

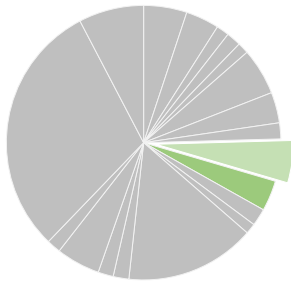


Federal Energy R&D: Advanced Manufacturing

BY COLIN CUNLIFF | APRIL 2019

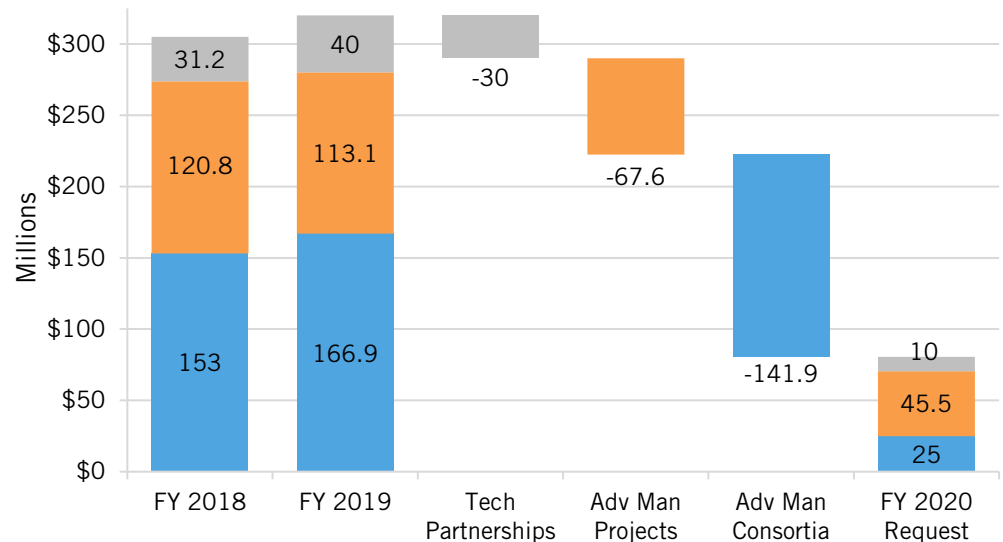
This briefing is part of a series on the U.S. energy budget. See: itif.org/energy-budget.

The Department of Energy’s (DOE) Advanced Manufacturing Office (AMO) works to improve the energy efficiency and productivity of U.S. manufacturers by focusing R&D on cross-cutting, platform technologies relevant to manufacturing in multiple fields. A key goal is to ensure new energy technologies invented in the United States are also manufactured in the United States. AMO supports R&D through competitive funding opportunities designed to develop novel manufacturing technologies.¹



Manufacturing (light green)
Other Efficiency (green)
Energy R&D (light gray)

Figure 1: The FY 2020 budget request would cut advanced manufacturing R&D by 75 percent²



What's At Risk

Manufacturing plays an outsized role in the health of the U.S. economy because of both its impact on trade and innovation, and its large multiplier effect on other sectors. Accelerated innovation in both industrial processes that use energy and products used by the energy industry would strengthen U.S. manufacturing and hasten progress toward national economic, workforce, security, and environmental goals. Market failures, however, lead to many gaps in the private-sector response to the manufacturing and energy innovation imperative, and have led to significant supply-chain weaknesses, regional hollowing out, and underinvestment in workforce education and training.

AMO helps address such market failures in several ways, with the goal of improving the energy productivity of U.S. manufacturing, reducing lifecycle energy and resource impacts of manufactured goods, and transitioning DOE-supported technologies and practices into

U.S. manufacturing. Together, these efforts assist manufacturers in cutting energy costs, which has already been an important driver in the “reshoring” of manufacturing to the United States over the past decade.³

Advanced Manufacturing R&D Subprograms

Unlike other DOE technology programs structured around technical focus areas, AMO subprograms are structured around modes of program implementation: individual R&D projects, collaborative R&D consortia, and technology partnerships.⁴

- **Advanced Manufacturing R&D Projects** focus on high-impact manufacturing technology and process challenges in areas such as advanced materials manufacturing for energy applications, improved energy-efficient process technologies, high-performance computing for manufacturing, additive manufacturing processes, roll-to-roll processing, wide bandgap power electronics, chemical and thermal process intensification, and structures used in extreme environments.
- **Advanced Manufacturing R&D Consortia** bring together manufacturers, research institutions, suppliers, and universities in public-private R&D partnership consortia, each of which focuses on a specific set of challenges at the nexus of manufacturing and energy. AMO consortia include the Manufacturing Demonstration Facility (MDF), which focuses on advanced manufacturing technologies to reduce energy and production costs; the Carbon Fiber Test Facility (CFTF); six Manufacturing USA institutes that focus on clean energy technologies; the Energy-Water Desalination Hub; and the Critical Materials Institute.⁵
- **Advanced Manufacturing Technical Partnerships** help small and medium-sized manufacturers improve their energy productivity and reduce waste and water use; demonstrate the viability of improved energy-management approaches; and promote combined heat and power (CHP) and waste heat to power technologies to improve efficiencies and lower energy costs.

Key Elements of the FY 2020 Budget Proposal

- **An 85-percent reduction in the Advanced Manufacturing Consortia**, including termination of the Critical Materials Institute, the Energy-Water Desalination Hub, and the six clean energy Manufacturing USA institutes. Reduced funding will support smaller and more directly-managed National Laboratory-based consortia that focus on power semiconductors, cybersecure process controls, water security, rare-earth materials, and other advanced materials. The topical areas for the proposed new consortia match the focal areas of existing consortia, with the primary difference being a shift away from working with industry and university partners. But industry collaboration is essential for ensuring that the results of laboratory R&D transfer into actual manufacturing capabilities. This new model

for laboratory-based consortia will likely not realize the full benefit of U.S. investment in manufacturing R&D.⁶

- **Reduced funding for public-private R&D projects at the Manufacturing Demonstration Facility (MDF) and the Carbon Fiber Test Facility (CFTC),** including a shift toward early-stage R&D.
- **A 60-percent reduction in Advanced Manufacturing R&D Projects,** with reduced R&D in roll-to-roll manufacturing processes, efficient drying technologies, materials operating in harsh environments, and reduced funding to support early-career post-doctoral researchers. Remaining funding will focus on manufacturing advanced thermoelectric generation system components and new energy storage technologies, including support for the administration’s crosscutting Advanced Energy Storage Initiative.
- **Elimination of the Industrial Assessment Centers (IACs) and the Combined Heat-and-Power Technical Assistance Partnerships (CHP TAPs),** which provide technical assistance to small and medium-sized manufacturers to improve resilience and lower energy costs. Overall funding for the Technical Partnerships subprogram would decline by 75 percent.

ENDNOTES

1. DOE, “FY 2020 Congressional Budget Justification” Volume 3 Part 2, 163-172 (DOE Chief Financial Officer DOE/CF-0153, April 2019), https://www.energy.gov/sites/prod/files/2019/04/f61/doe-fy2020-budget-volume-3-part-2_0.pdf.
2. The FY2020 budget for EERE would use \$353 million in prior year (FY 2018 and FY 2019) balances to fund FY2020 programs. Thus the numbers shown in the figure underestimate the magnitude of cuts included in the proposed budget. Department of Energy, “FY 2020 Congressional Budget Request: Budget in Brief,” (DOE CFO, March 2019), p 3, <https://www.energy.gov/sites/prod/files/2019/03/f60/doe-fy2020-budget-in-brief.pdf>; DOE, “FY 2020 Congressional Budget Justification” Volume 3 Part 2, 165.
3. Stephen Ezell, Robert Atkinson, and David M. Hart, “ITIF Comments Responding to Administration RFI for National Strategic Plan for Advanced Manufacturing,” (Information Technology and Innovation Foundation, 2018), <http://www2.itif.org/2018-comments-national-strategic-plan-advanced-manufacturing.pdf>.
4. DOE, “FY 2020 Congressional Budget Justification” Volume 3 Part 2, 163-172.
5. The Manufacturing USA initiative refers to a network of 15 manufacturing institutes sponsored by the Department of Defense (DOD), the National Institutes of Standards and Technology (NIST), and DOE. The six Manufacturing USA institutes hosted by DOE are commonly called the clean energy manufacturing innovation (CEMI) institutes. For more on the relationship between the CEMI institutes and the larger Manufacturing USA network, see David M. Hart and Peter L. Singer, “Manufacturing USA at DOE: Supporting Energy Innovation” (Information Technology and Innovation Foundation, May 2018), <http://www2.itif.org/2018-doe-musa-institutes.pdf>.
6. Hart and Singer, “Manufacturing USA at DOE: Supporting Energy Innovation.”

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