

Certainly, if we hope to remould our economy with a minimum of disruption to the quality of life we have come to expect, we must get on with it as soon as possible. This means there will be an extended transitional period, several decades in duration, when neither the system we know today nor the one we envisage for the future will be in place. In this interim, we will have to continue and even augment the use of certain hydrocarbons while developing alternative energy sources and technologies to the point of commercialization. This is seen as necessary to "buy time", but *the ultimate goal of our alternative energy policy is to phase out the use of fossil hydrocarbons as sources of energy.*

The transition period will be a challenging time but one which offers unique opportunities for Canada. All nations will at some stage have to face the reality of getting away from using nonrenewable energy resources and if we develop the alternative technologies which will eventually be required by the rest of the world, our export opportunities will be unprecedented. Specific efforts which should be begun immediately are offered in the form of recommendations throughout this Report but they are concentrated primarily in the chapter on Alternative Energy Sources, Currencies and Technologies.

3. ENVIRONMENTAL CONCERNS

The exploitation of energy cannot be accomplished without having some effect upon the environment, but different energy options affect the environment in differing ways and degrees. Some forms of energy development are more ecologically benign than others and the Committee wishes to emphasize that its investigation has been pursued taking environmental concerns into consideration at all times. It would not make sense to formulate an energy policy which would solve energy problems but create serious environmental ones.

Many of our seemingly most intractable environmental problems arise out of our overwhelming dependence upon hydrocarbons as sources of energy. This is because both the fossil fuels themselves and their combustion products are pollutants when released into the biosphere.

Natural gas is the cleanest of the hydrocarbon fuels. Being a gas, it is easily dispersed when released to the atmosphere and, depending upon the completeness of combustion, produces predominantly carbon dioxide upon burning. Oil in its various forms is more polluting, being a complex, biologically toxic substance to begin with and releasing a variety of materials upon combustion, including hydrocarbons, particulates, carbon monoxide (CO), carbon dioxide (CO₂), nitrogen oxides (NO_x), sulphur dioxide (SO₂) and heavy metals. Coal is yet again more polluting, producing a significantly greater quantity of the same types of pollutants derived from

liquid hydrocarbons but also bringing about significant ecological damage during the mining process. Strip mining, acid mine wastes, particulate release during transportation and burning, erosion and occupational health hazards such as black lung disease all contribute to making coal the least environmentally acceptable type of fossil fuel.

Two of today's most disturbing environmental problems are acid rain and the accumulation of carbon dioxide in the atmosphere, and both of these phenomena result primarily from the combustion of fossil fuels. Thus environmental concern has been a major factor in causing the Committee to believe that a new energy system in Canada should be one which is not based principally upon the combustion of hydrocarbons.

A. ACID RAIN

Acid rain was once thought to be a problem of only local magnitude, such as the acidification of lakes in close proximity to mineral smelting operations. However, it has now been shown that acid rain is a widespread, even global, problem whose ecological effects may become most significant.

Acid rain is not new. In 1852, residents of Swansea, Wales complained about the effects "corrosive rain" caused by the local coal industry was having on their cattle and the vegetation of the region. It is, however, a growing problem with Europe, Scandinavia, Japan and North America all beginning to recognize its detrimental ecological, social and health effects. In 1979, the preliminary report of the joint Canada-U.S. group studying the Long Range Transportation of Air Pollutants (LRTAP) "identified acidic precipitation as the problem of greatest common concern at the present time."

The reason acid rain has made headlines only in the last few years is that scientists have just recently managed to accumulate enough data to begin to appreciate the geographical extent and the severity of the problem. Acid rain is not immediately or obviously damaging and, for this reason, it can be termed an insidious pollutant; ecological consequences only become apparent after enough acid has accumulated, over a considerable length of time, to bring about an observable effect. Many environmentally-concerned people believe that by the time damage becomes blatantly obvious, too much acid will have accumulated for ameliorative action to be taken at reasonable cost to prevent rapid environmental deterioration.

More is known about the effects of acid rain on some sectors of the environment than on others. For instance, a good deal is known about the effects of