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Japan Pursues International Competitiveness with Its Newest S&T Strategy

"Innovators of the world, come together in Japan," urged Japan's Minister of State for Science and Technology Policy, Iwao Matsuda, at a recent seminar sponsored by the American Association for the Advancement of Science, the Japanese Embassy, and the Washington Science Policy Alliance. "Japan will provide the greatest environment for the creation of tomorrow's science and technology," Matsuda said.

Matsuda's talk centered on the Japanese government's aggressive 3rd Science and Technology Basic Plan, a five-year plan for advancing Japan's international competitiveness in science and technology (S&T) that went into effect in April 2006. According to Matsuda, efforts and funding in the next five years will focus on creating an environment more conducive to innovation and more attractive to scientists than in the past. Despite current fiscal difficulties, Japan plans to invest about 25 trillion yen ($226 billion USD) in S&T over the next five years.

Much of the nanotechnology and materials science funding is expected to go to projects relevant to society and industry, according to Tatsuo Morimoto, the Director for Nanotechnology and Materials Science, Bureau of Science and Technology Policy. As examples, he highlights fuel-cell efficiency, construction materials that can withstand earthquakes, electronics that overcome the limits of existing devices, patient-friendly nano-biodevices, and materials that can relieve dependence on limited natural resources. These areas will be a focus of funding, but he adds, "the importance of basic research is also emphasized clearly."

In addition to an increase in funding, the next five years will see an emphasis on creating a more "lively" research environment for scientists through institutional and social reforms such as enhancing graduate education, encouraging female researchers, drawing on talented senior researchers, and focusing a large portion of money on collaborative, competitive projects.

There are also plans to improve many deteriorating research facilities and build 30 world-class research centers in Japan within the next five years. According to Matsuda, the success of Japan's S&T initiative depends on the country's ability to "nurture researchers" in a way that the public understands and supports.

During the past 10 years, Japan has spent a significant amount of money and time improving its science research environment. According to Matsuda, the Japanese government strongly believes that international competitiveness in S&T is the key to a sustainable Japanese economy. In light of Japan's aging and shrinking population and lack of natural resources, Prime Minister Junichiro Koizumi declared, during a speech earlier this year, "Without the promotion of science and technology, the nation will not develop."

Government officials have shown this deep level of commitment to raising the standard of research since 1996, when they first instituted Japan's ambitious Science and Technology Basic Plan. This initial five-year plan was designed to promote research and development as a means of meeting social and economic needs in Japan. The strategy involved an increase in research funding, restructuring of the research funding infrastructure, and support for 10,000 postdoctoral fellows, among other projects.

One of the most significant changes to occur during the first plan was the creation of the Council for Science and Technology Policy (CSTP) in early 2001. The council includes university professors and state ministers from fields such as education, economy, finance, and S&T. The CSTP is responsible for determining the course of Japan's S&T policy.

The 2nd Science and Technology Basic Plan, lasting from April 2001 to March 2005, outlined a three-part vision for Japan's S&T policies:

- Contribute to the world by the creation and utilization of scientific knowledge;
- Attain international competitiveness and sustainable development; and
- Secure safety and quality of life.

The plan aimed to double research funding and prioritize research and development based on national and social issues. Although the funding goal was not met, due to fiscal constraints, Japan's S&T budget grew faster than many other government budgets within Japan.

Four research areas were identified as top-priority areas by CSTP during the second plan: nanotechnology and materials science, information and communication technology, environmental science, and life science. In addition, the plan emphasized the importance of basic research.

This was good news for materials research. "The direct influence of the prioritization doesn't appear so early," said Morimoto, "but since materials science has been historically regarded as an important and competitive science and technology area, much research has been funded continuously."

Morimoto specifically noted that research in fuel-cell and battery materials, photocatalyst materials, carbon nanotubes, and superconducting materials benefited from this funding. These areas are "the result of such continuous funding with clear recognition of the importance of basic research," he said. Nanotechnology and materials science continue as a top priority in the third plan.

Assessments have shown the level of research in Japan steadily rising over the last 10 years. The number of publications has increased both in quality and quantity. In addition, there have been major reorganizations in national research institutes and universities to allow scientists more freedom in research.

In his talk, Matsuda commented on the attitude of the recent *Rising Above the Gathering Storm* report by the U.S. National Academy of Sciences. "I myself was deeply impressed by this stance," he said of the United States' commitment not to be content with its current position in the scientific community, but to continue to "get out and compete." "We would like to follow you," he said.

KENDRA RAND

Challenges Remain in DOE's Plans for Cleanup of Radioactive Waste in Underground Tanks

While the U.S. Department of Energy's overall plan for cleaning up radioactive waste in 246 underground tanks at three defense-related sites is workable, some important challenges should be addressed, says a recently released report from the National Academies' National Research Council (NRC).

The tanks are located at DOE's Savannah River Site in South Carolina, the Hanford Site in Washington state, and the Idaho National Laboratory. DOE plans to remove the waste from the tanks and separate out high-level radioactive waste, which will eventually be shipped to an off-site geological repository. The remaining radioactive waste will be disposed of on-site, and residual waste in the tanks will be covered by grout. So far, only two of the 246 tanks have been cleaned out and backfilled with grout, and none has had a permanent cover installed.

DOE faces technical hurdles, such as retrieving waste from tanks with significant obstructions at the Savannah River Site and from tanks with leaks at the Hanford Site, said the NRC committee that wrote the report. In addition, the committee, chaired by Frank L. Parker of Vanderbilt University, expressed concern that more radioactive material than planned could remain in the waste to be disposed of on-site at the Savannah River

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Site after the waste separation process. It also questioned the large volume of radioactive material that DOE plans to place in saltstone vaults there. To reduce the amount of radioactive material to be disposed of at the Savannah River Site, the report said DOE should develop alternatives or enhancements to one of its planned interim waste processing techniques. The committee also had serious reservations about some of the assumptions the agency made regarding how much waste will remain in closed tanks at Savannah River after clean-up.

The safety and reliability of a plan to immobilize large amounts of the Hanford Site's non-high-level radioactive waste in glass before on-site disposal were also of concern. This process, known as bulk vitrification, needs to undergo a more detailed transparent and independent technical review of its likely performance and safety, the committee said. The Idaho facility, on the other hand, is making good progress in tank clean-up and closure, the committee found, although there are fewer tanks at the site and they are simpler to clean.

Deciding how much waste to retrieve from the tanks and how much of it should be disposed of on-site—answering the question "How clean is clean enough?"—is difficult, the committee said. DOE must consider the feasibility of technologies to retrieve and separate waste, the risk to workers, the potential risks posed by wastes left on-site, and costs. Making these assessments would be easier if DOE pursued a more consistent risk-informed process with greater participation by other stakeholders, especially the public the report said. The committee applauded the increased transparency in some of DOE's recent waste assessments.

It is not practical to remove all of the waste from the tanks, the committee said. It reiterated a finding from an interim report issued last year, however, that DOE should decouple the cleaning of tanks likely to hold significant residual waste from the schedule for permanently closing them. This would allow more time for the development of technologies that could remove even more wastes from those tanks. Given that DOE is in the early stages of the tank cleanup process, there is time to pursue a research and development program to improve waste retrieval, tank stabilization, and immobilization of low-level radioactive waste, the committee said. It concluded that a 10-year program supported by $10–$50 million per year would be appropriate for generating improved knowledge about tank waste management and disposal. In addition, DOE should begin planning for how it will monitor tanks after they are closed so that monitoring systems can be built in and around tanks before they are covered.

The report was requested by Congress and sponsored by the U.S. Department of Energy. The National Research Council is the principal operating arm of the National Academy of Sciences and the National Academy of Engineering. It is a private, nonprofit institution that provides science and technology advice under a congressional charter. Copies of *Tank Waste Retrieval, Processing, and On-Site Disposal at Three Department of Energy Sites: Final Report* are available from the National Academies Press; tel. 202-334-3313 or 1-800-624-6242 or on the Internet at http://www.nap.edu.

Scientific Council of the ERC Announces ERC Launch and Funding Strategy http://erc.europa.eu

The ERC Scientific Council is the policy-setting supervisory body of the European Research Council. It acts on behalf of the scientific community in Europe to promote creativity and innovative research. It directs the scientific strategy and oversees the operational management of the ERC, including the selection of proposals and funding decisions, and the actual launch of the ERC.

The outline strategy for the launch of the ERC states that two funding streams, operating on a "bottom-up" basis across all research fields, are the core of the ERC's operations for the full duration of the 7th Framework Programme (2007–2013). As part of the overall scientific strategy for the ERC at the start of its operations in early 2007, the Scientific Council confirmed that priority will be given to supporting the independent careers of prominent researchers from all over Europe. Along with the launch strategy, the Scientific Council also announced the establishment of the ERC Starting Independent Research Grant. More information is available on the Web site of the ERC Scientific Council at http://erc.europa.eu.

Mjwara Appointed as South Africa's Director General of the Department of Science and Technology

Philemon Mphathi Mjwara has been appointed as the Director General of the Department of Science and Technology in South Africa. Mjwara said, "I am looking forward to this new challenge. I see this as an opportunity to contribute to directing science and technology (S&T) activities towards socioeconomic ends, thereby increasing the relevance of S&T to socioeconomic development. I also hope to see the fruits of S&T diffusing through to society in the best possible way."

Prior to this appointment, Mjwara served as group executive responsible for research and development at the Council for Scientific and Industrial Research (CSIR), and prior to that, he was the head of the CSIR National Laser Centre, where he was instrumental in creating a network of laser centers in Africa. Mjwara was a member of the core team responsible for developing scenarios for South Africa as part of the first technology foresight project (1999–2010). He was recently asked to participate in the development of scenarios for the years 2004–2014. □

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