



America COMPETES 2010 and the FY2013 Budget

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Summary

The 112th Congress faces several funding decisions that may affect implementation of the America COMPETES Reauthorization Act of 2010 (America COMPETES 2010, P.L. 111-358). Signed on January 4, 2011, this law seeks to improve U.S. competitiveness and innovation by authorizing, among other things, increased federal support for research in the physical sciences and engineering; and science, technology, engineering, and mathematics (STEM) education.

The President's FY2013 budget request seeks increased funding for many America COMPETES 2010 research-related activities but includes few specific requests for the law's STEM education provisions. This approach is consistent with prior legislative and executive actions. The FY2013 request seeks an increase of 4.1% for the so-called "doubling path" accounts at the National Science Foundation (NSF), Department of Energy's (DOE's) Office of Science, and National Institute of Standards and Technology's (NIST's) core laboratory and construction. This growth rate is less than the authorized rate of 6.3% and equal to the FY2012 enacted rate (4.1%). Some legislators have expressed concerns about the feasibility of the doubling effort given the nation's current fiscal challenges.

P.L. 112-175 provides continuing appropriations to federal agencies at the FY2012 funding level plus 0.612% from October 2012 through March 27, 2013. However, the Budget Control Act of 2011 requires automatic funding reductions (or sequestration) at federal agencies beginning in January 2013. Office of Management and Budget estimates of the anticipated sequestration's effect on federal agency budgets suggest that COMPETES Act programs could experience reductions of about 8.2% from FY2012 enacted funding levels.

In the regular appropriations process for FY2013, House and Senate appropriators moved on two of the three annual appropriations bills that typically contain funding for COMPETES Act provisions—Commerce, Justice, Science, and Related Agencies (CJS) and Energy and Water Development (E&W)—before Congress recessed in September. The House has passed its versions of these bills; the Senate has not. **Table 1** includes the FY2013 funding status of selected provisions from America COMPETES 2010, the FY2013 Administration budget request, and from related congressional appropriations proposals.

In brief, the House and Senate bills would increase funding for the doubling path accounts in FY2013, but at a lower rate than in prior years. Proposed growth rates for these accounts are 3.8% (House) and 3.9% (Senate), which correspond to almost a 20-year doubling period. The House and Senate bills disagree about funding for the Advanced Research Projects Agency-Energy (ARPA-E). The House bill provides \$200.0 million for the program while the Senate bill recommends the authorized level of \$312.0 million.

Regarding STEM education, both the House and Senate bills propose the full request for NSF's main education account. If enacted, that funding level would be the account's first increase in two years. The House committee report expresses concern about DOE education activities and recommends reduced funding for some programs. Both the House and Senate bills would provide the requested funding level for the DOE Office of Science's main education and training account.

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On January 4, 2011, President Obama signed P.L. 111-358, the America COMPETES Reauthorization Act of 2010. The law responds to concerns about U.S. competitiveness by, among other things, increasing funding for research in the physical sciences and engineering; and by authorizing certain federal science, technology, engineering, and mathematics (STEM) education programs. America COMPETES 2010 reauthorized selected provisions of the 2007 America COMPETES Act (P.L. 110-69).¹

The purpose of this report is to provide information on the President's FY2013 budget request—and the status of FY2013 congressional appropriations actions—for the agencies, programs, and activities authorized by America COMPETES 2010.² For a broader policy discussion of the America COMPETES Reauthorization Act of 2010, see CRS Report R41819, *Reauthorization of the America COMPETES Act: Selected Policy Provisions, Funding, and Implementation Issues*, by Heather B. Gonzalez. For information about prior year funding for America COMPETES 2007 and 2010, see CRS Report R41906, *America COMPETES 2010: FY2012 Funding and FY2008-FY2011 Funding Summary*, by Heather B. Gonzalez.

The America COMPETES Reauthorization Act of 2010

America COMPETES 2010—like America COMPETES 2007—is designed to “invest in innovation through research and development, to improve the competitiveness of the United States, and for other purposes.”³ In total, America COMPETES 2010 authorizes approximately \$45.6 billion in funding between FY2010 and FY2013 for federal research in the physical sciences and engineering, STEM education, and other programs. Provisions of the law expire at the end of FY2013 unless Congress acts to reauthorize.

Among other things, America COMPETES 2010 increases funding authorizations for the National Science Foundation (NSF), National Institute of Standards and Technology (NIST) laboratories,⁴ and the Department of Energy (DOE) Office of Science (SC); and authorizes new technology transfer and commercialization activities at these agencies. It also authorizes inducement prizes at federal agencies; establishes a loan guarantee program for manufacturers; and establishes a Regional Innovation Program (RIP). In STEM education, America COMPETES 2010 seeks to provide greater coordination of federal STEM education programs, authorizes support for academic programs that provide teacher certification concurrent with a bachelors degree in a STEM field, and repeals certain unfunded STEM education programs.

¹ The full title of the America COMPETES Act is the “America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act.” This report refers to the America COMPETES Reauthorization Act of 2010 as “America COMPETES 2010” and to the America COMPETES Act as “America COMPETES 2007”; and refers to both America COMPETES 2010 and America COMPETES 2007 as “America COMPETES 2007 and 2010” or as “both COMPETES Acts.”

² Numbers reported are rounded, therefore small inconsistencies may occur in some cases.

³ P.L. 111-358, Purpose.

⁴ NIST is part of the U.S. Department of Commerce.

America COMPETES 2010 is an authorization measure. New programs—and funding increases for existing programs—authorized by the law will not be established or realized unless funded by an appropriations act.

The President's FY2013 Budget Request

Two central policy contributions of America COMPETES 2010 are the so-called “doubling path” policy for targeted accounts at the NSF, NIST laboratories, and the DOE Office of Science; and the authorization of STEM education activities at various federal agencies.⁵ The President's FY2013 budget request increases funding for the targeted accounts (albeit at a lower-than-authorized rate)⁶ but includes support for few America COMPETES 2010 authorized STEM education programs. In this regard the President's FY2013 budget request is generally consistent with prior year requests and appropriations activity for both COMPETES Acts.

Of the new programs with defined funding authorizations in America COMPETES 2010,⁷ only the Regional Innovation Program (RIP) at the Department of Commerce is specifically included in the FY2013 budget request.⁸ The President does not appear to seek funding for the program provisions of the NIST Green Jobs Act, Federal Loan Guarantees for Innovative Technologies in Manufacturing, or the STEM-Training Grant program, which were also established by America COMPETES 2010. America COMPETES 2010 also authorizes new programs without providing a defined funding amount. One example of this type of authorization is the Green Chemistry Basic Research program at NSF. The FY2013 budget request includes funding for a green chemistry program at NSF.

The following section discusses the President's FY2013 budget request for programs and agencies authorized by America COMPETES 2010 in greater detail.

Research

This section highlights the Administration's FY2013 requests for selected agencies and programs included in America COMPETES 2010 and examines the budgetary status of the doubling path target accounts.

National Science Foundation

President Obama's FY2013 budget request for the NSF's Research and Related Activities (R&RA) account—which is the primary source of research funding at the Foundation—is \$5.983

⁵ For more information on the doubling path policy see, CRS Report R41951, *An Analysis of Efforts to Double Federal Funding for Physical Sciences and Engineering Research*, by John F. Sargent Jr.

⁶ Neither COMPETES Act specifies a compound annual growth rate (CAGR or “growth rate”), as such. To help Congress evaluate the effect of various funding proposals or authorizations on targeted accounts, CRS calculates the CAGR implicit in the budget request, authorization, or appropriation by comparing each to the baseline year (2006). The CAGR is used to calculate the number of years required for a doubling from the baseline.

⁷ A “defined” funding authorization includes a specific funding level or amount, such as \$4.0 million. Defined appropriations may be contrasted with funding levels that are not defined, such as “such sums as may be necessary” or program provisions that do not include an authorized funding level at all.

⁸ This includes both the RIP program as a whole and the science park infrastructure loan component.

billion. This amount is \$294.3 million (5.2%) more than the FY2012 estimated level of \$5.689 billion, and \$654.5 million (9.9%) less than the COMPETES 2010 authorized amount of \$6.638 billion.⁹

The President's budget request for R&RA includes specific funding for two America COMPETES 2010 programs—the Experimental Program to Stimulate Competitive Research (EPSCoR) and Partnerships for Innovation (PFI) programs. America COMPETES 2010 reauthorizes but does not specify funding levels for these two programs. The President requests \$158.2 million for EPSCoR, or \$7.3 million more than the FY2012 estimate of \$150.9 million.¹⁰ The FY2013 NSF budget request states that the National Academy of Science is studying NSF's EPSCoR programs in accordance with Section 517 of America COMPETES 2010. Findings are expected in late 2013. The FY2013 request for PFI is \$8.2 million, or \$200,000 more than the FY2012 estimate of \$8.0 million. NSF indicates that it intends to dedicate the requested \$200,000 increase to the Building Innovation Capacity track, which funds partnerships between academic researchers and small businesses.¹¹

Section 509 of America COMPETES 2010 directs NSF to establish a Green Chemistry Basic Research program. In response to these provisions, the FY2013 NSF budget request includes funding for a new Sustainable Chemistry, Engineering and Materials (SusCHEM) program as part of NSF's Science, Engineering, and Education for Sustainability (SEES) portfolio. The President seeks \$76.7 million in FY2013 for SusCHEM and four other new related SEES programs.¹²

In FY2013 the NSF intends to emphasize the new "OneNSF Framework," which seeks to enable "seamless operations across organizational and disciplinary boundaries."¹³ Although the OneNSF Framework applies across all NSF directorates, most of the OneNSF Framework priorities are funded in the R&RA account. Other NSF-wide priorities include clean energy, advanced manufacturing, multidisciplinary research, and STEM education and workforce. The FY2013 NSF budget proposes \$67.0 million in research program terminations, including reductions in Computer and Information Science and Engineering (CISE), Cyber-enabled Discovery and Innovation (CDI), Mathematics and Physical Sciences (MPS), Nanoscale Science & Engineering

⁹ FY2012 funding levels in the *FY2013 NSF Budget Request to Congress* are as estimated, not enacted. Congress typically appropriates to NSF at the major account level. Funding levels for sub-accounts included in the budget request are therefore generally what NSF estimates it will provide. The FY2012 estimated amount for R&RA also excludes a one-time transfer of \$30.0 million to the Major Research Equipment and Facilities Construction (MREFC) account as authorized by P.L. 112-55.

¹⁰ For more information on the EPSCoR program, see CRS Report RL30930, *U.S. National Science Foundation: Experimental Program to Stimulate Competitive Research (EPSCoR)*, by Christine M. Matthews.

¹¹ More information about the PFI program is available at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504708&org=IIP&from=home.

¹² The FY2012 request for SEES was \$998.2 million. This amount was \$337.5 million (51.1%) more than the annualized FY2011 level of \$660.7 million as reported in the *FY2012 NSF Budget Request to Congress*. The total request for SEES in FY2013 is \$202.5 million, which is less than a third of the FY2011 annualized level and a fifth of the FY2012 request. NSF attributes the large differences between the FY2011-FY2013 SEES funding levels to accounting changes. Specifically, the NSF says that SEES "has requested \$202.50 million in FY 2013, an increase of \$45.50 million over the comparable FY2012 Current Plan total of \$157.0 million. The SEES program was re-baselined in FY2012 to reflect more stringent criteria for investments, including strong requirements for interdisciplinarity and systems-based research, including social and economic aspects. All SEES programs established after FY2010 are included in the re-baselined SEES, while legacy programs are excluded." E-mail communication between CRS and NSF Senior Legislative Policy Analyst Karen Pearce, March 7, 2012.

¹³ National Science Foundation, *FY2013 Budget Request to Congress*, February 13, 2012, p. Overview-3, <http://www.nsf.gov/about/budget/fy2013/index.jsp>.

Centers (NSECs), and public outreach.¹⁴ The NSF FY2013 budget request describes these programs as either duplicative or obsolete (either because the program has achieved its original goals or as a result of maturation in the field).

In September 2012, NSF announced its intention to realign some of its research-related programs beginning on October 1, 2012. The Foundation plans to move two programs from the Office of the Director to the research directorates. The Office of Cyberinfrastructure is to become a division within the Directorate for Computer and Information Sciences, and the Office of Polar Programs is slated to become a division within the Directorate for Geosciences. The NSF also seeks to merge two other offices, the Office of International Science and Engineering and the Office of Integrative Activities, into the Office of International and Integrative Activities.¹⁵ It is not yet clear how these changes will affect research and activities in these fields.

Department of Energy, Office of Science

The President's FY2013 budget request for the **DOE Office of Science** is \$4.992 billion. This funding level is \$118.4 million (2.4%) more than the FY2012 enacted level of \$4.874 billion and \$1.009 billion (16.8%) less than the authorized level in America COMPETES 2010 (\$6.001 billion). The President also seeks \$350.0 million for the ARPA-E account at DOE, which is \$75.0 million (27.3%) more than the FY2012 enacted level of \$275.0 million and \$38.0 million (12.2%) more than the amount authorized in America COMPETES 2010 (\$312.0 million).

National Institute of Standards and Technology

At **NIST**, the President seeks a total of \$857.0 million in FY2013. This funding level is \$106.2 million (14.1%) more than the FY2012 enacted level of \$750.8 million and \$182.7 million (17.6%) less than the authorized level of \$1.040 billion. Within the NIST budget, the President requests \$648.0 million, or \$81.0 million (14.3%) more than the FY2012 enacted level of \$567.0 million and \$28.7 million (4.2%) less than authorized level of \$676.7 million, for the Scientific and Technology Research and Services (STRS) account. The President also seeks \$60.0 million, or \$4.6 million (8.3%) more than the FY2012 enacted level of \$55.4 million and \$61.3 million (50.5%) less than the authorized amount of \$121.3 million, for Construction of Research Facilities (CRF) account. Within NIST's Industrial Technology Services (ITS) account (\$149.0 million total request), the Administration requested \$128.0 million for the Hollings Manufacturing Extension Partnership (MEP), which is \$400,000 less than the FY2012 enacted amount; and seeks no funding for the Baldrige Performance Excellence program, which is the same as the FY2012 enacted levels. The President does not specifically request FY2013 funds for activities authorized by the NIST Green Jobs Act.

The Doubling Path

The President's FY2013 budget request states that the Administration seeks to continue the so-called "doubling path" policy in FY2013. First initiated in FY2006, Congress and successive

¹⁴ The public outreach programs slated for termination in FY2013 are Communicating Science Broadly and Connecting Researchers with Public Audiences. Communicating Science Broadly is an R&RA program. Connecting Researchers with Public Audiences is an Education and Human Resources (E&HR) program.

¹⁵ National Science Foundation, "National Science Foundation Realignment Plans," press release, September 7, 2012.

Administrations have sought to double funding for the NSF, Department of Energy's Office of Science, and National Institute of Standards and Technology's core laboratory and construction accounts (collectively "the targeted accounts").¹⁶ Under current authorizations for FY2011 to FY2013, targeted account funding levels would have increased at a compound annual growth rate of 6.3%, a pace that would have resulted in doubling in approximately 11 years.¹⁷ However, appropriations in FY2011 and FY2012 for the targeted accounts increased at rates of 4.6% and 4.1%, respectively (about an 18-year doubling pace). Although the President's FY2012 budget request initially sought funding for targeted accounts consistent with a 12-year doubling period (about 6.0% growth rate), the September 1, 2011, *Mid-Session Review* stated that the doubling goal would need to be delayed. The President's FY2013 budget request once again asserts support for the doubling path policy, but seeks an overall increase of 4.1% for the targeted accounts. This growth rate is closer to FY2012 enacted appropriations of 4.1% than to the authorized growth rate of 6.3%. Some legislators have raised concerns about pursuing the doubling effort given the nation's current fiscal challenges, including one who urged observers "to be realistic about the notion of doubling the NSF budget" in FY2013.¹⁸

STEM Education

The President's FY2013 STEM education request primarily targets two central groups: STEM graduates and STEM teachers. The FY2013 budget request establishes a new "government-wide goal to increase, over the next decade, the number of well-prepared college graduates with STEM degrees by one-third, or one million" and continues the Administration's previous commitment to prepare 100,000 STEM teachers over the next decade (the so-called "100Kin10" initiative).¹⁹ To achieve these goals, the President's FY2013 budget request seeks program and funding changes to some existing America COMPETES 2010 authorized programs and agencies.²⁰ The President's FY2013 budget does not appear to include specific requests for new STEM education programs authorized by America COMPETES 2010, such as the STEM-Training Grant Program.

National Science Foundation

The primary source of funding for STEM education activities at NSF is the Education and Human Resources (E&HR) account.²¹ The President seeks \$875.6 million for E&HR in FY2012.

¹⁶ For an analysis of the doubling effort that includes historic trends, see CRS Report R41951, *An Analysis of Efforts to Double Federal Funding for Physical Sciences and Engineering Research*, by John F. Sargent Jr.

¹⁷ As authorized by the America COMPETES Reauthorization Act of 2010 (P.L. 111-358).

¹⁸ Opening Statement of Ranking Member Dan Lipinski, in U.S. Congress, House Committee on Science, Space, and Technology, Subcommittee on Research and Science Education, "The National Science Foundation's FY2013 Budget Request," hearings, 112th Cong., 2nd sess., February 28, 2012, <http://democrats.science.house.gov/sites/democrats.science.house.gov/files/documents/DWL%20Opening%20Statement%20NSF%20FY13%20Budget.pdf>.

¹⁹ See Executive Office of the President, Office of Science and Technology Policy, "Preparing a 21st Century Workforce: Science, Technology, Engineering, and Mathematics (STEM) Education in the 2013 Budget," press release, February 13, 2012, p. 1, http://www.whitehouse.gov/sites/default/files/microsites/ostp/fy2013rd_stem.pdf.

²⁰ America COMPETES 2010 directed the National Science and Technology Council to develop a STEM education strategic plan. Although Administration officials have stated that the strategic plan will be published in the spring of 2012, the FY2013 budget request appears to anticipate at least parts of the Administration's plan by prioritizing certain policy strategies (e.g., increasing the number of STEM graduates) and establishing long-term objectives.

²¹ The NSF Research and Related Activities account also supports some STEM education activities. For more information on STEM education funding at NSF, see CRS Report R42470, *An Analysis of STEM Education Funding at the NSF: Trends and Policy Discussion*, by Heather B. Gonzalez.

This amount is \$46.6 million (5.6%) more than the FY2012 enacted level of \$829.0 million and \$166.2 million (16.0%) less than America COMPETES 2010 authorized level of \$1.042 billion.

The FY2013 NSF budget request highlights certain NSF-wide and E&HR-specific proposals for STEM education. NSF-wide efforts center on the planned new Expeditions in Education (E²) initiative, which would “address a challenge in STEM learning or education using current or emerging areas of science.”²² E² is a \$49.0 million co-funded initiative that would be supported through contributions from various Research and Related Activities (R&RA) accounts (\$28.5 million) and from E&HR (\$20.5 million). The FY2013 NSF request also seeks increased co-funding for the Graduate Research Fellowship (GRF) program. The FY2013 request for the GRF is \$243.0 million, which is \$45.0 million (22.7%) more than the FY2012 estimate of \$198.1 million. About half of the funding for the GRF in FY2013 would come from R&RA, up from 7.4% in FY2009.²³ NSF anticipates that the increased funding will provide for 2,000 new fellows in FY2013 (8,900 total) at a cost of education (COE) level of \$12,000 per fellow. NSF asserts that the FY2013 COE level is consistent with America COMPETES 2010.²⁴

Other major E&HR initiatives in FY2013 include increased coordination with the Department of Education (ED) on the Mathematics and Science Partnership (MSP) program, on STEM education research, and on a proposed K-16 mathematics education program. E&HR and ED would jointly fund the new \$60.0 million K-16 mathematics program. E&HR contributions would come from the Discovery Research K-12 (DR-K12) program and from the Transforming Undergraduate Education in STEM (TUES) program.²⁵ Finally, the FY2013 request for E&HR would “reframe” E&HR programs and activities such that each division’s programs and activities would align with one of three new categories of activity (e.g., core research and development investments, leadership investments, and expedition investments). The Administration seeks \$20.0 million in new funding (\$5.0 million for each E&HR division) for a so-called “Core Launch Fund” to support the reframing.

The FY2013 NSF budget request includes funding for existing STEM education programs authorized under America COMPETES 2010, but for which the act does not specify funding levels. These include the Integrative Graduate Education and Research Traineeship (IGERT), the Robert Noyce Teacher Scholarship (Noyce) program, Research Experiences for Undergraduates (REU), and the STEM Talent Expansion Program (STEP), among others. The Administration’s FY2013 requests for these programs are \$52.0 million for IGERT (13.6% below FY2012), \$54.9 million for Noyce (same as FY2012), \$68.4 million for REU (3.7% over FY2012), and \$17.3 million for STEP (31.6% less than FY2012).

Both America COMPETES 2007 and 2010 authorize an NSF program to support Hispanic-serving institutions (HSIs). Section 7033 of America COMPETES 2007 directed NSF to establish

²² National Science Foundation, *FY2013 Budget Request to Congress*, February 13, 2012, p. NSF-Wide Investments-15, <http://www.nsf.gov/about/budget/fy2013/index.jsp>.

²³ From FY2004 to FY2009 R&RA contributions to GRF were approximately 7%-8% of the GRF total. In FY2010, R&RA contributions increased to about 25%.

²⁴ National Science Foundation, *FY2013 Budget Request to Congress*, February 13, 2012, p. NSF-Wide Investments-68, <http://www.nsf.gov/about/budget/fy2013/index.jsp>.

²⁵ The reductions to TUES may be partially off-set by E&HR and R&RA contributions to the proposed E² initiative project, Transforming Undergraduate STEM Learning through Science and Engineering (TUSLSE). According to the NSF, the TUSLSE initiative builds on TUES and other NSF undergraduate programs. Both TUSLSE and TUES appear to have similar goals.

a program for HSIs. Section 512 of America COMPETES 2010 directs the NSF to maintain its HSI program—and all other minority-serving institution (MSI) programs, such as the Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)—as separate programs.²⁶ Although the FY2013 budget request appears to maintain existing NSF MSI programs separately, NSF has not established an HSI-specific program. The FY2013 request lists “research to examine the particular STEM student and institutional capacity needs in Hispanic-serving institutions”²⁷ as one of the emphases of the Division of Human Research Development within E&HR, but does not otherwise specifically mention HSIs.²⁸

Department of Education

The President’s FY2013 budget request for the Department of Education (**ED**) proposes to reorganize the department (as previously proposed in the FY2011 and FY2012 requests).²⁹ The proposed reorganization would eliminate and consolidate certain programs, including America COMPETES 2010 programs.³⁰ For example, under the reorganization plan, both the Teachers for a Competitive Tomorrow (TCT) and Advanced Placement (AP) programs would be eliminated and their program functions absorbed into the newly created Teacher and Leader Pathways (TLP)³¹ and College Pathways and Accelerated Learning (CPAL)³² programs, respectively.³³

The status of both the TCT and AP programs, as authorized by the COMPETES Acts, is unclear. Congress has not funded the TCT program since FY2010, and the President’s FY2013 ED request for higher education does not specify funding for the program. Although ED operates an AP program, it does so under the authority of the Elementary and Secondary Education Act of 1965, as amended by No Child Left Behind (ESEA, P.L. 107-110), not under the authority of either COMPETES Act. The AP programs authorized by ESEA and COMPETES are substantively different, though they share some features. As such, it is unclear if the AP program at ED complies with the AP program authorized by the COMPETES Acts. The FY2013 ED request for CPAL, including the AP program authorized by ESEA, is \$81.0 million. Of this amount, \$24.1

²⁶ NSF previously proposed consolidating its minority-serving institution programs. Congressional authorizers and appropriators both rejected that proposal.

²⁷ National Science Foundation, *FY2013 Budget Request to Congress*, February 13, 2012, p. EHR-1, <http://www.nsf.gov/about/budget/fy2013/index.jsp>.

²⁸ Other federal agencies with HSI programs include the National Aeronautics and Space Administration (NASA) and ED. NASA seeks \$30.0 million in FY2013 (same as FY2012) for its Minority University Research and Education Program (MUREP), which includes funding for HSIs. The FY2013 ED budget request for HSIs is \$220.9 million. (No change from FY2012.) Of this amount, \$100.0 million in mandatory funds would support 111 non-competing continuation awards under the HSI STEM and Articulation program.

²⁹ Congress must authorize this reorganization for it to take effect. The FY2011 and FY2012 appropriations to ED retained the existing department structure and organization. Legislative debate about the President’s proposal has continued in the context of the proposed reauthorization of the Elementary and Secondary Education Act of 1965, as amended by the No Child Left Behind Act (P.L. 107-110). That debate began in the 111th Congress and continues in the 112th.

³⁰ For more information, see CRS Report R41355, *Administration’s Proposal to Reauthorize the Elementary and Secondary Education Act: Comparison to Current Law*, by Rebecca R. Skinner et al.

³¹ TLP includes funding for five existing programs: Transition to Teaching, Teacher Quality Partnership, Teachers for a Competitive Tomorrow, Teach for America, and School Leadership.

³² CPAL includes funding for three existing programs: the High School Graduation Initiative, Advanced Placement, and Javits Gifted and Talented Education.

³³ It is not clear how the Department of Education would operate these merged programs or what their future functional relationship would be compared to the current separate programs.

million would go to the advanced course test fee component of the AP program. The FY2012 enacted funding level for the ESEA authorized AP program is \$26.9 million.³⁴

Department of Energy

DOE does not typically request funding for America COMPETES Act authorized STEM education programs. However, the department says it operates programs that correspond with its responsibilities under the law.³⁵ Among these is the DOE Office of Science (SC), Science Graduate Fellowship (SCGF) program, which the department asserts is one of two fellowships that correspond with the Protecting America's Competitive Edge (PACE) graduate fellowship program.³⁶ The President's FY2013 request for DOE includes no funding for SCGF. This is consistent with FY2012 congressional appropriations actions. For example, House Committee on Appropriations FY2012 DOE appropriations report language directed SC to "justify to the Committee why fellowships should be funded within the Office of Science when other agencies, in particular the National Science Foundation, are the primary federal entities for such purposes."³⁷ Final enacted funding for SCGF in FY2012 was \$5.0 million, which was to support a third year of funding for the FY2010 cohort of fellows. No funding was provided for new fellows.

DOE also asserts that the Academies Creating Teacher Scientists (DOE ACTS) program corresponds with the Summer Institutes program and that the SC Early Career Research Program corresponds with the Early Career Awards program. (America COMPETES 2010 reauthorized both the Summer Institutes and Early Career Awards programs.) In accordance with the recommendations of a 2010 DOE Committee of Visitors report, the President terminated DOE ACTS in the FY2012 budget request.³⁸

According to the DOE, each of the six SC research programs supports Early Career Research Program awards out of their core research program offices. DOE representatives state that "Office of Science support for Early Career Research awards is approximately \$16.0 million per year."³⁹ CRS identified one specific request for the SC Early Career Research Program in the FY2013 SC budget request. That specific request is in the Fusion Energy Sciences budget in the "Other" sub-account. (The other SC research program offices do not specify funding for Early Career Research program awards.) In FY2012, enacted funding for the Fusion Energy Sciences "Other" sub-account was \$11.9 million. These funds supported the SC Early Career Research, Historically

³⁴ The President's FY2013 ED budget request contains other STEM education items that, while not authorized by either COMPETES Act, may interest COMPETES analysts. For more information on these proposals, go to: <http://www2.ed.gov/about/overview/budget/budget13/crosscuttingissues/stemed.pdf>.

³⁵ Telephone and e-mail communications between the author and Jane Wise, special assistant, Office of Congressional and Intergovernmental Affairs, U.S. Department of Energy, March 21, 2012, identified programs in the FY2013 DOE budget request that correspond with DOE's STEM education responsibilities under America COMPETES 2010.

³⁶ The second fellowship program that DOE has identified as consistent with PACE is the Computational Science Graduate Fellowship (CSGF) in the Office of Science, Advanced Scientific Computing Research. The FY2013 request for CSGF is \$6.0 million. PACE was authorized and reauthorized by the COMPETES Acts.

³⁷ H.Rept. 112-118, p. 114. DOE states that it is preparing a 10-year plan for the SCGF program, as directed by the House Committee on Appropriations. Funding for SCGF was \$8.0 million in FY2011.

³⁸ U.S. Department of Energy, *Report of the Committee of Visitors of the Office of Workforce Development for Teachers and Scientists (WDTS) in the Department of Energy*, May 17-19, 2010, http://science.energy.gov/~media/bes/besac/pdf/Wdts_cov_2010_f.pdf.

³⁹ E-mail communications between the author and Jane Wise, special assistant, Office of Congressional and Intergovernmental Affairs, U.S. Department of Energy, March 21, 2012.

Black Colleges and Universities (HBCU), and summer internships for undergraduates programs. The FY2013 request for the Fusion Energy Sciences “Other” sub-account is \$9.2 million. This amount is \$2.7 million, or 22.7%, less than the FY2012 enacted amount for this account.⁴⁰

Finally, in FY2012 the Senate Committee on Appropriations urged SC to consider redirecting funds from terminated education programs to the Distinguished Scientist Program authorized by the COMPETES Acts. The President’s FY2013 request for SC does not include funding for this program, which DOE has not initiated.

Other Provisions

The President’s FY2013 budget requests funding for other America COMPETES 2010 provisions as well—including \$25.0 million for the new RIP program at the Department of Commerce’s (DOC) Economic Development Administration (EDA). Of this amount, the President seeks \$7.0 million for the Science Park Infrastructure Loan Guarantee program, which America COMPETES 2010 authorized as a separate component of the RIP program. The Administration’s FY2013 budget request does not appear to include specific funding for the new Federal Loan Guarantees for Innovative Technologies in Manufacturing program at the Department of Commerce or for the activities authorized by the NIST Green Jobs Act of 2010, both of which were authorized by America COMPETES 2010. FY2012 funding for the DOC included \$5.0 million each for the science park and manufacturing loan guarantee programs and encouraged EDA to support RIP activities through the Economic Adjustment Assistance account.⁴¹

FY2013 Congressional Action

Funding for America COMPETES 2010 programs and agencies is typically included in three appropriations acts:⁴²

- *Commerce, Justice, Science, and Related Agencies* (CJS), for NSF, NIST, and other Department of Commerce programs;⁴³
- *Energy and Water Development* (Energy-Water), for DOE programs; and⁴⁴
- *Labor, Health and Human Services, Education, and Related Agencies* (Labor-HHS-Education), for ED programs.⁴⁵

As appropriations measures typically include a variety of provisions and programs, this section focuses on funding provisions that relate most closely to policies, programs, agencies, and

⁴⁰ Authorized funding for the Early Career Awards program is \$25.0 million in FY2013. Information about the Early Career Research program is available at <http://science.energy.gov/early-career/>.

⁴¹ H.Rept. 112-184, p. 216, and P.L. 112-55 (125 Stat. 592).

⁴² For more information on the appropriations process, see CRS Report R42388, *The Congressional Appropriations Process: An Introduction*, by Jessica Tollestrup.

⁴³ CRS Report R41721, *Commerce, Justice, Science, and Related Agencies: FY2012 Appropriations*, coordinated by Nathan James, Jennifer D. Williams, and John F. Sargent Jr.

⁴⁴ CRS Report R41908, *Energy and Water Development: FY2012 Appropriations*, coordinated by Carl E. Behrens.

⁴⁵ CRS Report R42010, *Labor, Health and Human Services, and Education: FY2012 Appropriations*, coordinated by Karen E. Lynch.

activities specifically authorized by America COMPETES 2010. **Table 1** summarizes the FY2013 appropriations status of these selected provisions. This section will be updated as the House and Senate consider their respective America COMPETES 2010-related appropriations measures.

Continuing Resolution and Sequestration

On September 28, 2013, the President signed P.L. 112-175 (Continuing Appropriations Resolution, 2013) The new law provides interim (or “continuing”) appropriations to federal agencies at FY2012 levels plus 0.612% through March 27, 2013. P.L. 112-175 also requires specified federal agencies to provide the House and Senate appropriations committees with

- a six-month spending plan based on the funding levels in P.L. 112-175; and,
- agencies must provide the appropriations committees with a spending plan that reflects the impact of budgetary changes, if adjustments must be made to agency budgets as a result of the anticipated sequestration (see below).

Concerns about the potential effects of anticipated automatic and largely across-the-board federal budget cuts (also known as “sequestration”) overlie the FY2013 congressional budget debate.⁴⁶ In August 2012, Congress passed the Sequestration Transparency Act of 2012 (P.L. 112-155), which directed the President to, among other things, report to Congress on the potential budgetary effects of sequestration. The Office of Management and Budget (OMB) issued that report on September 14, 2012—noting that the findings were preliminary.⁴⁷ Based on the estimates in the OMB September report, the anticipated sequestration could potentially reduce discretionary sequestrable budget authority in most COMPETES Acts accounts by approximately 8.2%.

Regular Appropriations

Commerce, Justice, Science, and Related Agencies

The House passed H.R. 5326 (Commerce, Justice, Science, and Related Agencies Appropriations Act, 2013) by a vote of 247-163 on May 10, 2012. The act provides FY2013 appropriations for the DOC (including NIST), NSF, and other CJS agencies.

The Senate Committee on Appropriations reported a bill to provide FY2013 CJS appropriations on April 19, 2012 (S.Rept. 112-158, S. 2323). That measure has not passed the full Senate.

This section compares funding levels in H.R. 5326 (as passed by the House) and H.Rept. 112-463 (which accompanied H.R. 5326), with the Senate Committee on Appropriations’ recommendations, selected FY2012 enacted or estimated appropriations, FY2013 Administration

⁴⁶ The Budget Control Act of 2011 (P.L. 112-25) included provisions to automatically reduce, or “sequester,” federal budgets. This largely across-the-board reduction is scheduled to occur on January 2, 2013. For more information about sequestration, see CRS Report R42050, *Budget “Sequestration” and Selected Program Exemptions and Special Rules*, coordinated by Karen Spar.

⁴⁷ Findings in the OMB report were based on FY2012 funding levels and do not reflect FY2013 funding levels as provided in the continuing resolution. Executive Office of the President, Office of Management and Budget, *OMB Report Pursuant to the Sequestration Transparency Act of 2012* (P.L. 112-155), September 2012, http://www.whitehouse.gov/sites/default/files/omb/assets/legislative_reports/stareport.pdf.

budget requests, and FY2013 America COMPETES 2010 funding authorizations. Policy provisions in H.Rept. 112-463 and S.Rept. 112-158 that relate to specific America COMPETES 2010 authorizations are also noted herein.

Department of Commerce

NIST. H.R. 5326 would provide \$830.6 million to NIST in FY2013. This amount is \$4.6 million (0.6%) more than the Senate Committee on Appropriations recommendation of \$826.0 million. It is \$79.8 million (10.6%) more than the FY2012 enacted level of \$750.8 million, \$26.4 million (3.1%) less than the President's FY2013 request for \$857.0 million, and \$209.1 million (20.1%) less than the \$1.040 billion authorized in America COMPETES 2010. H.R. 5326 provides \$128.4 million for the MEP program in FY2013. This amount is the same as the FY2012 enacted level and slightly less than the \$128.5 million that the Senate Committee on Appropriations recommends.

Regional Innovation Program (RIP) and Innovative Technologies in Manufacturing.

America COMPETES 2010 authorized two regional economic development programs at the EDA: RIP, which includes funding for loan guarantees for science parks, and the Federal Loan Guarantees for Innovative Technologies in Manufacturing program (hereinafter called the "manufacturing loan guarantee program"). H.R. 5326 would authorize unspecified funding for the RIP and would provide up to \$5.0 million for the manufacturing loan guarantee program. S. 2323 and S.Rept. 112-158 would provide \$25.0 million for RIP, including up to \$7.0 million for loan guarantees for science parks, but do not specify funding for the manufacturing loan guarantee program. Senate provisions are consistent with the President's FY2013 request.⁴⁸ FY2012 enacted funding provides up to \$5.0 million each for both the RIP and manufacturing loan guarantee programs and caps the total guaranteed loan principal for both programs at \$70.0 million. Provisions in the House committee report direct EDA to provide details of its efforts to implement the manufacturing loan guarantee program with its FY2014 budget request. Provisions in the Senate committee report direct EDA to continue providing grants and technical assistance to entities supporting clean energy technology commercialization; to consider new competitions in industries not previously targeted; and to consider geographic equity when making award decisions.

National Science Foundation

Top Line Allocations. As passed by the House and recommended by the Senate Committee on Appropriations, FY2013 funding for the NSF would be identical in five of six major NSF accounts. A \$59.4 million difference in funding for the main research account leads to an equivalent difference between the two top lines, but other than that, the House and the Senate Committee on Appropriations agree on major funding levels for the NSF in FY2013. At the top line, the full House and Senate committee proposed funding levels for NSF are between \$40.6 and \$100.0 million less than the President's request and between \$240.0 and \$299.4 million more than the FY2012 estimate. All three proposals (House full, Senate committee, and President's request) are about \$1.0 billion less than the amount authorized by America COMPETES 2010. (See **Table 1** for details.) NSF-wide provisions in the Senate committee report direct NSF to

⁴⁸ The FY2013 request and S.Rept. 112-158 refer to the Regional Innovation Program authorized under COMPETES 2010 as the "Regional Innovation Strategies Program."

report on its progress implementing and responding to various Office of the Inspector General reports and recommendations. An NSF-wide amendment adopted during House floor debate (H.Amdt. 1088) would eliminate funding for NSF's Climate Change Education program.

Research Funding. H.R. 5326 would provide \$5.943 billion for NSF's main research account, Research and Related Activities (R&RA), in FY2013. This amount is \$59.4 million (1.0%) more than the Senate Committee on Appropriations recommendation of \$5.883 billion. It is also \$253.7 million (4.5%) more than the FY2012 estimate of \$5.689 billion, \$40.6 million (0.7%) less than the President's FY2013 request for \$5.983 billion, and \$695.1 million (10.5%) less than the \$6.638 billion authorized in America COMPETES 2010. An amendment adopted during House floor debate (H.Amdt. 1094) would eliminate funding for political science research at NSF.

Research provisions in the House committee report direct NSF to give priority to research in the following fields: cybersecurity; advanced manufacturing; materials research; and research in the natural and physical sciences, mathematics, and engineering. Other provisions from the House committee report direct i-Corps participants to commit to the domestic production of goods or services commercialized with NSF assistance, encourage the Foundation to establish neuroscience as a cross-cutting budget theme, require NSF to report on plans to recompute certain major facilities awards, and require NSF to report on interdisciplinary activities at NSF-funded research facilities.

Research provisions in the Senate committee report direct NSF to reduce funding for new OneNSF activities and focus on core programs and infrastructure. Other research provisions in the Senate committee report provide the full request—\$244.6 million (\$161.9 of which is reserved for infrastructure)—for the astronomical sciences; provide funding for the Large Synoptic Survey Telescope; and encourage NSF to allocate adequate funding for domestic radio astronomy facilities while the Atacama Large Millimeter Array transitions to full operation.⁴⁹ The Senate committee report also provides funding for cybersecurity security research (\$161.0 million) and the Academic Research Fleet (\$927.8 million), and supports full funding for scientific facilities and instrumentation. EPSCoR, which was reauthorized by America COMPETES 2010, would receive \$158.0 million under the Senate committee proposal. (This amount is slightly less than the FY2013 request for \$158.2 million and \$7.3 million more than the FY2012 estimate of \$150.9 million.)

STEM Education. The House and the Senate Committee on Appropriations agree on funding levels for NSF's main education account, Education and Human Resources (E&HR), in FY2013. Both legislative bodies propose \$875.6 million for E&HR in FY2013. This amount is equal to the President's budget request, \$46.6 million (5.6%) over the FY2012 estimate of \$829.0 million, and \$166.2 million less than the America COMPETES 2010 authorized level of \$1.042 billion.

STEM education provisions in the House committee report incorporate NSF's proposed program reductions; direct the foundation to continue work on a tracking and evaluation system to assess implementation of the National Research Council report on best practices in STEM education;

⁴⁹ In August 2012, the Portfolio Review Committee of the National Science Foundation Division of Astronomical Sciences released a report with recommendations for ground-based astronomy in the United States. See National Science Foundation, Division of Astronomical Sciences, Portfolio Review Committee, *Advancing Astronomy in the Coming Decade: Opportunities and Challenges*, August 14, 2012, http://www.nsf.gov/mps/ast/portfolioreview/reports/ast_portfolio_review_report.pdf.

and accept proposed changes to the Informal Science Education (ISE) program, but encourage NSF to work with stakeholders as it transitions ISE toward activities intended to increase focus on innovative learning and engagement strategies. The House committee report also encourages NSF to use existing resources to promote collaboration between research institutions and STEM-focused K-12 schools.

The Senate committee report encourages NSF to continue support for undergraduate science and engineering education; rejects the Administration's proposed cuts to the ISE program; urges NSF to ensure that GRF applications are reviewed on their merit, and not rejected for reasons other than the quality of the proposal;⁵⁰ and directs NSF to fund the Research in Disabilities Education and Research on Gender in Science and Engineering programs at FY2012 levels and to maintain them as separate programs. S.Rept. 112-158 also provides the following amounts for the following programs: the full request (\$64.0 million) for the Advanced Technological Education program, the FY2012 enacted level of \$54.9 million for the Noyce program, and \$45.0 million (\$20.0 million more than the request) for the Federal Cyber Service: Scholarships for Service program.

Broadening Participation. The House committee report provides the FY2013 request for NSF's Historically Black Colleges and Universities Undergraduate Program (HBCU-UP, \$31.9 million), the Louis Stokes Alliances for Minority Participation (Stokes, \$45.6 million) program, and the Tribal Colleges and Universities Program (TCUP, \$13.3 million). These amounts are equal to the FY2012 estimated levels for these programs. The Senate committee report provides \$33.0 million for HBCU-UP, \$47.8 million for the Stokes program, and \$13.4 million for TCUP. Additionally, the Senate committee report provides \$25.0 million for the Centers for Research Excellence in Science and Technology (CREST) program. The FY2012 estimate for CREST is \$24.2 million.

Provisions in the House committee report direct NSF to report on how the needs of Hispanic Serving Institutions (HSIs) will be addressed in FY2013 and on any plans to establish an HSI-focused program in FY2014. Provisions in the Senate committee report encourage NSF to prioritize proposals that have "demonstrated maturity, including previous partnerships with other federal agencies."⁵¹

Energy and Water Development

The House passed H.R. 5325 (Energy and Water Development Appropriations Bill, 2013) by a vote of 255-165 on June 6, 2012. Among other agency accounts, the act provides FY2013 appropriations for the Department of Energy's Office of Science (SC) and Advanced Research Projects Agency – Energy (ARPA-E). America COMPETES 2010 provides authorizations for both the Office of Science and ARPA-E.

⁵⁰ NSF had previously announced that it would reject research proposals—even basic research proposals—without review if the proposal was submitted by students in clinical or counseling psychology graduate programs. The foundation has since changed this decision. See Siri Carpenter, "NSF Gives Clinical Students a Shot at Winning Graduate Fellowships," *Science*, vol. 336, no. 6084 (May 25, 2012), <http://www.sciencemag.org/content/336/6084/972.short>.

⁵¹ S.Rept. 112-158, p. 110-111.

The Senate Committee on Appropriations reported an FY2013 Energy and Water Development appropriations bill on April 26, 2012 (S.Rept. 112-164, S. 2465). That measure has not passed the full Senate.

This section compares funding levels in H.R. 5325 (as passed by the House) and H.Rept. 112-462 (which accompanied H.R. 5325), with the Senate Committee on Appropriations' recommendations, selected FY2012 enacted funding, and FY2013 Administration budget requests. It also provides FY2013 America COMPETES 2010 funding authorizations for SC and ARPA-E and notes policy provisions in H.Rept. 112-462 and S.Rept. 112-164 that relate to specific America COMPETES 2010 authorizations.

Department of Energy

Office of Science (SC). H.R. 5325 would provide \$4.801 billion for the Office of Science in FY2013.⁵² This amount is \$107.6 million (2.2%) less than the Senate Committee on Appropriations' recommendation of \$4.909 billion, \$72.2 million (1.5%) less than the FY2012 enacted level of \$4.874 billion,⁵³ and \$190.6 million (3.8%) less than the President's FY2013 request for \$4.992 billion. America COMPETES 2010 authorized \$6.001 billion for this account in FY2013. General SC provisions in the House committee report include the expectation that the office will continue to support minority serving institutions. General SC provisions in the Senate committee report express continued support for SC research priorities in new materials, biofuels, and computing. However, the Senate committee report also expresses concerns about how SC is managing lower priority research activities. In particular, the Senate committee report notes that the office has not provided sufficient strategic guidance on how lower priority research areas may or should adjust their scope of work in response to decreasing budgets. Both House and Senate committee reports also contain specific provisions for SC sub-accounts.

STEM Education. The House committee report provides \$14.5 million for the Workforce Development for Teachers and Scientists (WDTS) account in FY2013.⁵⁴ This amount is the same as both the Senate committee recommendation and the FY2013 request. FY2012 enacted funding for WDTS is \$18.5 million. H.Rept. 112-462 provides no funds for the Office of Science Graduate Fellowship (SCGF). This is consistent with the DOE FY2013 budget request. The Senate committee report commends the Office of Science for its efforts to evaluate its science workforce development programs.

The House committee report includes educational activities on its list of "major committee concerns" about DOE (in general, not just in the Office of Science account). Other major committee concerns with a potential COMPETES Act nexus include competitiveness and intellectual property. (See section titled "Other DOE-wide Issues and Competitiveness.") H.Rept. 112-462 prohibits DOE from funding fellowship and scholarship programs in FY2013 unless (1) those programs were specifically requested in FY2013 DOE budget documents and (2) the program is not otherwise excluded from receiving funding. The House committee report also directs DOE to provide the committee with a comprehensive listing of all FY2012 funded educational activities.

⁵² This amount includes a \$23.5 million rescission.

⁵³ This amount includes a \$15.4 million rescission.

⁵⁴ Although DOE may provide STEM education funding through various research accounts, WDTS is the main education and training line item in the Office of Science budget.

ARPA-E. H.R. 5325 would provide \$200.0 million for ARPA-E in FY2013. This amount is \$112.0 million (56.0%) less than the Senate Committee on Appropriations' recommendation of \$312.0 million, \$75.0 million (27.3%) less than the FY2012 enacted level of \$275.0 million, and \$150.0 million (42.9%) less than the President's FY2013 request for \$350.0 million. America COMPETES 2010 authorized \$312.0 million for this account in FY2013. ARPA-E provisions in the House committee report express support for the program's increased focus on transportation technologies. An amendment added during House floor debate prohibits ARPA-E awardees from using federal funds to raise private capital or advertise.⁵⁵ ARPA-E provisions in S.Rept. 112-164 encourage DOE "to continue tracking projects to demonstrate how federal investments have developed more energy efficient technologies and potentially new industries."

Other DOE-wide Issues and Competitiveness. H.Rept. 112-462 expresses a number of general concerns about the DOE, including concerns that the agency has failed to produce committee-requested reports on certain Office of Science activities (e.g., Energy Innovation Hubs, exascale computing, and future year funding levels for SC accounts) in a timely manner. The House committee report also encourages DOE to consider aspects of the ARPA-E project and program management model for application elsewhere in the department and raises general competitiveness concerns about the possibility that foreign manufacturers may be capitalizing on ideas developed in DOE labs. In response to these competitiveness concerns, H.Rept. 112-462 directs DOE to report on existing authorities to control intellectual property and help retain domestic manufacturing and to make recommendations for improving domestic intellectual property transfer and retention.⁵⁶

S.Rept. 112-164 also expresses a number of general concerns about DOE. For example, the Senate committee report raises concerns about contractor support at the Office of Science (and elsewhere in the department), noting that the cost of contractor support functions at SC increased by 10% between FY2007 and FY2009. The Senate committee report also directs DOE to maintain existing small business contracting practices at the national laboratories—which the committee report states the department had considered changing—and directs DOE to consult with Congress, including the Committee on Small Business and Entrepreneurship, before making any changes.

Labor, Health and Human Services, Education, and Related Agencies

Department of Education

Neither house passed a regular Labor-HHS-Education appropriations measure before recessing at the end of September 2012. However, the Senate Committee on Appropriations reported S. 3295, making regular appropriations for the Departments of Labor, Health and Human Services, and Education for the fiscal year ending September 30, 2013, on June 14, 2012. (See S.Rept. 112-176.) The Senate committee report does not specify funding amounts for COMPETES Act-related Department of Education (ED) programs.

⁵⁵ H.R. 5325, §524, as passed by the House. Video of the floor debate about this amendment, which was adopted by voice vote, is available at <http://www.youtube.com/watch?v=kXLVDNKcn08>.

⁵⁶ For more information on intellectual property rights, go to the CRS "Issues in Focus/Intellectual Property Rights" webpage at <http://www.crs.gov/pages/SubIssue.aspx?CLIID=2688&parentID=14>.

S. 3295, as reported, would provide \$36.0 million for Advanced Placement (AP) programs as authorized by the Elementary and Secondary Education Act, as amended by No Child Left Behind (ESEA, P.L. 107-110). This amount is \$6.0 million more (20.0%) than the FY2012 enacted level of \$30.0 million. The President’s FY2013 request for ED, as in prior years, does not reflect the account structure authorized under ESEA and therefore does not include a specific request for AP programs.⁵⁷

**Table I. America COMPETES Reauthorization Act of 2010 (P.L. 111-358):
Selected Programs and FY2013 Appropriations Status**

(in millions of dollars)

Programs	FY2012 Enacted/ Estimated ^a	FY2013 Authorization (P.L. 111-358)	FY2013 Request	House Passed	Senate Committee Reported	FY2013 Final
Department of Education						
Teachers for a Competitive Tomorrow – Baccalaureate (§1003)	n/d ^b	\$2.0	n/d	n/a	n/d	
Teachers for a Competitive Tomorrow – Master’s (§1003)	n/d	\$2.0	n/d	n/a	n/d	
Advanced Placement and International Baccalaureate Programs (§1003)	n/d ^c	\$75.0	n/a ^d	n/a	n/d ^e	
Alignment of Education Programs (§1003) ^f	n/d	\$120.0	n/d	n/a	n/d	
Department of Energy						
Summer Institutes (§901)	n/d ^g	\$25.0	\$0.0	n/d	n/d	
Nuclear Science Program Expansion Grants for Institutions of Higher Education (§902)	n/d	\$10.4	n/d	n/d	n/d	

⁵⁷ The FY2013 ED budget request reflects the Administration’s proposal to reorganize ED, which Congress has not enacted. For more information on the Administration’s plan for ED, see CRS Report R41355, *Administration’s Proposal to Reauthorize the Elementary and Secondary Education Act: Comparison to Current Law*, by Rebecca R. Skinner et al.

Programs	FY2012 Enacted/ Estimated ^a	FY2013 Authorization (P.L. 111-358)	FY2013 Request	House Passed	Senate Committee Reported	FY2013 Final
Nuclear Science Competitiveness Grants for Institutions of Higher Education (§902)	n/d	\$8.8	n/d	n/d	n/d	n/d
Hydrocarbon Systems Science Talent Program Expansion Grants (§902)	n/d	\$10.1	n/d	n/d	n/d	n/d
Early Career Awards (§902) ^h	n/d	\$25.0	n/d	n/d	n/d	n/d
Protecting America's Competitive Edge (PACE) Graduate Fellowship Program (§902) ⁱ	n/d ^l	\$21.9	n/d ^k	n/d and \$0.0 ^l	n/d	n/d
Distinguished Scientist Program (§902)	n/d ^m	\$33.0	n/d	n/d	n/d	n/d
Basic Research (Office of Science, §903)	\$4,873.6 ⁿ	\$6,000.7	\$4,992.1	\$4,801.4	\$4,909.0	
Advanced Research Projects Agency—Energy (§904)	\$275.0	\$312.0	\$350.0	\$200.0	\$312.0	
Department of Commerce						
Federal Loan Guarantees for Innovative Technologies in Manufacturing (New, §602)	\$5.0	\$20.0	n/d	\$5.0	n/d	n/d
Regional Innovation Program (New, §603)	n/d	\$100.0	\$25.0 ^o	n/d ^p	\$25.0 ^q	
Loan Guarantees for Science Park Infrastructure (New, §603)	\$5.0	\$7.0	\$7.0 ^o	n/d ^p	\$7.0 ^q	
National Institute of Standards and Technology						
Total	\$750.8	\$1,039.7	\$857.0	\$830.2	\$826.0	
Scientific & Technical Research & Services	\$567.0	\$676.7	\$648.0	\$621.2	\$623.0	

Programs	FY2012 Enacted/ Estimated ^a	FY2013 Authorization (P.L. 111-358)	FY2013 Request	House Passed	Senate Committee Reported	FY2013 Final
Construction of Research Facilities	\$55.4	\$121.3	\$60.0	\$60.0	\$60.0	
Industrial Technology Services	\$128.4	\$241.7	\$149.0	\$149.0	\$143.0	
<i>Manufacturing Extension Partnership</i>	\$128.4	\$165.1	\$128.0	\$128.4	\$128.5	
<i>Baldrige Performance Excellence Program</i>	\$0.0	\$10.6	\$0.0	n/d	n/d	
NIST Green Jobs Act of 2010 (New, §703)	n/d	\$7.0	n/d	n/d	n/d	
National Science Foundation						
Total	\$7,033.1	\$8,300.0	\$7,373.1	\$7,332.5	\$7,273.1	
Research & Related Activities	\$5,689.0	\$6,637.8	\$5,983.3	\$5,942.7	\$5,883.3	
Education & Human Resources	\$829.0	\$1,041.8	\$875.6	\$875.6	\$875.6	
Major Research Equipment and Facilities Construction	\$197.1	\$236.8	\$196.2	\$196.2	\$196.2	
Agency Operations & Award Management	\$299.4	\$363.7	\$299.4	\$299.4	\$299.4	
National Science Board	\$4.4	\$4.9	\$4.4	\$4.4	\$4.4	
Office of the Inspector General	\$14.2	\$15.0	\$14.2	\$14.2	\$14.2	
STEM-Training Grant Program (New, §556)	n/d	\$10.0	n/d	n/d	n/d	

Sources: U.S. Department of Commerce, *The Department of Commerce Budget in Brief Fiscal Year 2013*, no date, http://www.osec.doc.gov/bmi/budget/FY13BIB/fy2013bib_final.pdf; U.S. Department of Education, *FY 2013 Department of Education Justifications of Appropriation Estimates to the Congress*, February 13, 2012, <http://www2.ed.gov/about/overview/budget/budget13/justifications/index.html>; U.S. Department of Energy, *FY2013 DOE Budget Request to Congress: Detailed Budget Justifications*, no date, <http://www.cfo.doe.gov/budget/13budget/index13.html>; Department of Commerce, National Institute of Standards and Technology, National Technical Information Service, *Fiscal Year 2013 OMB Budget Submission*, no date, http://www.osec.doc.gov/bmi/budget/fy13cbj/NIST-NTIS_FY2013_cbj_FINAL.pdf; National Science Foundation, *National Science Foundation FY2013 Budget Request to Congress: Overview*, February 13, 2012, <http://www.nsf.gov/about/budget/fy2013/index.jsp>; America COMPETES Reauthorization Act of 2010 (P.L. 111-358); H.R. 5326 and H.Rept. 112-463; S. 2323 and S.Rept. 112-158; H.R. 5325 and H.Rept. 112-462; and S. 2465 and S.Rept. 112-164.

Notes: n/d = not defined; CRS was unable to identify a specific, defined appropriation or budget request for the authorization. Programs designated as “new” were authorized by America COMPETES 2010. Totals may not add due to rounding.

- a. “Enacted” funding levels come from annual appropriations acts while “estimated” funding levels come from agency budget documents. Enacted funding levels may not include rescissions, transfers, or other changes. Estimated funding levels may or may not reflect such changes, but do provide budgetary data for accounts that are not typically specified in annual appropriations acts. For example, Congress typically appropriates to the NSF at the major account level (e.g., R&RA). As a result, most NSF sub-accounts have no enacted funding level. NSF estimates program funding levels and publishes these estimates in its annual budget request to Congress.
- b. Congress has not provided funding for this program since FY2010.
- c. ED relies on ESEA for authority to operate its AP programs, not the COMPETES Acts. As explained previously, it is unclear if ED’s AP programs also comply with the COMPETES Acts. FY2012 funding for AP programs in P.L. 112-74 was \$27.0 million.
- d. The President’s FY2013 request would merge Advanced Placement (AP) programs into the proposed new program, College Pathways and Accelerated Learning (CPAL). The FY2013 request for CPAL is \$81.0 million, which includes \$24.1 million for AP test fees.
- e. S. 3295 would provide funding for AP programs under the authority of ESEA, Title I, Part G; rather than under the authority of the COMPETES Acts. The FY2013 funding level for AP programs in S. 3295 is \$36.0 million, or \$6.0 million (20%) more than the FY2012 enacted level.
- f. ED does not rely on P.L. 111-358 or P.L. 110-69 for general statutory authority to undertake alignment activities. The exception to this rule is for state education data systems, for which ED relies on P.L. 110-69, Section 6401.
- g. According to DOE, this program corresponds with the DOE ACTS program. DOE ACTS was eliminated in FY2012.
- h. DOE indicates that the SC Early Career Research program corresponds with the Early Career Awards program authorized by the COMPETES Acts. The department states that total funding for this program is about \$16.0 million annually and that funding for the program comes from each of the six SC research program budgets.
- i. According to the DOE, the department manages at least two programs that are consistent with PACE provisions: (1) the Computational Science Graduate Fellowship (CSGF) in the Office of Science, Advanced Scientific Computing Research, and (2) the Office of Science Graduate Fellowship (SCGF) program in the Office of Science, Workforce Development for Teachers and Scientists.
- j. FY2012 funding for CSGF was \$6.0 million, while funding for SCGF (as per H.Rept. 112-331) was \$5.0 million.
- k. The FY2013 request for CSGF is \$6.0 million. DOE does not seek funding for SCGF in FY2013.
- l. H.Rept. 112-462 does not specify funding for the CSGF and provides \$0.0 for the SCGF in FY2013.
- m. H.R. 5325 urged DOE to redirect funding from proposed Office of Science, Workforce Development for Teachers and Scientists program terminations to the Distinguished Scientist program in FY2012. However, DOE has not initiated this program.
- n. This amount reflects a \$15.4 million rescission in FY2012 in accordance with the contractor pay freeze.
- o. Although America COMPETES authorizes a separate \$7.0 science park loan guarantee program, the FY2013 DOC budget request includes funding for science parks in the total \$25.0 million request for the RIP program.
- p. H.R. 5326 specifies that funding for the EDA account includes funding for loan guarantees for manufacturing, but does not provide a defined appropriation for either the RIP (as a whole) or for the science park loan guarantee component (in particular).
- q. Consistent with the President’s budget request, the Senate Committee on Appropriations recommends a total of \$25.0 million for the RIP account in FY2013, of which, \$7.0 million is for science park loan guarantees.

Policy Context

The COMPETES Acts are designed to improve the competitive position of the United States by fostering scientific and technological innovation. The primary policy devices that the acts employ—to this end—are rapid increases in authorized funding for physical sciences and engineering research (e.g., the so-called “doubling path” policy for targeted accounts) and STEM education program authorizations. The specific debate about FY2013 funding for America COMPETES 2010 provisions occurs within the broader conversation about these policy choices. This section briefly summarizes this policy context.⁵⁸

Few analysts dispute the contention that the path to global competitiveness in the 21st century runs through the twin pillars of scientific and technological advancement. The policy question, then, is what should the federal government do (if anything) to encourage scientific and technological innovation and (thereby) national competitiveness?

A broad coalition of business, academic, and government leaders has concluded that the answer to this question is that the federal government should encourage innovation by supporting physical sciences and engineering research and by increasing the domestic supply of STEM workers. Supporters of this consensus assert that a combination of external pressures and internal weaknesses threatens the United States’ innovation advantage. For example, supporters note that changes in the industrial bases and educational attainment rates of rapidly developing countries like China and India mean that these countries are able to compete for a growing percentage of the world’s high-value jobs and industry. Further, these advocates assert that signs of potential weakness in areas that have long been U.S. strengths—such as the U.S. STEM workforce and leading-edge research—appear to accompany these global changes. In particular, COMPETES Act proponents raise concerns about funding for research in the physical sciences and engineering and the domestic supply of scientists, engineers, and technicians.⁵⁹

Although support for the innovation policy approach embodied in the COMPETES Acts is widespread, it is not uniform. Opposition has tended to fall into three broad categories: (1) questions about fundamental assumptions, (2) preferences for alternative policies or approaches, and (3) cost. For example, some analysts dispute fundamental assumptions behind policies designed to increase the supply of STEM workers, arguing that there is no evidence of broad shortages of STEM workers and that the bigger challenge is on the demand side.⁶⁰ Another fundamental assumption that some analysts have called into question is whether increased investment in publically funded research will increase U.S. competitiveness given that such

⁵⁸ For more in-depth analysis of the COMPETES Acts, see CRS Report R41819, *Reauthorization of the America COMPETES Act: Selected Policy Provisions, Funding, and Implementation Issues*, by Heather B. Gonzalez.

⁵⁹ This case is laid out more fully in National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, Committee on Prospering in the Global Economy of the 21st Century: An Agenda for America Science and Technology, and Committee on Science, Engineering, and Public Policy, *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, National Academies Press, 2007, <http://www.nap.edu/catalog/11463.html>.

⁶⁰ Testimony of Alfred F. Sloan Foundation Vice President Michael S. Teitelbaum, in U.S. Congress, House Committee on Science and Technology, Subcommittee on Technology and Innovation, *The Globalization of R&D and Innovation, Part 4*, hearings, 110th Cong., 1st sess., November 7, 2007, http://archives.democrats.science.house.gov/Media/File/Commdocs/hearings/2007/tech/06nov/Teitelbaum_testimony.pdf.

research is typically publically available.⁶¹ Other analysts prefer to use regulatory changes and tax policy to achieve competitiveness objectives, arguing that direct federal investment in research in the physical sciences and engineering and in STEM education distorts markets.⁶² Opponents have also raised concerns about cost, arguing that authorized funding increases are too expensive in light of the federal fiscal condition, deficit, and debt.⁶³

In addition to the broad conversation about the policy approach embodied by the COMPETES Acts, there are more specific debates about the acts' particular methods and means that may become part of the FY2013 funding conversation. These debates center on the federal role in the national research and development (R&D) enterprise and on the federal STEM education portfolio. For example, some policymakers prefer to limit the federal role in the national R&D enterprise to basic research, while other policymakers favor an approach that includes both basic research and support for development at stages that are closer to commercialization. The congressional debate about the federal role in the national R&D enterprise may shape both the character and amount of research funding Congress appropriates to COMPETES Act agencies. In the realm of STEM education, a number of policy conversations may become part of the FY2013 funding debate. Among these is the question of a strategy for federal STEM education programs. America COMPETES 2010 directed the National Science and Technology Council to prepare a strategic plan for federal STEM education programs. The Administration indicates that it expects to release the strategic plan in 2012. To the extent that this strategic plan embraces or sets aside existing programs in the federal STEM education portfolio—or recommends the creation of new programs—a policy debate about the direction of federal STEM education investments in FY2013 may follow its release.

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⁶¹ For more information about these arguments, see CRS Report R41951, *An Analysis of Efforts to Double Federal Funding for Physical Sciences and Engineering Research*, by John F. Sargent Jr.

⁶² Testimony of Competitive Enterprise Institute Vice President for Policy/Director of Technology Studies Wayne Crews, House Committee on Science and Technology, *The Future of Manufacturing: What Is the Role of the Federal Government in Supporting Innovation by U.S. Manufacturers?*, hearings, 111th Cong., 2nd sess., March 17, 2010, <http://gop.science.house.gov/Media/hearings/full110/mar17/Crews.pdf>.

⁶³ For example, see House debate, "Conference Report on H.R. 2272, America COMPETES Act," *Congressional Record*, daily edition, vol. 153 (August 2, 2007), pp. H9592-H9604.