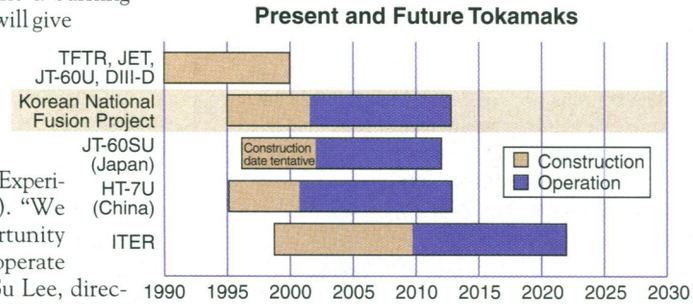
PLASMA PHYSICS

Korea Plans New Tokamak Machine

Korea has decided to build an advanced superconducting tokamak as part of an effort to become a leader in fusion science and technology. Korean officials hope that the $300 million machine, which would be the first large machine to confine a burning plasma for long periods, will give it both the scientific and industrial expertise needed to join an even bigger program, the $10 billion International Thermonuclear Experimental Reactor (ITER). "We have a window of opportunity before ITER is ready to operate in 2010," says Gyung-Su Lee, director of joint research at Korea Basic Science Institute (KBSI) in Taejon, the planned site for the tokamak.



An opening. Korea hopes its fusion program will fill a gap in research around the world.

SOURCE: KOREAN NATIONAL FUSION PROJECT

Even leaders can't go it alone, however, and last week Korean scientists discussed the fusion project at a 3-day forum on U.S.–Korean cooperation in science and technology hosted by George Mason University in Fairfax, Virginia. "Koreans are not well-trained in this field, and U.S. help is greatly needed to make sure that the Korean investment is not wasted," says Choong Suk Chang, a Korean-born plasma physicist with joint appointments at U.S. and Korean institutions. Last month the Korean government approved the first 2 years of the project's funding, but, says Chang, "we have a limited budget, and we must get all we can from the United States." But with the U.S. fusion budget shrinking rapidly (*Science*, 15 December, p. 1755), forum participants said that help is likely to be limited to technical advice.

The proposed tokamak is still in the design phase. It was in the works even before the abandonment last summer of a similar project, the Tokamak Physics Experiment (TPX), planned for the Princeton (N.J.) Plasma Physics Laboratory, says Duk-In Choi, KBSI president. The similarities of the two machines give Korean scientists a chance to answer many of the same questions motivating TPX, such as the behavior of burning plasmas under steady-state conditions.

The tokamak is but one part of the larger Korean National Fusion Project, which involves several universities, research institutes, and government ministries as well as the country's leading industrial companies. The scope of the program reflects not only the country's faith in fusion as a future energy source but also its desire to develop related technologies, including superconducting magnets and advanced materials. "We would like to be a very quick learner and catch up to the mainstream in a short time," says Choi.

International cooperation is one way to do that, say Korean officials including science minister Kum Mo Chung, himself a plasma physicist and strong supporter of the project. And U.S. scientists also see value in sharing. John Schmidt, director of advanced projects at the Princeton lab, says that "we're already hosting Korean scientists on U.S. tokamak experiments [at the lab's Tokamak Fusion Test Reactor], and we have [computer] analysis codes and other information to share." At the same time, he says, cooperation will mean opportunities for at least a portion of the more than 100 scientists who had been working on TPX.

Korea is also looking for help from fusion programs in Japan, whose plans to upgrade its JT-60U tokamak are on hold, and China. But Schmidt and other U.S. participants in last week's forum say they won't be able to offer the Koreans much more than advice if their own programs are devastated.

–Jeffrey Mervis and Dennis Normile

INSTITUTE OF MEDICINE

Panel to Feds: Hands Off Radioisotopes

For 4 decades, the same agency that regulates commercial nuclear plants has monitored the use of radioisotopes in medicine and biomedical research. Now it's time to find a new overseer, according to a group of experts in nuclear medicine, economics, public health, law, and public policy at the Institute of Medicine (IOM).

The 16-member panel issued a report on 14 December saying that the federal government should be relieved of responsibility for monitoring isotopes used in medicine and biomedical research, and that this job should be given to the states. The reason for making the change, the report says, is that rules set by the federal Nuclear Regulatory Commission (NRC) have become "burdensome, costly, and unduly prescriptive." Charles Putman, a radiologist at Duke University and chair of the IOM committee, says that the move would be more cost-effective and would "improve the public's access to information" about the medical uses of radiation. The panel's message comes out, coincidentally, as the NRC is enforcing strict compliance with its rules at some research institutions (*Science*, 15 December, p. 1747).

If accepted, the IOM proposal would affect the nearly 50 radionuclides currently used in medicine and biomedical research, which are now classified as "byproducts" of commercial nuclear programs. These include such isotopes as iridium-192, used in cancer therapy, carbon-14, used to trace the metabolism of new drugs, and phosphorus-32, used to study cellular kinetics. Federal agencies would still approve the safety of radiopharmaceuticals, machines that produce ionizing radiation, and nonbiomedical use of isotopes. States, said the panel, could strip away some of the regulations it deemed burdensome and unnecessary. NRC rules that the panel disliked, for example, ask licensees to submit written quality management programs and require notice of cases of "misadministration."

The panel's recommendations make sense to medical practitioners like radiologist Barry Siegel of Washington University in St. Louis, who is also an adviser to the NRC. "We need regulation of nuclear medicine, but the people that regulate nuclear power plants are not the people for the job," says Siegel.

But there was some disagreement, even within the IOM committee. Panel member Robert Adler, for example, a professor of law at the University of North Carolina who has worked for the U.S. Consumer Product Safety Commission, issued a dissenting statement. Adler says the NRC rules are reasonable and are similar to those designed to protect the public from undue risk at the Food and Drug Administration. He advocates reform rather than abolishment of NRC authority.

The IOM committee suggests that the transition from federal to state authority be made gradually, only after the Department of Health and Human Services (HHS) has helped set up state enforcement mechanisms. The next stop for these proposals is the NRC advisory committee on medical isotopes: It will discuss the IOM report at a meeting in February. After that, an NRC staff task force will weigh in with its own views. But major changes in the regulation of medical isotopes, according to Siegel, will require an act of Congress.

–Lori Wolfgang