A GLOBAL PERSPECTIVE

A. International Patterns of Energy Supply and Demand

Energy is the most fundamental constituent of the physical world. No activity can take place without the expenditure of energy. Population expansion, the global trend to urbanization and the continuing quest for an improved standard of living place increasing demands on the Earth's energy resources. These resources belong to one of two broad categories – renewable and nonrenewable energy forms. Today, most of society's energy supply comes from nonrenewable sources in the form of fossil fuels and uranium. Renewable sources such as hydraulic energy, biomass, direct solar radiation, wind, tidal energy and geothermal energy probably account for about 20% of world energy use. Nonetheless, biomass is the dominant component of energy supply in many developing countries, some of which now face a severe shortage of fuelwood.

Patterns of energy use have changed dramatically in the twentieth century, in both the quantity and types of energy demanded. The most profound changes occurred during the quarter-century 1950-1975, during which society's need for energy more than tripled and oil replaced coal as the world's most important energy commodity. Much of this increased energy usage occurred in the industrialized world and global inequalities in per capita energy consumption have widened in the postwar period to extraordinary levels. Per capita consumption of commercial energy in Canada stands slightly higher than that of the United States, 1.8 times that of West Germany, twice that of the United Kingdom, 2.5 times that of France or Japan, 15 times that of Brazil or mainland China, and 480 times that of Chad or Ethiopia (United Nations, 1986).

Figure 1 shows the growth in global demand for commercial primary energy since 1950, based on United Nations statistics and expressed in millions of barrels/day of oil equivalent. "Commercial energy" refers to energy which is commercially traded, and includes crude oil, natural gas, coal and primary electricity (hydro-, nuclear- and geothermal-electricity). Excluded from Figure 1 is the exploitation of biomass – fuelwood, peat, agricultural wastes and dung – as an energy source. Reliable statistics on biomass consumption are not available because much of it is collected by users and not commercially traded. Rudimentary data suggest that biomass may contribute an additional 15% to the commercial use of energy pictured in Figure 1. "Primary energy" refers to energy as extracted or produced at the wellhead, mine or hydro-electric station; that is, energy measured at the point of production. The term "oil equivalent" indicates that energy forms such as natural gas and electricity have been expressed as equivalent quantities of oil, based upon their energy content. By this measure, world demand for commercial primary energy had grown to about 130 million barrels/day of oil equivalent by 1984, according to the U.N. If all of the Earth's population consumed energy at the same per capita rate as Canadians, the total demand for commercial primary energy would have stood at approximately 685 million barrels/day of oil equivalent in 1984.