



Report to Congress

2025



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This Report covers the period from October 1, 2022, to September 30, 2023.

A Message From our Interagency Team

In 2023, Manufacturing USA® continued to strengthen U.S. global leadership in advanced manufacturing by supporting the development and transition of innovative technologies into scalable, cost-effective, and high-performing domestic manufacturing capabilities.¹ Collaboration across the network—including institutes, industry, academia, and government partners—has been key to harnessing technology to accelerate manufacturing and bolster economic and national security.

Throughout its existence, Manufacturing USA has demonstrated that the public-private partnership model is essential to accelerating technology development and advancing manufacturing. In 2023, the Manufacturing USA network convened 17 institutes focused on advancing key technology areas—including electronics, materials, digital controls, automation, and biomanufacturing—critical to securing U.S. global leadership in advanced manufacturing.

The Manufacturing USA network succeeds through its collaborative model, forging strong partnerships across institute networks to overcome challenges and drive industrial innovation. In FY 2023 alone, the network worked on more than 900 high-priority applied research and development technology projects, helped more than 150,000 workers, students, and educators through institute workforce development programs and training, engaged more than 2,900 institute member organizations (with 73% of industry member organizations comprising small and mid-size manufacturers), and invested \$380 million from state, federal, and private funds in addition to \$160 million in base federal funding.

Workforce development remains a cornerstone of the network's success, ensuring a future workforce that will support tomorrow's advancements and opportunities. In FY 2023, Manufacturing USA launched two significant network-wide workforce programs—Modern Makers and the Manufacturing USA Education and Workforce Development Roadmap—to ensure that technologies invented in the U.S. will be made here by a skilled and expert domestic workforce. Manufacturing USA is poised to support the Administration in implementing its newly developed “America’s Talent Strategy: Building the Workforce for the Golden Age” and “White House Artificial Intelligence Action Plan” through continued industry-driven initiatives, including standards for occupations and training for skills needed in emerging technologies.

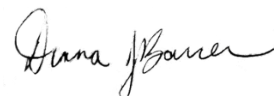
Manufacturing USA serves federal agencies and U.S. industry as a valuable resource for delivering technical leadership, empowering the current and next-generation manufacturing workforce, and building powerful innovation networks and supply chains. With ongoing collaboration and innovation, the program is well-positioned to drive the future of U.S. manufacturing.



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¹ Consolidated and Further Continuing Appropriations Act, 2015, (Pub. L. 113-235, Title VII – Revitalize American Manufacturing Innovation Act of 2014, codified at 15 USC. 278s)
[http://uscode.house.gov/view.xhtml?req=\(title:15%20section:278s%20edition:prelim\)](http://uscode.house.gov/view.xhtml?req=(title:15%20section:278s%20edition:prelim))

About Manufacturing USA

A strong manufacturing sector is the foundation of America's economic success and national security. It fuels job creation, fosters innovation in critical industries, and enhances our quality of life. Manufacturing accounts for 54% of U.S. private sector research and development investment, driving the advancement of cutting-edge technologies.²

Manufacturing USA was established to secure the future of manufacturing in the United States by connecting people, ideas, and technology to solve industry-relevant challenges. As part of the government's unified strategy for global leadership in advanced manufacturing, Manufacturing USA aims to make the U.S. more competitive in the global manufacturing landscape, ensure economic growth, and secure manufacturing jobs for the future.

Our Vision: U.S. global leadership in advanced manufacturing through the development and transition of innovative technologies into scalable, cost-effective, and high-performing domestic manufacturing capabilities.

Our Mission: To connect people, ideas, and technology to solve industry-relevant advanced manufacturing challenges, thereby enhancing industrial competitiveness.

Goals: Manufacturing USA works to achieve this vision through four goals:³

- **Goal 1:** Increase the competitiveness of U.S. manufacturing
- **Goal 2:** Facilitate the transition of innovative technologies into scalable, cost-effective, and high-performing domestic manufacturing capabilities
- **Goal 3:** Accelerate the development of an advanced manufacturing workforce
- **Goal 4:** Promote a network of institutes that build long-term support for and from their communities

In FY 2023, Manufacturing USA operated through a network of 17 manufacturing innovation institutes sponsored by the Departments of Commerce, Defense, and Energy. Each institute is a public-private partnership concentrating on a unique advanced manufacturing technology, all working towards securing the future of manufacturing in the U.S. The institutes are hubs for innovation, where manufacturers, academic institutions, and government agencies collaborate on research and development projects, share risks, and pool resources to tackle key manufacturing challenges.

Through its network of institutes, the Manufacturing USA Program leverages the strengths of many partners to advance the state of manufacturing in the United States. This collaborative approach accelerates technological innovation and fosters a vibrant, globally competitive manufacturing sector and supply chains, driving economic growth and creating high-value jobs.

Manufacturing USA Program Performance at a Glance

Manufacturing USA's vision and mission guide its participating agencies and institutes to achieve its four program goals. Through collaboration, the program accelerates technology transition from

² *Research and Development: U.S. Trends and International Comparisons. Science and Engineering Indicators 2024.* National Science Board, National Science Foundation. 2024. NSB-2024-6. Alexandria, VA. Available at <https://nces.nsf.gov/pubs/nsb20246/>.

³ In FY 2023, the program's participating agencies updated and began implementing Goal 4, as outlined in the *Strategic Plan for the Manufacturing USA Program (2024)*. Advanced Manufacturing National Program Office, National Institute of Standards and Technology, Department of Commerce. Available at: <https://www.manufacturingusa.com/news/manufacturing-usa-releases-2024-strategic-plan>

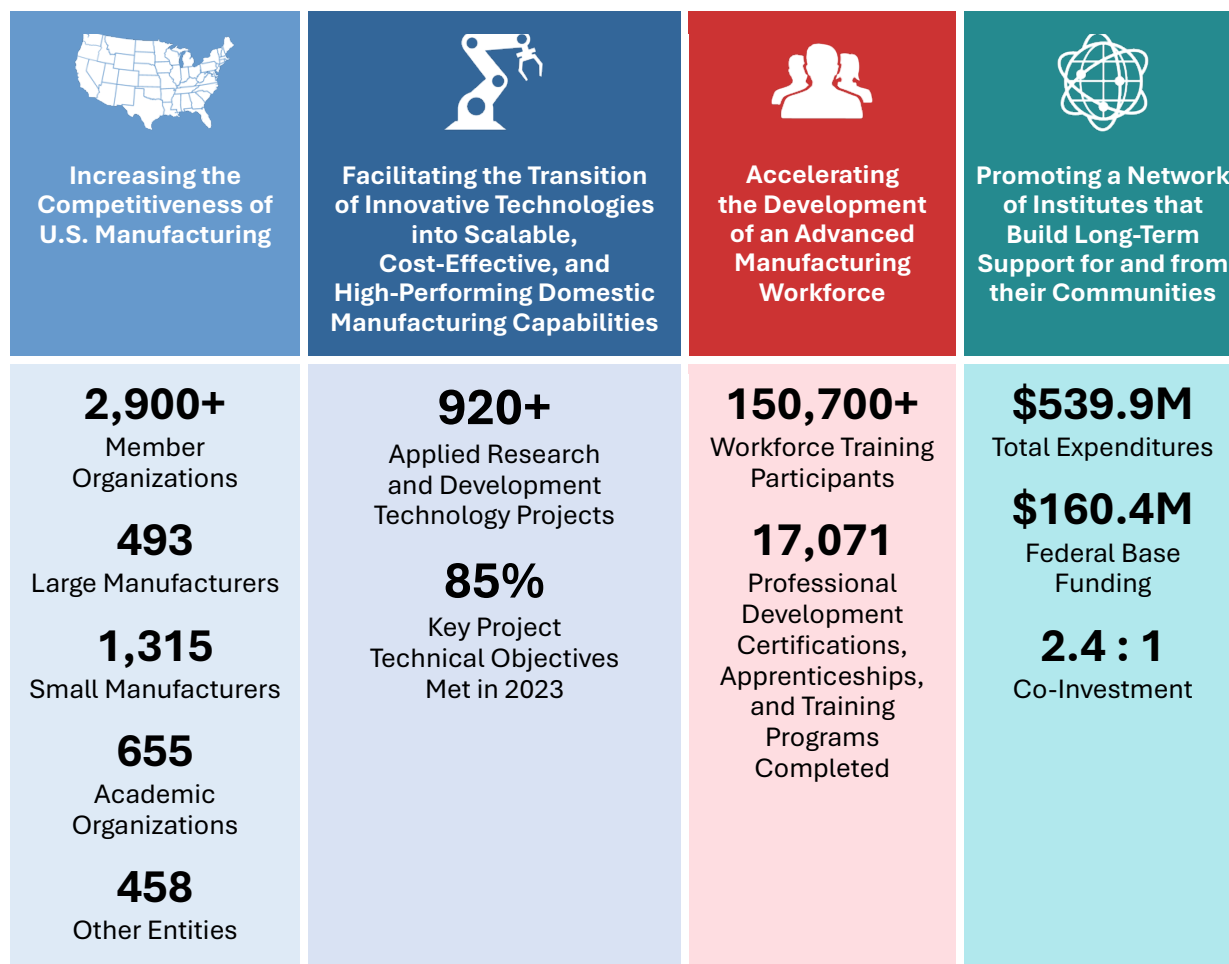
early-stage research to practical and commercial applications, unleashing domestic manufacturing potential and industrial innovation.

A comprehensive, collaborative approach is essential to Manufacturing USA's success. In FY 2023, its institutes invested approximately \$540M, including \$380M from private, state, and federal sources, and \$160M in base federal funding, to strengthen America's manufacturing leadership.

Manufacturing USA institutes bring together manufacturers, research institutions, academia, start-ups, and government agencies to drive innovation. This collaboration speeds the development of new technologies that improve products and manufacturing processes, reduce costs, boost efficiency, and expand capabilities. In FY 2023, the institutes managed over 900 research and development projects.

Manufacturing USA also links members, federal agencies, and workforce development partners to attract untapped American talent and create opportunities for high-paying advanced manufacturing careers. In FY 2023, over 150,000 workers, students, and educators participated in its programs. Over 17,000 workers completed certificate, apprenticeship, or training programs, while 130,000 students and 3,300 educators participated in activities featuring new curricula, industry-verified certificate pathways, and targeted upskilling.

FY2023 Network Metrics



Goal 1: Increasing the Competitiveness of U.S. Manufacturing

Improving manufacturing production capabilities will boost the global competitiveness of U.S. manufacturers. Achieving this goal requires advancing U.S. leadership in manufacturing research, innovation, technology development, and industry deployment. Manufacturing USA institutes play a key role by fostering strong networks and strategic technical portfolios to drive innovation and productivity. By deploying advanced manufacturing innovations, manufacturers can adopt new technologies, lower production costs, and bring innovative products to market, further strengthening their global competitiveness.

Examples of institute projects to increase the U.S. manufacturing competitiveness include:

Improving Quality Control through Human-Robot Collaboration: The Advanced Robotics for Manufacturing (ARM) Institute developed an advanced system of sensors and software, improving quality inspection through human-robot collaboration. This integrated 3D inspection system was designed for easy programming and compatibility with existing computerized maintenance management systems. The system not only strengthens manufacturing efficiency and reliability but also bolsters industrial competitiveness by improving resolution, cycle time, and programming efficiency while offering actionable insights for future advances. It has been successfully implemented at Stellantis (Fiat Chrysler Automotive) in the United States. By automating the qualification process with AI-driven, high-resolution 3D scanning and industrial collaborative robots designed to work alongside humans, it addresses quality backlog issues and detects process drift earlier. ARM is now expanding the implementation to seven additional parts across 12 plants.

AIM Photonics Offers New Cost-Effective Opto-Electronic Testing Services: American Institute for Manufacturing (AIM) Photonics has launched Opto-electronic Testing Services to provide cost-effective access to advanced test and measurement tools, addressing a significant barrier for start-ups and smaller companies, as well as larger companies. Offered through its Rochester, NY facility—the only shared U.S. center providing photonic and electronic test, assembly, and packaging prototyping for substrates up to 300 mm wafers—the service includes over 30 tools for testing photonic integrated circuits (PICs) and conventional electronic ICs. By enabling rapid verification and optimization of devices and manufacturing processes, AIM Photonics helps members and customers save time and resources, fostering innovation without cost-prohibitive infrastructure investment. This initiative strengthens U.S. integrated photonics manufacturing, driving technological advancements and increasing U.S. competitiveness globally.

Goal 2: Facilitating the Transition of Innovative Technologies into Scalable, Cost-Effective, and High-Performing Domestic Manufacturing Capabilities

Advanced manufacturing technologies often face technical and economic barriers that impede their transition from research laboratories to scalable production environments. Innovations originating in universities and manufacturers frequently stall at the scale-up stage, adversely affecting U.S. manufacturing productivity. Manufacturing USA institutes tackle these challenges by de-risking technology development, making new technology accessible to manufacturers of all sizes—small, medium, and large. They offer shared resources and expertise to address challenges related to facility and equipment access. An important benefit of their connected network is the enhanced scale-up of newly developed manufacturing capabilities.

Examples of Manufacturing USA projects transitioning innovative technology into domestic manufacturing capabilities include:

LIFT Leads Effort to Build Department of Defense Electrochemical Separator Production in Detroit:

LIFT launched a project to establish a pilot line for producing electrochemical separators—critical components for energy storage and conversion systems—at its Detroit facility. The initiative addresses the lack of U.S.-based manufacturers for these high-quality, corrosion-resistant separators in the power range required by DoD. During the two-year trial period, LIFT will design and operate the production line, delivering units for testing before transitioning to full-scale production. By securing the supply chain, reducing costs, and strengthening domestic manufacturing capabilities, this project not only supports defense applications but also bolsters U.S. competitiveness in technology innovation.

RAPID Advances Continuous Process Manufacturing to Cut Costs and Improve Product Quality:

Leveraging RAPID's principles of modular process intensification, the University of Pittsburgh collaborated with Lubrizol Corporation to transform a key chemical dispersant production process from batch to continuous manufacturing, resulting in dramatic cost reductions. The team developed a compact, shipping container-sized continuous production module. This innovation enabled the production of higher-quality products while reducing capital costs by 65% and operating costs by 60%, demonstrating the potential for scalable, efficient, and cost-effective domestic manufacturing solutions based on modular process intensification.

Goal 3: Accelerating the Development of an Advanced Manufacturing Workforce

Adoption of new manufacturing technologies requires a skilled workforce across all education and training levels. The Manufacturing USA Program plays a unique role in developing an advanced manufacturing workforce, including skilled technicians, production workers, engineers, scientists, and laboratory personnel. Innovative manufacturing technologies have the potential to create millions of secure, high-wage jobs, many of which do not require a four-year degree. However, the gap between the skills needed for these technologies and those possessed by the workforce is significant and growing. Workforce development must keep pace with evolving skill demands to address this gap and continue to include jobseekers who are veterans, people with disabilities, and those reentering the workforce.

Examples of Manufacturing USA initiatives that accelerate the development of an advanced manufacturing workforce include:

The ARM Institute’s RoboticsCareer.org platform connects students, job seekers, and training providers with effective training programs and manufacturing jobs: The ARM Institute’s RoboticsCareer.org platform, developed in collaboration with its member consortium, helps bridge the manufacturing workforce gap by connecting individuals to opportunities in robotics. The platform links future workers to over 16,700 robotics training programs, evaluates and endorses top training programs, and provides personalized, up-to-date job listings. All programs and jobs align with the skills and competencies defined by the ARM Institute’s industry-led membership for robotics roles in manufacturing. Training providers can list their programs for free, and employers gain access to qualified workers through its talent database. In 2023, ARM enhanced RoboticsCareer.org by introducing job-matching features to better connect employers with candidates.

IACMI’s InnoCrate Paves the Way for Advanced Manufacturing Careers: Developed and piloted in 2023, IACMI’s InnoCrate learning kits accelerate the development of an advanced manufacturing workforce by introducing K-12 students to foundational skills in composites. The teaching tools are divided by age levels, culminating with high school students being taught manufacturing workforce-oriented concepts, including computer-aided design (CAD) modeling, computerized numerical control (CNC) machines, molding techniques, and metal casting. Over 1,000 kits have been distributed to 13 schools, reaching approximately 2,000 students, with a focus on rural areas. To support educators, IACMI provided free “Train the Trainer” sessions to teachers from nine schools in East Tennessee. By making advanced manufacturing concepts accessible and engaging, InnoCrate equips students with the knowledge and inspiration needed to pursue careers in this critical field, fostering a pipeline of skilled workers for the future.

Manufacturing USA Network Workforce Initiatives

In 2023, Manufacturing USA launched two network-wide initiatives to expand access to workforce training best practices and to inspire interest in advanced manufacturing careers:

A Manufacturing USA Workforce Roadmap: To attract and retain students and workers, Manufacturing USA created a first-of-its-kind roadmap⁴ aimed at building a robust advanced manufacturing workforce. Developed in consultation with industry and government, the roadmap identifies scalable and ready-to-go vocational, student, and workforce programs with the highest potential to address critical gaps and ensure long-term sustainability.

Each institute in the network addresses workforce needs within its specific technology area, while a coordinated, network-wide expansion of efforts amplifies the impact across U.S. manufacturing. Guided by the roadmap, the network focuses on common workforce development activities—often through regional and sectoral partnerships—to tackle workforce challenges and support the sustained growth of advanced manufacturing nationwide.

Modern Makers: In FY 2023, Manufacturing USA launched the Modern Makers initiative to showcase the pathways individuals take to enter and advance in the manufacturing workforce. By highlighting success stories from within the Manufacturing USA network, the initiative promotes careers in advanced manufacturing. The inaugural cohort comprises 16 Modern Makers nominated by Manufacturing USA institutes.⁵ Their stories have the power to transform perceptions of manufacturing careers.

⁴ *Revitalizing America's Manufacturing Workforce: A Manufacturing USA National Roadmap* (2023). Advanced Manufacturing National Program Office, National Institute of Standards and Technology. Available at: <https://www.manufacturingusa.com/pages/revitalizing-americas-manufacturing-workforce-manufacturing-usa-national-roadmap>

⁵ The Modern Makers (2023). Advanced Manufacturing National Program Office, National Institute of Standards and Technology. Available at: <https://www.manufacturingusa.com/modern-makers>

Goal 4: Promoting a Network of Institutes that Build Long-Term Support for and from their Communities

The Manufacturing USA Program fosters a collaborative network of advanced manufacturing institutes, each firmly rooted in its community. These institutes ensure long-term viability by delivering tangible benefits to their partners, attracting co-investment, and engaging industrial, academic, and government stakeholders. This integrated approach strengthens local and regional economies, drives national prosperity, and enhances national security through a business model that supports the institutes' ongoing operations.

Examples of how the network of institutes builds long-term support for and from their communities include:

Minnesota Invests in Bioindustrial Manufacturing Facility: Minnesota has approved up to \$100 million in co-investment with federal funding to establish a groundbreaking bioindustrial manufacturing campus to address the critical need for pilot-scale facilities that will transform American biomanufacturing for the 21st century. This initiative, spearheaded by BioMADE, positions the U.S. as the leader in cutting-edge bioindustrial innovation. By creating high-value products like bioplastics and durable fibers, the investment strengthens supply chains and will create high-paying manufacturing jobs in Minnesota, while serving as a model for the development of a national network of bioindustrial infrastructure, benefitting both urban and rural communities.

Cross-Institute Workshop Tackles E-Textile Innovation Challenges: E-textiles—fabrics embedded with electronic components for functions like sensing, heating, lighting, or data transmission—face significant hurdles in development and scalability. Their design often relies on slow, iterative physical prototyping, resulting in inconsistent performance and challenges when scaling manufacturing processes. To address these issues and enhance industry collaboration, the ARM Institute, NextFlex, and AFFOA hosted a pioneering workshop for their member organizations. This event brought together experts in functional fabrics, electronics design, manufacturing, and design tools to close critical gaps in digital tools for e-textile development. By fostering collaboration across industries and institutes and leveraging broad collective expertise, this initiative bolsters the sustainability of institute efforts while strengthening the innovation networks of all the participants.

APPENDIX A: Manufacturing USA Metrics Map and Performance Metrics Data

Measuring Manufacturing USA Program Performance

Manufacturing USA's performance metrics provide the basis for evaluating the program's success in meeting its goals. Table 1 illustrates how each metric category aligns with the program's goals,⁶ which are based on the legislative program purposes.⁷ Twenty-six metrics are currently monitored, with a strong emphasis on education and workforce development efforts, as shown in Tables 2 and 3. In these tables, FY 2023 metrics are compared to those from FY 2022.

In addition to the Manufacturing USA program metrics shared here, each funding agency has developed specific metrics to align with its unique mission. These additional metrics are collected and evaluated separately by each funding agency to ensure a comprehensive assessment.

Table 1. Performance Metrics Mapped to the Manufacturing USA Program Goals

Institute Metric Category	<u>Goal 1</u> Increase the competitiveness of U.S. manufacturing	<u>Goal 2</u> Facilitate the transition of innovative technologies into scalable, cost-effective, and high-performing domestic manufacturing capabilities	<u>Goal 3</u> Accelerate the development of an advanced manufacturing workforce	<u>Goal 4</u> Promote a network of institutes that build long-term support for and from their communities
Impact to U.S. Innovation Networks	●	●		●
Financial Leverage		●		●
Technology Advancement	●	●		
Development of an Advanced Manufacturing Workforce	●		●	

The collaborative efforts and strategic initiatives led by Manufacturing USA institutes have catalyzed advancements in technology innovation and workforce development. In FY 2023, the institutes experienced a 14% growth in overall membership, reflecting increasing enthusiasm and support for their initiatives. The Manufacturing USA network has over 2,900 member organizations and fosters broad engagement in collaborative research, development, and workforce training efforts.

Notably, industrial companies lead institute membership, comprising 62% of member organizations, 73% of which are small and medium-sized manufacturers (SMMs). SMMs are crucial to spreading innovation and play a pivotal role in Manufacturing USA, reflecting the network's inclusive membership strategy. Community colleges and major research universities account for 22% of memberships, while non-profits and government organizations comprise the remaining 16%.

⁶ *Strategic Plan for the Manufacturing USA Program (2024)*. Advanced Manufacturing National Program Office, National Institute of Standards and Technology, Department of Commerce. Available at: <https://www.manufacturingusa.com/news/manufacturing-usa-releases-2024-strategic-plan>

⁷ 15 U.S.C. § 278s(b)(2)). [http://uscode.house.gov/view.xhtml?req=\(title:15 section:278s edition:prelim\)](http://uscode.house.gov/view.xhtml?req=(title:15 section:278s edition:prelim))

Table 2. Technology Research and Development Performance Metrics*

Specific Metric	Unit of Measure	FY 2022	FY 2023
Impact to U.S. Innovation Networks			
Organizations with institute membership agreements	Total number of memberships	2,572	2,921
Type of member organizations	Number of large manufacturers (each with more than 500 employees)	436	493
	Number of small manufacturers (each with 500 or fewer employees)	1,177	1,315
	Number of academic members (universities, community colleges, etc.)	568	655
	Number of other entities (government members, government laboratories, not-for-profits, etc.)	330	458
Financial Leverage			
Federal investment	Federal base funding in the fiscal year	\$145.7M	\$160.4M
Co-investment	Cost-share expended and federal funding not part of the base federal funding in the fiscal year	\$307.8M	\$379.5M
Total expenditure	Total institute expenditures in the fiscal year	\$453.6M	\$539.9M
Technology Advancement			
Active research and development projects	Number of ongoing projects	678	929
Key project objectives met	Percentage of key project milestones met	85%	85%

* Data includes 16 institutes; the 17th institute, EPIX, joined the network during FY 2023 and, therefore, did not yet have a complete year of data to report.

In FY 2023, Manufacturing USA institutes managed 929 applied research and development projects, demonstrating a strong commitment to fostering innovation and maintaining the United States' global competitive advantage. The focus on high-priority technology projects supports both national and economic security and ensures that the United States remains at the forefront of manufacturing advancements. The substantial \$540 million financial commitment by the public and private sectors includes \$160 million (30%) from sponsoring federal agencies, effectively catalyzing \$380 million (70%) in co-investment. This high level of co-investment highlights the unwavering commitment of private industry, states, and federal agencies to strengthening domestic advanced manufacturing. This strong financial support is essential for executing impactful projects and programs, accelerating technological advancements, and building the workforce. The financial commitments from the federal government and partner sources demonstrate confidence in Manufacturing USA's mission and represent a tangible investment in the future of manufacturing.

In FY 2023, the institutes effectively managed 216 education and workforce development projects, marking a 40% increase from the previous year. These initiatives received funding of \$43.3 million, with 80% sourced from the federal government. The extensive involvement in workforce development programs, which reached over 150,000 participants, highlights Manufacturing USA's dedication to cultivating a highly skilled workforce capable of excelling in the advanced

manufacturing sector. By nurturing a group of manufacturing professionals capable of leveraging and contributing to technological innovations, the institutes actively support continuous innovation and production capabilities aligned with the latest technological advancements.

Table 3. Education and Workforce Development (EWD) Performance Metrics*

Metric	Units of Measure	FY 2022	FY 2023
STEM activities	Total number of students participating in institute projects or internship programs and training	79,229	130,286
	Workers completing a certificate, apprenticeship, or training program	23,059	17,071
Educators and trainers	Teachers or trainers completing institute-led training	4,037	3,361
	Total number of EWD participants	106,325	150,718
Source of funding for institute EWD projects or activities	<u>Base-funded projects</u> : base federal funding from the original cooperative agreement or technology investment agreement	43	56
	<u>Commercial-funded projects</u> : support provided by industry, regardless of membership status	22	74
	<u>Federal agency-funded projects</u> : resourced from federal funding outside the base Cooperative Agreement (CA) or Technology Investment Agreement (TIA) funding	44	51
	<u>State- or locally-funded projects</u> : resourced from state or municipal government funding	26	17
	<u>Other funded projects</u> : resourced from philanthropic organizations, nonprofits, foundations, or associations	19	11
	Total number of EWD projects and activities	154	209
Funding amount expended for EWD projects and activities	<u>Base funding expended</u> : resourced by institutes using base federal funding from the original CA or TIA	\$8.7M	\$10.4M
	<u>Commercial expenditures</u> : provided by industry, regardless of membership status	\$2.3M	\$0.3M
	<u>Federal agency expenditures</u> : resourced from federal funding outside the base CA or TIA funding	\$22.3M	\$24.1M
	<u>State or local funding expended</u> : resourced from state or municipal government funding	\$4.9M	\$4.1M
	<u>Other expenditures</u> : resourced from philanthropic organizations, nonprofits, foundations, or associations	\$2.1M	\$3.7M
	Total expenditures for EWD projects and activities	\$40.3M	\$43.3M

*Data includes 16 institutes; the 17th institute, EPIX, joined the network during FY 2023 and, therefore, did not yet have a complete year of data to report.

The FY 2023 metrics data for Manufacturing USA showcases the network's significant accomplishments and highlights its essential role in advancing U.S. manufacturing capabilities. As Manufacturing USA expands its influence, the emphasis on innovation, collaboration, and workforce development remains crucial in cementing the U.S.'s position as a global leader in advanced manufacturing.

APPENDIX B: Manufacturing USA Institutes in FY 2023

Institute	Technology Focus Area	Agency	Headquarter Location	Established
America Makes The National Additive Manufacturing Innovation Institute	Additive manufacturing	DoD	Youngstown, OH	Aug 2012
MxD Manufacturing Times Digital	Digital manufacturing and design/ Cybersecurity in Manufacturing	DoD	Chicago, IL	Feb 2014
LIFT Lightweight Innovations For Tomorrow	Lightweight materials manufacturing	DoD	Detroit, MI	Feb 2014
PowerAmerica Next Generation Power Electronics Manufacturing Innovation Institute	Wide-bandgap power electronics manufacturing	DOE	Raleigh, NC	Dec 2014
IACMI Institute for Advanced Composites Manufacturing Innovation	Fiber-reinforced polymer composites manufacturing	DOE	Knoxville, TN	Jun 2015
AIM Photonics American Institute for Manufacturing Integrated Photonics	Integrated photonics manufacturing	DoD	Rochester & Albany, NY	Jul 2015
NextFlex America's Flexible Hybrid Electronics Manufacturing Institute	Thin flexible electronic devices and sensor manufacturing	DoD	San Jose, CA	Aug 2015
AFFOA Advanced Functional Fabrics of America Institute	Sophisticated, integrated, and networked fibers, yarns, and fabric manufacturing	DoD	Cambridge, MA	Apr 2016
CESMII Collaborative Ecosystems Smart Manufacturing Innovation Institute	Smart manufacturing, sensing, control, modeling, analytics and platform technologies	DOE	Los Angeles, CA	Dec 2016
ARMI BioFabUSA Advanced Regenerative Manufacturing Institute	Engineered tissues and tissue-related manufacturing	DoD	Manchester, NH	Dec 2016
ARM Institute Advanced Robotics for Manufacturing Institute	Transformative artificial intelligence and robotic technologies for manufacturing	DoD	Pittsburgh, PA	Jan 2017
NIIMBL National Institute for Innovation in Manufacturing Biopharmaceuticals	Biopharmaceutical manufacturing	DOC	Newark, DE	Mar 2017
RAPID Rapid Advancement in Process Intensification Deployment Institute	Modular chemical-process intensification for manufacturing	DOE	New York, NY	Mar 2017
REMADE Reducing Embodied-energy of Products and Materials	Material-efficient technologies	DOE	Rochester, NY	May 2017
CyManII Cybersecurity Manufacturing Innovation Institute	Cybersecure and energy-efficient manufacturing	DOE	San Antonio, TX	Sep 2020
BioMADE Bioindustrial Manufacturing and Design Ecosystem	Reliable bio-industrial manufacturing technologies	DoD	St. Paul, MN	Oct 2020
EPIXC The Electrified Process for Industrial eXcellence Institute	Hybrid industrial heating	DOE	Tempe, AZ	May 2023

APPENDIX C: Supplemental Information

Funds Expended by the Department of Commerce

This Report to Congress is required to state the funds expended by the Department of Commerce on the program. Congress appropriated \$37 million to the Department of Commerce for Manufacturing USA for FY 2023, of which approximately \$14 million was spent to provide financial assistance to the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL). Approximately \$7.2 million was spent providing network services to support Manufacturing USA, the operation of the National Program Office, and other statutory requirements. No waivers of cost-share requirements for NIIMBL were requested.

Summary of Institute Reports to Commerce

Institutes established under the Commerce Manufacturing USA statute are required to submit a detailed report to the Secretary of Commerce, with a summary and assessment of that report included in the Manufacturing USA Annual Report to Congress.⁸ At the start of FY 2023, this requirement only applied to the Commerce-sponsored NIIMBL institute. In FY 2023, the Department of Energy launched the EPIXC institute and renewed their IACMI, PowerAmerica, and CESMII institutes. In future years those institutes launched or renewed under Manufacturing USA's legal authority will be included in this section.

The following is a summary and assessment of the NIIMBL 2022-23 Annual Report to the Secretary of Commerce. NIIMBL released a public version of this report, without the financial reporting data, in January 2024.⁹

NIIMBL launched operations on March 1, 2017, to promote U.S. global leadership in biopharmaceutical manufacturing innovation and to ensure that U.S. inventions become products made in America. The institute's success will promote economic development, with additional impacts on national security and public health, by strengthening the domestic supply chain and advancing the rapid scale-up of biomanufactured therapies. NIIMBL's annual report submitted to the Secretary of Commerce covered a summary of accomplishments and activities from March 1, 2022 to June 30, 2023, NIIMBL's sixth year of operation. NIIMBL reports that, in its sixth year, the institute has:

- Demonstrated continuing value to the community, with membership increased by 16% year-over-year. NIIMBL ended the year with 239 members, including 25 large industry manufacturers, 96 small to medium-sized manufacturers, and 73 academic institutions.
- Invested \$11M in new technology projects in areas such as preventive medical countermeasures, cell processing, critical quality attribute measurement, and reliability.
- Matured NIIMBL-led programs in process intensification, big data, and viral vector manufacturing to support ecosystem-wide innovation and innovator access to current and future state-of-the-art equipment and industry-relevant materials for biomanufacturing biopharmaceutical manufacturing.

⁸ 15 U.S.C. § 278s(j). [http://uscode.house.gov/view.xhtml?req=\(title:15 section:278s edition:prelim\)](http://uscode.house.gov/view.xhtml?req=(title:15 section:278s edition:prelim)).

⁹ NIIMBL 2022-2023 Annual Report (2024). The National Institute for Innovation in Manufacturing Biopharmaceuticals. Available at: <https://www.manufacturingusa.com/reports/niimbl-2022-2023-annual-report>

- Invested \$2.5M in workforce development, reaching over 4,000 professionals and 2,000 students in the biopharmaceutical field, which included high school and college students in learning programs designed to inform, inspire, attract, and recruit the next-generation workforce. In addition, the first faculty participant joined the NIIMBL Faculty Fellows Program, which aims to facilitate collaboration between academics and industry.
- Continued making progress in helping our nation prevent, prepare for, and respond to future health threats through 32 federally funded special projects,¹⁰ including projects for establishing testbeds to support collaborative innovation at NIIMBL. At the time of this report, almost all projects have concluded.

NIIMBL's performance continues to demonstrate its commitment to strengthening U.S. leadership in biopharmaceutical manufacturing, which will support the economy, speed patient access to the best available therapies, and ensure our national prosperity.

¹⁰ American Rescue Plan (ARP) Act of 2021 (Pub. L. 117-2)