U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Advanced Materials and Manufacturing Technologies Vision and Strategy for America's Energy Transition

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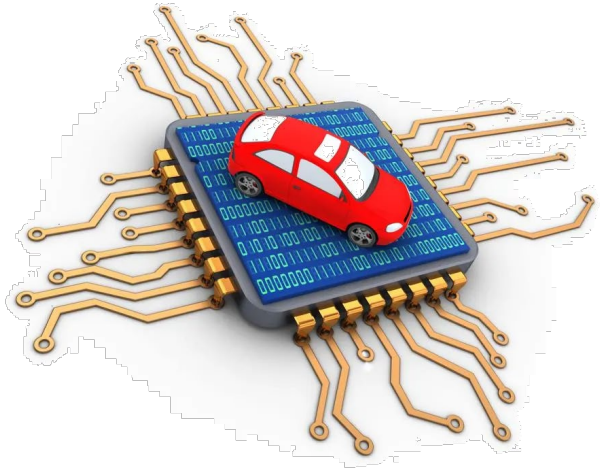
U.S. Department of Energy

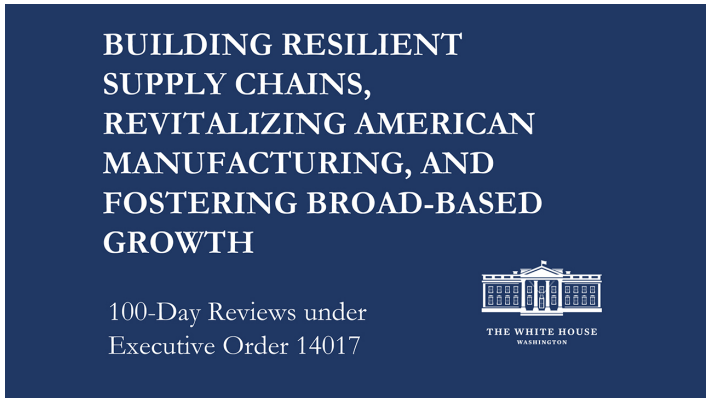
May 16, 2023

The World is Changing

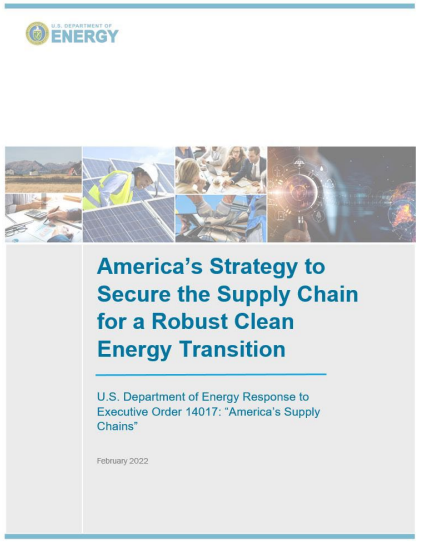


And America is Taking Action

Ambitious goals, investments in innovation, and bills and legislations



$50B to revitalize semiconductor research, development, and manufacturing



100% carbon pollution-free electricity by 2035; and net-zero emissions economy by 2050.

CHIPS for AMERICA

$50B to revitalize semiconductor research, development, and manufacturing

The Right Time for AMMTO

Technology Innovation

Inspire People

Transform Materials and Manufacturing

Vision

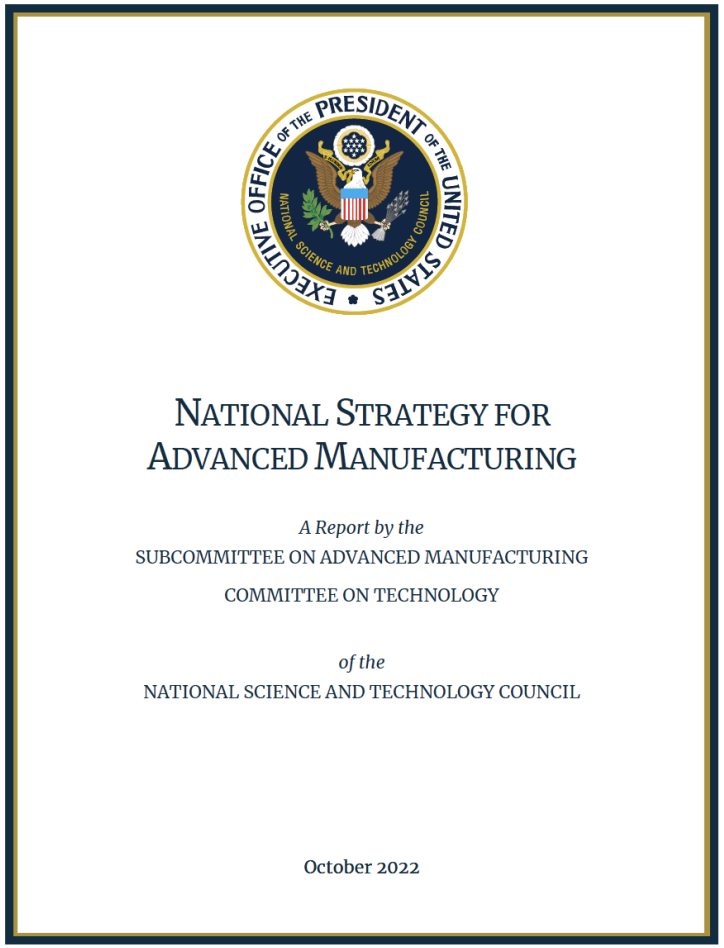
A globally competitive U.S. manufacturing sector that accelerates the adoption of innovative materials and manufacturing technologies in support of a clean, decarbonized economy.

Mission

We inspire people and drive innovation to transform materials and manufacturing for America's energy future.

AMMTO's Contribution to America's Leadership in Advanced Manufacturing

1. **Why** is it important?
2. **Who** created it?
3. **How and when** was it created?
4. **How** did AMMTO contribute?



EXECUTIVE OFFICE OF THE PRESIDENT OF THE UNITED STATES
NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

NATIONAL STRATEGY FOR ADVANCED MANUFACTURING

A Report by the
SUBCOMMITTEE ON ADVANCED MANUFACTURING
COMMITTEE ON TECHNOLOGY

of the
NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

October 2022

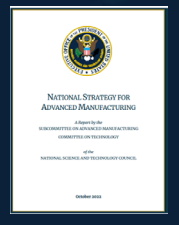
National Strategy for Advanced Manufacturing

Subcommittee on Advanced Manufacturing

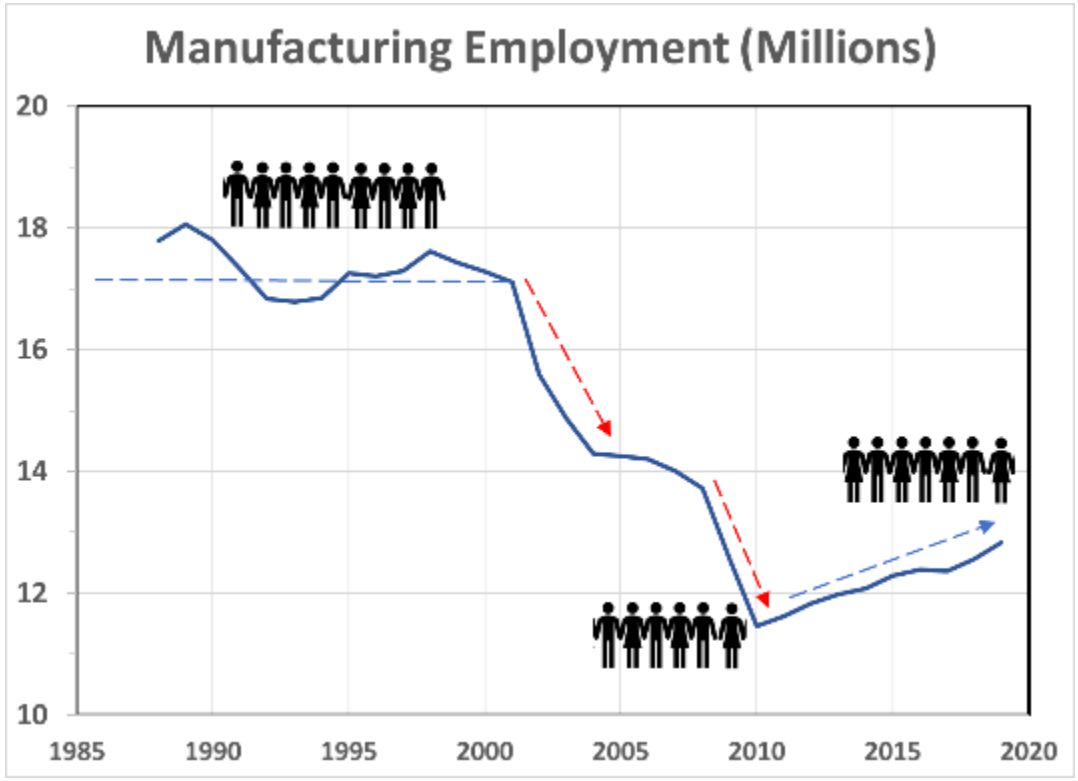
Committee on Technology

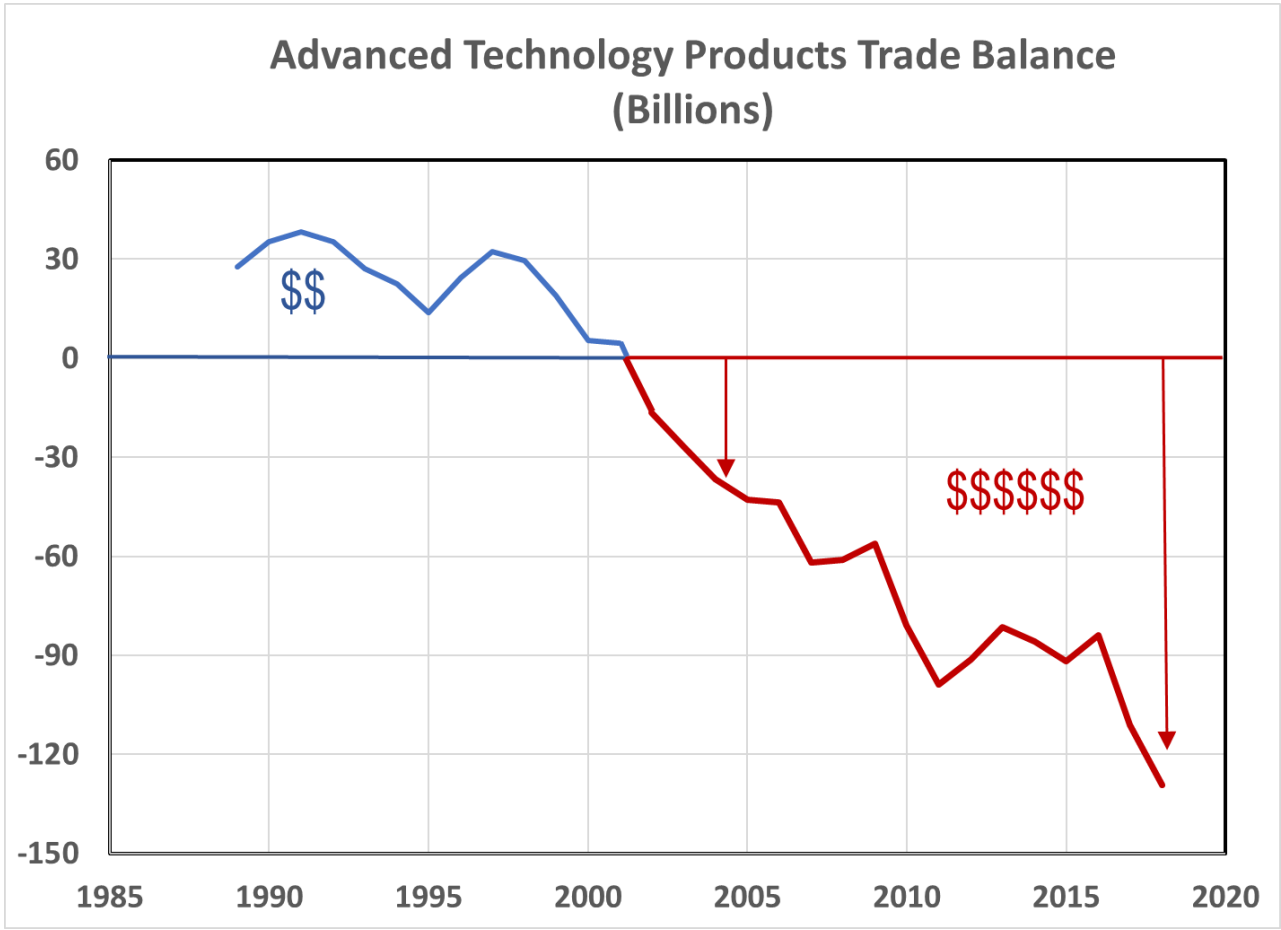
National Science and Technology Council

Manufacturing Employment and Trade Balance



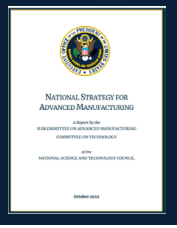
While manufacturing employment is rising, trade deficit for advanced technology products is increasing



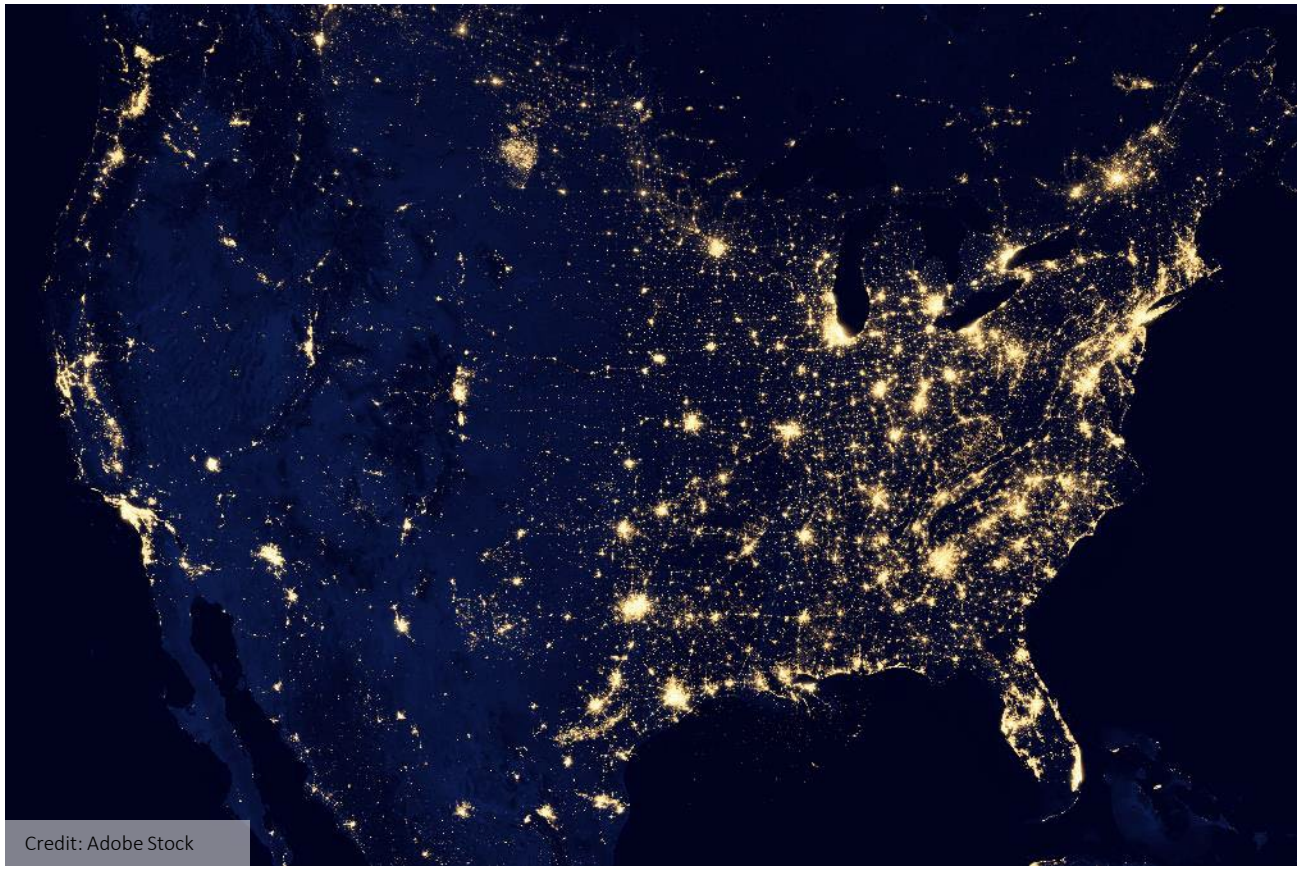


Credit: Bureau of Labor and Statistics

Strengthening American Manufacturing and Competitiveness

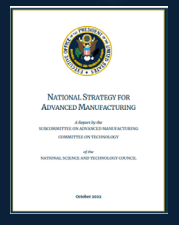


- Grow the Economy
- Create High-Quality Jobs
- Enhance Environmental Sustainability
- Address Climate Change
- Strengthen Supply Chains
- Ensure National Security
- Improve Healthcare



Credit: Adobe Stock

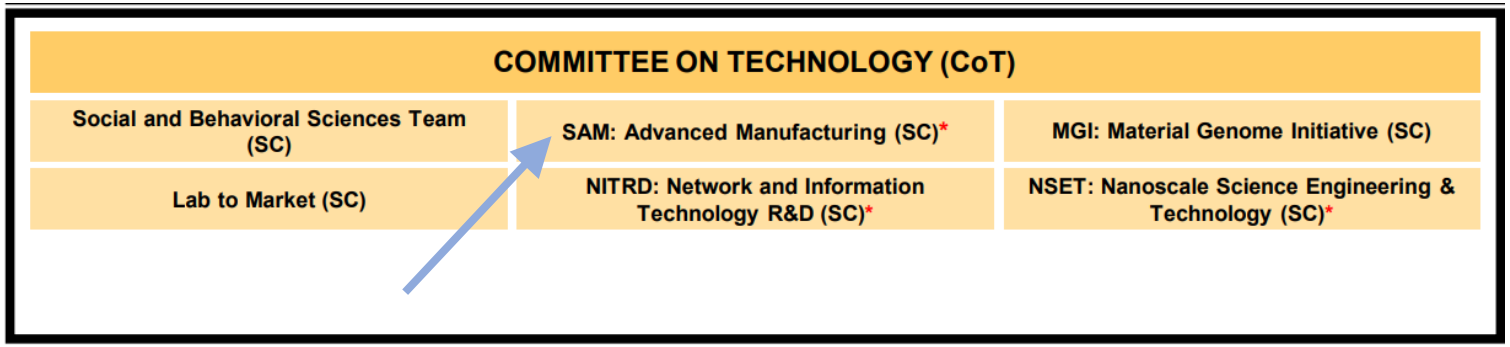
National Science and Technology Council (NSTC)

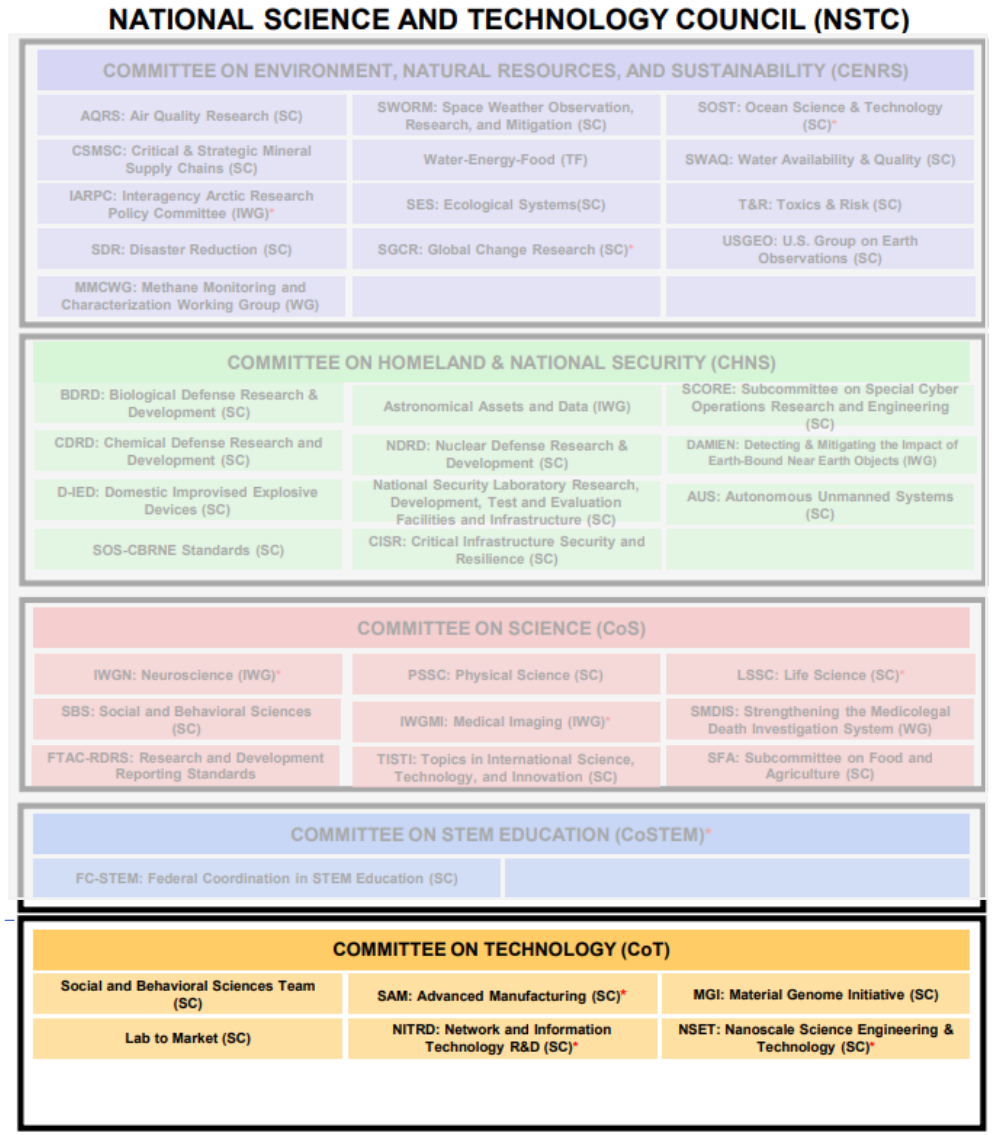


Cabinet-level Council through which the executive branch coordinates science and technology policy across the Federal R&D enterprise.

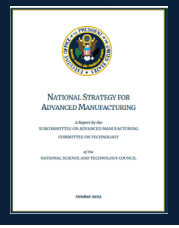
Chair: POTUS
Members: VPOTUS, OSTP Director, Cabinet Secretaries, and Agency Heads with significant science and technology responsibilities, and other White House officials.

Work organized under five primary committees





Strategy Developed with Stakeholder Input



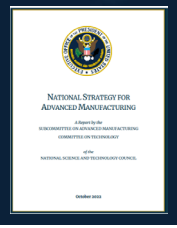
Request for Information (RFI), Office of Science and Technology Policy

Extensive input from the public, including from AIChE, ASME, ITIF, NAE, NDIA, SME, and many others

14 roundtables across the nation with industry (large and small across many sectors), academia, state and regional organizations and professional societies

Input received from nearly 1000 individuals and organizations

Strategic Plan Structure

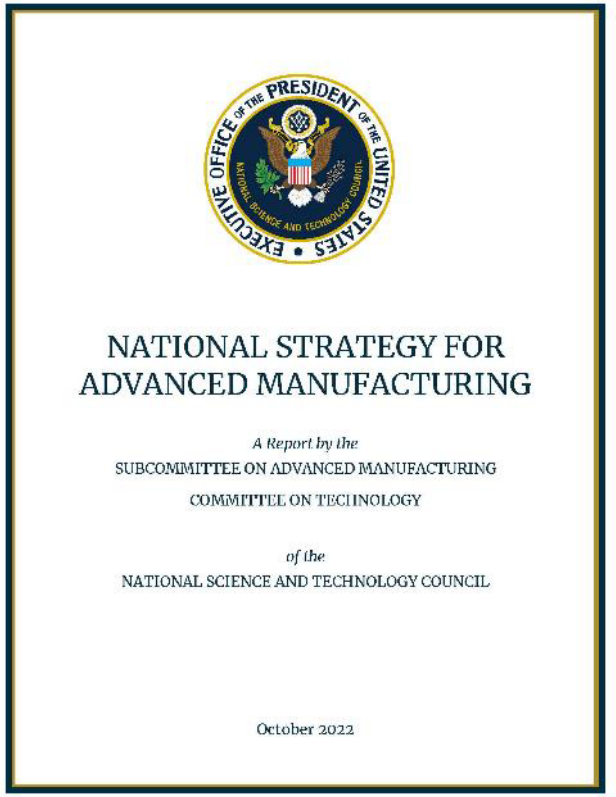


Vision:

United States leadership in Advanced Manufacturing - grow the economy, create jobs, enhance environmental sustainability, address climate change, strengthen supply chains, ensure national security, and improve healthcare.

National Goals:

1. Develop and implement **advanced manufacturing technologies** – **5 Objectives** with **18 priorities**
2. Grow the advanced manufacturing **workforce** – **3 Objectives** with **8 priorities**
3. Build resilience into manufacturing **supply chains** and ecosystems – **3 Objectives** with **11 priorities**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Next Steps

Released the National Strategy on National Manufacturing Day – October 2022

Socialize the Goals/Objectives/Priorities with Government, Industry, and Academia

Develop an internal interagency implementation plan to achieve the goals of the National Strategy

Track the progress towards achieving the national goals, maximize coordination, and minimize duplication of effort

AMMTO/IEDO's Contribution to Shaping NSAM

Goals	Objectives	DOC	DOD	DOE	DOL	DOT	ED	EPA	HHS	NASA	NSF	USDA
Advanced Manufacturing Technologies	Enable Clean and Sustainable Manufacturing to Support Decarbonization	●	●	●		●		●	●		●	●
	Accelerate Manufacturing for Microelectronics and Semiconductors	●	●	●							●	
	Implement Advanced Manufacturing in Support of the Bioeconomy	●	●						●	●	●	●
	Develop Innovative Materials and Processing Technologies	●	●	●		●		●	●	●	●	●
	Lead the Future of Smart Manufacturing	●	●	●						●	●	●
Advanced Manufacturing Workforce	Expand and Diversify the Advanced Manufacturing Talent Pool	●	●	●	●		●		●	●	●	●
	Develop, Scale, and Promote Advanced Manufacturing Education and Training	●	●	●	●	●	●		●	●	●	●
	Strengthen the Connections Between Employers and Educational Organizations	●	●		●	●	●		●		●	●
Manufacturing Supply Chains and Ecosystems	Enhance Supply Chain Interconnections	●	●	●					●	●	●	●
	Expand Efforts to Reduce Manufacturing Supply Chain Vulnerabilities	●	●	●		●		●	●	●	●	●
	Strengthen and Revitalize Advanced Manufacturing Ecosystems	●	●	●		●	●		●	●	●	●

Enable Clean and Sustainable Manufacturing to Support Decarbonization

- Decarbonization of Manufacturing Processes
- Clean Energy Manufacturing Technologies
- Sustainable Manufacturing and Recycling

Credit: Adobe Stock, Modified by C. Blasioli/NIST

Develop Innovative Materials and Processing Technologies

- High-Performance Materials Design and Processing
- Additive Manufacturing
- Critical Materials
- In-Space Manufacturing

Credit: NASA/SEArch+/Apis Cor

Credit: America Makes

Lead the Future of Smart Manufacturing

- Digital Manufacturing
- Artificial Intelligence in Manufacturing
- Human-Centered Technology Adoption
- Cybersecurity in Manufacturing


Credit: NIST/AIM Photonics

How will AMMTO Do It?

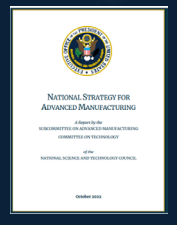
In Progress. I will add 4-5 slides over the weekend to cover:

(1) AMMTO's Identity and Innovation Ecosystem
(2) AMMTO's Goals and Operational Strategy
(3) Invite and encourage people to think with us about the future of energy and manufacturing:
   - Here is what we did (MT FOA, NNS FOA, IACMI, Wind FOA)
   - As we proceed, we need YOUR input in defining new areas

Thank you

Backup Slides

NSTC Subcommittee on Advanced Manufacturing



Origin: Congressional mandate for SAM in 2012 bipartisan COMPETES Act

Functions: Interagency planning, coordination, and information sharing on advanced manufacturing federal policy and programs. Assigned principal responsibility for development and execution of **National Strategic Plan for Advanced Manufacturing**

Priorities:

- Review and Coordinate Federal Government's Advanced Manufacturing R&D
- Update and Publish Strategic Plan

Co-chairs: Ezinne Uzo-Okoro (EOP/OSTP), Mike Molnar (DOC/NIST), Rob Gold/Tracy Frost (DoD/OSD),

Membership: DOC, DoD, DOE, DOL,DOS, DOT, ED, EOP, EPA, HHS, NASA, NSF, SBA, USDA

Key Objectives

- Advanced Mfg. Technologies & Program Coordination
- Education & Workforce Development
- Mfg. Ecosystem & Supply Chain

Modern American Industrial Strategy

- Areas where relying on private industry, on its own, will not mobilize the investment necessary to achieve our core economic and national security interests.
- Investments help accelerate and shape breakneck innovation, and they encourage private investment and market competition
- Infrastructure literally lays the groundwork for private investment
- Public investments in research and innovation power the private engine of the American economy.
- Transition to a zero-carbon economy may be the greatest economic transformation since the Industrial Revolution.
- 1) Deploying New Tools and Fresh Approaches, 2) National Commitment to Building Fairly at Scale and Speed, 3) Closer Cooperation with Allies and Partners

Advanced Manufacturing Creates

Economic Competitiveness

National Security

Energy Security

- Innovative products in the marketplace
- Agile, cost-effective manufacturing processes
- Quality, high-wage jobs for Americans

Why a National Strategic Plan for Advanced Manufacturing?

To address global competition, the Biden-Harris Administration has taken steps to:

- Revitalize the manufacturing sector,
- Increase the resilience of U.S. supply chains and national security,
- Invest in R&D, and
- Train Americans for jobs of the future.

Credit: Adobe Stock

Relevance to DOE/AMMTO

1. DOE/AMMTO members actively contributed to the development and implementation of the SP

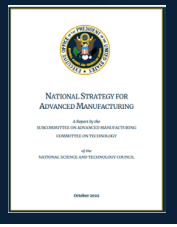
Goal 1: Diana Bauer (Co-chair), Blake Marshall, Jeremy Mehta, Alaa Elwany

Goal 2: Steve Shooter, Anne Hampson, Nebiat Solomon, Pete Langlois

Goal 3: Diana Bauer, Blake Marshall, Kelly Visconti, Zack Valdez

Goal 1:
Develop and Implement Advanced Manufacturing Technologies

Goal 1: Develop and Implement Advanced Manufacturing Technologies



1) Enable clean and sustainable manufacturing to support decarbonization

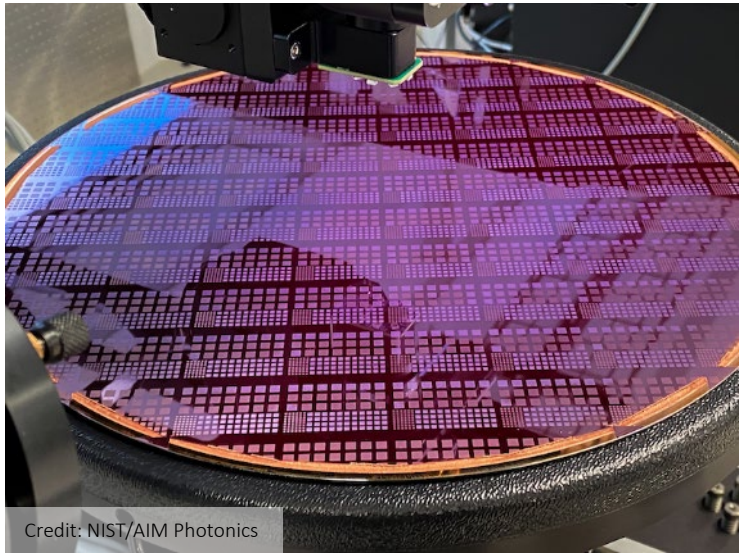
2) Accelerate manufacturing innovation for microelectronics and semiconductors

3) Implement advanced manufacturing in support of the bioeconomy

4) Develop innovative materials and processing technologies

5) Lead the future of smart manufacturing


Credit: Adobe Stock


Credit: NIST/AIM Photonics

Goal 2:
Grow the Advanced Manufacturing Workforce

Goal 2: Grow the Advanced Manufacturing Workforce

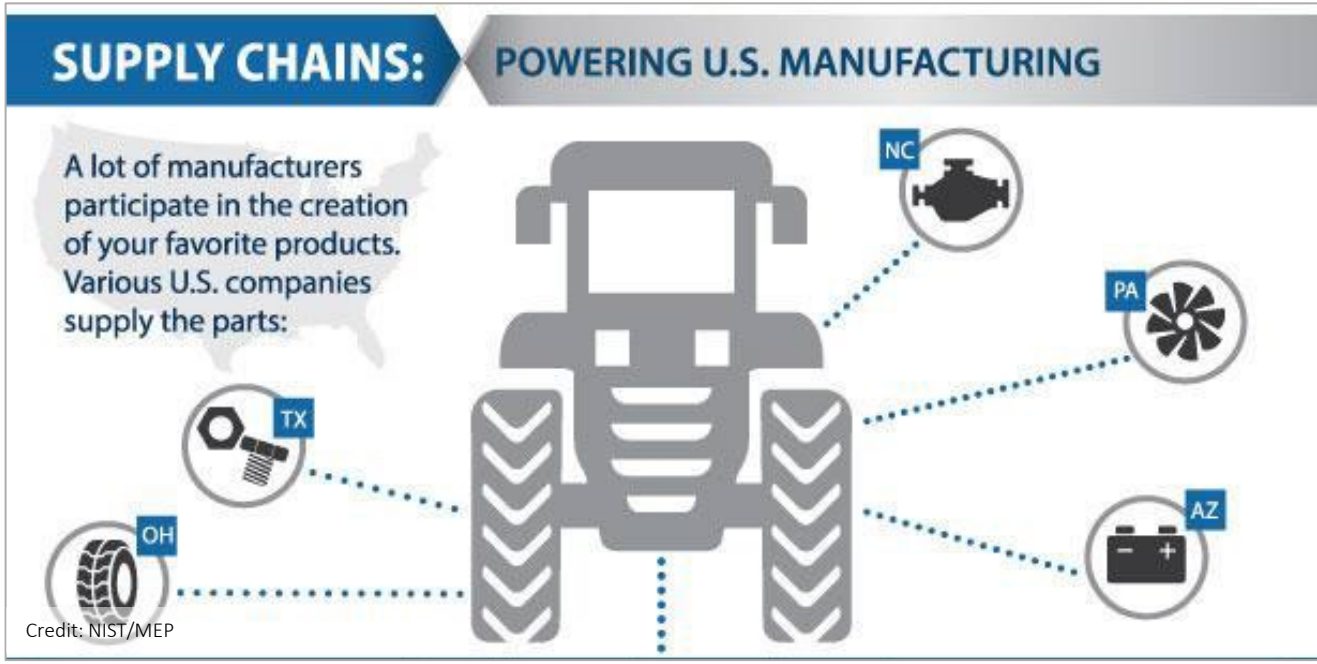
Credit: Adobe Stock

1) Expand and diversify the advanced manufacturing talent pool
2) Develop, scale, and promote advanced manufacturing education and training
3) Strengthen connections between employers and educational organizations

Goal 3:
Build Resilience into Manufacturing Supply Chain and Ecosystems

Goal 3: Build Resilience into Manufacturing Supply Chains and Ecosystems

1) Enhance supply chain interconnections
2) Expand efforts to reduce supply chain vulnerabilities
3) Strengthen and revitalize advanced manufacturing ecosystems



Credit: NIST/MEP