

Better Than Expected Fiscal Year 2016 Omnibus Appropriations for Clean Energy and Manufacturing...Hundreds of Millions in Federal Funding Opportunities Coming

As Washington digs out from last week's historic blizzard, let's take a moment to look back at the 2016 Omnibus Appropriations bill and what it holds for R&D programs.

Congress and the Administration agreed to Fiscal Year 2016 Omnibus appropriations that generally treat R&D investment well—including funding for clean energy and advanced manufacturing—with many research agencies funded back at pre-sequestration levels, even after adjusting for inflation.

Overall Investment in R&D: Overall, the Omnibus appropriated \$148 billion in total R&D spending for FY 2016, up 8% over FY 2015, and slightly higher than the President's request. Defense R&D gets \$78.2 billion, while civilian R&D will see \$70.3 billion.

Some of the big winners include: advanced technology and medical research at the Department of Defense; biomedical research at NIH; scientific computing, and nuclear and fossil energy R&D (especially natural gas technologies) at the Department of Energy; and NASA space technology. The Omnibus provides the full request of \$200 million for a new Precision Medicine Initiative.

Total R&D Spending for 2016 \$148 Billion

Defense R&D	\$78.2
Civilian R&D	\$70.3



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CLEAN ENERGY TECHNOLOGY

Department of Energy (DOE): While previously a source of contention, DOE's Office of Energy Efficiency and Renewable Energy (EERE) received \$2.07 billion, a surprising 7.7% increase over FY 2015, but well below (-23.9%) the President's request. Within the clean energy programs, geothermal, water power, vehicle technologies, building technologies and advanced manufacturing received significant increases over FY 2015, although substantially below the President's request. Wind energy took a substantial hit.

The budget agreement provides \$70 million for five Clean Energy Manufacturing Institutes and \$20 million for the Manufacturing Demonstration Facility. Look for new announcements soliciting proposals for two new clean energy manufacturing institutes, in addition to the competition for an institute on smart manufacturing that is currently in progress.

Department of Energy Office of Energy Efficiency and Renewable Energy FY 2016 Funding			
Program	FY 2016 Funding (millions)	Percent Change from FY 2015	Percent Change from Request
Vehicle Technologies	310	10.7	-30.2
Solar Energy	242	3.7	-28.2
Advanced Manufacturing	229	14.3	-43.4
Bioenergy Technologies	225	0	-8.5
Building Technologies	201	16.6	-24.1
Hydrogen and Fuel Cells	101	4.1	-2
Wind Energy	95	-10.8	-34.4
Geothermal Energy	71	29.1	-26
Water Power	70	14.8	4.5
Other Department of Energy FY 2016 Funding			
ARPA-E	291	3.9	-10.5
Electricity Delivery/Energy Reliability R&D	162	50.0	5.6

In its appropriations for DOE, Congress provided guidance in several areas:

- DOE is directed to end the practice of taking a small fraction of annual funding within EERE offices to fund incubator programs.
- In vehicle technologies, EERE is directed to spend:
 - \$20 million for SuperTruck II to further improve efficiency of heavy-duty trucks, including making up to four new awards;
 - \$10 million for vehicle electrification projects;
 - \$43 million for advanced battery development; and
 - \$22.5 million for fuel and lubricant technologies.
- In solar energy, the agreement provides \$48 million for concentrating solar power. DOE is also directed to provide funding opportunities to support U.S. equipment supply chain technology efforts.
- Marine power continues to be neglected, though it is now being recognized as a program in its own right. The Secretary is directed to establish a separate Water Power Technologies Office within EERE. Of the \$45 million provided for marine and hydrokinetic technologies, at least \$22 million is to support private sector-led R&D and deployment of marine energy conversion systems and component technologies, including wave and current; and not less than \$5 million is to be spent to continue development and construction for an open water, grid-connected wave energy test facility.
- In building technologies, \$10 million is to support a competitive funding opportunity on energy efficiency in small and medium-sized commercial buildings; \$18 million is for trans-active controls R&D; and \$24 million for solid-state lighting projects.
- Congress provided continued funding for the Batteries and Energy Storage Innovation Hub, Fuels from Sunlight Innovation Hub, and three BioEnergy Research Centers.

Department of Defense (DOD):

Appropriations for clean energy and energy efficiency include:

- \$56 million for the Navy Energy Program
- \$41 million for Operational Energy Capability
- \$55.8 million for the Strategic Environmental Research Program
- \$52.7 million for the Environmental Security Technical Certification Program

While DOD has already announced its FY 2016 Energy Conservation Investment Program (ECIP) awards, it plans to invest \$150 million in FY 2017, including \$37.5 million in renewable energy projects and \$97.5 million in energy efficiency projects. Funding is expected to remain at \$150 million annually for FY 2017-FY 2021.

Department of Agriculture/Farm Energy (USDA):

Mandatory funding of \$50 million was maintained for the Rural Energy for America Program. However, the Biomass Crop Assistance Program was severely cut, from a mandatory \$25 million to \$3 million. The Biorefinery, Renewable Chemical and Biobased Product Manufacturing Assistance program was also cut from a mandatory \$50 million to \$27 million. USDA carries out some farm energy-related research through its Agriculture and Food Research Initiative, which received \$350 million in the budget agreement. For the second year in a row, USDA received no funds it requested for establishing agricultural innovation institutes.





MANUFACTURING AND INDUSTRIAL-RELATED TECHNOLOGY

National Institute for Standards and Technology (NIST): NIST received \$130 million for the Hollings Manufacturing Extension Partnership, of which \$25 million is for the National Network for Manufacturing Innovation (NNMI), including funding for a new institute (see notice below for new NIST Institute) and up to \$5 million for coordinating NNMI activities. The budget agreement merges the activities of the Advanced Manufacturing Technology Consortia (AMTech) into NNMI. The agreement emphasizes that NIST must hold open competitions in order to allow industry to define the technology focus areas. Also, NIST will receive \$5 million for work in metals-based additive manufacturing.

Department of Defense: DOD will continue to make significant investments in manufacturing:

- \$157 million for Defense-wide manufacturing science and technology program
- \$52 million for manufacturing technology in the 6.3 advanced technology development account
- \$60 million for Army ManTech

In addition, the budget agreement includes \$250 million for the Defense Rapid Innovation Fund, a vehicle for small businesses to provide DOD with innovative technologies that can be rapidly inserted into acquisition programs that meet defense needs.

Department of Energy: As mentioned above, DOE received \$229 million for advanced manufacturing R&D and demonstration, including funds for two new clean energy manufacturing institutes.



LOOKING TO THE FUTURE, THE FY 2017 R&D BUDGET

The Administration will soon release its FY 2017 budget proposal. Expect continued focus on renewable energy and grid modernization, as well as innovation in clean energy technologies. We may see new funding proposed for using renewable energy to power water desalination or purification. The Administration is likely to continue to propose investments to strengthen U.S. manufacturing in areas such as nanotechnology, robotics, the Materials Genome, and cyber-physical systems and their application to smart cities. A new Precision Medicine Initiative and addressing privacy concerns with Big Data are also priorities. The Administration is encouraging agencies to use new models to foster innovation such as Grand Challenges, incentive prizes, citizen science, and collaboration with the Maker Movement.

Federal Agencies Setting the Stage for New Manufacturing Innovation Institutes, Update on the National Network for Manufacturing Innovation (NNMI)

National Institute of Standards and Technology (NIST): In late December, NIST issued a Notice of Intent to hold a competition that will seek applications for two new Manufacturing Innovation Institute awards. To provide the public with an opportunity to learn more about the solicitation, NIST will hold a Proposer's Day workshop. Pre-applications will be required, and NIST will only consider one pre-application per applicant. For its first institutes, NIST will provide up to \$70 million per institute over five to seven years, which must be matched by private and other non-federal sources.

While NIST is open to receiving proposals on any topic of interest to industry, it has particular interest in two subject areas identified by the President's Council of Advisors on Science and Technology Advanced Manufacturing Partnership as technology areas critical to supporting national needs:

- **Collaborative Manufacturing Robots.** An institute would focus on developing advanced robotic systems that can safely operate in collaboration with humans or other robots, be tasked and re-tasked easily, and be integrated into the rest of an enterprise seamlessly and quickly.
- **Biopharmaceutical Manufacturing.** An institute would center on "biologic" therapies that are manufactured using living cells instead of conventional chemistry. The institute would aim to stimulate innovation in manufacturing that will enable new, more cost effective treatment of disease and solidify the domestic competitiveness of the U.S. biopharma industry.



Department of Defense:

In support of the Defense-wide Manufacturing Science and Technology Program, the Air Force recently issued a Request for Information to gather input from industry, academia, and other stakeholders as part of an effort to select and scope the technology focus areas for as many as two more Manufacturing Innovation Institutes. Selection will be based on national security requirements, economic benefit, technical opportunity, relevance to industry, business case for sustainability and workforce development opportunities.

Six candidate technology focus areas are currently under consideration, as well as a seventh “open topic” to encourage responses describing other technology focus areas that may also be of interest to DOD. The topics are:

- Bioengineering for Regenerative Medicine
- Bio-printing across Technology Sectors
- Securing the Manufacturing Digital Thread (Cybersecurity for Manufacturing)
- Advanced Machine Tools and Control Systems
- Certification, Assessment and Qualification
- Assistive and Soft Robotics

Department of Energy:

DOE has expressed its intention to hold competitions for awards for two new clean energy manufacturing institutes in the current fiscal year. Topics have not been announced, but several were mentioned in the FY 2016 budget request, and workshops have been held recently on high value roll-to-roll manufacturing, process intensification, and sustainable manufacturing.

TechVision21 can help you:

TechVision21 can help you pinpoint sources of Federal funding that can support your research, technology and economic development objectives. We can work with you to develop a Federal funding strategy, engage with program and funding decision-makers, develop project concepts, identify appropriate partners, and to organize and write high quality grant and funding proposals.

Let's chat about your objectives and how TechVision21 can help advance your interests.



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