Opportunities within the American Recovery and Reinvestment Act (ARRA)

Overview

The National Science Foundation (NSF), the Department of Energy Office of Science (DOE OS), and the National Institute of Standards and Technology (NIST), the three agencies highlighted in the America COMPETES Act of 2007 and the American Competitiveness Initiative (ACI) under President Bush, all received significant boosts to their budgets from the ARRA. Among other provisions, the final bill also gives NIH $10.4 billion in stimulus funding, provides $3.5 billion for energy R&D at the Department of Energy (DOE), and funds climate change-related projects in the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA). In addition, some funds that are provided to the State of Pennsylvania through the State Fiscal Stabilization Fund (SFSF) may be used for higher education infrastructure. Together, these investments represent significant opportunities for Lehigh University in the areas of research, instrumentation and infrastructure, and education. A brief summary is provided of funding within these three areas for several of the largest federal funding agencies and the state.

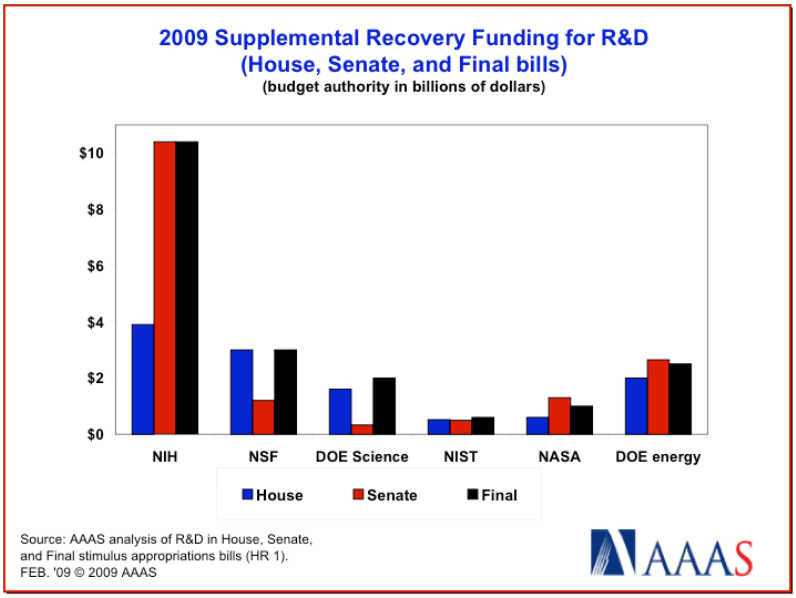
Total Federal R&D Funding: $21.5 billion
R&D Activities: $18.0 billion
Facilities and Infrastructure: $3.5 billion

Funding by Agency

- NIH: $10.4 billion
- NSF: $3 billion
- DOE: $5.5 billion (1.6 billion for Office of Science)
- NIST: $0.6 billion
- NASA: $1 billion
- Other: $1 billion

Some additional details are also given in the Figure below and in Appendix I.

A Blackboard/Wiki site (bb.lehigh.edu) has been set up under the title “Stimulus Package (ARRA) Information.”



Department of Energy (DOE)

Research

DOE Office of Science (DOE-OS)

The stimulus package provides $1.6 billion for DOE-OS. There is no specific directive on the expenditure of these funds for research or on laboratory or scientific infrastructure. Some reports suggest that these funds will be used to clear the backlog of repair and construction projects at the Department of Energy National Laboratories.

ARRA funds may go to DOE-OS's new Energy Frontier Research Centers (EFRC) program. While the proposals are currently under review, Congress has not yet approved FY 2009 funding for this program. If the funding is approved, the EFRC program could receive additional funding from ARRA. DOE received 260 applications (71 % from universities), requesting a total of $4.9 billion over 5 years. Awards would be $2 to $5 million per year over a five-year period, so DOE would only be able to fund 20 - 50 awards with the requested FY 2009 funding level of $100 million.

DOE Other Programs

ARRA includes a sizeable investment to develop new, clean, renewable energy sources to reduce the nation's dependence on foreign oil. The bill includes almost $30 billion for investments in applied research, loan guarantees and grants to develop new technologies in partnership with industry, and energy efficiency and conservation activities. The applied R&D funding in the bill includes potential partnerships between universities and industry to develop the next generation of renewable energy technologies. DOE, while it has some Congressional direction on the programs' shape, will still need time to develop new solicitations.

- ***DOE Energy Efficiency and Renewable Energy Research and Development (EERE)*** The bill includes $2.5 billion for applied research, development, demonstration and deployment of energy efficiency and renewable energy technologies. Of this, $800 million is for biomass projects and $400 million is for geothermal activities and projects. Also included is an allocation of $50 million for research to increase the efficiency of information and communications technology and to improve standards. The remaining $1.25 billion in support could also be made available for wind, solar, waterpower, hydrogen, and vehicles, industrial and buildings technologies activities.

- ***DOE Fossil Energy*** ARRA includes $1 billion for existing fossil energy research and development programs. An additional $1.52 billion is directed to a competitive solicitation for a range of industrial carbon capture and energy efficiency improvement projects, including a small amount for innovative concepts for beneficial CO_2 reuse. To further the development of carbon capture and storage technologies, DOE will also receive $50 million for a competitive solicitation for site characterization activities in geologic formations and $20 million for geologic sequestration training and research grants.

- ***Smart Grid*** ARRA provides $4.5 billion for activities related to developing the smart electricity grid, of which $100 million is for worker training. This funding is a major new investment of federal funding that is likely to be focused on collaboration with industry and utilities, but there may be some opportunities for academic researchers.

- ***Advanced Research Projects Agency – Energy (ARPA-E)*** $400 million in ARRA establishes ARPA-E, as authorized in the America COMPETES Act. This organization, within DOE but outside both the Office of Science and the applied research programs, is modeled after the Defense Advanced Research Projects Agency (DARPA) and is legislatively directed to support novel early-stage energy research, development of technologies, research and development of manufacturing processes, and coordination for technology demonstration and facilitation of technology transfer. Steven Chu, the new Secretary of DOE, has explicitly stated he considers the development of a new class of solar cells and biomass substitutes for oil appropriate research focuses for ARPA-E funding.

Instrumentation and Infrastructure

ARRA provides DOE with $3.2 billion to fund a new Energy Efficiency and Conservation Block Grant (EECBG) program. This program provides funding to State, local, and tribal governments for energy efficiency and conservation projects to implement strategies to reduce fossil fuel emissions, reduce total energy use, and improve energy efficiency in the transportation, building and other sectors. Under the population-based formula, 68 percent of the funds will go to local governments, 28 percent to States, 2 percent to Indian tribes, and 2 percent ($400 million of this funding) for competitive grants.

Education

Nothing noted at this time for DOE.

National Institutes of Health (NIH)

Research

Of the $10.4 billion assigned to NIH, $8.2 billion is available for research projects.

Of the $8.2 billion, $800 million will be given out be the Office of the Director for short-term grants with a focus on:

- current scientific challenges
- new research within existing projects
- research on public and international health priorities

The remaining $7.4 billion will be distributed among the centers and institutes of NIH and the Common Fund in proportion to the existing allocations. NIH is concerned that the funds need to be used over a 2-year period. Funding is available until September 30, 2010.

Each institute within NIH has been charged to develop their own plan. However, the following mechanisms for the distribution of funds are likely to be used:

- ***Challenge Grants*** These will focus on currently intractable research problems or to jump start emerging research areas. They are likely to focus on multi-disciplinary, cross-institutional projects, with $500,000 per year available for two years for each project.

- ***R01s and related research mechanisms*** The main focus will be on previously approved but not funded R01s (1400 such exist) that have been through the peer review process already. Grant renewals are also eligible for stimulus funding (unlike NSF). The only new proposals considered will be those that can be completed within 2 years.

- ***Supplemental funding*** This will be used to expand the goals for existing projects as, e.g., with new cross training positions or equipment.

Instrumentation and Infrastructure

$1 billion will be available for competitive awards for construction/renovation/repair of existing extramural research facilities. These funds will be made available (probably) through the resurrection of the existing C06 Construction Grant with a new request for application that will be released soon.

$300 million will be available for shared instrumentation and other capital equipment through the ongoing Shared Instrumentation Grant program of the NIH National Center for Research Resources.

Education

Nothing noted at this time for NIH.

National Science Foundation (NSF)

Research

Of the $3 billion for NSF, $2 billion will be appropriated for NSF research directorates and offices. This money need not be distributed equally between programs but the distribution will be determined internally. Also, geographical parity in funding will not be a criterion in assigning funds (as it may be for some NIH programs).

Main focus will be on raising success rates in ongoing and planned FY2009 core programs, including those whose due dates fell within 2009.

Focus on early career researchers and support for undergraduate research, graduate students, and post-docs.

No supplements will be given for past grants from these funds (general policy direction from Office of Management and Budget) but the funding could be used for supplements for upcoming 2009 renewals.

Timeline for funding: Congressional pressure is to assign as much of it as possible by September 30, 2009, but the funding is available through September 30, 2010. Also, NSF can use the money for a 3-year project length while NIH needs to spend it in a 2-year period.

Instrumentation and Infrastructure

$200 million will be used to restart an old program (through a new solicitation) for repair and renovation of science and engineering facilities at institutions of higher learning and research. Criteria for funding this program are likely to be: impact of proposed renovation on future research and training and improving National research capabilities; the need for renovation for the facility; and the merit of the project and management budget and funding. There may be institutional limits on the number of such applications.

$300 million will be assigned to the existing MRI: Major Research Instrumentation program. (The current solicitation closed in January 2009). NSF may direct the additional $300million to the proposals already submitted, raise the maximum grant amount to $6 million, and/or waive cost sharing requirements.

Education

$100 million is provided for three education programs:

- $60 million for the Robert Noyce Teacher Scholarship program
- $25 million for the Math and Science Partnerships program (both existing programs)
- $15 million to establish a new ***Professional Science Master's program***. This was authorized in 2007, but never funded. This program aims to facilitate the creation or improvement of professional science master's degree programs that emphasize practical training in high-need areas.

Other Agencies

Research

Department of Defense (DoD) $300 million to DoD to assist with the development of energy efficiency technology. Each of the Research, Development, Test and Evaluation (RDTE) offices within the Army, Navy and Air Force will receive $75 million, with another $75 million allotted for the Defense-wide RDTE office. These funds will provide financial support for pilot projects, demonstrations and energy efficient manufacturing enhancements.

Healthcare Comparative Effectiveness This program addresses research focused on comparative "clinical effectiveness" of alternative therapies. $1.1 billion will be provided for comparative effective research under the following agencies (the mechanism for distributing this money has not been determined):

- $ 700 million for the Agency for Healthcare Research and Quality (AHRQ)
- $ 400 million for NIH
- $400 million for the Office of Health and Human Services (HHS) via the Office of the Secretary

National Aeronautics and Space Administration (NASA) NASA receives $1 billion, with:

- $400 million targeted for earth science climate research missions and improving NASA's supercomputing capabilities
- $150 million for activities related to aviation safety, environmental impact mitigation and the NextGen Air Transportation System
- $400 million for exploration activities
- $50 million for cross-agency support, with the priority of spending for NASA-owned facilities damaged in 2008 by hurricanes and natural disasters

National Oceanic and Atmospheric Administration (NOAA) NOAA gets $830 million, with:

- $230 million for NOAA operations, research, and facilities
- $600 million for construction and repair of NOAA facilities, ships and equipment, of which $170 million will address critical gaps in climate modeling and establish climate data records for continuing research into the cause, effects and ways to mitigate climate change.

Instrumentation and Infrastructure

National Institute of Standards and Technology (NIST) ARRA provides $580 million to NIST. Of that, $220 million is for scientific and technical research and services and $360 million is for construction of research facilities, of which $180 million is for a competitive construction grant program for research science buildings. This program established in 2008 provided competitive awards for construction of research science buildings at colleges, universities, and other research organizations. This funding is for competitions held in FY 2008 (for which NIST received 93 proposals and made only 3 awards) and FY 2009. In the FY 2008 version, funds were to be used for construction of new buildings or expansion of existing research science buildings, such as laboratories, test facilities, measurement facilities, and observatories. (Unlike other infrastructure programs in the stimulus bill, this program is not for renovation.) As in FY2008, cost sharing will be encouraged, between 25 – 50%. The timeline for FY2009 is not yet clear.

In addition, as part of the Health Information Technology initiative, $20 million is transferred from HHS to NIST to create and test standards related to health security and interoperability. As part of the Smart Grid initiative, $10 million will be transferred from DOE to NIST. Thus the stimulus appropriations combined with a regular appropriation could leave NIST with a FY 2009 budget of $1.3 billion or higher, well above the $882 million authorized for FY 2009 in the America COMPETES Act of 2007.

Education

Department of Labor (DOL) The stimulus bill provides $2.95 billion for formula grants to States for training and employment services. ARRA allows local workforce investment boards to contract with institutions of higher education and other eligible training providers to offer increased training for individuals for high demand occupations.

ARRA also includes $750 million for a program of competitive grants for worker training and placement in high growth and emerging industry sectors. This includes $500 million for projects that prepare workers for careers in energy efficiency and renewable energy. Grants are to non-profit partnerships that include industry and labor and may include educational institutions. (This is a program that was authorized in 2007 but never funded.) The remaining funds are directed to training in health care; training for wireless and broadband deployment, advanced manufacturing and other high demand industry sectors.

State of Pennsylvania

Research

Nothing noted at this time.

Instrumentation and Infrastructure

State Fiscal Stabilization Fund (SFSF) — Higher Education Infrastructure $53.6 billion for SFSF to restore State support for elementary, secondary and postsecondary public education. Within SFSF, $48.6 billion is distributed to the States by formula. SFSF funds must first be used to restore State aid to school districts for primary elementary and secondary education and State support to public institutions of higher education. The bill directs the latter institutions to use the funds to "mitigate the need to raise tuition and fees for in-State students" and prohibits all institutions from using the funds to increase endowments. After restoring State education budgets, remaining SFSF funds can be used to provide subgrants to public and private institutions of higher education for modernization, renovation, or repair of facilities. Funds cannot be used for new construction.

Under Governor Rendell's plan, Pennsylvania will use half of the $1.9 billion in SFSF in 2009-10 and the remainder in 2010-11. Of the $953 million that will be allocated in 2009-10:

- $42 million will restore planned budget cuts to the four state-related universities
- $418 million will fully fund the second year of the state's school funding formula and $319 million will be allocated to school districts for other academic investments
- $173 million will support other government services

Governor Rendell scheduled briefings on the ARRA stimulus package for Pennsylvania legislative leadership, local elected officials, the Pennsylvania delegation in Washington and a special briefing for all interested members of the Pennsylvania legislature. The Governor has also directed each cabinet secretary and agency director to brief key stakeholders and gather input on specific Pennsylvania use of these funds by mid-March.

The Office of Government Relations at Lehigh is carefully monitoring federal ARRA funding as it is dispersed to appropriate agencies in Harrisburg. Some of these may include the Department of Community and Economic Development (DCED), Department of Environmental Protection (DEP), and the Department of Health (DOH). The Association of Independent Colleges and Universities in Pennsylvania (AICUP) will host a seminar at Lehigh on March 26, 2009 providing an overview of federal stimulus dollars.

Education

Nothing noted at this time, but see item under Department of Labor (DOL).

Recommendations for Lehigh's Response

Campus leadership

- Gather information on programs for ongoing, new, and ready-to–start renovation or new facilities and prioritize these for the institution as there may be a limited number allowed per institution both by NSF and NIH. For NIST, consider applying for new construction of science research buildings through the new 2009 solicitation, and if possible, revisit any applications made to the FY 2008 competition.

- Identify existing and new Professional Science Masters degree programs that include collaborations with State industries and other employers as partners (to fund these through NSF).

- Look to developing new programs and growing existing ones in the area of Comparative Effectiveness in Healthcare.

- Coordinate with the Pennsylvania Governor and relevant State and local programs to seek support for "green campus" building and renovation initiatives through DOE.

- Coordinate with the Pennsylvania Governor on the renovation and repair needs on the campus to be funded by the SFSF – Higher Education Infrastructure.

- Get familiar with Renewable Energy tax credits (allocated through the U.S. Treasury) and Clean Energy bonds (CEBS) (allocated through the State), both obtainable through DOE in relation to investments in campus construction.

Individual Researchers and Groups

- **DOE:** Now is the time to float energy and environment white papers to DOE program managers. Review current or potential industry collaborations for DOE applied research program awards to industry-led partnerships. Reach out to program staff in the DOE applied research offices to provide ideas on new solicitations and raise awareness of ongoing Lehigh programs.

- **NIH:** Find out from program officers about research topics suitable for challenge grants and about supplemental funding to existing grants. Identify multidisciplinary teams for challenge grants focusing on projects that can be completed in two years.

- **NSF:** Find out about supplements in 2009 for currently funded programs. Consider revising (increasing) budgets for pending applications and resubmitting earlier applications. Consider resubmission of old MRI proposals to NSF.

Table. R&D and Other S&T Funding in FY 2009 Economic Recovery Act Appropriations

(budget authority in millions of dollars)

	FY 2009 House	FY 2009 Senate *	**FY 2009 FINAL**	FY 2008 Total
National Institutes of Health	3,900	10,400	**10,400**	29,607
Natl. Ctr. for Research Resources	*1,500*	*300*	***1,300***	*1,149*
Office of the Director	*1,500*	*9,200*	***8,200***	*1,109*
Buildings and Facilities	*500*	*500*	***500***	*119*
Transfer from AHRQ 2/	*400*	*400*	***400***	*0*
National Science Foundation	3,000	1,200	**3,000**	6,055
Academic Research Infrastructure	*200*	*0*	***200***	*0*
Major Research Instrumentation	*300*	*0*	***300***	*94*
Other Res. & Related Activities	*2,000*	*1,000*	***2,000***	*4,827*
Education and Human Resources 3/	*100*	*50*	***100***	*726*
Major Res. Equip & Facil. Constr.	*400*	*150*	***400***	*205*
Dept. of Energy Office of Science	1,600	330	**1,600**	4,036
ARPA-E (Adv. Research Projects Agency - Energy)	400	0	**400**	0
DOE Energy Efficiency & Renewables 1/	2,000	2,648	**2,500**	1,238
DOE Fossil Energy 1/	0	200	**1,000**	576
DOE Weapons Activities 1/	0	500	**0**	2,742
National Aeronautics & Space Admin.	600	1,300	**1,000**	17,179
Science	*400*	*450*	***400***	*4,706*
Aeronautics	*150*	*200*	***150***	*512*
Cross-Agency Support Programs 3/	*50*	*200*	***50***	*3,243*
Exploration	*0*	*450*	***400***	*3,143*
Department of Defense R&D Programs 1/	350	200	**200**	79,347
Natl. Inst. of Standards and Technology	520	495	**600**	737
Scientific and Tech. Res. And Services	*100*	*168*	***220***	*441*
Technology Innovation Program	*70*	*0*	***0***	*46*
Manufacturing Extension Partnership 3/	*30*	*0*	***0***	*90*
Construction of Research Facilities	*300*	*307*	***360***	*160*
Transfer for Health IT to STRS	*20*	*20*	***20***	*0*
Natl. Oceanic and Atmospheric Admin. 3/	1,000	1,022	**830**	3,896
U.S. Geological Survey facilities 3/	200	135	**140**	100
USDA CSREES Agri. and Food Res. Initiative	0	50	**0**	191
USDA ARS Buildings and Facilities	209	0	**176**	47
HHS Agency for Healthcare Res. And Quality 2/	300	300	**300**	0
HHS Office of the Secretary AHRQ transfer 2/	400	400	**400**	0
HHS Centers for Disease Control buildings 3/	462	412	**0**	55
HHS Office of Sec. pandemic flu 3/	420	0	**0**	75
HHS Office of Sec. Biodefense countermeasures	430	0	**0**	102
				Government wide:
AAAS estimates of R&D in items above:	13,209	17,773	**21,506**	144,354
Conduct of R&D	*9,529*	*15,786*	***18,000***	*139,878*
R&D facilities and capital equipment	*3,680*	*1,987*	***3,506***	*4,476*

AAAS estimates of R&D and related items in FY 2009 House, Senate, and conference stimulus bills (HR 1).

Most programs in this table are a mix of R&D and non-R&D items, except as noted.

* - Reflects Senate-approved amendments to the original Senate bill.

1/ R&D items only. Excludes non-R&D spending.

2/ For health care comparative effectiveness research.

3/ Non-R&D items.

AAAS - February 12, 2009 REVISED to reflect House-Senate conference report.