

# **Research Infrastructure in the President's 2011 Budget**

A Report to Congress on Federal Investments in Research Facilities Construction and Major  
Research Instrumentation

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## Summary

The President's 2011 Budget proposes to invest \$4.6 billion in research infrastructure, defined as support for R&D facilities construction, maintenance and the purchase of major capital equipment for R&D. The current state of Federal support for research infrastructure, however, requires consideration of the Recovery Act, which provides unprecedented, substantial investments in research facilities construction and renovation and major research instrumentation for intramural and extramural laboratory facilities. Most of these funds have yet to be awarded, although they will be awarded by the close of fiscal year (FY) 2010. These investments, when fully obligated, are likely to change dramatically the state of research infrastructure in the Nation's Federal laboratories, national user facilities, and academic institutions. Therefore, at this time it is our assessment that it is premature to identify deficiencies in research infrastructure or prioritize future needs for Federal investments in research infrastructure. As Recovery Act and follow-on FY 2010 and FY 2011 funds are awarded, the Committee on Science of the National Science and Technology Council will be actively monitoring the progress of research facilities construction and maintenance as well as procurement of major instrumentation. The Committee's work will be informed by the results of the National Science Foundation's survey of science and engineering facilities at academic institutions, last conducted in FY 2005 but scheduled to be refreshed later in 2010, which will provide a comprehensive national assessment of academic research infrastructure. The Committee's work will also be informed by ongoing dialogue between Federal agencies on the state of research infrastructure in Federal intramural and contractor-operated facilities.

## Federal Investments in Research Infrastructure

As part of the annual Federal budget, Federal agencies are required to report their investments in research and development (R&D) to the Office of Management and Budget (OMB) according to the guidelines and definitions established in OMB Circular A-11 Schedule C. Within agencies' R&D portfolios, OMB Circular A-11 requires agencies to distinguish between conduct of R&D (further divided into basic research, applied research, and development), research and development facilities, and major equipment for R&D based on the following definitions (reproduced here from the November 2009 edition of OMB Circular A-11):

### **Conduct of research and development** in OMB Circular A-11:

Research and development (R&D) activities comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications. Include:

- Administrative expenses for R&D.

Exclude:

- Physical assets for R&D such as R&D equipment and facilities.
- Routine product testing, quality control, mapping, collection of general-purpose statistics, experimental production, routine monitoring and evaluation of an operational program, and the training of scientific and technical personnel.

**Research and development facilities** in OMB Circular A-11:

Amounts for the construction and rehabilitation of research and development facilities. Includes the acquisition, design, and construction of, or major repairs or alterations to, all physical facilities for use in R&D activities. Facilities include land, buildings, and fixed capital equipment, regardless of whether the facilities are to be used by the Government or by a private organization, and regardless of where title to the property may rest. Includes the international space station and such fixed facilities as reactors, wind tunnels, and particle accelerators.

**Major equipment for research and development** in OMB Circular A-11:

Amounts for major equipment for research and development. Includes acquisition or design and production of movable equipment, such as spectrometers, research satellites, detectors, and other instruments. At a minimum, this line should include programs devoted to the purchase or construction of R&D equipment.

The R&D facilities category listed above is also known as “R&D facilities construction.” The Major equipment for R&D category listed above is also known as “major capital equipment for R&D” and includes major research instrumentation. In this report, the terms “major equipment for R&D” and “major research instrumentation” are used interchangeably. These two categories are commonly combined into one category known variously as “R&D plant” or “research infrastructure” or “R&D facilities and equipment” or “R&D Facilities Construction and Major Capital Equipment for R&D.”

These agency-reported data are published annually as part of the Budget of the U.S. Government. For the 2011 Budget, these data appear in the Analytical Perspectives volume of the *Budget of the U.S. Government Fiscal Year 2011* in Chapter 21, Research and Development. The budget data are presented in Table 21-1; R&D facilities and major equipment for R&D are combined into a Facilities and Equipment category in the Table. Table 1 of this report reproduces the data on Facilities and Equipment from the Research and Development chapter. Tables 2 and 3 subdivide the data in Table 1 into its components. Table 2 of this report presents data on R&D Facilities Construction by Federal agency for Fiscal Years 2009 through 2011; Table 3 of this report presents data on Major Capital Equipment for R&D by Federal agency for Fiscal Years 2009 through 2011. (Although the Circular A-11 provides standard definitions for the various categories of R&D, there are minor inconsistencies between Federal agencies in how they classify programs as conduct of R&D, major equipment for R&D, and R&D facilities construction. Some of these inconsistencies are noted in this report.)

**Table 1.** R&D Facilities Construction and Major Capital Equipment by Agency  
(budget authority in millions of dollars)

	FY 2009 Actual 1/	FY 2010 Estimate	FY 2011 Proposed
<b>R&amp;D Facilities Construction and Major Capital Equipment for R&amp;D</b>			
Defense (military)	228	84	<b>97</b>
Health and Human Services	1,662	125	<b>150</b>
<i>Nat'l Institutes of Health</i>	1,633	108	<b>133</b>
NASA	2,180	2,267	<b>2,547</b>
Energy	2,027	1,088	<b>928</b>
<i>Office of Science</i>	1,303	648	<b>667</b>
<i>Defense Programs</i>	248	186	<b>162</b>
<i>Energy Programs</i>	476	254	<b>99</b>
Nat'l Science Foundation	998	458	<b>452</b>
Agriculture	327	185	<b>34</b>
Commerce	775	365	<b>331</b>
NOAA	348	255	<b>176</b>
NIST	427	110	<b>155</b>
Interior	10	7	<b>2</b>
Transportation	20	22	<b>25</b>
Telecom. Dev. Fund	6	4	<b>0</b>
Smithsonian	74	46	<b>58</b>
<b>Total R&amp;D Facils. &amp; Capital Equip.</b>	<b>8,307</b>	<b>4,651</b>	<b>4,624</b>
Defense	476	270	<b>259</b>
Nondefense	7,831	4,381	<b>4,365</b>

1/ Includes Recovery Act appropriations.

The data in Tables 1 through 3 show that the Federal government makes substantial investments in the construction, renovation, and maintenance of the Nation's laboratory facilities and the Nation's stock of major research instrumentation. Agency proposals in the 2011 Budget include \$4.6 billion for R&D facilities and R&D major equipment within a \$147.7 billion Federal R&D portfolio. The \$4.6 billion total in the 2011 Budget is down slightly (\$27 million) from the \$4.7 billion 2010 enacted funding level.

**Table 2. R&D Facilities Construction by Agency**  
(budget authority in millions of dollars)

	FY 2009 Actual 1/	FY 2010 Estimate	FY 2011 Proposed
<b>Research and Development Facilities Construction</b>			
Defense (military)	228	84	97
Health and Human Services	1,638	116	141
<i>Nat'l Institutes of Health</i>	1,633	108	133
NASA	1,994	2,157	2,427
Energy	1,045	529	371
<i>Office of Science</i>	548	239	261
<i>Defense Programs</i>	101	75	50
<i>Energy Programs</i>	396	215	60
Nat'l Science Foundation	28	49	43
Agriculture	289	145	-7
Commerce	370	80	125
NOAA	92	0	0
NIST	278	80	125
Interior	10	7	2
Transportation	20	22	25
Telecom. Dev. Fund	6	4	0
Smithsonian	74	46	58
<b>Total R&amp;D Facils. Construc.</b>	<b>5,702</b>	<b>3,239</b>	<b>3,282</b>
Defense	329	159	147
Nondefense	5,373	3,080	3,135

1/ Includes Recovery Act appropriations.

**Federal agencies not listed do not report R&D facilities spending.**

The current state of Federal support for research infrastructure, however, requires consideration of the Recovery Act, which provides substantial investments in research infrastructure. The FY 2009 data show the dramatic impact of investments in the American Recovery and Reinvestment Act (ARRA or Recovery Act; Public Law 111-5). FY 2009 figures in Tables 1, 2, and 3 include Recovery Act appropriations and enacted 2009 appropriations. The \$8.3 billion FY 2009 funding level for research infrastructure is nearly twice the approximately \$4.6 billion annual investments of recent years. It is worth noting that one construction project, the International Space Station (which did not receive Recovery Act funds) in the National Aeronautics and Space Administration (NASA), accounts for \$2 billion annually in R&D facilities construction funding. Excluding the Space Station, the FY 2009 Federal investment in research infrastructure represents a nearly 2.5-fold increase over annual Federal investments in research infrastructure. Federal investments in major research instrumentation of \$2.6 billion in FY 2009 (see Table 3) are nearly double the \$1.3 billion proposed for FY 2011; excluding the approximately \$2 billion

annually for the Space Station, the Federal investment in R&D facilities construction in FY 2009 is triple the FY 2011 proposed investment (see Table 2).

**Table 3.** Major Capital Equipment for R&D by Agency  
(budget authority in millions of dollars)

	FY 2009 Actual 1/	FY 2010 Estimate	FY 2011 Proposed
<b>Major Capital Equipment for R&amp;D</b>			
Health and Human Services	24	9	<b>9</b>
<i>Nat'l Institutes of Health</i>	0	0	<b>0</b>
NASA	186	110	<b>120</b>
Energy	982	559	<b>557</b>
<i>Office of Science</i>	755	409	<b>406</b>
<i>Defense Programs</i>	147	111	<b>112</b>
<i>Energy Programs</i>	80	39	<b>39</b>
Nat'l Science Foundation	970	409	<b>409</b>
Agriculture	38	40	<b>41</b>
Commerce	405	285	<b>206</b>
<i>NOAA</i>	256	255	<b>176</b>
<i>NIST</i>	149	30	<b>30</b>
<b>Total Major Capital Equip.</b>	2,605	1,412	<b>1,342</b>
Defense	147	111	<b>112</b>
Nondefense	2,458	1,301	<b>1,230</b>

1/ Includes Recovery Act appropriations.

**Federal agencies not listed do not report major R&D equipment spending.**

### **Recovery Act Investments in R&D Facilities Construction and Major Research Instrumentation**

The American Recovery and Reinvestment Act (ARRA or Recovery Act; Public Law 111-5) provided unprecedented, substantial investments in research infrastructure for intramural and extramural facilities construction and major instrumentation. Most of these funds have yet to be awarded, although they will be awarded by the close of FY 2010. These investments, when fully obligated, are likely to change dramatically the state of research infrastructure in the Nation's Federal laboratories, national user facilities, and academic institutions. Therefore, at this time it is our assessment that it is premature to identify deficiencies in research infrastructure or prioritize future needs for Federal investments in research infrastructure.

*U.S. Department of Agriculture, Agricultural Research Service, Buildings and Facilities, \$176 million*

The U.S. Department of Agriculture's (USDA) Agricultural Research Service (ARS) Buildings and Facilities (B&F) account supports construction and maintenance of intramural ARS laboratory facilities around the nation. Recovery Act funding enables ARS laboratories to fund deferred maintenance projects. Of the \$176 million appropriated, \$39 million has been obligated as of February 2010. The full impacts of this funding on ARS laboratories will not be known

until the end of FY 2010 when all funds are obligated. The past several budget requests have requested no funding for this account.

*Department of Commerce, National Institute of Standards and Technology, Construction of Research Facilities, \$360 million*

The National Institute of Standards and Technology's (NIST) Construction of Research Facilities (CRF) program customarily funds intramural construction, renovation, and maintenance work. The Recovery Act provided \$180 million for a competitive, extramural construction grant program for research facilities outside the NIST laboratories. The remaining \$180 million in Recovery Act appropriations will be used for construction, renovation, and maintenance projects at NIST laboratory facilities in Maryland and Colorado. As of February 2010, roughly half of these funds have been obligated (\$186 million). In January 2010, NIST announced 12 external awards totaling \$123 million ([http://www.nist.gov/public\\_affairs/releases/20100108\\_cgp\\_awards.htm](http://www.nist.gov/public_affairs/releases/20100108_cgp_awards.htm)) for 11 universities and one non-profit institution. In July 2009, NIST announced \$55.5 million for 4 cost-shared university research facilities awards that were meritorious but unfunded project proposals received in a 2008 research construction grant competition.

*Department of Commerce, National Oceanic and Atmospheric Administration, Operations, Research and Facilities and Procurement, Acquisition, and Construction, \$830 million*

These two NOAA accounts received \$830 million in the Recovery Act. Funding includes \$230 million for habitat restoration, navigation projects, vessel maintenance, and other activities. An additional \$430 million will be dedicated for construction and repair of NOAA facilities, ships and equipment, improvements for weather forecasting and satellite development. A total of \$170 million also will be directed for climate modeling activities, including supercomputing procurement and research into climate change. NOAA has identified a portion of this funding as R&D facilities construction or major capital equipment for R&D. As of March 15, 2010, \$566 million of these funds have been obligated.

*Department of Energy, Office of Science, \$1.6 billion*

The Department of Energy's (DOE) Office of Science is a leading Federal supporter of large-scale scientific user facilities for shared use by the science and engineering community, including researchers at academic institutions. Recovery Act appropriations totaling \$1.6 billion, of which \$1.5 billion has been obligated as of February 2010, have been allocated for the conduct of R&D as well as R&D facilities construction and major capital equipment of R&D. DOE Science reports spending \$1.3 billion on R&D facilities construction and major capital equipment of R&D in FY 2009 (see Table 1), double the 2010 enacted and 2011 Budget investments for the Office because of the infusion of Recovery Act funds. The Office of Science has published a report providing details of its Recovery Act investments ([http://www.energy.gov/recovery/documents/Office\\_of\\_Science\\_Program\\_Plan.pdf](http://www.energy.gov/recovery/documents/Office_of_Science_Program_Plan.pdf)), including: \$330 million for operations and equipment at Office of Science major scientific user facilities, used annually by over 20,000 researchers; \$150 million for ongoing construction on the National Synchrotron Light Source-II at Brookhaven National Laboratory, in Upton, New York; \$125 million for needed infrastructure improvements across nine DOE National Laboratories: Ames Laboratory, Argonne National Laboratory, Brookhaven National Laboratory, Fermi National

Accelerator Laboratory, Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Stanford Linear Accelerator Center, and Thomas Jefferson National Accelerator Facility; \$123 million for major construction, modernization, and needed decommissioning of laboratory facilities at Oak Ridge National Laboratory (ORNL), in Oak Ridge Tennessee; Lawrence Berkeley National Laboratory (LBNL), in Berkeley, California; and Brookhaven National Laboratory; and \$65 million for construction of the 12-Billion Electron Volt Upgrade of the Continuous Electron Beam Accelerator Facility (CEBAF) at Thomas Jefferson National Accelerator Facility (TJNAF) in Newport News, Virginia.

*Department of Energy, Energy Efficiency and Renewable Energy, \$206 million*

Within a \$16.8 billion total Recovery Act appropriation (\$14.5 billion obligated as of February 2010), the Department of Energy's (DOE) Energy Efficiency and Renewable Energy (EERE) program has obligated \$105 million in Recovery Act funds for eight new projects to establish critical research and testing facilities at seven U.S. Department of Energy (DOE) national laboratories. These projects were announced in November 2009 ([http://apps1.eere.energy.gov/news/daily.cfm/hp\\_news\\_id=218](http://apps1.eere.energy.gov/news/daily.cfm/hp_news_id=218)). The EERE program has also obligated \$101 million in Recovery Act funding for National Renewable Energy Laboratory (NREL) facility and infrastructure improvements ([http://apps1.eere.energy.gov/news/daily.cfm/hp\\_news\\_id=163](http://apps1.eere.energy.gov/news/daily.cfm/hp_news_id=163)). These investments represent a substantial increase over the average in annual EERE funds in recent years for R&D facilities construction.

*Department of Health and Human Services, National Institutes of Health, National Center for Research Resources, \$1.3 billion*

The Recovery Act provided \$1.0 billion for a competitive, extramural construction grant program for research facilities outside NIH. The objective of the Recovery Act Extramural Construction program is to facilitate and enhance the conduct of biomedical and behavioral research by supporting the costs of designing and constructing non-Federal basic and clinical research facilities to meet the biomedical or behavioral research, research training, or research support needs of an institution or a research area at an institution. The NIH budget has not included funding for new extramural construction grants since FY 2005. The Recovery Act also provided \$300 million for Shared Instrumentation/High-End Instrumentation Grants programs to supplement annual appropriations of approximately \$60 million a year. As of February 2010, less than half of these funds have been obligated (\$620 million, out of \$1.61 billion total for NCRR including research grant funding). The full impacts of this funding on academic and other extramural laboratories will not be known until the end of FY 2010 when all funds are obligated.

*Department of Health and Human Services, National Institutes of Health, Buildings and Facilities, \$500 million*

The Recovery Act provided \$500 million for the construction, renovation, and maintenance of intramural research facilities at the National Institutes of Health (NIH). The Recovery Act appropriation far exceeds the Buildings and Facilities appropriation of \$100-\$150 million annually in recent years. As of February 2010, \$66 million of the \$500 million has been

obligated. The full impacts of this funding on NIH's biomedical research infrastructure will not be known until the end of FY 2010 when all funds are obligated.

*Department of the Interior, U.S. Geological Survey, Surveys, Investigations, and Research, \$140 million*

The U.S. Geological Survey (USGS) received \$140 million in the Recovery Act for: repair, construction, and restoration of facilities; equipment replacement and upgrades including streamgages, and seismic and volcano monitoring systems; national map activities; and other critical deferred maintenance and improvement projects. As of February 2010, \$46 million of Recovery Act funds have been obligated.

*National Science Foundation, Research and Related Activities, Academic Research Infrastructure, \$200 million*

The Recovery Act provided \$200 million for the Academic Research Infrastructure (ARI) program of competitive, merit-reviewed grants to fund repairs and renovations at the nation's academic research facilities. This program last received funding in FY 1996, and has received no regular appropriations since then. A May 2009 solicitation invited proposals for projects of up to \$10 million each for the repair or renovation of existing academic research facilities. Proposals submitted to the ARI solicitation are currently under review and have not yet been awarded.

*National Science Foundation, Major Research Instrumentation, \$90 million*

The National Science Foundation's (NSF) Major Research Instrumentation (MRI) program is an NSF-wide, crosscutting program that strengthens the U.S. scientific enterprise by investing in state-of-the-art research instrumentation at our Nation's institutions of higher education, research museums, and non-profit research organizations. The MRI program promotes the acquisition and development of instrumentation for shared use. MRI funds are awarded through a competitive, merit review process based on proposals. The Recovery Act provides \$100 million for the MRI program. Proposals submitted for Recovery Act funds are currently under review and have not yet been awarded.

The Recovery Act provided nearly \$1.8 billion in competitively awarded funds for *extramural* research infrastructure, primarily in academic institutions, through programs in NIST (CRF), NIH (NCRR), and NSF (ARI and MRI). This amount is nearly a 10-fold increase over annual enacted appropriations for research infrastructure in NIH, NSF, and DOD (\$201 million in the 2011 Budget; see below). The Federal government does not generally provide competitively awarded funds for extramural research facilities construction. Thus, these Recovery Act appropriations for extramural research infrastructure will have an outsized impact on addressing the instrumentation and facilities needs at non-Federal research institutions, especially academic institutions. As of February 2010, most of these funds have not yet been obligated and thus their impacts cannot be evaluated. Therefore, at this time it is our assessment that it is premature to identify deficiencies in research infrastructure or prioritize future needs for Federal investments in extramural research infrastructure.

Similarly, the Recovery Act provided substantial funding for *intramural* research infrastructure, far in excess of annual appropriations for such projects. Recovery Act appropriations for intramural research infrastructure will have an outsized impact on addressing the instrumentation

and facilities needs at Federal research institutions, including FFRDCs (federally funded research and development centers; federally owned, contractor operated institutions). As of February 2010, most of these funds have not yet been obligated and thus their impacts cannot be evaluated. Therefore, at this time it is our assessment that it is premature to identify deficiencies in research infrastructure or prioritize future needs for Federal investments in intramural research infrastructure.

### **Budget Proposals for Research and Development Facilities Construction in the President's 2011 Budget**

The 2011 Budget proposes \$3.3 billion for R&D facilities construction as identified in the annual Federal agency survey of R&D investments in the Federal budget (See Table 2). Nearly all of these investments are for intramural or FFRDC facilities. A majority of the investment (\$2.4 billion) is in the National Aeronautics and Space Administration (NASA), nearly entirely for one project, the International Space Station (ISS). R&D Facilities Construction funds in the Department of Defense (DOD), the National Institutes of Health (NIH), the Department of Energy (DOE), the Smithsonian Institution (SI), and the National Institute of Standards and Technology (NIST) will be devoted to Federal or FFRDC facilities. National Science Foundation (NSF) funds will support construction projects that are managed by the extramural research community. There are no dedicated funds in the 2011 Budget for competitively awarded extramural research facilities construction grants, in accordance with past agency budget requests.

### **Budget Proposals for Major Instrumentation Acquisitions in the President's 2011 Budget**

In addition to substantial investments in the operation, maintenance, and construction of R&D facilities, the 2011 Budget proposes \$1.3 billion for major capital equipment for R&D (see Table 3). Nearly all of these investments are equipment purchases for intramural or FFRDC (federally owned, contractor operated) laboratories. Customarily, these equipment and instrumentation purchases are funded out of general program funds rather than separate programs for equipment and instrumentation. One exception is the National Science Foundation's Major Research Equipment and Facilities Construction (MREFC) account; the 2011 Budget proposes \$165 million for 5 projects to support the acquisition, construction and commissioning of major research facilities and equipment that provide unique capabilities at the frontiers of science and engineering. Although many MREFC projects are better classified as R&D facilities construction, NSF classifies the entire MREFC account as major capital equipment. Other NSF support of major capital equipment for R&D (\$235 million in the 2011 Budget) is funded within the Research and Related Activities (R&RA) account.

There are also dedicated funds in the 2011 Budget to support major research instrumentation acquisitions in the extramural research community through the programs listed below, totaling \$201 million in the 2011 Budget:

#### *National Science Foundation, Major Research Instrumentation, \$90 million*

The National Science Foundation's (NSF) Major Research Instrumentation (MRI) program is an NSF-wide, crosscutting program that strengthens the U.S. scientific enterprise by investing in state-of-the-art research instrumentation at our Nation's institutions of higher education, research

museums, and non-profit research organizations. The MRI program promotes the acquisition and development of instrumentation for shared use. MRI funds are awarded through a competitive, merit review process based on proposals. The 2011 Budget proposes \$90 million for the MRI program, the same as the 2010 enacted funding level. The Recovery Act provides \$100 million for the MRI program. Proposals submitted for Recovery Act funds are currently under review and have not yet been awarded.

*Department of Health and Human Services, National Institutes of Health, National Center for Research Resources, Shared Instrumentation Grants, \$66 million*

The National Center for Research Resources (NCRR) within the National Institutes of Health (NIH) supports the Shared Instrumentation/High-End Instrumentation Grants programs. Although these programs are not typically included in the annual R&D budget survey of major capital equipment for R&D funding, these one-year awards help NIH-supported investigators acquire commercially available equipment, typically too costly to obtain through a research project grant. Instrumentation purchased with an award must be shared by at least three NIH-supported scientists. The Shared Instrumentation program funds equipment in the \$100-\$600 thousand range and the High-End Instrumentation program funds instrumentation in the \$750 thousand - \$2 million range. These funds are awarded through a competitive, merit review process based on proposals. The 2011 Budget proposes \$66 million for the Shared Instrumentation/High-End Instrumentation Grants programs, an increase of \$2 million over the 2010 enacted funding level. The Recovery Act provides \$300 million for these programs.

*Department of Defense, Defense University Research Instrumentation Program, \$45 million*

The Department of Defense's (DOD) Defense University Research Instrumentation Program (DURIP) funds competitive grants for research instrumentation to enhance universities' capabilities to conduct world class research critical to DOD needs. DURIP generally funds equipment in the \$50 thousand to \$1 million range. DURIP is funded by the three services (Army, Navy, and Air Force) in each service's University Research Initiatives (URI) program. The 2011 Budget proposes \$45 million combined for DURIP (\$13 million Army, \$17 million Navy, \$15 million Air Force).

In addition to these dedicated programs, other Federal programs offer support for research instrumentation as part of general infrastructure support. The National Science Foundation's (NSF) Experimental Program to Stimulate Competitive Research (EPSCoR) program, for example, proposes \$112 million in the 2011 Budget for its Research Infrastructure Improvement (RII) program of awards to strengthen academic research infrastructure to institutions in EPSCoR-eligible states. While the program does not generally fund research instrumentation exclusively, the program does support awards for instrumentation as part of complex, multifaceted statewide awards to develop research infrastructure.

## **National Coordination of Research Infrastructure**

Although it is premature at this time to identify deficiencies in research infrastructure or prioritize future needs for Federal investments in research infrastructure, the Office of Science and Technology Policy (OSTP) and Federal agencies are taking steps to provide national coordination of research infrastructure through the National Science and Technology Council

(NSTC). The soon-to-be reconstituted Committee on Science of the NSTC will be the primary mechanism for this interagency effort. As Recovery Act and follow-on FY 2010 and FY 2011 funds are awarded, the Committee on Science will be monitoring the progress of research facilities construction and maintenance projects as well as the procurement of major instrumentation.

For extramural facilities, the Committee's work will be informed by the results of the National Science Foundation's survey of science and engineering facilities at academic institutions, last conducted in FY 2005 and published in July 2007 as *Science & Engineering Research Facilities: Fiscal Year 2005*. The next edition of the survey is scheduled for FY 2010. The FY 2005 survey found that U.S. academic institutions had 185.1 million net assignable square feet of science and engineering research space, continuing a steady upward trend from previous years (for example, 155 million net assignable square feet in the FY 2001 survey). At that time, academic institutions reported that 22 percent of their research space either required renovations or required replacement, and estimated that the backlog (deferred plans) of renovation or replacement of facilities in their institutional plans totaled \$3.6 billion. Although the next survey of S&E research facilities may not fully capture Recovery Act investments, it is clear that the approximately \$1.8 billion in Recovery Act funds for research infrastructure (the bulk of which will be awarded to academic institutions) will have a substantial impact on the state of U.S. academic research infrastructure.

Although there is no similar survey of R&D facilities at Federal or FFRDC (government-owned, contractor-operated) laboratories, the Committee's work will be informed by ongoing dialogue between Federal agencies on the state of research infrastructure in Federal intramural and contractor-operated facilities. As the substantial Recovery Act investments for intramural research infrastructure are implemented, there will be ongoing coordinated interagency assessments of the state of intramural research infrastructure and efforts to identify deficiencies in research infrastructure when matched against national research needs in areas relevant to the specific mission requirements of Federal agencies.

## **Conclusion**

The President's 2011 Budget proposes a substantial Federal investment of \$4.6 billion in research infrastructure. The current state of Federal support for research infrastructure, however, requires consideration of the Recovery Act, which provides substantial investments in research facilities construction and major instrumentation for intramural and extramural laboratory facilities. Recovery Act appropriations for intramural and extramural research infrastructure will have an outsized impact on addressing the instrumentation and facilities needs at Federal and non-Federal research institutions, especially academic institutions. As of February 2010, most of these funds have not yet been obligated and thus their impacts cannot be evaluated. Therefore, at this time it is our assessment that it is premature to identify deficiencies in research infrastructure or prioritize future needs for Federal investments in research infrastructure. The soon-to-be-reconstituted Committee on Science of the National Science and Technology Council will be monitoring the progress of research facilities construction and maintenance as well as procurement of major instrumentation for both intramural and extramural facilities. As the substantial Recovery Act investments for research infrastructure are implemented, there will be ongoing coordinated interagency assessments of the state of research infrastructure and efforts to

identify deficiencies in research infrastructure when matched against national research needs in areas relevant to the specific mission requirements of Federal agencies.