Montreal, as well as a refinery in Quebec City. British Columbia has seven refineries most of them located close to Vancouver.

A more recent trend has been to increase the size of individual refineries to effect economies of scale. Although the average size of individual refineries is increasing all over Canada, this is particularly evident in Alberta, Saskatchewan and Manitoba. These provinces were previously served by a multiplicity of small refineries close to individual cities but many are now being phased out and replaced by two large refineries in Edmonton where they will be close to the main sources of crude in Alberta. They will be of optimum size and will confine any environmental problems to one area, thus facilitating pollution control. Saskatchewan will lose two small refineries, but a remaining one will be expanded.

A third factor influencing refinery location has been proximity to deepwater ports in cases where crude input is received by tanker. The economies now being obtained with very large tankers have stimulated the construction of large refineries in the Atlantic provinces, specifically at Saint John, NB, Point Tupper, NS, and Come By Chance, Nfld. All are located in areas of relatively low population density so that a major proportion of their output is either shipped inland or re-exported. Changes in international markets had a major impact on the "export" refineries in 1974, resulting in a marked decrease in product exports.

In 1974 Canadian refineries yielded an average 33% of motor gasoline, 33% of middle distillates including light heating oil, diesel oil and jet fuel and about 22% of heavy fuel oil. Other products included liquefied petroleum gas, petrochemical feedstocks, aviation gasoline, asphalt and lubricating oil. To meet the high yields of light products most refineries are equipped with a catalytic cracker and total installed cracking capacity in 1974 was equivalent to about 23% of the crude distillation capacity. Catalytic reforming amounted to about 15% of crude capacity. This process upgrades gasoline quality and also delivers aromatic petroleum chemical feedstocks. To meet the need for high quality low-sulphur distillates, hydrogen-treating plants have been installed totalling 36% of crude feed and it is common practice to hydrogen-treat most or all of the gas oil and light distillates. Six hydrocracking units have been installed in Canada capable of treating 5% of crude feed. This new process is of value in upgrading heavy fuels to middle distillates which have been in relatively short supply.

Canada's petrochemical complex will be significantly enlarged by the construction of the country's first "petrochemical refinery" at Sarnia, Ont. Scheduled to start production in 1978, the refinery will manufacture both fuel products and petrochemicals. New petrochemical plants will also be built in the area for further processing of the chemical products.

At Sarnia, three refineries are now integrated with nine petrochemical companies. The oil refineries supply petroleum gases, naphtha and aromatics to the chemical companies who convert them to a large number of intermediates as well as final products. Western Canadian natural gas is also piped into this complex. The intermediate products produced in these chemical plants 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 of the joint products from the petrochemical plants are sold back directly 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.

Canadian refineries are investing in environmental control and conservation equipment to meet new standards. Process cooling water has been minimized or abandoned entirely in favour of air cooling. Water effluent undergoes gravity separation and secondary processes such as air flotation, biological oxidation or filtration. Low sulphur fuels and dispersion from tall smóke stacks minimize the discharge of sulphur dioxide from process heaters. Increased emphasis on products designed to reduce pollution by the consumer has resulted in sulphur-free fuels and motor gasolines with reduced harmful emission levels.

The pioneer oil sands recovery plant at Fort McMurray includes refining equipment to semi-process the recovered bitumen to a synthetic crude oil. The second oil sands plant is now under construction by a new group of participants which include the federal, Alberta and Ontario governments, and further plants are planned. Research programs are being staffed up to develop improved techniques for the extraction and processing of this resource.

Natural gas. Processing capacity at the end of 1974 was 16.1 MMMcf a day, an increase of