

Hot Fusion Plans Get Icy Reception

Energy Secretary James Watkins' honeymoon with Congress is over—at least when it comes to his management of the nation's magnetic confinement fusion research program. Key leaders of the House Science, Space, and Technology Committee are challenging plans being drafted by Watkins' staff to restructure the fusion program and delay construction of a new experimental reactor.

Representative Robert Roe (D-NJ), chairman of the committee, held 3 days of hearings last week to scrutinize all aspects of U.S. fusion research. Roe's committee is especially concerned about the direction of the Department of Energy's fusion research program, the construction timetable for the controversial \$900-million Compact Ignition Tokamak (CIT), and the U.S. role in an international effort to design and build an even more advanced test reactor. This fusion reactor would be the forerunner of a prototype for producing electricity.

The committee aimed some of its sharpest criticisms at a tentative plan being shaped by Robert O. Hunter, Jr., director of the Office of Energy Research. Hunter's blueprint calls for setting up a laser-based fusion program to compete with magnetic fusion in a race to find the best approach for designing a commercial fusion power reactor (*Science*, 23 June, p. 1434). Roe questioned whether such a competition was practical. He said it looked as though the approach would "dissipate" the program's resources "all over the lot." Representative Don Ritter (R-PA) was also skeptical: "How do you rationalize having two programs?" he asked Hunter, when the existing program is already putting a strain on DOE's budget.

The other burning fusion controversy that the committee is exercised about is Watkins' move to halt construction-related site design and engineering work on the CIT until questions about the physics of plasma heat loss in tokamaks are better understood. Hunter told committee members that this could take as long as 4 years and is necessary to "make sure the CIT has a very high probability of ignition."

But Roe questions the need for such a cautious approach. He pointed out that DOE's Magnetic Fusion Advisory Committee in June urged Hunter to move ahead on the ignition reactor design while working to resolve the physics issues at the same time. Indeed, all but one of 12 fusion experts drawn from DOE's major research laboratories, universities, and industry thought that physics studies could be done in parallel with design and engineering work. Said

Ritter, "It sounds to me like the physics community is saying 'forge ahead now.'"

Hunter had one ally at the hearings: Massachusetts Institute of Technology professor Kim Molvig, who works for him as a consultant. Molvig told the committee that physicists at the Princeton Plasma Physics Laboratory, where the CIT is to be built, may be too optimistic about how much the new machine will boost plasma confinement conditions in the hydrogen-fueled reactor.

Despite the risk of not reaching ignition, Representative Marilyn Lloyd (D-TN), chairman of the Subcommittee on Energy Research and Development, emphasized that some action is needed if the fusion program is going to survive politically. "You know not everyone is sold on the energy program that we are discussing today," said Lloyd. "And I must tell you that unless we move on with [the CIT] . . . then you are not going to have the support of the United States Congress."

Hunter, however, made it known that he

has another reason for delaying construction plans. At the hearing he released a draft fusion program plan—which Watkins has yet to approve—calling for competitive bidding on all phases of the project: site selection, operations, and construction. Hunter cast doubt about the suitability of Princeton as the home for the CIT, even though DOE had approved the site before he joined the department.

"There is a problem" with the Princeton location, said Hunter, because of potential local political opposition to tritium fuel that will be needed to operate the reactor. "[That] could well be fatal to carrying out ignition experiments there." This issue of local opposition has been raised in the past (*Science*, 14 April, p. 138), but so far Princeton has shown it can meet regulatory requirements and has the support of local officials.

Legislators will dissect these arguments and further examine Watkins' draft fusion program plan later this month in two more days of hearings. Hunter also is expected to explain how he plans to cut the fusion research program, which Congress saw fit to reduce this year by \$20 million.

■ MARK CRAWFORD

Supercomputer Policy Under Review

Supercomputers and high-speed data networks have spread their tentacles across the United States at a rapid pace in the 1980s, in part because the federal government had a strategy for promoting this fast-growing field of technology and followed through with an investment in five supercomputer centers, according to a paper issued this month by the Office of Technology Assessment (OTA). The result may not have been as coherent as a Japanese-style industrial scheme, but it worked.

But now that the initial 5-year investment is coming to an end, OTA says, it is time to step back and consider its purpose. To this end, OTA has published an interim report that "provides an inventory of unanswered policy questions," says Charles Brownstein of the National Science Foundation (NSF), a reviewer of the OTA study.

One of the big questions is, What should the five original NSF-backed supercomputer centers do now? As the OTA notes, even the definition of supercomputers has changed tremendously since 1984, when NSF started investing in its centers. For example, it no longer makes sense to try to make the "fastest" computer, according to OTA, but rather, the computer with the best performance for an assigned task. "High-performance" computers, as they are dubbed here, are being developed for a bewildering variety of tasks. There are more than 40 federal installations, as well as several private companies and a dozen academic centers, that give researchers access to such machines. "In the light of the proliferation of alternative technologies and centers," OTA says, the NSF centers need to define their role more precisely.

Another area that needs attention, OTA says, is the strategy for developing a high-speed network to link these computers. The Administration and congressional leaders both have endorsed the idea and promised money (*Science*, 11 August, p. 596). But it is not clear how all the elements of the network would fit together or who would govern it. Some unresolved issues are: Who should get access to the system? Who should determine fees (if any)? And how should standards be enforced? It will require "clear central leadership" to resolve these matters, OTA says, but universities and research centers may not find it easy to submit to such authority. "Currently, there is no single entity that is big enough. . . to make a proper national network happen," OTA concludes.

■ ELIOT MARSHALL