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## Two Proposed Initiatives Give New Life to U.S. S&T Funding

For many in the scientific community, the highlight of President George W. Bush's 2006 State of the Union Address on January 31 was the much-heralded announcement of two new major science and technology (S&T) initiatives. Bush's proposed American Competitiveness Initiative is a 10-year, \$136 billion undertaking that would double the federal commitment to basic scientific research and train tens of thousands of new math and science teachers. The initiative would increase spending on federal research and development (R&D) next year by nearly \$6 billion, a level more than 50% higher than in 2001. The budgets of the National Science Foundation (NSF), the Department of Energy's Office of Science, and the National Institute of Standards and Technology (NIST) core laboratories would double over 10 years with \$50 billion. The initiative would also make permanent an existing R&D tax credit to encourage the private sector to invest in technology, and provide \$380 million to improve the quality of K-12 math and science education.

Bush also announced the Advanced Energy Initiative—a 22% increase in clean-energy research—at the DOE to push for breakthroughs in automobile fuel and electrical generation, in order to free the United States from what Bush termed an unhealthy “addiction” to oil. This is an area where materials R&D stands to benefit enormously.

Specifically, the new Bush agenda calls for \$150 million toward the development of “homegrown” renewable biofuels from agricultural waste products such as wood chips, stalks, or switch grass, as well as \$30 million to develop new materials for batteries and fuel cells to power the next generation of hybrid vehicles. The proposed new \$148 million Solar America Initiative targets accelerated development of semiconductor materials that convert sunlight directly to electricity. Bush's plan would also provide \$289 million—an increase of \$53 million over FY2006 funding—for the Hydrogen Fuel Initiative.

At a February 1 briefing in Washington, D.C., the day after Bush's address, Energy Secretary Samuel Bodman hailed the president's new initiatives as “a renaissance for U.S. science and global competitiveness,” enabling the DOE to support about 2600 more researchers in FY2007 than the agency did in FY2006. “It will translate itself into a material change in our ability to provide resources for supporting the scientific endeavor of our country,” he said. Commerce Secretary Carlos Gutierrez

announced that the extra funding would enable NIST to add 600 new staff scientists to its roster.

The issues of innovation and competitiveness have gained prominence among scientists and congressional leaders, thanks in part to an R&D benchmarks report released a year ago by the Task Force on the Future of American Innovation, which first caught the attention of U.S. policy makers with its warning of a pending national crisis.

It was followed in October 2005 by a National Academies report, *Rising above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*, which listed several “worrisome indicators” that the United States was losing its global competitive edge, and proposed numerous specific actions the federal government can take to ensure the country's global leadership through the 21st century. In a January 11 speech to the U.S. Chamber of Commerce, White House Chief of Staff Andrew Card called the National Academies report “compelling,” although he cautioned that the report's recommendations would need to be considered in the context of federal budget constraints.

Last December, a National Summit on Competitiveness was held that further made the case that the federal government should be investing more in R&D in the physical sciences, math, and engineering, and education in these fields at all levels.

Congress has responded with a flurry of legislation that incorporates many similar features to Bush's proposed initiatives. For instance, recent bipartisan legislation introduced in the U.S. Senate would substantially increase federal investments in physical science research and education.

The three bills—joined together under the umbrella title “Protecting America's Competitive Edge” (PACE)—would also provide larger tax incentives for industry to invest in R&D and would establish a new class of student visas for doctoral candidates studying in the fields of math, engineering, technology, and science. Senate bill S.2197 focuses on energy, S.2198 addresses education, and S.2199 is a finance bill. The S.2199 bill would double the federal R&D tax credit, provide an employee education tax credit, and support the development of science parks.

Senate bill S.2109—known as the National Innovation Act—was introduced in December, targeting research investment, increasing the pool of S&T talent, and promoting the development of an innovation infrastructure. The bill would establish a President's Council on

Innovation to promote innovation in the public and private sectors, as well as the Innovation Acceleration Grants Program, encouraging federal S&T funding agencies to allocate 3% of their R&D budgets to grants for high-risk frontier research.

Senate bill S.2109 also calls for a near-doubling of research funding for NSF by 2011 and encourages the development of regional clusters (“hot spots”) of technology innovation throughout the United States, modeled on the success of areas like Silicon Valley. Senate staff members have emphasized that S.2109 is complementary to, not competitive with, the PACE bills, and that the final legislation would incorporate the best features of all the bills.

Not to be outdone, members of the U.S. House of Representatives have introduced three separate bills that seek to implement the recommendations of the National Academies report. The H.R. 4596 bill seeks to strengthen long-term basic research by authorizing 10% increases per year in funding. H.R. 4434 would establish an NSF scholarship program for science, math, and engineering students who commit to becoming teachers at elementary and secondary schools, along with summer teacher training institutes at NSF and DOE to improve the knowledge and pedagogical skills of science and math teachers. H.R. 4435 would establish a new agency within the DOE to reduce U.S. energy dependence on non-U.S. countries by 20% over a 10-year period.

“The vitality of our economy in the 21st century really demands that we manage as a federal government the investment in workforce and an adequately prepared workforce, and the tools that that workforce needs to maintain American preeminence in science and technology,” said OSTP Director John Marburger at the February 1 briefing, although he emphasized the need to focus on priorities and said that the president's initiative is not committed to increasing the budgets for all of science. “The U.S. excels in the productivity of its research because it has excellent mechanisms for identifying the priority areas,” he said.

JENNIFER OUELLETTE

## EC and China Step Up Cooperation on Clean Coal Technologies and Other Energy Issues

European Energy Commissioner Andris Piebalgs met with the Chinese government in February to address near-zero emissions power-generation technology. Piebalgs emphasized that “tackling the carbon dioxide emissions from coal-fired power plants is an important step in improving the global environment. By reducing the environ-

mental impact of coal, it will remain a viable part of our energy mix for some time. Energy is one of the EU's foremost concerns, and I am glad to have this opportunity to discuss the way ahead with my Chinese counterparts."

European Science and Research Commissioner Janez Potocnik said, "[T]his new agreement on zero-emission power generation is another example of the developing partnership between the EU and China in science and research."

The memorandum of understanding between Europe and China will encourage the development of technology allowing the capture and underground storage of carbon dioxide emitted from coal-fired power stations, a matter of potential significance in the fight against climate change, say EC news sources.

According to EC news, carbon dioxide emissions from coal-fired power generation are growing rapidly and represent a serious challenge to the long-term stability of the climate. China, the world's second-largest consumer of energy after the United States, is heavily dependent on coal, which accounts for 70% of its energy consumption. In 2004, China consumed about 34% of the coal used worldwide and generated 74% of the growth in world coal consumption. China wants to reduce coal-related environmental pollution in cities. It is also keen to make use of the potential of coal to produce liquid fuels and hydrogen, technology that would reduce its dependence on imported oil and help diversify its energy supply. Estimates show that carbon dioxide emissions from coal use in China are growing rapidly, so there is a pressing need to tackle environmental pollution and energy security in China.

As stressed at a previous EU-China summit, both regions are committed to working together to combat their common challenges of energy security, increasing pressure on global energy resources, and climate change. The mem-

orandum of understanding builds upon and strengthens work such as the Action Plans on clean coal technologies and energy efficiency and renewable energy, the EU-China Dialogue on Energy and Transport Strategies, the Scientific and Technological Cooperation Agreement, and the EU-China Energy and Environment Program. The EU and China are also developing their overall cooperation on science matters. There are more than 100 joint research projects carried out by Chinese and European teams, worth about €300 million, and China is a partner in the ITER fusion project.

### U.K. Calls for Materials Strategy

The U.K. materials industry must continue making its products more desirable and discover new markets and opportunities if it wants to continue as a world-class competitor. This was the message from Industry Minister Alun Michael, speaking in March at the Department of Trade and Industry's (DTI) release of a report on materials manufacturing.

"A Strategy for Materials," produced by the DTI Materials Innovation and Growth Team (MatIGT), has identified what the U.K. materials sector must focus on if it is to continue as a world leader in materials science. It advises a five-prong approach: transferring knowledge, raising awareness, accelerating innovation, improving skills and knowledge, and building a better environment.

In making these recommendations, MatIGT took account of the key challenges facing the materials community. These include globalization, energy and climate change, sustainable production and consumption, and innovation in developing countries.

Michael said, "The U.K. is home to a number of world-class manufacturing companies whose success depends on the development and use of both traditional and advanced materials.

"The government welcomes this strategy and is keen to move forward in partnership with the materials community to ensure their strategy is delivered. This report very effectively identifies the challenges ahead, and I hope this strategy will help the industry respond and grow."

Prime Minister Tony Blair also had some words of praise and encouragement for the materials industry.

"I am delighted the whole materials community, industry, academia customers, and other stakeholders are determined to continue to drive forward together to deliver a strategy that will enable Britain to continue to benefit from being one of the foremost advanced technological societies in which world-class materials expertise underpins sustainable growth," he said.

"I wish them and the body they are forming, Materials UK, every success as they strive to deliver the challenging but very necessary agenda they are proposing," said Blair.

Launched in 2005, MatIGT was asked to define a materials strategy for the United Kingdom that would enable it to make best use of the benefits that new developments in materials offer. The initiative has successfully brought together a wide variety of stakeholders from across the materials industry to consider the key issues and develop a strategy for the future. It has proposed the formation of Materials UK, a body that will work with existing organizations within the broader materials sector and will unite the materials community under a common vision.

The materials sector turns over about £200 billion, contributes 15% of GDP to the economy, employs 1.5 million people, and supports a further four million jobs.

An electronic version of the report and its supporting documentation can be accessed at Web site [www.dti.gov.uk/materialsig.htm](http://www.dti.gov.uk/materialsig.htm). □

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