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The Advanced Technology Program

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Summary

The Advanced Technology Program (ATP) was created by P.L. 100-418, the Omnibus Trade and Competitiveness Act of 1988, to encourage public-private cooperation in the development of pre-competitive technologies with broad application across industries. Administered by the National Institute of Standards and Technology (NIST), a laboratory of the Department of Commerce, this activity has been targeted for elimination as a means to cut federal spending. However, strong support by the former Clinton Administration and the Senate led to continued funding in FY1997 and FY1998, although at reduced levels. FY1999 appropriations increased 3% while FY2000 funding decreased 28% to $142.6 million. Although the original FY2001 appropriations bill passed by the House included no financing for ATP, P.L. 106-553 appropriated $145.7 million, 2% more than the previous year. The Bush Administration's FY2002 budget would have suspended new awards pending a program evaluation. The appropriations bill as initially passed by the House included similar provisions although P.L. 107-77 funded the program at $184.5 million, an increase of 27% over FY2001. For FY2003, the Administration requested $107.9 million for ATP, 35% below the previous fiscal year. However, P.L. 108-7, the omnibus appropriations bill provides $178.8 million for the program (after the 0.65% across the board recision mandated by the legislation). The Bush Administration's FY2004 budget recommends $27 million for ATP to cover on-going commitments; no new projects would be funded. H.R. 2799, the FY2004 appropriations bill passed by the House, provides no financing for ATP. This report will be updated as events warrant.

Program Rationale

Title V of the Omnibus Trade and Competitiveness Act (P.L. 100-418) established the Advanced Technology Program. This effort grew out of concerns over the competitiveness of American companies in the global marketplace. While numerous factors affect the rate of technical progress in an economy, what was seen as critical is how quickly and successfully science and technology are transformed into new or better products, processes, or services. The commercialization and diffusion of goods and services stood out as significant problems in the ability of U.S. industries to compete.

Underlying the structure of ATP is an effort to foster cooperation among government, industry, and academia to facilitate the generation of new technologies and techniques for the commercial market. While opponents argue that joint ventures stifle competition, proponents assert that they are designed to accommodate the strengths and responsibilities of the various sectors. Collaborative projects attempt to utilize and integrate what the participants do best and to direct these R&D activities toward the goal of meeting marketplace demands. Joint endeavors are seen as reducing risks and costs while permitting work that crosses traditional boundaries of expertise and experience.

Program Operation

The Advanced Technology Program was designed ". . .to serve as a focal point for cooperation between the public and private sectors in the development of industrial technology" and to help solve ". . .problems of concern to large segments of an industry," as noted in the Conference Report to accompany the bill. Placed within NIST, in recognition of the laboratory's on-going relationship with industry, ATP provides seed funding to single companies or to industry-led consortia of universities, businesses, and/or government laboratories for development of generic (broad-based), pre-competitive technologies that have many applications across industries. Awards, based on technical and business merit, are for high-risk work past the basic research stage but not yet ready for commercialization. Market potential is an important consideration in project selection. Scientific and technical review generally is performed by federal and academic experts. Business plan assessments are made by individuals from the private sector.

Awards are for either product or process (manufacturing) technology development. Individual firms are restricted to funding of $2 million over 3 years. Money is only to be used for direct R&D costs. Large firms must provide at least 60% of total (direct and indirect) projects costs; small and medium-sized companies are not required to cost-share direct costs. Joint ventures may receive up to 5 years of financing for any amount limited only by availability. In such cases, the private sector must provide more than 50% of funding. While universities and federal laboratories can participate in collaborative work, the grant from ATP is made solely to companies. P.L. 102-245 modified the original law and required that the recipient of an ATP award be a firm that is U.S.-owned ("a company that has a majority ownership or control by individuals who are citizens of the United States") or a business that is incorporated in the United States and has a parent company established in a country which affords American firms reciprocal opportunities.

In its first year, FY1991, ATP was funded at $36 million. Appropriations increased to $48 million in FY1992, $67.9 million in FY1993, and $199.5 million in FY1994. For FY1995, financial support expanded significantly to $431 million. However, P.L. 104-6 rescinded $90 million of this amount. Funding for FY1996 was $221 million with a small increase to $225 million in FY1997 but reduced to $218 million by P.L. 105-18. For FY1998, P.L. 105-119 appropriated $192.5 million. P.L. 105-277 provided $197.5 million in FY1999 support for ATP, 3% above the previous year. This figure reflected a $6 million rescission contained in the same law that accounts for "deobligated" funds resulting from early termination of certain projects. In FY2000, the appropriations bill that originally passed the House included no funding for ATP, since, as stated in the accompanying report, ". . .the program has not produced a body of evidence to overcome those fundamental questions about whether the program should exist in the first place." Yet, P.L. 106-113 did finance ATP at $142.6 million, 28% less than FY1999. In FY2001,

the original House-passed appropriations bill did not fund the program, yet P.L. 106-553 provided $145.7 million, 2% above the previous year's financing.

The Bush Administration's FY2002 budget proposed suspension of new ATP projects pending a program evaluation, although $13 million was to be provided for ongoing financial commitments. Again, the initial appropriations bill passed by the House, terminated ATP. The final legislation, P.L. 107-77, financed the effort at $184.5 million, almost 27% more than FY2001.

The President requested $107.9 million in FY2003 funding for ATP, 35% below the previous appropriation. The budget also called for changes in ATP program operation that would: (1) allow universities to lead joint ventures; (2) permit universities to negotiate with partners on ownership of intellectual property arising from joint research; (3) restrict large company participation to cooperative projects; (4) require firms that successfully commercialize ATP-funded technologies to pay the government a 5% royalty up to 500% of the original grant; (5) insure that funds are not used for product development or marketing; and (6) use private sector, non-proprietary information, when appropriate, to make award selections. While no relevant FY2003 appropriations legislation was enacted during the107th Congress, several Continuing Resolutions financed the program until the 108th Congress enacted P.L. 108-7. This omnibus FY2003 appropriations bill funds ATP at $178.8 million (after the 0.65% across the board recision mandated by the legislation), 3% below the earlier fiscal year.

The Administrations' FY2004 budget requests $27 million for ATP (an 85% decrease) to cover on-going commitments; no new projects would be financed. H.R. 2799, as passed by the House on July 23, 2003, provides no funding for ATP in FY2004.

According to NIST, as of July 2003, 665 projects have been funded, of which about 30% are joint ventures. Approximately $2,009 million in federal funds have been matched by $1,912 million from the private sector. Small businesses or cooperative efforts led by such firms make up 64% of the awardees. The first four competitions (ending August 1994) were general in nature. The following year, in response to large increases in federal funding, NIST restructured part of ATP to focus on various groups of projects in "well-defined" programmatic areas designed for long-range support. These were selected in conjunction with industry. Since FY1999 NIST has held one competition open to all areas of technology.

Results

NIST has undertaken numerous studies of ATP; the General Accounting Office (GAO) has also studied the program. In its first evaluation (1994), NIST concluded the program had stimulated research that would not have been done without the federal support; that R&D cycles within companies have been abbreviated; and that "valuable business alliances" had been created.[1] However, in a May 1995 report, GAO argued that these conclusions can not be adequately substantiated by the information provided in the

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[1] National Institute of Standards and Technology, *Setting Priorities and Measuring Results at the National Institute of Standards and Technology,* January 31, 1994.

NIST study on which they are based.[2] Acknowledging that it was too early to determine the long-term impact of ATP, the GAO report stated that some of the indicators NIST utilized ". . .may create false expectations of the program's economic success." NIST vigorously defended its methodology.

Additional studies funded by NIST found that ATP shortened R&D cycles by half and accelerated technological progress within the firm; stimulated productive collaborative activities among companies and between firms and universities; facilitated commercialization; and increased private sector investment in high risk technology development.[3] An April 2000 progress report reinforced these earlier findings.[4] This study indicated that "...participants in 261 projects have identified more than 1,200 different applications (or uses) of the technologies under development," and that the majority of these are new solutions to market needs or improvements in existing products or processes. Product cycles are being reduced and while 24% of respondents said that they would not have undertaken the project without ATP funding, most others noted that the R&D would have been significantly slower without such support. NIST found that "...organizations are pursuing different R&D than they would have undertaken without ATP funding," and that this work is more technically advanced and risky. The ATP financing also stimulated additional private sector money in these technical areas than otherwise would be the case. Over half of the companies are now able to make a new or improved product. According to March 9, 2000 testimony by Raymond Kammer, then Director of NIST, approximately 120 new technologies have been commercialized.

The concern over whether or not ATP supports projects that could reasonably attract private sector investment has been an issue throughout the life of the program. In a report examining award winners and "near winners" during the first 4 years of ATP, GAO found the program funded both projects that would not have progressed without this federal support and those that would have been financed by the private sector.[5] Half of the awardees stated that they would have continued without ATP financing. Of the "near winners," 50% pursued their efforts in the absence of federal money but took longer to achieve their goals. According to GAO, while 63% of the applicants did not look elsewhere for funds, about half of the applicants who did ". . .were told by prospective funders that their projects were either too risky or 'precompetitive' — characteristics that

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[2] General Accounting Office, *Performance Measurement, Efforts to Evaluate the Advanced Technology Program*, GAO/RCED-95-68, May 1995.

[3] Silber and Associates., *Company Opinion About the ATP and Its Early Effects*, 30 January, 1995; Laidlaw, Frances Jean, *Acceleration of Technology Development by the Advanced Technology Program: The Experience of 28 Projects Funded in 1991*, 23 October, 1997; National Institute of Standards and Technology, *Advanced Technology Program: Development, Commercialization, and Diffusion of Enabling Technologies*, by Jeanne W. Powell, December 1997; National Institute of Standards and Technology, *Advanced Technology Program Performance of Completed Projects, Status Report Number 1* by William F. Long, March 1999, vii.

[4] National Institute of Standards and Technology, *Development, Commercialization, and Diffusion of Enabling Technologies: Progress Report,* by Jeanne W. Powell and Karen L. Lellock, April 2000.

[5] General Accounting Office, *Measuring Performance: The Advanced Technology Program and Private-Sector Funding*, GAO/RCED-96-47, Jan, 1996.

fulfill the aims of ATP funding." Respondents also noted that the program facilitated development of joint ventures to pursue ATP activities.

A study undertaken by the American Enterprise Institute concluded that ATP "has had only limited success" in choosing projects that could not raise private sector funds. According to the authors, this has occurred because companies are not interested in pursuing R&D that fails to compliment work performed for profit. In addition, the ATP selection criteria focuses on commercial sales and job creation, not on projects for which there are "broad social benefits" and insufficient private investment. An April 2000 report by GAO noted that "two inherent factors in ATP's current award selection process – the need to guard against conflicts of interest and the need to protect proprietary information – make it unlikely that ATP can avoid funding research already being pursued by the private sector in the same time period."[6]

Issues and Observations

There have been efforts in the past several years to terminate the Advanced Technology Program. These actions, along with additional attempts to withdraw government support for other technology development efforts, appear to reflect a philosophy that eschews direct federal financing of private sector R&D efforts aimed at the commercialization of new technologies and production processes. Such activities are seen by opponents as "industrial policy," the means by which government rather than the marketplace "picks winners and losers." Instead, measures which would occasion a better investment environment for industry to expand their innovation-related efforts would, proponents argue, be preferable to government funding.

This signals a change from the past during which a varied approach toward facilitating technological advancement had evolved. Legislative initiatives over the past 20 years have resulted in a body of laws, programs, and policies which involve both indirect and direct measures to stimulate technology advancement in the private sector. Indirect incentives include a research and experimentation tax credit; changes to the antitrust laws to encourage collaborative R&D and cooperative manufacturing ventures; alterations of patent ownership policies to facilitate government-industry-university interaction; and practices to promote technology transfer. Direct measures involve federal funding for ATP, the Small Business Innovation Research Program, and the now terminated Technology Reinvestment Project of the Department of Defense. These cost-shared programs have been supported, in part, because of their potential contribution to the country's national or economic security.

The mix of approaches was developed with bipartisan support in Congress. Under former President Reagan, public-private cooperation in research and development was promoted by the executive branch. The George H. Bush Administration adopted a policy in which the government's role was ". . .to support the development of generic or enabling technologies at the pre-competitive stage of R&D." The Clinton Administration expanded this concept to include additional direct federal funding to achieve increased commercialization of the results of R&D. ATP reflects such ideas; thus discussions over

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[6] General Accounting Office, *Advanced Technology Program: Inherent Factors in Selection Process Could Limit Identification of Similar Research*, April 2000. 5.

its proposed elimination have called into question many of the underlying assumptions shaping the environment within which industry works toward technological advancement.

Proposals to terminate or severely limit ATP and other federally funded technology efforts have renewed the debate over the role of the federal government in promoting commercial technology development. In arguing for less direct federal involvement, advocates believe that the market is superior to government in deciding which technologies are worthy of investment. They prefer mechanisms that enhance the market's opportunities and abilities to make such choices. It is also suggested that agency discretion in selecting one technology over another can lead to political intrusion and industry dependency. On the other hand, supporters of direct methods maintain that reliance on indirect measures can be wasteful, inefficient, and ineffective and can compromise other goals of public policy in the hope of stimulating innovative performance. Advocates argue that it is important to put the nation's scarce resources to work on those technologies which will have the greatest promise as determined by industry and supported by the private sector's willingness to match federal funding. They assert that the government serve as a catalyst for companies to cooperate and undertake important new work which would not have been possible without federal participation.

Technological progress is important to the nation because of its contribution to economic growth and a high standard of living. How best to achieve this continues to be debated. Among the questions which might be expected to be explored are: Should the government directly fund industrial R&D not directly tied to agency missions? Is the R&D supported by ATP critical to U.S. interests? Would this R&D be performed without federal financing? What benefits have accrued and do these benefits justify the costs? Are there other ways to generate these benefits? Is there industrial support for this program or is there a preference for other types of measures?

Critics view ATP as a means for a federal agency to select commercial firms and/or technologies for support. They maintain that the absence of market-generated decisions will result in technologies that can not be utilized productively by participating companies. Such a program encourages selection of well-written proposals rather than assistance for truly important technologies. However, proponents stress that ATP is market driven and that the technical areas for investment have been developed in conjunction with industry. In addition, companies have to put up significant amounts of funding and survive a rigorous business review; procedures that make the Advanced Technology Program different from other federal efforts.

Perhaps most crucial to the debate is the way cooperative R&D is viewed. Today, American companies appear to be more competitive in the global marketplace than they were when the Omnibus Trade and Competitiveness Act was considered in 1988. While there are many factors that have contributed to this improving situation, proponents of joint R&D efforts, such as ATP, point to the benefits derived from increased technical collaboration and the development and application of the resulting new technologies and production processes. Questions remain whether direct federal funding for such programs are the most effective or efficient means to secure these outcomes. Is the approach embodied in ATP the preferable one, or could other mechanisms such as permanent tax credits for R&D; changes in capital gains treatment; and/or liability and regulatory reform be more effective?