to pay for each diesel fill-up. Companies feel that credit is being squeezed because oil companies are concerned about oversupply in the trucking industry as well as the economic viability of smaller companies.

Ability to Recover Price Increases

Given the high level of competition in the trucking sector (little increase in rates over the past decade, an oversupply of trucks), trucking company officials claim that there are few options for carriers and owner-operators in dealing with diesel increases over the past several months. They reported that in some cases, the increased fuel costs have forced carriers and owner-operators to leave the business.

The trucking industry has chosen to seek fuel surcharges to try to recover increased fuel costs. A fuel surcharge is typically an additional percentage of the total freight rate to compensate for the increased fuel costs. The fuel surcharge is seen as a temporary charge to the client and is not intended to be a freight rate increase. The surcharge in most cases is paid to the carrier who may then pass it on to the owner-operator as appropriate. Truck owners indicate that, given the competitive nature of trucking, acceptance of fuel surcharges by shippers has been mixed and can vary by carrier or by what the client is willing to pay. Shippers with the ability to pass charges on to their clients are most likely to accept reasonable fuel surcharges. For example, by virtue of owning their own fleet, private carriers in most cases are in a better position than for-hire carriers to pass on fuel increases through the price of their goods. Acceptance of fuel surcharges appears to have become a bit more widespread in Atlantic Canada as shippers realize that the health of their truckers is important for their own economic well-being.

For owner-operators, fuel is their most important variable cost. Changes in fuel costs that cannot be recovered threaten the economic viability of many independent owner-operators. In a sector where oversupply already exists because of the low barriers to entry and where cost-accounting quality is uneven from operator to operator, the future of many self-employed truckers is increasingly in doubt.

Recent Transport Canada figures and analysis suggest that diesel increases in the first half of 2000 increased

carriers' fuel costs by 25 per cent. However, it would appear that large carriers have been reasonably successful in their ability to offset these higher diesel prices through the raising of rates or surcharges or through improved efficiencies since their profitability declined only slightly during this period (see Transport Canada's 2000 Annual Report for details). Nevertheless, the increased fuel costs are cutting into margins that are already thin within the industry.

Quality/Environment

No complaints were heard from trucking carriers and owner-operators regarding the quality of diesel in Canada. A few carriers did raise concerns, however, that drivers fuelling in Canada cannot choose to mix grades of low sulphur diesel to suit their destinations. At U.S. truck stops, the driver has a choice of which diesel to buy. However, in most cases in Canada only winter diesel is available to truckers during the colder months. Winter diesel does not gel up like summer diesel in extreme cold temperatures, but it is more expensive and provides lower mileage and less power. A southbound trucker may wish to use less of the winter diesel if travelling to the southern United States, but does not have the option to do so when fuelling in Canada.

Environmental regulations are becoming a factor with respect to diesel prices and the purchasing arrangements for diesel. A number of carriers noted that the more stringent environmental regulations were making it difficult for them to maintain on-site storage for fuel. Switching to a cardlock network is a common strategy to overcome this problem, although this reduces the number of fuelling options for carriers.

Fuel Management

Notwithstanding the difficulties that rising diesel prices have created for carriers, owner-operators and their clients alike, the increase has resulted in better fuel management practices and closer monitoring of fuel purchases. A number of carriers are undertaking innovative practices to deal with rising fuel prices. First and foremost, they are becoming more knowledgeable about diesel prices. This includes having adequate information to negotiate prices with suppliers, and monitoring the billing more carefully (i.e., to catch billing errors). Second, technical improvements are being implemented such as automatic speed controls, automated tire inflation adjustments, more efficient engines and better monitoring of driver log books. Also, carriers need to monitor their fuel purchases. Some carriers reported that suppliers had made some errors on their invoice bill.

Having said this, drivers entering the trucking industry appear to need higher qualifications. There is general agreement among industry stakeholders that drivers require better business skills to be successful, including learning how to best purchase and manage fuel. It was

suggested that financial management and fuel management could be part of the core competencies required to drive a truck. A number of carriers are already providing seminars to their own drivers on how to lower their fuel consumption.

Farming

Overview

Like trucking, farming continues to be at the centre of considerable change. As one representative of the agricultural community put it, “there will be more change in farming over the next few years than in the previous 100 years.” Increasing input costs—including higher diesel prices—depressed world market prices, and lower subsidies are forcing farms to adjust to keep their operations viable. The average size of Canadian farms has grown in part to offset these increased costs, with fewer farm owners operating larger areas. Ironically, an increasing number of farmers have also become truck owner-operators working on a for-hire basis in order to earn a secondary income to support their farms.

According to Statistics Canada, there were 276,548 farms in Canada in 1996. Over 95 per cent of farms were family owned and operated. During that year, total sales of primary agriculture amounted to \$27.3 billion.

Farming varies considerably by region in Canada. For example, the Maritime provinces are large producers of forage crops as well as edible horticultural crops, especially potatoes. Québec and Ontario produce 70 per cent of the country’s total dairy production, while the prairie provinces are the largest producers of grain and oilseeds as well as beef.

Grain farmers in the prairie provinces are experiencing considerable change due to the consolidation of grain elevators. As an example, the Saskatchewan Wheat Pool alone will have reduced its number of grain elevators from 1,200 to 55 terminals by July 31, 2001. Most farmers now have to truck their grain much greater distances to high-throughput grain terminals, resulting in increased transportation diesel consumption, a cost that is ultimately borne by the farmer. At the same time, local fuel distribution points have been closing as the oil industry rationalizes its operations. This may affect the quality of the farmer’s fuel delivery service—something that is highly valued. All of these changes suggest that agricultural producers will be paying closer attention to diesel prices as well as to the way they manage their fuel.

Relationship with the Diesel Industry

Farmers’ Diesel Fuel Needs

Diesel is the principal source for fuel on Canadian farms. Much of the machinery on a farm—such as tractors,

combines and irrigation pumps—is fuelled by diesel (although gasoline, natural gas, electricity and propane may also be used directly or indirectly). Many large farms also operate their own diesel trucks in order to transport their crops and carry out other farm-related activities.

Farmers across Canada are well aware of the rapid increase in their fuel costs. While diesel is not their largest input, it is increasing in importance as prices continue to rise. According to the Canadian Agricultural Energy End-use Data and Analysis Centre (CAEEDAC), Saskatchewan is the largest agricultural user of diesel fuel among the provinces, followed by Alberta and Ontario. Saskatchewan is the largest user by virtue of the number and size of farm operations in the province and by the large amount of energy involved with grain and oilseed farming. Large farms in Alberta or Saskatchewan can often consume over 100,000 litres per year, although most farms in other regions would use considerably less. For these large farms, diesel fuel is typically the third largest input cost (after fertilizer and pesticides).

Farmers’ demand for diesel fuel is uneven. Demand peaks in spring (land work and seeding) and autumn (harvest). Weather affects demand as well, with the result that good weather brings very high demand for farm fuel in a concentrated period of time.

As indicated above, the fuel needs of western grain farmers have increased, as grain must be transported greater distances due to the reduced number of grain elevators. For example, in the mid-1980s, farmers, on average, hauled their grain 15 kilometres to the nearest elevator. By the late 1990s, that distance had doubled to over 30 kilometres. This has caused an increase in direct diesel fuel consumption and costs for those farmers who transport their own grain. Alternatively, farmers who pay others (either a for-hire carrier or a grain marketing company) must also pay increased transport costs to cover the longer hauling distances.

Unlike truckers, farmers cannot go in search of supply. They are dependent on diesel being delivered to them when they need it. Most farms in Canada have on-site fuel storage tanks, which belong to either the supplier or the farmer. If the storage tank belongs to the supplier, the farmer must purchase the fuel from that distributor. Some oil companies will install a storage tank and a pump on farms at no direct cost. Usually, farmers with this agreement will pay a higher price for their fuel because oil companies must recover the cost of the tank and the

pump. If the reservoir belongs to the farmer, he/she can shop around for the supplier with the lowest price.

The size of storage tanks varies across the country due to differences in farm size and environmental regulations. For example, the average farm in New Brunswick has a 1,000-litre (250-gallon) tank, whereas most farms in the prairie provinces possess diesel tanks with a capacity of at least 4,000 litres (1,000 gallons). Each province appears to have a different capacity threshold for fuel storage tanks above which strict environmental regulations come into play. For example, the installation of a containment dike, double walling, automatic shutoffs and other safety measures to control possible leaks and spills are often required for larger tanks. These larger tanks thus become more expensive to maintain. Not surprisingly, most farmers' fuel tanks tend to be just below the limit of what is allowed by provincial authorities to be unregulated storage. The wide use of smaller tanks has meant that fuel deliveries are required more frequently during busy farming periods.

Service Is Everything

A major issue for all farmers when considering inputs like diesel is service. Farmers' diesel consumption and the rate of that consumption can be difficult to predict, given weather conditions. Overall demand for farm fuel is high at certain periods when all farmers may require the delivery of product at the same time. As a result, farmers seek a diesel supplier who can be responsive and dependable so that their farming activity never gets delayed due to a lack of fuel. They have come to expect services like same-day delivery and tank "top-ups" (when the supply truck happens to be passing through the area). Most farmers are loyal to their local dealer and are willing to forego slight cost savings offered by a competing source if their current supplier has proven to be reliable. Not surprisingly, some agricultural producers reported that there seemed to be greater competition on service than on price.

Changes in Fuel Distribution

Diesel used to be purchased from suppliers or distributors who had a local branch storage plant. The personal relationship between farmer and supplier has generally been very strong. The local distributor was likely to be a neighbour who was active in the community. The fuel storage and commercial outlet available in the local town meant that revenues were generated locally and remained in the community. The distributor understood the needs of the farmer and could be relied upon in times of shortage. Payment terms could be negotiated based on the farmer's cash flow. In addition, the local distributor might carry

the fuel directly to the farmer's fields where it would be more convenient to refuel machinery.

However, the rural diesel distribution system has undergone significant change in recent years. The suppliers' need for greater efficiency among local branch plants and distributors has led to the consolidation of local activities to create larger regional reseller and agency operations with a much wider geographic reach (e.g., well over 100 kilometres). It is a similar consolidation to the closure of thousands of small local gasoline stations in the 1980s and 1990s and their replacement with more efficient self-serve super-stations. The net result is lower fixed costs that ultimately, in theory, should lead to lower prices for the end user.

The extent of rural rationalization, particularly in western Canada, is somewhat dependent on the actions of major farm co-operatives that are significant suppliers to the farm market. As member-owned and farmer-responsive organizations, they have expressed the desire to maintain their local presence and may not have the same drive or interest in consolidation. Nevertheless, there has been strong rationalization among the co-operative suppliers who need to become more efficient to remain in the market. Co-ops, however, continue to maintain a presence in areas that receive less attention from the major oil companies.

Farmers are very concerned about the impact of this consolidation of diesel distribution points. They worry that it will mean a drop in service, such as less responsive fuel delivery. They are concerned that deliveries from a regional centre will occur only when there are enough customers to justify travelling to the local area. Some farmers stated that they have already experienced less frequent deliveries due to the consolidation of distribution points. The end result could be that farmers may be forced to purchase larger fuel tanks to ensure adequate supply during peak times. In most cases, this would mean that farmers would have to pay to upgrade their storage sites to conform with environmental regulations that apply to larger fuel tanks. Farmers were emphatic that they do not wish to become fuel depots that require considerable maintenance and can pose certain hazards. Nevertheless, this evolution may become inevitable.

While none of the farmers interviewed had reported running out of fuel, they are very concerned that shortages may occur because the distributors are located further from the farm, and even the slightest mistake in their fuel management could result in shortages.

However, technological developments are making it possible to have electronically monitored fuel tanks that will notify a supplier when a customer's tank has reached a low level of fuel. A network of these automated tanks can allow suppliers to plan their fuel deliveries much more efficiently.

Diesel Purchasing Arrangements

Farmers can purchase their diesel fuel from several sources, the most common being: branded reseller, branded agent and independent reseller, or directly from a regional or major refiner.

Branded Resellers

Branded resellers have an “arms length” buy/sell relationship with their supplier who is typically a regional or major refiner. They usually own the facility from which they operate or lease the plant from their supplier. Branded resellers are authorized to market the supplier’s branded petroleum fuels in a designated trading area. They most often buy at a negotiated price related to their volume and to the wholesale unbranded posted rack price. Most farm customer pricing therefore will ultimately be affected by changes in the wholesale unbranded rack price, the reseller’s operating costs/desired margin and local market conditions, with the branded reseller determining the selling price and carrying receivables. Branded resellers can also act as agents for their supplier in delivering to larger “delegated” farm customers. They generally earn a commission based on volume or haulage for this type of sale. In the latter case, the control over customer pricing rests with the supplier.

There are currently about 420 branded resellers in Canada. Two-thirds carry the brands of the three major refiner-marketers, while the other third sells the products of regional refiners.

Branded Agents

Branded agents are essentially delivery or contract haulers for their supplier. They are responsible for collecting accounts and sell at the price determined by their supplier, which is usually a refiner-marketer. Most agents are compensated on a volume basis and are responsible for their operating costs. The supplier owns the bulk facility from which they operate. Farm customer pricing rests with the supplier as any special prices or discounts must be approved by the company that the agent represents. Farm customer pricing is determined by a host of market and cost factors, including local competitive conditions, agency-operating costs and desired margins.

There are currently about 480 branded agencies in Canada, 90 per cent of which have ties with the three major refiner-marketers. The rest are associated with regional refiners.

Independent Resellers

Independent resellers have no branded affiliation with a regional or major refiner and market petroleum fuels

under their own brand name. They secure supply from refiners and/or large wholesalers at prices that are typically negotiated as a discount, based on volume, to the wholesale unbranded rack price. Therefore, their pricing to farm customers is largely influenced by changes in the underlying wholesale rack price, the reseller’s operating costs/desired margin and local competitive conditions.

There are about 120 independent resellers currently operating in Canada.

Regional/Major Refiners

Some large farm customers may receive product directly from a refiner. Pricing on these transactions is normally referenced to the wholesale unbranded rack price. The major supplier sets pricing and must take into account the same market and cost factors as in the other modes of operation.

Pricing

Traditionally, a price was negotiated between the farmer and the distributor at the beginning of the year and remained in place for the balance of the year. The price usually represented the distributor’s cost plus his margin for transportation and other costs, less a discount based on the volume of fuel purchased by the farmer. Recently, however, with the increased price volatility in the oil market, farmers are discovering that prices may change from delivery to delivery. Many expressed frustration in trying to understand the wide fluctuations in price over the past several months. There was a common belief that price changes are asymmetric—that prices increase more rapidly than they decrease. Some farmers were also unclear as to why neighbouring farms were receiving a different price.

Many farmers expressed concerns about the lack of transparency of wholesale diesel pricing and how pricing is based. The distributor is now less involved in price setting and, in many cases, has been replaced by a centralized and less flexible head office. Prices are still generally based on volumes purchased as well as delivery charges, but because of the limited transparency in the more centralized and rationalized environment, the prices are more difficult to comprehend.

When farmers do seek out bids for their business, they have found that prices are very similar among suppliers when all factors are taken into account. Discounts are generally based on volume: the larger the quantity, the better the discount from the retail price. However, since most farmers have tanks of 4,000 litres or less, it is difficult for them to get a discount. Owners of smaller

farms found that volume-based discounting prevented them from obtaining price discounts.

Co-operative distributors often have loyalty programs that reimburse customers a percentage of their total purchases, but initial costs may be higher as there is sometimes no upfront volume discount. This amount may vary from co-operative to co-operative depending on the organization's philosophy and financial health. While the co-operatives are aware of other prices in the marketplace, they generally aim to secure a set margin on the fuels they provide to their members and therefore may be less flexible on price discounting. The research team found that farmers who are co-operative members are generally quite loyal to these suppliers. Many farmers indicated that they are very unlikely to switch suppliers over a small difference in price if they are satisfied with their current supplier's service.

Group Purchasing

Some farmers have tried or are currently involved in group purchasing arrangements. Group purchasing involves a number of farmers who join together to request tender bids to supply the group with fuel and/or other inputs. The idea behind group purchasing is that by pooling volume with one supplier, the group should be able to receive a lower fuel price. Every region visited featured examples of purchasing groups.

Farmers reported that most suppliers showed minimal interest in bidding for their purchasing group's business. Some suppliers will not submit bids to purchasing groups as a matter of policy. For example, co-ops often do not bid on group purchases since they already represent a group purchasing effort. Interested suppliers often request some form of collateral in the event that one or more members of the group are unable to make their fuel payments, or request that payments are made on a C.O.D. basis. For suppliers, a group purchasing arrangement may not necessarily mean lower transportation costs, as deliveries must still be made to individual farms. Moreover, a purchasing group may be less important for a regional distributor than it would have been for a local supplier in the past. One particular problem with group purchasing is ensuring that all members of the group pay their bills promptly in order to maintain the agreement. One member's failure to make payments can jeopardize the entire group's fuel supply.

Farm input purchasing groups appear to have a mixed impact on farm fuel prices. Some group members reported that they had received better discounts for their diesel. Others found that they were not offered any significant discounts, or that any discounts they did receive were short-lived. In some cases, where a purchasing group was

successful, group members noted that other suppliers would undercut the negotiated price and effectively break up the group. Establishing and maintaining a purchasing group takes considerable effort. Further study appears to be necessary on what makes a successful purchasing group.

Credit Terms

In the past, credit terms for farmers were quite flexible and were often geared to the farm revenue cycle. The current industry norm on credit terms for farm customers is usually 30 days. However, some farmers reported receiving credit terms of less than 30 days, which is very much out of synchronization with the farm operation's cash flow cycle. Diesel is a non-recoverable commodity once it is consumed. Many farmers have found themselves in situations where they must buy their farm fuel on a C.O.D. basis or have had to pay for their previous delivery before a new one is received. Many farmers are unable to get operating credit from financial institutions to carry them over until the harvest.

With the supplier head offices playing a stronger role, farmers are concerned that the resulting technical change in billing may also cut their payment terms and that methods such as automatic debit from their bank accounts may become the new standard for paying for fuel deliveries.

It was suggested that a principal reason behind the consolidation of fuel distribution points and a move to a centralized billing system is that local distributors are too close to customers and are being too lax in dealing with payments in arrears.

Competition for Business

Farmers in the regions visited tend to have the choice of between two and four fuel suppliers. Many claimed that local agents competed for their business on the basis of service, not price. Given the close range in prices, many farmers purchase their fuel through the local co-op since they might later receive a patronage dividend based on their volume purchased or because of a loyalty to the co-operative concept. However, the co-ops' ability to compete price-wise with the major refiner-marketers will likely be tested as the latter distribute product from more efficient regional terminals while the co-ops retain more of their local distribution points.

There do not appear to be any concerted attempts by the major suppliers to increase market share among farmers in any of the regions visited for this study. However, there are indications that smaller specialized resellers are interested in developing supply arrangements with the farming sector that are more accommodating to farmers' needs, such as actively managing the fuel tank on the farmer's property or providing more favourable credit terms).

Ability to Recover Price Increases

The ability to recover price increases depends on how the prices for farmers' products are fixed on the market. When prices are determined on world markets, as they are for wheat, there are limited opportunities to recover increased costs unless the world price for the commodity increases. Some adjustment may take place through federal farm revenue stabilization programs. When products are priced through marketing boards, such as through a dairy commission, price increases can generally be recovered although only after a certain lag period, i.e., when prices are reviewed. With pure cash crops, such as fruits and vegetables, prices are determined according to supply and demand. Farmers control their prices and can pass on increases, based on their competitors' pricing.

Better Management of Farm Fuel

The rationalization of fuel distribution points and recent price increases will have several implications for farmers. First and foremost, farmers will need to devote greater attention to managing their fuel supply, especially during their busiest times of the year. It will be increasingly difficult to receive same-day service, and farmers will need to build this change into their farming practices.

Second, as previously indicated, farmers will no doubt need to consider increasing their fuel storage capacity despite the increased capital cost and not wishing their farms to become repositories of large quantities of fuel. At the very least, farmers will need to monitor their fuel supply more frequently so that deliveries can be planned ahead of time as much as possible.

Third, several of the representatives of the farming community, co-operatives, as well as the diesel industry commented on the need for farmers to be more proactive with respect to fuel pricing. As one person put it, the lack of seemingly competitive pricing is due in part to the lack of proper buyer purchasing. In the past, many farmers did not pay much attention to fuel purchases since fuel was not a major input cost. This passive approach, however, will likely change as diesel costs cut into the agricultural producer's margin.

Farmers will therefore need to be better negotiators when purchasing fuel. This involves being more informed of fuel prices before entering into purchasing arrangements with suppliers and asking for prices on consistent terms (i.e., before-tax prices or after-tax prices, with or without transportation). It also requires farmers to negotiate for fuel ahead of time rather than from the middle of the field when fuel is required immediately. Some farmers were not aware of the price they have been paying for diesel. Farmers who track diesel prices appeared to be getting better fuel prices

than those who took a less active approach to purchasing fuel. The group purchasing mode, discussed above, is one example of a more proactive approach to fuel purchasing.

It was also suggested that farmers need to pay greater attention to the fuel billing process. Farmers are not properly surveying their fuel bills to ensure that the proper amount and correct negotiated price are being charged.

Finally, farmers will need to continue adopting a number of strategies to reduce diesel fuel consumption. These strategies include minimal or zero tillage and making fewer passes over the land. When financially possible, farmers are purchasing more fuel-efficient machinery.

Quality/Environment

The quality of diesel is an important issue for agricultural producers. Although many participants had heard stories of farmers receiving poor quality fuel in the past, there were no recent reports of quality problems among the farmers interviewed for the study. Unlike trucking, farmers consume their diesel on a seasonal basis. This means that agricultural producers have to ensure that they have used up their summer diesel before filling their tanks with winter diesel. Otherwise, a mix of the two could result in freezing during winter use.

Some concerns were also expressed about the effect of using low sulphur diesel in older machinery. Unlike trucking machinery, farm machinery is changed infrequently. A change in fuel composition, such as the switch to lower sulphur diesel for environmental considerations, can therefore be problematic for older farm machinery. In many instances, a special additive is required to mix with the lower sulphur diesel to prevent performance problems in older machinery. Using additives means an increase in price of approximately one to two cents a litre at the farmer's expense. In other cases, engines have to undergo expensive modifications to function in accordance with the new fuel specifications. Therefore, changes in fuel standards can have a more serious impact on a farmer's costs. As indicated previously, to meet its environmental commitments, the federal government has announced plans to go from 500 ppm sulphur to 15 ppm by 2006 for on-road diesel. It is not yet known as to whether this requirement for on-road diesel will affect the refiners' ability to continue to produce the higher sulphur off-road diesel used in farm machinery.

As mentioned earlier, environmental factors actually play an important role with respect to diesel fuel and pricing. There is increasing pressure on farmers to store larger amounts of fuel in bigger fuel tanks. These larger tanks will need to conform to environmental regulations at an added cost to farmers. Alternatively, some suppliers have programs

whereby they manage the fuel tanks and oversee all of the maintenance and environmental compliance. This convenience, of course, comes at an increased cost to the farmer that is reflected in his or her per litre price of diesel.

Other Issues

Although this study looked at diesel fuel only, farmers identified the need to also examine the impact of rising natural gas prices on their operations. Much of their

fertilizer—a bigger cost input for farmers than diesel—is derived from natural gas. Many farmers said they are paying approximately 75 per cent more for fertilizer in 2001 than in 2000 due to soaring natural gas prices.

Many farmers also believe that the federal government should remove its excise tax on fuel for farming purposes so that it is consistent with provincial tax policy. At present, farm fuel is exempt from provincial consumption taxes in all provinces, but farmers pay the federal excise tax of four cents per litre.

Case Studies

As part of its research, The Conference Board of Canada looked in detail at five regions in Canada: Moncton, New Brunswick; Saint-Hyacinthe, Québec; Winnipeg, Manitoba; Regina, Saskatchewan; and Guelph, Ontario. The case studies were largely based on interviews carried out in these regions. These regions shared many common features in terms of how the diesel industry is organized and in terms of the issues affecting both the trucking and farming sectors. To the greatest extent possible, these common issues and concerns have been included previously in the discussion on the trucking and farming sectors.

However, some important regional differences or characteristics were observed as well. To assist the reader, only the regional differences are presented below. The concerns of stakeholders are consolidated so that no specific stakeholder can be identified. Nevertheless, the project team feels that the concerns expressed are accurately reflected in the case studies that follow.

Moncton, New Brunswick

Overview

Greater Moncton, with a population of 114,000, is the second largest city in New Brunswick. Moncton's economy is closely tied to that of New Brunswick as well as to the entire Atlantic region. The major economic activities of the province centre around food and beverages, followed by pulp and paper, sawmills, manufacturers of furniture and other wood-based industries, metal processing, transportation equipment and the processing of non-metallic ores and primary metals.

New Brunswick is also the home of a major regional refiner, wholesaler and marketer, Irving Oil. It is impossible to consider the economy of the region without taking into account the influence of the Irving group of industries. Irving is the largest supplier of petroleum product in Atlantic Canada; it owns three of the region's largest trucking companies, and it has extensive interests in agriculture as well as in most other sectors of the New Brunswick economy. Irving also has Canada's largest and most up-to-date refinery, which is located in Saint John, as well as the largest distribution network throughout Atlantic Canada.

Importance of Trucking

Trucking is a crucial activity to New Brunswick and the rest of the Atlantic region. Moncton's strategic location—

with its easy access to all the major markets in the Maritimes and its strong connections to the U.S. market—make it the region's hub for road transportation. All Less-Than-Trailer (LTL) shipping for the Atlantic region is facilitated through Moncton, and all of the region's major overland shipping companies are headquartered in the Moncton region. Of the nearly 200 trucking firms in Atlantic Canada, more than half are located in New Brunswick, including six of Canada's largest. New Brunswick trucking firms offer next-day delivery to Montréal, Boston or New York; second-day delivery to Toronto and Cleveland; third-day delivery to St. Louis or the Mexican border at Laredo; and sixth-day delivery to Los Angeles.

The for-hire segment of the trucking industry in Atlantic Canada generated just over \$960 million in operating revenues in 1997, which is slightly more than 7 per cent of Canada's total. This compares to the region's 5.8 per cent contribution to the GDP. In the 1987–96 period, trucking revenues have increased 3.5 per cent annually, compared to an industry growth for Canada as a whole of 5.4 per cent.

Trucking Preoccupations

Supply

The supply of diesel to the trucking industry in Atlantic Canada is clearly dominated by the few players who have the supply network to meet the truckers' needs—the major and regional refiner-marketers. The Atlantic region does not have a significant number of independent resellers or retailers who can support the trucking industry beyond local needs.

Pricing

Generally, price information is provided to clients based on a formula that is known only to the supplier, but the price appears to bear a relationship to rack prices. The absence of a formula may be due in part to the fact that Irving Oil, the largest supplier in the region, is a private company and does not post rack prices. Nevertheless, it is clear that all suppliers are constantly aware of New York and regional rack prices for diesel and that their prices are influenced accordingly. Trucking company operators in the Moncton region proved to be among the best informed

in Canada on diesel prices. Many actively track important benchmark prices.

Price Transparency

Members of the trucking community in Atlantic Canada considered the lack of a clear explanation of price changes to be an important issue. This is particularly true when prices increase. Companies that keep up-to-date with developments in international markets are often at a loss to explain why their prices change relative to international conditions. The supplier does not offer explanations of these changes, which gives end users the feeling of powerlessness in confronting fluctuating prices and fosters the belief that changes are arbitrary and are being controlled by the oil companies themselves. In addition, there is a general belief that price changes are asymmetric—that prices increase more rapidly than they decrease.

Most in the trucking industry believe that there is very little competition between oil companies on the basis of price. There is clearly a price benefit that derives from the potential volumes used by a large truck company. However, this study found that the price differences offered by oil companies for individual customers are fairly narrow, usually differing by a fraction of a cent per litre and seldom by more than one or two cents.

Participants commonly feel that the regional refiner produces whatever level of competition exists in the market. Price differentials between petroleum companies in Atlantic Canada appeared smaller than those in the rest of the country, although this cannot be shown empirically due to the confidential nature of the pricing.

The presence of a large refinery in the region leads many carriers to believe that the prices they are paying do not reflect actual costs in the region, which they judge should be lower than in other parts of Canada. While there is general acceptance that the world crude price is the main factor responsible for high diesel prices, they consider that local trucking firms should benefit from Irving's integration into other economic activities. At the same time, there is a general perception that the presence of a large regional refiner-wholesaler has led to a higher degree of competition than might otherwise be the case. Prices in the region are seen as highly competitive with cross-border U.S. prices, and it is advantageous to Canadian companies to purchase the greatest possible amount of their diesel within Canada.

Importance of Agriculture

Agriculture and the agri-food sector make up 3.7 per cent of New Brunswick's GDP and account for 13.2 per

cent of the total industrial output. In 1996, there were over 3,200 farms. In 1998, the farming sector in the province produced agricultural product cash receipts of \$344 million. The major contributors to farm income are potatoes (24 per cent), dairy products (19 per cent), poultry and eggs (18 per cent) and fruits and vegetables (16 per cent). New Brunswick has the largest average farm size in Atlantic Canada, with 287 acres.

The southeast region of New Brunswick, where Moncton is located, has just over 740 farms, or 22.8 per cent of the New Brunswick total. Cash sales of farm products ring in approximately \$49 million annually, representing 16.2 per cent of provincial farm sales. Most farms are beef farms (350), followed by mixed horticultural (85), dairy (65) and blueberry (50). The average farm size is approximately 250 acres (100 hectares).

Farming Preoccupations

Supply

The major and regional refiner-marketers control the supply of farm fuel in New Brunswick. Independent branded and unbranded distributors continue to exist, but their numbers have been reduced as a result of rationalization. In addition, it is often difficult for these independents to undercut the prices of the much larger refiners who also supply them with product and therefore control its price. In Atlantic Canada, the co-operative movement is also a force in providing farm inputs, including farm fuel. Like other distributors, the co-operatives have no refining capacity of their own and need to obtain their supply through contracts with the major and regional refiners as well as on the spot market.

Farm size in the Moncton area is just under the regional average and is much smaller than that found in western Canada. As might be expected, the farm fuel consumption of local farmers is relatively low, with most farms using between 10,000 and 20,000 litres of diesel per year. On-site storage facilities usually have a capacity of about 950 litres (250 gallons). On-site storage is primarily limited by environmental legislation that imposes a strict series of regulations on fuel storage tanks greater than 1,000 litres. Most farmers cannot afford to comply with these regulations and therefore are more dependent on diesel deliveries than would otherwise be the case. As a result, the frequency of delivery as well as the amount of time it takes a supplier to respond to a customer's request for fuel are the most important considerations for farmers when deciding on a supplier.

In many cases in New Brunswick, on-site storage tanks are provided by the fuel companies on the understanding

that the tanks will be used solely to store the supplier's product. Many farmers seemed to believe that these facilities were provided free of cost. While no upfront cost is generally charged, the provision of storage facilities affects the price the farmer pays for his fuel, and so, ultimately, the farmer pays for his storage facilities through higher fuel prices.

Diesel Purchasing Arrangements/Pricing

Moncton-area farmers frequently stated that they do not understand their billing and why prices are constantly changing. Traditionally, a price was negotiated at the beginning of the year and remained in place for the balance of the year. Currently, with the increased price volatility in the oil market, farmers are discovering that prices are changing from delivery to delivery. This is difficult for them to adapt to, and they often suspect that the oil companies are taking advantage of them.

Uses of Farm Fuel

New Brunswick farmers are allowed to use only coloured diesel for on-farm activities related to agricultural production. Many of the New Brunswick farmers interviewed would like to be able to use their farm fuel for complementary activities that are necessary for them to carry out their agricultural production, but that are currently beyond the prescribed use for coloured fuel. These activities include trucking their goods to market and using their trucks for snow removal to allow easier pick-up of their produce at the farm gate.

Saint-Hyacinthe, Québec

Overview

Saint-Hyacinthe was selected as a case study because of the importance of both agriculture and trucking to the region. Saint-Hyacinthe, with a population of 39,000, is in the centre of the Montérégie region of Québec. This is perhaps the most important agricultural region in that province. Saint-Hyacinthe is also well located in terms of Québec's major highway networks, and it is a trucking centre that houses numerous transportation companies of all sizes. Montérégie's economy is centred around agriculture and mining, and Saint-Hyacinthe is a major agricultural centre. Agriculture directly provides 10 per cent of the jobs in the Saint-Hyacinthe area, and another 12 per cent are derived from food processing.

Saint-Hyacinthe is located 64 kilometres from Montréal and 200 kilometres from Québec City on the major route

between the two centres. It is therefore within reasonable proximity of three major refineries—the Ultramar refinery in St-Romuald and the Shell and Petro-Canada refineries in Montréal. Irving Oil also has a terminal located in Trois-Rivières, and other companies' terminals are located in Montréal.

Importance of Trucking

Trucking is an important activity in the province of Québec. According to L'Association du camionnage du Québec, which represents 90 per cent of the vehicles used in public trucking in Québec, trucking generates over \$2.5 billion per year in revenue and provides employment to about 40,000 people in the province.

The Saint-Hyacinthe region is the head office for over 60 regional, national and international transportation companies. Major regional trucking is centred on grains, liquids and bulk transport. Saint-Hyacinthe's strategic location on the Trans-Canada highway between Montréal and Québec gives trucks in the region easy access to all the major markets in Québec, Ontario, the Maritimes and the rest of Canada, as well as strong connections to north-south routes to the United States and Mexico. Saint-Hyacinthe is within 600 kilometres of the Toronto, New York and Boston markets, which combined with Québec's population, provide easy access to a population of over 65 million. There are three highways within 35 kilometres of Saint-Hyacinthe that lead directly into the United States. Trucking companies located in the Saint-Hyacinthe region compete for timely deliveries to all the major North American markets. Saint-Hyacinthe is also particularly well located for intraprovincial transport.

Trucking Preoccupations

Pricing

Prices provided to trucking companies are generally based on Montréal rack prices that are published in the *Bloomberg Oil Buyers' Guide*. The guide is updated electronically whenever prices change and is updated in hard copy weekly. Companies in the Saint-Hyacinthe region exhibited a fair understanding about how their prices were determined. Prices tend to change more rapidly than was the case several years ago, with weekly prices replacing monthly ones.

Competition

Most transporters benefit from a fair amount of competition for their business. Most of the major companies and

regional refiners actively court their business. In addition, the recent establishment of a terminal owned by Irving Oil, 35 kilometres away in Trois-Rivières, has added a new element to the local market. Québec and Ontario are important markets for diesel suppliers, and regional companies are trying to expand their outlets in order to better meet the needs of trucking companies travelling from eastern to central Canada. For smaller operators, independent distributors are also a viable option, with two independent companies offering a limited number of cardlocks and truck stops.

As in other regions, volume is an important factor in determining both competition and discounts. Nevertheless, in the Saint-Hyacinthe region, even smaller carriers feel that there is a strong interest in their business and that they are being provided with competitive prices. Attempts by some groups of small carriers in Québec in general to collectively negotiate better diesel prices based on consortium volumes has produced responses from suppliers and has led to lower prices for carriers. This has not been the case in every region of Canada.

The issue of surcharges and their collection is a critical issue for owner-operators in the Québec market and has been an ongoing topic of discussion for a trucking forum set up by the Government of Québec. Negotiators for the owner-operators are trying to obtain an agreement for their members whereby owner-operators would receive an acceptable fuel surcharge, whether the for-hire company had received it or not. Larger trucking companies are concerned that this would cut into their already very slim operating margins. Surcharges in Québec are not always calculated on per mile rates, but often on the flat rates that frequently cover shipments between major markets, such as the Montréal-to-Toronto run.

Importance of Agriculture

Agriculture is the most important primary-sector activity in Québec. The 1996 agricultural survey indicates that in that year there were 28,255 farms providing approximately 68,000 jobs. In 1999, agricultural receipts in Québec were \$5.1 billion. From the point of view of revenue generated, dairy farming was the most important activity (29 per cent) followed by pork (15 per cent), poultry and livestock (10 per cent each), fruits and vegetables (8 per cent) and cereals (8 per cent). Animal and animal products made up 63 per cent of total farm revenues, while 25 per cent were derived from crops. Québec is responsible for approximately 17 per cent of Canadian agricultural production. Québec farm revenues tend to be more stable than in other parts of Canada due to the large number of marketing boards covering products such as

milk, poultry, turkey and eggs. More than 92 per cent of Québec agricultural sales benefit from some type of stabilization plan based on the costs of production.

As in most other areas of Canada, Québec has experienced a decrease in the number of small farms, while larger enterprises take on increasing importance. Between 1995 and 1997, the proportion of farms with revenues of over \$250,000 increased from just over 15 per cent to just under 19 per cent.

The region around Saint-Hyacinthe has some of the best soil in Québec, aided by a long growing season that can last from 200 to 215 days. The Montérégie region produces just over 31 per cent of Québec's agricultural receipts and is the most important region in this regard.

Farming Preoccupations

Fuel costs for farmers in the Saint-Hyacinthe region, while an important and increasing expense, are not one of the primary input costs. There are 1,426 farms in the Saint-Hyacinthe region. The average farm size is 157 acres, nearly 40 per cent below the provincial average of 258 acres. In addition, the importance of animal-based agriculture means that the volumes of farm fuel consumed on the farm are relatively small, but 95 per cent are also growing corn, soy or cereals. The capacity of on-site storage facilities for the farmers interviewed ranged between approximately 1,900 and 3,800 litres (500 and 1,000 gallons).

Supply

The co-operative movement (through its fuel division, Les Pétroles Sonic) is the dominant player in the supply of farm fuel in the Saint-Hyacinthe area. Independent branded and unbranded distributors continue to exist, but their numbers have been reduced as a result of rationalization. Sometimes these distributors may have a slight price advantage over the co-operatives due to their relationship to the refiner. While the co-operative movement has no refining capacity of its own, it is able to obtain supply from the major refiners as well as purchase product on the spot market from both refiners and distributors. The co-operative movement has reduced its number of bulk plants by over 80 per cent. Nevertheless, it has maintained supply to its distribution system through exchange arrangements with other bulk plants throughout the province.

Given the number of farmers in the region, access to suppliers has not diminished markedly. This difference in distribution is probably accounted for by the important role of Les Pétroles Sonic in supplying diesel fuel. Its distribution network services about 50 per cent of the farmers in Québec, regardless of whether they are co-operative

members or not. Agriculture is the core of the co-operative movement's business. It might therefore be expected that its distribution network—while rationalized extensively from 45 to 8 bulk plants throughout Québec—remains more in tune with the farmers' needs. Other refiner-marketers have also rationalized their distribution outlets in line with what has happened in other parts of Canada.

Change in the Distributor Relationship

The concerns expressed by farmers in other regions regarding their distributor relationship were not evident in the Saint-Hyacinthe area. The relationship between the farmer and his local co-op has remained intact, and many farmers feel a strong sense of loyalty to their local co-operative. The farmers also praised the co-operative movement for providing information to the farmer related to the different grades of fuel, adaptation to new technology, as well as environmental issues.

Winnipeg, Manitoba

Overview

Much of Winnipeg's existence and development stem from its central location and its fertile soil for farming. It serves as a major distribution hub and is the centre of considerable economic activity for both the province and central Canada. It is relatively close to the ports of Churchill, Manitoba, and Thunder Bay, Ontario, and is served by three continental railway lines. Winnipeg is 17 hours by road from Chicago and 8 hours from Minneapolis. The estimated population for the Winnipeg area in 1999 was 677,525, which represents approximately 60 per cent of the province's population.

Retail trade and transportation are among the dominant industries in the city. Winnipeg is western Canada's largest and most diversified aerospace centre. The city also has a large manufacturing sector that ultimately requires strong transportation links to ship products.

Interestingly, in the cases of Winnipeg and Regina, one finds considerable interconnection between the trucking and farming industries. As the number of grain elevators decreases, farmers and grain exporters increasingly require the services of the trucking industry to transport grain greater distances to high speed, high-volume grain elevators located on the main rail corridors. As many farmers mentioned, they rely heavily on the trucking sector.

Likewise, many trucking company representatives in western Canada talked about the importance of the agricultural industry to the economy—and to the trucking industry in particular. Agriculture-related products represent a considerable portion of goods transported by truck (fresh

farm products alone represented over 12 per cent of total goods trucked out of Manitoba into the United States in 1998). And the hauling of grain is one of the most competitive trucking sectors in the Prairies.

Another way in which the two industries intersect is that a number of farmers are also truck owner-operators who are either transporting their own goods or are working on a for-hire basis to earn a secondary income to support their farming.

The Winnipeg area has no refining capacity in its immediate area, but is serviced by the product pipeline from Edmonton. There are two bulk fuel terminals in Winnipeg operated by Esso and Shell. Exchange agreements are in place with other refiners.

Importance of Trucking

Winnipeg has a number of interprovincial trucking terminals and is home to several major trucking companies. The city's Perimeter Highway provides easy access to eastern and western Canadian destinations via the Trans-Canada Highway. The Emerson-Pembina border crossing south of Winnipeg is the second busiest international border crossing point in western Canada. Approximately 95 per cent of goods moved within Manitoba are transported by truck, as is 80 per cent of Manitoba's merchandise trade with the United States.

The total direct and indirect impact of the trucking industry in Manitoba is approximately \$1.18 billion of Manitoba's GDP, involving the full-time employment of approximately 33,000 people and \$654.9 million in salaries, wages and benefits. For every 15 drivers, there are approximately 10 non-driving personnel to support the for-hire trucking activity.

The number of Manitoba-based for-hire trucking companies increased by 65 per cent between 1990 and 1999, partly due to rail line consolidation.

Trucking Preoccupations

Supply

Unlike carriers operating out of Ontario or Québec, Winnipeg-area trucking companies operating interprovincially are highly dependent on either a network of strategically located storage facilities across Canada and/or access to one of the national cardlock systems.

Price

Smaller carriers in the Winnipeg area expressed a strong fear that increasing diesel prices could force them out of business.

In Manitoba, farmers have had a long-standing practice of being able to use off-road diesel (which is not subject to provincial consumption tax) to truck their neighbour's grain or produce (in addition to their own grain) to the grain elevator. Commercial trucking companies that transport grain, on the other hand, do not receive this particular tax exemption, which puts them at a disadvantage in transporting farm produce.

Importance of Agriculture

Winnipeg is headquarters to a number of major agricultural businesses including United Grain Growers, Cargill Limited, Agricore, James Richardson and Sons Limited, the Canadian Grain Commission and the Canadian Wheat Board. The Winnipeg Commodity Exchange is Canada's only agricultural futures and options exchange. The food and beverage sector, based significantly on Manitoba's strong and diversified farm sector, is the largest manufacturing industry in Manitoba.

Between 1995 and 1999, agriculture and related industries contributed an average of 11 per cent to the provincial GDP. Direct agriculture's contribution to GDP was 3 per cent in 1999, when net farm incomes fell.

There were 24,383 farms in Manitoba in 1996. Family-operated farms accounted for 98 per cent of farms, while 1.5 per cent were non-family corporations. The average size of farm has been increasing in Manitoba and was 784 acres in 1996.

Manitoba has seen a diversification of farming away from wheat. In 1991, wheat farms represented 29 per cent of farms. By 1996, only 16 per cent of all farms were primarily wheat-growing operations. However, the number of cattle and miscellaneous specialty farms saw major increases during this same period.

Total farm cash receipts for 1999 were estimated to be \$2.95 billion: 48 per cent from crop production and 45 per cent from livestock production (the remainder were direct payments to producers, such as crop insurance). Canola has become Manitoba's most valuable crop over the past three years.

Farming in Manitoba in the past few years has faced difficult times due to low grain prices and poor weather. On average, a farm operator's total income in 1998 was 5 per cent lower than in 1997. In 1996, 32 per cent of farm operators had jobs outside the farm.

Farm fuel represented 6.7 per cent of net farm operating expenses in 1999. Manitoba's farms and agri-food industry consumed almost 23 per cent of total gasoline and fuel oil in the province in that year.

Farming Preoccupations

Diesel fuel is often the third largest input cost for area farmers, after fertilizer and pesticides. Its importance as an input cost is much greater in Manitoba compared to eastern and central Canada. A considerable amount of fuelling takes place on farms where fuel needs to be transported to machinery out in the fields. As outlined previously, fuel costs for many Manitoba farmers have been increasing because of the greater distances they must travel in order to truck their produce to the elevator. Whether they haul their grain in their own tractor-trailers, hire a carrier or employ the trucking services of a grain marketer, farmers are ultimately paying more for fuel than before.

Supply

Diesel fuel for most farmers used to be supplied by dealers at the local level who were relatively close to area farms. However, many of these local depots are closing and being replaced by regional or central depots, such as in Winnipeg or Brandon. Even suppliers in a relatively large centre like Portage la Prairie have closed and been replaced by operations in Winnipeg. Some consolidation by suppliers was to be expected as farms became larger, but distribution points are centralizing even beyond that anticipated level, with the result that the catchment area for suppliers continues to grow. Deliveries are now being made by larger trucks and on a less frequent basis. Many farmers noted that it might become difficult for smaller farms to get fuel when required if the trend continues.

Many of the farmers in Manitoba now have 3,800-litre (1,000-gallon) tanks or less. Environmental regulations for the storage of fuel take effect for tanks larger than this capacity (for example, larger tanks must have a dike built around them) and thereby increase maintenance costs as well as environmental risks.

Competition

Most farmers indicated to us that there were two to three suppliers serving their region. Federated Co-operatives Ltd. is a major supplier in Manitoba and has a presence in almost every region. It supplies farm fuel to the local co-ops, which in turn primarily supply farmers (60 to 70 per cent of their fuel is purchased for farming). Also, a few independent distributors with their own bulk facilities supply farmers as well.

The most common concern raised by farmers in Manitoba over competition for their business stemmed largely from the drop in the number of suppliers and the

belief that central or regional distribution centres will be less responsive to local needs than local suppliers have traditionally been.

There is a perception that the co-ops' share of the farm market has been increasing as the branded dealers withdraw their local distribution points. The long-term impact on farm fuel prices for agricultural producers remains unclear. A higher degree of rationalization among the majors may translate into lower prices for the end user. This may be less of an option for the co-ops that wish to maintain closer access to farming markets.

Regina, Saskatchewan

Overview

Regina is located in south central Saskatchewan, midway between Calgary, Alberta, and Winnipeg, Manitoba. It borders the American states of Montana and North Dakota. Regina has a resource-based economy fuelled by agriculture, oil and natural gas production, and telecommunications. Government and administration also play a large role in the area's economy. In addition to being the capital of Saskatchewan, the city is home to the Saskatchewan Wheat Pool, the world's largest grain handling co-operative, and the Federated Co-operatives refinery, which has been integrated with the New Grade Energy Inc. heavy oil upgrader. IPSCO, western Canada's largest steel producer, bases its Canadian operations in Regina. The Regina area's population in 1996 was 193,652, but city officials note that the population within one-day's trucking distance is 10 million, including both Canadian and American population centres.

The late 1990s saw significant economic growth in the Regina area (11.1 per cent in 1997 and 1998), but this has since slowed due in part to low agricultural prices and their impact on farmers' incomes and ultimately on the services sector. The agricultural sector has a profound influence on much of the province's economy. Saskatchewan grows half of the entire quantity of Canada's major export crops: wheat, oats, barley, rye, flaxseed and canola. That being said, there is a great deal of concern over the future of farming in Saskatchewan and its impact on the entire provincial economy.

Regina possesses its own refining capacity (Federated Co-operatives Ltd.). The refinery has been in the process of being expanded and will see its production increase by 45 per cent once completed. Regina also receives product through the Edmonton product pipeline. In addition, there are two bulk fuel terminals in Regina operated by Esso and Shell. Exchange agreements are in place with other suppliers. The Government of Saskatchewan announced

plans in 1998 to create a Petroleum Technology Research Centre in Regina.

Importance of Trucking

Regina's central location allows it to play an important role in the distribution of goods to western Canadian centres and to centres in the U.S. Midwest and beyond. There are approximately 2,400 trucking companies registered within Saskatchewan and 95 per cent of the goods moved within Saskatchewan depend on trucks. Transportation industries employ over 28,000 people, or 5 per cent of the Saskatchewan labour force.

Trucking Preoccupations

Pricing

Fuel arrangements between carriers and suppliers are often based on a "rack plus" arrangement. It was noted that rack prices in Saskatchewan tend to be lower than in Alberta. However, with higher provincial taxes, the user prices end up being virtually the same. Several trucking representatives also noted that rack prices have been fluctuating—often it seems on a daily basis—for the past several months. This appears to differ from the traditional pattern of less price volatility in western Canada because U.S. rack prices have less influence there.

Smaller trucking companies have made some effort to undertake group purchasing, but suppliers have shown very little interest in submitting tenders. It was noted that organizing a purchasing group can be difficult in light of issues such as liability and common needs. For example, individual trucking companies may require different cardlock networks and therefore different suppliers due to differences in destinations and routes taken.

Competition

Unlike those in Québec and Ontario, many of the transporters interviewed in Regina believe that there is limited competition for their business. Everyone interviewed noted that they could choose among only two to three suppliers within the region, with Federated Co-operatives a possible supply source for trucking within Saskatchewan. Some sensed that there was very little competitive pricing.

Other Issues

Farmers in Saskatchewan can use tax-exempt diesel fuel to haul their own produce, but they are not permitted to

use this fuel to truck their neighbour's produce as can farmers in Manitoba.

Importance of Agriculture

Although it is Saskatchewan's third largest industry, agriculture and the agri-food sector is the province's largest primary industry and represents 8.3 per cent of the provincial GDP. It is Saskatchewan's third largest employer (13 per cent of the total labour force).

In 1996, there were over 56,995 farms in the province. According to 1999 figures, agricultural products provided a total of approximately \$5.5 billion in cash receipts, two-thirds of which came from wheat and other principal grains and one-third from livestock.

The average size of a farm has been increasing in Saskatchewan. It was 1,152 acres in 1996, yet only 22 per cent were 1,600 acres or more. Average prices for grains such as wheat, flax, and canola have been decreasing, and outstanding farm debt is on the rise.

Saskatchewan farmers are facing particularly tough times due in part to low grain prices. A farming operation of 2,000 acres or more is now seen by many as the necessary minimum size for a sustainable grain-producing farm. However, as noted, most farms are below that size. As a result, margins are very tight for smaller farmers. Increases in costs for inputs such as diesel or fertilizer can be a determining factor in whether some smaller farms continue operating.

According to the Saskatchewan Association of Rural Municipalities, realized net farm income in the province for 1999 was forecast at \$96 million, or an 87 per cent reduction from the previous five-year average. The number of farm bankruptcies in the province increased by 8 per cent in 1999, and between 1998 and 2000 agricultural employment in Saskatchewan diminished.

Farming Preoccupations

As in Manitoba, the average farm operation in Saskatchewan uses a considerable amount of diesel-fuelled machinery. In addition, many farmers have purchased diesel-fuelled trucks for their fieldwork because the price of diesel fuel is lower than that of gasoline (this difference in price has disappeared over the past year). Diesel fuel is often the third largest input cost for area farmers, after fertilizer and pesticides.

The main concern in rural Saskatchewan is elevator consolidation and the abandonment of rail lines, which is leading to increased trucking and fuel costs for the farmers. In the past, the average farmer would travel only 10 to 15 kilometres to the local grain elevator. Now, some

farmers must travel as far as 100 kilometres to the nearest high-volume terminal.

Supply

Most farmers indicated they had been happy with their access to diesel suppliers and the service provided, but were concerned about recent trends towards the rationalization of fuel distribution. The supply of fuel is increasingly coming from central locations such as Regina or from regional centres rather than from local depots or distributors that were usually located within 30 kilometres. This means that larger trucks are supplying fuel to farmers within a 200-kilometre radius. The result of this is that daily service or deliveries out in fields if necessary are less frequent. Farmers are concerned that fuel may be available only once enough orders are requested in the area. Most claim that this will make it hard to get service, particularly if one is running a small agricultural operation.

Agricultural producers are also concerned about the issues of fuel theft and the storage of large quantities of a flammable product that has all kinds of environmental repercussions associated with a larger tank. Many farms are not set up to accommodate the larger trucks that increasingly deliver fuel. And these larger trucks are not able to deliver fuel to the tanks located in various fields, a service to which many farmers have become accustomed. More centralized distributors are also less likely to agree to such deliveries.

Pricing

Some farmers have tried or are currently involved with group purchasing arrangements. Farmers of North America, based in Saskatoon, is an important group involved in developing a group purchasing program for farmers for various inputs including farm fuel. For farmers more so than for truckers, the issue of liability for payment must first be overcome in order to generate any interest from potential suppliers (i.e., what happens if one farmer cannot afford to pay his bills?). As a result, a self-screening or self-selection among the group may occur to ensure that all partners are secure. The other alternative for purchasing groups is paying C.O.D. on deliveries.

Credit Terms

The payment arrangement for diesel fuel is an important issue. Some farmers told us that their credit period to pay for their fuel has been decreasing—often 10 days or even upon delivery instead of 30 days—due in part to the farmers' recent financial difficulties. Aggravating this problem is the reluctance of financial institutions to lend

money for the purchase of inputs such as fuel. Using credit facilities such as a credit card to purchase fuel is a problem, for high interest charges (typically 2 per cent per month) are incurred on unpaid balances.

Competition

The local co-ops, supplied by the Federated Co-operatives refinery in Regina, are a major player in the Saskatchewan market. Prices among the suppliers were reported to be very similar, except that the co-ops may provide a patronage dividend at the end of the year to members based on volumes purchased.

Ability to Recover Price Increases

Many Saskatchewan farmers noted that they are unable to pass on increasing fuel costs because the price of their primary commodity (grains) is fixed on world markets. As a result, farmers must absorb all increased costs themselves.

Guelph, Ontario

Overview

Guelph was selected as a case study because of its importance as an agricultural and trucking centre in Ontario. Guelph, with a population of approximately 100,000, is located in the centre of Wellington County in western Ontario. This region is an important agricultural region in the province of Ontario, with nearly 14,000 farms generating \$1.57 billion in farm operating revenues. Guelph is also well located in terms of the major highway networks in the province, and the region around Guelph houses numerous transportation companies of all sizes. The economy of Wellington County is centred around farming. Guelph is a major agricultural research and organizational centre. While agriculture directly provides only 2 per cent of the jobs in the town of Guelph itself and transportation and storage provides just under 3 per cent, the importance of these two activities to the region is much greater. Guelph provides a representative situation of both agriculture and trucking in Ontario.

Guelph is located 100 kilometres west of Toronto, about 15 minutes north of Highway 401. It is therefore within reasonable proximity of all the refineries and bulk terminals in Toronto and southern Ontario.

Importance of Trucking

Trucking is a crucial economic activity in Ontario. According to the Ontario Trucking Association, trucking

generates over \$3.3 billion per year in GDP and provides direct or indirect employment to about 200,000 people in the province. Seventy per cent of Ontario's land freight and 80 per cent of its trade with the United States is hauled by truck. Approximately four million trucks cross the Ontario-U.S. border each year.

Guelph and its surrounding region house the headquarters of several regional, national and international transportation companies, which carry every type of cargo. Guelph's strategic location off the 401 and proximity to Toronto and Ontario's industrial heartland makes it a strategic location for trucking. Trucks in the region have easy access to all the major markets in Ontario, Québec and the rest of Canada, as well as strong connections to north-south routes with the United States. Trucking firms located in the Guelph region can compete for timely deliveries of Ontario production to all the major North American markets.

Trucking Preoccupations

Pricing

Most companies in the Guelph region monitor Toronto rack prices, and companies sometimes talk among themselves about pricing and supply information. Companies in the Guelph region seemed to have a fair understanding of how their prices relate to the Toronto rack price for diesel.

Price Transparency

Price transparency did not appear to be a major issue for the trucking firms interviewed in the Guelph area, although they share in the common belief that price changes are asymmetric—that prices increase more rapidly than they decrease. As was the case for Saint-Hyacinthe area trucking companies, most firms feel that their diesel prices are competitive and reflect market and supply conditions.

Competition

Because of its size and importance, the Ontario fuel market is one of the most competitive in Canada. All the major refiner-marketers as well as a number of independent distributors and resellers are present. Most transporters benefit from this competition for their business. Trucking companies are able to make daily decisions about where to purchase their product, which may save them more than one cent per litre of diesel. For a trucking company that consumes 20 million litres per year, this can result in a saving of \$200,000 per year or more.

Many trucking companies have extensive on-site storage, and this provides a window of opportunity for independent resellers to meet their sizeable in-yard needs. For the trucking companies' on-road purchases, the three national chains all have viable cardlock systems that span the major provincial routes. Regional refiners from other areas are also trying to make inroads into the Ontario cardlock system. In addition, a number of individual truck stops or chains are using innovative approaches to attract a portion of the trucking community's business.

As in other regions, the volume of diesel potentially purchased by a company is the determining factor in both supplier interest and discounts. Nevertheless, in the Guelph region, even smaller carriers are very well informed about prices offered and find that the presence of independents provides them with viable and competitive supply alternatives. The stakeholders we met in Guelph were not aware of successful attempts to form consortia in order to achieve greater discounts on diesel purchases.

Ability to Recover Price Increases

Ontario truckers have been the most visible and militant in attempting to establish and receive a reasonable fuel surcharge from the shipper in order to recover some of the costs of escalating diesel prices. Owner-operators have been at the forefront of this struggle because of their particular vulnerability in the marketplace. Given the high degree of competition in the trucking industry, however, the negotiating power rests with the shipper who can replace his/her current trucking firm with a competitor who is not pressing for a surcharge. As in other parts of Canada, shippers with the ability to pass charges on to their clients are most likely to accept reasonable fuel surcharges.

Truckers in Ontario were fairly successful in negotiating surcharges when diesel prices were at their highest levels and the Ontario economy was booming. As fears of a slowing economy have increased and diesel prices have come down somewhat, several major shippers have sought to reduce the surcharges previously negotiated. The strong position of these shippers in the marketplace allows them to impose these reductions, which may then become a signal for other shippers or logistics companies.

Ontario owner-operator associations argue that without some form of relief, many independent brokers (another name for owner-operators) will be forced to abandon the industry. While this may have little impact in the short term with a slowing economy, once the economy picks up again, shippers may find themselves with a shortage of trucks.

Importance of Agriculture

Although Ontario's economy is highly diversified, agriculture remains one of the most important primary-sector activities. According to the 1998 agricultural survey, there were 42,715 farms and 57,675 operators, generating farm cash receipts of \$7.2 billion. The average farm size in Ontario is about 200 acres, and farms in the Guelph area conform to the provincial norm. Agriculture in Ontario is highly diversified.

In terms of revenue generated, dairy farming is the most important activity (18 per cent) followed by cattle and calves (14 per cent), fruits and vegetables (12 per cent), flowers and nurseries (9 per cent), pork (8 per cent), soybeans and poultry (7 per cent each), corn (6 per cent), tobacco (5 per cent) and eggs (3 per cent). Revenues are divided almost evenly between animal and animal products and crops. Ontario is responsible for almost 24 per cent of Canadian agricultural production.

As in most other areas of Canada, the number of small farms has diminished in Ontario. Nevertheless, 30 per cent of Ontario farms have gross farm revenues of less than \$25,000, while 61 per cent have revenues under \$100,000. Only 10 per cent of farms have revenues above \$250,000, just over half the proportion in Québec.

The region around Guelph is important agriculturally. Western Ontario has 32 per cent of Ontario's farms and produces 35 per cent of the province's farm operating revenue. Guelph also provides a centre for agri-business and agricultural research centred at the University of Guelph. Guelph houses many agricultural associations that represent farmers throughout Ontario.

Farming Preoccupations

Fuel costs for farmers in the Guelph region, while an important and increasing expense, are not one of the primary input costs. In 1998, machinery fuel was ranked the seventh highest expense of Ontario farmers, constituting 4.1 per cent of farm expenditures.

Supply

Due to improved agricultural techniques, the amount of farm fuel used per farm in the Guelph area is relatively small. Many farms use well below 18,900 litres (5,000 gallons) per year. On-site storage facilities for the farmers interviewed were generally 3,800-litre tanks (1,000 gallons). Some farmers own their own storage tanks, while others have them installed by their supplier. UPI, a distributor of farm fuel and other inputs, is particularly

active in supplying technologically advanced tanks to their customers, with features such as double-wall storage, electric pumps and electronic sensors that measure fuel inventory levels 24 hours per day and communicate levels directly to the supplier's dispatch. When a supplier provides storage, he/she is responsible for maintaining it and ensuring that environmental regulations are met.

UPI, which is headquartered in Guelph, specifically targets the Ontario agricultural community. It is an outgrowth of the United Co-operatives of Ontario and services much of the co-operative movement's membership. Its emphasis on providing services specifically geared to farming has earned UPI an important part of the market share for farm fuel. UPI is 50 per cent owned by a large regional refiner and 50 per cent owned by a large American seed company. It is therefore able to guarantee its supply and obtain it at competitive prices. Major refiner-marketers who have their own distribution systems dominate the rest of the farm fuels market.

Reduction in Distribution Points

The number of fuel distribution points has declined markedly in Ontario as it has in other parts of Canada. However, most of the rationalization occurred several years ago and, in general, farmers in the Guelph region have adjusted to the change. As one farmer put it: "Before there were 50 guys with 50 different companies providing fuel. Today there are 50 guys with two or three companies. Same phone number, same guy, same service." The personal relationship between the farmer and the local distributor has remained intact, but on top of this there is now also the relationship with the larger company that controls much of the pricing as well as distribution.

Farmers' perception that distribution has not diminished critically may come from UPI's presence. While its distribution network was rationalized extensively—from 56 to 16 distribution points throughout Ontario—UPI remains more in tune with the farmers' needs. UPI aims to make deliveries to customers within 90 minutes.

Conclusions

This report examined changes in the Canadian diesel industry and how these changes are affecting two of the most important users of diesel fuel—Canadian truckers and farmers. The study has presented a clear overview on how the diesel industry and its distribution network function and it identifies the major preoccupations of both the agricultural and trucking sectors relating to fuel.

The diesel industry in Canada, like all petroleum-based product industries, follows economic rules of supply and demand over which it has minimal control. The price of diesel's major input, crude oil, is determined outside of Canada on a world market. Canada produces just less than 3 per cent of the world's oil, and most of the major and regional refineries in Canada are net purchasers of crude oil. This means that Canadian refineries buy their crude oil at world prices. Similarly, diesel prices themselves are more strongly influenced by continental and world conditions than they are by cost, supply or demand factors within Canadian borders. U.S. crude inventories or weather conditions in the northeastern U.S. states can send the price of Canadian diesel soaring or tumbling.

In the five regions studied in detail, Canadian farmers and truckers raised several concerns relating to the various relationships that exist between diesel prices and external factors. These preoccupations were summarized in four specific questions that were then examined both qualitatively and using empirical analysis.

1. Does the price of diesel follow the price of crude oil?

The study finds a strong correlation between crude prices and diesel prices at the wholesale level. Crude oil prices make up approximately 75 per cent of the ex-tax wholesale price paid for diesel. As crude oil prices change, diesel prices follow suit. A one-cent increase or decrease in the cost of a litre of crude oil normally leads to a wholesale price increase or decrease of just about one cent on a litre of diesel.

2. Does the price of diesel adjust faster to an increase in the price of crude oil than to a decrease?

By looking at data from 1992 to 2000, the study found that diesel prices at the rack or wholesale level rise more quickly than they fall within the first few days of a crude oil price change. After about one month, prices have adjusted fully to a change in crude oil prices whether

there has been an increase or a decrease. The time pattern for a price adjustment for the end user may differ because of prices that may be guaranteed to customers for a set period of time, regardless of wholesale diesel price changes. The industry counters that there is a greater lag to end-user price increases as a result of these guarantees as well as local market conditions. As end-user prices are not known, it is impossible to comment on this assertion, although some consumers validated it.

3. Why does the price of heating fuel have an impact on the price of diesel?

Regular sulphur diesel fuel and heating oil can both be used for home heating. A shortage in heating oil affects the demand for, and subsequently the price of, diesel fuel. The study found that the prices track each other very closely. Because products can be substituted, distillate prices are usually priced in reference to each other. For example, low sulphur diesel may be priced one cent per litre above furnace fuel.

4. Is the price of diesel influenced by prices in the United States?

Our studies of data since 1997 confirm that American and Canadian diesel markets are closely tied to each other.

Diesel products can both be exported and imported freely between Canada and the United States as well as other countries. Canadian two-way trade in diesel totalled almost 4 billion litres in 1999. Canadian refiners are particularly sensitive to competition from American refiners and take U.S. rack prices into account when they set their own wholesale prices. If Canadian rack prices were significantly higher than those in neighbouring U.S. markets, Canadian refineries could lose much of their business to imports. This could affect the refinery's economic viability.

The fuel range of modern trucking fleets is another factor that underlines the importance of U.S. diesel prices on Canadian prices. Much of Canada's trucking takes place on north-south routes between Canada and the United States. The average tractor-trailer can travel over 3,000 kilometres between fill-ups. If diesel prices were much more expensive in Canada than the United States, trucks would purchase the majority of their diesel south of the border. This U.S. influence on prices affects all diesel purchasers in Canada, whether they are involved in cross-border transport or not.

Only the three major integrated oil companies sell diesel fuel across Canada and across all the major trucking routes. Regional refiner-marketers are expanding their presence into other provinces, but at present they cannot serve the complete interests of national transport companies. Regional refiners are an important presence in both on-site storage and cardlocks within their regions and may often be the predominant force in their particular province.

The farming community is serviced both by the major and regional refiner-marketers as well as by specialized networks of agricultural input providers that are generally tied to agricultural co-operative movements.

Independents, such as independent truck stops and non-branded resellers, have an important role in both the trucking and farming markets in certain localities and have a definite impact on competitiveness and innovation at the local diesel level.

The study's other observations include:

- The wholesale and ultimately the end price for diesel products is strongly affected by external factors—world crude prices, U.S. rack prices, continental inventories and weather conditions.

When refiners are determining their rack price, they look at a variety of features. These include crude oil prices; diesel commodity value as established by international markets; the value of alternative products such as heating oil; import alternatives; as well as the domestic rack prices of competitors and the local supply situation and market conditions. The final consumer price is generally determined on some formula based on the rack price or some crude price indicator.

- The rapid increase in world crude oil prices is the major culprit behind the increase in diesel prices to Canadian truckers and farmers since 1999. The relationship between crude oil prices and diesel prices is clear and has been confirmed by empirical analysis.
- The petroleum industry, including its diesel distribution activities, has been going through a period of rapid rationalization of operation with the goal of lowering operating costs and increasing efficiency.

From 40 diesel-producing refineries in the 1970s, there are currently 19. Large numbers of secondary terminals and local fuel distributorships have been closed or amalgamated, particularly in rural areas. The percentage of closures of bulk plants for some regions has been over 70 per cent.

- Truckers and farmers generally expressed no major pre-occupations about the service they have received from the petroleum industry. Although prices are at high levels in 2001, competition exists between suppliers and an adequate supply of diesel is readily available. All truckers and farmers interviewed have the choice of

several suppliers and, while the difference in price between suppliers may not be great, a price difference generally exists. Ex-tax prices in Canada are very close to those in the United States. In fact, taking into account the lower federal excise tax in Canada, truckers hauling on north-south routes find it advantageous to buy their fuel in Canada. No issues of shortage of supply were reported.

- Cardlock systems for on-road diesel will expand across Canada.

Refiner-marketers are finding cardlocks to be a low-cost alternative to truck stops. They can use these installations to pump large volumes of diesel at low overhead and without high investment. The number of cardlocks has increased, from just over 680 in 1992 to close to 1,300 in 2000, an increase of approximately 90 per cent. The price spread between delivered fuel and the cardlock has fallen dramatically as trucking firms are encouraged to move to on-road, rather than on-site, supply.

- Price transparency does not exist at the end-user level for diesel.

While rack diesel prices are publicly available (although at a cost), most farmers and many trucking companies do not monitor them on a regular basis. Truckers and farmers are not generally aware of the prices their competitors are paying for their products. Discounts are negotiated individually and in a variety of ways, and terms vary from customer to customer. There is some possibility for informal price comparison, but there are no six-foot signs advertising diesel prices at cardlocks as there are at local service stations advertising gasoline prices.

- Size matters. Discounts in the diesel industry are based on potential volumes consumed.

Large users, particularly in the trucking industry, have purchasing power in the diesel marketplace. They are able to negotiate significant discounts based on volume compared to their smaller competitors. They are also able to negotiate better credit terms as well as longer price guarantees. Competition for their business is also more intense. Small users, on the other hand, may be faced with fewer supply options, tougher credit terms and higher prices that they are less able to absorb. Volume discounts also exist for farm fuel, although the quantities involved are much smaller.

- Information is power. The more knowledge end users have about diesel prices, the better their ability to negotiate a greater discount.

Some consumers of diesel products keep themselves very well informed of competing suppliers' prices, crude oil benchmark price movements, as well as the discounts

available in their industry. With this information, they are able to negotiate the lowest possible prices given their volumes of consumption. Conversely, end users with little information generally take the prices offered to them and overpay in relation to their better-informed competitors.

- Better fuel management by users will be required.

The increasing cost of fuel and changes in how diesel is distributed will continue to force both the trucking and farming sectors to re-examine their own fuel management practices in the search for greater efficiency and lower total costs. Those operators who have already devoted attention to fuel management (e.g., strategies to reduce consumption, monitor supply) appear to have lower fuel costs than those who have not done so.

- Differences in credit terms between diesel resellers and end users prove disadvantageous to the reseller.

Truck stops and independent resellers usually purchase their supply from refiner-marketers based on daily rack prices and on credit terms that seldom exceed 10 days. On the other hand, the refiner-marketer's best customers in both the trucking and agriculture sectors generally buy their fuel on 30-day terms and with price guarantees that provide them with less price volatility. As the majors and resellers compete for the same clients, the difference in credit terms places the resellers at a distinct disadvantage.

Resellers have tried to counter this disadvantage by offering better service, developing customer loyalty programs and by continually innovating in order to meet the special needs of their customers.

- The ability to pass on higher fuel costs varies. The rate of increase in the cost of fuel and other inputs is

reported to be outstripping the increase in trucking rates or in most agricultural product prices.

Fuel surcharges in the trucking industry have met with limited success due to the highly competitive nature of trucking. The oversupply of truckers and the general lack of shipper loyalty have meant that surcharges have to be negotiated delicately in order for a transporter not to be replaced by a competitor who will accept a lower surcharge or none at all just to keep his/her trucks running. Some farmers can recover increased input costs when marketing boards cover their products. This recovery, however, is generally made only after a lengthy time lag. Farmers of crops whose prices are governed by local supply and demand may have more flexibility in recovering costs, depending on local market conditions. At the other end of the spectrum, those farmers whose crops are priced on world markets have little ability to recoup cost increases.

- Service above all. Farmers expect to pay a reasonable price for their fuel, but most importantly, it is the service they receive that colours their vision of the diesel industry.

Farmers require fuel in the quantities they need, when they need it. To have a tractor or combine sit idle in a field while the farmer waits for the delivery truck costs the agricultural producer much more than the cost of the fuel itself. There is serious concern that rationalization in the fuel industry will compromise the service that farmers need and have come to expect. They fear that fuel delivery will be less dependable when it is ordered from an anonymous voice more than 100 kilometres away, rather than from the local village distributor.

Empirical Analysis

During the case studies held in five Canadian cities, The Conference Board of Canada met with stakeholders from the oil industry as well as end users. As a result of these discussions, specific questions concerning diesel prices were identified. The questions are:

1. Does the rack price of diesel follow the price of crude oil?
2. Does the rack price of diesel adjust asymmetrically to a change in the price of crude oil?
3. Does the price of heating fuel have an impact on the rack price of diesel?
4. Does the rack price of diesel in Canada follow the rack price of diesel in the United States?

These questions will be looked at in this section.

Data

Before going into the analysis, the source of the data will be discussed. All prices used in the empirical analysis are ex-tax. The data trends used in the empirical analysis are shown in Chart 5. The Canadian rack price for regular sulphur and low sulphur diesel came from *Bloomberg Oil Buyer's Guide*. The Canadian rack price is an average of the rack price of five Canadian cities: Vancouver, Edmonton, Toronto, Montréal and Saint John. The historical data consists of weekly prices that were transformed to monthly prices. The period for the rack price of regular sulphur diesel is January 1992 to December 2000. The period for the rack price of low sulphur diesel is January 1997 to December 2000.

For the price of crude oil, a Canadian average is also used. The average was calculated using the price of Canadian Par crude oil in Edmonton and the price of Brent in Montréal. The series consists of monthly prices for the period of January 1992 to December 2000. The source of the data was Natural Resources Canada and M.J. Ervin and Associates.

The rack price for heating oil used in Chart 6 also came from *Bloomberg Oil Buyer's Guide*. Once again, a Canadian average was calculated using three Canadian cities: Edmonton, Toronto and Montréal. The series consists of weekly prices and was converted to monthly prices for the period from January 1992 to December 2000.

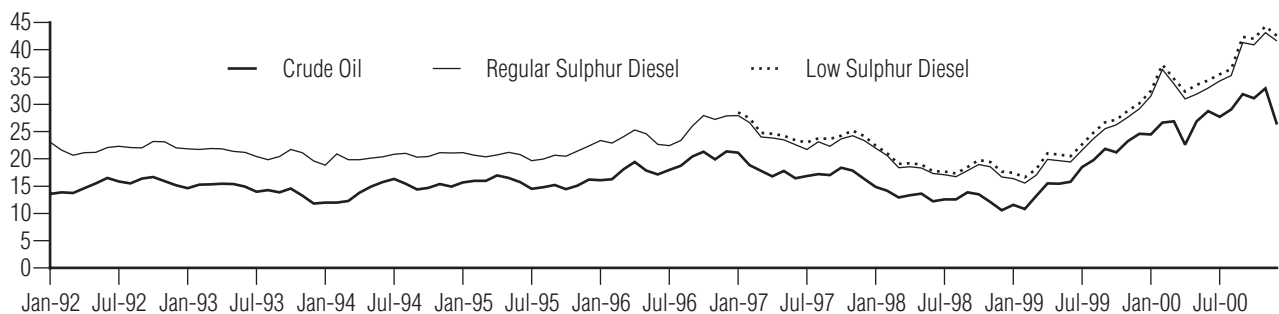
The rack price for diesel in the United States was not available. Instead, in Chart 7, the rack price for heating oil traded on the New York Mercantile Exchange (NYMEX) was used as a proxy. The series came from the Budd Consulting Group Inc. and MPAS Inc. The period covers January 1997 to December 2000. The data are collected on a daily basis and were transformed to monthly averages.

The regressions for the empirical analysis are done by Ordinary Least Squares (OLS), using monthly data. The period studied depends on the availability of the data. Where possible, rack prices for regular sulphur and low sulphur diesel were used.

Question 1: Does the rack price of diesel follow the price of crude oil?

The main driver behind the rack price of diesel fuel is crude oil. In 2000, crude oil represented approximately

Chart 5
Rack Price for Regular and Low Sulphur Diesel and Price for Crude Oil
(cents per litre ex-tax)



Sources: *Bloomberg Oil Buyer's Guide*, Natural Resources Canada, and M. J. Ervin.

75 per cent of the cost in the rack price of diesel. Petroleum product refiners are price takers of crude oil. Taking this into consideration, when crude oil prices go up, diesel prices should follow. To test this assumption, the following equation was used:

$$\Delta W_t = \beta_1 \Delta C_t + \beta_2 \Delta C_{t-1},$$

where ΔW is the change in the rack price of diesel over a one-month period, ΔC is the change in the price of crude oil over a one-month period and β_1 and β_2 are the estimated coefficients.

Both estimated coefficients should be positive and the sum should be close to one. This means that a variation in the price of one cent per litre in crude oil represents a one-cent per litre variation in the rack price of diesel. In theory, only the first coefficient should be significant and equal to one. But rack prices for diesel might take up to one month to adjust completely, and hence the sum of the coefficients ΔC_t and ΔC_{t-1} should approximate one.

The regressions were done for both regular sulphur diesel and low sulphur diesel. The results from the analysis for regular sulphur diesel are shown in Table 4. The t-statistics are also presented. The results show that the rack price for regular sulphur diesel is positively correlated with the price of crude oil. The adjusted R² of 0.540 is high for a first difference equation. The sum of the estimated coefficients is equal to 1.036. This signifies that an increase or decrease of one cent per litre in the price of crude oil causes an increase or decrease of 1.036 cents per litre in the rack price of diesel. The significance of the first lag variable suggests that it takes up to one month for a variation in the price of crude oil to be completely passed on to the rack price of regular sulphur diesel.

Table 5 shows the results for the analysis of low sulphur diesel and the t-statistics. Once again, diesel is positively correlated with crude oil. The adjusted R² of 0.549

is also very good for a first difference equation. The sum of the estimated coefficients is equal to 1.019. This means that a variation in the price of crude oil of one cent per litre would cause a variation of slightly more than one cent per litre in the rack price of low sulphur diesel. Compared to regular sulphur, the price of low sulphur diesel takes the same amount of time to adjust, approximately one month in total.

Question 2: Does the rack price of diesel adjust asymmetrically to a change in the price of crude oil?

Price asymmetry refers to the phenomenon of prices responding more strongly to increases in the cost of crude oil than to decreases. Price asymmetry can be a result of market power or other reasons, such as inventory management or consumer response to changing prices. The following model was used to test for price asymmetry:

$$\Delta W_t = \beta_1 \Delta C_t + \beta_2 (\Delta C_t \times D1) + \beta_3 \Delta C_{t-1} + \beta_4 (\Delta C_{t-1} \times D2),$$

where ΔW is the change in the rack price of diesel over a one-month period and ΔC is the change in the price of crude oil also over a one-month period. The estimated coefficients are β_1 , β_2 , β_3 and β_4 and $D1$ and $D2$ are dummy variables to account for an increase in the price of crude oil. They are equal to one if the variation is positive and to zero if otherwise.

The number of lags included into the equation is determined from the first analysis. Since the first lag was significant for both regular and low sulphur diesel, both of these are used in the estimation. If price asymmetry exists, the estimated coefficients, β_2 and β_4 will be significant.

The results of the analysis are shown in Table 6. The t-statistics are also shown. For the two analyses, the estimated coefficients for the dummy variables are significant. This signifies that price asymmetry is present for both regular and low sulphur diesel.

Table 4
Rack Price for Regular Sulphur Diesel

Sample period: January 1992 to December 2000

Variables	Estimated Coefficients	t-Statistics
ΔC_t	0.658	10.233
ΔC_{t-1}	0.378	5.269
Sum	1.036	
Adjusted R ²	0.540	
Durbin-Watson	2.062	

Source: The Conference Board of Canada.

Table 5
Rack Price for Low Sulphur Diesel

Sample period: January 1997 to December 2000

Variables	Estimated Coefficients	t-Statistics
ΔC_t	0.680	7.320
ΔC_{t-1}	0.339	3.121
Sum	1.019	
Adjusted R ²	0.549	
Durbin-Watson	2.240	

Source: The Conference Board of Canada.

Table 6**Results of the Analysis on Price Asymmetry, 1992–2000**

All sulphur levels of diesel

Variables	Regular Sulphur Diesel		Low Sulphur Diesel	
	Estimated Coefficients	t-Statistics	Estimated Coefficients	t-Statistics
ΔC_t	0.452	5.275	0.455	3.836
D1	0.478	3.601	0.564	2.970
ΔC_{t-1}	0.567	5.076	0.605	3.369
D2	-0.346	-2.277	-0.436	-1.859
Adjusted R ²	0.586		0.611	
Durbin-Watson	2.022		2.326	

Source: The Conference Board of Canada.

For regular sulphur diesel, the estimated coefficient for the current period dummy variable, *D1*, is positive and significant. This implies that the rack price for diesel adjusts more strongly to an increase in the cost of crude oil than to a decrease. For a one-cent per litre increase in the price of crude oil, the rack price for diesel immediately goes up by 0.930 cent per litre. If the cost of crude oil drops by one cent per litre, then the rack price will go down by only 0.452 cent per litre. The estimated coefficient for the first lag dummy variable, *D2*, is also significant but negative. This implies that the adjustment for a decrease is stronger than an increase for the lag variable. Over the total adjustment period, if the cost of crude oil rises by one cent per litre, the rack price for diesel will go up 1.151 cents per litre. If the cost of crude oil goes down one cent per litre, then the price of diesel will decrease by 1.018 cents per litre.

For low sulphur diesel, the estimated coefficient for the current period dummy variable, *D1*, is also positive and significant. This implies that the rack price for low sulphur diesel will adjust more strongly to an increase in crude oil than to a decrease. If the cost of crude oil goes up by one cent per litre, then the rack price will rise by 1.019 cents per litre. If the cost of crude oil falls by one cent per litre, then the rack price will decrease by only 0.455 cent per litre. The estimated coefficient for the first lag dummy variable, *D2*, is negative and significant (at the 10 per cent level). Over all of the adjustment period, the total adjustment for an increase of one cent per litre in crude oil is an increase of 1.188 cents per litre in the rack price for low sulphur diesel. For a decrease of the same amount, the rack price will drop by 1.061 cents per litre.

The research team decided to look at these results in greater detail to see if the high volatility in diesel prices

in 2000 was unduly influencing the findings of asymmetry. Data from 2000 was excluded from the series. Because of the limited data available for low sulphur diesel, the regressions were rerun only for regular sulphur diesel. The results, shown in Table 7, confirm the existence of asymmetry, but lessen its magnitude. For regular sulphur diesel for the period 1992 through 1999, the estimated coefficient for the current period dummy variable, *D1*, remains positive and significant, although the magnitude of the adjustment is smaller than when data for 2000 is included. The immediate reaction to a one-cent increase in the price of crude is an increase of 0.731 cent per litre in the rack price of diesel. Over a one-month adjustment period, a price increase of 1.080 cents per litre in diesel rack has taken place. For a one-cent decrease in the price of crude oil, the immediate change in the rack price of diesel is a 0.545-cent per litre decrease, and a one-month adjustment of 1.049 cents per litre.

Table 7**Results of the Analysis on Price Asymmetry, 1992–99, for Regular Sulphur Diesel**

Sample period: January 1992 to December 1999

Variables	Estimated Coefficients	t-Statistics
ΔC_t	0.545	7.320
D1	0.186	1.485
ΔC_{t-1}	0.504	5.714
D2	-0.155	-1.250
Adjusted R ²	0.679	
Durbin-Watson	1.834	

Source: The Conference Board of Canada.

Question 3: Does the price of heating fuel have an impact on the rack price of diesel?

The third question takes a look at the relationship between the rack price for diesel and the rack price for heating oil. It was mentioned that the rack price for diesel does not go below the rack price for heating oil because they can be substituted for each other. Diesel fuel can be used in a furnace instead of heating oil. Because of this characteristic, if the rack price for diesel ever went below the rack price for heating oil, all owners of an oil furnace would switch to diesel fuel, creating a higher demand. This would then create a supply shortage.

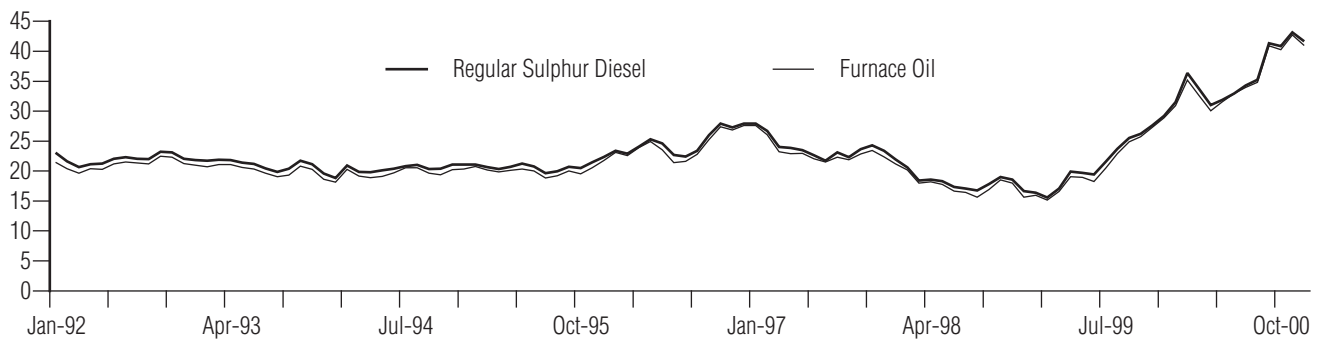
Chart 6 shows the series for the rack price for regular sulphur diesel as well as heating oil. It shows that the rack price for diesel closely tracks the rack price for heating oil.

Question 4: Does the rack price of diesel in Canada follow the rack price of diesel in the United States?

During our case studies, it was pointed out that the rack price for diesel in Canada is closely tied to the rack price in the United States. The NYMEX price for heating oil was used as a proxy for the rack price of diesel in the United States. Chart 7 shows the relationship between the NYMEX price for heating oil and the rack price for regular sulphur diesel.

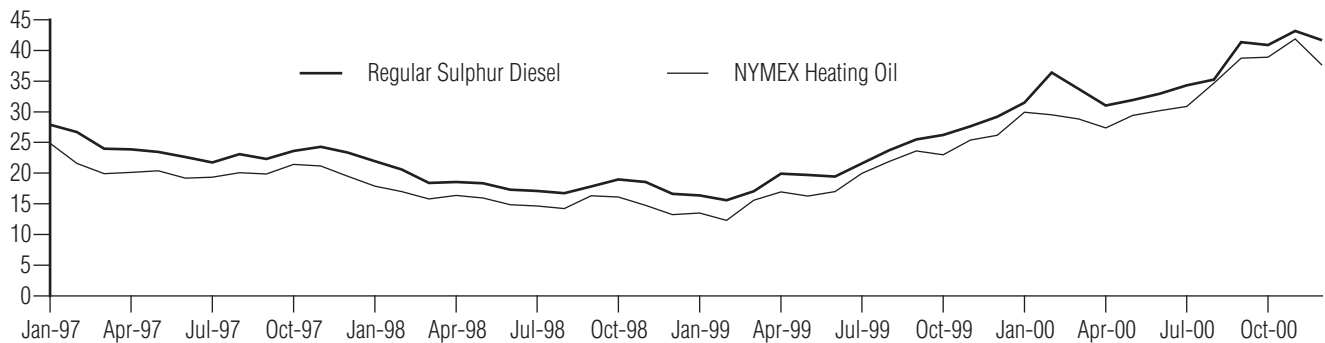
Chart 7 shows that the rack price for regular sulphur diesel in Canada closely tracks the NYMEX price of heating oil. This analysis shows that the American and Canadian markets are closely tied to each other.

Chart 6
Rack Price for Regular Sulphur Diesel and Furnace (Heating) Oil in Canada
(cents per litre, ex tax)



Source: Bloomberg Oil Buyer's Guide.

Chart 7
Rack Price for Regular Sulphur Diesel and NYMEX Heating Oil
(cents per litre, ex tax)



Source: Bloomberg Oil Buyer's Guide, Budd Consulting Group Inc. and MPAS Inc.



The Conference Board of Canada
Insights You Can Count On

255 Smyth Road, Ottawa, ON, K1H 8M7 Canada • *Tel.* 1-866-711-2262 *Fax* (613) 526-4857
E-mail contactcboc@conferenceboard.ca
Internet www.conferenceboard.ca