

U.S. Appropriations and Recovery Acts Lead to New Facilities, More Awards

At a time when many government agencies are facing budget cuts, both the U.S. Department of Energy (DOE) and the U.S. National Science Foundation (NSF) received substantial budget increases and allotments of the recent economic stimulus money. For the materials research community, these increases mean new research facilities, higher award success rates, more graduate students and postdoctoral fellows, funding for mid-scale instrumentation, and large-scale equipment upgrades.

The fiscal year 2009 budget for the DOE Office of Science increased nearly 19% over the fiscal year 2008 budget in the Omnibus Appropriations Act for 2009 (Appropriations Act), passed in March. The Office of Science received an additional \$1.6 billion in economic stimulus funding from the American Recovery and Reinvestment Act of 2009 (Recovery Act), signed into law by President Obama in February.

The Appropriations Act provides \$100 million to the DOE Office of Basic Energy Sciences (BES) for the establishment of 30 Energy Frontier Research Centers (EFRCs). The EFRCs will focus on meeting the basic research needs for a secure energy future, as identified by the 12 BES *Basic Energy Needs* workshops that have taken place since 2003. In May, DOE requested \$100 million to continue funding the centers in the next fiscal year. An additional \$100 million is planned for each of the following three years to fund the 30 EFRCs at \$2–\$5 million per year for the full five-year award.

An additional 16 EFRCs will be established and forward-funded for all five years by \$277 million in economic stimulus money from the Recovery Act. In total, BES plans to invest \$777 million in the 46 EFRCs and nearly 1800 senior investigators, postdoctoral candidates, students, and technicians over the next five years. The 46 centers were announced in April 2009, and were chosen from among 260 applications. For a detailed breakdown of the centers, see www.er.doe.gov/bes/EFRC.html.

The Recovery Act also includes over \$800 million for research, infrastructure, and construction projects at the DOE Office of Science National Laboratories. The largest single allocation, \$150 million, was made to Brookhaven National Laboratory to accelerate construction of the National Synchrotron Light Source-II (NSLS-II). The stimulus funding will substantially reduce the cost risks and schedule risks for the project according to Aesook Byon, deputy project director for the NSLS-II.

Additional allotments were made to Lawrence Berkeley National Laboratory

for construction of the Advanced Light Source User Support Building, to Oak Ridge National Laboratory for an advanced materials and chemistry research facility and new equipment at the Spallation Neutron Source, and to the DOE Nanoscience Research Centers for equipment upgrades and new tools, among others. For a detailed breakdown, see www.energy.gov/news2009/7083.htm.

Other areas that will benefit from the funding increases include core research by students, postdoctoral candidates, and scientists, and a prototype 100-gigabit per second data network linking research centers across the nation. For more information on the stimulus funding allocated to the Department of Energy, visit www.energy.gov/recovery.

The NSF fiscal year 2009 budget for Research and Related Activities—the account that funds the disciplinary research programs—increased by about 7.5% over fiscal year 2008. This increase and an additional \$3 billion in economic stimulus money that NSF received from the Recovery Act will have a direct and significant effect on researchers, including graduate students and postdoctoral fellows.

“The \$3 billion provided to NSF [in the Recovery Act] will go directly into the hands of the nation’s best and brightest researchers at the forefront of promising discoveries, to deserving graduate students at the start of their careers, and to developing advanced scientific tools and infrastructure that will be broadly available to the research community,” said NSF Director Arden Bement in a statement released in February.

Around \$2 billion of the Recovery Act funding will go toward supporting proposals already in the pipeline, or to proposals that the Faculty Early Career Development (CAREER) Program declined after October 1, 2008. According to Zakya Kafafi, director of the Division of Materials Research (DMR), in recent years many excellent proposals have not been successful due to lack of funding. Last year the success rate for DMR proposals was around 21%. According to Kafafi, the division aims to reach an award success rate of greater than 25%, hopefully close to 30%, with the increased funding. The number of funded CAREER proposals will double in FY 2009.

Priority will be given to high-risk research projects with the potential for high-return, with a focus on investigators early in their careers and researchers from groups that are traditionally underrepresented in the physical sciences, namely women, minorities, and people with disabilities. Research areas of inter-

est include, but are not limited to, materials theory, matter by design, materials for renewable energy, and science and engineering beyond Moore’s law. NSF expects to review and/or award all of the proposals eligible for stimulus funding by September 30, 2009.

Within DMR, the added funding will enable the Biomaterials program to move from infancy to a full program, and will increase support for the Partnership in Research and Education for Materials, Materials World Network and International Materials Institutes programs, mid-scale instrumentation, and research and development in and upgrades to DMR-supported national facilities. In an effort to increase the work force in materials science and engineering, DMR will fund more graduate students and postdoctoral fellows working in materials research and education centers, with a focus on broadening participation.

The \$900 million of the NSF-received Recovery Act funding will support research instrumentation, facilities, and infrastructure. New solicitations have been posted on the Web site of the Office of Integrative Activities (www.nsf.gov/od/oiia/programs) for the Major Research Infrastructure program (funded at \$300 million) and the Academic Research Infrastructure program (funded at \$200 million). Another \$100 million will be devoted to education and human resources, including a new Professional Science Masters Program (funded at \$15 million). For more information on the stimulus funding allocated to the National Science Foundation, visit www.nsf.gov/recovery.

KENDRA RAND

Australia Launches \$4.5 Billion Clean Energy Initiative

Through the Clean Energy Initiative, the Australian government will invest (AUD)\$4.5 billion to support the growth of clean energy generation and new technologies, and to reduce carbon emissions and stimulate economic activity. The government is committed to ensuring 20% of Australia’s electricity comes from renewable sources by 2020. This objective is supported by the Renewable Energy Fund and the Energy Innovation Fund, and by efforts to encourage deployment, such as through the Solar Homes and Communities Plan.

The 2009–2010 budget further strengthens Australia’s domestic and international climate change response, with substantial new measures to encourage innovation in clean energy generation and low-emissions technologies.

Investments include:

- \$2.4 billion in low-emissions coal technologies, including new funding of \$2 billion in industrial-scale projects under the Carbon Capture and Storage (CCS) Flagships program;
- \$1.6 billion in solar technologies, including new funding of \$1.4 billion in a Solar Flagships program; and
- \$465 million to establish Renewables Australia to support leading-edge technology research and bring it to market, including new funding of \$100 million. The new body will advise governments and the community on the implementation of renewable energy technologies, and support growth in skills and capacity for domestic and international markets.

This represents an unprecedented investment of \$3.5 billion in new money by the Rudd Government in clean energy in this budget.

The government's commitment to establish the Global Carbon Capture and Storage Institute and the Flagships program will ensure that Australia continues to be a world leader in the development of low-emissions coal technology, according to the ministries for Innovation; for Resources and Energy; for the Environment, Heritage & the Arts; and for Climate Change and Water.

The Institute supports the G8 target for 20 industrial-scale carbon capture and storage projects to be operating around the world by 2020.

In addition, the Flagships program supports the demonstration of large industrial-scale projects in Australia, and may include a carbon dioxide storage hub.

The Rudd Government will establish Renewables Australia to promote the development, commercialization, and deployment of renewable technologies. It will operate at arm's length from government, using a strategic investment approach under an expert board.

The Solar Flagships program will aim to create an additional 1000 MW of solar generation capacity. This ambitious target is three times the size of the largest solar energy project currently operating anywhere in the world, according to the ministries.

Solar Flagships will seek to develop up to four individual generation plants on the national grid. These may demonstrate both solar thermal and solar photovoltaic (PV) technologies, and have electricity generation capacity equal to or greater than a current coal-fired power station.

The specific technologies will be based on a competitive assessment, with an explicit criterion of industry development, including capacity to boost domestic manufacturing and future export potential.

Solar Flagships projects will complement CCS Flagships projects, and demonstrate the Government's commitment to helping to maintain the value of Australia's coal exports and utilizing Australia's renewable potential. The two strategic technology priorities of CCS and solar will be underpinned by supporting specialized research, development, and demonstration programs.

Modernization of EU Research Funding on the Right Track

In April, the European Commission presented a progress report covering the first two years of the 7th European Union (EU) framework program for research and development (FP7), which will last until 2013. The largest EU R&D funding program to date, with a €54 billion budget over seven years, proves to be well suited to answer the EU's economic and societal needs, according to the European Commission. Its structure and new instruments help the EU to address its challenges. Priority areas such as environment, energy, or nanotechnologies contribute to building a sustainable, low carbon economy, with industry-led technology platforms helping to define topics which meet industry's long-term needs. Joint Technology Initiatives embody new public-private ventures on an unprecedented technological and financial scale. FP7 is a strong asset in the EU's fight against the current economic crisis with its budget growing every year by 13% until 2013. The report underlines remaining challenges for the FP7 such as the mobilization of new Member States, the participation of small businesses (SMEs), and administrative simplification.

EU Commissioner for Science and Research, Janez Potočnik, said, "The eco-

nomics crisis is a good reality check for our programs. I'm happy to see that FP7 is passing the test: It injects fresh money to support research, with almost a doubling of the annual budget between 2007 and 2013, and acts as an incentive for Member States and the industry to do likewise."

In its first two years, with around 25,000 proposals reaching the final evaluation stage, 5500 were selected to receive grants totaling around €10 billion. Demand was high for the new European Research Council, with around 11,000 proposals for its first calls. Over 600 grants have been provided to EU researchers. Responding to the needs of industry for strategic technology development, five Public-Private Partnerships (JITS) have been launched. The new Risk Sharing Finance Facility (RSFF) has approved loans of €2 billion to support high-risk R&D projects.

In the first two years, 44% of the budget for collaborative research has been allocated to interdisciplinary research such as environment, energy, agriculture, transport, nanotechnologies, and information and communication technologies, supporting the EU's renewed sustainable development strategy. As part of the EU economic recovery plan, FP7 will support the "greening" of the EU automotive, manufacturing, and construction sectors through three public-private R&D partnerships.

Stronger and more strategic international cooperation is among the FP7 priorities. For instance, new countries have been associated to FP7, bringing their total number to 12; a specific EU-Africa Partnership on Science, Information and Space has been signed; and the International scientific collaboration was promoted by the launch of the International Thermonuclear Experimental Reactor (ITER).

According to the report, some issues need further attention, such as the low participation of SMEs. Successful participation of researchers from new Member States can be improved. Progress on simplification and the effective operation of new instruments may require changing the ground rules. To further improve FP7, the Commission will be seeking advice from an independent expert group, which will undertake an FP7 Interim Evaluation by autumn 2010. □