

Overview of the Conference Report on H.R. 2272, the *America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act (COMPETES)**

Earlier this year, both the U.S. House and Senate passed comprehensive legislation (H.R. 2272, S. 761) to ensure our nation's competitive position in the world through improvements to math and science education and a strong commitment to research.

H.R. 2272 is the culmination of a year and a half-long, bipartisan effort led by Members of the House Science and Technology Committee to pass a package of competitiveness bills in response to recommendations in the 2005 National Academies report, *Rising above the Gathering Storm*.

The Conference Agreement follows through on a commitment to ensure U.S. students, teachers, businesses and workers are prepared to continue leading the world in innovation, research and technology – well into the future.

In summary, the Conference Agreement:

- Keeps research programs at National Science Foundation (NSF), the National Institute of Standards and Technology (NIST) and the Department of Energy (DOE) Office of Science on a near-term doubling path;
- Authorizes a total of \$33.6 billion over fiscal years 2008 – 2010 for science, technology, engineering and mathematics (STEM) research and education programs across the federal government.
- Helps to prepare thousands of 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;
- 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;
- Establishes an Advanced Research Projects Agency for Energy (ARPA-E), a nimble and semi-autonomous research agency at the Department of Energy to engage in high-risk, high reward energy research.
- Expands programs at NSF to enhance the undergraduate education of the future science and engineering workforce, including at 2-year colleges;
- Includes provisions throughout the bill to help broaden participation in science and engineering fields at all levels;
- Authorizes two new competitive grant programs that will enable partnerships to implement courses of study in mathematics, science, engineering, technology or critical foreign languages in ways that lead to a baccalaureate degree with concurrent teacher certification;
- Authorizes competitive grants to increase the number of teachers serving high-need schools and expand access to AP and IB classes and to increase the number of qualified AP and IB teachers in high-need schools;
- Expands early career grant programs and provides additional support for outstanding young investigators at both NSF and DOE; and
- Strengthens interagency planning and coordination for research infrastructure and information technology (i.e. high-speed computing).
- Puts the Manufacturing Extension Partnership (MEP) on a path to doubling over 10 years.

Following are more detailed summaries of the conference agreement's eight titles:

TITLE I – Office of Science and Technology Policy (OSTP)/Government Wide Science

The conference agreement directs the President to convene a National Science and Technology Summit to examine the health and direction of the U.S. STEM enterprises; requires a National Academy of Sciences study on barriers to innovation; changes the *National Technology Medal* to the *National Technology and Innovation Medal*; establishes a President's Council on Innovation and Competitiveness (akin to the President's Council on Science and Technology); requires prioritization of planning for major research facilities and instrumentation nationwide through the National Science and Technology Council; and expresses a sense of Congress that each federal research agency should support and promote innovation through funding for high-risk, high-reward research.

TITLE II – National Aeronautics and Space Administration

The conference agreement establishes the National Aeronautics and Space Administration (NASA) as a full participant in all interagency activities to promote competitiveness and innovation and to enhance science, technology, engineering and mathematics education. The agreement also affirms the importance of NASA's aeronautics program to innovation and to the competitiveness of the United States. It urges NASA to implement a program to address aging workforce issues at NASA and to utilize NASA's existing Undergraduate Student Research program to support basic research by undergraduates on subjects of relevance to NASA. Finally, the conference agreement expresses the sense of Congress that the International Space Station (ISS) National Laboratory offers unique opportunities for educational activities and provides a unique resource for research and development in science, technology, and engineering which can enhance the global competitiveness of the U.S.

TITLE III – National Institute of Standards and Technology

The conference agreement authorizes a total of \$2.652 billion over fiscal years 2008 – 2010 for NIST. This includes funds for the NIST labs, for lab construction, the TIP program, and the Manufacturing Extension Partnership (MEP) Program. This funding level keeps the NIST labs on a path to doubling in ten years.

The conference agreement funds the NIST Labs at \$502.1 million for FY08 and increases the funding by 8% per year (10-year doubling), which result in \$541.9 million in FY09 and \$584.8 million in FY10. The conference agreement provides \$150.9 million in FY08 for lab construction. Construction out-year funding levels will allow the completion of construction projects at NIST's Boulder, CO and Gaithersburg, MD facilities. The MEP program is funded at \$110 million in FY08, \$122 million in FY09 and \$131.8 million FY10 – placing MEP on a path to doubling over the next 10 years.

The conference agreement creates a new initiative, the Technology Innovation Program (TIP) which is based on the proven success of the Advanced Technology Program (ATP), but better reflects global innovation competition by funding high-risk, high-reward, pre-competitive technology development, focusing on small- and medium-sized companies. The TIP allows for greater industry input in the operation of the program, allows university participation for the first time, and firmly focuses the program on small- and medium-sized high-tech firms.

TIP will replace ATP and bridge the funding gap between the research lab and the marketplace. The conference agreement provides an authorization of \$100 million FY08, \$131.5 million FY09 and \$140.5 million in FY10. These funding levels will allow for a viable program, with approximately \$40 million per year for new awards.

The agreement includes language to clarify that the focus of TIP is to support, promote and accelerate innovation in the U.S. through high-risk, high-reward research in areas of critical national need. It specifies that large companies may not receive any TIP funding.

TITLE IV – National Oceanic and Atmospheric Administration

The conference agreement establishes a coordinated ocean, Great Lakes, coastal and atmospheric research and development program for the National Oceanic and Atmospheric Administration (NOAA) in consultation with NSF and NASA. In addition, NOAA is required to build upon existing educational programs and activities to enhance public awareness and understanding of the ocean, Great Lakes, and atmospheric science. As a result, a science education plan is to be developed that would set forth the goals and strategies for NOAA, and be reevaluated and updated every 5 years. NOAA would also be recognized for their historic contributions to the innovation and competitiveness of this country, as well as be recognized as a full participant in interagency efforts to promote innovation and competitiveness.

TITLE V – Department of Energy

The conference agreement provides nearly \$17 billion to Department of Energy (DOE) programs over fiscal years 2008 – 2010, keeping Office of Science on a seven-year doubling path and establishes an Advanced Research Projects Agency for Energy, or ARPA-E.

ARPA-E will address long-term and high-risk technological barriers in energy through collaborative research and development that private industry or the DOE are not likely to undertake alone. Because of its autonomy within DOE, and the flexibility and resources afforded to its technical personnel, ARPA-E is structured to respond very quickly to energy research challenges, as well as terminate or restructure programs just as quickly. A fund is established in the U.S. Treasury separate and distinct from DOE appropriations, as will be the budget request for ARPA-E. With this separate fund, ARPA-E will be independent of the DOE bureaucracy, and likewise should not operate at the expense of other programs at DOE, particularly the Office of Science. The conference agreement authorizes \$300,000,000 in FY 2008, and such sums as are necessary thereafter for fiscal years 2009 and 2010.

As the nation's largest supporter of the physical sciences, the DOE Office of Science funds basic research and world-class facilities that play an integral role in the effort to maintain the technological competitiveness of the U.S. The conference agreement contains an authorization for the Office of Science which extends the 7 year doubling track prescribed in Energy Policy Act of 2005 by authorizing Fiscal Year 2010 at a funding level of \$5.8 billion.

The conference agreement provides \$150 million for K-12 science, technology, engineering and mathematics (STEM) education programs that capitalize on the unique scientific and engineering resources of the national laboratories. These programs include a pilot program of grants to states to help establish or expand statewide specialty high schools in STEM education; a program to provide internship opportunities for middle and high-school students at the national labs, with priority given to students from high-needs schools; a program at each national lab to help establish a Center of Excellence in STEM education in at least one high-need public secondary school in each lab region in order to develop and disseminate best practices in STEM education; and a program to establish or expand summer institutes at the national labs and partner universities in order to improve the STEM content knowledge of K-12 teachers throughout the country.

All of these programs would be coordinated by a newly appointed Director for STEM Education at the Department, who would also serve as an interagency liaison for K-12 STEM education. In keeping with ongoing efforts to improve coordination and evaluation of K-12 STEM education programs across the federal government, all of the programs authorized in this conference agreement require evaluation and reporting of program impact.

In addition, the conference agreement highlights the critical role of young investigators working in areas relevant to the mission of DOE by establishing an early career grant program for scientists at both universities and the national labs; and a graduate research fellowship program for outstanding graduate students in these fields. The agreement also brings attention to research and education needs in the nuclear sciences and hydrocarbon systems sciences by establishing programs of grants to universities to establish or expand degree programs in these areas.

Finally, the conference agreement helps DOE recruit distinguished scientists to the national labs and foster collaboration between universities and the labs by providing competitive grants to support joint appointments between the two.

TITLE VI – Department of Education

To enhance teacher education in the STEM fields and critical foreign languages, the conference agreement authorizes two new competitive grant programs. The programs will specifically enable partnerships to implement courses of study in STEM fields and critical foreign language that lead to a baccalaureate degree with concurrent teacher certification and at the graduate level the conference agreement implements 2- or 3-year part-time master's degree programs in these areas for current teachers to improve their content knowledge and pedagogical skills. The conference bill authorizes \$151,200,000 for the baccalaureate degree program and \$125,000,000 for the master's degree program for fiscal year 2008 and the two succeeding fiscal years.

The conference agreement authorizes competitive grants to increase the number of highly qualified teachers serving high-need schools and expand access to AP and IB classes; as well as authorize the Secretary of Education to contract with the National Academy of Sciences to convene a national panel within a year after the enactment of this Act to identify promising practices in the teaching of science, technology, engineering and mathematics in elementary and secondary schools.

The conference agreement authorizes two new grant programs to enhance math education in elementary and middle school mathematics and provides grants to support the following activities to assist states to implement programs for secondary schools and in addition to other best practices and in-service training, the bill provides targeted help to low-income students who are struggling with mathematics. It authorizes appropriations of \$95, 000, 000 for fiscal year 2008 and such sums as may be necessary for each of the two succeeding fiscal years for these two programs.

The conference agreement also authorizes a competitive grant program to increase the number of students studying critical foreign languages, starting in elementary school and continuing through postsecondary education programs.

The conference agreement also authorizes competitive grants to states to promote better alignment of elementary and secondary education with the knowledge and skills needed to succeed in academic credit-bearing coursework in institutions of higher education, in the 21st century workforce and in the Armed Forces. It also authorizes the Secretary of Education to award grants of \$50,000 to three elementary and three secondary schools, with a high concentration of low-income students in each state, whose students demonstrate the largest improvement in mathematics and science.

TITLE VII – National Science Foundation

The conference agreement provides \$22 billion to the National Science Foundation (NSF) over fiscal years 2008 - 2010, putting it on a path to double in approximately 7 years. Particularly strong increases are provided in fiscal year 2008 for K-12 STEM education programs at NSF. These programs, including the Noyce Teacher Scholarship program and the Math and Science Partnerships program will help to prepare thousands of new STEM teachers and provide current teachers with content and pedagogical expertise in their area of teaching.

In addition to providing increased support for programs that address the earliest stages of the STEM workforce pipeline, the conference report will help create thousands of new STEM college graduates, including 2-year college graduates, through increased support for the STEM talent expansion (STEP) program and the Advanced Technological Education (ATE) program.

For those STEM graduates who continue on the path toward academic careers, the conference agreement provides critical support for young, innovative researchers by expanding the graduate research fellowships (GRF) and integrative graduate education and research traineeship (IGERT) programs, strengthening the early career grants (CAREER) program, and creating a new pilot program of seed grants for outstanding new investigators. Such programs have an additional benefit of helping to stimulate high-risk, high-reward research by identifying and taking a chance on the best and brightest young minds.

Finally, the conference agreement includes provisions throughout the bill to help broaden participation in STEM fields at all levels, from kindergarten students through academic researchers. These include several programs of outreach and mentoring for women and minorities, a request for a National Academy of Sciences report to identify barriers to and opportunities for increasing the number of underrepresented minorities in STEM fields, and an emphasis on inclusion of students and teachers from high-needs schools.

TITLE VIII – General Provisions

The conference agreement includes several general provisions related to the purposes of the legislation, but unrelated to any of the agencies above.

Specifically, the agreement requires the Secretary of Commerce report to Congress on the feasibility, cost and potential benefits of establishing a program to collect and study data on export and import of services; expresses a Sense of the Senate that the Securities and Exchange Commission and the Public Company Accounting Oversight Board should promulgate final regulations implementing the section of the Sarbanes-Oxley Act that are designed to reduce burdens on small businesses; directs the Government Accountability Office, after three years, to assess a representative sample of programs under this Act and make recommendations to ensure their effectiveness; expresses a Sense of the Senate that federal funds should not be provided to any organization or entity that advocates against a U.S. tax policy that is internationally competitive; directs a National Academy of Sciences study on the mechanisms and supports needed for an institution of higher education or non-profit organization to develop and maintain a program to provide free access to on-line educational content as part of a degree program, especially in science, technology, engineering, mathematics and foreign languages, without using federal funds; expresses a Sense of the Senate that deemed exports should safeguard U.S. national security and basic research and that the President and the Congress should consider the recommendations of the Deemed Exports Advisory Committee; and lastly, expresses a Sense of the Senate that U.S. decision-makers should take the necessary steps for the U.S. to reclaim the preeminent position in the global financial services marketplace.