

trillion m³ may exist at the high and low probability levels respectively, about 90% of it in frontier areas. Details on how these estimates were made can be found in the Geological Survey Report EP 77-1 *Oil and natural gas resources of Canada 1976*.

13.5 Oil refining, gas processing

The rate of growth of petroleum product demand in recent years has been reduced because of a combination of factors — a slowdown in economic activity, higher product prices and energy conservation efforts. Surplus refining capacity has resulted, mostly in the East. Net sales of petroleum products were 96 million cubic metres in 1976, up 3.6% from 93 million a year earlier, a sharp reversal from the annual growth pattern of 5.4% over the past decade.

Table 13.9 gives details of oil refinery capacity in Canada for 1977, showing scheduled completion dates for new facilities. At the end of 1977, there were 38 refineries in Canada with total capacity of 390 800 m³ per day.

Net sales of natural gas in Canada increased 1 500 million m³ to an estimated 65 848 million m³ and exports were up slightly.

Natural gas processing capacity at the end of 1976 was 473.4 million m³/d, only 7 million m³/d more than in 1975. This small increase reflects the fact that no new major plants came on stream during 1976 although a record number of smaller ones were commissioned.

With major new gas reserve discoveries in 1976 and 1977, gas processing capacity will probably increase substantially in the near future. Plant output includes pipeline gas, propane, butanes, pentanes plus and sulphur.

Refinery expansions during the next several years are expected to centre on completion of projects already under way. These include the Texaco Canada Ltd. 15 103 m³/d Nanticoke refinery on the north shore of Lake Erie (1978 completion) and a Petrosar Ltd. petrochemical refinery in Sarnia, scheduled to operate in late 1977. This plant, when fully operational, will produce 5 644 m³/d of petrochemicals and 18 280 m³/d of petroleum products. Expansions under way include the Consumers Co-operative Refineries Ltd. plant in Regina and Chevron Standard Ltd. refinery in British Columbia.

Some expansion of existing refineries is already in progress. In 1977 Canada had 38 operating refineries with a total capacity at year end of more than 390 000 m³/d, compared to 37 refineries in 1976 with a total capacity of more than 357 000 m³/d. Refinery runs in 1976 were about 286 170 m³/d, about the same as in 1975.

In 1976 Canadian refineries yielded an average 36% of motor gasoline, 31% of middle distillates including light heating oil, diesel oil and jet fuel and about 19% 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, and total installed cracking capacity in 1976 was equivalent to about 29% 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 36% of crude feed and it is common practice to hydrosulphurize most or all gas, oil and light distillates. Seven hydrocracking units have been installed in Canada capable of treating 5% of crude feed. This new process 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