From the commercial viewpoint this technical coupling through the fuel cycle is an extremely important factor. A significant facet of this coupling is the complex of facilities that industry has provided and will continue to provide at large capital outlays for the various operations in the fuel cycle for water reactors. Because of this close coupling with respect to fuel cycles, it is possible to expand from these facility investments and the know-how related to light-water reactors to their use as breeders.

Thus we see the transition from the light-water reactors to the breeder as an orderly process in which the fuel produced by the light-water reactors will help to supply both until enough of the fast reactors are on line long enough to form a completely self-sufficient fuel system. In such a system each breeder reactor would, hopefully, in 7 to 10 years produce enough fissionable fuel to refuel itself and one other reactor. This is what we refer to as a "doubling time" of 7 to 10 years. If a fuel doubling time of less than about 10 years (the approximate doubling time of the electrical power demand in the United States) can be achieved with the breeders, these nuclear power generating systems could become self-sustaining in about 30 years after introduction, providing fuel for new and old reactors as needed.

The development of such a breeder reactor system will, of course, cost money, but the indications are that financial savings and other important benefits resulting from the decreased cost of the electric power will compensate for this expense many times over. The economic advantages that can be expected to accrue from a strong program for the development of breeder reactors were brought out by a "cost–benefit analysis of the U.S. breeder reactor program" completed last year by the AEC. According to this analysis, the breeder offers a tremendous dollar payoff. For example, in addition to large industrial expenditures, we estimate that the LMFBR research-and-development cost will be in excess of $2 billion through the year 2020 for the AEC. Assuming a 1984 introduction of the commercial fast breeder, the gross benefits to this nation from electrical energy savings in the 35-year period thereafter, to the year 2020, are estimated to be more than $200 billion in terms of 1970 dollars. I might mention also that, under the same set of assumptions, a significant savings of nuclear fuel resources and other benefits would accrue as a result of introducing the breeder. The savings over the 35-year period would amount to 1.4 million tons of U_3O_8, the energy equivalent of 400 thousand million tons of coal. To put this into perspective, I might recall for