

# Will the Reagan administration kill America's fusion program?

by Marsha Freeman, Science & Technology Editor

*EIR* has learned that science policymakers for the Reagan administration are considering a "restructuring" of the U.S. magnetic fusion program, an attempt to return to a "go-slow" program to develop fusion energy which would stop construction of new fusion experiments needed to sustain continued progress in the program, and would preclude broadening the effort to develop the technology and engineering base for commercial fusion power.

Fusion energy is the process of the Sun and stars: the fusing together of isotopes of hydrogen. The promise of fusion is to create an energy source which uses hydrogen from water for fuel, which is safe, clean and unlimited.

Over the past year a milestone was reached in the United States with the passage and signing into law of the 1980 Magnetic Fusion Energy Engineering Act. The current threat to revise the fusion timetable jeopardizes that law's commitment to demonstrating engineering feasibility by the year 1990 and commercial feasibility by the year 2000.

## 'Too optimistic'

According to an assistant director for the White House Office of Science and Technology Policy (OSTP), the fusion program developed in the last days of the Carter administration, including the signing of the Fusion Act, was "too optimistic." Refusing to elaborate on this, the spokesman stated that there are "technical" reasons why the timetable for fusion should be stretched out, and asserted that fusion would make an impact on the national energy scene "more likely by the year 2040 or 2050, not 2000 or 2010, which was the framework some enthusiasts saw."

There should be "support for basic science and engineering rather than accelerating industry participation," this OSTP official stated, "and we want to shift the emphasis back to science and engineering research."

This perspective violates the intention of the law to increasingly involve high-technology industry in the fusion program to develop the technology and engineering that will be required to build power plants in the

next century. "Basic research" in fusion may sound like a positive approach, but without industry involved, the program will quickly reach a dead end.

Even within the purview of basic research, the OSTP admitted that some of the new fusion experiments required to answer remaining scientific questions about fusion may have to be "deferred" because they would require up-front funding.

This policy of halting new experiments and projects and refusing to build an engineering prototype fusion reactor will wreck progress in fusion. Questions that remain in the scientific feasibility for fusion can only be answered through the use of bigger and more sophisticated experimental machines. Therefore, this sort of "restructured" program has nothing to do with a real concern for basic science, but represents an attempt to destroy the future of the program and demoralize the scientists and administrators who have led one of the nation's most important energy development programs.

## What will be affected

The Magnetic Fusion Energy Engineering Act mandated that there be a fusion engineering device (FED) on line by 1990; by the year 2000 the U.S. would have a commercial demonstration reactor to lay the basis for utility-based fusion power systems. Without a commitment this year to build this FED the letter of the law will not be met. The next-step tokamak device, the Tokamak Fusion Test Reactor (TFTR), is the furthest advanced fusion technology. The TFTR will become operational at Princeton University in about a year. If there is no follow-on tokamak such as the FED ready to be designed and constructed after this test device, the tokamak program will come to a dead end. The United States will have shown that fusion is scientifically feasible, but have no reactor to demonstrate engineering feasibility so it can be utilized.

In addition to the mainline tokamak program, the United States has the most diversified fusion program in the world. Americans are the leaders in magnetic mirror fusion technique and have excellent efforts in

hybrid mirror-tokamak programs. The U.S. fusion program currently involves a plan to build the world's largest tandem mirror facility at the Lawrence Livermore Laboratory, called the Mirror Fusion Test Facility (MFTF).

The MFTF has been authorized by the Congress and the FY82 budget of \$456 million includes funds for construction. The White House science office and the Office of Management and Budget are now thinking of abandoning the tandem mirror project in fiscal 1983 budget.

The bumpy torus, developed at the Oak Ridge National Laboratory, embodies a mirror-tokamak hybrid concept; it has been a promising approach to fusion. The Congress has authorized \$20 million so the construction of an Elmo Bumpy Torus proof-of-principle scientific experiment can begin in FY82. Administration policy-makers are trying to take it out of the FY83 budget.

Key to advancing to the fusion engineering phase is the solution of severe materials problems. Also in the FY82 budget are \$14 million to continue construction of the Fusion Materials Irradiation Test (FMIT) facility at the Hanford facility in the state of Washington. This will be the only machine in the world which can simulate a fusion environment, in order to develop and test new materials. The budget-cutters are advising that the FMIT will not be part of the FY83 funding.

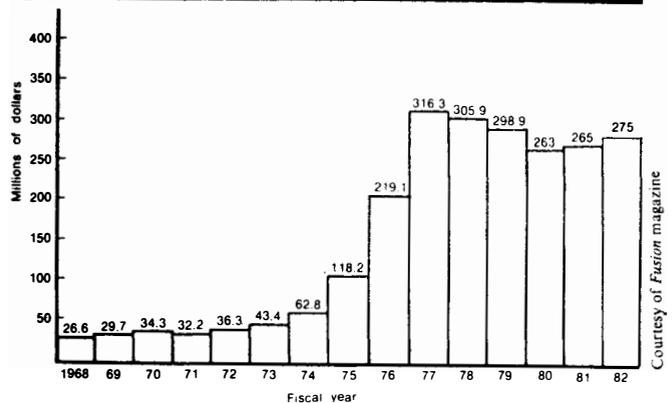
As scientists in the fusion program will be the first to state, there is no point in continuing the current research work if there is no intention to develop engineering technologies and proceed to the next stages in each fusion area. The most serious potential effect will be the demoralization of the fusion community. Already, technical people involved with various aspects of developing the fusion budget and advising the Congress have left Washington and gone into industry out of frustration.

### Who makes fusion policy?

Until the early 1970s, the nation's magnetic fusion program consisted of a handful of small-scale scientific experiments at primarily the national laboratories. In 1972 an alliance of key scientists, including Dr. Robert Hirsch at the Atomic Energy Commission and the Energy Research and Development Administration, conspired with Congressional leaders such as Mike McCormack to push for an aggressive fusion effort.

Just at the time when decisions would have to be made to spend considerably larger amounts of money to build the next-larger class of fusion experiments, the 1973 oil embargo forced the energy question. The Nixon administration commissioned the Project Independence study, whose findings were published in 1974.

Based on that study, the Nixon energy program



### The magnetic fusion budget in constant 1977 dollars

The U.S. magnetic fusion program has suffered a decline in real-dollar funding since the advent of the Carter administration. The buying power, in terms of personnel, new machines, and operating expenses has continued to decline as inflation has out-run insufficient increases in the budget. This graph is based on a very conservative 8 percent annual inflation rate and therefore understates the actual rate of decline.

Last spring, during budget hearings before Congress, the director of the fusion program, Edwin Kintner, pointed out that to attain the same **real dollar** level of \$316 million as in FY77 the **current** dollar funding for fusion would have to be about \$525 million. Instead the FY 82 budget will be \$456 million, far short of the FY77 level program.

The Fusion Act mandates that the fusion budget should indeed have been at the \$525 million level for FY82, with another 25 percent increase in FY83 and a total doubling of the program within seven years. This would begin to return the program to the increase in **real dollars** which is required to begin the engineering development phase for fusion and the development of an engineering and later, commercial prototype reactor.

called for the demonstration of liquid metal breeder technology by 1980, bringing 240 gigawatts of conventional nuclear energy on-line by 1985, and an aggressive fusion program to develop the energy technologies for the future. Although, as the report states, the scientific feasibility of fusion was "uncertain" and would not be proven until the next generation of machines was in operation, the importance of fusion and its potential benefits outweigh any "risks" of increasing fusion funding.

Under Ford, the fusion budget was *doubled* between FY75 and FY76 and then nearly doubled again in the next fiscal year (see diagram). Another hundred million dollars was added on in FY 1977. That was the last Ford fusion budget. With the advent of the zero-growth Carter administration and James Schlesinger as energy adviser, fusion funding began to decline.

Schlesinger's fusion policy was clearly stated and reflected his overall perspective that "the age of cheap

energy is over." There is no "technological fix" to solve our energy crisis, the fusion community was told, along with the American public. The proposed solution was an unfeasible and economically destructive synthetic fuels program, emergency stockpiling of oil, decreased standards of living though energy "conservation," and military readiness to invade Mideast oil fields.

Nuclear technology would be denied to the developing countries on the basis of bogus weapons proliferation concerns, and Americans would permanently learn to live with less.

After two years of what began to be accurately perceived as madness, the Congress, the scientific community and the political forces associated with Lyndon LaRouche struck back. Fusion had to be the cornerstone of a sane energy policy, all agreed. A series of scientific reviews of the fusion program was initiated to gather the ammunition to reverse the Carter go-slow fusion policy, and the Fusion Energy Foundation alerted the American public that its energy future was being sold down the river.

### **A sane fusion policy**

In August 1978, scientists at the Princeton Plasma Physics Laboratory succeeded in achieving a plasma temperature over 60 million degrees in their Princeton Large Torus tokamak machine. This milestone, which was hailed around the world, created the momentum to initiate a review of the Schlesinger policy of fusion by the year 2020.

Mike McCormack, the chairman of the Energy Research and Production subcommittee of the House Committee on Science and Technology called Dr. Hirsch, now in industry, in to Washington to chair a fusion review panel. Made up of respected figures in the scientific community and high-technology industry, the Hirsch panel stated that the fusion program was "funding-limited" and that further progress required an increasing budget.

A year later, under heavy scientific, public, and industry pressure, the Department of Energy initiated its own fusion review. Headed by Dr. Solomon Buchsbaum, this Energy Research Advisory Board panel also concluded that the program was ready to advance to the engineering phase, and recognized that this would require significant increases in the fusion budget.

With this ammunition and a full-scale national and international mobilization of support from the FEF, Congressman McCormack proceeded in January 1980 to introduce a bill into the House of Representatives revising the nation's fusion timetable. The bill passed the House on Aug. 26, 1980 and the Senate a month later. The bill mandates a 25 percent increase in fusion funding for the two fiscal years after passage and a total doubling of the budget within seven years.

The nation finally had a law on the books that outlined a fusion policy to demonstrate commercial feasibility by the year 2000 with funding levels to make this goal a reality. The DOE Office of Fusion Energy drew up program plans to meet the legal deadlines. The Fusion Engineering Device began to be designed; it appeared that a three-year attempt to cripple the program, during which time the budget did not even keep up with inflation, would be reversed, once and for all.

### **Reagan saboteurs**

Considering President Reagan's pro-nuclear, pro-growth mandate from the electorate last November, many fusion supporters could not imagine that this new administration would try to reverse the important progress made in putting the nation on a firm road to commercial fusion. Yet, when the administration's revised FY81 budget was released to Congress on March 10 the funding for fusion had been sliced from \$505 million to \$460 million. Worse yet, Carter holdover Dr. N. Douglas Pewitt, acting director of the DOE's Office of Energy Research, was telling the Congress that nearly unanimously passed the McCormack fusion bill a year ago that it was a "permissive piece of legislation."

"This administration will not make a commitment to build a Fusion Engineering Device," he intoned. At that point it was clear that the budget-slashers and anti-science Carter leftovers would be exerting pressure on the spokesmen, such as Energy Secretary Edwards, who insisted that the administration would support fusion development.

During the summer, confirmation hearings were held for the President's science adviser, Dr. George Keyworth. Asked about fusion, Dr. Keyworth stated that he thought fusion should be "kept in the national laboratories" and that industry involvement and engineering development would "hurt" the science effort.

Now, spokesmen for the OMB and science adviser's office are using a series of excuses, such as technical problems and budget constraints to try to pretend there is no law on the books mandating accelerated fusion development

Even the best-intentioned people advising current science and technology policy will be responsible for irreparable damage to the fusion and other advanced nuclear programs if this mentality is allowed to predominate. There will be virtually no way to rebuild fusion capability of world leadership quality if continued stagnation drives the most talented people out of the program.

Like the NASA budget in the late 1960s, today's fusion budget decisions will affect the program for years to come. The U.S. has held the world lead in fusion research for the past decade. It could lose it now with the stroke of a pen.