U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

ADVANCED MANUFACUTURING OFFICE FY 2018 BUDGET AT-A-GLANCE

The Advanced Manufacturing Office (AMO) identifies scientific and technical challenges and fosters public-private partnerships to pursue early-stage and applied research and development (R&D) of materials, processes, and information technologies needed for an efficient, productive, and competitive American manufacturing sector.

Economic Highlights

Manufacturing and energy are major stimuli for the U.S. economy, job growth, and global competitiveness.

- Manufacturers contribute almost $2.2 trillion per year to U.S Gross Domestic Product and employ 9% of the nation's workforce.
- The manufacturing sector accounts for 30% of U.S. energy use at a cost to industry of over $130 billion per year.
- AMO leverages hundreds of industry, national laboratory, and academic resources across the U.S. to solve critical manufacturing challenges through cost-shared partnerships. About 75% of all U.S. patents relate to manufacturing.
- For every $1.00 spent in manufacturing, $1.81 is added to the U.S. economy.

AMO supports R&D breakthroughs in technical fields essential to American industry.

- AMO focuses on 14 core technologies, such as: process intensification (e.g. chemical processes), critical materials (e.g. rare-earth minerals), roll-to-roll processing (e.g. batteries and fuel cells), additive manufacturing, advanced materials and smart manufacturing, new combined heat and power (CHP) technologies, and wide bandgap power electronics. Emerging R&D includes energy-efficient semiconductors for advanced computing (e.g. supercomputers), and clean water technologies.
- AMO R&D Consortia inspire collaborations among U.S. industry, universities, government, and national laboratories to address shared technical challenges and adopt place-based innovation approaches.
- AMO sponsors private sector and national laboratory partners in supercomputing, as well as small businesses through the Lab-Embedded Entrepreneurship Program (LEEP) and cooperative R&D agreements (CRADAs).

AMO works with American businesses to realize quantifiable energy savings in manufacturing and production.

- AMO has 191 public and private voluntary partners with 2,500 U.S. facilities representing more than 11.4% of the U.S. manufacturing energy footprint. In 2015, BPP partners reported cumulative energy intensity savings of 600 trillion British thermal units (BTUs) and $3.1 billion in energy cost savings.
- AMO partner facilities achieved a 12% reduction in expenditures in 15 months after ISO 50001 implementation – translating into annual savings of $36,000 to $938,000 for each partner.
- AMO partnerships have provided expertise on 780 CHP projects, with an estimated installed capacity of 1.7 gigawatts (GW).

FY 2018 Priorities

Program Strategy

Scientific and early-stage R&D on manufacturing and energy issues with high potential for subsequent economic growth and jobs in the private sector.

- Cross-cutting technology issues applicable to energy intensive/energy dependent manufacturing and applicable materials, processes, and platform technologies.
- Early-stage R&D based at national labs, universities, and companies, and consortia as partnerships between research organizations and private sector firms to lower their barriers to new technologies for subsequent demonstration and deployment.

Activity Highlights

- High-Performance Computing for Manufacturing (HPC4M) – Address challenges in advanced materials and processes.
- Lab-University-Manufacturer Research Consortia – Pursue R&D on additive manufacturing (3D Printing), carbon fiber composites, rare earths, smart innovative clean technologies, chemical process intensification, and power electronics.
- Laboratory Research Projects with Small Businesses – Lower barriers for companies to participate in lab research activities.
- Early-Stage R&D Projects at Labs and Universities – Conduct R&D for advanced catalysis, roll-to-roll processes, thermal intensification, clean water, advanced semiconductors, and CHP.
- Industry-University-Lab Technical Partnerships for Manufacturing – Create and disseminate R&D insights gained from new technologies and tools developed for energy productivity in manufacturing.
- University Technical Partnerships for Advanced Manufacturing Workforce – Sponsor R&D fellowships at universities.

FY 2018 Budget Request

Budget Authority (Dollars in Thousands)	FY 2018 Request
Advanced Manufacturing R&D Projects	41,000
Advanced Manufacturing R&D Consortia (previously R&D Facilities)	27,500
Advanced Manufacturing Technical Partnerships (previously Industrial Technical Assistance)	13,500
Total, Advanced Manufacturing	**82,000**

AMO sponsors development of manufacturing and energy innovations that spur U.S. economic growth and create jobs for Americans.

Major Accomplishments and Goals

AMO encourages competitive scientific and technical exploration on high-potential R&D.

- AMO supported collaboration between the National Laboratories and the private sector through initiatives such as Cyclotron Road/LEEP, Small Business Vouchers, and Technologist-in-Residence Programs.
- AMO supports public-private partnerships using HPC4Manufacturing and world-class supercomputers to address technical challenges of manufacturing. AMO has facilitated nearly 40 joint national laboratory-industry projects.

AMO connects energy-related manufacturing technologies with next-generation leaders.

- In university-based public-private partnerships, thousands of students work with small businesses to gain technical experience and job-ready manufacturing knowledge.
- R&D fellowships support advancement of scientific leaders in emerging technical areas important to United States manufacturing.

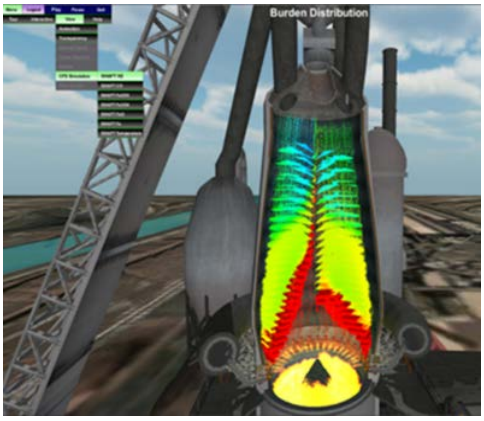
AMO R&D partnerships lower barriers to technology transfer.

- AMO supports public-private partnerships with 600 companies addressing key pre-competitive R&D technical challenges for U.S. manufacturers.
- In 2017, the AMO multi-year program plan identifies 14 cross-cutting and platform technology areas applicable to U.S. innovation leadership in energy and manufacturing, including advanced materials, manufacturing process technologies, information technologies, and tools for field-scale research verification.
- By 2025, AMO plans to develop manufacturing technologies and advanced materials that lower facility level energy costs by 50% or more, and/or provide 50% savings over targeted lifecycles compared to the 2010 baseline.
- By 2025, AMO plans for partnerships to result in 30,000 U.S. manufacturing facilities implementing and testing new manufacturing energy management and combined heat and power (CHP) technologies.

Success Stories

AMO-supported research focused on developing cost-effective separation, processing, and substitution of critical materials and rare-earth elements used by U.S. transportation, energy, medical, and other industries. In the past three years, this research has yielded 47 invention disclosures, 13 patent applications, two technology licenses, two open-source software packages, and 80 technical publications.

Through a partnership with **INFINIUM**, a metals production technology company, production of rare-earth magnets sourced and manufactured entirely in the U.S., as well as a new approach for refining neodymium-praeseodymium master alloys for rare-earth, high-strength magnets, will be demonstrated. This is the first U.S. sole source production of a rare-earth alloy for magnet fabrication in nearly 20 years and is essential to having a domestic industrial magnet supply chain as a technical response to China's near-monopoly on rare-earth magnets.



Through AMO's **High Performance Computing for Manufacturing (HPC4MFG)** program, a partnership between Purdue-Northwest University, Lawrence Livermore National Laboratory, and the American Iron and Steel Institute, high-fidelity-physics-based modeling of energy intensive manufacturing processes is used to investigate new tools for maximizing the energy productivity of steelmaking. New knowledge gained from these discoveries and tools can subsequently be used to make U.S. steel production globally cost competitive, while continuing to protect the clean air and water of the nation.