COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

HEARING CHARTER

Funding for the America COMPETES Act in the FY2009 Administration Budget Request

Thursday, February 14, 2008
10:00am – 12:00pm
2318 Rayburn House Office Building

1. Purpose
On Wednesday, February 14, 2008, the Committee on Science and Technology will hold a hearing to consider how the Administration's FY2009 budget proposal addresses programs authorized in the America COMPETES Act (PL 110-69) within the jurisdiction of the Committee. Subcommittees will hold additional hearings regarding specific agency budgets, including for the National Science Foundation (NSF), National Institute of Standards and Technology (NIST), and Department of Energy (DOE).

2. Witness
Dr. John H. Marburger, III is Director of the Office of Science and Technology Policy (OSTP). The mission of the office is to serve as a source of scientific and technological analysis and judgment for the President with respect to major policies, plans, and programs of the Federal Government. Dr. Marburger also co-chairs the President's Committee of Advisors on Science and Technology (PCAST) and supports the President's National Science and Technology Council (NSTC).

3. Overview
H.R. 2272, the America COMPETES Act (COMPETES) passed the House of Representatives (367-57) and the Senate (by Unanimous Consent) on August 2, 2007 and was signed into law by the President on August 9, 2007.

A response to the 2005 National Academies' report *Rising Above the Gathering Storm*, COMPETES seeks to ensure U.S. students, teachers, businesses, and workers are prepared to continue leading the world in innovation, research, and technology. The law implements recommendations from the Gathering Storm report, and specifically:

- Authorizes $33.6 billion over fiscal years 2008 – 2010 for science, technology, engineering, and mathematics (STEM) research and education programs across the Federal government.

- Keeps research programs at NSF, NIST and the DOE Office of Science on a near-term doubling path;

- Helps to prepare new teachers and provide current teachers with content and teaching skills in their area of education through NSF's Noyce Teacher Scholarship Program and Math and Science Partnerships Program;
- Expands programs at NSF to enhance the undergraduate education of the future science and engineering workforce, including at 2-year colleges;
- Expands early career graduate-level grant programs and provides additional support for outstanding young investigators at NSF and DOE;
- Creates the Technology Innovation Program (TIP) at NIST (replacing the existing Advanced Technology Program or ATP) to fund high-risk, high-reward, pre-competitive technology development with high potential for public benefit;
- Puts the Manufacturing Extension Partnership (MEP), which provides cost-shared technical assistance to small manufacturers to modernize their operations, on a path to doubling over 10 years;
- Establishes an Advanced Research Projects Agency for Energy (ARPA-E), a nimble and semiautonomous research agency at the Department of Energy to engage in high-risk, high reward energy research;
- Includes provisions throughout the bill to help broaden participation by women and minorities in science and engineering fields at all levels; and
- Strengthens interagency planning and coordination for research infrastructure and information technology (i.e. high-speed computing).

The President released his FY2009 budget proposal on February 4, 2008. The budget proposes funding increases for physical sciences research programs as part of the American Competitiveness Initiative (ACI), many of which are consistent with increases authorized in COMPETES. However, the Administration's budget ignores or neglects several other areas of COMPETES, including math and science education activities at NSF, manufacturing and technology stimulus programs at NIST, and important energy programs including ARPA-E.

4. Funding for the America COMPETES Act, by Agency

National Science Foundation (NSF)

The COMPETES Act put NSF on a 7-year doubling path, authorizing $7.326 billion in FY2009. The Administration's FY2009 request for the National Science Foundation is $6.854 billion, $822 million (13.6 percent) above the FY2008 level of $6.032 billion.[1] While the FY2008 omnibus gave only a 2.5 percent increase to NSF over FY07, the Administration's FY2009 request reflects a determination to keep NSF on a 10-year doubling path proposed under the FY07 American Competitiveness Initiative (ACI).

Research and Related Activities

The request for the Research and Related Activities (R&RA) account is $5.594 billion, $773 million (16 percent) over the FY2008 estimate of $4.821 billion and $150 million

[1] The expected FY2008 funding level is $33 million below the appropriated level due to a rescission required by the Appropriators in the FY2008 omnibus bill.

less than authorized in COMPETES. In keeping with the Administration's emphasis on the mathematical and physical sciences, engineering and computer sciences under the ACI, those directorates, in addition to cyberinfrastructure, each see an approximately 20 percent increase over FY2008, while the biological sciences (+10.3 percent) and social, behavioral and economic sciences (+8.5 percent) see more modest increases. Although the COMPETES Act does not assume that all fields will receive equal increases each year, the law does specifically call on NSF not to disinvest in the biological and social sciences over the long-term.

K-16 STEM Education Programs

The COMPETES Act authorized $995 million for the Directorate for Education and Human Resources (EHR) in FY2009. The Administration's FY2009 request for EHR is $790.41 million, an increase of $64.81 million (8.9 percent) over FY2008, but still $205 million short of the authorized level. Most of the increases authorized in COMPETES were directed to two K-12 programs: the Math and Science Partnerships Program (MSP), which supports teacher professional development, and the Robert Noyce Teacher Scholarship Program, which educates K-12 STEM teachers, focusing on both pedagogy and content areas. In the FY2009 request, MSP receives a $2.5 million increase to $51 million ($60 million below the authorized level) and Noyce receives $11.6 million ($3.5 million below the FY2008 appropriated level and $103 million below the FY2009 authorized level). (Note: The FY2009 budget request indicates that NSF plans to provide only $10.8 million for Noyce in FY2008, despite the omnibus appropriation report's specification of $15 million.) Two undergraduate programs, the STEM Talent Expansion Program and the Advanced Technological Education program, are flat-funded in FY2009 despite being authorized for 10 percent increases in COMPETES. The Administration's rationale for flat-funding all of these education programs and not funding Noyce at the level of the appropriations directive is that they have not yet undergone the evaluation required under the new Academic Competitiveness Council (ACC) process. (Note: With regard to the Noyce program, the ACC is evaluating the program as it was implemented in previous years, not the significantly revised Noyce program authorized in COMPETES).

National Institute of Standards and Technology (NIST)

COMPETES put NIST on a ten-year path to doubling, authorizing $881.8 million in FY2009 for research, lab construction, and the external industrial technology programs. The President's FY2009 budget requests $638 million for NIST, 16 percent below the FY2008 estimated budget. While the request comes close to the authorized level for NIST internal research programs, it eliminates or severely reduces funding for the external industrial technology programs. This reflects a continued Administration opposition to the industrial technology programs.

NIST Labs and Lab construction

The NIST internal research laboratories perform research in support of measurement science and technology and technical standards development. COMPETES put the internal research laboratory account on a ten-year path to doubling, authorizing $541.9

million in FY2009. The budget proposal nearly matches this level (falling short by $6.9 million or 1.3 percent), in keeping with the Administration's emphasis under ACI on supporting basic research in the physical sciences. The budget proposes $99 million in funds for laboratory construction. In addition to COMPETES-authorized funds for basic maintenance and completing construction of high-performance laboratory space at the NIST campus in Boulder, CO, the budget proposes new funding for an expansion of office and laboratory space at JILA, a joint research institute operated by NIST and the University of Colorado.

Technology Innovation Program (TIP)

The Technology Innovation Program (TIP) was created in COMPETES to replace the Advanced Technology Program (ATP). TIP awards cost-shared grants to small companies and joint ventures for the development of high-risk, high-reward technologies that meet critical national needs, and was based in part on Administration proposals for reforming ATP. Under the provisions in COMPETES, TIP will continue to fund grants that were originally awarded by ATP in 2007, and will make its first round of new awards in 2008.

The Administration's budget proposes zero funding for TIP. The Administration justifies the elimination of the program by arguing that TIP would support activities that private industry has the means to support. The Administration has not provided documentation to support this assertion.

Manufacturing Extension Partnership (MEP)

The MEP program is a public/private partnership in all 50 states and Puerto Rico that provides technical assistance for small manufacturers to modernize their operations and adapt to foreign competition. MEP Centers are supported by equal contributions from Federal funds, state funds, and client fees. In FY2006, MEP clients reported increased or retained sales of $6.76 billion, cost savings of over $1.1 billion, new client investment of over $1.6 billion, and more than 51,000 jobs created or retained.

The COMPETES Act put the MEP program on ten-year path to doubling, authorizing $122 million in FY2009. The budget proposes only $4 million for MEP, to be used to close out the program. The Administration states that the MEP centers will change to a self-supporting basis, as the Administration asserts was intended in the original authorization. However, the Technology Administration Act of 1998 (P.L. 105-309) extended the lifetime of MEP Centers indefinitely, so long as they receive a positive evaluation through an independent review. It is unclear that the Centers can operate on a self-sustaining basis, and the Administration has not provided any documents to indicate that this would be possible.

Department of Energy

The FY2009 Administration request for the entire Department of Energy is $25 billion. Of that, approximately $8.6 billion is dedicated to non-defense activities in Science, Energy Efficiency and Renewable Energy, Nuclear Energy, Fossil Energy and

Electricity. The remaining $16.4 billion is divided between the nuclear weapons mission, environmental cleanup and management of radioactive waste.

Office of Science

The FY2009 budget request for the DOE Office of Science is $4.7 billion. This represents an increase of $704 million, or 18 percent over the FY2008 enacted level of funding, and $478 million or 9 percent below funding authorized in COMPETES. (Note: COMPETES includes only a top-line authorization level for the DOE Office of Science; it is silent on funding for specific research program areas.)

The request for Basic Energy Sciences (BES) is $1.6 billion, an increase of $298 million or 23 percent over enacted FY2008 funding. As the largest program within the Office of Science, BES conducts research primarily in the cross-cutting areas of materials and chemical sciences, and, based on a series of recent workshops, plans to focus more on specific research areas for energy applications.

The budget would provide $369 million for Advanced Scientific Computing Research (ASCR), an increase of $18 million or 5 percent over enacted FY2008 funding. This includes funds to continue upgrading the Leadership Class Facilities at Oak Ridge National Laboratory and Argonne National Laboratory.

Biological and Environmental Research (BER) would receive $569 million under the President's budget, which is $24 million over current year funding. In addition to the role of BER in areas such as genomics, climate change research, medical applications, and environmental remediation, the FY2009 request supports continued funding for three bioenergy centers established in 2007.

The FY2009 funding request for High Energy Physics (HEP) is $805 million, which is $117 million or 17 percent more than the enacted FY2008 level. This program conducts fundamental research in elementary particle physics and accelerator science and technology. Funding for the NOvA neutrino physics experiment and research in preparation for the International Linear Collider at the Fermi National Accelerator Laboratory and Stanford Linear Accelerator Laboratory are restored in this request.

Fusion Energy Sciences (FES) receives $493 million, an increase of $207 million or 72 percent over enacted FY2008 funding. Of this amount, $214 million is dedicated to restoring funding for the U.S. role in the International Thermonuclear Experimental Reactor (ITER). Finally, Nuclear Physics (NP) would receive $510 million, an increase of $77 million (18 percent) over FY2008 funding.

Math and Science Education Programs within DOE

The DOE Office of Science's Workforce Development for Teachers and Scientists (WDTS) program funds a number of math and science education programs. The FY2009 funding request for WDTS is $13.6 million, an increase of $5.6 million or 70 percent over enacted FY2008 funding. This includes funding for the National Science Bowl, a math and science knowledge competition among high school teams across the

country; the Science Undergraduate Laboratory Internship (SULI) program, which supports students working at DOE National Laboratories in individually mentored research experiences; and the DOE Academies Creating Teacher Scientists (DOE ACTS) program, which assists educators in improving their content knowledge in areas of high importance to DOE missions and in becoming contributing researchers in the scientific community.

Recognizing the importance of K-12, undergraduate, and graduate STEM education to the nation's competitiveness and particularly workforce needs in the energy industry, COMPETES directs the DOE Office of Science, through a Director of Mathematics, Science and Engineering Education, to expand and raise the profile of STEM education activities at the Department of Energy. COMPETES directs the Department to establish a separate fund using .3 percent of all DOE R&D funds for education activities, and provide an accounting of this funding in the Administration's budget request. The budget request does provide a funding summary for education activities at the Department. However, the budget request does not clearly indicate whether a separate fund has been established or whether a Director has been named.

In addition, COMPETES authorizes several STEM education programs that are not explicitly funded in the President's budget. These include a pilot program of grants to specialty schools for science and mathematics, education programs for middle and high school students and professional development programs for teachers at National Laboratories, and programs to expand research and education at universities for nuclear and hydrocarbon (oil and gas) science.

ARPA-E

The COMPETES Act authorized the establishment of an Advanced Research Projects Agency for Energy, or ARPA-E. ARPA-E was created to fund collaborative research and development to overcome long-term or high-risk technological barriers in energy technologies that industry by itself will not undertake because of technical and financial uncertainty. The COMPETES Act authorized $300 million for the initial year of ARPA-E's programs. Other legislative proposals establishing ARPA-E called for subsequent year's funding as high as $1 billion to $1.5 billion. The Administration's FY2009 budget proposal contains no requested funds for ARPA-E. COMPETES also calls for the appointment of a Director for ARPA-E, and the legislative report further specifies that an Acting Director should be appointed to serve until a Director is confirmed by the Senate. The President has not yet appointed an Acting Director.

ARPA-E is intended to be unique not only in the type of research it conducts, but also in how it conducts that research. ARPA-E is intended to be a nimble and semi-autonomous agency within the Department of Energy, similar to the Defense Advanced Research Projects Agency at the Department of Defense (DARPA). Like DARPA, the Director of ARPA-E should establish and monitor project milestones, initiate research projects quickly, and just as quickly terminate or restructure projects if such milestones are not achieved. Projects are intended to be conducted through teams that utilize the talent, resources, and facilities found in the nation's universities, National Laboratories

and in the private sector. The Director is also given special hiring authority to quickly recruit technical staff as program managers on a short-term basis, and offer competitive salaries rivaling those of industry. The Administration has not moved towards establishing ARPA-E, nor do any current or proposed programs at the Department resemble the organizational structure or operating principles of ARPA-E as outlined in the COMPETES Act.