

Statement of Dr. John P. Holdren
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Executive Office of the President of the United States
to the
Committee on the Budget
United States Senate
On
Silo Busting: Effective Strategies for Government Reorganization
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Chairman Murray, Ranking Member Sessions, and Members of the Performance Task Force, it is my distinct privilege to be here with you today to discuss the current state of Federal support of science, technology, engineering, and mathematics (STEM) education in the context of the President's fiscal year (FY) 2014 Budget and our shared interest in improving the efficiency and effectiveness of Federal programs.

President Obama strongly believes that the United States must equip many more students to excel in STEM fields. That's why the President's 2014 Budget invests \$3.1 billion in programs across the Federal government on STEM education, a 6.0 percent increase over the 2012 enacted funding level. The 2014 Budget includes critical investments in several key areas that will benefit aspiring students: preparing and supporting excellent STEM teachers; supporting more STEM-focused high schools and districts; improving undergraduate STEM education; improving the reach of informal STEM-learning efforts; and investing in breakthrough research on STEM teaching and learning.

The President's 2014 Budget also takes important steps to substantially decrease the fragmentation of STEM programs across the Federal government by decreasing the number of STEM programs from 226 to 110 – a more than 50 percent reduction. These disciplined choices to reorganize and cut back lower-priority or narrow-purpose programs make room for targeted increases, allow for easier coordination, and improve opportunities for rigorous evaluation of the remaining programs.

An Administration-Wide Priority to Improve Program Management

The Administration has been working to reduce duplication and fragmentation challenges over the last four years. In February 2012, the President submitted a proposal to Congress to reinstate Presidential authority to reorganize Federal agencies to reduce the number of overlapping government programs. The 2013 Budget proposed cuts, consolidations, and savings across the Government totaling more than \$24 billion in the upcoming fiscal year, and \$520 billion through 2022, some of which Congress adopted. The President's 2014 Budget goes even further, including 215 cuts, consolidations, and savings proposals, which are projected to save more than \$25 billion in 2014. The 2013 Budget also established the first-ever government-wide Cross Agency Priority Goals, a new kind of management approach – one that brings people together from across and outside the Federal Government to coordinate their work and combine their skills, insights, and resources on a shared cross-agency priority. In the fall of 2012, the Administration released 14 cross-agency priority goals, including one in STEM education to have Federal agencies work together to meet the President's goal of 1 million additional STEM graduates in the next 10 years.

The Government Accountability Office (GAO) also has taken an active role in analyzing the structure of the Federal government and recommending areas to reduce duplication and fragmentation. In 2011, GAO began annual reporting on specific opportunities for the Federal government to reduce duplication, overlap, and fragmentation and to pursue other financial opportunities. GAO's independent analysis is a welcome addition to the effort to make government more effective and efficient and to modernize it for the 21st century. The GAO released a second annual report in 2012, and its third annual report in April 2013.

Currently, Federal initiatives to promote STEM education are spread across the Government in more than 200 programs within 13 different agencies, as the GAO noted in its 2012 report. The 2014 Budget proposes a reorganization of STEM education programs to reduce fragmentation and improve the delivery and impact of these investments.

Science, Technology, Engineering, and Mathematics (STEM) Education

As we look at the President's 2014 Budget, I want to provide some important context. During the first four years of the Administration, the Administration has used four strategies to make progress on improving STEM education.

We have worked to maintain a strong investment in STEM education even during difficult budgetary times. For example, the President's 2014 Budget invests \$3.1 billion in programs across the Federal government on STEM education, an increase of 6.0 percent over 2012 funding levels. This includes the critical investments I discuss in the remainder of my testimony.

We have made STEM a priority in many more of the Administration's education efforts. For example, in the first round of the Department of Education's \$4.3 billion Race to the Top competition, states were encouraged to apply to a competitive preference priority to develop comprehensive strategies to improve achievement and provide rigorous curricula in STEM subjects; partner with local STEM institutions, businesses, and museums; and broaden participation of women and girls and other groups underrepresented in STEM fields. Other examples include STEM priorities in the Department of Education's Investing in Innovation (i3) and Supporting Effective Educator Development programs. Prioritizing STEM in existing programs at the Department of Education has the advantage of leveraging existing resources, and embedding STEM within our overall education reform efforts.

The President has set ambitious but achievable goals and challenged the private sector. For example, the President announced the goal to prepare 100,000 excellent STEM teachers in his 2011 State of the Union Address. Answering this call to action, over 150 organizations, led by the Carnegie Corporation of New York, formed a coalition called 100Kin10. Members of the coalition have made over 150 commitments to support STEM teacher preparation, and raised over \$30 million in funds. Additional examples of this all-hands-on-deck approach to challenging companies, foundations, non-profits, universities, and skilled volunteers include Change the Equation, US2020, and increasing the reach of the Advanced Placement (AP) program for children in military families.

The President continues to make STEM a high priority. The President hosted the first-ever White House Science Fair in late 2010, fulfilling a commitment he made at the launch of his Educate to Innovate campaign to directly use his bully pulpit to inspire more boys and girls to

excel in mathematics and science. Last month, he hosted the third White House Science Fair. The President has also issued a call to action to the 200,000 federal scientists and engineers to volunteer and think of creative ways to engage students in STEM subjects.

STEM Education in the 2014 Budget

In the 2014 Budget, the Administration is proposing a reorganization of STEM education programs into four key areas: K-12 instruction; undergraduate education; graduate fellowships; and informal education activities that typically take place outside the classroom. This reorganization involves the consolidation or restructuring of more than half of these programs and streamlining of functions across agencies to improve the delivery and impact of STEM education.

The 2014 Budget is part of a broader Administration commitment to look carefully at the effectiveness of all STEM programs and find ways to improve them. To further this goal, in 2011 I established a Committee on STEM Education under the National Science and Technology Council (NSTC) as called for in Section 101 of the America COMPETES Reauthorization Act of 2010 (Public Law 111-358). The work of this Committee is closely aligned with the vision for STEM education outlined by Congress in the America COMPETES Reauthorization Act and has focused on improving the coordination and effectiveness of all Federal STEM education programs. The Administration released a description of a 5-year Federal STEM education strategic plan and an update to the Federal STEM inventory along with the 2013 Budget. The final strategic plan will be released this month. It will outline a path to increased coordination and collaboration among the Federal agencies that invest in STEM education.

Guided by drafts of the strategic plan, the 2014 Budget makes disciplined choices to consolidate and cut back lower-priority or narrow-purpose programs to make room for targeted increases. This includes the proposed elimination or consolidation of 116 programs, with approximately \$180 million in savings reinvested in new or existing STEM programs. The reorganization will substantially decrease the fragmentation of STEM programs across agencies, allowing potential for easier coordination and strong evaluations of what's working. The reorganization focuses on: K-12 instruction; undergraduate education; graduate fellowships; and informal education activities that typically take place outside the classroom. Each key area would have a lead agency. The Department of Education's role in K-12 education would be to develop STEM innovation networks, support STEM Teacher Pathways to help reach the President's goal of preparing 100,000 effective STEM teachers over the next decade, and create a STEM Master Teacher Corps to build the STEM instructional skills of others. NSF would promote reform of STEM undergraduate education and enhance graduate fellowships to reach more students and address national needs. The Smithsonian Institution would improve the reach of classroom and informal education materials and activities by ensuring they are aligned with what students are learning in the classroom, and would work with Federal science agencies to harness their unique expertise and resources to create relevant materials, on-line resources, and effective delivery mechanisms to reach more students. Other Federal science agencies would also play an active role in developing and implementing the initiatives at Education, NSF, and the Smithsonian to ensure they align with agency and national goals. The reorganization also includes increasing capacity at key agencies, including \$5 million for a new Office of STEM at the Department of Education.

These disciplined choices to consolidate and cut back lower-priority or narrow-purpose programs make room for targeted increases in high-priority areas. In his 2011 State of the Union address, the President called for a new effort to prepare 100,000 effective STEM teachers with strong teaching skills and deep content knowledge over the next decade. That call had roots in a groundbreaking analysis by the President's Council of Advisors on Science and Technology (PCAST) and remains a priority for this Administration. In this effort, we have been assisted by a robust set of partnerships with the private sector. Last month, I hosted a roundtable of more than 30 professionals from inside and outside government committed to the cause of improving the Nation's corps of K-12 science and math teachers. That day, one of our partners, the Howard Hughes Medical Institute (HHMI), announced that it would donate \$22.5 million to the National Math and Science Initiative (NMSI) to accelerate the scale-up of the UTeach program in American universities. UTeach, pioneered at the University of Texas-Austin, is a program that allows undergraduates to earn simultaneously a teaching certificate and a Bachelor's degree in a STEM field. Along with other initiatives such as 100Kin10 (a collaborative effort between nonprofit, philanthropic, and other private organizations), NMSI and UTeach are helping to achieve the President's goal of preparing 100,000 effective STEM teachers over the next decade. In the 2014 Budget, the Department of Education is investing \$80 million to support this goal.

In line with the government-wide STEM-education reorganization, the Department of Education will also restructure its existing efforts to lead a cohesive and robust initiative around improving K-12 instruction. The Budget invests \$150 million to help school districts, individually or in consortia, to build strategic partnerships with universities, Federal science agencies, businesses, museums, skilled volunteers, and other educational entities. These partnerships – STEM Innovation Networks – will help district leaders harness local, regional, and national resources to transform STEM teaching and learning by, for example, implementing innovative research-based practices and building teacher capacity. Each network will engage in activities based on local needs, such as providing quality professional development to STEM teachers and developing and evaluating instructional models that help students meet STEM-focused, college and career-ready standards. The Innovation Networks are modeled on successful State and local efforts such as the partnership between the Ohio STEM Learning Network, the Cleveland Metropolitan School District, GE, and MC2High School. This investment also includes \$5 million to support a STEM Virtual Learning Network, a national, online community of STEM educators that will enable them to exchange STEM education materials and best practices, including those developed through the Innovation Networks. Additionally, Networks will leverage the expertise of the Nation's most talented science and math teachers—through the Budget's \$35 million investment in a new STEM Master Teachers Corps—to help improve instruction in their schools and districts, and to serve as a national resource for best practices in math and science teaching. These efforts build on the foundation of the \$150 million Math and Science Partnership program, which provides grants to every State to implement and improve STEM instruction.

The President continues to support undergraduate STEM education reform as a top priority, in part to fulfill a recommendation of PCAST's most recent report on undergraduate STEM education, released in February 2012, calling for the United States to establish a goal of training one million additional STEM graduates over the next decade. To further this goal, the Administration proposes consolidating select STEM undergraduate-education activities into a new consolidated program at NSF. This reform will increase the efficiency and effectiveness of these investments by promoting implementation of evidence-based instructional practices and supporting an expanded evidence base. It also supports research on how new technologies can

facilitate adoption and use of new approaches to instruction. The 2014 Budget provides \$123 million for this new program, Catalyzing Advances in Undergraduate STEM Education.

The Administration is also committed to increasing the number of college graduates with degrees in technical fields. Opportunities to work on real-world research problems can help inspire students to pursue such degrees. The 2014 Budget proposes \$79 million, an increase of \$13 million above the 2012 enacted level, for NSF's Research Experiences for Undergraduates (REU) program. Since early opportunities to conduct research can be especially influential in maintaining a student's interest in STEM fields, the program will increase its investment in research experiences for those in their first or second year of college.

By reorganizing or eliminating select fellowship programs, the Budget will provide \$325 million to expand and enhance NSF's Graduate Research Fellowship program, creating a new National Graduate Research Fellowship. The program will not only continue to support the Nation's most promising students in any STEM field, but will also allow students to gain specialized experiences in areas of significant national need or of particular interest to mission agencies. Reorganizing graduate fellowships will position the Administration to implement a national strategy for fellowships and for graduate education more broadly, streamline the application and award process, and reduce administrative costs.

The Budget adds \$25 million to the Smithsonian Institution to improve the reach of informal STEM education by ensuring that materials are aligned to what students are learning in the classroom. The Smithsonian will work with Federal science and technology agencies such as the National Aeronautics and Space Administration (NASA), the U.S. Department of Agriculture (USDA), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Environmental Protection Agency (EPA), the National Institutes of Health (NIH), and other science partners to harness their unique expertise and resources to create relevant materials and curricula, on-line resources, and effective delivery and dissemination mechanisms to reach more teachers and students both inside and outside the classroom.

The Budget also proposes additional steps to increase the capacity of the Department of Education to invest in breakthrough innovation. The Budget proposes up to \$65 million for the Advanced Research Projects Agency for Education (ARPA-ED) within the Investing in Innovation (i3) program. ARPA-ED will catalyze the development and deployment of new tools and technologies to significantly improve student learning. ARPA-ED will push the education research, development, and demonstration field forward by: sponsoring the synthesis and vetting of public and private R&D efforts; identifying breakthrough development opportunities; shaping the next wave of R&D; investing in the development of new education technologies and tools; and identifying and transitioning the best and most relevant R&D from other federal agencies.

The 2014 Budget leaves intact over 100 programs spread across the agencies. So it by no means is proposing to take away all of the diverse programs the Federal government supports. And there has been a very serious effort to preserve the programs that best leverage the unique assets of the science agencies and are integral to the agencies' missions and goals. The reorganization also preserves programs that provide direct funding to Minority-Serving Institutions (MSIs) because reform in this area must first begin with engagement with the MSI community to determine the best ways to improve services to these institutions. The Administration is committed to ensuring that the new system of delivering STEM education administered through new initiatives at the Department of Education, NSF, and the Smithsonian

Institution will be managed so that these lead agencies interact with the mission agencies and preserve the valuable capabilities, translational capacities, goals, and needs of the mission agencies.

Conclusion

The 2014 Budget represents a comprehensive effort to improve STEM education, and will allow us to achieve a number of important goals. It will help Federal STEM efforts reach more students and more teachers more effectively by reorienting Federal policy to meet the needs of those who are delivering STEM education: school districts, States, and colleges and universities. It will reduce fragmentation of the Federal STEM education investment, reorganizing efforts and redirecting resources around clearly defined priorities. It will enable rigorous evaluation and evidence-building strategies for Federal STEM education programs. It will increase the impact of Federal investments in important areas such as graduate education by expanding resources for a more limited number of programs. And it will provide additional resources to meet specific national goals such as preparing and recruiting 100,000 high-quality K-12 STEM teachers, recognizing and rewarding excellence in STEM instruction, strengthening the infrastructure for supporting STEM instruction and engagement, increasing the number of undergraduates with a STEM degree by one million, and broadening participation in STEM fields by underrepresented groups.

I look forward to working with this Committee on our common vision for improving STEM education for all of America's students. I will be pleased to answer any questions the Members may have.