



Science's rightful place is in service of society

Science policy must concentrate less on how much money is spent, and more on how to translate investments into public good, says Daniel Sarewitz.

Amid the mess of US politics — a pointless government shutdown, across-the-board cuts, endless partisan squabbling — now is a good moment to take stock of the fate of publicly funded science. After all, five years ago next week Barack Obama was first elected president, promising that he would “restore science to its rightful place” in US society. How has he done?

Pretty well — and the ongoing budget crisis might be the most important reason. When there is no new money to throw at science, the only way to improve its social value is to tighten how the old money is spent. And science policies under Obama are beginning to add up to a strategy to correct the greatest weakness of the US research enterprise: the isolation of the conduct of science from its use in society.

In biomedicine, the doubling of the US National Institutes of Health (NIH) budget between 1998 and 2003 did not reduce the stunningly high failure rates and costs of drug development. To confront this problem, the Obama administration created the National Center for Advancing Translational Sciences (NCATS), which was approved by Congress in December 2011. Central to NCATS' vision, says NIH director Francis Collins, are partnerships between “government, academia, philanthropy, patient advocates, and biotechnology and pharmaceutical companies to overcome translational roadblocks and offer solutions to detect, treat and prevent disease”.

Despite forecasts of doom, basic science in the United States stands preeminent, as shown by the ongoing harvest of Nobel prizes. But where is the pay-off for the rest of society? The bankruptcy of Detroit in Michigan, once the world auto-industry capital, underscores the need for new science-based technology sectors to create jobs for millions of people, yet it also makes apparent the lack of connection between scientific excellence and economic well-being. To help close this gap, the Obama administration last year created the National Additive Manufacturing Institute. Focused on three-dimensional printing, it is located in the ‘rust belt’ city of Youngstown, Ohio, and was launched with a US\$30-million government contribution matched by corporate funds. In May, the president announced three more manufacturing institutes, each to be “a regional hub designed to bridge the gap between basic research and product development, bringing together companies, universities and community colleges, and federal agencies to co-invest in technology areas”.

In climate change, more than 20 years of research have yielded little in terms of a strategy to adapt to climate impacts or mitigate their causes. The administration is wrapping up what is only the third national assessment of climate since 1990, and is calling for a new process of “sustained assessment”. National

assessments are seen as obligatory end-of-pipe summaries of knowledge. Sustained assessment is different: a continual process, according to the US Global Change Research Program, of engaging “diverse viewpoints of private industry, state and local governments, non-governmental organizations, professional societies and impacted communities” that helps scientists to “understand what information society wants and needs” and “provides mechanisms for researchers to receive ongoing feedback on the utility of the tools and data they provide”.

The Department of Energy (DOE) has long been viewed as an underperformer, beset by programmatic fiefdoms and high-profile failures. Even before President Obama was elected, Congress had authorized the creation of the Advanced Research Projects Agency-Energy to pursue high-risk, high-reward projects outside the DOE bureaucracy, but the

agency did not get funded until early in the Obama administration. A year later, the DOE launched the Energy Innovation Hubs to address challenges such as energy storage, through collaborative teams of “top talent across the full spectrum of R&D performers — including universities, private industry, non-profits, and government laboratories — integrating expertise in multiple scientific disciplines, engineering fields, and technology areas”. And last July, the department said that it was bringing basic research and energy technology research into the same administrative home to enhance “the ability to closely integrate and move quickly among basic science, applied research, technology demonstration, and deployment” — a change that should have been made 25 years ago.

What ties these initiatives together? It is the recognition that when scientists and knowledge users understand one another's evolving capabilities

and needs, resources can be allocated more effectively, and knowledge can be tested for reliability and used more efficiently. Each of the initiatives aims to foster close and persistent links between scientists and those who might benefit from scientific knowledge.

These programmes are not panaceas, and several of them have been controversial. But they move the goals of science policy in the right direction — away from an obsession with how much money is spent on science, and towards a consideration of how best to ensure that science investments turn into public value. The ‘rightful place’ of science must be created through complex institutional arrangements that allow the progress and contributions of science to emerge from its engagement with society. ■

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BASIC SCIENCE IN THE UNITED STATES STILL STANDS PREEMINENT BUT WHERE IS THE PAY-OFF FOR THE REST OF SOCIETY?

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