



On science policy

The interconnectedness of our most pressing global challenges means that progress on each can be mutually reinforcing. Science and technology must be at the core of this effort.

PRESIDENT OBAMA UNDERSTANDS with crystal clarity the indispensable role that science, technology, and innovation (ST&I) will need to play if the great challenges of our time are to be successfully met.

He has communicated this understanding with uncommon eloquence, but even more important, he has put his understanding of the importance of ST&I into practice in the appointments he has made, the budgets he has proposed and pushed through, and the policy initiatives he has launched.

The great and immediate challenges to which ST&I are most germane are six, all of them with requirements and ramifications that are global, not just national, and all of them in President Obama's sights:

- promoting economic recovery, job creation, and development;
- defeating the most dangerous diseases and achieving better health care for all at affordable cost;
- meeting national and global needs for energy without wrecking the climate with CO₂ emissions from fossil-fuel combustion;
- managing the competing demands on land and fresh water for the production of food, fiber, biofuels, and ecosystem services, including carbon sequestration and habitat for biodiversity;
- maintaining the productivity and ecological integrity of the oceans; and
- reducing the dangers posed by the existence and spread of nuclear weapons.

These challenges are in many respects

interrelated, meaning that failures and shortfalls in any one area can impede or doom progress in the others. But their interconnectedness also means that progress on the different challenges can and should be mutually reinforcing. For example, the advances in ST&I required for affordably meeting energy needs without entraining unmanageable climatic disruption could prove to be a major generator of new technologies, products, businesses, and jobs. The pursuit of such "win-win" approaches to the array of challenges we face is in fact one of the central themes of ST&I policy in the Obama Administration.

No less important is recognition by the President and his ST&I appointees that meeting the practical challenges listed above will depend on adequate investment in and care for the cross-cutting, foundational "pillars of progress" in ST&I, notably:

- the quality of science, technology, engineering, and mathematics (STEM) education and training, from pre-school to grad school to lifelong learning;
- the capabilities, financial health, and productivity of the institutions that conduct most of society's fundamental research, namely our research universities and national and private laboratories;
- the capacity and robustness of infrastructures for information/communication, transportation, and energy;
- our competence in space, which is



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invaluable not only for expanding our understanding of the universe and other realms of basic science but also for its roles in communications, geopositioning, and Earth observations for a multitude of purposes;

- an economic and political environment that promotes and rewards research, entrepreneurship, and innovation while also providing appropriate protections for the public's interests in health, safety, personal and national security, privacy, and so on; and
- encouragement and support for a variety of partnerships—across academic disciplines, governmental bodies, the public and private sectors, and nations around the world—in order to combine skills and insights, share costs and risks, engage all the stakeholders, undertake projects at the needed scale, and optimally distribute solutions and benefits.

The combination of the six indicated practical challenges, on which progress is urgently required, and the six “pillars of progress” that we dare not neglect, constitutes a formidable agenda for ST&I policy in the Obama Administration. And the task is magnified by the necessity of gaining the consent of a fractious Congress for many of the needed measures and by the budget constraints imposed by the worst economic crisis of modern times. I am nonetheless optimistic about how much the Administration will be able to get done in this domain, for a number of reasons.

First among those reasons is, again, that the President understands the importance of the whole *problématique*, including the ways in which its pieces relate to one another, and is able to bring extraordinary explanatory and persuasive powers to the task of helping the Congress and the public understand it. In addition, he has appointed a constellation of Cabinet secretaries, deputy- and undersecretaries, agency heads, and White House office directors who, as a group, are unusually savvy about science and technology, very forward-leaning about the potential of ST&I to help deal with society's most vexing problems, and exceptionally collaborative in working together across departmental lines to get the needed jobs done.

This optimism about the potential of ST&I and collaborative effort in translating that potential into achievement are

being mirrored in entirely new levels of enthusiasm among state and local government officials as well as business and philanthropic leaders, for building partnerships with the federal government on ST&I initiatives. These interactions on ST&I across levels of government and across sectors are taking place with a frequency and intensity that is as challenging to my calendar (and the calendars of the President, the Vice President, and the leaders of all of the S&T-heavy cabinet departments and agencies) as it is exciting.

The same is true at the international level. Bilateral commissions on science and technology cooperation with Russia, China, India, and Brazil are already being reinvigorated. The tally of countries that have dispatched an ambassador, science and technology minister, or chief science adviser to my White House office to discuss building stronger bilateral ties in



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S&T stands, as I write this, at fourteen. The excitement and anticipation I'm sensing from all across the global S&T community about this Administration's openness to new levels and forms of cooperation is a sea change—and a huge opportunity.

Beyond these bases for optimism and beginnings of new efforts, moreover, the Obama presidency already has a quite remarkable array of concrete achievements in ST&I policy to its credit. For example:

- The combination of the final FY2009 and FY2010 budgets and the American Recovery and Reinvestment Act (ARRA, signed into law February 17, 2009) lifted Federal support for basic

and applied research to the highest level in history.

- Total ARRA investments in ST&I will exceed \$110 billion, including some \$38 billion for renewable energy and energy efficiency, \$29 billion for health research and health information technology, and \$20 billion for information, transportation, and energy-transmission infrastructure.
- ARRA also has about \$90 billion for improving education, including \$4.4 billion for the “Race to the Top” competition among states in which STEM education is a major priority and \$650 million for educational technology.
- The first chief technology officer and first chief information officer for the nation have been hard at work in the White House on a wide range of initiatives that are already impacting the use of information technology to increase transparency of government operations and public access to government data, the efficiency of processing of veterans' benefit claims, the effectiveness of medical research and health care, and more.
- Rules governing stem-cell research with federal funds have been revised to allow responsible, high-promise approaches that were previously ruled out, and procedures governing visas for foreign scientists and engineers cooperating with American colleagues have been streamlined without compromising national security.

In light of all this, and the many other activities my office is undertaking with the President's support, I can say confidently that the motto of those working on ST&I policy in the Obama Administration remains “Yes, we can.” ∞