EIR Special Report

Fusion energy's economic promise

The Magnetic Fusion Engineering Act of 1980, signed by President Carter on Oct. 7, may be the most significant piece of legislation of the century. One scientist called it "a historic victory for the cause of scientific progress in America." The bill's primary sponsor, Democrat Mike McCormack of Washington, called it "the most important energy project ever undertaken by anybody anywhere."

Fusion is the energy source of the sun. Harnessed on earth, fusion will be safe, clean, efficient, and abundant enough to guarantee mankind's energy needs of every kind for millions of years. The McCormack bill commits the United States to realizing controlled thermonuclear fusion energy in a commercially feasible form by the end of this century.

As a result of recent scientific advances, the nation is positioned to develop the full engineering back-up technology required for a fusion reactor. The new law mandates setting up the first national fusion engineering center, which will conduct and coordinate technological research and development, ranging from superconducting magnets to reactor materials and full-scale plasma heating systems. The present magnetic fusion budget of $100 million will be increased by $100 million for each of the next two years to get the ball rolling.

The United States is now officially committed to building a prototype magnetic fusion reactor by the year 2000. The legislation is as definitive in this respect as the Atomic Energy Act of 1954, which opened the way to commercialization of nuclear fission power, and President Kennedy's space program budgeting of the early 1960s, which committed the nation to putting a man on the moon by the end of that decade.

The harnessing of fusion power will mean the economic basis on which to meet all the world's energy needs for millions of years in all possible forms, including electricity, heat for industrial processing, and hydrogen. Moreover, fusion torch technology will work in such a way that currently useless materials are broken down into their constituent elements, which can then

Photo: Suzanne Klebe/NSIPS

Michael McCormack (center), chairman of the Energy Research and Production Subcommittee of the House Science and Technology Committee.

be processed to create useful materials of all kinds—providing an unlimited resource base in the broadest sense.

Complex and difficult engineering requirements remain to be met. A plasma and heating configuration that is pure enough, dense enough, and stable enough to produce large amounts of net energy cheaply remains to be developed. But scientists are confident they can solve these problems. The other problems are political.

Fusion development is fatal to the political patrons of "human limitations." The prospect of fusion power dashes to the ground all the tenets of economic austerity, "energy conservation," and "limits to growth." The prospect of cheap, abundant energy within mere decades means that every existing source of energy can be confidently exploited to the maximum in the interim. By harnessing the ultimate source of energy in the universe, we prove in practice that we have an unlimited resource and population potential.

A twenty-year mobilization

The McCormack fusion program can immediately begin to turn the U.S. economy around—not only in the laboratories, but in the factories and schools. Congressman McCormack put it this way when he was asked about the "economic payback to the economy":

> One can look at the long-range implication—having a new and extremely important, overwhelmingly important energy-production technol-

In this section

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The McCormack bill

The following is an excerpt from H.R. 6308, Mike McCormack's Magnetic Fusion Engineering Act of 1980.

. . . It is declared to be the policy of the United States and the purpose of this act to accelerate the national effort in research, development, and demonstration activities related to magnetic fusion energy systems. Further, it is declared to be the policy of the United States and the purpose of this Act that the objectives of such program shall be:

1) to promote an orderly transition from this current research and development program through commercial development;

2) to establish a national goal of demonstrating the engineering feasibility of magnetic fusion by the early 1990s;

3) to achieve at the earliest practicable time, but not later than the year 1990, operation of a magnetic fusion engineering device based on the best available confinement concept;

4) to establish as a national goal the operation of a magnetic fusion demonstration plant at the turn of the twenty-first century;

5) to foster cooperation in magnetic fusion research and development among government, universities, industry, and national laboratories;

6) to promote the broad participation of domestic industry in the national magnetic fusion program;

7) to continue international cooperation in magnetic fusion research for the benefit of all nations;

8) to promote greater public understanding of magnetic fusion; and

9) to maintain the United States as the world leader in magnetic fusion. . . .

Acceleration of the current magnetic fusion program will require a doubling within seven years of the present funding level without consideration of inflation, and a 25 per centum increase in funding each of fiscal years 1982 and 1983.

ogy. The second implication is that in the intermediate term, starting almost at once, you have additional benefits in superior technology as far as nuclear fission is concerned. Third, these programs provide money pumped into the American economy and provide jobs for researchers, scientists and engineers, and vendors and fabricators. In that sense, even if one doesn't assign an intermediate or long-range value to these programs, they still are just as valuable to society in the immediate timeframe, or in the next few months, as a CETA program or any other program which results in hiring people.

Of course, the McCormack program contributes much more than a CETA make-work job program. It immediately sets up the framework for:

1) a total assessment of the scientific manpower requirements to meet the goals of commercial fusion demonstration by the turn of the century, and a revamping of the educational system to meet those needs;

2) the rapid gearup of the high-technology energy programs which have been left on the shelf, but which are needed in order to meet the total energy and industrial requirements for transition to a fusion economy;

3) a host of new industries which will be necessary to provide the components for nuclear fusion reactors as such.

It is absurd to think of the United States making the transition to nuclear fusion after a 20-year interlude of a major energy cutback. Yet the nuclear industry is currently at a standstill, oil plants are being converted back into coal-burning plants, and a major substitution of outrageously inefficient solar energy, biomass, and synfuels is being planned to replace oil and nuclear.

Thus even the most optimistic of forecasters, such as the World Coal Study, are projecting only a yearly increase in electricity growth of 3.2 percent, far below the necessary increase in order to merely reverse the collapse of U.S. industry, much less gear up for entering the fusion era.

Yearly electric growth must go back up to at least 6 to 7 percent through a rapid increase in the high-technology use of coal, restoration of nuclear energy plants which have been shut down or sabotaged by DOE sponsorship of environmentalist objections, and setting new and rapid timetables for commercial deployment of the breeder reactor, high-temperature nuclear and MHD technology.

This energy gearup, more than the fusion research and construction program itself, means immediate jobs. The United States should produce additional 2,500 one-gigawatt nuclear reactors by the year 2000, including 1,500 for export to the developing sector.