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WASHINGTON

Additive Manufacturing Coalition: Overview of the Biden Administration Manufacturing Agenda

April 6, 2022

The country is at an inflection point

Changing social, economic and geopolitical environment demands a new approach to the country's industrial strategy

- The pandemic has exposed structural vulnerabilities that resulted from decades-long underinvestment in our domestic industrial base.
- Supply chain challenges create risks for national and economic security
- Climate change creates an existential threat that must be addressed through investments in energy industrial base
- Increasing geopolitical threats from rival countries require a more robust investment in critical technologies/capabilities
- Growing inequality in the country must be addressed to support country's social fabric



Domestic manufacturing is part of the answer

Administration rolled out 21st Century Industrial Strategy in June, outlining its commitment to revitalizing American manufacturing

- **Goal:** Rebuild U.S. industrial base across particular sectors, technologies, and regions of the country.
- **Strategy:**
 - Reduce supply chain vulnerabilities by increasing resiliency, security, stability and innovation.
 - Adapt to the growing threat of climate change.
 - Leverage the buying power of the federal government (procurement, federal financial assistance)
 - Innovate in critical technologies and industries to achieve global preeminence
 - Expand manufacturing capacity/capabilities to broader set of regions, industries and communities



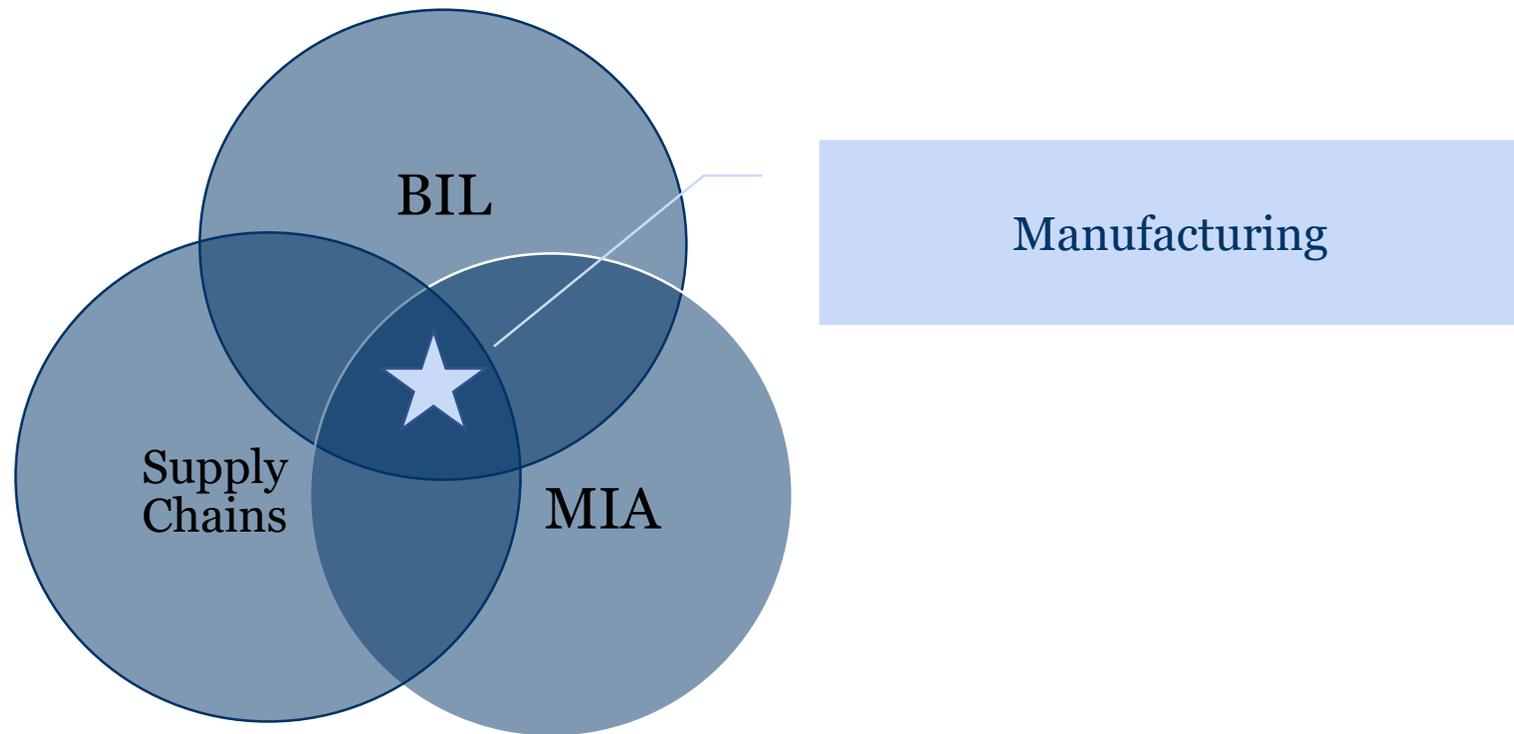
Manufacturing is Central to Administration's Agenda

- *Made in American EO* (Jan): increases requirements for US-based manufacturing in federal procurement
- *Supply Chain Resilience* (June/Feb, 2022 reports): calls for investments in scaling innovative manufacturing technology to innovate our way into resilient supply chains across multiple products/industries
- *Public Health Supply Chain* (July report): building resilience in US public health industrial base preparedness
- *Bipartisan Infrastructure Law*
 - Broadband—electronic components; EV charging infrastructure; Lithium ion batteries and battery materials; DOE demonstration projects—nuclear, hydrogen, carbon capture; EV buses, rolling stock
- *Bipartisan Innovation Act* - multiple investments that touch upon manufacturing technologies and scale up: NSF Tech directorate; CHIPS, MUSA, MEP, Critical Supply Chain Resilience Program, Climate investments
- *Other* – EDA BBB regional grants; State Small Business Credit Initiative (\$10b fund; manufacturing focus)



Intersecting Priorities

Manufacturing is Central to Several of the Administration's Priorities



Aligning these strategies will create complementarities with respect to manufacturing capabilities across lifecycle



Several Administration Priorities Support Increasing Domestic Manufacturing and Are Mutually Reinforcing

- **Supply chains:** Increase supply chain resilience in critical industries through domestic manufacturing strategy as well as near shoring (e.g., semiconductors, critical minerals, biopharma, EV batteries, ICT)
- **BIL:** Investments forthcoming in domestic manufacturing: EVs, EV charging infrastructure, waste water, broadband, rail, etc.
- **Made in America:** Align procurement and MIA goals/waivers to support domestic manufacturing agenda and priorities; support *Invent it Here, Make it Here EO agenda*.
- **Bipartisan Innovation Act:** Invest in basic and applied R&D as well as manufacturing ecosystem (MEP, MUSA), Critical Supply Chain Resilience Program and regional tech hubs
- **Other:** Energy-based Industrial Strategy including decarbonization, EDA's BBB Regional Challenge projects



Initial Examples of Priority Products in BIL – NOT COMPLETE

1. Broadband—electronic components
2. EV charging infrastructure \$7.5
3. Lithium ion batteries and battery materials \$6
4. DOE demonstration projects— hydrogen (\$9.5), carbon capture (\$12) , nuclear (
5. Steel

Other priority products (later stage):

1. Zero emission vehicles and chargers—buses, ferries
2. Rolling stock – high speed rail
3. Building materials—iron, steel, aluminum, concrete
4. Transmission—transformers, power lines



How do we leverage existing resources to maximize opportunity?

- Incent upgrading and innovation with new funding
- Encourage better quality jobs (BIL, other)
- Regionalism: work with states to build out ecosystems
- Engage with private sector on industry supply chain build out



What problems do we need to solve to be able to capitalize on this moment?

- *Workforce*
 - Long-term shortage of manufacturing workers due to aging workforce, etc.
 - 800,000 reported job openings in manufacturing in 2021
 - New skills as technologies upgraded toward digital
- *Supplier tech development*
 - SME manufacturers 40% less productive than larger manufacturers; 30% of differential attributed to lack of investment in new equipment
- *Scale up*
 - Strong early-stage funding for new technologies/startups in advanced manufacturing technologies (e.g., semiconductors, energy, bio-related); less funding available as companies grow to scale
- *Other Issues:*
 - Trade barriers – tariffs (ex: steel, chassis OTHER?)
 - Currency imbalance – FOR SREE!
 - WAGES?



Initial Policy Development

Four Primary Areas of Focus with examples of policy focus:

1) *Financing/Demand-Pull/Market Readiness*

- *EXIM domestic manufacturing program (approved, April 2022)*
- *SSBCI state program (ARP)*
- Equity financing tools (expansion of InQTel model; SBICs)

2) *Manufacturing Ecosystem*

- SMEs:
 - *AM Forward: additive manufacturing initiative with OEMs/SMEs*
- Manufacturing USAs:
 - Extend MRL work into level 8; support work at pilot demonstration level



Initial Policy Development

Four Primary Areas of Policy Development

3) Manufacturing Workforce

- Expanding Technician/Production Workers in the near term
 - *DoD ManTech, IBAS programs, NSF ATE program*
- Registered Apprenticeships
 - DOL

4) Industry-Specific Work – PULL FROM SUPPLY CHAIN WORK/OTHER

- Biomanufacturing strategy – bioindustrial, biofuels, biopharma, bioag
 - DoD investing \$1.1 billion in bioindustrial pilot facilities
- Pharma/API
- Energy supply chains



Existing USG Tools Can Increase Manufacturing Capacity

Examples of existing & potential USG programs and tools that can support execution

1. Financing

- DOE LPO, ATVM loans
- DOD DPA Title III, In-Q-Tel
- HHS DPA Title III, BARDA
- EXIM proposed domestic manufacturing program

1. SME technology adoption and growth

- SBA 504 loans and 7(a) loans
- NIST Manufacturing Extension Partnerships (MEPs)
- State Small Business Credit Initiative (SSBCI)

2. Workforce development

- DOL Registered apprenticeships
- EDA BBB Jobs Challenge
- Manufacturing USA institutes
- DOD ManTech/IBAS

3. Regional manufacturing clusters

- EDA BBB Regional grants; DOE Regional Clean Hydrogen Hubs

5. Demand-Pull

- Made in America
- Other market signals through policies, waiver decisions, and more

6. Convening, Stakeholders, and “Bully Pulpit”

- RFIs, convenings, CEO calls, etc.



What can ACSCC do to support the manufacturing agenda?

- Underscore moment and opportunity
- Highlight areas of specific opportunity – industries, technologies
- Elevate private sector voice at the table and to the agenda



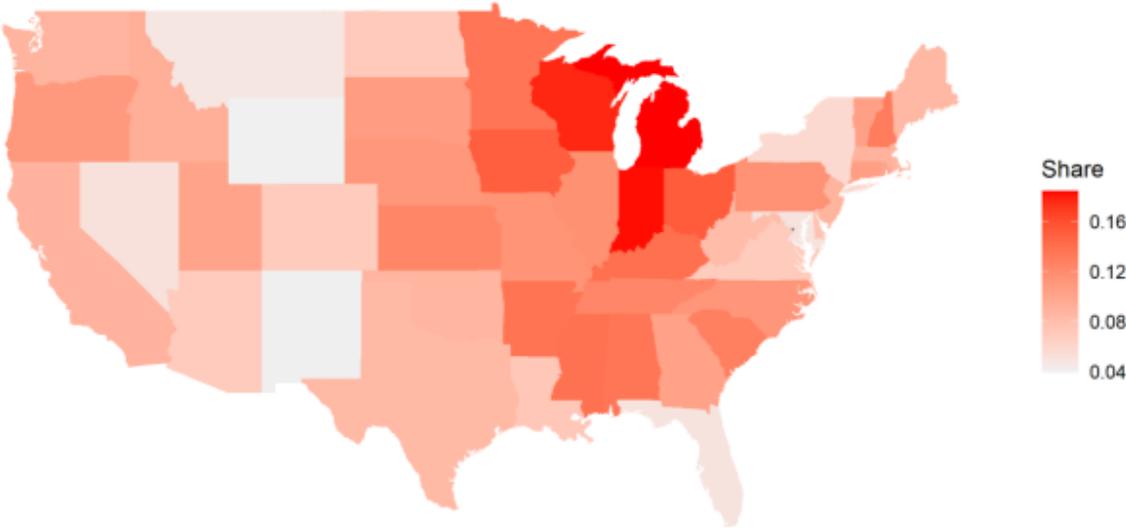


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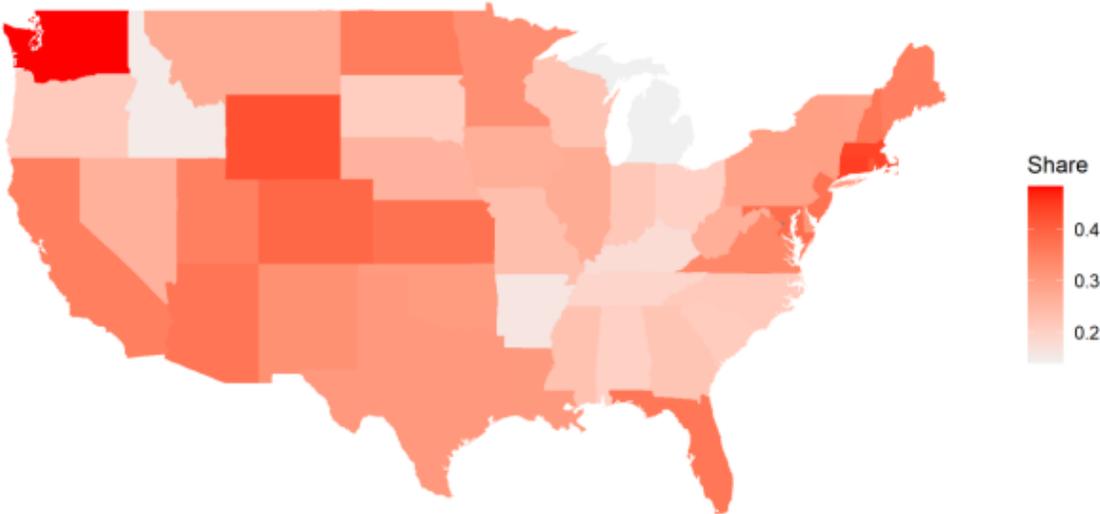
Additive Manufacturing Can Boost Manufacturing Across the Country

There is a strong concentration of manufacturing jobs in Southern states, and even more so, in Midwestern states.



Source: The Burning Glass Institute analysis, using microdata from the American Community Survey

Chart 7 - Advanced manufacturing share, in state manufacturing employment.

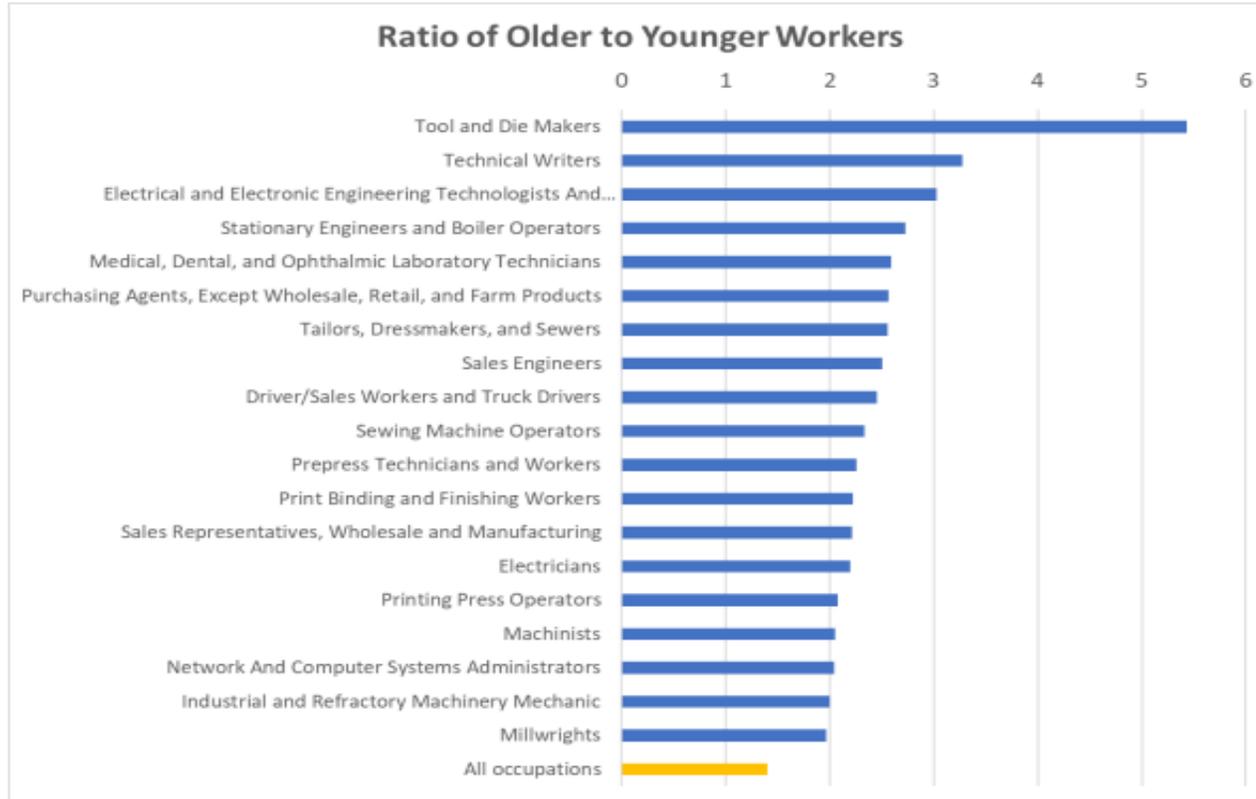


Source: The Burning Glass Institute analysis, using microdata from the American Community Survey



Need a Workforce Training Agenda for AM

Chart 12 - In many manufacturing occupations, many workers are expected to retire in the coming decade. In many of them the inflow of new workers is unlikely to be sufficiently large to replace them

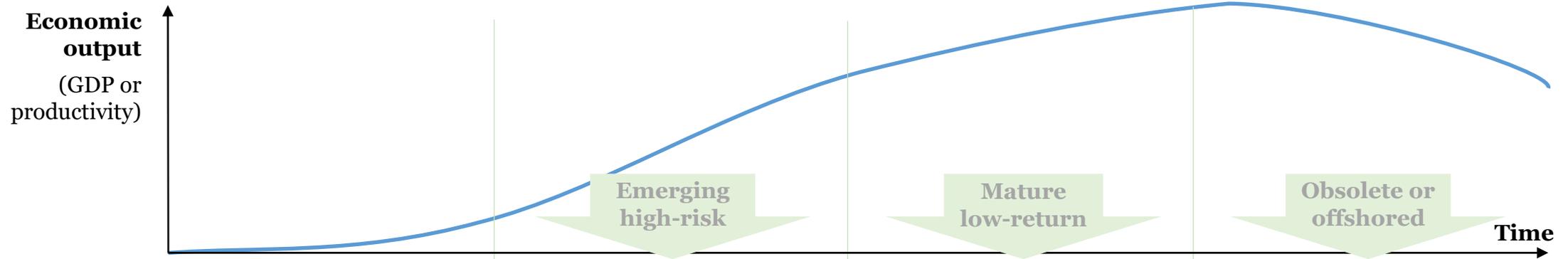


Note: Older workers are those aged 55+. Younger workers are those of ages 16-29.

Source: The Burning Glass Institute analysis, using microdata from the American Community Survey



US Manufacturing Scale Up Focuses on Two Key Stages of the Commercial Lifecycle



	1	2	3	4
Commercial lifecycle stage:	Research and design: Conceiving new products	Learning curve: Scaling up new technology	Mass production: Maintaining supply chains	End of life: Managing legacy production
Basis of competition and US competitive position	Intellectual property-based competition where the US maintains global leadership	Engineering and technical competition where the US is rapidly losing world GDP share	Price- and efficiency-based competition where the US is rapidly losing world GDP share	Commoditized products and unprofitable assets in which US capital no longer invests
Examples of activities	Biologics research; chip design	New fabs; batteries; aircraft	Auto parts, metals, machinery	Medical PPE; rare earth metals
What do we need to solve?	Close R&D funding gap: <ul style="list-style-type: none"> • Increase federal R&D funds • Match funds to specific outcomes (e.g., challenges) • Turn around declining R&D productivity 	Scale up new manufacturing: <ul style="list-style-type: none"> • Invest growth capital to accelerate & commercialize • Introduce new production methods or technologies • Advance engineering goals 	Improve SME competitiveness: <ul style="list-style-type: none"> • Provide low-cost lending to raise SME investment • Improve productivity level • Increase output growth, job growth, and wage growth 	Secure essential supply: <ul style="list-style-type: none"> • Identify critical supply gaps • Maintain repurpose capacity • Ensure minimum operating capacity if long lead times (e.g., for rare earth mines)
Key economic benefits	<ul style="list-style-type: none"> • High profits and high-wage jobs in superstar cities • Wealth growth (market cap) 	<ul style="list-style-type: none"> • Rapid quality improvement and price declines • Spillovers to other industries 	<ul style="list-style-type: none"> • Widespread job growth and SME output growth • Smaller trade deficit 	<ul style="list-style-type: none"> • Emergency preparedness • National defense and security

Additive manufacturing is important to the country

1

The competitiveness of the U.S. industrial base relies on the capability of tens-of-thousands of small and medium sized (SME) manufacturers. Original Equipment Manufacturers (OEMs) rely on products manufactured by these SMEs to support their own production.

2

Compared to 25 years ago, there is 30 percent less capital invested in our domestic manufacturing base, with the result being that SME manufacturers have fallen behind in technology acquisition and deployment relative to larger firms. Over time, this lack of investment in technology modernization has made SME manufacturers 40 percent less productive than larger OEMs.

3

Additive manufacturing (3D printing) is broadly applicable across industrial sectors and has been identified as a foundational technology that once deployed at scale can greatly increase the agility, capacity, and resiliency of U.S. supply chains. A company with additive capability, for example, can easily make products for multiple industries, and can quickly adjust to new demands (PPE, for example). Additive technologies can also reduce part lead times by as much as 90%.

Challenges among SMEs in AM adoption

Unfortunately, the adoption of additive capabilities across the U.S. industrial base has been slow – despite the benefits.

- 1. SMEs often lack a clear demand signal**, which can make an investment in new 3D printing machines riskier than many small manufacturers can tolerate (since it typically requires SMEs to take on new debt).
- 2. SMEs often lack access to affordable financing** that would support the purchase and installation of new additive machines.
- 3. SMEs often need technical assistance** to install and utilize new production technologies like 3D printers.
- 4. SMEs must train their workforce differently**, including upskilling workers used to supporting more traditional manufacturing processes.

Additive Technology is a Priority for USG

- 1. Additive technology is included in the top ten advanced technologies identified in the USICA bill that the United States should invest in to become globally competitive.**
- 2. Additive technologies are one of the primary cross-cutting technologies identified in the Manufacturing Scale-Up IPC for all agencies, particularly DoD.**
- 3. The United States is one of the leading countries in innovation in additive and has several established and startup firms creating transformative technology that could grow domestically and potentially globally.**