Six Proposals Chosen for Industrial Competitiveness Program

The Department of Energy (DOE) and the Environmental Protection Agency (EPA) have announced a new round of grants under a program designed to enhance U.S. industry's global competitiveness through energy efficiency. Six proposals, of 31 submitted, have been selected for $1.4 million in grants under the National Industrial Competitiveness through Environment, Energy and Economics (NICE^3) program.

Linda J. Fisher, EPA's assistant administrator for Prevention, Pesticides and Toxic Substances, said, "These programs demonstrate that environmental protection and industrial competitiveness are not mutually exclusive goals. By building environmental considerations into our technological choices, we can have more efficient industries, reduced energy use, and a cleaner environment."

NICE^3 was launched as a seven-state pilot program in 1991 by the Departments of Energy and Commerce and the Environmental Protection Agency. Under the program, states and private participants provide at least half of the funding for the projects, which are jointly sponsored by state agencies. Proposals were sought from the seven states with the highest energy and pollution abatement costs: California, Illinois, Louisiana, New Jersey, New York, Ohio, and Texas.

The six applicants selected to receive grants are:

- Western Reserve Manufacturing Company, Lorain, Ohio. The proposal is to eliminate corrosive, polluting waste gases while improving the quality of the casting of barstock, used in the manufacturing of bearings, bushings, and other critical machinery parts.
- AAP St. Marys, St. Marys, Ohio. This project will introduce a new, more efficient technology for remelting the considerable volume of aluminum chips produced by the company's manufacturing process, which transforms aluminum ingot into finished cast aluminum wheels for automobiles.
- Avery Dennison's Fasson Films Division, Painesville, Ohio. This project will substitute an ultraviolet curing system for solvents in the manufacture of pressure-sensitive labels.
- Ultrasonic Products Inc., Chancel Island Harbor, California. This project will demonstrate a new ultrasonic dishwashing technology, eliminating the use of caustic detergents.
- California Integrated Waste Management Board. This project will demonstrate how a typical paper product manufacturer can substitute 40% of its requirement for fiber with mixed-quality recycled paper.
- Dupont Merck Pharmaceutical Company, Trenton, New Jersey. This project will demonstrate how ultrasonic cleaning technology can substitute for the use of solvents in cleaning chemical tanks or drums.

https://doi.org/10.1557/S0883769400046893 Published online by Cambridge University Press

NRC Report Examines U.S.-Japan Alliances in the Semiconductor Industry

A report* from the National Research Council's Committee on Japan explores the scope of U.S.-Japan strategic alliances in the semiconductor industry, the forces behind these alliances, and their impact on participating organizations, the United States, and Japan. The report concludes that long-term interests of both the United States and Japan can be served if U.S.-Japan alliances can "bring in vital technology, manufacturing know-how and resources—instead of serving primarily as conduits for technology transfer to Japan."

The working group that prepared the report, co-chaired by Daniel I. Okimoto of Stanford University and Sheridan Tatsuno of NeoConcepts, was formed in the fall of 1990. A workshop on U.S.-Japan Technology Linkages in Semiconductors was convened in September 1991 to gain additional insights from other experts in the United States and Japan.

The report discusses the often-cited flow of technology from the United States to Japan. Formal and informal trade barriers during the 1950s-1970s made it difficult for U.S. companies to break into the Japanese market other than by selling U.S. patents to Japanese companies through simple licensing agreements. Such arrangements bolstered near-term profits for U.S. companies, but these companies did not appreciate how quickly competitors could advance. Japan gained use of seminal patents such as Du Pont's for nylon, RCA's for basic color television technology, and transistors from Bell Laboratories. Japanese companies invested considerable resources in adapting, commercializing, and further developing these technologies, positioning Japan to become a technological leader in many segments of the semiconductor industry.

U.S. companies started showing more caution when licensing technology, either not licensing at all or using patents to obtain know-how of comparable value. But, "closing off the flow of knowledge in basic research is not only impossible, but also undesirable," the report says. The committee suggests, instead, carefully structuring product and process technology transfer.

Many legal and regulatory constraints were removed with the passage of the Foreign Trade and Exchange Act in 1979, clearing the way for Japanese companies to enter into joint ventures and to trade more freely. The number of strategic alliances between Japan and the United States boomed in the mid- and late 1980s, and the nature of alliances shifted from simple licensing to more complicated arrangements. Small start-up firms in the United States have been turning to large Japanese companies to supplement or replace traditional sources of financing and to tap into Japan's manufacturing capability. For the large, integrated "silicon majors" that dominate Japanese industry, small U.S. firms provide access to complementary technical capabilities that can be leveraged to gain a stronger position in new, design-intensive semiconductor markets.

What will the future hold? The report examines five scenarios ranging from gradual U.S. recovery, to Pacific Rim dominance, suggesting that the most likely scenario is an equilibrium model, or gradual decline of the U.S. in this industry. To maintain long-term balance, U.S. companies will have to pay greater attention to competitive fundamentals, including the retention of a viable manufacturing infrastructure. Japanese corporations—who, the report says would favor equilibrium so as not to aggravate potentially volatile trade tensions—will have to strengthen generic research and new product design and do more to ensure a full reverse flow of technology, better access to Japanese markets, and a clearer commitment to reciprocity.

The report offers suggestions to industry, universities, and the government to maintain U.S. strength in the semiconductor industry. It encourages industry to strive for a permanent foothold in Japan's industrial structure through strategic alliances that seek long-term learning, not quick fixes. U.S. manufacturing and equipment-making capabilities should be upgraded and the flow of technology, especially for manufacturing know-how, should reverse. The U.S. government, in addition to developing a sound macroeconomic policy, can offer incentives for U.S.-Japanese liaisons, for capital equipment investment, for exporting products from the United States, and for successfully transferring manufacturing technology to the United States. The report recommends against protecting U.S. semiconductor markets and for continuing the pressure on Japan to open its markets. Also, continued Department of Defense support for SEMATECH (article on SEMATECH follows) is recommended.

The report gives a final warning that the possible worst-case scenario—of the United States supplying new ideas to foreign manufacturers who derive most of the added value—is a real concern and that "considerable effort will be required to avert this outcome. Ensuring the long-term competitiveness of the U.S. semiconductor industry and of the United States as a place of production requires not only economic revitalization at the macroeconomic level, but also strategic alliances structured to produce positive, demonstrable benefits to the United States."

* The report, *U.S.-Japan Strategic Alliances in the Semiconductor Industry* (National Academy Press, Washington, DC, 1992), is available from the Office of Japan Affairs, National Research Council, 2101 Constitution Avenue, NW, Washington, DC 20418.

GAO Report Assesses SEMATECH

The U.S. General Accounting Office's assessment of SEMATECH, a government-industry research and development consortium, indicates that the consortium has demonstrated U.S. ability to match, although not outdo, competition from overseas in the area of semiconductor manufacturing equipment and manufacture, and has also demonstrated an ability to manufacture state-of-the-art semiconductors using only U.S. equipment. SEMATECH was formed in 1987 from 14 major semiconductor manufacturers, who agreed to at least equal government funding for the purpose of regaining U.S. leadership in semiconductor manufacturing. Two of the smaller of those 14 companies discontinued their memberships this year.

The report says that while the U.S. semiconductor world market is no longer declining, how SEMATECH has contributed to the arrest is unclear. Nevertheless, the Defense Advanced Research Projects Agency (DARPA), which oversees SEMATECH, believes the consortium's programs will yield high returns by reducing manufacturing costs and providing effective responses to customers' needs.

SEMATECH's projected budget calls for funding at $200 million per year through 1997. Congress has already authorized a full 50% share in SEMATECH support ($100 million) for 1993, but it is uncertain whether this level of provision will continue. DARPA's stance is that SEMATECH needed initial government support to become established, but that the semiconductor industry "should bear the primary responsibility for ensuring continued support for SEMATECH because it is an industry-led consortium addressing industry needs." DARPA is proposing 20% cuts in federal assistance through 1997.

Congress continues to support funding for SEMATECH, but GAO questions the level of that funding, whether SEMATECH's activities translate into jobs, and SEMATECH member companies' increasing business involvement with overseas firms.

According to SEMATECH, its mission

https://doi.org/10.1557/S0883769400046893 Published online by Cambridge University Press

has succeeded by:

- Demonstrating the capability to fabricate semiconductor devices with 0.5 μm linewidths on 150-mm wafers using only U.S.-supplied equipment. Next-generation technology is on schedule for completion by the end of 1992.
- Being a communications forum for the semiconductor industry. By sharing precompetitive data, SEMATECH has (1) nurtured a culture that establishes long-term relationships between semiconductor manufacturers and their suppliers; (2) improved strategic planning within the industry by, for example, developing a consensus among member companies on performance requirements and timing for next-generation equipment; (3) developed standard methods for evaluating, improving, and qualifying equipment and associated software; and (4) begun to develop industrywide standards for computer-integrated manufacturing.
- Keeping new technology development costs low by working with a relatively low number of U.S. equipment and materials suppliers.
- Making efforts to standardize hardware and software interfaces between different pieces of equipment, and lowering manufacturing costs through better process controls. SEMATECH has also demonstrated product capability and integration of these products into complete shop floor control systems.

A copy of the report (GAO/RCED-92-223BR) can be obtained from the U.S. General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20877, phone: (202) 275-6241.

RAND to Manage Critical Technologies Institute

RAND has been named to manage the Critical Technologies Institute (CTI). The company's responsibility will be to provide analytical support to the White House in the weighing of new technologies such as advanced materials. RAND will receive $9.4 million for the first three years of the program.

White House Science Adviser D. Allan Bromley, who chairs CTI's operating committee, believes CTI will bring "disciplined inquiry to the many problems which the U.S. must address through a unified federal technology policy if we intend to maintain our competitive position in world markets."

Tim Webb, RAND's associate director for CTI, notes that one basis on which critical technology is defined will be the White House critical technologies list, issued last year. Advanced materials was on that list.

CTI and RAND are also being asked to consider other issues such as scientific and technical education and training; direct governmental support of R&D; tax, legal, and regulatory policies that influence investments in and the use of technology; patent and copyright policies; and how CTI could serve as a bridge between the private sector and the Administration on technology policy questions.

To direct CTI in Washington, Stephen Drezner is relocating from RAND's Santa Monica, California headquarters, where he has served as vice president for research. To get in touch with CTI, call (202) 296-5000. □

https://doi.org/10.1557/S0883769400046893 Published online by Cambridge University Press