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GLOBAL EFFECTS OF INCREASED USE OF ENERGY

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INTRODUCTION

We in the peaceful nuclear energy community have been comfortable in the belief that what we have wrought over the past 30 years has been an unmitigated blessing for mankind. It comes as a disconcerting shock therefore to find that, just when nuclear energy has achieved such great success, our effort is being challenged on the most fundamental grounds. Where we claim nuclear energy is clean, safe, and necessary, critical voices, particularly in the United States, claim it is unclean, unsafe, unnecessary.

We have always conceded that, in opting for nuclear energy, mankind is assuming a certain risk. Nuclear energy *is* potentially more dangerous than other forms of energy. It is only by scrupulous attention to detail, and exertion of great care, that we can expect to maintain the safety of nuclear power plants. So far, we have been highly successful.

Yet there is a much more difficult and profound issue. We are still at the very beginning of the nuclear age. As we think about the possibilities and the dangers of nuclear power, we tend inevitably to think of nuclear power as an isolated, smallish thing. But in the very long run, nuclear energy will almost surely be the dominant energy source. At that time, will we have to confront entirely new questions of environmental impact, questions that conceivably could compromise the whole path we are now taking?

In this paper, we shall try to visualize the possible ultimate impacts of nuclear energy. We shall consider several interrelated questions. First, what is the motivation for the large-scale development of nuclear energy? Second, can we estimate, even very roughly, what the world's eventual nuclear energy budget might be? And third, can we visualize limits to the ultimate use of nuclear energy — such as limits to reserves of raw materials, global thermal effects, questions of disposal of radioactive and other wastes produced in the course of generating the ultimate budget of nuclear energy?

This paper is, by the nature of its subject matter, speculative. Yet the questions it raises in our opinion go to the very heart of the motivation for nuclear energy and to the ultimate risks of the new energy source. If the motivation is sufficiently strong, we must be prepared to deal with the risks. But we cannot be content with examining the risks when nuclear energy is relatively unimportant; we must try to assess the risks ultimately, when both the need for

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