We anticipate that 30 years from now nuclear power plants will generate over one-half of the nation's total electric power. Of course, this growth may not be achieved if we are counting on doing the job exclusively with today's types of commercial light-water reactor plants. These plants must be the workhorses of the nuclear power industry in the years ahead, but they must be coupled with other more-advanced types to fulfill our longer-term energy needs while at the same time satisfying environmental and social concerns about large-scale energy production. Although current light-water reactors have many advantageous characteristics, we know that they do not achieve thermal efficiencies comparable to the more-advanced reactors now under development. Furthermore, they extract only between 1 and 2% of the potential energy from their uranium fuel. They are dependent on the availability of large amounts of low-price uranium ores to keep their power costs economically competitive with those of fossil-fuel plants.

Fortunately, nature has arranged things so that we can obtain a large fraction of the vast amounts of energy locked up in uranium and thorium minerals through the breeder-reactor principle, and we can expect that breeder-reactor power costs will be relatively insensitive to the cost of the uranium and thorium; this opens up the economic use of low-grade as well as high-grade ores. Through our breeder-reactor development program, those of us in the energy community—the utilities, manufacturers, universities, and the government—are now well under way toward taking advantage of this gift of nature, an abundance of low-cost nuclear energy that can serve our needs for thousands of years to come.

I believe we are only beginning to recognize the implications of this promised abundance. We simply have not had time to develop the long-term perspective necessary to envision the full possibilities. But, as we achieve our goals in the breeder development, I believe we will witness a transition to the massive use of nuclear energy in a new economic and technological framework. This transition may be slow, and it will require the introduction of a series of innovations in industrial, agricultural, and transportation technology. The innovations will include such advances as large-scale dual-purpose desalting plants, electromechanization of the farm and of transportation, electrification of the metal and chemical industries, more effective means for utilizing wastes, and devices for converting nuclear energy directly to electricity. It seems to me that these innovations, and others, are going to be necessary to keep this planet liveable for the increased number of people we will see on it, even with a reduced population growth,