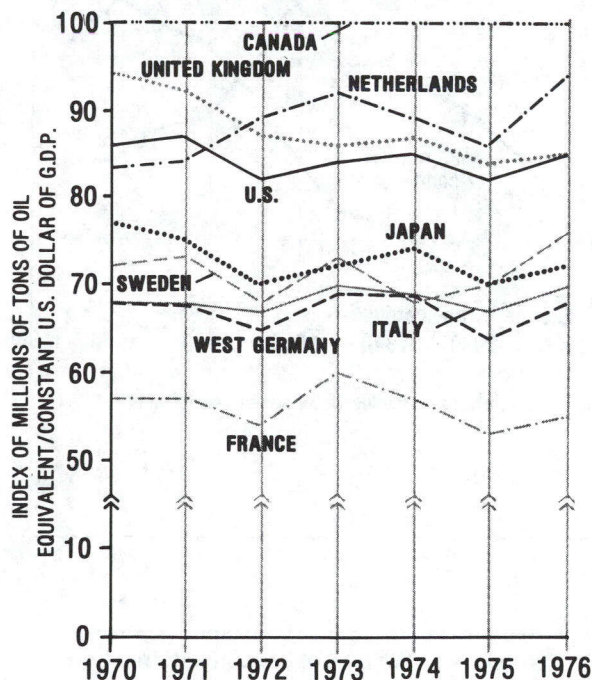


amount of energy consumed in relation to the value of national output generated has been maintained, (Figure 5-5), while the rate of economic growth was kept at a level at least as great as in Canada and in some cases much higher (Figure 5-6). In fact, in the 1977-1979 period, every other country surveyed in Figure 5-5 enjoyed improved economic growth while Canada, even with cheap oil, continued to suffer from a decline in the growth of real GDP. It appears, therefore, that since other economies can perform healthily on less energy, there must be opportunities in Canada for less energy-intensive methods of production.

Figure 5-5: INDEX OF ENERGY CONSUMPTION PER CONSTANT DOLLAR OF GROSS DOMESTIC PRODUCT IN SELECTED COUNTRIES, 1970-1976



Source: After Slagorsky, 1979, p. 4.

The energy intensities of the economies of Figure 5-5 are reflected in the level of energy use per dollar of Gross Domestic Product while trends in the ratio reflect both a changing energy intensity and possible efficiency gains. Canada does use more energy per dollar of GDP than the other countries shown but it is not appropriate to draw too many conclusions from the comparisons of aggregate energy use among countries simply because this broad measure hides important differences. Energy

intensity of the overall economy can be high in comparison with other economies even though energy efficiency may be high as well. This will be the case where there are many industries which require large amounts of energy to produce a given dollar value of output (aluminum smelting being an example). Energy-intensive industries may use technologies which are efficient in their use of energy but the process itself may simply require large amounts of energy. For instance, existing technologies dictate that some 35 megajoules of energy per kilogram of product must be used to produce fertilizer while 200 MJ/kg is necessary in the production of paint (Slesser, 1978).

Other factors also affect levels of energy consumption. Colder and more sparsely populated countries use more energy for heating and transportation purposes. Since resource endowments differ amongst countries, different industrial patterns develop. Canada, with its particular array of natural resources, has developed mineral extraction, smelting and pulp and paper industries which require large amounts of energy. Most importantly though, Canada has a varied and plentiful indigenous supply of energy which has led to more modest energy prices than those characteristic of countries which do not enjoy the same resource abundance.

Aggregate energy/output ratios do, however, have value for indicating the broad performance of Canadian production against that of other countries and they provide clues about where energy-saving opportunities exist. When these ratios are calculated for individual industries, the results are even more useful. An analysis of energy/output ratios for specific industries and sectors in Canada shows that the greatest opportunities for reduced energy use are in the petroleum, crude steel and pulp and paper industries and in the transportation and residential sectors (Slagorsky, 1979). In the transportation sector — where Canadians consume twice as much energy per capita as do the Japanese and Europeans — the most significant potential savings lie in road transport. Although the differences in energy consumption per dwelling among countries are not as significant, savings are also possible in the Canadian residential sector.

Comparisons among nations indicate, therefore, that the energy consumed per unit of output is not necessarily a fixed relationship. This result is an extension of the idea that energy use and output growth have varied historically according to changes in the economic and physical environment. Energy use will evolve in Canada and experience in other industrialized countries is evidence that this change need not be economically destructive.

The primary incentive to lower the rate of growth in energy demand in many countries results from their lack of plentiful indigenous energy supplies at a time when oil