

The U.S. Bioeconomy Policy Landscape

Table of Contents

Executive Summary	2
Congressional Leadership and Strategy	2
The NSCEB’s Final Report (2025)	3
Congressional Action and Bipartisan Support	4
Complementary National Security Efforts	4
Congressional Caucuses and Oversight	4
The BIOTech Caucus	4
Federal Executive Action	5
Industry Leadership and Public–Private Partnerships	5
BIO’s Bioeconomy Task Force	5
BioMADE (Bioindustrial Manufacturing and Design Ecosystem)	5
Key Legislative Proposals	6
The Agricultural Biorefinery Innovation and Opportunity (Ag BIO) Act of 2025	7
The Farm to Fly Act of 2025	7
Workforce & Education Policy	7
Regulation and Standards	7
Federal Financial Tools Enhance Private-sector Investment	8
Department of Energy (DOE) Loan Programs Office	8
Treasury’s Inflation Reduction Act (IRA) Incentives	8
USDA Loan Guarantees: Biorefinery, Renewable Chemical, and Biobased Product Assistance Programs	8
Opportunities for Tax Credits Modeled on CHIPS & IRA	8
Federal Policies and Programs Advancing the U.S. Bioeconomy	9

Executive Summary

The U.S. bioeconomy is evolving into a coordinated national priority, driven by bipartisan congressional support and industry engagement. Key levers include the establishment of the National Biotechnology Coordination Office (NBCO), legislative initiatives such as the Ag BIO Act and Farm to Fly Act, and robust financial incentives through DOE loan guarantees, USDA Section 9003 programs, and IRA tax credits for sustainable fuels. Leaders should note the growing emphasis on regional biomanufacturing hubs, workforce development, regulatory modernization, and supply chain resilience, with industry partners like BioMADE bridging the scale-up gap from pilot projects to commercial production. Overall, the policy landscape reflects a converging ecosystem where federal strategy, legislation, financial tools, and public-private partnerships align to advance U.S. competitiveness, national security, and technological leadership in biotechnology. Yet, greater efforts and emphasis up and down the bioeconomy value chain are needed.

Congressional Leadership and Strategy

National Security Commission on Emerging Biotechnology (NSCEB)

Senator Todd Young (R-IN) has become a central figure in shaping U.S. bioeconomy and biotechnology strategy. As co-chair of the bipartisan National Security Commission on Emerging Biotechnology (NSCEB), he was instrumental in producing the Commission's landmark reports — including *Biotechnology and American National Security: A Framework for Action* (2024) and its final report in April 2025. These reports define biotechnology as a foundational 21st-century technology and call for a coordinated national strategy to advance U.S. leadership.

Young has championed recommendations such as:

- Establishing regional biomanufacturing hubs.
- Expanding workforce development pipelines in biotechnology.
- Securing supply chains for critical inputs such as APIs and industrial enzymes.
- Launching a Biotechnology Industrial Base Initiative, modeled on the CHIPS and Science Act.
- Expanding procurement standards for bio-based products and integrating biotechnology into national security briefings.

The NSCEB's Final Report (2025)

Established by the FY22 NDAA, the NSCEB evaluated biotechnology's implications for defense and competitiveness. Its April 2025 report issued 49 recommendations, including:

Year Intro.	Title	Key Recommendations Included from NSCEB	Stage	Last Action
2025	National Biotechnology Initiative Act of 2025 S.1387 H.R. 2756	1) Establish a National Biotechnology Coordination Office (NBCO) in the Executive Office of the President (EOP) with a director, appointed by the President, who would coordinate interagency actions on biotechnology competition and regulation; 2) Direct each relevant agency to designate a senior official to lead biotechnology policy.	Introduced	Referred to the Committee on Health, Education, Labor, and Pensions
2024	Elevating Biotechnology Threats Reporting Act H.R.8564	1) Require intelligence community to submit to the congressional intelligence committees a report with respect to biotechnology gaps, description of any existing formal mechanisms by which the intelligence community provides intelligence and support with respect to biotechnology threats, and an assessment of any existing mechanisms and manners by which the intelligence community consults with biotechnology experts and other outside experts with related expertise.	Introduced	Did not pass as a stand alone bill, but was included as a amendment on the IAA (H.R. 8512 Section 703)
	Synthetic Biology Advancement Act of 2024 S.4413	1) Create a Synthetic Biology Center under USDA, with a focus on the application of synthetic biology to food security and agriculture.	Introduced	Referred to the Committee on Agriculture, Nutrition, and Forestry
	Agriculture and National Security Act of 2024 S.4420	1) Establish a senior advisor for national security and require USDA to identify any gaps or limitations related to food and agriculture in existing national security efforts.	Introduced	Referred to the Committee on Agriculture, Nutrition, and Forestry
	Agricultural Biotechnology Coordination Act of 2024 S.4421	1) Establish the Office of Biotechnology Policy in the Department of Agriculture.	Introduced	Referred to the Committee on Agriculture, Nutrition, and Forestry
	Biotechnology Oversight Coordination Act of 2024 S.4428	1) Establish an interagency committee to coordinate activities of the Federal Government relating to biotechnology oversight.	Introduced	Referred to the Committee on Commerce, Science, and Transportation
2023	National Defense Authorization Act for Fiscal Year 2025 H.R.5009	1) DOD to create and publish an annual biotechnology roadmap, including assessing barriers to adoption of biotechnology, DOD workforce needs, and opportunities for international collaboration; 2) DOD to Initiate a public-private "sandbox" in which DOD and industry can securely develop use cases for AI and biotechnology convergence (AixBio); 3) Intelligence Community to conduct a rapid assessment of biotechnology in the People's Republic of China and their actions to gain superiority in this sector; 4) Intelligence Community to develop an intelligence strategy to identify and assess biotechnology threats, especially regarding supply chain vulnerabilities.	Passed	Became Law

Congressional Action and Bipartisan Support

The Commission's recommendations have attracted broad bipartisan backing. Senators Mitt Romney (R-UT), Mark Warner (D-VA), and Jeanne Shaheen (D-NH) have voiced strong support. Legislative follow-through includes:

- National Biotechnology Initiative Act of 2025 (S.1387/H.R.2756): Establishes the NBCO and designates agency leads.
- FY25 NDAA (H.R.5009): Requires a DOD biotech roadmap, an AI-biotech testbed, and an intelligence community assessment of China's biotechnology ambitions.
- Elevating Biotechnology Threats Reporting Act (H.R.8564, 2024): Mandates IC reporting on biotechnology threats.
- Additional Senate bills (S.4413, S.4420, S.4421, S.4428) advancing USDA synthetic biology, food security, and coordination efforts.

On the House side, the Select Committee on the CCP has made biotechnology resilience and security a core component of U.S.–China competition strategy.

Complementary National Security Efforts

NSCEB's work aligns with other federal initiatives, including:

- HHS ASPR's Bioindustrial Base Assessment (2023).
- DOD's Office of Biodefense Policy and resilience planning.
- DHS biosurveillance programs.

Congressional Caucuses and Oversight

The BIOTech Caucus

Launched in June 2025, the bipartisan BIOTech Caucus is co-chaired by Reps. Chrissy Houlahan (D-PA) and Stephanie Bice (R-OK). The caucus elevates biotechnology as a strategic national priority with a focus on:

- **Biosecurity:** Federal investments to defend against natural and engineered threats.
- **Innovation:** Streamlining regulatory pathways, fostering public-private partnerships, and enabling rapid commercialization.
- **Economic Opportunity:** Supporting job creation, rural development, and global problem-solving in health, agriculture, and climate.

Vice-Chairs include Reps. Ro Khanna (D-CA), Gus Bilirakis (R-FL), Jake Auchincloss (D-MA), and Pete Sessions (R-TX). Other caucuses, such as the AURP BIO Health Caucus, Michigan Bioscience Legislative Caucus, and North Carolina Life Sciences Caucus, underscore the role of state and regional engagement.

Federal Executive Action

OSTP plans to release a comprehensive strategy in fall 2025, expected to:

- Double federal bioeconomy R&D over five years.
- Expand U.S. biomanufacturing capacity by 40%.
- Establish interagency coordination mechanisms.
- Create a national genomics and biosurveillance data infrastructure.
- Fund graduate fellowships and technical training in bioengineering.

Industry Leadership and Public–Private Partnerships

The private sector drives domestic biotechnology investment and helps shape policy. Notable initiatives include:

BIO's Bioeconomy Task Force

The Task Force comes from *Schmidt Futures* and related partners, and its work is laid out in a strategy document titled “[The U.S. Bioeconomy: Charting a Course for a Resilient and Competitive Future](#)” (often called the BioFutures report), which emphasizes a systems-of-systems approach: not just R&D, but providing a strategy /roadmap for workforce, feedstocks, scale-up/infrastructure, regulatory/regulatory alignment, supply chain, and equitable economic opportunities. Specific outputs include case studies, quantified scenarios of scaling bioproduction, discussions of policy gaps (e.g. regulatory, measurement, workforce) and suggested investment levels (e.g., for infrastructure and R&D).

The report has played an important role in broadening the visibility of the U.S. bioeconomy, highlighting its significance well beyond traditional health and pharmaceutical applications. By underscoring opportunities in bioindustrial manufacturing, chemicals, materials, fuels, and supply chain security, it has helped elevate the conversation around biotechnology as a pillar of economic and national resilience. In doing so, the report has shaped discussion on the urgent requirement for scale-up capacity, pilot and demonstration facilities, regulatory modernization, and a skilled workforce. Several of these priorities are now beginning to surface in federal funding streams and legislative proposals. In addition, the report's findings and recommendations have served as direct input into government initiatives, including the White House's *Data for the Bioeconomy Initiative*, which advances guidance on data sharing, measurement, and valuation of the bioeconomy across sectors.

BioMADE (Bioindustrial Manufacturing and Design Ecosystem)

BioMADE (Bioindustrial Manufacturing & Design Ecosystem) is a U.S. Department of Defense–backed Manufacturing Innovation Institute under the Manufacturing USA network, launched in April 2021. The institute began with an initial award of roughly \$87 million over seven years from the DoD, supported by more than \$180 million in non-federal cost shares from universities, industry, states, and other partners. Since then, its budget ceiling was increased in 2023 by the DoD to exceed \$500 million, enabling more ambitious programs and facility investments.

BioMADE has grown to include over 275 member organizations spanning academia, private firms, state economic development agencies, and nonprofits across dozens of states. In its project portfolio, it has funded dozens of initiatives: projects aimed at supply chain resiliency, sustainability, defense-relevant materials, novel bio-based chemicals and fibers, workforce training, and regulatory or process scale-up challenges. For example:

- Recent deliverables include a demonstration-scale facility in Maple Grove, Minnesota, announced in April 2025. This 122,000 square foot facility features two 25,000-liter fermenters and is intended to help move bioindustrial technologies from pilot toward commercial scale, especially in materials, lightweight composites, and other defense-relevant products. The investment (roughly \$132 million from DoD and the Minnesota Department of Employment and Economic Development) underscores the growing scale of BioMADE’s infrastructure ambitions.
- Another recent project is a new bioindustrial manufacturing facility near Ames, Iowa: a multi-user, pilot-scale plant with large fermenters and downstream processing, set to open in 2028, with cost-shares from the DoD, Iowa State University, and the Iowa Economic Development Authority.
- Also, BioMADE recently announced a set of three projects (totaling \$6.4 million) through its “Sustainable Logistics for Advanced Manufacturing” call, producing defense-relevant lubricants from food waste, bio-based carbon fiber, and enhanced textile fibers.

BioMADE is working to close the “scale-up gap” by providing infrastructure and demonstration facilities that allow R&D innovations to move more quickly toward commercial production without having to shift expensive scale-up work overseas. It is also contributing to supply chain resilience and national security by focusing on defense-relevant materials and processes (e.g., bio-based carbon fiber, lubricants, specialty fabrics). Furthermore, BioMADE’s regional facility projects are expected to generate economic development and jobs in feedstock-rich and rural areas, expanding the distribution of bioindustrial capacity across the country.

Key Legislative Proposals

The Agricultural Biorefinery Innovation and Opportunity (Ag BIO) Act of 2025

Ag BIO aims to enhance the U.S. bioeconomy by modernizing the USDA's Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program. This legislation proposes \$100 million in mandatory funding over five years to support the development of advanced biofuels, renewable chemicals, and biobased products. It seeks to streamline loan guarantees, expand access to grants, and provide cost-share grants covering up to 60 percent of project costs for pilot and demonstration-scale facilities. These measures are designed to address the scale-up bottleneck in biomanufacturing and promote domestic commercialization of bio-based technologies.

The Farm to Fly Act of 2025

The Farm to Fly Act focuses on accelerating the production and use of sustainable aviation fuels (SAF). It expands USDA eligibility for SAF projects, standardizes SAF definitions, and fosters interagency collaboration to streamline development and deployment. While the bill does not specify a funding amount, it directs the USDA to integrate SAF into its bioenergy programs, thereby creating new markets for American farmers and strengthening domestic energy resources.

Workforce & Education Policy

A skilled workforce underpins the bioeconomy's growth:

- **Federal programs:** NSF bioengineering fellowships, DOE bioenergy workforce initiatives, USDA extension programs.
- **Industry partnerships:** BioMADE, SynBioBeta workforce tracks, and regional workforce consortia.
- **Gaps:** Projections suggest SynBio industries could double by 2030, highlighting unmet demand for technicians and regulatory professionals.

Regulation and Standards

Regulatory modernization is central to scaling the bioeconomy:

- **Emerging needs:** Harmonized standards for synthetic biology, AI-biotech convergence, and SAF certification.
- **NIST initiatives:** Development of standards for bio-based materials and secure bio-data infrastructure.

Federal Financial Tools Enhance Private-sector Investment

Department of Energy (DOE) Loan Programs Office

The DOE's Loan Programs Office (LPO) provides critical financing for large-scale energy projects, including bioenergy and advanced fuels, which are central to expanding the U.S. bioeconomy. Loan guarantees reduce investment risk for private developers scaling up biorefineries and sustainable aviation fuel (SAF) facilities. Conditional loans, such as those for Calumet's Montana SAF project and Gevo's corn starch-to-jet fuel facility in South Dakota, help accelerate commercial production, enhance domestic manufacturing capacity, and support the administration's targets for SAF production.

Treasury's Inflation Reduction Act (IRA) Incentives

IRA tax credits, including Section 45Z for SAF, provide per-gallon incentives for low-carbon fuels, directly supporting bio-based fuel production. Facilities that meet prevailing wage and apprenticeship requirements can access higher credits, further driving U.S. workforce participation in bioeconomy sectors. These incentives improve project economics for biorefineries and SAF producers.

USDA Loan Guarantees: Biorefinery, Renewable Chemical, and Biobased Product Assistance Programs

USDA Section 9003 loan guarantees support the construction, retrofitting, and scaling of facilities producing advanced biofuels, renewable chemicals, and biobased products. By providing up to \$250 million in backing per project, these programs lower financial barriers to the commercialization of emerging bio-based technologies. This supports the transition from pilot-scale innovations to full-scale production.

Opportunities for Tax Credits Modeled on CHIPS & IRA

Tax credits modeled on CHIPS and IRA, if applied to the bioeconomy, could provide similar investment incentives for biomanufacturing, SAF, and renewable chemical production. Such credits would mirror successful strategies from the semiconductor sector, spurring domestic investment, innovation, and workforce development in bio-based industries. By reducing upfront capital costs and improving return on investment, these incentives would encourage private-sector engagement, scale-up of new technologies, and the creation of a globally competitive U.S. bioeconomy.

Federal Policies and Programs Advancing the U.S. Bioeconomy

Category	Bill/Department	Policy Implications for the Bioeconomy
Agriculture & Feedstock	Farm Bill	Supports bioenergy crops and renewable fuel infrastructure; provides cost-share programs and grants for bio-based product development; promotes sustainable agricultural practices to supply feedstocks for biorefineries.
	USDA	Administers loan guarantees (e.g., Section 9003 Biorefinery, Renewable Chemical, Biobased Product Assistance Programs) and grants to scale bio-based technologies; provides technical assistance and financing for pilot and demonstration facilities; integrates biofuels into agricultural programs, boosting rural economic development.
Energy & R&D	DOE	Offers loan guarantees through LPO for large-scale bioenergy and advanced fuel projects; funds R&D and demonstration projects via ARPA-E; bridges the gap from lab-scale innovations to commercial deployment of biomass conversion, renewable chemicals, and SAF technologies.
Market Demand & Deployment	Department of Defense (DoD)	Drives demand for advanced biofuels (especially SAF) through procurement programs; supports R&D and testing of drop-in biofuels and biobased materials; facilitates commercialization and strengthens domestic supply chains.
	Infrastructure Investment and Jobs Act	Improves transportation, energy storage, and logistics infrastructure to support delivery and utilization of biofuels, bioproducts, and biomass feedstocks; funds waste-to-energy and renewable energy projects, indirectly expanding markets for bio-based products.
Financial Incentives	Inflation Reduction Act (IRA)	Provides tax credits and grants for low-carbon fuels and bio-based manufacturing (e.g., Section 45Z SAF credit); ties incentives to emissions reductions and workforce standards; lowers investment risk and improves economics for bio-based facilities, accelerating sustainable scale-up.