Manufacturing USA®

Manufacturing USA Program Strategic Plan

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About This Document

This *2025 Manufacturing USA Program Strategic Plan* outlines the role of the Manufacturing USA institutes and participating federal agencies in enhancing American manufacturing competitiveness by advancing manufacturing technologies, fostering agile domestic supply chains, and developing a skilled advanced manufacturing workforce. This document fulfills the strategic planning requirement under the Program's authorizing statute.*

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* Consolidated and Further Continuing Appropriations Act, 2015, (Pub. L. 113-235, Title VII – Revitalize American Manufacturing Innovation Act of 2014, codified at 15 U.S.C. § 278s(i)(2)(C)). See: http://uscode.house.gov/view.xhtml?req=(title:15%20section:278s%20edition:prelim).

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Overview of the Manufacturing USA Program

The Manufacturing USA Program catalyzes public and private investments in pre-competitive advanced manufacturing technology. It develops new technologies for transition to American manufacturing, while preparing and connecting the workforce for advanced manufacturing jobs. These investments improve the capability, resilience, and security of the domestic industrial base and manufacturing supply chains, unleashing U.S. global competitiveness.

Advanced manufacturing encompasses new ways to produce existing products as well as the creation of entirely new products driven by advanced and emerging technologies. These activities may rely on the integration and coordination of information, automation, computation, software, sensing, and networking. They may also utilize cutting-edge materials and emerging capabilities stemming from advancements in the physical and biological sciences, such as materials science, chemistry, and biology.

The Manufacturing USA Program's authorizing legislation[1] directed the Secretary of Commerce to establish the Manufacturing USA Program and convene a network of institutes focused on advanced manufacturing innovation. The mission of the Manufacturing USA Program is to connect people, ideas, and technology to solve industry-relevant advanced manufacturing challenges, thereby enhancing industrial competitiveness. By achieving this mission, the Program strengthens the economy, expands opportunities for high-paying jobs, improves national security, and advances healthcare solutions.

The Manufacturing USA Program accomplishes its mission through robust interagency cooperation and a network of uniquely structured public-private partnerships. Federal agencies and Manufacturing USA institutes work together to advance the Program's mission through the Manufacturing USA network, which is coordinated by the Advanced Manufacturing National Program Office.

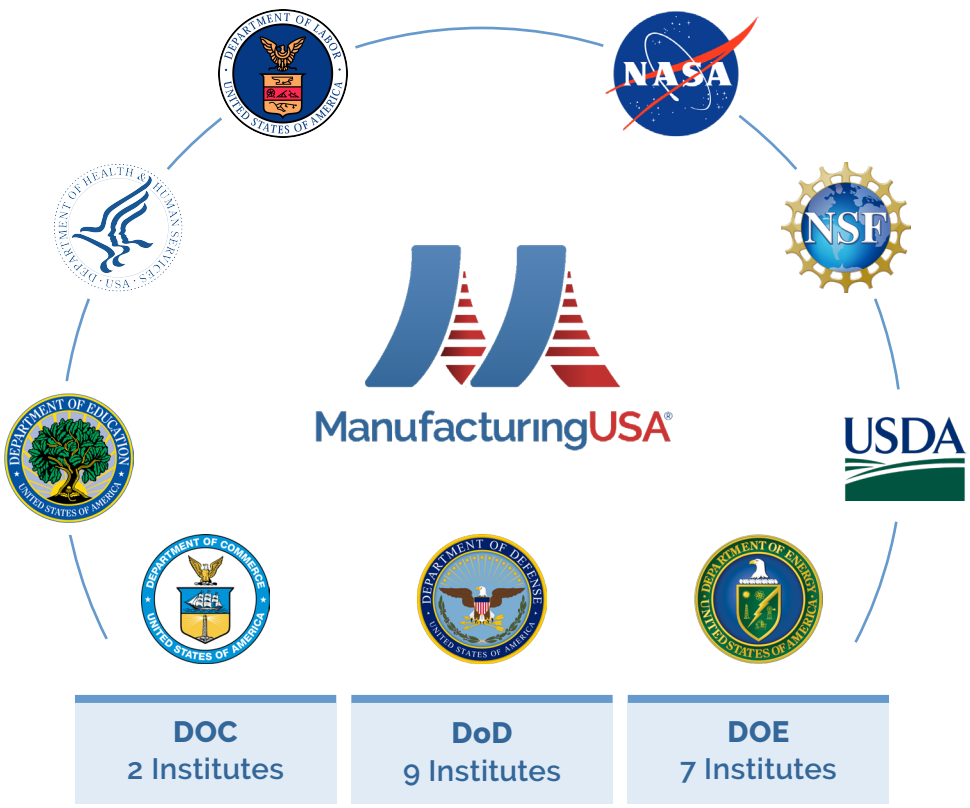
1 Revitalize American Manufacturing and Innovation Act of 2014 (Pub. L. 113-235, codified in relevant parts at 15 U.S.C. § 278s(b) and 15 U.S.C. § 278s(c)). http://uscode.house.gov/view.xhtml?req=(title:15%20section:278s%20edition:prelim).

Participating Federal Agencies

Eighteen Manufacturing USA institutes have been established to date by the Department of Commerce (DOC), the Department of Defense (DoD), and the Department of Energy (DOE). In addition to these three sponsoring agencies, six other federal agencies participate in the Manufacturing USA Program: Department of Education (ED), Department of Labor (DOL), Health and Human Services (HHS), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), and Department of Agriculture (USDA).

Together, the interagency team shares information and approaches to address mission-specific manufacturing challenges and identify opportunities to collaborate to strengthen the national impact of the Program.

Figure 1. Agencies participating in Manufacturing USA.



The Advanced Manufacturing National Program Office

The Manufacturing USA Program's authorizing legislation also directed DOC to establish an office at the National Institute of Standards and Technology (NIST) to oversee the planning, management, and coordination of the Program.[2] The Advanced Manufacturing National Program Office (AMNPO) serves as this interagency program office, convening and coordinating the Program's activities in collaboration with federal agencies whose missions contribute to or benefit from advances in the nation's manufacturing capabilities.

The Manufacturing USA Institutes

Each Manufacturing USA institute is a public-private partnership of companies, academia, state, Tribal, and local governments, and federal agencies that co-invest in developing innovative advanced manufacturing technologies and capabilities. Each institute focuses on a unique technology area and provides the resources and infrastructure needed for the collaborative, pre-competitive development of promising innovations to serve the nation's industrial base. Institutes also work to ensure the workforce has the skills needed to support the industrial deployment of these technologies.

The Manufacturing USA institutes, working with the participating agencies, address important manufacturing challenges for critical and emerging industries. DOC, DoD, and DOE have provided initial funding for institutes through competitive federal assistance agreement awards. Institutes established under the Manufacturing USA statute have a co-investment requirement, with a minimum of 1:1 match of non-federal resources to federal base program support.[3] Federal support may be continued after an initial funding period of 5-7 years following a rigorous evaluation.

2 Revitalize American Manufacturing and Innovation Act of 2014 (Pub. L. 113-235, codified in relevant part at 15 U.S.C. § 278s(i)(2)(A)). http://uscode.house.gov/view.xhtml?req=(title:15%20section:278s%20edition:prelim).

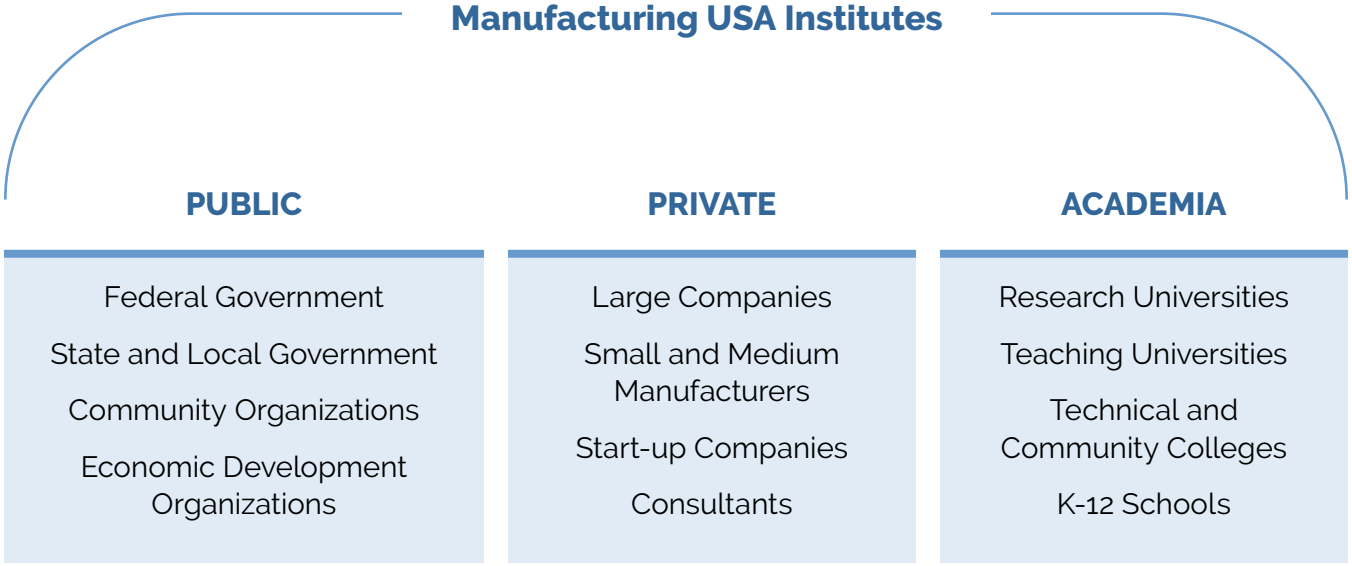
3 Revitalize American Manufacturing and Innovation Act of 2014 (Pub. L. 113-235, codified in relevant part at 15 U.S.C. § 278s(e)(7)). http://uscode.house.gov/view.xhtml?req=(title:15%20section:278s%20edition:prelim)

Institute technology focus areas reflect the mission and needs of the sponsoring federal agencies:

- The Department of Commerce established two institutes focused on manufacturing technology and workforce development in industry sectors of critical importance to the U.S. economy, with significant associated impacts on national security.
- The Department of Defense established nine institutes, focused on advancing manufacturing technologies needed for the military and potential dual-use commercial applications.
- The Department of Energy established seven institutes, focused on improving the productivity, affordability, competitiveness, and resource efficiency of manufacturers across industrial sectors.

All institutes tailor operational plans to their technology focus, membership, and the sponsoring agency's mission. As depicted in Figure 2 below, each institute convenes members from manufacturing enterprises of all sizes, universities, community colleges, state, Tribal, and local governments, and other federal equities with interests and capabilities in the specified technology area. Members leverage the institutes' unique technical and networking capabilities to collectively accelerate advanced manufacturing innovation while protecting each member's intellectual property. They also upskill the workforce needed to advance new technologies into industrial use. Institute-led technology-focused networks also serve as invaluable resources for the federal government to tackle agency-specific advanced manufacturing challenges.

Figure 2. Manufacturing USA Institute Members and Stakeholders.



The Manufacturing USA Network

The Manufacturing USA Program's network of institutes serves as a national asset to drive impact across the private, public, and academic sectors. Through the cooperation, collaboration, and leadership of the institutes, working with their federal sponsors and other participating agencies, the Manufacturing USA network unites domestic advanced manufacturing stakeholders into a nationwide, collaborative innovation ecosystem advancing the capabilities of the dual-use industrial base.

In Fiscal Year 2023, the Manufacturing USA institutes collectively worked with over 2,900 member organizations to collaborate on more than 900 technology and workforce-applied R&D projects. More than 62% of member organizations are manufacturers, and 73% of those are small and medium-sized manufacturers, reflecting the composition of the U.S. industrial base. The institutes also engaged more than 150,000 students, teachers, and workers in advanced manufacturing skills training. State, industry, and non-core federal funds contributed about $380 million to these activities, representing a 2.4:1 investment match to the core federal funds.

The network of institutes benefits from years of sharing best practices and coordinating activities, advancing the Program's vision for U.S. global leadership in advanced manufacturing. At the same time, each institute continues to fulfill the mission needs of its sponsoring agency.

Table 1. Manufacturing USA Institutes (April 2025)

Institute	Technology Focus Area	Agency	Headquarter Location	Est.
America Makes The National Additive Manufacturing Innovation Institute	Additive and adaptive 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 and packaging	DoD	Rochester & Albany, NY	Jul 2015
NextFlex America's Flexible Hybrid Electronics Manufacturing Institute	Hybrid electronics and sensors manufacturing	DoD	San Jose, CA	Aug 2015
RFTI Revolutionary Fibers and Textiles Institute	Revolutionary fabric and textile manufacturing and soft good process automation	DoD	Cambridge, MA	Apr 2016
CESMII Collaborative Ecosystems for Smart Manufacturing Innovation Institute	Smart manufacturing, sensing, control, modeling, analytics and platform technologies	DOE	Los Angeles, CA	Dec 2016
ARMI | BioFab USA 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

Table 1. Manufacturing USA Institutes (April 2025) *continued*

Institute	Technology Focus Area	Agency	Headquarter Location	Est.
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 And Decreasing Emissions	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 Electrified Processes for Industrial eXCellence	Hybrid industrial heating	DOE	Tempe, AZ	May 2023
SMART USA Semiconductor Manufacturing and Advanced Research with Twins	Digital Twins for Semiconductor Manufacturing	DOC	Raleigh, NC	Jan 2025

Manufacturing USA Program Strategy

The 2025 Manufacturing USA Strategic Plan guides the participating agencies and institutes to achieve the Program's vision, mission, goals, and objectives, unleashing American innovation and creating lasting value in critical manufacturing industries.

Vision

The vision for the Manufacturing USA Program is ***U.S. global leadership in advanced manufacturing.***

Mission

To support this vision, the mission of the Manufacturing USA Program is to connect people, ideas, and technology to solve industry-relevant advanced manufacturing challenges and enhance industrial competitiveness.

Goals and Objectives

In alignment with the vision and mission of the Manufacturing USA Program, the participating agencies and institutes work toward four consensus goals that flow from the nine statutory purposes stated in the authorizing legislation[4] and are consistent with each sponsoring agency's mission:

Goal 1: Increase the competitiveness of U.S. manufacturing

Goal 2: Transition innovative technologies into scalable domestic manufacturing capabilities

Goal 3: Develop an advanced manufacturing workforce

Goal 4: Promote a durable network of institutes serving national priorities

These four goals guide a clear strategy for driving manufacturing innovation, speeding the shift from early-stage research to development and, ultimately, deployment in the U.S. manufacturing sector. An interagency team assessed the Program's goals and objectives from previous Strategic Plans[5] to shape this 2025 plan.

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4 15 U.S.C. § 278s(b)(2). https://uscode.house.gov/view.xhtml?req=(title:15%20section:278s%20edition:prelim).

5 *National Network for Manufacturing Innovation (NNMI) Program Strategic Plan*, Executive Office of the President, National Science and Technology Council, Advanced Manufacturing National Program Office (February 2016). https://www.manufacturingusa.com/reports/national-network-manufacturing-innovation-nnmi-program-strategic-plan,

and *Manufacturing USA Strategic Plan*, Advanced Manufacturing National Program Office (November 2019). https://www.manufacturingusa.com/reports/manufacturing-usa-strategic-plan.

Strategic Plan for the Manufacturing USA Program, Advanced Manufacturing National Program Office (August 2024). https://www.manufacturingusa.com/news/manufacturing-usa-releases-2024-strategic-plan.

Strategic objectives were refined to emphasize the importance of leadership, technical innovation, workforce development, and strong private-sector partnerships in advancing the Program's mission. The Program's goals and objectives are outlined in detail in the sections below and summarized in Table 2.

Table 2. Manufacturing USA Strategic Goals and Objectives

Goal 1: Increase the competitiveness of U.S. manufacturing

Objective 1.1 Promote innovation networks to strengthen the manufacturing industrial base.	**Objective 1.2** Establish and support a portfolio of industry-relevant innovative technologies.	**Objective 1.3** Provide U.S. leadership to serve national advanced manufacturing priorities.

Goal 2: Transition innovative technologies into scalable domestic manufacturing capabilities

Objective 2.1 Provide validated innovative technologies, materials, and equipment.	**Objective 2.2** Promote shared learning across manufacturing sectors.	**Objective 2.3** Facilitate collaborations for multidisciplinary technologies and supply chain development

Goal 3: Develop an advanced manufacturing workforce

Objective 3.1 Encourage the future workforce to pursue advanced manufacturing careers.	**Objective 3.2** Promote work-based learning, Registered Apprenticeships, and hybrid learning.	**Objective 3.3** Develop and integrate industry-driven advanced manufacturing credentialing and certification.

Goal 4: Promote a durable network of institutes serving national priorities

Objective 4.1 Implement membership structures that promote shared risks and investment.	**Objective 4.2** Adopt institute models that ensure long-term continuity of operations.	**Objective 4.3** Address the needs of emerging manufacturing sectors and supply chains.

Goal 1: Increase the competitiveness of U.S. manufacturing

The deployment of advanced manufacturing innovation that boosts production capabilities and introduces new products to the marketplace strengthens U.S. manufacturers' competitiveness. The three strategic objectives that support Goal 1 position the Program to build the linked innovation networks, technical portfolios, and leadership needed to accelerate innovation collaboratively.

Objective 1.1 Promote innovation networks to strengthen the manufacturing industrial base. Strengthening market-driven manufacturing innovation and enhancing domestic production is critical for U.S. global competitiveness. Manufacturing USA institutes provide regional and national advanced manufacturing leadership, leveraging expertise in specific technology areas and industries. Institutes partner with industry, universities and government laboratories to reduce risks associated with technology development and accelerate deployment to American manufacturers. By combining the resources and market knowledge of larger partners with the agility of smaller partners, institutes create opportunities across U.S. manufacturing value chains. As described in Goal 3, institute partnerships with community colleges, universities, non-profits organizations, and workforce development programs are critical contributors in innovation networks for U.S. advanced manufacturing. These partners provide curricula and training materials to grow the pipeline of skilled workers.

Objective 1.2 Establish and support a portfolio of industry-relevant innovative technologies. The Manufacturing USA Program grows domestic advanced manufacturing capabilities through de-risking innovative technologies and preparing them for implementation in commercial production. These investment priorities are driven by manufacturing roadmaps that combine industry knowledge of market demands and end user requirements in alignment with agency mission needs, resulting in a competitive advantage for the institute's members.

The institutes identify promising low Technology Readiness Level (TRL) or Manufacturing Readiness Level (MRL) manufacturing technologies and conduct collaborative applied research projects, including translational research, to mature for scale-up and transfer into industrial development and use.[6]

6 TRLs are used to estimate the maturity of technologies, especially for acquisition purposes. MRLs are criteria used to assess the readiness of a product or system for full-scale production. Each readiness scale can be useful for assessing the development level of a new manufacturing technology, depending on the specific technology and application.

Institutes also provide leadership within technology or sector-focused manufacturing communities by connecting small start-up technology developers to end users, leading to earlier and better knowledge of user requirements to inform laboratory prototypes.

Objective 1.3 Provide U.S. leadership to serve national advanced manufacturing priorities. Manufacturing USA Institutes serve both as sector leaders to determine priorities for implementing advanced manufacturing innovations and as national leaders with expert insight into the nation's domestic competitiveness needs. Collaboration among institutes and the federal government, with input from all stakeholders results in more actionable strategies to advance the manufacturing capabilities within sectors important to the dual-use U.S. industrial base. By sponsoring and convening activities such as technical roadmapping, technology forums, and workforce training, the Manufacturing USA network facilitates consensus on the shared needs of industrial ecosystems to drive innovation beyond an individual institute's reach. Through strong leadership and coordination of investments, the network can work together to support current and future industries.

Goal 2: Transition innovative technologies into scalable domestic manufacturing capabilities

Advanced manufacturing technologies that show promise in research laboratories often face technical and economic barriers that limit scale-up and implementation in production environments. Advancement of promising manufacturing innovations developed in universities and small- and medium-sized manufacturers (SMMs) often stalls prior to scale-up, which is detrimental to aggregate U.S. manufacturing productivity. Manufacturing USA lowers barriers by making complex technologies more accessible to manufacturing companies at all scales, reducing market failures.

The scale-up amplification of newly developed manufacturing capabilities is a key benefit stemming from a connected network of institutes. The collective networks within Manufacturing USA also inform the development of strategies to address facility and equipment access needs and linkage to later-stage business services to support the scale-up of technologies in development.

Objective 2.1 Provide validated innovative technologies, materials, and equipment. Many manufacturers, particularly SMMs, cannot independently take on the technical and financial risks associated with the development, transition, and adoption of new manufacturing technologies. Manufacturing USA institutes help resolve this challenge by identifying promising breakthroughs that align with compelling industry needs and then advancing those technologies to the point of broad accessibility through translational research.

Projects sponsored by the institutes engage technology developers across member institutions and regions to conduct applied research and development (R&D) to address shared innovation priorities. Institutes develop testbeds and demonstration facilities that provide opportunities for potential users to assess the suitability of new technologies for their needs, in addition to industrially relevant context for innovators seeking to advance the state of the art.

These facilities and services, including affordable state-of-the-art prototyping capabilities, allow domestic manufacturers to conduct limited-scale production runs to evaluate new manufacturing processes or prototypes prior to committing to full-scale production.[7] Manufacturing USA institutes also provide access to technical consulting services, equipment, training, and opportunities to collaborate and conduct business with other institute members and technology and service providers, lowering the barriers and timeline to industrial deployment.

Objective 2.2 Promote shared learning across manufacturing sectors. The Manufacturing USA Program promotes partnerships that include large, small and medium-sized organizations that benefit from shared resources and understanding of priorities and end-user requirements for innovative technologies. Innovation in one sector is often cross-cutting and faces similar barriers to adoption in other manufacturing sectors. The Program provides a unique platform for sharing knowledge and experience among institute members, the broader manufacturing sectors they serve, and across federal agencies and federal laboratories to accelerate the maturation of innovation into industrial use.

The institutes create nationwide value by communicating emerging government and industry technology priorities, spotlighting institute-led activities, products, and services, and addressing shared technical challenges. Shared learning topics include return on investment in infrastructure, best practices for secure data sharing, managing

7 Manufacturing USA institutes have historically focused applied, precompetitive R&D on bridging the "valley of death" in TRLs or MRLs 4-7. As chartered, institutes can, and do to the extent supported by funding, work with later technology maturity levels (i.e., TRLs 7-9 or MRLs 7-10) to support scale-up activities such as technology qualification, pilot production, manufacturing deployment, and commercialization.

engagement with foreign-owned entities, implementing cyber-physical security practices, and creating effective incentives for pre-competitive technology collaboration. While each institute serves the unique needs of its community, the partnerships address common challenges that drive growth of a stronger industrial base.

Objective 2.3 Facilitate collaborations for multidisciplinary technologies and supply chain development. Each institute specializes in a unique subset of manufacturing technologies, ranging from biopharmaceuticals to robotics to cybersecurity, each with its own supply chain networks. However, product development often requires the application and integration of multiple technologies and can benefit from collaboration between the institutes. Cross-institute collaborations may stimulate regional innovation networks in industry sectors that are geographically concentrated. Furthermore, cross-collaboration promotes the development of new domestic supply chain networks, technical tools, and services, thereby enhancing economic and national security.

Manufacturing USA institutes are non-federal entities with complex membership structures where value is created by balancing the needs and interests of partners, including federal sponsors. The requirement for non-federal co-investment to match Federal base funding inserts an additional layer of complexity that must be managed when navigating cross-network collaboration. Despite those strategic and operational realities, the cultivation of partnerships across the network is an opportunity to tap into the full capabilities of the network to accelerate technical innovation and develop the skilled workforce needed for national security, energy security, and U.S. industrial competitiveness.

Goal 3: Develop an advanced manufacturing workforce

The Manufacturing USA Program has a unique role in accelerating the development of a U.S. advanced manufacturing workforce that includes skilled technicians, production workers, engineers, scientists, and laboratory personnel.

U.S.-based innovation can create secure high-wage manufacturing jobs, many of which do not require a four-year postsecondary degree. However, the gap between the skills needed for the new technologies and the skills possessed by the U.S. manufacturing workforce is wide and growing. This gap will widen further unless workforce development keeps pace with the changing skills needed for jobs that emerge with the development

and deployment of new technologies. Aligned with *America's Talent Strategy,*[8] the Manufacturing USA Program supports a workforce system that can propel American workers into high-wage careers and deliver the talent advanced manufacturing employers need to power the nation's economic resurgence.

While each institute has its own technology portfolio, all institutes share a goal of fueling advanced manufacturing job creation, strengthening career technical education pathways, leveraging innovative learning tools, upskilling incumbent workers, and increasing supply-side responsiveness to emerging workforce demand.

Objective 3.1 Encourage the future workforce to pursue advanced manufacturing careers. The U.S. will only succeed in building workforce capacity when there is a more positive narrative around manufacturing careers and when the talent pools from which employers draw are broader. Negative perceptions surrounding the manufacturing workplace are well documented and are a barrier to those considering manufacturing career pathways. Nurturing the interest of students in science, technology, engineering, and mathematics (STEM) in advanced manufacturing is an important step toward developing an advanced manufacturing workforce to meet current and future U.S. needs.

Manufacturing USA institutes work with educational institutions to promote manufacturing careers. These partners support the dissemination of career opportunities available through STEM education, including building STEM knowledge with internships, pre-apprenticeship and Registered Apprenticeship programs, afterschool programming, and other approaches outside of typical classroom settings. By highlighting the types of high-paying jobs in manufacturing and the opportunities for career advancement in this sector, these partners play a critical role in attracting new talent.

Communication plans for network and institute activities should include expanded outreach efforts and drive access to knowledge about advanced manufacturing careers to grow interest in advanced manufacturing careers. For example, information on advanced manufacturing opportunities in the defense industrial base should be readily available to veterans and service members that are transitioning to civilian careers.

Objective 3.2 Promote work-based learning, Registered Apprenticeships, and hybrid learning. Institutes support education and workforce development at all levels and provide guidance on the skills and knowledge needed to meet the needs of specific advanced manufacturing occupations. Connecting students to work-based

8 https://www.dol.gov/sites/dolgov/files/OPA/newsreleases/2025/08/Americas-Talent-Strategy-Building-the-Workforce-for-the-Golden-Age.pdf.

learning opportunities such as Registered Apprenticeships, cooperative education (Co-op), internships, and residency-type capstone projects is necessary to integrate the conceptual and hands-on learning needed for success.

To ensure students have access to high-quality learning experiences, institutes encourage robust industry and employer participation in the development of Registered Apprenticeships and other work-based learning opportunities. Such programs must also be aligned to facilitate students' seamless transitions through levels of study. The institutes are increasingly monitoring and addressing the quality and alignment of secondary and postsecondary career and technical education programs to ensure that technician education programs are built and scaled around realistic expectations of the needs of industry.

Manufacturing USA expands Registered Apprenticeships into new sectors, which is consistent with Executive Order 14278, *"Preparing Americans for High-Paying Skilled Trade Jobs of the Future,"*[9] which establishes a policy to "protect and strengthen Registered Apprenticeships and build on their successes to seize new opportunities and unlock the limitless potential of the American worker." Focusing on promoting alternatives to traditional college degrees, it connects workers with education and training for high-skill, high-paying trades in advanced manufacturing.

Objective 3.3 Develop and integrate industry-driven advanced manufacturing credentialing and certification. To create a set of credentials that accurately represent the workforce needs and can evolve as innovation is deployed, Manufacturing USA institutes work with industry to translate emerging advanced technologies into occupational requirements. The institutes also work with education and training providers to guide the development of high-quality curricula, learning materials, and industry-relevant credentials. Aligning industry workforce needs with education and training programs will support the changing skill sets and competencies that are essential in a globally competitive advanced manufacturing workforce. Additionally, implementing stackable credentials enables workers to advance in their careers while providing employers with a mechanism to upskill entry-level and incumbent workers.

Consistent with the pillars of *America's Talent Strategy*,[10] the Institutes collaborate with industrial partners and national organizations, including professional organizations and trade groups, to support the development and validation of worker credentials, including for occupations for which certifications and degrees are not already available.

9 https://www.whitehouse.gov/presidential-actions/2025/04/preparing-americans-for-high-paying-skilled-trade-jobs-of-the-future/.

10 https://www.dol.gov/sites/dolgov/files/OPA/newsreleases/2025/08/Americas-Talent-Strategy-Building-the-Workforce-for-the-Golden-Age.pdf.

Goal 4: Promote a durable network of institutes serving national priorities

The Manufacturing USA Program cultivates and maintains engagement from stakeholders across the advanced manufacturing value chain. It is critical that institutes develop business models that support long-term viability by delivering tangible benefits to partners and successfully driving co-investment from the private sector. Sufficient support from industrial and academic institute members, government partners, and other sources is the foundation of operational viability. Sponsoring federal agencies and the institutes evaluate performance through metrics developed both at the institute and program levels to monitor both risks and value delivered.

Objective 4.1 Implement membership structures that promote shared risks and investment. Manufacturing USA offers value to members across stakeholder groups with different core missions, financial resources, business operations, and expectations. The Program creates an opportunity for domestic stakeholders to pool their risk, supported in part by the federal government, to advance manufacturing so the next generation of products and systems continues to be made in the U.S. Although culture and needs may differ among industry sectors, the Program benefits from sharing knowledge of successful operational and collaborative partnership models.

Institutes continually identify and recruit key stakeholders across the industry, including suppliers, end-users, and promising start-up companies, and build and maintain strong representation among all member groups to properly inform priorities. They also engage academic institutions, from major research organizations to local community colleges, likely to benefit from and contribute to technical and workforce development activities. Relationships with federal, state, Tribal, and local governments, federal laboratories, professional associations, economic development organizations, and venture capitalists must also be considered in setting membership structures. Knowledge sharing around managing intellectual property and conflicts of interest, effective communication and outreach, and other practices allow institutes to promote shared risk and benefits of membership.

Objective 4.2 Adopt institute models that ensure long-term continuity of operations. Manufacturing USA is a public-private partnership, where federal funding catalyzes co-investment from non-federal partners. To ensure that institutes can continue operations in the event of a lapse in federal funding and to promote business continuity, each institute works with its lead funding agency on long-term planning to include business plans, funding opportunities, and strategic membership models.

The Program supports institute operational continuity in many ways, such as increasing awareness of strategic partners associated with manufacturing and sharing best practices for operationalizing business models. Additional efforts include increasing the awareness of the Manufacturing USA brand and impact via ManufacturingUSA.com, national awareness campaigns, and Congressional briefings. Links to other sources of funding are also promoted through the network of participating agencies and their relationships with non-profit foundations and professional organizations with significant stakeholder reach.

All institutes work with their sponsoring agencies to develop long-term strategic partnership plans, although any given institute may have a plan with distinct features that meet its unique mission, technology, and membership structure. The AMNPO assists institutes and agencies in this process by facilitating the sharing of best practices from earlier institute planning efforts and may share funding opportunities from non-sponsoring agencies with the network.

Objective 4.3 Address the needs of emerging manufacturing sectors and supply chains. The specific manufacturing sectors represented by the existing network of institutes cover many national priorities that are critical to our national security, energy security, and economic prosperity. Determining which existing and emerging advanced manufacturing sectors can benefit from the Manufacturing USA institute model is a strategic decision that must also factor in the potential complementarity or undesired duplication with existing institutes, as well as the needs of sponsoring agencies and national priorities. The full network of federal agencies and Manufacturing USA institutes can contribute valuable perspective to inform future investments to address emerging manufacturing challenges and domestic supply chain networks.

Path Forward

The strength of the Manufacturing USA Program is driven by the work of the institutes and the Program's network of public-private partnerships. The implementation of the strategies presented in this document is the work of the federal agencies and institutes as collaborative partners. Using collaboration mechanisms such as the Program's Federal Interagency Working Team, the Manufacturing USA Council, the annual network meeting, and the Workforce and Communications Teams, the Manufacturing USA partners will work together to identify specific actions to implement this strategy. Any new initiatives, as well as all federal activities documented in this strategic plan, are subject to budgetary constraints and other approvals, including the weighing of priorities and available resources by the Administration in formulating its annual budget and by Congress in legislating appropriations.

Metrics and Evaluation

The Program's Annual Reports to Congress (Appendix A) include a minimum of ten quantitative performance metrics, complemented by an additional twenty-seven education and workforce metrics, that track the progress toward the Program's goals in alignment with the Program's statutory purposes.[11] In addition to these network-wide metrics, each lead sponsoring agency collects and evaluates additional metrics at the institute level relating to the agency's unique mission requirements. As the implementation plan is developed for the strategic objectives outlined in this document, appropriate key indicators for monitoring progress will be identified, building on the performance data collected at the institute and network level.

11 Revitalize American Manufacturing and Innovation Act of 2014 (Pub. L. 113-235, codified in relevant part at 15 U.S.C. § 278s(b)(2)). http://uscode.house.gov/view.xhtml?req=(title:15%20section:278s%20edition:prelim).

Appendix A: Coordinating and Reporting

Active coordination has improved the Manufacturing USA Program and increased its impact. Coordination occurs among all the participating federal agencies, among the agencies sponsoring institutes, between the federal agencies and the institutes, and among the institutes themselves.

The Interagency Working Team

The Interagency Working Team is comprised of representatives from participating federal agencies who meet regularly to discuss and coordinate activities. The interagency team also discusses higher-level policy issues and actions that might affect the Manufacturing USA network.

Sponsoring Agency Leadership Meetings

Leaders from the federal sponsoring agencies (DoD, DOE, and DOC), meet biweekly to coordinate activities across the institutes, disseminate and discuss plans for the Manufacturing USA network, and share best practices. This group also establishes *ad hoc* working groups, as needed, with targeted objectives, such as how institutes can be leveraged to address a specific national need.

Education and Workforce Development Team

The Manufacturing USA Education and Workforce Development Team facilitates collaboration among the institutes' workforce development leads and agency partners across the network. The group encourages cross-network projects and shares best practices to expand knowledge and awareness, develop new competency and skill curricula, engage academia, industry, and economic development stakeholders regionally and nationally, and scale and implement education and workforce development activities to maximize impact.

Communications Team

Each institute has its own strategies and communication channels to promote the institute's work and benefits of membership within its technical community, and to engage with current and potential members. Institute communication leads share information and ideas for effective outreach and communications with a variety of audiences. In addition, the institute and sponsoring agencies work closely to plan and implement targeted public activities, such as national outreach initiatives. The team also leverages shared resources and approaches to improve awareness and perceptions of advanced manufacturing careers.

The Advanced Manufacturing National Program Office (AMNPO) communicates to various stakeholders through multiple media and non-traditional channels to broaden awareness of Manufacturing USA and opportunities to engage. These communications primarily focus on the U.S. manufacturing industry, including manufacturers of all sizes who benefit from technology and workforce development. Communication efforts also reach workers, educators, and students who benefit from education and workforce development opportunities. A national educational awareness campaign involves network-wide collaboration to craft and share stories that illustrate the impacts that institutes and their members have across key areas, including advanced manufacturing technology leadership, strategic supply chain development, pandemic response, and advanced manufacturing education and workforce development. These efforts also resulted in the Emmy®-awarded short documentary, *Rethinking Manufacturing*.[12]

Through the ManufacturingUSA.com website and social media (LinkedIn and Twitter), the AMNPO engages the national ecosystem, promotes the role of the network of institutes, shares news and successes from the institutes, informs potential new members about how to participate in institute activities, and updates the manufacturing industry on the opportunities available through the Manufacturing USA Program. These collective communication efforts complement the activities of the institutes and agencies within the network.

Network Meetings

The AMNPO arranges for annual Network meetings. Staff from Manufacturing USA institutes and participating agencies connect at least once a year at these meetings to share best practices, generate new ideas for collaboration, and identify cross-institute priorities. Annual meetings often include pre-meeting and parallel working sessions for specific interest groups, such as an executive session for institute directors, senior federal leaders, the Education and Workforce Development team, and the Communication team. These meetings have proven to be productive for information sharing and idea generation, as well as facilitating dialogue on Program direction.

12 *Brunner, Garcia, Gerskovic and Stewart Receive Emmy® Awards for Video, "Rethinking Manufacturing"* National Institute of Standards and Technology, Department of Commerce (August 14, 2020). https://www.nist.gov/about-us/nist-awards/brunner-garcia-gerskovic-and-stewart-receive-emmyr-awards-video-rethinking.

Institute Coordination

Institutes identify shared best practices by comparing membership models, industry sectors, and target stakeholders. By leveraging lessons from more established institutes, new institutes can scale up and mature more quickly. Participating agencies can expand engagement with institutes by identifying unique delivery opportunities. Encouraging this internal communication will continue both in regular, formal interactions discussed below and in informal or *ad hoc* situations.

In 2022, the Program's authorizing legislation was amended to direct NIST to establish a Council of Institute directors to foster collaboration among the Institutes and to assist AMNPO in carrying out its functions.[13] In fulfilling this mandate, AMNPO first convened the Manufacturing USA Council in 2023. The Council selects cross-institute collaborations to extend the impacts of the network.

Annual Reports to Congress

Manufacturing USA is mandated to provide Annual Reports to Congress. The Program has exceeded this requirement by also producing annual highlight reports detailing success stories from every institute in technology advancement projects and workforce development, and the building of innovation ecosystems and supply chains. All reports are available on www.ManufacturingUSA.com.

13 15 U.S.C. § 278s(i)(7). http://uscode.house.gov/view.xhtml?req=(title:15%20section:278s%20edition:prelim).

Appendix B: Program Assessments

Sponsoring Agency Assessments

In addition to external assessments and annual performance metrics, sponsoring agencies implement assessment processes associated with renewing assistance agreements.

In 2019, agencies sponsoring institutes under the Manufacturing USA authority were given authorization to renew funding for sponsored institutes beyond their initial award period, subject to a rigorous merit review.[14] Following this authorization, DOC and DOE each established their review process and evaluation criteria. In 2021, NIST developed its own performance standards to evaluate the renewal of DOC-sponsored Manufacturing USA institutes using a rigorous merit review process by an independent, external evaluation panel.[15] The process and standards were piloted with the DOC-sponsored institute NIIMBL, leading to a renewal in their funding.

In a 2019 Congressionally Requested plan for sustained investment in its institutes, DoD determined that continued investment would be contingent upon periodic evaluation of performance and progress towards charting principles. Using evaluation criteria based upon established peer review of federally funded R&D centers, DOD has a five-year rotating schedule of assessments, evaluating two institutes each year. The DoD-chartered Joint Defense Manufacturing Council conducts these assessments. Similarly, DOE published a Manufacturing USA Institute Renewal Process Framework in 2022.[16] The framework outlines the steps DOE will take to consider award renewals for its institutes and establishes the criteria and input sources to be used.

14 Revitalize American Manufacturing and Innovation Act of 2014 (Pub. L. 113-235, codified in relevant part at 15 U.S.C. § 278s(e)(2)(B)(i), as amended). http://uscode.house.gov/view.xhtml?req=(title:15%20section:278s%20edition:prelim).

15 *Manufacturing USA Institute Evaluation: Renewal Process and Performance Standards,* Office of Advanced Manufacturing, National Institute of Standards and Technology (July 15, 2021). https://www.manufacturingusa.com/reports/manufacturing-usa-institute-evaluation-renewal-process-and-performance-standards.

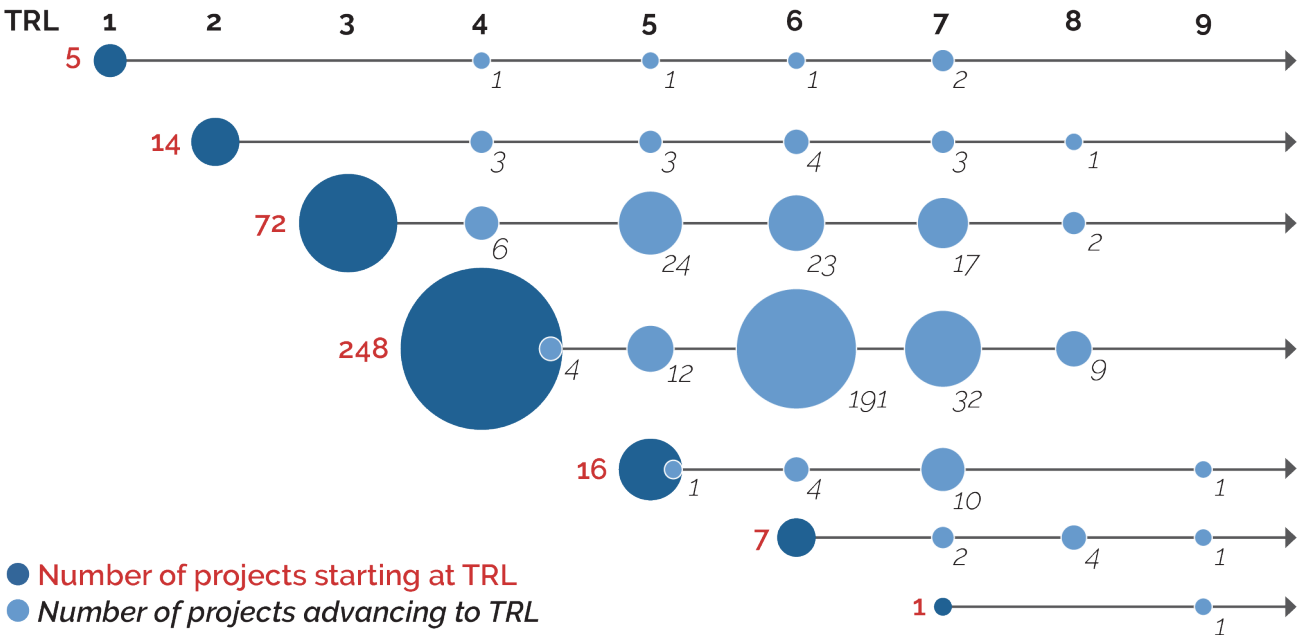
16 *Clean Energy Manufacturing Innovation Institute Renewal Process Framework.* Department of Energy (June 3, 2022). https://www.energy.gov/sites/default/files/2022-06/Clean%20Energy%20Manufacturing%20Institute%20Renewal%20Process%20Framework.pdf.

External Assessments

The Manufacturing USA Program has greatly benefited from external assessments, notably periodic assessments by the Government Accountability Office (GAO) and multiple workshops and studies convened by the National Academies of Sciences, Engineering and Medicine. Feedback on the Program, whether highlighting successes or recommending improvements, has been used to guide the Program's activities and make them more effective. Best practices identified through independent assessments have provided valuable guidance for both new and maturing institutes.

In December 2021, GAO released its third assessment report on Manufacturing USA: *Advanced Manufacturing: Innovation Institutes Report Technology Progress and Members Report Satisfaction with Their Involvement*.[17] GAO found that the majority of institute projects moved from TRL 4 to 6, developing technology from lab demonstration to a prototype system implemented in a simulated production environment. Importantly, the report indicated that small manufacturers, who are institute members, were generally engaged and satisfied with their participation. Finally, the GAO indicated that while sponsoring agencies had implemented prior recommendations on interagency collaboration and the further development of continuity of operations criteria, the further development of network-wide performance metrics was still recommended.

Figure 3. Advancement of Technology Readiness Level (TRL) for Completed Manufacturing USA Institute Projects, as of March 2021.



Source: GAO analysis of data provided by Manufacturing USA institutes. | GAO-22-103979

17 *Advanced Manufacturing: Innovation Institutes Report Technology Progress and Members Report Satisfaction with Their Involvement*, GAO-22-103979 (December 16, 2021). https://www.manufacturingusa.com/reports/advanced-manufacturing-innovation-institutes-report-technology-progress-and-members-report.

Appendix C: Abbreviations

AIM Photonics	American Institute for Manufacturing Integrated Photonics
America Makes	The National Additive Manufacturing Innovation Institute
AMNPO	Advanced Manufacturing National Program Office
ARM	Advanced Robotics for Manufacturing Institute
ARMI | BioFabUSA	Advanced Regenerative Manufacturing Institute
BioMADE	Bioindustrial Manufacturing and Design Ecosystem
CESMII	Collaborative Ecosystems Smart Manufacturing Innovation Institute
CMEI	Office of Critical Minerals and Energy Innovation (formerly DOE's Office of Energy Efficiency & Renewable Energy)
Co-op	Cooperative Education
CyManII	Cybersecurity Manufacturing Innovation Institute
DOC	Department of Commerce
DoD	Department of Defense
DOE	Department of Energy
DOL	Department of Labor
ED	Education Department
EDA	Economic Development Administration (DOC)
EPIXC	Electrified Processes for Industrial eXCellence
EWD	Education and Workforce Development
FDA	Food and Drug Administration
FY	Fiscal Year
GAO	Government Accountability Office
HHS	Department of Health and Human Services
IACMI	Institute for Advanced Composites Manufacturing Innovation
IP	Intellectual Property
LIFT	Lightweight Innovations For Tomorrow
MxD	Manufacturing Times Digital

MRL	Manufacturing Readiness Level
PowerAmerica	Next Generation Power Electronics Manufacturing Innovation
NASA	National Aeronautics and Space Administration
NextFlex	America's Flexible Hybrid Electronics Manufacturing Institute
NIIMBL	National Institute for Innovation in Manufacturing Biopharmaceuticals
NIST	National Institute of Standards and Technology (DOC)
NSF	National Science Foundation
OAM	Office of Advanced Manufacturing
RAMI Act	Revitalize American Manufacturing and Innovation Act of 2014
RAPID	Rapid Advancement in Process Intensification Deployment Institute
REMADE	Reducing Embodied Energy and Decreasing Emissions
RFTI	Revolutionary Fibers and Textiles Institute
R&D	Research and Development
SBIR	Small Business Innovation Research
SMM	Small and Medium-Sized Manufacturer
STEM	Science, Technology, Engineering, and Mathematics
TRL	Technology Readiness Level
USDA	Department of Agriculture

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