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TECHVISION21 INSIDE VIEW



Despite the Political Divide, Washington's Spending Spree Continues with Billions in Grants and Loans for R&D, Technology, and Clean Energy

Washington's partisan politicos continue to butt heads, and rancor grows with every passing day toward the election. But that has not stopped Federal departments and agencies from awarding a steady stream of green in loans and grants focused on research, technology, and clean energy. Companies, start-ups, higher education institutions, and communities across the country are vying for a share to fund R&D, technology centers, advanced manufacturing, and regional innovation hubs. Some of this funding aims to build up U.S. capacity and keep the United States in the lead in artificial intelligence, quantum, biomanufacturing, and semiconductors.

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Highlights...

Commerce Starts Spending CHIPS Act Money Both sides of the aisle agree the United States needs to rebuild domestic semiconductor manufacturing and secure semiconductor supply chains.

CHIPS Incentives. With \$39 billion in funding for the construction, expansion, or modernization of domestic commercial semiconductor manufacturing facilities, the National Institute of Standards and Technology announced its first awards:

- \$35 million to BAE to support modernization of the company's Microelectronics Center, a mature-node production facility in Nashua, New Hampshire. The project will replace aging tools and quadruple the production of chips necessary for critical defense programs.
- \$162 million to Microchip Technology Inc. to support onshoring of the company's semiconductor supply chain. Approximately \$90 million will be used to modernize and expand a fabrication facility in Colorado Springs and approximately \$72 million to expand a fabrication facility in Gresham, Oregon.
- \$1.5 billion to GlobalFoundries for three projects: construction of a new state-ofthe-art 300 mm fab in Malta, New York; expansion of an existing Malta fabrication facility to supply semiconductors to General Motors; and revitalization of an existing fab in Burlington, Vermont to commercialize new 200 mm technologies, creating the first U.S. facility capable of high-volume manufacturing of nextgeneration Gallium Nitride on Silicon.
- \$8.5 billion split across four Intel projects: construction of two new leading-edge logic fabs and modernization of one existing fab in Chandler, Arizona; modernization of two fabs into advanced packaging facilities in Rio Rancho, New Mexico; creating a new regional chipmaking ecosystem in New Albany, Ohio anchored by construction of two leading-edge logic fabs; and expansion and modernization of technology development facilities in Hillsboro, Oregon that will utilize the world's first High NA EUV lithography equipment.



- \$6.6 billion to TSMC in support of three greenfield leading-edge fabs in Phoenix, Arizona, including for the production of 4nm FinFET and 2nm process technologies.
- \$6.4 billion to Samsung Electronics for two new leading-edge logic fabs, an R&D fab, and an advanced packaging facility in Taylor, Texas and expansion to their existing Austin facility.
- \$6.1 billion to Micron to support construction of two leading-edge DRAM fabs in Clay, New York, and investment in a DRAM facility co-located with Micron's R&D facility in Boise, Idaho.

In the recent budget agreement, Congress encouraged NIST to continue to explore opportunities to expedite the National Environmental Policy Act (NEPA) review process to ensure funds granted under the CHIPS Act are expeditiously distributed to qualified projects, and semiconductor fabrication plant construction continues without delay.

The CHIPS Program Office is still accepting applications for construction, expansion, or modernization of commercial facilities for semiconductor materials and manufacturing equipment. Statements of interest are being accepted until June 18, 2024.

Due to overwhelming demand for CHIPS incentives funding and other reasons, the CHIPS Program Office will not move forward at this time with the Notice of Funding Opportunity for the construction, modernization, or expansion of U.S. semiconductor R&D facilities.





CHIPS SBIR on Metrology. On April 16, the CHIPS Program Office released a Notice of Funding Opportunity for Metrology under the Small Business Innovation Research program. The CHIPS Office anticipates awarding approximately \$54 million to 24 small business projects in a range of open challenges and specific areas of interest across measurement services, tools, and instrumentation; innovative manufacturing metrologies; novel assurance and provenance technologies; and advanced metrology R&D testbeds. Full applications are due on June 14, 2024.

Hubs, Hubs, Washington Loves Hubs

The Federal government has made numerous awards to establish and develop technology, innovation, and clean energy hubs. The aim is to build capacity and ecosystems that will strengthen and spur U.S. innovation.

Microelectronics Hubs. The Department of Defense selected eight hubs for the CHIPS Act-funded Defense Microelectronics Manufacturing Commons. With memberships across a mix of universities, companies, and national laboratories, they are anchored in Arizona, California (2), Indiana, Massachusetts, New York, North Carolina, and Ohio. In December 2023, the Department of Defense released its first annual Call for Projects from across the Commons, proposals were due in February, and DoD expects to award \$280 million in the third quarter of FY 2024. Proposals were sought on a range of topics in 5G/6G, AI hardware, commercial leap ahead technologies, electromagnetic warfare, edge computing/IoT, and quantum.



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Technology Hubs. The Department of Commerce's Economic Development Administration selected 31 regional Tech Hubs as designees that are now competing in a Phase 2 competition in which they could be awarded \$40 million to \$70 million each. Collectively, the designees requested \$2 billion in funding for a total of 182 projects, including workforce development programs, entrepreneur support, technology commercialization and capital investments. In total, Tech Hubs applicants reported at least \$435 million in matching funds for their projects from industry; state and local governments; and other partners. Five to ten hubs are expecting to win this Phase 2 funding. The designees come from across the country, and their strategies and programs revolve around a number of technologies and industries across autonomous systems, quantum, biomanufacturing, precise and predictive medicine, energy, critical minerals supply chain, semiconductor manufacturing, and materials manufacturing.

Hydrogen Hubs. In October 2023, the Department of Energy awarded \$7 billion to launch seven Regional Clean Hydrogen Hubs to anchor a national network of clean hydrogen producers, and support the production, storage, delivery, and end-use of clean hydrogen. These regional hubs—many of them multi-state—will be in Appalachia, California, Texas, the Heartland, the Mid-Atlantic, the Midwest, and the Pacific Northwest.





Regional Innovation Engines. In January 2024, the National Science Foundation selected ten inaugural Regional Innovation Engines.

- Central Florida Semiconductor Innovation Engine
- Colorado-Wyoming Climate Resilience Engine
- Great Lakes Water Innovation Engine
- Louisiana Energy Transition Engine
- North Carolina Textile Innovation and Sustainability Engine
- North Dakota Advanced Agriculture Technology Engine
- Paso del Norte Defense and Aerospace Innovation Engine
- Piedmont Triad Regenerative Medicine Engine
- Southwest Sustainability Engine
- Upstate New York Energy Storage Engine

Each of these engines will initially receive up to \$15 million for two years and, should they demonstrate progress toward their milestones, they could potentially receive \$160 million each over 10 years. They are led by universities or coalitions, and focused on a range of technologies including advanced energy and industrial efficiency, biotechnology, advanced materials, advanced computing and semiconductors, robotics and advanced manufacturing, and disaster prevention and mitigation.





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

Finally, a set of FY 2024 appropriations bills made it to the President's desk, and signed into law. In some areas of R&D, innovation and, particularly clean energy, appropriations fall short of the Biden Administration's budget request.

A successful NSF Engine will lead to its region becoming a nationally renowned, selfsustaining, 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:

Defense RDT&E

The Department of Defense continues to identify innovation, and expediting fielding of new technologies and innovations into military capabilities as a top priority. This includes pulling from the growing ecosystem of technologies from commercial firms and start-ups. Emblematic of this priority is the massive 10X boost in funding for the Defense Innovation Unit—DoD's venturing arm. DIU received \$946 million, \$842 million above the budget request and up from the \$107 million enacted in FY 2023. Big chunks of this increase are going to quantum, artificial intelligence, anti-drone systems, the DIU and services non-traditional innovation field enterprise, 5G interference with military radars, and support to the combat commands.

The Department of Defense received \$148 billion for research, development, test, and evaluation, about \$3 billion more than the President's request. Of note:

- The Army received \$712 million for Next Generation Combat Vehicle, about \$328 million more than the President's request.
- The Air Force MANTECH program received \$188 million, \$144 million more than the request.
- The Air Force received \$200 million for its Sentinel Industrial Base program for prototyping to reduce schedule, cost, and risk; to stabilize the industrial base; to develop radiation-hardened components for strategic applications, and certifying metal-oxide-semiconductor field-effect transistors; to strengthen Sentinel program key suppliers; and for workforce development and collaboration with trade schools.
- The Defense-wide Manufacturing Science and Technology Program got \$479 million, \$227 million more than the request. This included a \$100 million increase for DoD biotechnology manufacturing institutes. Trusted and Assured Microelectronics got \$920 million, \$86 million below the request.

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Department of Commerce

Economic Development Administration. There is continuing support for building regional innovation ecosystems across the country. In this regard, EDA got \$50 million for its Regional Innovation Program. In the budget agreement, Congress urged EDA to use this program to invest in university-based, high-tech business incubators to diversify distressed manufacturing communities and legacy urban and rural communities by encouraging entrepreneurship and patent creation, and promoting technology commercialization through business start-ups. EDA also received \$41 million for its Tech Hubs program, with Congressional encouragement to support consortia that have proven regional strategies that bridge urban and rural economies.

NIST. The National Institute of Standards and Technology got \$1.5 billion, \$172 million less than the request and \$167 million less than FY 2023. Of that, \$175 million goes for the Hollings Manufacturing Extension Partnership, and \$37 million for Manufacturing USA. Congress encourages NIST to increase support for AI, quantum information science, biotechnologies, and advanced communications research and standards.

Department of Energy Clean Energy Programs

Investments to advance clean energy technologies and their deployment continue to be relatively high. However, for the most part, Congress did not meet the President's budget request and funding levels were similar to FY 2023 (see table below).

FY 2024 Appropriations for Key Department of Energy Programs			
Program	FY 2023	Request	Final
TOTAL Office of Energy Efficiency and Renewable Energy	\$3.5B	\$3.8B	\$3.5B
Vehicle Technologies	\$455M	\$527M	\$450M
Bioenergy Technologies	\$280M	\$323M	\$275M
Hydrogen/Fuel Cells	\$170M	\$163M	\$170M
Solar Energy	\$318M	\$379M	\$318M
Wind Energy	\$132M	\$385M	\$137M
Waterpower	\$179M	\$230M	\$200M
Geothermal	\$118M	\$216M	\$118M
Industrial Efficiency & Decarbonization		\$394M	\$237M
Advanced Materials and Manufacturing Technologies		\$241M	\$215M
Building Technologies	\$332M	\$348M	\$332M
Manufacturing and Energy Supply Chains	\$18M	\$18M	\$18M
Clean Energy Demonstrations	\$89M	\$215M	\$50M
Science	\$8.1B	\$8.8B	\$8.2B
ARPA-E	\$470M	\$650M	\$460M



There was significant direction from Congress for Department of Energy spending. For example:

- Across Department of Energy agencies—EERE, Office of Science, Office of Fossil Energy, Office of Nuclear Energy, and Office of Electricity—there were carve-outs in their appropriations for cross-cutting initiatives in carbon dioxide removal, critical minerals, energy storage, hydrogen, and industrial decarbonization. For example, the energy storage cross-cutting initiative gets \$581 million and industrial decarbonization gets \$953 million.
- Within EERE funds, \$35 million goes to the Lab-Embedded Entrepreneurship Program;
 \$60 million for technologies to advance hydrogen use for hard-to-electrify
 applications such as locomotives, maritime shipping, and aviation; and \$141 million
 for marine energy. This funding for marine energy includes \$35 million for
 competitive solicitations to support university- and industry-led projects to rapidly
 design, fabricate, and test marine energy systems, subsystems, and components.
- Nuclear energy gets a boost. \$800 million will go for two cost shared awards for near term commercial deployments of a Generation 3+ small modular reactor technology in the United States. There is also \$100 million for a cost shared competitive award to support design, licensing, supplier development, and site preparation of a grid-scale Generation 3+ reactor design that can be deployed no later than 2030.
- The budget agreement includes not less than \$135 million for artificial intelligence/machine learning across Office of Science Programs. It also provides \$245 million for quantum information science, including \$120 million for research and \$125 million for the five National Quantum Information Science Research Centers.

Request for Information (DE-FOA-00033315). The Department of Energy is seeking comments from industry, academia, research laboratories, government agencies, and other stakeholders on issues related to U.S domestic wind turbine blade manufacturing. EERE is specifically interested in information on current domestic blade manufacturing challenges, future domestic blade manufacturing needs, workforce, technology development, impacts of tax credits and incentives, and stakeholder strategy development. Answers to numerous questions on topics are due by July 30, 2024.



Current Opportunities

The Federal government continues to issue funding opportunities soliciting requests for proposals for 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. Examples of current funding opportunities include:

- Photovoltaics Research and Development (DE-FOA-0003337). The Department of Energy will fund innovative solar PV R&D that reduces the cost of PV modules, reduces carbon and energy intensity of PV manufacturing processes, and optimizes PV technology for new, specialized markets. There are two areas of interest: photovoltaic advances in cell efficiency, reliability, and supply chain; and building academic capabilities in cadmium telluride. DOE expects to provide a total of \$20 million for 8-15 new awards ranging between \$1 million and \$4 million each. Letters of intent due by June 12, concept papers due by July 1, and full applications by September 16.
- Bipartisan Infrastructure Law (BIL)—Joint Office of Energy and Transportation: Communities Taking Charge Accelerator (DE-FOA-0003214). The Department of Energy intends to provide \$54 million in funding to support planning, demonstration, and deployment projects in the following areas: solving for nohome charging; expanding e-mobility solutions through electrified micro, light, and medium-duty fleets; and managed charging for clean reliable energy. Individual grant awards expected to range from \$250K-\$4 million. Concept papers due May 20, and full applications due July 16.





- Bipartisan Infrastructure Law (BIL)—Advanced Energy Manufacturing and Recycling Grant Program (DE-FOA-0003294). The Department of Energy will provide \$425 million to support projects by small and medium-sized manufacturing firms in two areas of interest: projects to establish new, or requip or expand, an existing manufacturing or recycling facility for the production or recycling, as applicable, of advanced energy property; and projects to re-equip an existing industrial or manufacturing facility with equipment designed to substantially reduce the GHG emissions of that facility, or to establish new, or re-equip or expand, an existing manufacturing or recycling facility that produces materials that result in substantially lower carbon intensity compared to an appropriate industry benchmark and are not derived from a primary feedstock of palm fatty acid distillates or fossil fuels including coal, natural gas, and petroleum. Closing date is July 1.
- Rural Energy for America Program (REAP). The Inflation Reduction Act provided \$1 billion for the REAP program across six quarterly cycles to be obligated by September 30, 2024. REAP provides grants, guaranteed loans, and grant and loan combinations to help agricultural producers and rural small businesses reduce energy costs and consumption or to deploy clean energy projects. Remaining window opening dates to submit applications are April 1-June 30, 2024 and July 1-September 30, 2024. There is a continuous application cycle for guaranteed loans. For renewable energy system projects, the maximum grant request is \$1 million, and there is a cost share ranging from 50-75 percent depending on the project.





- 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 contribute to innovation ecosystems. \$20 million in total funding, with individual awards of \$400,000. Preliminary proposals due June 27.
- Agriculture and Food Research Initiative Competitive Grant Program on Education and Workforce Development (USDA-NIFA-AFRI-010693). The U.S. Department of Agriculture will provide \$49 million in grants to support agriculture-related education and workforce development. This includes: professional development opportunities for K-14 educational professionals; non-formal education that cultivates food and agricultural interest in youth; workforce training at community, junior, and technical colleges; training of undergraduate students in research and extension; and fellowships for predoctoral candidates and postdoctoral scholars. Depending on the type of education and training program, proposals are due over the period August 15-December 5.



- Department of Defense Small Business Innovation Research Program. DoD components—Navy, Air Force, DHA, DLA, DTRA, MDA, and OSD—opened their Phase 1 SBIR programs on May 15. SBIR topics generally involve critical technology areas: FutureG, trusted AI and autonomy, biotechnology, advanced computing and software, integrated sensing and cyber, directed energy, hypersonics, microelectronics, integrated network systems, quantum science, space technology, renewable energy generation and storage, advanced materials, and human-machine interfaces. Additional areas supporting component specific missions including advanced infrastructure and advanced manufacturing, combat casualty care, emerging threat reduction, military infectious diseases, military operational medicine, mission readiness and disaster preparedness, nuclear, and sustainment and logistics. There is also an innovation open topic. Phase 1 grant sizes are different across the DoD components, but typically range from \$100-\$250K. Phase II awards can be as high as \$1.8 million. Proposals are due June 12.
- Department of Commerce Economic Development Administration Public Works and Economic Assistance Programs. Applications are accepted on a rolling basis. EDA investment priorities include workforce development; economic development projects that support the competitiveness and domestic production of innovative, high-value products and production technologies; technology-based economic development including projects that foster regional knowledge ecosystems that support entrepreneurs and startups, including the commercialization of new technologies; and a range of green projects for sustainable development. Grants can be as high as \$5 million.



Looking Ahead

Notices of Intent. The Department of Energy has issued several notices of intent to release funding opportunities that may be of interest:

- Waterpower Innovation Network (DE-FOA-0003323). This FOA will provide funding to programs that accelerate the commercialization and adoption of water power systems and solutions through incubation and acceleration programming and services that support entrepreneurs and small businesses in marine energy and/or hydropower.
- Solar Energy Technology Office Funding Opportunity (DE-FOA-0003331) (STRIVES). Funding will support development and demonstration of technology and market tools for better integration of distributed energy resources including solar, wind, and energy storage.
- Building Technologies Office Funding Opportunity (DE-FOA-0003136) (Connected Communities). Funding will support projects to equitably advance grid-edge solutions for resilient, decarbonized communities including an emphasis on affordable housing communities.
- Vehicle Technologies Office Funding Opportunity (DE-FOA-0003344) (Super Truck Charge). Funding will support projects that demonstrate concepts for managed charging at truck depots/hubs and truck stops that alleviate grid capacity challenges.
- Smart Manufacturing Technologies for Material and Process Innovation (DE-FOA-0003329). Funding will support research, development, and demonstration in four areas of interest: smart manufacturing for a circular economy, smart manufacturing for tooling and equipment, smart manufacturing for high performance materials, and smart technologies for sustainable and competitive U.S. mining.
- Offshore Wind National and Regional Research and Development (DE-FOA-0003334). \$48 million in funding will support R&D on floating offshore wind systems and fixed-bottom offshore wind foundations, technologies to monitor birds and bats offshore, a consortium to connect domestic manufacturing and supply chain assets to the U.S. and global offshore wind development pipeline, creating a university-led center of excellence for floating offshore wind, and advancing offshore wind turbine lighting protection. Individual grants are expected to range from \$400K-\$5 million.



ARPA-E Open. 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. For FY 2025, the first release of topics for Phase 1 proposals will be July 8, 2024, the funding opportunity announcement will be issued August 5, and full applications will be due October 8, 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 \$1.1 million or \$1.6 million in a Phase II competition. In a few cases, projects could receive an additional \$1.1 million.



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GET CRITICAL INSIGHTS

TechVision21 President and CEO's book—Next Generation Innovation: Supercharge Your Business Through Strategic Government Partnerships offers rich insights drawn from Kelly Carnes' real-world experience as an attorney for technology companies, Senior Advisor to the Secretary of Commerce and Senate-confirmed Assistant Secretary of Commerce for Technology Policy, and her current entrepreneurial effort.



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 <u>Amazon</u> today.



Kelly Carnes President & CEO TechVision21

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