

TECHVISION21

INSIDE VIEW



Despite Topsy-Turvy Political Environment, Washington is Dishing Out Hundreds of Millions in Grants for R&D, Technology, and Clean Energy

Washington is embroiled in a whirlwind of controversy, partisan head-butting, and uncertainty. But that has not stopped the Federal government from rolling out hundreds of millions of dollars in funding opportunities, with more in the pipeline. Companies, start-ups, higher education institutions, and communities across the country are vying for a share to boost their R&D, research and technology centers, high-tech manufacturing, and regional innovation hubs. Some of this funding aims to build up the U.S. capacity in critical emerging technologies such as AI and quantum, rebuild U.S. manufacturing in semiconductors, and address gaps in supply chains for critical materials.

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Highlights...

President Biden's Executive Order on Artificial Intelligence (AI)

On October 30, 2023, President Biden issued an Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence. To TechVision21's knowledge, this sweeping Executive Order is unprecedented in the history of the role of government in technology, and promises to be pivotal in the establishment of the framework, environment, guidelines, and regulations that will shape and govern the Age of AI in the United States.

TechVision21 has never seen a more extensive Presidential executive order on technology. It covers multiple dimensions of AI R&D, deployment, use, industry development, and competition in the United States; involves dozens of actions to be taken by numerous Federal departments and agencies; and all on very short timelines. In some cases, it extends these actions beyond AI to so-called "critical technologies."



The Executive Order directs Federal departments and agencies—within their missions, and by leveraging their programming and legal authorities—to implement eight guiding AI principles and priorities:

- Artificial Intelligence must be safe and secure.
- Promoting responsible innovation, competition, and collaboration will allow the United States to lead in AI and unlock the technology’s potential to solve some of society’s most difficult challenges.
- The responsible development and use of AI requires a commitment to supporting American workers.
- Artificial Intelligence policies must be consistent with the Biden Administration’s dedication to advancing equity and civil rights.
- The interests of Americans who increasingly use, interact with, or purchase AI and AI-enabled products in their daily lives must be protected.
- Americans’ privacy and civil liberties must be protected as AI continues advancing.
- It is important to manage the risks from the Federal Government’s own use of AI and increase its internal capacity to regulate, govern, and support responsible use of AI to deliver better results for Americans.
- The Federal Government should lead the way to global societal, economic, and technological progress, as the United States has in previous eras of disruptive innovation and change.

In implementing these priorities, the Executive Order directs and details actions to be taken in numerous arenas: standards for safety and security, infrastructure cybersecurity, CBRN threats, labeling of synthetic content, dual-use, use of Federal data for AI training, AI for military and intelligence purposes, innovation and private sector competition, immigration, computing resources for AI research, new research institutes, AI training and workforce development, workforce displacement, labor standards, intellectual property, electric power generation, climate change, criminal justice, discrimination in government benefits and programs, hiring, housing, consumer and patient protections, healthcare, education, drug development, transportation, privacy, Federal government use of AI and hiring AI talent, and global engagement in standards development and research. Each Federal agency is to designate a Chief Artificial Intelligence Officer, some agencies are to create internal Artificial Intelligence Governance Boards, and a White House Artificial Intelligence Council is established in the Executive Office of the President.

TechVision21 believes that, if the Executive Order and the plans it calls for are fully implemented, nearly every company and institution in the United States will be touched by them. We urge you to review carefully how these may impact your business, plans, and operations, and to engage with your associations and policy-makers and take opportunities to respond to Requests for Information and comments to help shape the environment, guidance, and regulations for AI in the United States going forward. Link to Executive Order:

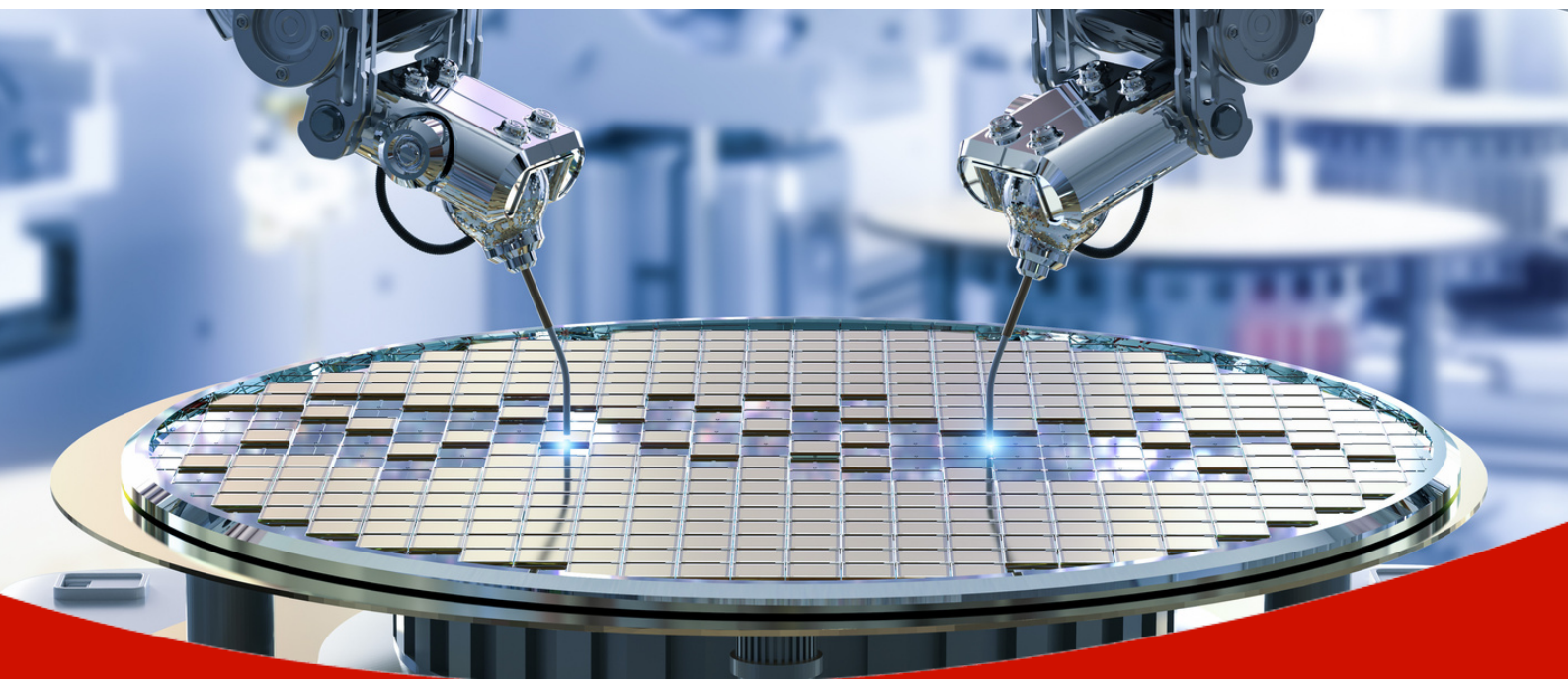
<https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/>

CHIPS Act Programs Roll Out

Despite partisan acrimony in Washington, there is large bipartisan consensus on the need to rebuild U.S. domestic semiconductor manufacturing and secure semiconductor supply chains.

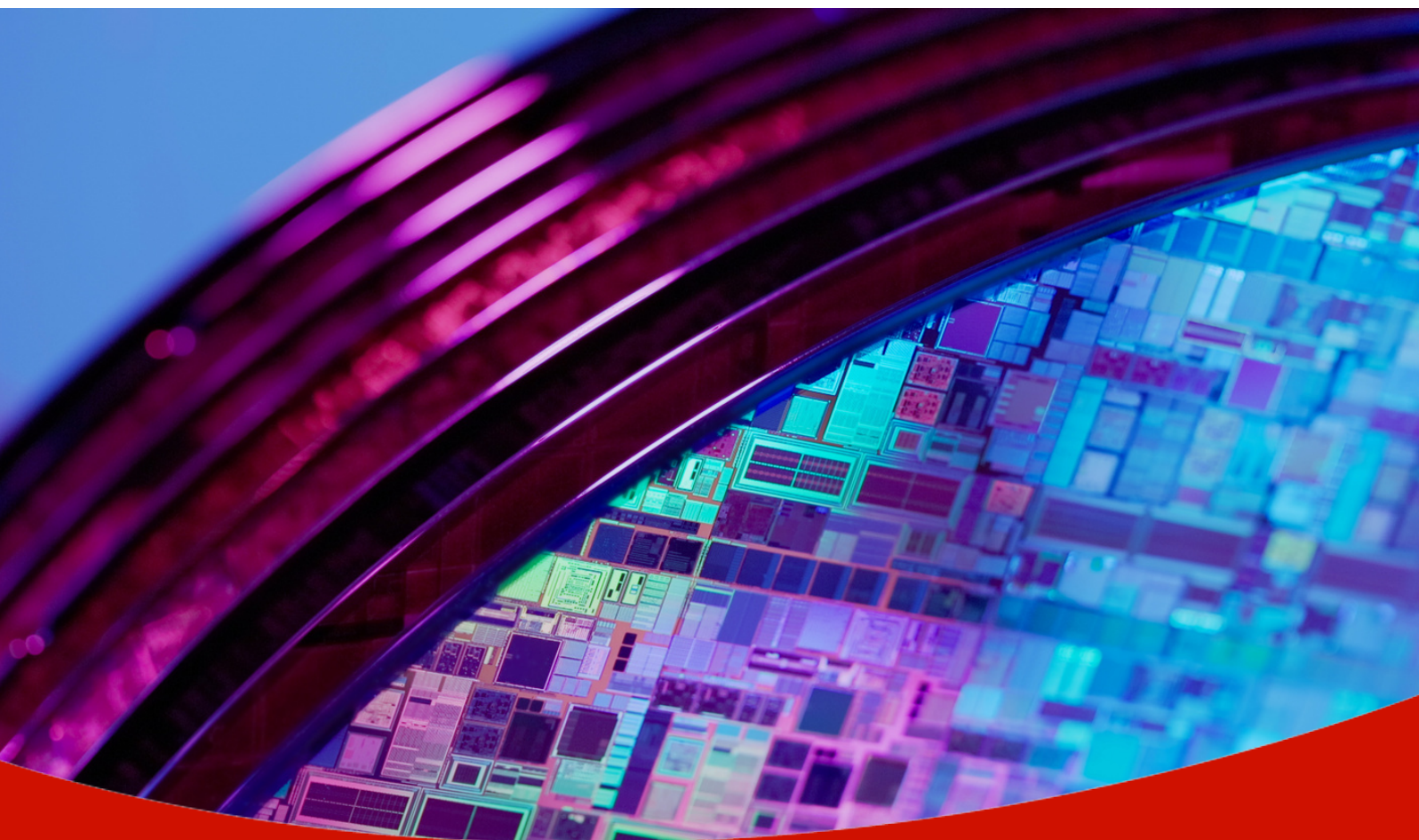
CHIPS Incentives. The National Institute of Standards and Technology is administering \$39 billion in funding for the construction, expansion, or modernization of domestic commercial semiconductor manufacturing facilities for: leading-edge logic or memory chips, current-generation and mature-node chips, back-end production, wafers, semiconductor materials, and semiconductor manufacturing equipment.

Most CHIPS direct funding awards will equal 10 percent of project capital expenditures. In rare cases, applicants may receive an award of 20 percent or 30 percent of project capital expenditures if they make a particularly compelling case that their project advances the program's economic and national security objectives and demonstrate that the additional funding is necessary to make the project commercially viable. Projects eligible for the Advanced Manufacturing Investment Credit will not receive an award of more than 20 percent of project capital expenditures. The CHIPS Act requires that an applicant has been offered a covered incentive from a state or local jurisdiction where the project is located.



NIST accepts statements of interest and applications for funding under the CHIPS Incentives Program on a rolling basis (statements of interest and pre-applications are required):

- Full applications for leading-edge facilities began being accepted on March 31, 2023.
- Full applications for current-generation, mature-node, and back-end production facilities began being accepted on June 26, 2023.
- For wafer manufacturing facilities, pre-applications began being accepted on September 1, 2023 and full applications have been accepted starting on October 23, 2023.
- For semiconductor materials and manufacturing equipment facilities for which the capital investment equals or exceeds \$300 million, pre-applications began being accepted on September 1, 2023 and full applications started being accepted starting on October 23, 2023.
- For semiconductor materials and manufacturing equipment facilities with capital investments under \$300 million, concept plans will be accepted between December 1, 2023 and January 1, 2024.



Manufacturing Commons. The CHIPS Act provided the Department of Defense with \$2 billion to establish a National Network for Manufacturing Research and Development to enable the laboratory-to-fabrication transition of microelectronics innovations in the United States. It sought proposals for regional hubs and core facilities in six areas of technology: secure edge/IoT computing, 5G/6G, AI hardware, quantum, electronic warfare, and commercial leap ahead technologies. It received 83 proposals for potential hubs and, on September 20, 2023, announced the selection of eight awardees that will split \$238 million. The awardees incorporate more than 360 organizations from more than 30 states. These hubs will compete for funding for projects through solicitations issued in the third quarter of each fiscal year.

Hubs Selected for Department of Defense Manufacturing Commons

Massachusetts: Northeast Microelectronics Coalition Hub led by the Massachusetts Technology Collaborative. 90 hub members, including MITRE, Harvard University, Lockheed Martin, Northrup Grumman, Nokia, Boston University, and Brown University. Awarded \$19.7 million.

Arizona: Southwest Advanced Prototyping Hub led by Arizona Board of Regents for Arizona State University. 27 hub members including Deca Technologies, Lam Research, Mercury Systems, Siemens EDA, Cadence, Sandia National Laboratories, and University of New Mexico. Awarded \$39.8 million.

Indiana: Silicon Crossroads Microelectronics Commons Hub led by the Applied Research Institute. 130 hub members including Purdue University and University of Michigan. Awarded \$32.9 million.

Ohio: Midwest Microelectronics Consortium Hub. 65 consortium members including a range of Midwest universities and community colleges; Global Foundries, Intel, and other microelectronics companies; and major defense contractors. Awarded \$24.3 million.

California: California Defense Ready Electronics and Microdevices Superhub Hub led by the University of Southern California. 16 hub members including Caltech, Morgan State University, North Carolina A&T, Pasadena City College, University of California Irvine, UCLA, University of California Riverside, University of California San Diego, University of California Santa Barbara, Boeing, HRL Laboratories, Lockheed Martin Aeronautics, Northrop Grumman, PDF Solutions, Raytheon, and Teledyne Scientific. Awarded \$26.9 million.

New York: Northeast Regional Defense Technology Hub, led by the Research Foundation for the State University of New York. 51 hub members including SUNY CNSE, Cornell University, Rensselaer Polytechnic Institute, and IBM. Awarded \$40 million.

North Carolina: Commercial Leap Ahead for Wide Bandgap Semiconductors Hub led by the North Carolina State University. 7 hub members including Wolfspeed, North Carolina A&T, Adroit Materials, General Electric, and Kyma. Awarded \$39.4 million.

California: California-Pacific-Northwest AI Hardware Hub led by the Board of Trustees of the Leland Stanford Junior University. 44 hub members, Awarded \$15.3 million.

Regional Innovation Engines

In an historic expansion of the National Science Foundation mission, the CHIPS and Science Act established a new Directorate for Technology, Innovation and Partnerships. TIP’s flagship program—Regional Innovation Engines—will make awards to Engines to carry out three core functions: use-inspired R&D, translation of innovations to practice, and workforce development.

A successful NSF Engine will lead to its region becoming a nationally renowned, self-sustaining, technology- and innovation-driven hub for the topic in which it specializes. An Engine could receive a total of \$160 million over a ten year period—the largest cash awards in NSF’s history. NSF has selected 16 finalists in the first-ever Regional Innovation Engines program competition, with awards expected in the fall of 2023:



- **Advanced Agriculture:** Northern Plains AgTech Engine for Food systems Adapted for Resiliency and Maximized Security (FARMS) led by North Dakota State University.
- **Advanced Manufacturing/Building Construction:** Additive Manufacturing Forward Engine (AMFE) led by Kentucky Science & Technology Corporation.
- **Advanced Materials:** Upstate Makes: A Materials Innovation Engine for Manufacturing Sustainability led by FUZEHUB Inc.
- **Aerospace:** Space for Earth, Space for All: Space Valley's Role in Securing America's Economic and Political Future led by New Mexico Trade Alliance.
- **Aerospace:** Paso del Norte Innovation for Defense and Aerospace (IDEA) Engine led by the University of Texas at El Paso.
- **Bioeconomy:** The Great Lakes Sustainability Hub for an Alternative Packaging Ecosystem (SHAPE) led by Michigan State University Foundation.
- **Blue Economy/Circular Economy:** Great Lakes ReNEW led by Current Innovation, NFP.
- **Blue Economy/Circular Economy:** Creating a Modern, Green and Inclusive Textile Sector led by The Industrial Commons.
- **Blue Economy/Circular Economy:** Midwest Sustainable Plastics Innovation Regional Engine (M-SPIRE) led by University of Minnesota Twin Cities.
- **Climate and Resilience:** Scaling the Regional, Technology-Driven, Innovation Ecosystem in Climate Solutions and Community Resiliency in Colorado and Wyoming led by Rocky Mountain Innovation.
- **Health & Wellness:** Central Carolina Engine for Innovation in Regenerative Medicine Clinical Manufacturing led by Wake Forest University School of Medicine.
- **Microelectronics and Semiconductors:** NeoCity Semiconductor Technology Accelerator led by ICAMR Inc.
- **Quantum:** Quantum Crossroads led by the University of Chicago.
- **Sustainable Energy:** New Energy New York Storage Engine (NENY-SE) led by Binghamton University.
- **Sustainable Energy:** Engine for Louisiana Innovation and Transition of Energy (ELITE) University led by Louisiana State University.
- **Water Sustainability:** Sustainability Innovation Engine for the Southwest (SIES) led by Arizona State University.

Appropriations Marks for Key R&D, Innovation, and Clean Energy Technology Programs

Appropriations Committees in the House and Senate have moved forward on FY 2024 appropriations for many Federal departments and agencies that carry-out key research, technology, innovation, and clean energy programs. However, differences between House and Senate appropriations will need to be resolved in an environment of partisan and intra-party bickering, in which a continuing resolution may be a best hope or a government shutdown the worse. Nevertheless some appropriation marks are close in the House and Senate, indicating what may eventually be passed, although many fall short of the Biden Administration's budget request.

Defense RDT&E. The President requested \$145 billion for defense research, development, test, and evaluation. The House would provide \$147 billion and the Senate \$143 billion. There continues to be interest in large investments in strengthening U.S. microelectronics. For example, the President requested \$1 billion for Trusted and Assured Microelectronics; the House would provide \$900 million and the Senate \$964 million. There is also significant support across the defense RDT&E budget to close the innovation "valley of death" through programs that accelerate development, prototyping, and fielding of new technologies, as well as reaching into the start-up sector for new innovations.

Regional Innovation. There is continuing support for building regional innovation ecosystems across the country. For example, the Senate would give \$50 million to the Commerce Department's Regional Innovation Program, and \$41 million to its Regional Technology and Innovation Hubs program; the latter has \$1.5 billion in mandatory spending for FY 2024. The Senate would also provide \$200 million for the National Science Foundation's Regional Innovation Engines program.

Clean Energy. Investments would continue to be relatively high to advance clean energy technologies and their deployment. However, neither the House nor the Senate would meet the President’s budget request (see table below).

FY 2024 Request and Appropriations Status for Key Department of Energy Programs			
Program	Request	House	Senate
TOTAL Office of Energy Efficiency and Renewable Energy	\$3.8B	\$3.0B	\$3.7B
• Vehicle Technologies	\$527M	\$400M	\$455M
• Bioenergy Technologies	\$323M	\$240M	\$280M
• Hydrogen/Fuel Cells	\$163M	\$138M	\$163M
• Solar Energy	\$379M	\$288M	\$318M
• Wind Energy	\$385M	\$113M	\$231M
• Water Power	\$230M	\$155M	\$200M
• Geothermal	\$216M	\$118M	\$118M
• Industrial Efficiency & Decarbonization	\$394M	\$235M	\$275M
• Advanced Materials and Manufacturing Technologies	\$241M	\$200M	\$220M
• Building Technologies	\$348M	\$255M	\$332M
• Manufacturing and Energy Supply Chains	\$18M	\$18M	\$19M
Clean Energy Demonstrations	\$215M	\$35M	\$89M
Science	\$8.8B	\$8.1B	\$8.4B
ARPA-E	\$650M	\$470M	\$450M



Current Opportunities. The Federal government continues to issue funding opportunities soliciting requests for proposals to research and to develop a wide range of technologies. Popular areas in which grants are flowing include clean energy and electrification, AI, quantum, semiconductors, other critical technologies, and workforce development. In addition, while the National Science Foundation has traditionally funded basic research, with the new Technology, Innovation, and Partnerships Directorate, it is expanding the scope of its support to technology development, translation, and innovation. Examples of current funding opportunities include:

- **Innovative Designs for High-Performance Low-Cost HVDC Converters (DE-FOA-0003141).** The Department of Energy seeks proposals for R&D to support innovations and cost reduction for high-voltage direct current voltage-source converter transmission systems. This investment aims to enable grid upgrades required to integrate increasing renewable energy generation on the grid. Concept papers due November 14, 2023, and full proposals on February 5, 2024. \$10 million will be awarded.
- **Energy Program for Innovation Clusters (EPIC) Prize Round 3.** EPIC is a \$4 million competitive funding program for incubators supporting energy startups. EPIC awards cash prizes to regional incubator teams that submit the most creative and impactful plans, then implement those plans to develop strong programming and support for energy startups and entrepreneurs. Phase 1 submissions due February 9, 2024.
- **Solar-Thermal Fuels and Thermal Energy Storage via Concentrated Solar-Thermal Energy (DE-FOA 0003080).** This Department of Energy seeks proposals on two approaches to energy storage in concentrated solar-thermal systems: thermochemical storage via solar fuel production and local thermal energy storage for dispatchable energy. Concept papers due November 13, 2023, and full proposals due January 12, 2024. Up to \$30 million will be awarded.

- **Enabling Partnerships to Increase Innovation Capacity (EPIIC).** The National Science Foundation's Directorate for Technology, Innovation and Partnerships seeks to support capacity-building efforts at institutions of higher education with limited research capacity, preparing them to participate in NSF Regional Innovation Engines. This solicitation seeks proposals from higher education institutions to broaden their participation in innovation ecosystems in key technologies (e.g., advanced manufacturing, advanced wireless, artificial intelligence, biotechnology, quantum information science, semiconductors, novel materials, and microelectronics) through capacity-building efforts—particularly undergraduate institutions and two-year institutions that lack the infrastructure and resources needed to grow external partnerships and effectively contribute to innovation ecosystems. \$20 million in total funding, with individual awards of \$400,000. Preliminary proposals due December 15, 2023 and June 27, 2024.
- **NSF Convergence Accelerator Phases 1 and 2 for the 2023 Cohort-Tracks K, L, M.** The National Science Foundation Convergence Accelerator is a two-track, two-phase program. In the two tracks, NSF is soliciting proposals led by institutions of higher education, non-profits, independent museums, observatories, research labs, professional societies, and similar organizations; and proposals led by for-profit or similar organizations. Phase 1 awardees receive resources to further develop their convergence research ideas, and to identify important partnerships and resources to accelerate their projects. Phase 2 awardees receive significant resources leading to deliverable research prototypes and sustainability plans. This solicitation for FY 2023 invites proposals for the following topics: equitable water solutions, real-world chemical sensing applications, and bio-inspired design innovations. If selected, Phase 1 awardees may receive funding up to \$750,000. If selected, Phase 2 teams could receive awards up to \$5 million. Under this solicitation, NSF expects to make 48 Phase 1 awards for a total of \$35 million. Full proposals due August 30, 2024.

Looking Ahead

Additional funding opportunities are in the pipeline or expected next year:

- **Department of Energy issued a Notice of Intent to release a funding opportunity on “Bipartisan Infrastructure Law (BIL) Electric Drive Vehicle Battery Recycling, Transport, and Design” (DE-FOA-0003119)** on or about November 2023. The anticipated funding opportunity will focus on solutions that reduce costs associated with battery recycling through technologies, processes, and product designs that facilitate the transport, disassembly, and preprocessing of end-of-life EV batteries. Also of interest are technologies or product designs that lower the costs and improve safety associated with the transport and disassembly of EV batteries; and recycling and disposal of EV battery accessory components. It is anticipated that approximately \$35 million will be awarded to fund R&D and demonstration of transportation, dismantling, and preprocessing of end-of-life EV batteries and \$2 million for recycling of plastic and polymer EV battery accessory components.
- **The Department of Energy issued a Notice of Intent to release a funding opportunity on Marine Energy University Foundational R&D (DE-FOA-0003097)** in October 2023. It is anticipated that the funding opportunity may include the following topic areas: open-source marine energy converter test platforms to produce open-source data; sustainable and scalable offshore wind, marine energy, and aquaculture; undergraduate senior design and/or research project development; and an open topic. There are subtopics with greater detail on areas of interest.
- **The Department of Energy issued a Notice of Intent to release a funding opportunity for a Critical Materials Accelerator (DE-FOA-0003155)** on October 23, 2023. The funding opportunity may include the following areas of interest: critical material lean/free magnets for clean energy technologies, motors and drivetrains using critical material lean/free magnets, improved unit operations of processing and manufacturing of critical materials, critical material recovery from scrap and post-consumer products, and reduced critical material demand for clean energy technologies.

- **ARPA-E Open.** In addition to its focused funding opportunities, every three years ARPA-E issues an OPEN funding opportunity open to projects to develop potentially disruptive new technologies across the full spectrum of energy-related technologies and applications. An OPEN solicitation is expected in 2024. Areas of interest could include electricity generation by both renewable and non-renewable means; electricity transmission, storage, and distribution; energy efficiency for buildings, manufacturing and commerce, and personal use; and all aspects of transportation, including the production and distribution of both renewable and non-renewable fuels, electrification, and transportation energy efficiency.
- **Department of Energy Small Business Innovation Research Program.** On November 6, 2023, the Department of Energy will release the topics list for its second 2023 solicitation for SBIR Phase 1 proposals. The funding opportunity announcement will be released on December 11, letters of intent will be due January 3, 2024, and full applications due February 21, 2024. For FY 2025, the first release of topics for Phase 1 proposals will be July 15, 2024, the funding opportunity announcement will be issued August 16, 2024, and full applications will be due October 15, 2024. Typically, Phase I grants to small businesses have maximum award sizes of \$200,000 or \$250,000. Projects can compete for additional funding of \$1,100,000 or \$1,600,000 in a Phase II competition. In a few cases, projects could receive an additional \$1,100,000.

GET CRITICAL INSIDE INSIGHTS!—TECHVISION21 PRESIDENT AND CEO'S NEW BOOK PUBLISHED

TechVision21 President and CEO's new book—Next Generation Innovation: Supercharge Your Business Through Strategic Government Partnerships—was recently published. Next Generation Innovation offers rich insights drawn from Kelly Carnes' real-world experience as an attorney for technology companies, Senior Advisor to four Secretaries of Commerce and Senate-confirmed Assistant Secretary of Commerce for Technology Policy, and her current leadership role at TechVisio21.

TechVision21 offers assistance to technology visionaries interested in doing well by doing good for the Nation. TechVision21 offers its clients the opportunity to collaborate with an expert team deeply knowledgeable about theories and models of innovation, the history of science and technology policy, and the details of U.S. government programs and budget-making processes. This includes how to access Federal funding to advance clients' research, technology, and policy interests. You can officially purchase a print copy or the e-book from [Amazon](#) today.



Bottom Line...

Washington is dishing out hundreds of billions of dollars in grants, loans, and tax credits for R&D, technology development, manufacturing, and clean energy. The funding landscape changes fast with new opportunities coming across government weekly. TechVision21 is ready to help advance your technology and clean energy interests in Washington –meetings with policy makers and program managers, pinpointing funding for projects, identifying key partners, and helping you prepare complex grant proposals. We have years of experience supporting clients in a wide range of technologies.

Do not hesitate to contact TechVision21 at (202) 966-6610 or at kcarnes@TechVision21.com

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