U.S. National Science Foundation: Experimental Program to Stimulate Competitive Research (EPSCoR)

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Summary

The Experimental Program to Stimulate Competitive Research (EPSCoR) of the National Science Foundation (NSF) was authorized by Congress in 1978, partly in response to concerns in Congress and the concerns of some in academia and the scientific community about the geographic distribution of federal research and development (R&D) funds. It was argued that there was a concentration of federal R&D funds in large and wealthy states and universities, and that the continuation of such funding patterns might ensure a dichotomy between the "haves" and "have-nots."

EPSCoR began in 1979 with five states and funding of approximately $1.0 million. Currently, EPSCoR operates in 29 jurisdictions, including 27 states and the Commonwealth of Puerto Rico and the U.S. Virgin Islands. To date, the NSF has invested approximately $920.0 million in EPSCoR programs and activities. When established, it operated solely in the NSF. EPSCoR was expanded in the mid 1980s and early 1990s; by 1998, seven other agencies had established EPSCoR or EPSCoR-like programs.

EPSCoR is a university-oriented program, with the goal of identifying, developing, and utilizing the academic science and technology resources in a state that will lead to increased R&D competitiveness. The program is a partnership between NSF and a state to improve the R&D competitiveness through the state's academic science and technology (S&T) infrastructure. Eventually, it is hoped that those states receiving limited federal support would improve their ability to compete successfully for federal and private sector funds through the regular grant system.

Some have questioned the length of time states should receive EPSCoR support. It continues to be called an experimental program after 28 years, and observers have noted that no state has yet to graduate, or leave the program. In August 2005, the NSF's Committee of Visitors (COV) released a review of the EPSCoR program for the period FY2000 through FY2004. One of the issues in the review was centered on determining when states would become independent of EPSCoR resources. The COV acknowledged that graduation/progression from the EPSCoR program is a "challenging" issue and it has become necessary to revisit what it means to graduate from the program.

The NSF FY2012 budget request proposes $160.5 million for EPSCoR activities, approximately $13.4 million (9.1%) above the FY2010 enacted level of $147.1 million. (As of this writing, a full-year FY2011 appropriation has not been enacted; therefore NSF is operating under a continuing resolution.) The FY2012 request supports a portfolio of three complementary investment strategies—research infrastructure improvement ($116.1 million), co-funding ($42.8 million), and outreach ($1.7 million). NSF indicates that approximately 24.0% of the funding for EPSCoR is to be used for new research awards in the FY2012 request. The remaining is to be used to provide continuing support for grants made in previous years. This report will be updated periodically.

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Background

The Experimental Program to Stimulate Competitive Research (EPSCoR) of the National Science Foundation (NSF) was authorized by Congress in 1978,[1] partly in response to concerns from Congress and from some of those in academia and the scientific community about the geographic distribution of federal research and development (R&D) funds.[2] Additional concerns resulted from the practice of congressional directed spending[3]—allocating funds for specific institutions or research projects.[4] Historical data revealed that there was a concentration of federal R&D funds in large and wealthy states and universities, and that the continuation of such funding patterns might ensure a dichotomy between the "haves" and "have-nots."[5]

As designed, EPSCoR is to help achieve broader geographical distribution of R&D support by improving the research infrastructure of those states that historically have received limited federal R&D funds. While these states fall outside of the top 10 states in receipt of federal R&D support, according to the NSF, they have "... demonstrated a commitment to improve the quality of science and engineering research and education conducted at their universities and colleges."[6] The premise of the program is that "academic research activity underpins every state's overall competitiveness."[7] James Savage, writing in *Funding Science in America*, describes EPSCoR's creation as a type of "affirmative action program designed to aid less successful states and their universities in their competition for federal research funds."[8] W. Henry Lambright, Director,

[1] Initial support for EPSCoR was contained in P.L. 95-392 (H.Rept. 95-1265), Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1979.

[2] House Committee on Science and Technology, Subcommittee on Science, *National Science Board: Science Policy and Management for the National Science Foundation, 1968-1980*, Report, 98th Cong., 1st Sess., January 1983, p. 121. See also Colwell, Rita, Director, National Science Foundation, Speech before the Tenth Anniversary of Coalition of EPSCoR States, Washington, DC, March 23, 1999, http://www.nsf.gov/news/speeches/colwell/rc90323epscor.htm, p. 2. The charter of the NSF directs the agency to, among other things, "... avoid undue concentration of such research and education." National Science Foundation Act of 1950, Sec. 3. 7(c). U.S. Congress, House Committee on Science and Astronautics, *A Bill to Amend the National Science Foundation Act of 1950*, 89th Cong., 2nd Sess., April 19, 20, and 21, 1966, pp. 2-3.

[3] Also known as Congressional earmarks.

[4] Congressional earmarking remains a concern in the scientific and academic community. See for example Dennis, Steven T., "Artfully Redefining Earmarks," *Roll Call*, January 12, 2009,pp.1, 22, and Brainard, Jeffrey and JJ Hermes, "Colleges' Earmarks Grow, Amid Criticism," The *Chronicle of Higher Education*, v. 54, March 28, 2008, p. A1.

[5] The historic concentration of federal R&D support to institutions has changed slightly. In FY2007, the first 100 institutions (in terms of receipt of federal R&D funds) accounted for 82.6% of the total federal R&D support for science and engineering to colleges and universities. In FY1996, the top 100 institutions commanded 83.4% of support; in FY1986, the proportion was 85.5%. National Science Foundation, *Federal Science and Engineering Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 2007*, NSF09-315, Arlington, VA, September 2009, Table 19, *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions, Fiscal Year 1996*, NSF98-331, September 1998, Table B-4, and *Federal Support to Universities, Colleges and Selected Nonprofit Institutions FY1986*, NSF87-318, January 1988, Table B-9. An analysis of state profiles for FY2007 reveal that the top 10 states accounted for 57.4% of federally funded academic R&D, while the 10 states with the smallest share totaled 3%. The states with the smallest share are all EPSCoR states. National Science Foundation, *Science and Engineering State Profiles: 2006-2008*, NSF10-302, Arlington, VA, November 2009, Summary Tables. State profiles are based on data for the 50 states, the District of Columbia, and Puerto Rico.

[6] National Science Foundation, *Annual Report FY2002, Experimental Program to Stimulate Competitive Research*, Education and Human Resources Directorate, Arlington, VA, October 23, 2002, p. 1.

[7] [National Computer Science Alliance] NCSA Access: *EPSCoR Conference*, http://access.ncsa.uiuc.edu/Stories/97Stories/EPSCoR.html, p. 1.

[8] Savage, James D., *Funding Science in America: Congress, Universities, and the Politics of the Academic Pork*, (continued...)

Center for Environmental Policy and Administration, Syracuse University, stated that "EPSCoR was not intended as an entitlement, but rather as a catalyst."[9] Lambright noted further that EPSCoR had a "troubled birth," having been rejected in its first vote by the National Science Board, the policy-making arm of NSF.[10] In order to win approval, the program had to be modified, expressing values consistent with those of the NSF: "... merit, with the emphasis on an institution, the university."[11]

EPSCoR began in 1979 with five states and funding of approximately $1.0 million. Currently, EPSCoR operates in 29 jurisdictions, including 27 states and the Commonwealth of Puerto Rico and the U.S. Virgin Islands. (See **Figure 1** for the participating jurisdictions.) A 2006 report of the NSF stated that NSF had invested approximately $920.0 million in EPSCoR programs and activities.[12] Currently, the EPSCoR program is approximately 2.1% of the NSF budget. When established, it operated solely in the NSF. Congressional action led to its expansion in the mid-1980s and early 1990s, and by 1998, seven other agencies had established EPSCoR or EPSCoR-like programs.[13] This report is limited to a discussion of EPSCoR programs at the NSF.

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Cambridge University Press, New York, 1999, p. 61.

[9] Lambright, W. Henry, Syracuse University, Paper prepared for the American Association for the Advancement of Science, Workshop on Academic Research Competitiveness, Coeur d'Alene, Idaho, *Building State Science: The EPSCoR Experience*, October 1-3, 1999, http://www.aaas.org/spp/rcp/epscor/lambright.htm, p. 2.

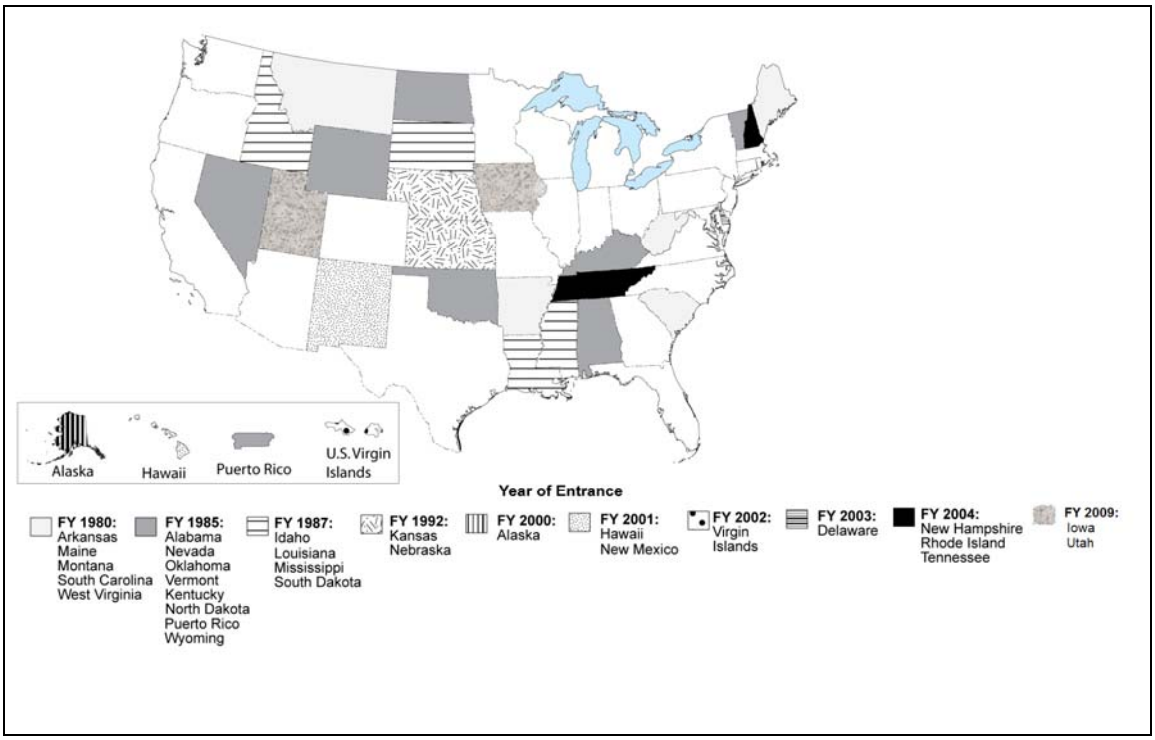
[10] U.S. Congress, House Committee on Science and Technology, *The National Science Board: Science Policy and Management for the National Science Foundation, 1968-1980*, Report prepared by the Science Policy Research Division, Library of Congress for the Subcommittee on Science, Research and Technology, 98th Cong., 1st Sess., January 1983, p. 121.

[11] Lambright, W. Henry, Workshop on Academic Research Competitiveness, p. 3.

[12] National Science Foundation, *EPSCoR 2020: Expanding State Participation in Research in the 21st Century—A New Vision for the Experimental Program to Stimulate Competitive Research (EPSCoR)*, A report to the National Science Foundation, August 2006, p. iii. The current 29 participating jurisdictions account for more 20% of the U.S. population, 18% of employed scientists and engineering, and approximately 25% of research institutions.

[13] Currently, EPSCoR and EPSCoR-like programs are operational in the National Aeronautics and Space Administration (NASA), Department of Energy (DOE), Environmental Protection Agency (EPA), Department of Defense (DOD), National Institutes of Health (NIH, Institutional Development Award, IDeA), and Department of Agriculture (USDA). In FY1993, congressional action led to the creation of the EPSCoR Interagency Coordinating Committee (EICC), with the purpose of improving coordination among the participating agencies and ensuring consistency in implementation of EPSCOR policies. NSF is the lead agency within the federal-wide effort, and an NSF official serves as chair and executive secretary of EICC. In FY1998, the Department of Commerce (DOC) established the Experimental Program to Stimulate Competitive Technology (EPSCoT). It was designed as a technology complement to EPSCoR-like programs. In FY2010, 6 agencies provided a total of approximately $449.9 million for EPSCoR/EPSCoR-like programs. (In FY2006, EPA discontinued releasing separate EPSCoR program solicitations). The estimated FY2010 EPSCoR budgets by agency are as follow: NSF, $147.1 million, DOE, $22.0 million, USDA, $26.2 million; NIH, $228.9 million; NASA, $25.0 million; and DOD, funding level not available.

Figure 1. NSF EPSCoR Jurisdictions



Source: NSF, 2009 EPSCoR Jurisdiction Map; http://www.nsf.gov/div/index.jsp?div=EPSC.

EPSCoR Goals and Mission

Arden L. Bement, Jr., Former Director, NSF, stated that "EPSCoR is based on the premise that no one region and no one group of institutions has a corner on the market of good ideas, smart people, or outstanding researchers."[14] EPSCoR is a joint program of NSF and selected states and territories. Its goal is to build competitive science by developing science and technology (S&T) resources through partnerships involving state universities, industry, government, and the federal R&D enterprise. The program is a partnership between the NSF and a state to improve the R&D competitiveness through the state's academic S&T infrastructure. The mission of EPSCoR is to raise the capability of a research institution or to assist in making a less-competitive institution more research intensive.[15] Eventually, EPSCoR supporters hope those states receiving limited federal support would gain some level of equity in competing for federal and private sector funds through the regular grant system.

[14] Written remarks of Arden L. Bement, Jr., Former Director, National Science Foundation, before the NSF EPSCoR Project Directors and Administrators Annual Meeting, Arlington, VA, August 11, 2008. (Bement resigned his position at NSF in May 2010 to become Director, Global Policy Research Institute, Purdue University. Subra Suresh was sworn in on October 18, 2010, as the 13th director of NSF. Suresh had been Dean, School of Engineering, Massachusetts Institute of Technology.)

[15] Approximately 30% of minority-serving colleges institutions are in EPSCoR jurisdictions. This includes 50% of historically black colleges and universities, 60% of tribal colleges and universities, and 30% of Hispanic serving institutions.

The goal of the program as described by NSF is to

> Provide strategic programs and opportunities for EPSCoR participants that stimulate sustainable improvements in their R&D capacity and competitiveness, and to advance science and engineering capabilities in EPSCoR jurisdictions for discovery, innovation and overall knowledge-based jurisdictions. EPSCoR achieves its objectives by: (1) catalyzing key research themes and related activities within and among EPSCoR jurisdictions that empower knowledge generation, dissemination and application; (2) activating effective jurisdictional and regional collaborations among academic, government and private sector stakeholders that advance scientific research, promote innovation and provide societal benefits; (3) broadening participation in science and engineering by institutions, organizations and people within and among EPSCoR jurisdictions; and (4) using EPSCoR for development, implementation and evaluation of future programmatic experiments that motivate positive change and progression.[16]

In a prepared statement before the NSF EPSCoR 21st Annual Conference, Arden Bement stated that "Over the past 30 years, EPSCoR has evolved into a Program of Experimentation. It is a federal-state partnership that continues to show how to create and sustain robust infrastructures that support world-class research and education in science and engineering."[17]

Operation and Funding

EPSCoR, while designed as a sheltered program, has been integrated into the performance of all NSF directorates.[18] Its grants are awarded on a competitive peer- or merit-reviewed basis. Proposals submitted vary, and come from academic, state, profit and nonprofit organizations, and individuals. Also, support is provided to cooperative programs among institutions in different EPSCoR states, or between a state's research institution and a primarily undergraduate institution. All principal investigators of NSF EPSCoR projects are required to be associated with research institutions, organizations, or agencies within the participating state. In addition, all of the projects must be designed to contribute to the research competitiveness of the colleges and universities in the particular state.

EPSCoR funding was not intended to replace existing federal, state, institutional, or private sector support, but to " ... add specific value to the state's academic infrastructure not generally available through other funding sources."[19] Responsibility for operating the program rests within the individual states. A state is required to provide matching funds. An EPSCoR governing committee is established in each participating state to identify opportunities for EPSCoR awards. States devise strategies that allow them to adapt to vastly different federal funding environments. The

[16] About EPSCoR, http://www.nsf.gov/od/oia/programs/epscor/about.jsp.

[17] Arden L. Bement, Jr., Former Director, NSF, "From the Top," Luncheon Remarks, NSF EPSCoR 21st Annual Conference, Arlington, VA, October 21, 2009.

[18] A report of a FY2006 workshop on EPSCoR directed that funding for EPSCoR be moved from the Education and Human Resources (EHR) Directorate to Integrative Activities (IA) of the Research and Related Activities Account (R&RA). It was determined that the activities, management, and cross-directorate interactions of EPSCoR would be more fully coordinated and maximized within the R&RA. Beginning in the FY2008, EPSCoR was transferred from the EHR to the IA account.

[19] National Science Foundation, *EPSCoR Research Infrastructure Improvement Grant Program* (RII), Program Solicitation, NSF 03-528, Arlington, VA, January 2003, p. 5.

programs are reviewed periodically by external panels and assessments are performed by independent organizations.

Data reveal that the 29 EPSCoR jurisdictions account for more than 20% of the U.S. population, about 25% of research institutions, and an estimated 16% of employed scientific and technical personnel. As a whole, these 29 jurisdictions receive approximately 13.6% of all NSF R&D funding.[20] In FY2010, NSF provided an estimated $147.1 million for EPSCoR activities, an increase of $14.1 million (10.6%) above the FY2009 level.[21] (See **Table 1** for funding levels of previous years.) Funding was provided through three complementary investment strategies—research infrastructure improvement grants, co-funding, and outreach and workshops.[22]

Table 1. Estimated EPSCoR Funding: FY2001-FY2010

(dollars in millions)

Fiscal Year	Research Infrastructure Improvement	Co-Funding	Outreach/Technical Assistance	Funding Year Totals
FY2001	40.4	34.4	0.1	74.9
FY2002	40.7	38.8	0.2	79.7
FY2003	46.9	42.1	0.2	89.2
FY2004	55.9	38.1	0.2	94.2
FY2005	58.1	35.2	0.1	93.4
FY2006	61.7	36.4	0.1	98.2
FY2007	65.8	36.2	0.1	102.1
FY2008	72.8	47.0	0.2	120.0
FY2009	91.3	41.1	0.5	132.9
FY2010	114.4	31.2	1.5	147.1
Total	**$648.0**	**$380.5**	**$3.2**	**$1,031.7**

Note: Funding levels provided by NSF Budget Office and NSF budget justifications.

NSF's current portfolio for EPSCoR includes three complementary investment strategies—research infrastructure improvement (RII) grants, co-funding of disciplinary and multidisciplinary research, and outreach and workshops. RII grants support S&T infrastructure improvements that have been designated by a governing committee in the EPSCoR state as essential to the state's future R&D competitiveness.[23] RII grants are of two types—RII Track 1 and RII Track 2. RII Track 1 grants are made to individual jurisdictions and are awarded up to $15.0 million for a

[20] National Science Foundation, *Federal Funds for Research and Development: Fiscal Years 2006-08*, Detailed Statistical Tables, NSF10-303, Arlington, October 2009, VA, Table 84.

[21] Funding levels include support for EPSCoR in the EHR Directorate and also co-funding available through the Research and Related Activities Account.

[22] Different investment strategies existed prior to the transfer of EPSCoR from the EHR to IA. See Note 15.

[23] Eligibility to participate in the EPSCoR Research Infrastructure Improvement competition is restricted to those states that received 0.75% or less of the total NSF research funds to all sources within a state averaged over the most recent three-year period. If in a rare instance a single large NSF-funded national or international facility skews the data, an adjustment to the eligibility criteria could be made. National Science Foundation, *EPSCoR Research Infrastructure Improvement Grant Program*, Program Solicitation, NSF08-500, Arlington, VA, January 4, 2008, p. 5.

period of up to 60 months. RII Track 2 grants are made to consortia of EPSCoR jurisdictions and are limited to a maximum of $2.0 million for up to 36 months. Examples of RII grants include startup funding for faculty research, faculty exchange projects with major research centers, development of nationally competitive high-performance computing capabilities, acquisition of state-of-the-art research instrumentation that is unavailable through the NSF's regular grant system, creation of graduate research training groups that encourage multidisciplinary experiences, developing linkages between industry and national laboratories, and development of programs to expand minority participation in science, engineering, mathematics, and technical disciplines. RII grants are the principal focus of the EPSCoR program. NSF funding for EPSCoR RII grants in the FY2011 budget request is $111.9 million, a $2.5 million decrease from the FY2010 estimate of $114.4 million.

The co-funded grant mechanism encourages EPSCoR researchers and institutions to move into the mainstream of federal and private sector R&D support. Co-funding is an internal, cross-directorate, NSF funding mechanism.[24] Co-funding activities are applicable in the various directorates, the Office of Polar Programs, the Office of International Science and Engineering, the Office of Cyberinfrastructure, and the Office of Integrative Activities. Co-funding allows states to receive more support than would have available under EPSCoR alone.[25] Proposals supported are in areas that have been identified by the state's EPSCOR governing committee as critical to the future R&D competitiveness of the state or jurisdiction, and include, among other things, individual investigator-initiated research proposals and R&D encompassed by the various crosscutting and interdisciplinary programs in NSF.[26] To receive support for co-funding, a grant proposal must be, among other things, rated at or near the same level as the highly rated grants in the regular grant process. The FY2011 request for co-funding is $41.0 million. In the FY2010 request, the co-funding strategy is estimated at $31.2 million.

The outreach funding mechanism of EPSCoR provides support for NSF program directors and relevant personnel to visit participating researchers in EPSCoR states and to further familiarize the states and researchers with NSF policies, practices, and programs. Also, it allows agency personnel to become more cognizant of the availability of resources within the states and their institutions. Outreach visits take two forms - those initiated by a host of an EPSCoR state or jurisdiction, and those initiated by NSF program officers. The visits may result in colloquia or seminars. It is NSF's contention that the contact provided by outreach visits will lead to an increase in both the quality and quantity of grant proposals submitted by participating states.[27] Funding for the outreach strategy in the FY2011 budget request is $1.5 million, level with the

[24] Proposals can not be submitted directly for co-funding. This mechanism is primarily internal to NSF, with reviews conducted by the EPSCoR office and the managing program office of the grant proposal. EPSCoR co-funding is limited to awards made by principal investigators at the eligible NSF EPSCoR jurisdictions.

[25] For expanded discussion of co-funding, see, for example, U.S. Congress, House Committee on Appropriations, *Department of Veterans Affairs and Housing and Urban Development, and Independent Agencies Appropriations for 2001*, 106th Cong., 2nd Sess., April 4, 2001, pp. 60-63, and *Annual Report FY2002, Experimental Program to Stimulate Competitive Research*, pp. 3-4.

[26] These crosscutting programs include those supported by multiple directorates in NSF and also joint agency programs. They include the Faculty Early Career Development Program, Professional Opportunities for Women in Research and Education, Major Research Instrumentation, Information Technology Research, Small Business Technology Research, Materials Research Science and Engineering Centers, Research Experiences for Undergraduates, Integrative Graduate Education and Research Training, and Grant Opportunities for Academic Liaison with Industry competitions.

[27] *EPSCoR Outreach* http://www.nsf.gov/od/oia/programs/epscor/outreach.jsp.

FY2010 estimate. It is anticipated that funding will allow for expansion of activities that build regional and jurisdictional research infrastructure.

Program Effectiveness

In 1994, an evaluation of the EPSCoR program was conducted by the COSMOS Corporation.[28] The evaluation, released in May 1999, covered the period 1980-1994, and was designed to, among other things, determine whether participating states and their institutions had increased their share of federal R&D funds and to identify the EPSCoR program strategies that led to improvement of the state and institutions research competitiveness. The evaluation found that states' R&D competitiveness did improve and that EPSCoR had contributed to this competitiveness. The report stated that

> Based on the observed changes in federal and NSF shares, it can be concluded that the EPSCoR states' share of R&D funding did increase relative to the shares of the other states. To this extent, EPSCoR was associated with a lessening of the undue geographic concentration of R&D in the United States. Although the changes were small in absolute terms, this was a notable accomplishment in an era when research universities in non-EPSCoR states also were thriving and upgrading substantially.[29]

The report noted that NSF EPSCoR had facilitated the development of partnerships and linkages among institutions, state and federal government, and the private sector. It also revealed that while no state had graduated from EPSCoR (no longer receiving EPSCoR support), many EPSCoR research clusters had become fully competitive and no longer sought EPSCoR resources.[30] The evaluators determined that for colleges and universities in EPSCoR states, the cluster strategy may have been a more effective approach to improving research capability than that of supporting individual researchers or single research projects, a strategy used in the early years of EPSCoR.

More recently, an August 2006 report, *EPSCoR 2020: Expanding State Participation in Research in the 21st Century—A New Vision for the Experimental Program to Stimulate Competitive Research (EPSCoR)*, finds that while some participating states and jurisdictions have developed S&T capabilities that address national issues, they need to progress at a faster pace in order to benefit more fully in a national research agenda.[31] The report states that

> The task now is to accelerate the positive trends in building research infrastructure and capacity in the states, and to incorporate the expertise and capabilities of these states into the

[28] National Science Foundation, An REC-Sponsored Report on Evaluation, A Report on the Evaluation of the National Science Foundation's Experimental Program To Stimulate Competitive Research, NSF99-115, Arlington, VA, May 1999, 36 pp.

NOTE: The evaluation covered the period 1980-1994.

[29] Ibid., pp. 19-20.

[30] "A cluster is a related group of research projects, often interdisciplinary, and awards are made to a cluster's principal investigator as well as to the component research projects. This strategy has led to the development of laboratories or centers, and not just the recruitment of cadres of new, research-oriented faculty in a number of EPSCOR universities. The cluster strategy also has been used to promote interdisciplinary collaboration among universities and between universities and industry." Ibid., p. 36.

[31] *EPSCoR 2020: Expanding State Participation in Research in the 21st Century—A New Vision for the Experimental Program to Stimulate Competitive Research (EPSCoR)*, 15 pp.

> larger national research agenda. As we move into a time of doubling the federal commitment to basic research, it is particularly critical and appropriate to make a new commitment to the EPSCoR states that have been left behind in the S&T community... . It is imperative that all of NSF's science, engineering, and education programs adopt the concept of broadening geographical and cultural participation in NSF activities as part of their objectives. Programmatic planning should consider how best to include all states and their research institutions as potentially important S&T resources.[32]

The workshop that generated this report proposed that a more flexible RII grant program should be instituted. The position of the workshop participants was that since the states are heterogeneous, a "one-size program" should not be applied to the then 27 different jurisdictions.[33] Rather, the individual needs of the states should be a factor in determining the most effective strategy for infrastructure improvement. The current award structure is viewed as being no longer adequate for some jurisdictions to achieve a higher level of competitive science in some areas of research. It was proposed that RII grants be awarded for a period of up to five years, in the amount of $3.0 -$5.0 million per year, per state or jurisdiction. The longer period of time for the grant would enable states to better implement their strategic plans. The increased level of funding would be related to the size of the jurisdiction and the extent of the "S&T transformative challenge."[34]

Another suggestion from the workshop was to place the EPSCoR program in NSF where its cross-directorate interactions would be maximized and integrated into all of the cutting edge initiatives of the agency. The FY2008 budget request for NSF did transfer the EPSCoR program from the Education and Human Resources Directorate to the Integrative Activities in the Research and Related Activities account. The FY2008 budget submission states that "The relocation will allow the EPSCoR program greater leverage for improving the research infrastructure, planning complex agendas, and developing scientific and engineering talent for the 21st century."[35]

An additional recommendation of the workshop was for EPSCoR states and jurisdictions to become a "test bed" for new initiatives. The report notes that because EPSCoR has matured as a program, it should expand its research capacity by developing expertise in areas of national importance, such as homeland security and national defense, cyberinfrastructure, environmental observatories, coastal and ocean issues, and energy expenditures. With the proposed flexibility to the RII grant mechanism, the participating states and jurisdictions could pursue multiple strategies, such as support for transformative research and innovation that has been outlined in NSF's strategic plan.[36] The workshop participants maintain that "Developing expertise in topics of national importance will enhance success of proposals in other competitions."[37]

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[32] Ibid., p. iv.

[33] (At the time of this particular workshop, there were 27 jurisdictions. Currently, there are 29.) Speaking before the 18th Annual EPSCoR National Conference, Sherry Farwell, Head, NSF EPSCoR Office, stated that it is necessary to provide funding opportunities for EPSCoR jurisdictions that account for their " ... inherent jurisdictional heterogeneity. That is, jurisdictions vary in their current capacities and capabilities, and hence in their relative positions on the trajectory leading to competitiveness." Written statement of Sherry Farwell, 18th EPSCoR National Conference, Puerto Rico, September 26, 2005.

[34] *EPSCoR 2020: Expanding State Participation in Research in the 21st Century—A New Vision for the Experimental Program to Stimulate Competitive Research (EPSCoR)*, p. 9.

[35] National Science Foundation, *FY2008 Budget Request to Congress*, Arlington, VA, February 2007, p. IA-1.

[36] National Science Foundation, *Investing in America's Future, Strategic Plan FY2006-2011*, NSF06-48, Arlington, (continued...)

Issues

At the beginning of the EPSCoR program, some questioned the length of time required for a state to improve its research infrastructure. It was suggested to be five years, but that proved to be " ... unrealistic, both substantively and politically."[38] Questions remain concerning the length of time states should receive EPSCoR support. There are those in the scientific community who believe that some states and their institutions should assume more responsibility for building their research infrastructure and become less dependent on EPSCoR funds. They argue that some researchers and states have become comfortable with EPSCoR funding and are not being aggressive in graduating from the program. It continues to be called an experimental program after 28 years, and no state has yet graduated from the EPSCoR program.[39] The issue of graduation from the program has generated considerable Congressional interest.

In August 2005, the NSF's Committee of Visitors (COV) released a review of the EPSCoR program for the period FY2000 through FY2004.[40] One of the issues in the August 2005 review was centered on determining when states would become independent of EPSCoR resources. Questions included What initiatives are there to promote graduation from EPSCoR and mainstreaming in the regular grant making process? What level of progress must a state achieve to justify that it is no longer eligible for EPSCoR resources? The COV admitted that graduation/progression from the EPSCoR program is a "challenging" issue and has been debated from the beginning of the program within NSF and among the various stakeholders and participating states and jurisdictions. The review determined that it has become necessary to revisit what it means to "graduate" from the program. Because of the importance in developing a mechanism or measure for graduation from the program, the COV proposed the creation of a dedicated EPSCoR Advisory Committee (external) that would make recommendations for both eligibility for and graduation from EPSCoR. The report stated that

> Clearly, a fixed definition of graduation would be a moving target, especially in an environment where jurisdictions are still being added to the EPSCoR family. The current Office Head has articulated a vision of "programmatic graduation/progression," which necessarily includes the evolution of the EPSCoR programs themselves as infrastructure

(...continued)

VA, September 2006, 19 pp. NOTE: NSF describes transformative research as "... research that has the capacity to revolutionize existing fields, create new subfields, cause paradigm shifts, support discovery, and lead to radically new technologies." National Science Board, *Enhancing Support of Transformative Research at the National Science Foundation*, NSB07-6, Arlington, VA, January 23, 2007, p. 3.

[37] *EPSCoR 2020: Expanding State Participation in Research in the 21st Century*, p. 13. For update of this workshop see for example National Science Foundation, *Experimental Program to Stimulate Competitive Research, Update: The EPSCoR 2020 Scorecard*, August 11, 2008, http://www.nsf.gov/od/oia/programs/epscor/presentations/HNBUpdate081108.pdf.

[38] Lambright, W. Henry, Workshop on Academic Research Competitiveness, p. 4.

[39] In April 2006, it was announced that Tennessee has become the first state to "begin the process of successfully transitioning out of the NSF EPSCOR program." The co-funding transition period in Tennessee will continue for three years, until April 2009. East Tennessee State University, Office of Research and Sponsored Programs. *Reflections*, v.1, July 2006, p.1.

[40] National Science Foundation, Education and Human Resources Directorate, *Experimental Program to Stimulate Competitive Research (EPSCoR)*, Committee of Visitors, Final Report, August 16, 2005, 25 pp.

> continues to grow. This vision should be further developed, vetted, and eventually implemented.[41]

The issue of increasing the number of states seeking support through the program was addressed in the review. The COV noted that the increase in the number of eligible jurisdictions has strained limited resources. In FY2002, 5,595 proposals were received, and 1,511 awards were made with a funding rate of 27.0%. In FY2006, 7,037 proposals were received, and 1,489 awards were made with a funding rate of 21.0%.[42] The report stated that

> Given the likely budgetary constraints to be imposed on EPSCoR in the coming years, the program runs the danger of not being able to serve its core clientele with the limited funds available if the number of eligible states and institutions continues to increase. At some point, the Foundation must more fully address infrastructure, capacity, and geographic distribution in its other grant programs. One solution might be for the Foundation to re-organize some of its existing programs in order to create an EPSCoR-like program that used "institutional competitiveness" rather than "state competitiveness" as the primary definitional criterion for support.[43]

Additional issues and questions were included in the August 2005 review by the COV. The review found that the majority of EPSCoR programs were capacity building based (infrastructure). The COV proposed that the significant number of capacity building programs should be supplemented with "complementary programs for building capability and competitiveness."[44] The SBRC grant mechanism was cited as important to expanding the "competitiveness" building component of EPSCoR. Also, the COV report found that while EPSCoR's program portfolio was diverse, and included minority serving institutions, community colleges, and high schools, it was determined that EPSCoR jurisdictions should further strengthen the linkages between faculty at minority serving institutions and those at research intensive institutions.

An examination of the review process for large RII-type proposals concluded that the review process should be more rigorous. The COV proposed including site visits in the review process, and in enlarging the pool of reviewers in the scientific and technical areas proposed for research. The review noted that with the current, relatively small number of reviewers of EPSCoR programs, there is "insufficient injection of new viewpoints in the review process."[45] The report suggested that the pool of reviewers should be expanded by rotating in a minimum of 25.0% new reviewers each year. The report further proposed that EPSCoR management use the review model employed by NSF's Engineering Research Centers, Science and Technology Centers, and Science of Learning Centers.

Many of the questions posed by the EPSCoR COV following its review of the program are those that are being debated by the various stakeholders in the EPSCoR community. In particular, questions concerning the criteria used to determine when a state or jurisdiction graduates from the EPSCoR program may continue to receive Congressional attention during the 111th Congress.

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[41] Ibid., p. 21.

[42] National Science Board, *Report to the National Science Board on the National Science Foundation's Merit Review Process, Fiscal Year 2006*, NSB07-22, March 2007, p. 31.

[43] Ibid., p. 23.

[44] *Experimental Program to Stimulate Competitive Research (EPSCoR)*, Final Report, p. 12.

[45] Ibid., p. 24.

Congressional Activity

On March 2, 2007, Senator Rockefeller introduced S. 753, EPSCoR Research and Competitiveness Act of 2007. S. 753 would authorize appropriations for FY2008 - FY2012 to NSF for EPSCoR in the following amounts: FY2008, $125.0 million; and FY2009-FY2012, $125.0 million and "... $125,000,000 multiplied by a percentage equal to the percentage by which the Foundation's budget request for such fiscal year exceeds the total amount appropriated to the Foundation for fiscal year 2008."[46] Language in the bill would require the development of plans that allow EPSCoR states and jurisdictions to participate in NSF's Cyberinfrastructure Initiative and Major Research Instrumentation program. S. 753 would require the NSF Director to obligate not less than 20.0% of the EPSCoR budget on co-funding projects that are ranked, by peer review, in the top 20.0% of all submitted grant proposals. Also, EPSCoR states and jurisdictions participating in the RII grant mechanism are to include in the proposals, partnerships with out-of-state research institutions. S. 753 was referred to the Senate Committee on Health, Education, Labor, and Pensions.

The FY2012 budget request for the NSF proposes $160.5 million for EPSCoR activities, approximately $13.4 million (9.1%) above the FY2010[47] enacted level of $147.1 million.[48] (As of this writing, a full-year FY2011 appropriation has not been enacted; therefore, NSF is operating under a continuing resolution – P.L. 112-4, as amended). The FY2012 request supports a portfolio of three complementary investment strategies—research infrastructure improvement ($116.1 million), co-funding ($42.8 million), and outreach ($1.7 million)—for the 29 EPSCoR jurisdictions. The NSF indicates that approximately 24.0% of the funding for EPSCoR is to be used for new research awards in the FY2012 request. The remaining funding is to provide continuing support for grants made in previous years.

On July 22, 2010, the Senate Committee on Appropriations approved S. 3636, Commerce, Justice, and Science Appropriations Bill, FY2011 (S.Rept. 111-229). The Senate bill requested a total of $2,353.4 billion for the NSF in FY2011, approximately $71.0 million below the Administration's FY2011 request and $480.9 million above the FY2010 estimate. Included in the support for NSF was $157.4 million for EPSCoR, $3.0 million (1.9%) above the FY2011 request and $10.3 million (7.0%) above the FY2010 level.

[46] S. 753, EPSCoR Research and Competitiveness Act of 2007, Section 3.

[47] The NSF estimates that for FY2010, approximately 1,917 people were involved in EPSCoR activities—533 senior researchers, 80 postdoctorates, 569 graduate students, 489 undergraduate students, and 246 other professionals. In the FY2012 request, NSF estimates that the number of people impacted by EPSCoR will be 2,190—682 senior researchers, 87 postdoctorates, 620 graduate students, 533 undergraduates, and 268 other professionals.

[48] The American Recovery and Reinvestment Act, 2009 (ARRA, P.L. 111-5) provided an additional $30.0 million for EPSCoR activities in FY2009. NSF carried over $20.0 million from the ARRA account because awards occurred late in FY2009. As a result, carryover funding is to be made in FY2010.

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