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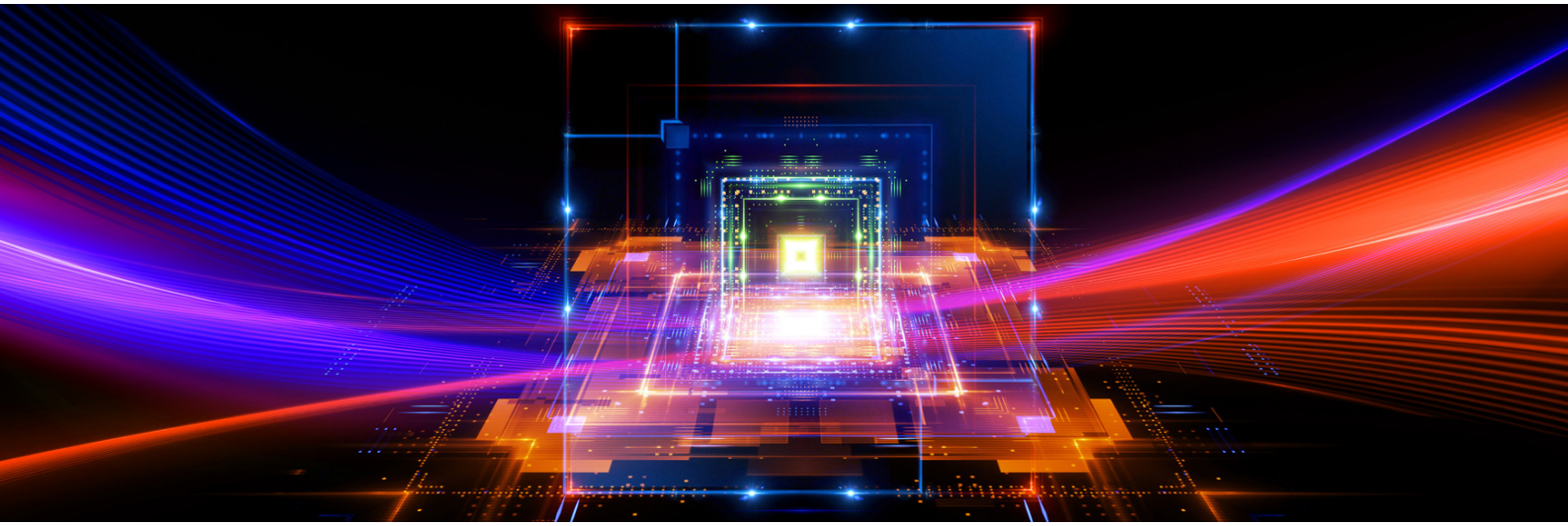
TECHVISION21
INSIDE VIEW



Spotlight on FY 2023 Omnibus Appropriations Technology, Research and Development

On December 29, 2022, President Biden signed the Consolidated Appropriations Act of 2023, which includes funding for Federal research, technology development and innovation programs. The Omnibus budget agreement appropriates an estimated $195 billion for Federal R&D, more than 10 percent over FY 2022. Most Federal agencies received an increase, and programs characterized as development saw more than an 18 percent increase. However, appropriations for most Federal agencies were below the President's request.

IN THIS ISSUE

Highlights…

USDA:

- **NIFA**. $1 billion for the National Institute of Food and Agriculture's research and education activities, an increase of nearly $48 million over FY 2022, including $450 million for the Agriculture and Food Research Initiative. Congress encourages NIFA to prioritize sustainable agricultural systems, particularly proposals on digital agriculture and the digitally augmented food supply chain.

- **Broadband**. $466 million for the Distance Learning, Telemedicine, and Broadband Program, and $348 million for the Re-Connect pilot to connect unserved and underserved rural communities with broadband.

- **Rural Development**. $13 million for the Value-Added Producer Grant Program, $3.5 million for the Appropriate Technology Transfer for Rural Areas Program, $3 million for Agriculture Innovation Center funding for grants to States for hosting a USDA Agriculture Innovation Center, where States provide non-Federal grant funding to producers developing, producing, and marketing value-added agricultural and food products.

Department of Commerce:

- **EDA.** $430 million for the Economic Development Administration, including $50 million for Regional Innovation Program (RIP) grants (also referred to as Build-to-Scale (B2S), $41 million for the Recompete Pilot Program, and $41 million for Regional Technology Innovation Hubs. In the Regional Innovation Program, $40 million is to go to the i6 Challenge (which funds proof of concept centers and commercialization-related efforts), and at least 40 percent of RIP grants are to go to rural communities.

- **NTIA.** The National Telecommunications and Information Administration will distribute $42 billion to build broadband infrastructure in unserved and underserved areas under the Infrastructure and Investments and Jobs Act.

- **NIST.** The National Institute of Standards and Technology received $1.6. billion, a 32 percent increase over FY 2022. This includes $2 million to support the American bioeconomy, $8 million for critical and emerging technologies standards, and $54 million for quantum information science activities. The Hollings Manufacturing Extension Partnership received $175 million, an increase of $17 million over FY 2022. Manufacturing USA received $37 million, an increase of $20.5 million over FY 2022. **Manufacturing USA will fund a new Institute, broadly competed across critical defense technologies. NIST also intends to establish three Manufacturing USA institutes focused on semiconductor manufacturing.**

  NIST is directed to submit a report to Congress on current biomanufacturing capacity in the United States; gaps in the biomanufacturing infrastructure; an assessment of sites for future domestic biomanufacturing facilities; and related assets and opportunities such as intellectual property, talent, and technology maturation lost to other countries over the last 5 years. **This could signal future Federal funding opportunities, for example, funding for R&D, a manufacturing institute, training, or biomanufacturing innovation ecosystems or hubs.**

Department of Energy:

- The Department of Energy (DOE) received $46 billion, of which $3.5 billion goes to the Office of Energy Efficiency and Renewable Energy, $260 million above FY 2022. However, EERE appropriations for sustainable transportation, renewable energy, advanced manufacturing, and building technologies fell well below the President's request—by more than $950 million. The Office of Science received $8.1 billion, $625 million over FY 2022 and $300 million over the President's request. ARPA-E received $470 million, $20 million over FY 2022, but $230 million below the President's request.

- **Cross-Cutting Initiatives.** DOE received $140 million for R&D and demonstration of carbon dioxide removal technologies; $248 million for R&D, demonstration, and commercialization to develop alternatives to, recycling of, and efficient production and use of critical minerals and materials; $540 million to advance energy storage, including the Energy Storage Grand Challenge; $389 million for development and demonstration of technologies for low-or no-emission alternative fuels for shipping, aviation, agriculture, and long-distance transportation; $316 million for the hydrogen crosscut; and $40 million for aquatic decarbonization.

- **Industrial Decarbonization.** DOE received $685 million for industrial decarbonization, and is directed to establish an Industrial Emissions Reduction Technology Development Program for clean industrial R&D and demonstrations. The funds provided are to develop technologies to strengthen the competitiveness of the U.S. industrial sector, with an emphasis on heavy industry.

Other Notable Highlights in the DOE Appropriations:

- **Vehicle Technologies.** Congress noted several of its vehicle-related priorities including R&D and/or demonstration of advanced wireless vehicle charging technologies, battery recycling, engine architectures for low-carbon fuels, and energy efficiency and low-emission technologies for off-road vehicles. DOE is directed to continue to support the Clean Cities alternative fuels deployment program, providing $65 million for that purpose, including $40 million for competitive grants to support alternative fuel, infrastructure, new mobility, and vehicle deployment activities. $54 million is provided for energy efficient mobility systems, including $34 million for early-stage R&D at the vehicle, traveler, and system levels, and $20 million for pilot and demonstration projects pairing self-driving technology with zero-emission vehicles.

Office of Energy Efficiency and Renewable Energy
FY 2023 Appropriations Highlights
(millions)

	FY 2023 Appropriations	Increase Over FY 2022
Vehicle Technologies	$455	+$35
Bioenergy Technologies	$280	+$18
Hydrogen/Fuel Cell Technologies	$170	+$12.5
Solar Energy	$318	+$28
Wind Energy	$132	+$18
Water Power	$179	+$17
Geothermal	$118	+$8.5
Renewable Energy Grid Integration	$45	+$5
Advanced Manufacturing	$450	+$34
Building Technologies	$332	+$24.5

- **Hydrogen.** Within the funds for hydrogen, $100 million is for H2@Scale, and $60 million for technologies to advance hydrogen use for hard-to-electrify transportation applications, including trains, maritime shipping, and aviation.

- **Solar Energy.** Within funds for solar energy, $60 million is for concentrating solar power and $77 million for PV. $45 million goes to reducing balance of system soft costs, and $40 million for work to lower barriers to solar adoption for low-income households, renters, multifamily homes, and minority communities. $55 million is for systems integration, and $70 million for solar manufacturing (some of which is likely to be awarded through Solar Manufacturing Incubator grants).

- **Wind Energy.** Within the funding, $30 million is for establishing a university-based development and testing facility to support industrial prototyping and manufacturing of large turbine systems.

- **Water Power**. Within the funding, $120 million is for marine energy, including $50 million for industry-led competitive solicitations to increase energy capture, improve reliability, and to assess and monitor environmental effects of marine energy systems and components at a variety of scales.$15 million is to go to small hydropower innovation, testing, and initiatives, including industry-led competitive solicitations for advanced turbine demonstrations, improved environmental performance, standardized or modular project deployment, and advanced manufacturing and supply chain innovations. $24 million will go to the Powering the Blue Economy initiative.

- **Geothermal.** $100 million for enhanced geothermal systems demonstrations and next generation geothermal demonstration projects.

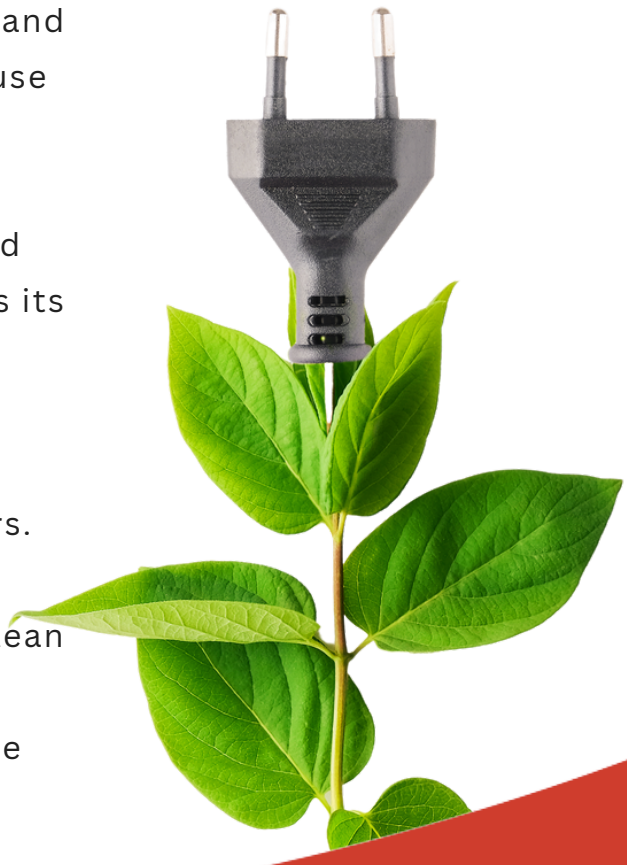
- **Manufacturing.** Funds are to go to a range of R&D related to industrial energy efficiency and decarbonization, including chemical and plastics manufacturing, additive manufacturing, power electronics, and advanced batteries. $15 million is to go for a competitive grant program to improve the sustainability of U.S. mining operations. $20 million is for R&D on technologies to achieve energy efficiency of water and wastewater treatment plants.

- **Cybersecurity.** $200 million is provided for cybersecurity, energy security, and emergency response.

- **Electricity.** $350 million goes to the Office of Electricity, including $20 million for a competitive pilot demonstration grant program on energy storage, and $121 million for R&D and demonstration of solid oxide fuel cell systems and hydrogen production, transport, storage, and use systems.

- **AI and Quantum.** The Office of Science received $135 million for AI and machine learning across its programs, and $245 million for quantum information science, including $120 million for research and $125 million for the five National Quantum Information Science Research Centers.

- **Clean Energy Demonstrations.** The Office of Clean Energy Demonstrations got $64 million, $52 million over FY 2022, but $125 million below the President's request.



NASA

- **Aeronautics.** NASA received $935 million for its aeronautics initiatives, and is encouraged to accelerate R&D for next generation commercial engine technologies for electrified aircraft propulsion, and to support research into additive manufacturing. It received $50 million for hypersonics, of which $15 million is for public-private partnerships in carbon/carbon material testing and automation of high-temperature ceramic matrix composites for material characterization.

- **Commercial Space.** NASA received $85 million for its Space Technology Tipping Point and Announcement of Collaborative Opportunities (ACO) program. These programs aim to reduce the development cost of space technologies and accelerate the infusion of emerging commercial capabilities into future missions.

National Science Foundation

- NSF received $9.5 billion with more than $7 billion going for research and related activities.

- **Technology and Innovation Partnerships (TIP).** TIP received $680 million, and another $210 million in supplemental funding. Congress expressed its support for TIP, and its Regional Innovation Engines program to create regional-scale innovation ecosystems throughout the United States. NSF expects to award approximately $850 million in the first round of Regional Innovation Engine grants.

- **Artificial Intelligence.** NSF received $686 million is support AI-related grants and interdisciplinary research initiatives. The agreement emphasized the ethical and safe development of AI, continued expansion of the National AI Research Institutes, finding high-end computing time for AI researchers, and AI workforce development and education programs for non-computer science students.

- **Quantum.** NSF received $235 million for quantum information science research, including $50 million for National Quantum Information Science Research Centers.

- **EPSCoR.** NSF received $245 million for the EPSCoR program, and is encouraged to meet the legislative requirement that 15.5 percent of NSF research funding goes to EPSCoR States in FY 2023.

- **STEM Education**. NSF received $1.2 billion for STEM education, and has renamed the Directorate for Education and Human Resources to the Directorate for STEM Education.

Department of Defense

- **RDT&E.** The Department of Defense received $140 billion for research, development, test, and evaluation, $10 billion above the President's request and $20 billion over FY 2022. Advanced Technology Development—6.3—received a nearly 27 percent increase.

- **Microelectronics.** Trusted and Assured Microelectronics received nearly $900 million, and an additional $207 million was appropriated for Microelectronics Technology Development and Support.

- **Biomanufacturing.** The Department received a $300 million increase for Biotechnology Manufacturing Institutes.

New and Future Funding Opportunities

Open Funding Opportunities:

- **Microelectronics Commons Hubs.** The Department of Defense is soliciting proposals to establish Regional Hubs and Cores for the Defense Microelectronics Commons (called for in the CHIPS Act). A Hub is a network of regional entities with lab prototyping capabilities and sources of microelectronics talent for onshore, lab-to-fab transition of semiconductor technologies. Cores are existing or new fabs/foundries. In FY 2023, up to nine hubs will be selected for funding in six technology areas: secure edge/IoT computing, 5G/6G technology, AI hardware, quantum technology, electronic warfare, and commercial leap ahead technologies. A total of $1.63 billion will be awarded over five years, including $350 million in FY 2023. Proposals are due February 28, 2023.

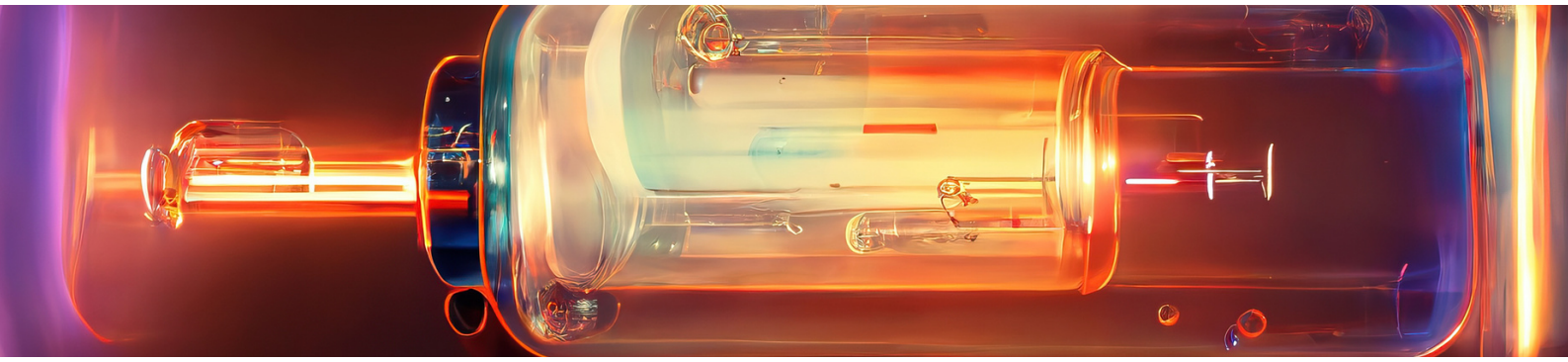
- **Materials and Manufacturing.** DOE's Advanced Materials and Manufacturing Office, Building Technologies Office, and Office of Electricity issued a multi-topic funding opportunity (DE-FOA-0002864) seeking concepts on a wide range of materials and manufacturing topics. DOE intends to award $51 million in 18-36 new grants, with individual awards ranging from $200,000-$10 million, depending on topic. A minimum 20 percent cost share is required. Concept papers due February 3, 2023.

- **Building Technologies.** DOE's Building Technologies Office issued a funding opportunity on Buildings Energy Efficiency Frontiers and Innovation Technologies–2022/2023 (DE-FOA-0002788) seeking concepts across five topic areas: heating, ventilation, air conditioning, and water heating technologies; thermal energy storage; battery energy storage systems; plug loads/lighting; and opaque building envelope. DOE intends to invest $15 million-$45 million. Concept papers due February 7, 2023.

- **Technology, Innovation, Partnerships.** The National Science Foundation's new Directorate for Technology, Innovation, and Partnerships has begun releasing funding opportunities. Current open topics include: innovative learning technologies for K-12 students; design of intelligent technologies and work organization; human behavior and infrastructure; partnerships to increase innovation capacity at universities with limited research capacity; experiential learning for emerging and novel technologies; broadening participation in AI research, education, and workforce development; quantum sensing; semiconductor manufacturing technician education; sustainable chemistry; regional innovation engines; teaming for semiconductor co-design research capacity; convergence accelerator; and I-Corps Hubs.

Future Funding Opportunities:

- **Hydrogen and Fuel Cells.** DOE issued a Notice of Intent to release a Hydrogen and Fuel Cell Technologies Office Funding Opportunity Announcement in Support of the Hydrogen Shot (DE-FOA-0002919). This FOA will support research, development, and demonstration of affordable hydrogen and fuel cell technologies to address the need for cost reductions and performance improvements for both fuel cell and hydrogen infrastructure technologies. The FOA is expected in January 2023.



- **Industrial Decarbonization.** DOE issued a Notice of Intent to release a Funding Opportunity Announcement on Industrial Decarbonization and Emissions Reduction Demonstration-to-Deployment (DE-FOA-0002936). DOE intends to fund high-impact, large-scale, transformational projects to significantly reduce greenhouse gas emissions from high-emitting industrial subsectors, through approaches such as energy efficiency; industrial electrification; low-carbon fuels, feedstocks, and energy sources; and carbon capture and utilization. Estimated total program funding is $6.3 billion, with an individual award ceiling of $500 million and award floor of $10 million.

- **Clean Energy Manufacturing and Recycling**. DOE issued a Notice of Intent to release a Funding Opportunity Announcement on Advanced Energy Manufacturing and Recycling Grant Program (DE-FOA-0002907). The FOA will award financial assistance in the form of cooperative agreements or grants to small- and medium-sized manufacturers to support projects to build new, re-equip, or expand existing clean energy manufacturing or recycling facilities in coal transition communities. There will be two topic areas: constructing new advanced energy manufacturing or recycling facilities, and re-equipping or expanding existing facilities to manufacture or recycle advanced energy property. An estimated $350 million will be awarded, with individual awards ranging from $10 million to $100 million.

- **Vehicle Technologies.** DOE issued a Notice of Intent to release the FY 2023 Vehicle Technologies Office Program Wide Funding Opportunity Announcement (DE-FOA-0002892). Areas of interest expected include: high-capacity, long cycle life lithium-sulfur batteries; advanced integrated charging system; charging concepts for off-road; circularity and sustainability of polymer composites for vehicle light weighting and decarbonization; low cost, low carbon magnesium production; novel lightweight materials;mobility system approaches supporting public transportation; reducing soft costs of electric vehicle infrastructure; addressing workforce training needs for transportation electrification; consumer education for electric vehicle charging; demonstration and deployment open topic; and modeling, analyzing, and addressing knowledge gaps in the workforce supporting electric vehicles and the related supply chain. The FOA is expected to be released in February 2023.

BOTTOM LINE

Washington is issuing competitions for 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

In the next Inside Review...**The new Science Act authorizes billions in new investments in R&D, technology, and workforce development. While it will be up to Congress to provide the funding, these new authorization represent a significant expansion of the Federal role in advancing U.S. technology and innovation. *Stay tuned...***

Kelly Carnes

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