

Raptor Collisions with Utility-lines—Now an Important Part of Their Environment and Ours

In transmitting electric power from production facilities to their users, utility concerns have erected many hundreds of thousands of kilometres of power- and distribution-lines practically throughout the world. In flight, birds-of-prey (raptors) are usually able to avoid such obstacles; however, when preoccupied or distracted—e.g. when engaged in territorial defence or pursuing prey—the potential for line-strikes increases. This potential is of greatest concern when power-lines are near nest-sites, roosts, or other high-use areas of endangered species.

Although a few actual case-histories of line-strikes by raptors are documented in the literature, efforts to portray utility-line collisions as a significant mortality-factor have not been convincing. The overall impacts on raptor populations, the specific environmental and behavioural factors which contribute to line-strikes, and appropriate techniques for mitigation, are poorly understood. In view of an ever-increasing demand for electric power and the continuing declines of many raptor populations, a systematic and comprehensive review of the problem is needed.

The US Bureau of Land Management, in cooperation with the Pacific Gas and Electric Company, is assembling all available published and unpublished information concerning raptor/power-line collisions, from which a definitive state-of-the-knowledge report will be pro-

duced. Thus, we would very much appreciate the publication of the following call for information in your internationally-influential Journal. As completion of this study is scheduled for the end of the present calendar year (1984), publication of this appeal at the earliest possible date will be necessary for its effective participation in our project:

The US Bureau of Land Management, Sacramento, California, in cooperation with the Pacific Gas and Electric Company, is assembling all available published and unpublished information concerning collisions of raptors with power-lines and other utility-lines. Actual case-histories—no matter how circumstantial or fragmentary—are needed. Please acknowledge that you have such information by writing to Dr Richard R. Olendorff, US Bureau of Land Management, 2800 Cottage Way, Sacramento, California 95825, USA. A form on which to record your information will then be sent by return mail.

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Increased Efficiency in Energy-use Could Help to Deal with Global Warming

According to a new study, increasing the efficiency of energy-use on a world-wide scale could be the most effective way to deal with the global warming that is expected to occur in the next century as carbon dioxide builds up and forms a 'greenhouse' in the atmosphere. Increased efficiency of use, which could cut global energy requirements in half in less than 50 years, is one of several 'CO₂-benign' energy strategies suggested in the study that has been prepared for the National Science Foundation (NSF) by engineering and economics specialists at the Massachusetts Institute of Technology (MIT) and Stanford University.

These strategies are based on the potential for greater efficiencies in the use of energy and for accelerating the transition from fossil to non-fossil fuel use. They include nuclear-fission power as well as power from renewable or solar sources such as wind, photovoltaic devices, and the limited use of biomass. Such strategies will be effective only if they are pursued world-wide, and the sooner the better, the report says.

'Most of those strategies, especially increasing energy productivity, are desirable for many other reasons—reducing environmental pollution and helping to reduce international tension both by reducing the pressure on depleting energy resources and by increasing beneficial international collaboration,' according to Dr David J. Rose and Dr Marvin M. Millar, both of MIT, and Dr Carson Agnew of Stanford. Dr Rose was the principal investigator for the study which was undertaken for the NSF's Division of Policy Research and Analysis. 'We conclude, after studying acid rain and other examples, that the time is propitious for enlarging the global discussion on the greenhouse effect,' the report says.

Stringent measures to restrict the use of fossil fuels at

this time 'are both unjustified and infeasible', because of the uncertainties that exist in both the timing and consequences of carbon dioxide-induced climate changes 'as well as the possibility of similar impacts due to other so-called greenhouse gases,' the report claims. 'However, given the potential for severe impacts, the possibility that such impacts will have a negative synergism with other environmental stresses occurring at the same time, and the inertia in the energy supply and demand system, it makes sense to develop new strategies for reducing future fossil-fuel carbon emissions, rather than relying solely on research to narrow uncertainties and/or ameliorative measures such as building dikes and developing new strains of 'greenhouse-resistant' crops.'

The greenhouse theory holds that increasing the carbon dioxide levels in the atmosphere, as more and more fossil fuel is burned, will trap more and more heat from the sun at the surface of the Earth and so cause global temperatures to rise. Recent reports on the greenhouse effect have been issued by the Environmental Protection Agency, which held out little hope for avoiding its consequences, and the National Academy of Sciences, which, while predicting substantial effects, concluded that more study was needed before any action should be undertaken.

The new report done for the NSF says that, based on current understanding of the effect of carbon dioxide on climate and trends in global energy-use, 'a significant... warming in the next century probably cannot be avoided.* However, the rate of increase of atmospheric

* See, for example, the paper on 'Energy and Climate', by Professor Roger R. Revelle & Dr Donald C. Shapero, published in our Summer issue of 1978 (*Environmental Conservation*, 5(2), pp. 81-91).—Ed.

CO₂ due to fossil-fuel consumption can be significantly reduced *via* the adoption of realistic energy strategies that are relatively "CO₂-benign"—[by which] we mean an atmospheric CO₂ increase from its present 340 parts per million volume to about 420 parts per million by the year 2050, corresponding to a "CO₂-doubling time" of several centuries.'

The MIT and Stanford specialists urge early action because it will minimize later difficulties. They noted that 'the time from conception of a new energy-supply technology to its widespread adoption is half a century or longer.' Although they urge an international approach to the problem, the three specialists acknowledge that it will be impossible to develop a global consensus for any one simple set of energy options—because of different stages of industrialization, different available resources, different perceptions of climatological or economic winning or losing, and other factors. However, 'the time seems propitious to extend the global debate on CO₂-climate, based on recent attention to other international environmental problems, [and] to the benefit of all.'

The report calls for the close study of electric power. 'The trend toward a more-electric future world, coupled with the fact that most non-fossil energy options are electric, indicates the need for and benefit of studying future electric systems closely. Electric power systems that incorporate storage, interactive load-control, and other operations involving joint generator-user decisions and technologies, will make electric power-systems much more versatile and responsive to demand, and result in cheaper average costs of electric power' than currently obtain.

The report also cites the need for more work in developing long-term energy-carbon dioxide models, 'particularly on how to account for the possibility of CO₂-climate changes on the energy-economic system.' In it are evaluated several energy-sources. Thus increased use of coal, the report says, would not be limited by availability or by extraction cost, but would be affected by 'a continuing shift toward a more technologically sophisticated world, for which electricity is better matched than heat by flames—a shift that reduces demand for all combustible fuel, not just coal.'

Nuclear fission, the report says, costs significantly less than coal power in many places in the world, 'especially given environmental restrictions against coal [that are] typical of present US practices.' Nuclear power will be

cheaper almost everywhere that environmental restrictions on coal are significantly increased. Although nuclear fission is currently at an impasse in the United States, it is being pursued vigorously in other industrialized countries. Its long-term future depends on such factors as technological advances, improvements in the management of the nuclear enterprise, and how fission compares with other options on economic and environmental grounds. On the other hand, nuclear fusion 'will not be ready for significant commercial power-production during the critical period before 2050,' the report says.

Because of possible high environmental costs and limits on the amount available, biomass may be used only for premium needs or by people living near exploitable forests 'who are not part of a money economy.' However, the possibility exists for arrays of photovoltaic cells to become a major energy-source for many countries. During the past ten years, improvements in manufacturing techniques and increased volume of production have led to significant cost reductions in this connection. However, substantial deployment will probably not occur before the year 2000, both because of the need to reduce present costs still further and also due to problems associated with its intermittent nature and high material- and land-use. Yet the report says that these difficulties can probably be resolved by more versatile electric power-systems and by judicious use of land which is relatively unproductive for other purposes.

Efforts to reduce energy consumption could occur without adversely affecting the gross national product, the report says. Energy per unit of GNP in constant dollars, or per unit of physical output, could decrease at the rate of about 1% per year without economic harm, because of long-term technological improvement and system replacement. 'This improvement seems achievable in all regions and sectors,' the report says, concluding that 'this is the most important single opportunity to ameliorate CO₂ buildup and appears attractive in its own right, both economically and environmentally.'

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How Hong Kong Could Solve an Animal Waste Pollution Problem

A plan to prevent the dumping of farm manure, which is generated locally at the rate of *ca* 2,000 tonnes a day, has been submitted to the Hong Kong Government by ERL (ASIA) Ltd, in association with HFA Hong Kong and Watson Hawksley Asia, as part of the campaign to end agricultural pollution in the New Territories. Most of the excreta produced by the Territory's vast population of pigs and chickens is currently discharged untreated into streams (Fig. 1) which are used for irrigation and flow into pools that are also used for fishing and bathing. Furthermore, these watercourses are subject to overflow, thus creating an environmental hazard over considerable areas.

The problem has been investigated for the Environmental Protection Agency of the Hong Kong Government by the above-mentioned consultant firms. Lead consultant was ERL (ASIA) Ltd, the Hong Kong-based subsidiary of Environmental Resources Limited, which

has its headquarters in London and acts as specialist consultant for governments and major companies in many parts of the world.

A combination of treatment methods has been recommended—dry handling of wastes on small farms and wet handling on large farms, combined with properly managed disposal. A variable amount of liquid/solids separation can be carried out on-site, depending on the size of the farm and the local circumstances. Although several recycling possibilities were explored, ranging from soil conditioning to methane production, the consultants found that these could not provide a general solution. Too often, no developed market existed for the product, although it was established that prevailing trade with southern China in some animal wastes could be further developed, while a limited market existed within Hong Kong for composted products (Fig. 2). The consultants also recommended establishing sites for relocating