

# TECHVISION21

## INSIDE VIEW



## Spotlight on CHIPS and Clean Energy

It's hard to keep track of the billions of dollars gushing out of Washington to support efforts across the country in R&D, high-tech manufacturing, clean energy, regional innovation hubs, and broadband. Every week, there are new requests for proposals for grant funding, and companies, universities, non-profits, state and local governments, and regional coalitions are scrambling to get a share.

There is no end to the funding stream in sight. In this issue of Inside View, we highlight some of the new funding and programming in semiconductor technology and clean energy.

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# CHIPS Act Implementation on Fast Track

After more than 18 months since the CHIPS Act was authorized in the 2021 National Defense Authorization Act, Congress pushed its appropriations over the finish line in the CHIPS and Science Act (P.L. 117-167) (“CHIPS”) signed by President Biden in August. The CHIPS Act appropriates more than \$50 billion to support investments in U.S. domestic semiconductor fabrication, assembly, testing, and R&D facilities; new semiconductor research and manufacturing centers; and workforce development (*See detail, Figure 1*). CHIPS already is having an impact. It is exciting to see that companies are announcing new investments in semiconductor-related facilities across the United States including in Ohio, New York, Idaho, Arizona, North Carolina, and Texas.



## Industrial Advisory Committee (IAC)

Many of the responsibilities for implementing this critical effort are assigned to the U.S. Department of Commerce, which announced on September 29 the appointment of a 24 member, mandated Industrial Advisory Committee to provide guidance to the Secretary of Commerce in implementing CHIPS Act provisions.

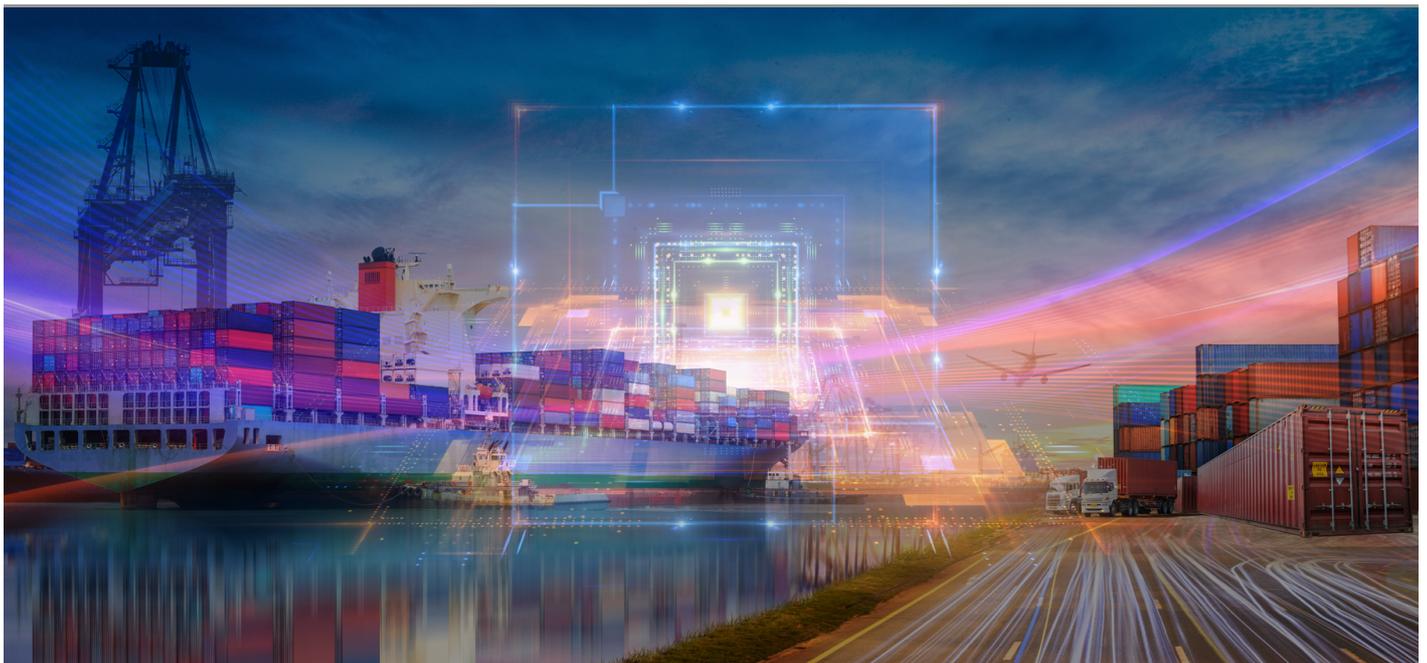
The IAC membership is a mix of representatives from semiconductor, semiconductor manufacturing equipment, and microelectronics device manufacturers; users; national laboratories; non-profit organizations and universities.

## Requests for Information

To gather public comments on two of the biggest provisions of the CHIPS Act for which the Commerce Department is responsible for implementing, the National Institute of Standards and Technology (NIST) recently issued two formal Requests for Information published in the Federal Register:

Figure 1. CHIPS ACT HIGHLIGHTS	
FUNDING FY 2022-2027	DESCRIPTION
<b>DEPARTMENT OF COMMERCE (INCLUDING NIST)</b>	
\$39.0B	<b>Semiconductor Incentives.</b> Commerce Department to provide Federal financial assistance to incentivize investment in facilities and equipment in the United States for semiconductor fabrication, assembly, testing, advanced packaging, or R&D. Funding to include grants, and up to \$6 billion in loans and loan guarantees.
\$2.0B	<b>National Semiconductor Technology Center (NSTC).</b> The Secretary of Commerce to establish the NSTC—a public-private sector consortium—to conduct research and prototyping of advanced semiconductor technology. Includes investment fund with the private sector to support start-ups, and directs DOC to work with other Federal agencies, the private sector, higher education institutions, and workforce training programs to expand participation in microelectronics-related education and training.
\$2.5B	<b>National Advanced Packaging Program.</b> Program led by NIST in collaboration with the NSTC to strengthen advanced test, assembly, and packaging capabilities in the United States.
\$500M	<b>Microelectronics Research at NIST.</b> Research on measurement science, standards, materials characterization, instrumentation, testing, and manufacturing capabilities. <b>Manufacturing USA Institute(s).</b> Up to three institutes focused on semiconductor manufacturing, and financial assistance to any Manufacturing USA Institute for work on semiconductor manufacturing.
\$6.0B	<b>Additional funding for the NSTC, National Advanced Packaging Program, Microelectronics Research at NIST, and Manufacturing USA Institutes.</b>
<b>NATIONAL SCIENCE FOUNDATION</b>	
\$200M	<b>CHIPS for America Workforce and Education Fund.</b> Provides funding to NSF for awards to higher education institutions, non-profits, or consortia for R&D, and related activities to advance innovative approaches to education and workforce development at all levels of education in fields and disciplines related to microelectronics.
<b>DEPARTMENT OF DEFENSE</b>	
\$2.0B	<b>National Network for Microelectronics Research and Development.</b> The Secretary of Defense may establish a U.S. national network for laboratory-to-fabrication transition of microelectronics innovations.
<b>DEPARTMENT OF STATE, ETC</b>	
\$500M	<b>CHIPS for America International Technology Security and Innovation Fund.</b> Treasury fund for Secretary of State, USAID, EXIM Bank, and U.S. International Development Finance Corporation for international information and communications technology security and activities to secure semiconductor supply chains.
<b>DEPARTMENT OF THE TREASURY</b>	
	<b>Advanced Manufacturing Investment Credit.</b> Advanced manufacturing investment tax credit equal to 25 percent of the qualified investment in a facility for manufacturing semiconductors or semiconductor manufacturing equipment.

- **Design and Implementation of the CHIPS Incentive Program.** In addition to grants to support U.S. domestic semiconductor facilities, the CHIPS and Science Act directs \$6 billion in incentives in the form of loans and loan guarantees, and expands the types of facilities eligible for the incentives. The Act adds requirements for applicants to provide plans to mitigate supply chain risks, protection against incentive recipients from investing in projects in countries of concern, and prevents them from using CHIPS funds for stock buybacks or dividends. The RFI poses a series of questions on the design of the loans and loan guarantees, role of suppliers and materials upstream in the semiconductor supply chain, intellectual property protections, claw backs to limit manufacturing in foreign countries of concern, the stock buyback ban, and barriers to workforce diversity, equity, and inclusion. **Responses to the RFI are due November 14, 2022.** The RFI and instructions for submitting comments can be accessed at: <https://www.federalregister.gov/documents/2022/10/12/2022-22158/implementation-of-the-chips-incentives-program>
- **Design of Semiconductor-related Manufacturing USA Institutes.** NIST is authorized and funded to establish up to three semiconductor-focused Manufacturing USA institutes and to award financial assistance to any Manufacturing USA institute for work related to semiconductor manufacturing. NIST is seeking public input to inform the design of, and requirements for, these institutes. The RFI poses questions on the potential scope and technological breadth of these institutes, their structure and governance, how to drive co-investment and build their financial sustainability, and their role in education and workforce development. **Responses to the RFI are due November 28, 2022.** The RFI and instructions for submitting comments can be accessed at: <https://www.federalregister.gov/documents/2022/10/13/2022-22221/manufacturing-usa-semiconductor-institutes>.



# Update on the Bipartisan Infrastructure Law —Funding Rolling Out

Funding from the Bipartisan Infrastructure Law (BIL)—including more than a half trillion in new spending over the next few years—is starting to roll out of Washington. This includes \$326 billion for roads and bridges; \$82 billion for public transportation; \$25 billion for airports; \$16 billion for ports and waterways; \$38 billion for transportation safety; \$18 billion for electric vehicles, buses, and ferries; \$64 billion for water projects; \$38 billion for resilience; \$75 billions in clean energy and power; and \$64 billion for broadband.

<b>Bipartisan Infrastructure Law Funding Clean Energy Research, Development, Demonstration, and Hubs</b>	
Regional Clean Hydrogen Hubs	\$8B
Regional Clean Direct Capture Hubs	\$3.5B
Battery Materials Processing/Battery Manufacturing and Recycling	\$6B
Carbon Capture Demonstrations	\$2.5B
Advanced Reactor Demonstrations	\$2.5B
Carbon Capture Large Scale Pilots	\$937M
Advanced Energy Manufacturing and Recycling	\$750M
Critical Materials Innovation	\$600M
Clean Hydrogen Manufacturing	\$500M
Energy Storage Demonstrations	\$355M
Energy and Minerals Research Facility	\$167M
Long Duration Energy Storage	\$150M
Commercial Direct Air Capture Technology Prize Competitions	\$115M
Enhanced Geothermal Systems and Pilot Demonstrations	\$84M
Critical Material Supply Chain Research Facility	\$75M
Marine Energy R&D	\$70M
Wind Energy Technology and Recycling	\$100M
Solar Energy-related R&D	\$80M
National Marine Energy Centers	\$40M

## R&D in BIL

Some of these funds go for R&D with a range of entities eligible including: \$500 million for transportation-related R&D, \$132 million for public transportation service R&D, \$970 million for highway safety R&D, \$548 million for vehicle safety and behavioral research, \$250M for R&D on cyber security for the energy sector, \$80 million for environmental and earth modeling supercomputing research, \$70 million for infrastructure security and resilience research, and a range of clean energy R&D and demonstration (Figure 2). Also included is \$50 million for states to provide assistance to small and medium manufacturers to invest in smart manufacturing technologies or to access high performance computing resources, and \$90 million for advancing the commercialization of emerging transportation technologies.

## Current and near-term funding opportunities

Currently, several Department of Energy (DOE) funding opportunities (FOA) are open, and new ones are on the horizon based on Notices of Intent and a Request for Information:

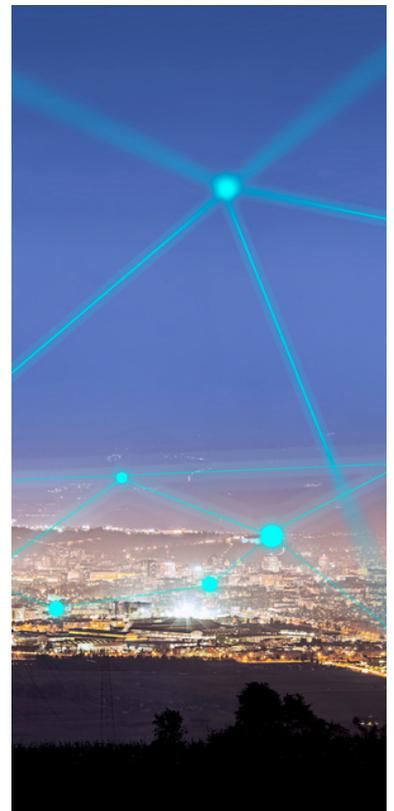
- FOA to fund 6-10 **Regional Clean Hydrogen Hubs**. This \$8 billion program will support the development of H2Hubs that demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen. The H2Hubs will also include substantial engagement of Tribes as well as local and regional stakeholders to ensure that they generate local, regional, and national benefits. The individual award ceiling is \$1.25B, and the award floor is \$400 million. **20-page concept papers due November 4, 2023. Proposals are due April 7, 2023. The department may solicit additional hydrogen hub proposals in the future.**
- FOA for establishing a **Rare Earth Element (REE) Demonstration Facility** that demonstrates the extraction, separation and refining from unconventional feedstock materials to high purity individual or binary rare earth metals (REM) and/or critical minerals and materials (CMM). DOE seeks applications from academic institutions acting as the Prime Applicant for a Phase I Front-End Engineering Design (FEED) study and Phase II design, construction, and operation of a first-of-a-kind, domestic, demonstration facility that produces REEs and CMM from domestic resources. There are two phases to the competition—a study phase, and a construction phase, with a down-select after Phase 1. Individual awards in Phase 1 are expected to range from \$800K to \$8 million, and the final award for the facility is \$124 million. Cost sharing of 20 percent required in Phase 1, and 50 percent in Phase 2. **Full applications due November 21, 2022.**

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- Notice of Intent to issue an FY22 **Advanced Materials and Manufacturing Technologies/Building Technologies** Multi-topic FOA. The funding opportunity is likely to focus on: next generation materials and manufacturing, secure and sustainable materials, and energy technology manufacturing and workforce development. Funding is to support applied R&D and pilot demonstration projects. The FOA is expected to be released mid-November 2022.
- Notice of Intent to issue a FOA on **Lithium Extraction and Conversion from Geothermal Brines**. It is anticipated that the FOA may include the following areas of interest: field validation of lithium hydroxide production from geothermal brines, and applied R&D for direct lithium extraction from geothermal brines.
- Notice of Intent to issue a FOA on **Advancing Fish Passage and Protection Technologies**. Funding will support advancing innovative fish passage and protection technologies for hydropower facilities by supporting manufacturers, equipment vendors, and research organizations in gathering relevant information and data through testing to verify biological effects and performance.
- Notice of Intent to issue three **Water Power** FOAs—Innovative Technologies to Enable Low Impact Hydropower and Pumped Storage Hydropower Growth, Stakeholder Insight into Hydropower R&D Issues, and Pumped Storage Hydropower Wind and Solar Integration and System Reliability Initiative.
- Request for Information to inform implementation of the \$1 billion BIL **Energy Improvements in Rural or Remote Areas Program**. The ERA program will provide federal support to rural or remote communities—potentially in the form of technical assistance, prizes, FOA, or other mechanisms—to improve the cost-effectiveness of energy generation, transmission, or distribution systems; site or upgrade transmission and distribution lines; reduce greenhouse gas emissions from energy generation; provide or modernize electric generation facilities; develop microgrids; and increase energy efficiency. DOE seeks input on program outcomes for residents of rural or remote areas; types of innovative energy projects to achieve those outcomes; considerations that could impact programmatic design or strategy; community benefits, including energy and environmental justice, diversity, equity, inclusion, and accessibility considerations; quality jobs; and ways to share knowledge gained and impacts. **Responses due by November 28, 2022. The RFI can be accessed at <https://oced-exchange.energy.gov/Default.aspx>**

**Based on DOE Requests for Information that closed recently, we expect to see FOA later this year on:**

- **Grid Resilience Grants (\$2.5 billion).** This program will fund transformational transmission and distribution technology solutions to mitigate multiple hazards across a region or within a community, including wildfires, floods, hurricanes, extreme heat, extreme cold, storms, and any other event that can cause a disruption to the power system. This program provides grants to electric grid operators, electricity storage operators, electricity generators, transmission owners or operators, distribution providers, and fuel suppliers.
- **Smart Grid Grants (\$3 billion).** This program will support projects to increase the flexibility, efficiency, and reliability of the electric power system, with particular focus on increasing capacity of the transmission system, preventing faults that may lead to wildfires or other system disturbances, integrating renewable energy at the transmission and distribution levels, and facilitating the integration of more electric vehicles, buildings, and other grid-edge devices. Smart grid technologies funded and deployed at scale under this program will demonstrate a pathway to wider market adoption. This grant program is open to domestic entities including institutions of higher education, for-profit entities, non-profit entities, state and local governmental entities, and tribal nations.
- **Grid Innovation Program (\$5 billion).** This program provides financial assistance to one or multiple states, Tribes, local governments, and public utility commissions to collaborate with electric sector owners and operators to deploy projects that use innovative approaches to transmission, storage, and distribution infrastructure to enhance grid resilience and reliability. Broad project applications are of interest including interregional transmission projects, investments that accelerate interconnection of clean energy generation, utilization of distribution grid assets to provide backup power and reduce transmission requirements, and more.



# Inflation Reduction Act Loaded with Incentives for Clean Energy, A Big Winner for the Wind and Solar Industry, Utilities, and Clean Vehicle Producers

In August, Congress passed, and the President signed the Inflation Reduction Act of 2022. It includes grants and numerous incentives to spur clean energy investment in the United States. This includes roughly \$250 billion in various clean energy-related tax credits:

## Industrial Advisory Committee (IAC)

### Clean Power Production

- Extension of the Renewable Electricity Production Tax Credit
- Extension of Energy Investment Tax Credit
- Nuclear Production Tax Credit
- Energy Investment Tax Credit for Solar and Wind in Low-income communities

### Cleaner Fuels

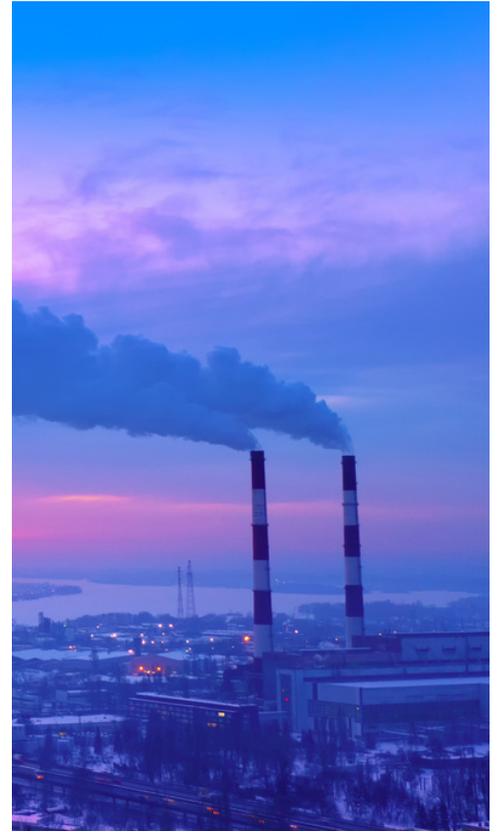
- New Clean Hydrogen Production Tax Credit
- New Clean Fuel Production Credit
- New Sustainable Aviation Fuel Credit
- Extension of Second-Generation Biofuels Incentives
- Extension of Biodiesel and Renewable Diesel Credit
- Extension of Alternative Fuel Refueling Property Credit

### Clean Energy-Related Manufacturing

- New Advanced Manufacturing Production Tax Credit (U.S. production of clean energy technology)
- Advanced Energy Project Credit for Energy Manufacturing (production and recycling of clean energy products, and projects to reduce GHG emissions in manufacturing facilities)

In addition, several clean energy grant programs received a big boost in funding:

- **USDA:** \$9.7 billion for improving the resiliency and purchase of renewable energy systems in rural areas, and \$2 billion for Renewable Energy for America Program (REAP) grants and loan guarantees.
- **Department of Energy:** \$5.8 billion for reducing emissions in energy-intensive industries, \$40 billion for loan and loan guarantees, and \$2 billion for grants for retooling auto manufacturing plants to produce clean vehicles.
- **Environmental Protection Agency:** \$15 billion for grants to support deployment of clean energy technologies in low-income and disadvantaged communities.



## Bottom Line...

Washington is dishing out hundreds of billions of dollars in grants, loans, and tax credits for semiconductor R&D and 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 decades of experience supporting clients in the semiconductor and defense industries, and have worked with clients to secure support for a wide range of clean energy-related projects including PV and concentrating solar, smart grid, ocean energy, geothermal, fuel cells, biofuels, and advanced vehicles. **Don't hesitate to contact TechVision21 at (202) 966-6610 or at [kcarnes@TechVision21.com](mailto:kcarnes@TechVision21.com)**

## In the next Inside Review...

In addition to the massive new investments in semiconductors and clean energy, Congress has appropriated significant new funding for broadband and authorized—in a new Science Act—new research and advanced technology development programs.

This includes a new Directorate for Technology, Innovation, and Partnerships at the National Science Foundation authorized at \$16 billion over five years. In addition, the new Science Act seeks to advance research and innovation in energy sciences, cybersecurity, food-energy-water nexus, sustainable chemistry, clean water, critical minerals, IoT for agriculture, the bioeconomy, drones, and artificial intelligence.

It includes a host of new efforts to educate and train science, engineering, and technical talent, and efforts to build regional innovation ecosystems. **Stay tuned...**



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