ENERGY CONSERVATION FROM AN ENVIRONMENTAL PERSPECTIVE

A Discussion Paper

for the

Main Hearings

As Part of the Second Submission by

Fisheries and Environment Canada

to the

Ontario Royal Commission on Electric Power Planning

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1. INTRODUCTION

The development of national energy resources such as fossil fuels and nuclear energy places severe pressures on the domestic natural environment. The nature, magnitude, and pervasiveness of these pressures have been reviewed in a submission to the Commission by Fisheries and Environment Canada. Pressures on the environment will increase, not only as a result of continued growth in energy production levels, but also due to diminishing returns from investments in the energy supply sector. As energy resources become scarcer, less accessible, and more difficult to extract, increasing amounts of energy and other valuable resources must be expended to develop the additional energy resources. The result will be increased environmental disruption per unit of energy delivered to final consumers. Rapid development of domestic energy sources, therefore, implies not only an expansion in the number of environmental problems, but also an increase in their severity and complexity.

Energy conservation, on the other hand, offers an opportunity to respond to changing energy realities while, at the same time, avoiding the increased environmental degradation associated with accelerated development options. However, there may be particular cases where energy conservation conflicts with environmental quality objectives.

As it is the fundamental responsibility of Fisheries and Environment Canada to protect and enhance the health and well-being of Canadian citizens by maintaining a healthy and productive natural environment, it is the Department's goal to ensure that energy conservation measures provide maximum benefit to the environment.

2. MEANING OF ENERGY CONSERVATION

Energy conservation, in broad terms, may be taken to mean:

1. A reduction in total energy demand and use over what it otherwise would have been in the absence of conservation measures.

2. A reduction in the use of particular types of energy, either by cutting back on their use, or by substituting the use of more abundant resources for less abundant ones (e.g., coal for natural gas), or by substituting more secure resources for less reliable ones (e.g., domestic energy resources for foreign).

3. More efficient matching of source to end use in order to conserve high quality energy resources such as fossil fuels and electric power and to make the most efficient use of available low quality energy resources. The use of diffuse solar energy or thermal emissions from power plants for space heating are examples of energy conservation in this case.

3. ENVIRONMENTAL IMPORTANCE OF ENERGY CONSERVATION

To the extent that energy conservation obviates the need for production, conversion, transportation or transmission, and utilization of energy, benefits will be realized in the form of savings of energy and other scarce resources used in energy production and utilization, and in reduced environmental damage. This reduction will occur by avoiding the use of the air, water, or land environments, either as direct inputs to the production of power (e.g., water for cooling or land for siting) or as indirect inputs such as the utilization of the environment as a receiving medium for residuals associated with power production. This reduced environmental pressure will translate into positive environmental effects such as lower probabilities of irreversible ecological damage, reduced loss of recreational opportunities, and fewer threats to human health.

Energy conservation also affects environmental quality in less direct ways by exerting an influence on economic activity, on investment decisions, and on the direction of technological change which, in turn, will affect environmental quality now and in the future. By reducing the claim on limited investment funds for exploiting conventional and nuclear energy sources, energy conservation makes more investment resources available to develop alternate energy sources and to invest in programs such as energy conservation, which often require a capital outlay. Conservation allows time to develop more appropriate responses to changing energy situations before future energy options are reduced or foreclosed due to heavy capital or technological commitments. This additional time is particularly important given the magnitude and long lead times of proposed energy developments, with their increasing risk to human and environmental health and the possibility of significant irreversible ecological impacts.

Thus, it can be stated in general terms that an investment in energy conservation is an investment in environmental quality. However, this cannot be stated without qualification.

4. RELATIONSHIP BETWEEN ENERGY CONSERVATION AND ENVIRONMENTAL QUALITY OBJECTIVES

Energy conservation policies and environmental quality objectives are generally complementary. However, there are important exceptions to this statement. If energy conservation is taken to mean the substitution of relatively abundant resources such as coal or uranium for increasingly scarce natural gas or for imported oil, a reduction in overall energy demand may be accompanied by significantly increased disruption of the domestic environment. Similarly, if energy conservation assumes the substitution of certain renewable energy resources such as large-scale hydraulic developments, significant environmental disruption may result. Further, some energy conservation policies will have negative environmental impacts on individual locations while providing environmental benefits on a broader basis, in terms of a reduction in pollution associated with energy

production and use. An example of this might be programs to promote better home insulation. This could lead to increased pressure on the natural environment where insulation is produced, but would reduce widespread environmental impacts by reducing the production of energy for space heating. Thus, energy conservation policies, just as proposals for the development of energy supply alternatives, should be examined carefully to determine potential impacts, direct and indirect, upon the natural environment.

In some cases, environmental regulations may conflict with energy conservation goals. For example, particularly in the short term, some technologies or management policies for pollution abatement are energy intensive. In many cases, however, energy penalties which have been incurred in meeting environmental regulations have been the result of add-on technologies, which must be considered temporary solutions. Longer-term solutions should result in changes in techniques of production whereby both environmental and energy savings can be jointly realized. For example, changes required to meet automobile emission standards initially involved energy penalties in terms of reduced fuel economy. However, auto emissions such as carbon monoxide and hydrocarbons are actually unburned fuels, and more efficient fuel burning systems have recently been developed so that the fuel penalty for emission control has been almost totally eliminated. In the long run, energy conservation and environmental protection are generally complementary, but in the few cases which might arise where conflicts exist, maintenance of overall environmental quality should take precedence.

Environmental regulations and energy policies complement one another through the economic system. If environmental costs were explicitly reflected in energy prices, then the price of energy would rise relative to those goods where production involves less disruption of the environment. In addition, the price of specific energy forms which are particularly serious polluters would rise relative to those which pollute less. It may not be feasible to put an explicit dollar price on environmental damage, however, environmental regulations which cause energy

prices to rise, in effect, attach a positive price to environmental damage. This will be reflected in energy use decisions by promoting reductions in energy consumption throughout the economic system and, hence, contributing to an improvement in environmental quality.

5. CONCLUSION

It has been stated that energy conservation is the purest form of environmental protection. This is true where environmental impacts are prevented, rather than abated or reduced through after-the-fact clean-up measures. However, energy conservation may conflict with environmental quality objectives. It is important, therefore, that the impacts of energy conservation on the environment be carefully assessed. Conversely, environmental protection measures may conflict with energy conservation objectives. However, in the long run, energy conservation and environmental quality objectives generally are complementary.