DOE, NSF Deal with Disappointing Appropriations

Reduced running times at user facilities, staff layoffs, and increased competition for awards are among the consequences anticipated by the U.S. Department of Energy (DOE) Office of Science and the National Science Foundation (NSF) of their fiscal year 2008 appropriations. Although the President and Congress showed strong support for major increases in their 2008 budgets, many NSF and DOE Office of Science programs were ultimately funded below levels consistent with the expected rate of inflation.

In a regular appropriations cycle, the President submits a budget request to Congress for the upcoming fiscal year by early February. Congress then has until October 1 to complete the 12 appropriations bills that provide funding for federal government operations and activities. But by mid-December 2007, the President and Congress had agreed only on appropriations for the Department of Defense (passed November 13). Congress combined the remaining appropriations bills together into one omnibus bill, the Consolidated Appropriations Act, which the President signed into law on December 26, 2007.

Both the President and Congress initially endorsed large increases in the NSF and DOE Office of Science budgets. However, Congress also supported increases for a number of programs whose budgets the President had requested be cut, resulting in a domestic appropriations budget about $20 billion over the President's request. In light of the President's promise to veto any appropriations bill over budget, Congress cut funding in many areas—and the large increases for NSF and the DOE Office of Science disappeared.

The DOE Office of Science budget for FY 2008 received a 4.6% increase over FY 2007. This is significantly less than the amounts originally endorsed by Congress and the President. High-energy physics, nuclear physics, fusion sciences, and basic energy sciences are hardest hit by the allocations, and many DOE-supported programs in these areas will be forced to cut staff and facilities run time, and some projects will be halted completely.

Funding for the Office of Basic Energy Sciences (BES) core research programs remains approximately flat in the FY 2008 appropriations—not accounting for inflation. The losses incurred by inflation mean that some projects will be shut down and some staff positions will be terminated. In addition, new BES initiatives in solar energy utilization, hydrogen research, advanced nuclear energy systems, and mid-scale instrumentation cannot be supported under the 2008 appropriations.

According to Harriet Kung, acting associate director of BES, "The shortfall in FY 2008 prevents BES from supporting most of the new energy research initiatives previously announced and requires BES to curtail existing research activities, scientific facilities operations, instrument development, and new facilities construction."

The Intense Pulsed Neutron Source at Argonne National Laboratory has been shut down as a result of the Act. The other BES user facilities—the synchrotron radiation light sources, neutron scattering facilities, electron beam microcharacterization centers, and nanoscale science research centers—are all operating under reduced hours and user services, and may have to lay off staff.

A number of facilities and instruments under development received lower-than-expected appropriations. The National Synchrotron Light Source-II at Brookhaven National Laboratory, the Advanced Light Source User Support Building at Lawrence Berkeley National Laboratory, and instrument fabrication projects for the Spallation Neutron Source at Oak Ridge National Laboratory, and the Linac Coherent Light Source at the Stanford Linear Accelerator Laboratory were funded at levels 33–70% lower than requested. Project teams are assessing the impacts of the reduced funding, and they anticipate major delays and cost increases.

The National Science Foundation's operating budget increased 2% over its FY 2007 operating budget, which is less than the expected 2.4% rate of inflation and much less than the amounts initially proposed by Congress and the President. NSF's research and development investments increased by only 1.1%, making cuts in grant numbers and sizes highly likely in most research directorates, including NSF's Math and Physical Sciences Directorate, which includes the Division of Materials Research (DMR).

After several years of relatively flat funding, the 2008 Presidential budget request for DMR included an increase of 9.8%. This would have been spread across all funding modes—individual and small groups, research centers, and facilities and instrumentation—and had many positive impacts on materials research. In actuality, the division will receive an increase of less than two percent.

This will lead to some difficult decisions, according to Zakya Kafafi, Director of DMR. But, she said, "There is an opportunity that awaits us to function at our best under the circumstances."

In particular, DMR is advocating that the materials community take advantage of cyberspace and virtual organizations. Shared facilities and equipment will allow materials research and education to move forward under a slight budget, said Kafafi. Expanding the network of remote automation and training programs could enable facilities to be used more efficiently, in addition to providing new opportunities for education and increased participation.

Kafafi also said that the interdisciplinary nature of materials research is an asset. "We have to keep in mind there are opportunities outside of DMR for funding," she said, even though the NSF appropriations are disheartening.

The 2008 appropriations came on the heels of the America COMPETES Act, passed in August 2007. The Act focuses on maintaining and strengthening U.S. innovation, and included authorization to double the DOE Office of Science budget and the NSF budget over the next seven to 10 years. Such a doubling requires an average annual funding increase of about 7% per agency.

"The impact of this 2008 appropriations bill will be minimal if it is a small dip on a rising curve that will quickly correct itself in the next few years," said Kafafi. "However, if this represents itself as a new trend in funding fundamental research and education, it will be extremely difficult for the United States to maintain its competitive edge in many areas of materials science and engineering."

KENDRA RAND

EU Funding Opens the Way for a New Age in Biosociety

The European Commission (EC) has made €1.75 billion available for the funding of projects in 32 areas of research as part of the Seventh Research Framework Program (FP7). These monies have been slated for projects ranging from environmental science to sustainable transport, from nanotechnology to biotechnology. The funding targets the key areas outlined in the Lisbon Agenda and will further Europe's standing as a leader in research and biotechnology, according to the EC.

Biotechnology is having an increasing impact on a range of economic sectors and disciplines, and the EU plans to be at the forefront of these changes, as well as to reap the rewards. No one recognizes the need for action more than the European Science and Research Commissioner Janez Potočnik. "There is no time to lose in research," he said.

Speaking at the announcement of the funding, the Commissioner further commented, "The EU's research framework program has seen a smooth start in 2007,

https://doi.org/10.1557/mrs2008.41 Published online by Cambridge University Press

mobilizing researchers from across Europe and beyond to compete with their best ideas and to cooperate in tackling many challenges. Today, we are continuing this effort and we call on all researchers to participate."

One of the key areas targeted by FP7 is the field of biotechnology, defined as the application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services. Recent years have seen advancements in the life sciences and biotechnology occurring at a rapid pace. Increasing genetic knowledge is paving the way for new gene therapies, agricultural products, foods, and even renewable materials such as biodegradable plastics, according to the EC.

All these advancements have a favorable impact on the bioeconomy of Europe, according to the EC. While still a relatively new concept, bioeconomy refers to a broad range of economic activities that benefit from discoveries and related products and services arising out of the biosciences. In Europe, the life sciences and biotechnology are already the main scientific drivers of the bioeconomy, with estimates of its value reaching €1.6 trillion per annum. This is beneficial not only for profits but also for employment. The agrofood industry in the EU alone employs over four million people and is worth more than €800 billion annually. If the EU is to build the world's most competitive knowledge-based economy and stay ahead of the pack, continual research and development is needed, according to the EU. This also requires the existence of an efficient and effective bio-based economic infrastructure to support it in a sustainable fashion, said the EC.

The impact of a bioeconomy would assist rural development and sustainability; ensure the long-term competitiveness of the European agriculture, food, and chemical industries; and reduce climate-changing greenhouse gas emissions. Biotechnology is opening up new possibilities in terms of tailor-made foods targeted at specific consumer groups. In addition, industrial biotechnology is breaking new ground in understanding microbial biodiversity and bioprocesses that could lead to valuable bioproducts and biomaterials, said the EC.

FP7 places a strong emphasis on international scientific collaboration in all areas of research. Open partnerships with countries from outside the European Research Area are also foreseen. In addition, specific activities have been identified, such as joint research with India on materials science and with Russia on power generation from biomass and tools for large power systems. This year will also see the creation of the Marie Curie International Staff Exchange Scheme to strengthen research partnerships through staff exchanges and networking activities among research organizations both within and outside Europe. This is expected to reinforce the relationships of European research organizations with their international counterparts, and there are specific calls for proposals from researchers in India working on materials and in Russia working on energy.

India Calls for Global Enterprise for Mitigation Technologies

Union Minister for Science and Technology and Earth Sciences, Kapil Sibal, leading the Indian Delegation at the 13th Conference of Parties of the United Nations Framework Convention on Climate Change in Bali, addressed the round table discussions on technology transfer in the context of climate change and global warming. The minister made an appeal to create a Global Enterprise for Mitigation Technologies (GEM).

He said, "Technology is a mixed blessing—while it is often the source of our problems, it also holds the promise of enduring solutions. In our move toward a low-carbon economy, technology has a vital role to play, and therefore, it is quite right that mitigation technologies engage significantly the attention of policymakers and scientists."

Sibal said that India believes there are three major elements: appropriate funding modalities and approaches, a facilitative environment for intellectual property rights, and enhancing the absorptive capacity within developing countries. The G-77+China have already put forward a proposal for the creation of a new multilateral technology cooperation fund that would finance the development, deployment, diffusion, and transfer of technologies for both mitigation and adaptation to developing countries. Sibal emphasized its centrality for future action.

Observing that one of the main barriers to technology adoption lies in the poor absorptive capacities of developing countries, the minister said that technology diffusion could not be forced through the harmonization of standards. Standards and norms must reflect the development levels of where they are being deployed.

Sibal concluded that the global challenge to combat global warming needs a global response. Much like the Human Genome project, the global community might consider a Human GEM project: a Global Enterprise for Mitigation technologies, he said.

Other panelists in the round table were Maxwell Jumah, deputy minister from Ghana; Andy Karsner from the U.S. Department of Energy; and Björn Stigson, president of the World Business Council for Sustainable Development and representative of the Global Environment Facility. □

https://doi.org/10.1557/mrs2008.41 Published online by Cambridge University Press