

In 1978 Canadian refineries yielded an average 34.8% of motor gasoline, 33% of middle distillates including light heating oil, diesel oil and jet fuel and about 16.3% of heavy fuel oil. Other products included liquefied petroleum gas, petrochemical feedstocks, aviation gasoline, asphalt, coke and lubricating oil. To meet the high yields of light products most refineries are equipped with catalytic crackers or other cracking processes, and total installed cracking capacity in 1978 was equivalent to about 28% of crude distillation capacity.

Catalytic reforming amounted to about 18% of crude capacity. This process upgrades gasoline quality and also delivers aromatic petrochemical feedstocks. To meet the need for high quality low-sulphur distillates, hydrogen-treating plants have been installed totalling 43% of crude feed and it is common practice to hydrosulphurize most or all gas, oil and light distillates. Hydrocracking is used to upgrade heavy fuels to motor gasoline and middle distillates.

At Sarnia, Ont. three refineries are integrated with nine petrochemical companies. The oil refineries supply petroleum gases, naphtha and aromatics. The chemical companies convert them to a large number of intermediate and final products. Western Canadian natural gas is also piped into this complex. The intermediate products include ethylene, propylene, butadiene, aromatics and ethylene oxide. Final products include carbon black, synthetic rubbers, detergent alkylates, polyethylene, polystyrene, polyvinylchloride, ammonia, fertilizers, petroleum additives and many others. Many products are sold back to the refineries for blending into fuel products. Fuels are piped directly to the petrochemical plants for process heat and power requirements. Montreal and Edmonton are also major petrochemical centres but plants are distributed widely across Canada.

In the past, location and size of Canada's refineries was determined by the tendency to install them close to centres of consumption. Thus, approximately 60% of total capacity is in the populous regions of Southern Ontario and Quebec. Ontario has two main refining centres, in Sarnia and southwest of Toronto; Quebec has the largest refining centre, in Montreal, as well as a refinery in Quebec City. British Columbia has seven refineries, most close to Vancouver.

More recently the size of individual refineries is being increased for economies of scale, particularly in Alberta, Saskatchewan and British Columbia. Many small refineries have been phased out and replaced by two large refineries in Edmonton, close to the main sources of crude. They will confine the area subject to any environmental risk. Environmental control and conservation equipment to meet new standards is being installed during refinery modernization programs.

A third factor influencing refinery location has been proximity to deepwater ports where crude input is received by tanker. The economies obtained with huge tankers stimulated construction of large refineries in the Atlantic provinces, specifically at Saint John, NB and Point Tupper, NS. Since these are located in areas of relatively low population density, most of their output is either shipped inland or re-exported. Production of Canadian refineries is closely in balance with total market demand, although there is some interchange of individual products to and from the United States. Exports were up from 1977 while imports were down.

## 13.6 Transportation

### 13.6.1 Natural gas

The complete system of gas transmission lines serves major Canadian centres from Vancouver to Montreal and transports gas to the international border for US markets from California to New England.

Most Canadian natural gas must be processed before it can be marketed. Gathering lines take raw gas from producing wells to a collection point on a transmission system or to the inlet of a gas processing plant. Main transmission systems receive marketable gas from field gathering lines or plants and transport it through trunk lines to Canadian distribution companies or to interconnected US transmission pipelines at the border. Distribution systems serve the ultimate customers in the centres of population.