AURP WHITEPAPER

The Geography of Technology, Science, and Innovation Under the CHIPS and Science Act

AURP Building Communities of Innovation™

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Introduction

The CHIPS (Creating Helpful Incentives for Producing Semiconductors) and Science Act passed Congress and was signed into law by President Biden on August 9, 2022. The Science portions of the Act would authorize the largest five-year investment in public R&D in the nation's history.

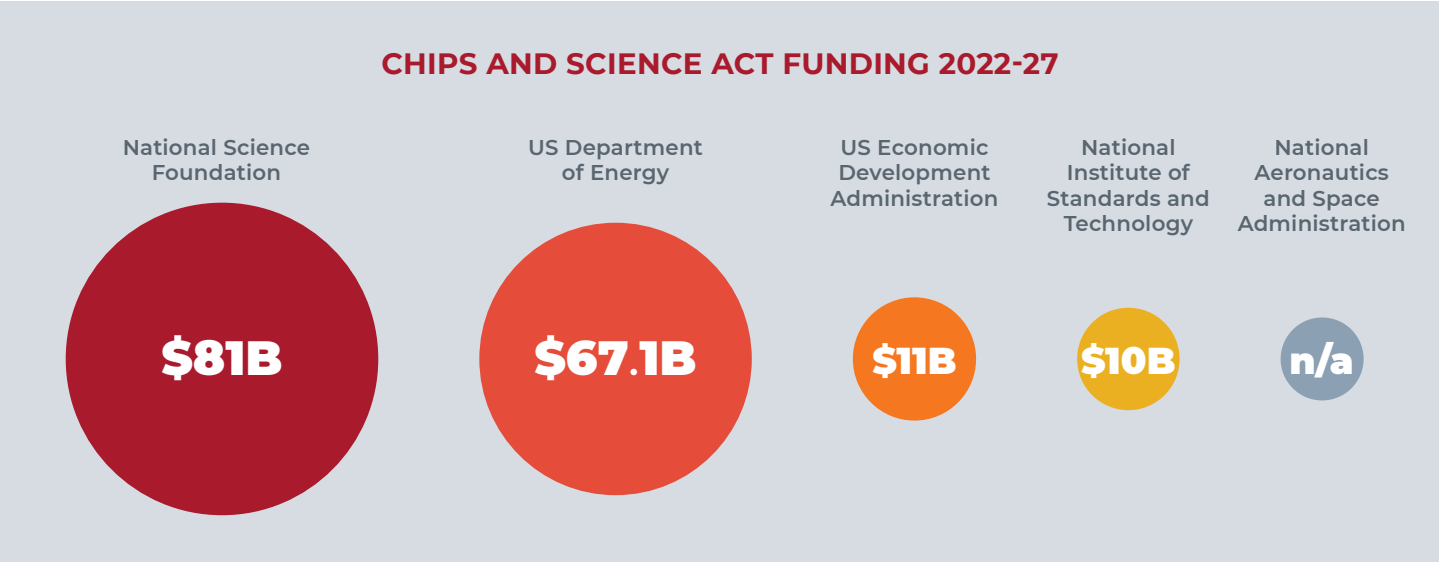
One important motive in passing the bill was to spread research and development funding and its impact to more areas of the United States than has occurred historically.

Overall, the Science portion of the CHIPS and Science Act authorizes $174 billion in spending over the next five years. Most of the authorized funding is for scientific R&D and commercialization.

Notably, the Act calls for an estimated **$77 billion for development of technology hubs** across the U.S., funded by the U.S. Department of Commerce (DOC), National Science Foundation (NSF) and U.S. Department of Energy (DOE), that will be explored in detail below.

But this funding has not yet been appropriated by Congress. Nevertheless, research parks, innovation districts, businesses, universities, federal labs, states, regions, and communities should prepare and strategize on how to compete for this unprecedented level of funding.

The CHIPS and Science Act authorizes $174 billion for investment in science, technology, engineering, and math programs, workforce development, and R&D



From McKinsey & Company CHIPS report, October 2022

In contrast, the CHIPS portion of the Act — approximately $50 billion — has already been funded by Congress. Accordingly, immediate focus has been on how funding for the CHIPS and Science Act will be sought competitively by industry, universities, regions and local communties in 2023, including the selection of a National Semiconductor Technology Center (NSTC), a $11 billion innovation hub that will advance semiconductor technology and seed new industries.

The process of organizing NSTC, including a possible hub and spoke model across the U.S., is already underway by the DOC. Given the emphasis on semiconductor technology within the CHIPS and Science Act, organizations and higher education institutions with existing or potential engineering and workforce opportunities in semiconductor manufacuturing and research will be the most likely applicants for funding from the DOC.

However, the Science portion of the Act gives a much broader range for organizations and institutions ability to compete for new research opportunities, STEM workforce and manufacturing funding (assuming funding is appropriated) including new technology hubs managed by the DOC and NSF. Funding strategies for each set of technology hubs vary slightly given Congressional policy direction, history of the agencies and additional factors to be discussed in this paper.

Department of Commerce (DOC) Technology Hubs

Under the CHIPS and Science Act and as directed by Congress, the DOC is authorized to create a minimum of 20 geographically distributed innovation hubs focused on tech transfer, job creation and expanding U.S. innovation capacity, authorized at $10 billion over five years.

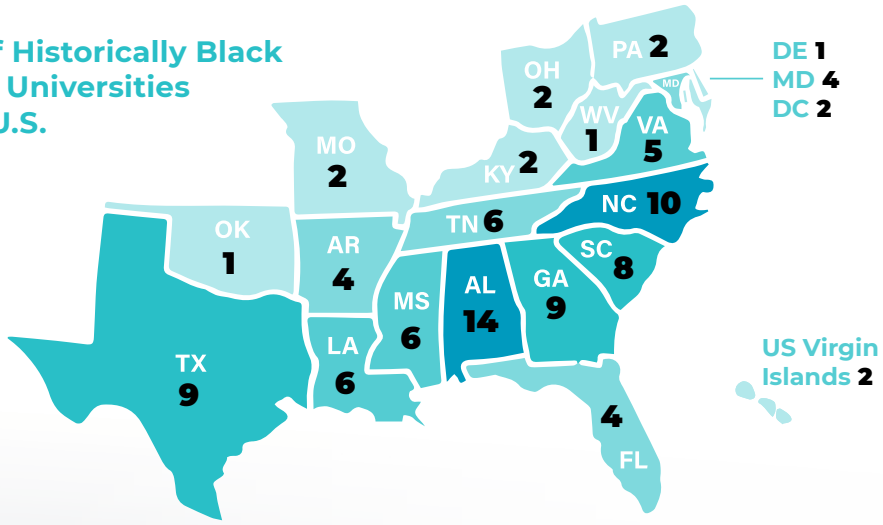
Projects funded through the program should reside in areas that are not already leading technology centers, with at least *three new hubs located "in each U.S. Economic Development Administration (EDA) regional division."* In addition, Congress has directed that at least one-third of eligible consortia "significantly benefit small and rural communities" including EPSCOR (Established Program to Stimulate Competitive Research) states and that one hub should be headquartered in a "low-population EPSCOR state."

A state is eligible to participate in the EPSCOR program if their most recent five-year level of total NSF funding is equal to or less than 0.75% of the total NSF budget. The U.S. National Institutes of Health (NIH) has a similar program for bio research funding targeting states with low NIH funding levels.

Congress is also interested in involving Historically Black Colleges and Universities (HBCUs) and Hispanic Serving Institutions (HSIs) in the development of these technology hubs. Accordingly, communities interested in competing for DOC technology hubs need to analyze which states are in their EDA region, work to connect with EPSCOR states, and involve HBCUs, HSIs and other universities in their region.

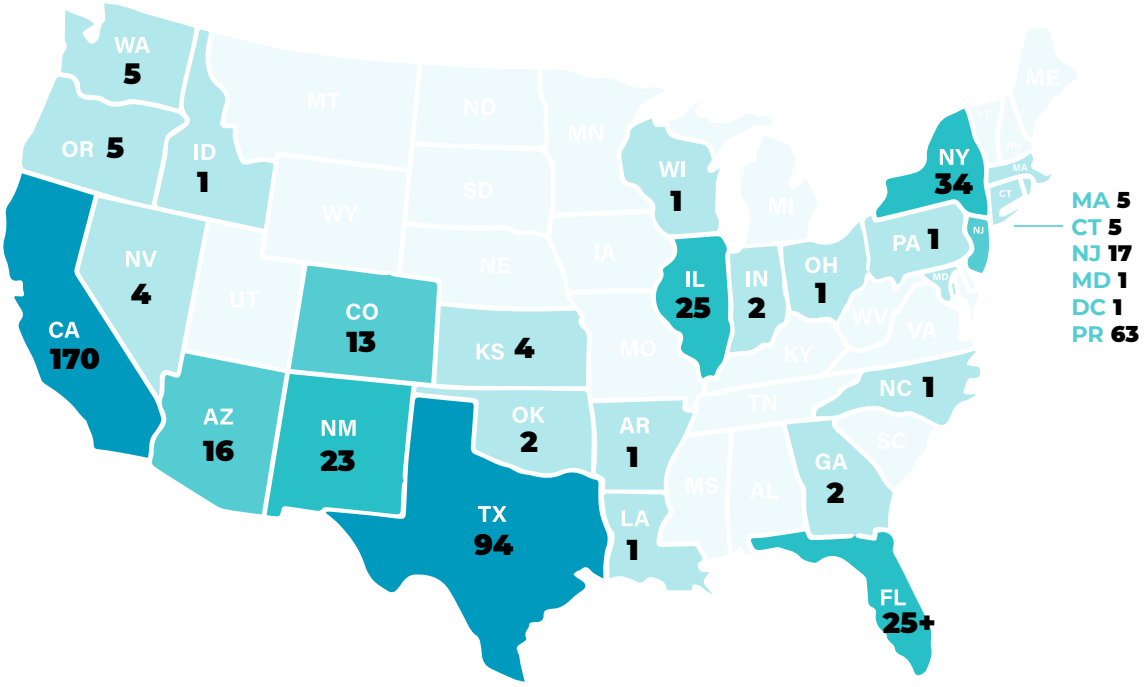
Locations of Historically Black College and Universities (HBCUs) in U.S.

Source: DOE

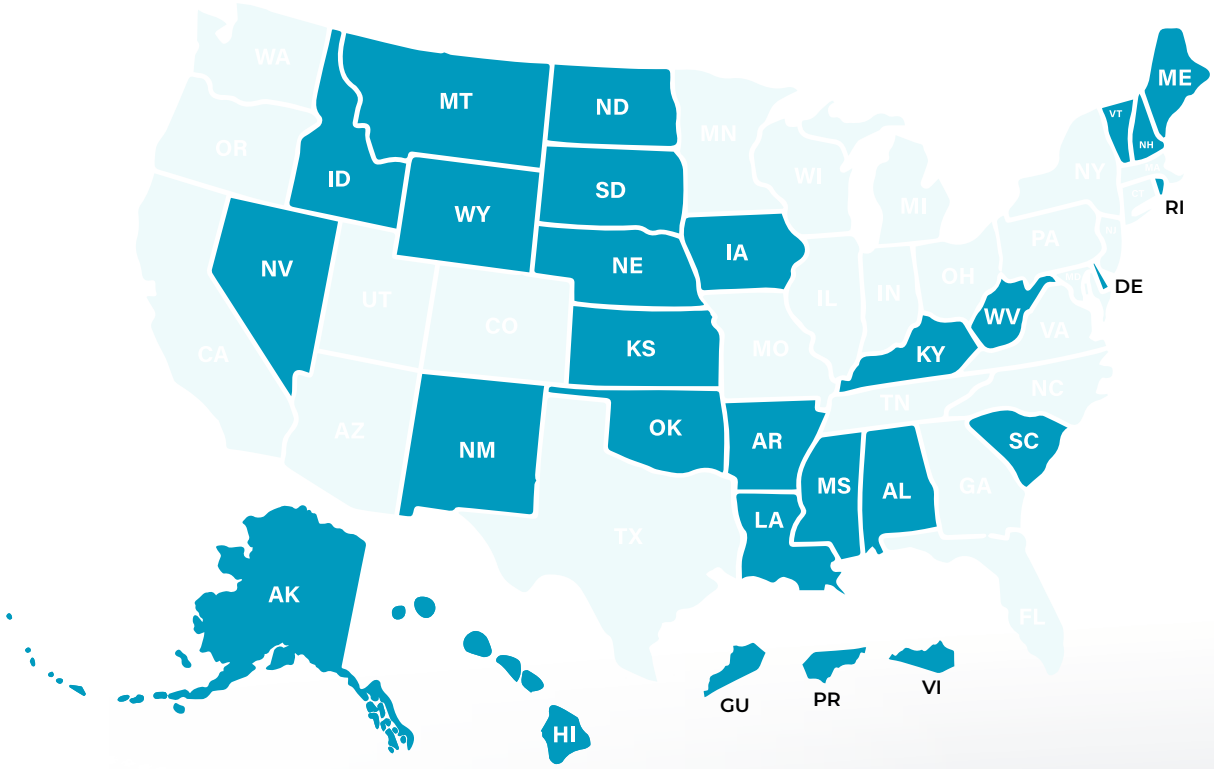


DOC TECHNOLOGY HUBS

Locations of Hispanic-serving Institutions in U.S.



EPSCOR states in blue

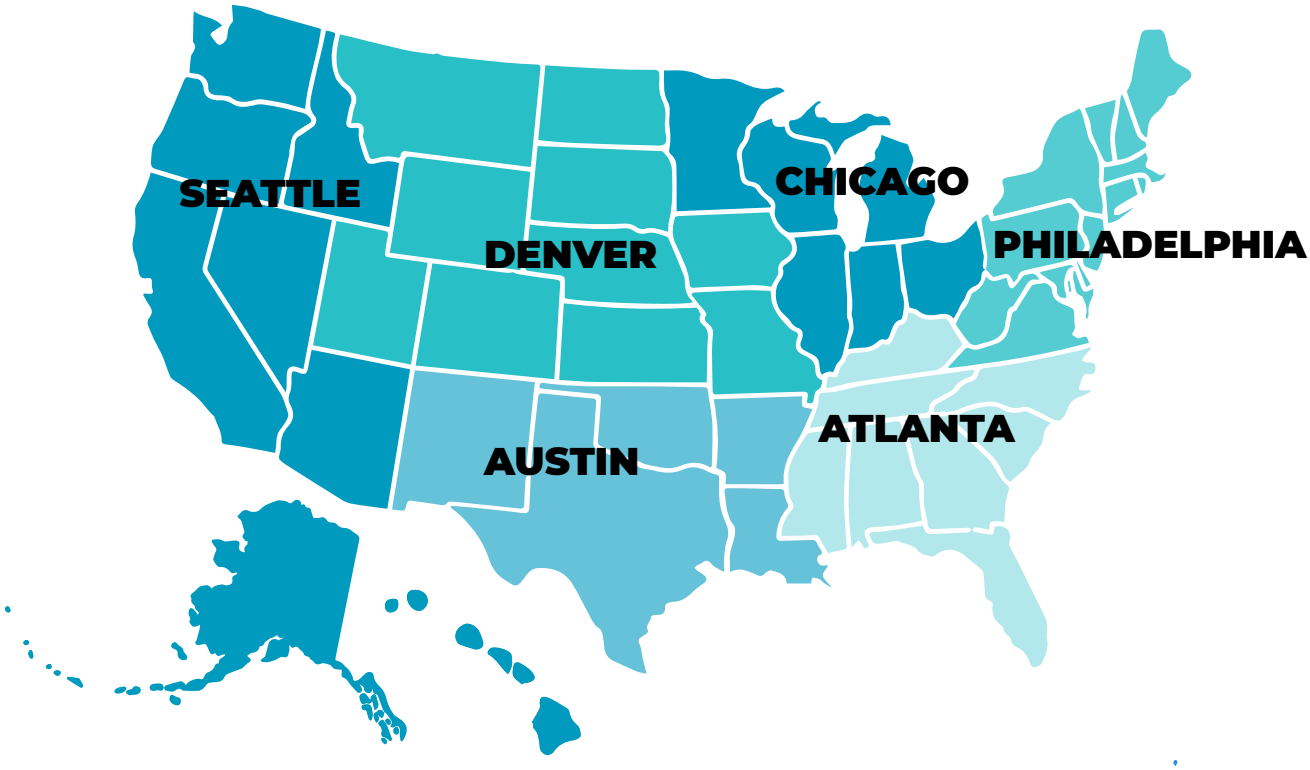


DOC TECHNOLOGY HUBS

EDA regions were organized many years ago to serve geographic administrative convenience when EDA was principally involved in public works programs at state and local levels. As this analysis shows, from an innovation capacity standpoint, there is wide variation among the EDA regions in the number of universities in each region, level of university R&D funding, number of EPSCOR states, and presence of HBCUs and HSIs.

That EDA regions are quite heterogeneous in these R&D factors should not be surprising since they were developed for federal administrative convenience, not based on existing technology clusters. Nevertheless, the EDA regions should give institutions a framework to consider when selecting other states for possible partners. For example, Arizona and New Mexico, which share a common border and have historic regional ties, are in different EDA regions and will be competing for technology hub funding within their individual state clusters.

EDA Administrative Regions



Atlanta Regional Office (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)

Austin Regional Office (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)

Chicago Regional Office (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)

Denver Regional Office (Colorado, Iowa, Kansas, Missouri, Montana, North Dakota, Nebraska, South Dakota, Utah, Wyoming)

Philadelphia Regional Office (Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New Your, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia)

Seattle Regional Office (Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Washington)

Analysis of EDA Administrative Regions:

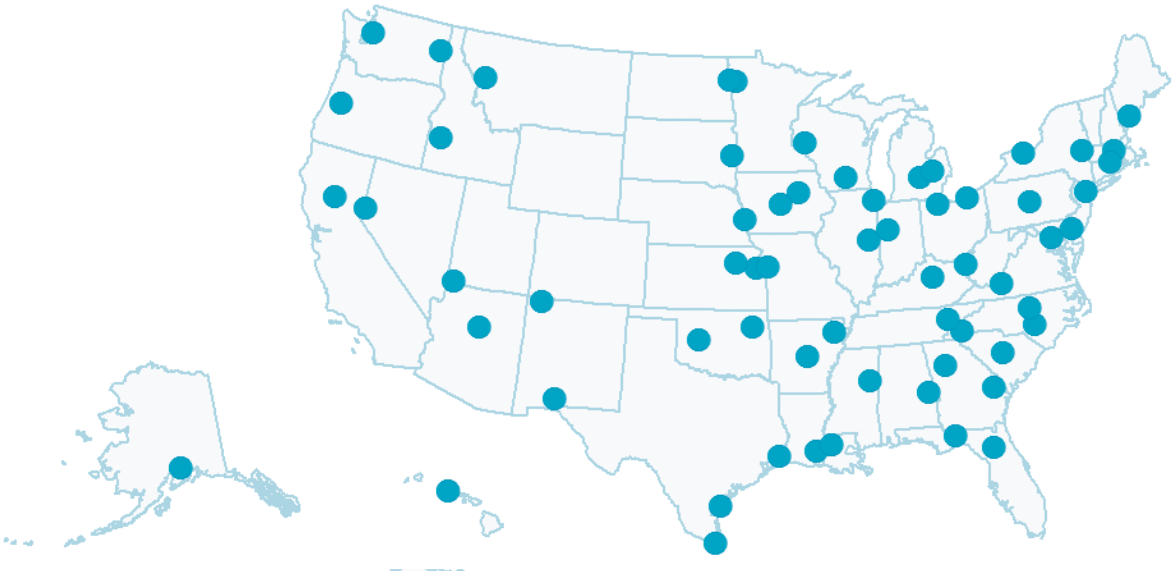
EDA Region	Number of R1 Institutions	Number of R2 Institutions	Number of AAU Institutions	R & D Higher Education Expenditures (millions)*	EPSCOR States	HBCUs	HSIs
Atlanta	27	22	6	$12,379	4	61	28
Austin	18	17	4	$8,174	4	20	121
Chicago	18	22	11	$12,013	None	2	29
Denver	17	13	6	$6,586	6	2	17
Philadelphia	46	32	21	$26,636	6	16	64
Seattle	20	21	13	$15,347	4	None	201

**Research and Development Higher Education Expenditures from NSF Science and Engineering State Profiles, 2020. R1 = Carnegie Classification Universities with Very High Level of R & D Expenditures; R2 are Universities with High Level of R &D Expenditures and AAU is an association of the leading public and private research-intensive universities in North America*

EDA UNIVERSITY CENTERS

The EDA administers a University Center program to enable institutions of higher education and consortia of these institutions to leverage university assets to build regional economic ecosystems. These Centers can be helpful for regions to connect with technology assets in a particular state or region.

Map of University EDA Centers



For list of University EDA centers by state see eda.gov/programs/university-centers/current-list/

MANUFACTURING EXTENSION PARTNERSHIP

A major impetus for the CHIPS and Science Act is to support the growth of manufacturing in the U.S. Each state has at least one Hollings Manufacturing Extension Partnership (MEP) designed to assist small and medium sized manufacturers in upgrading technologies and improving processes. The MEP program is scheduled for a major boost of $1.5 billion under the legislation and regions should be certain to involve their local MEP members in developing a regional strategy for a technology hub.

State List of MEP National Network Members

www.nist.gov/mep/centers/quick-list

SMALL BUSINESS DEVELOPMENT CENTERS (SBDCS)

Support for small businesses is another focus of the CHIPS and Science Act. SBDCs across the U.S., supported by the U.S. Small Business Administration (SBA), deliver professional business advising and technical assistance to existing small businesses and pre-venture entrepreneurs. SBDCs in your region should be part of any consortia being developed.

sba.gov/local-assistance/resource-partners/small-business-development-centers-sbdc#section-header-4

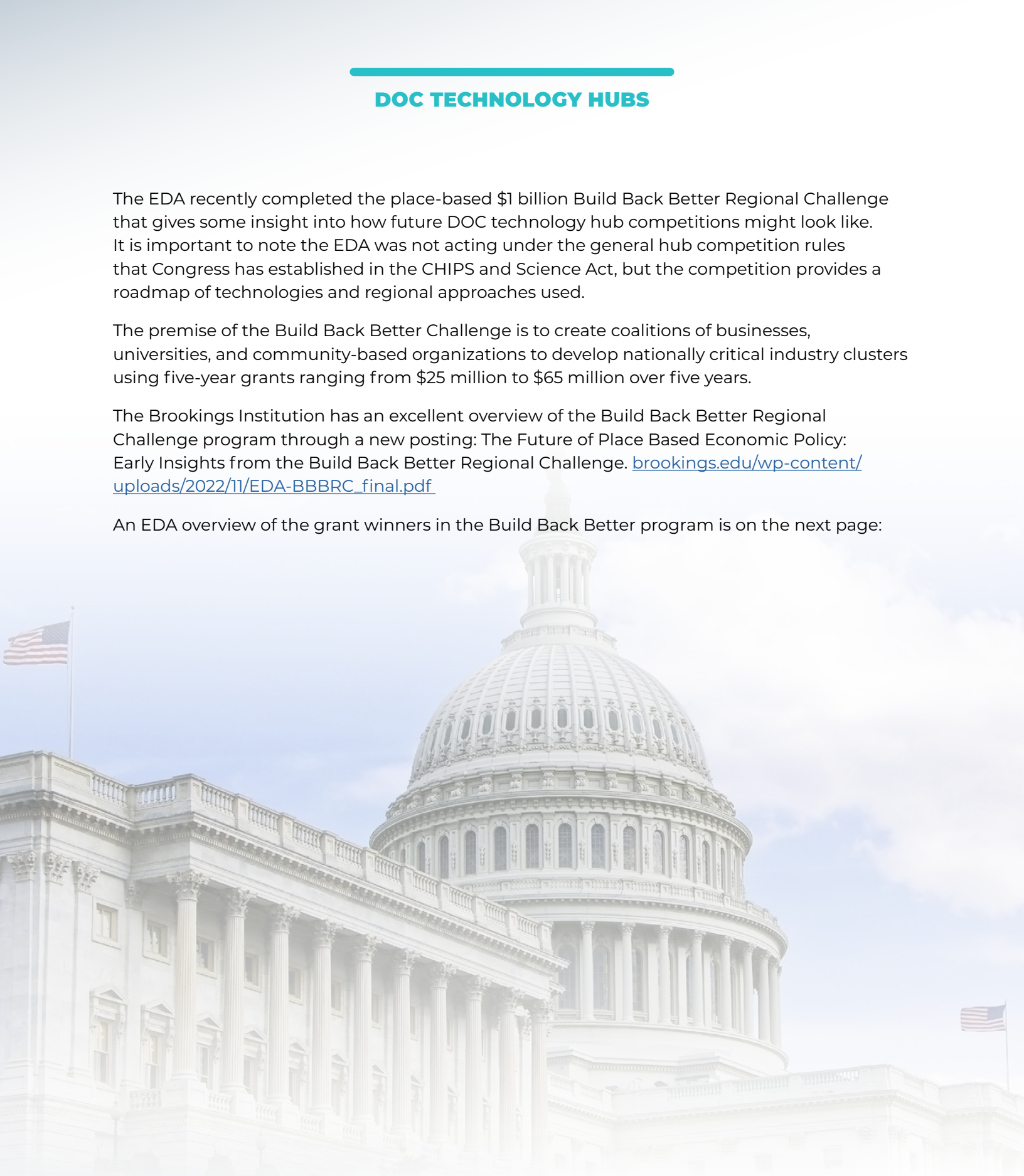
DOC TECHNOLOGY HUBS

The EDA recently completed the place-based $1 billion Build Back Better Regional Challenge that gives some insight into how future DOC technology hub competitions might look like. It is important to note the EDA was not acting under the general hub competition rules that Congress has established in the CHIPS and Science Act, but the competition provides a roadmap of technologies and regional approaches used.

The premise of the Build Back Better Challenge is to create coalitions of businesses, universities, and community-based organizations to develop nationally critical industry clusters using five-year grants ranging from $25 million to $65 million over five years.

The Brookings Institution has an excellent overview of the Build Back Better Regional Challenge program through a new posting: The Future of Place Based Economic Policy: Early Insights from the Build Back Better Regional Challenge. brookings.edu/wp-content/uploads/2022/11/EDA-BBBRC_final.pdf

An EDA overview of the grant winners in the Build Back Better program is on the next page:



U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

AMERICAN RESCUE PLAN

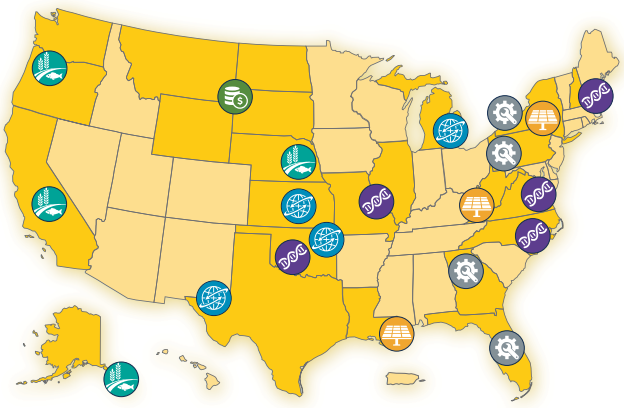
BUILD BACK BETTER REGIONAL CHALLENGE AWARDEES FACT SHEET

EDA's $1 Billion Build Back Better Regional Challenge Selects 21 Coalitions to Implement Strategies for Regional Economic Transformation

On September 2nd, the Biden-Harris Administration announced awards for 21 regional coalitions that were finalists in the Build Back Better Regional Challenge (BBBRC). This $1 billion grant competition, created through the American Rescue Plan Act, challenged communities to identify a set of interconnected investments that, together, could transform their local economy, expand economic opportunity and competitiveness, and create thousands of good jobs.

BBBRC awardees will each receive between $25 million and $65 million to fund 123 individual strategic projects to advance economic strategies benefiting 24 states. This federal funding is matched by more than $300 million of local investment and will leverage support from over 450 private sector and 27 labor unions or workers organizations.

These 21 coalitions were chosen from a highly competitive group of 60 finalists that each received $500,000 seed grants after being selected from 529 applicants. The selected portfolio represents the diversity of our nation and the belief that, with the right resources and opportunities, all communities can compete in the economy of the future.



Key

- ADVANCED MOBILITY and AEROSPACE
- BIOTECHNOLOGY and HEALTH
- CLEAN ENERGY
- INDIGENOUS FINANCE
- NATURAL RESOURCE and AGRICULTURE
- NEXT GENERATION MANUFACTURING
- STATES SERVED

Icons mark the lead institution of awardees

BBBRC is investing in emerging industries across the economy, including:

- 5 biotechnology and health clusters
- 4 advanced mobility hubs, from autonomous and electric vehicles to advanced aerospace manufacturing
- 4 clusters reinventing their natural resource and agricultural industries
- 4 communities developing next-generation manufacturing clusters
- 3 coalitions driving key segments of the clean energy economy
- 1 multi-state Tribal coalition growing an Indigenous finance industry

These investments will fund complementary, locally-led projects and create a coordinated regional economic strategy that is far greater than the sum of the parts. They include approximately:

- $300 million to accelerate innovation in emerging technologies
- $270 million to help workers access new job opportunities and job training
- $140 million to increase new business growth and entrepreneurial activity
- $110 million to construct critical enabling infrastructure and attract private investment
- $100 million to help small and midsized businesses adopt new processes and enter new markets
- $50 million to sustain regional governance and strengthen cluster development

And those dollars are reaching communities across the United States:

123 selected projects serving 801 counties across 24 states

- 236 counties that are fully rural
- 136 persistent poverty counties
- 106 counties that are home to largely underserved populations
- 121 counties that include Tribal areas, with $87 million funding two primarily Tribal coalitions
- Over $150 million invested in coal communities, as part of EDA's $300 million Coal Community Commitment

National Science Foundation Technology Hubs

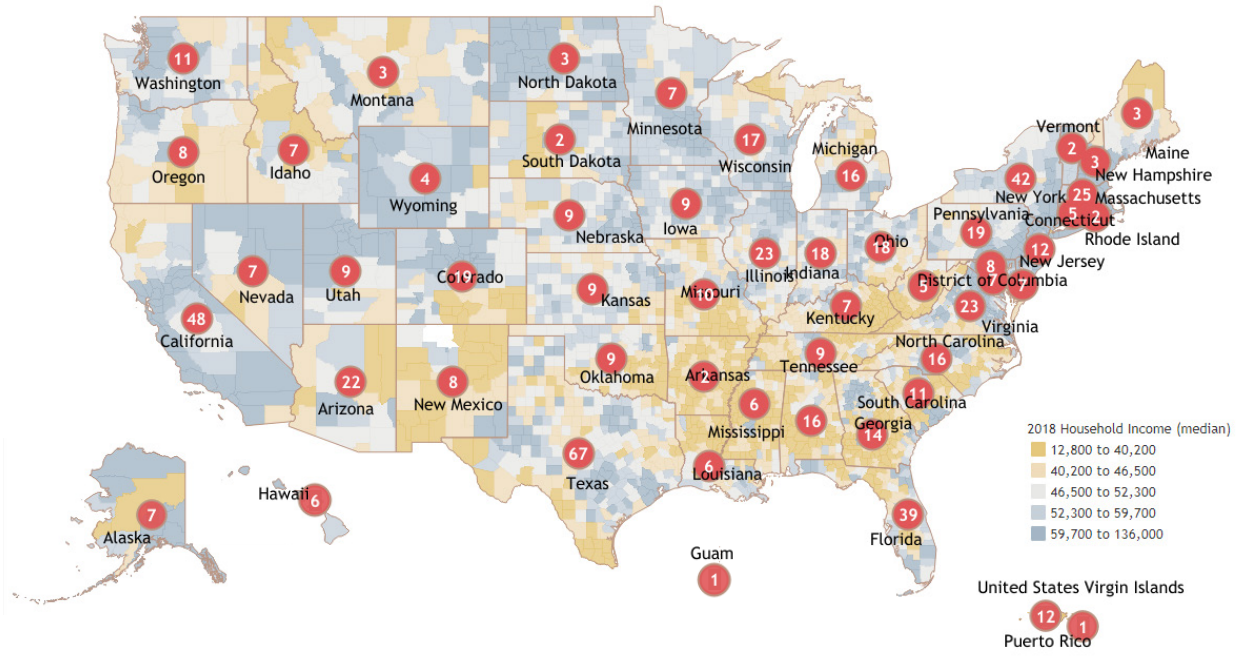
The NSF has established a new program called the Technology, Innovation and Partnerships (TIP) Directorate that will focus on supporting ”use-inspired” R&D. This is the first new directorate at NSF in more than 30 years. TIP’s mission is to foster innovation and technology ecosystems, establish translation pathways and develop partners to engage the nation’s diverse talent pools. beta.nsf.gov/tip/latest

The flagship program for TIP is the NSF Regional Innovation Engines program. NSF used part of its current budget to launch the NSF Engines program, but growth of the program will require Congress, through the CHIPS and Science Act, to fully fund TIP at $6.5 billion to launch a full set of NSF Engines projects and related efforts to accelerate applied research projects into economic growth. This program represents a change in NSF research focus from basic laboratory work to regional innovation as directed by Congress in the CHIPS and Science Act.

Besides scientific merit, TIP is to consider the ability to foster partnerships among regional stakeholders and increase participation from historically underrepresented populations in STEM. There is an emphasis on expanding funding into regions that have not historically

received much NSF funding, yet NSF does not have existing regional divisions that the EDA administers, so more national ecosystem partnerships might be developed through NSF.

NSF, through the limited start of the NSF Engines program, has attracted over 700 concept outlines. Uniquely for NSF solicitations, these proposals are being shared with communities to help develop partnerships with others in their region:



beta.nsf.gov/funding/initiatives/regional-innovation-engines/find-potential-nsf-engines

NSF expects Regional Engines awards to be announced in 2023 with future solicitations depending on additional funding for NSF's TIP program. Overall, NSF is scheduled for more than a $80 billion increase in funding under CHIPS and Science Act, making NSF one of the largest federal research agencies with increased appropriations scheduled should Congress fully fund the programs authorized.

Department of Energy Technology Hubs and other DOE provisions

The DOE is a major winner in the CHIPS and Science Act with an increase of over $67 billion in base funding.

The DOE Regional Clean Energy Partnerships program is a new initiative to spur clean energy innovation. This program comes with authorization of $250 million over five years to fund up to $10 million in partnerships and innovations in the clean energy-sector. The DOE is currently engaging in new prize competitions for university students developing clean energy technology using existing budget authority: energy.gov/technologytransitions/energytech-university-prize-2022-competition

Another provision in the CHIPS and Science Act creates the Foundation for Energy Security and Innovation (FESI) to support DOE and advance collaboration across sectors to accelerate commercialization of energy technologies. This Foundation would help regions with DOE national laboratories to connect on a business-friendly basis to create increased local impact and help the U.S. become more energy competitive. A parallel provision gives DOE labs authority to create entrepreneurial leave policies for DOE scientists and engineers to explore creating startup energy companies.

Other funding in the CHIPS and Science Act provides new research facilities at DOE regional labs. Note that DOE National Labs can be partners on NSF Regional Engine proposals.

Accordingly, regions with DOE National Labs should be looking to increase local involvement and partnerships with these facilities through new programming and investment in these facilities.

Office of Science Laboratories

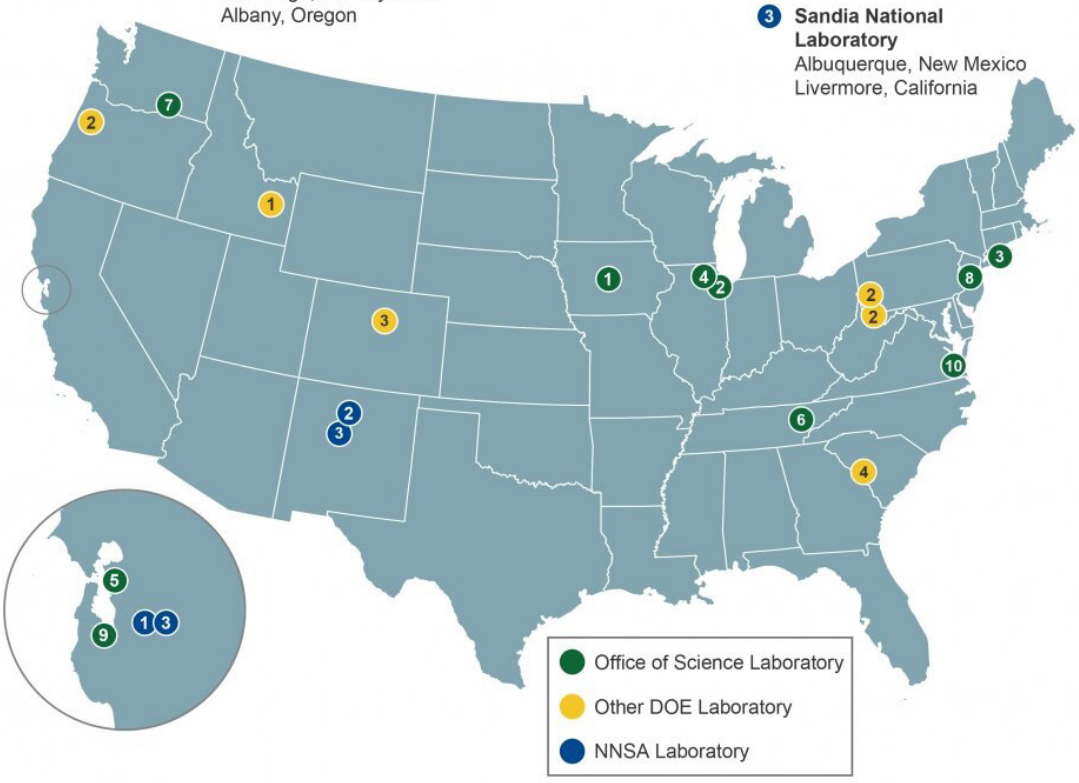
1. **Ames Laboratory**
   Ames, Iowa
2. **Argonne National Laboratory**
   Argonne, Illinois
3. **Brookhaven National Laboratory**
   Upton, New York
4. **Fermi National Accelerator Laboratory**
   Batavia, Illinois
5. **Lawrence Berkeley National Laboratory**
   Berkeley, California
6. **Oak Ridge National Laboratory**
   Oak Ridge, Tennessee
7. **Pacific Northwest National Laboratory**
   Richland, Washington
8. **Princeton Plasma Physics Laboratory**
   Princeton, New Jersey
9. **SLAC National Accelerator Laboratory**
   Menlo Park, California
10. **Thomas Jefferson National Accelerator Facility**
    Newport News, Virginia

Other DOE Laboratories

1. **Idaho National Laboratory**
   Idaho Falls, Idaho
2. **National Energy Technology Laboratory**
   Morgantown, West Virginia
   Pittsburgh, Pennsylvania
   Albany, Oregon
3. **National Renewable Energy Laboratory**
   Golden, Colorado
4. **Savannah River National Laboratory**
   Aiken, South Carolina

NNSA Laboratories

1. **Lawrence Livermore National Laboratory**
   Livermore, California
2. **Los Alamos National Laboratory**
   Los Alamos, New Mexico
3. **Sandia National Laboratory**
   Albuquerque, New Mexico
   Livermore, California



Other provisions in CHIPS and Science Act of interest to technology development and economic development communities:

The CHIPS and Science Act made a bipartisan commitment to fund research, domestic manufacturing, and regional innovation. The Act calls for an increase of $16 billion in its base budget of NSF core science funding, $12.9 billion in base budget funding for the DOE Office of Science, and $2.8 billion in base budget science and manufacturing funding for the National Institute of Standards and Technology (NIST).

Other provisions include $3.1 billion in proposed funding for Planning and Capacity Building awards of $3 million for each institution of higher education to establish or expand technology transfer offices, cover patent costs, develop private sector partners and training for entrepreneurial students and faculty (especially for universities that haven't established tech transfer offices). This provision was promoted by AUTM, a national association of tech transfer and commercialization professionals.

Advocacy for Federal Funding for Science Programs in CHIPS and Science Act:

The Appropriations Committees in Congress play an outsized role in deciding which programs get funded once they are authorized by Congress. Unless the Appropriations Committees fund the Science portions of the CHIPS and Science Act, the programs will not advance.

It is critical that members of Congress hear from their local, state or district members of the importance of funding the Science portion of the CHIPS and Science Act.

In 2007 and 2010, Congress passed similar legislation called the COMPETES Act to fund growth in scientific enterprises estimated at $77 billion over 15 years, but the funding did not come through. Only one of the 28 new COMPETES programs was ever fully funded. Listed at links below are the current members of the U.S. Senate and House Appropriations Committees, but membership will change with the new Congress in January 2023.

Members of Senate Appropriations Committee: appropriations.senate.gov/about/members

Members of House Appropriations Committee: appropriations.house.gov/about/membership

Fortunately, support in Congress for R&D funding and U.S. technological competitiveness is largely bipartisan. In November 2022, 15 Senators released a letter calling on Congress to approve down payments on new initiatives in the FY 2023 budget such as $1.5 billion for DOC Tech Hubs and $1.5 billion for NSF TIP Directorate among other CHIPS and Science programs.

U.S. Senators letter in support of CHIP and Science Act Appropriations
commerce.senate.gov/2022/11/cantwell-bipartisan-group-of-senators-tell-appropriators-america-s-competitive-future-depends-on-fully-funding-chips-science-act

Groups such as the American Association for Advancement of Science (AAAS) aaas.org and the Information Technology and Innovation Foundation (ITIF) itif.org have persuasively argued for increased R&D spending in the U.S. to advance knowledge and improve U.S. economic competitiveness. The SSTI Innovation Advocacy Council also is a leading voice in supporting state-based technology-led economic development policies at the federal level. ssti.org

The fact that 529 communities in the U.S. applied for Build Back Better Challenge EDA grants and 729 regions submitted NSF Regional Engines concept applications from all 50 states vividly demonstrates national interest in technology hubs.

With the nationwide involvement of regions competing for science-based technology hubs, not just traditional science centers such as Boston and San Francisco, perhaps this will help push Congress in upcoming years to annually support funding for the science and technology initiatives in the CHIPS and Science Act.

Conclusion and Recommendations

CONCLUSION

The Science portion of the CHIPS and Science Act is an unprecedented opportunity to build communities of innovation in all regions across the U.S. Yet none of this will matter if yearly appropriations for these programs don't follow.

It is critical for communities of innovation to work with their local, university and industry federal relations offices, local state Congressional delegations and national groups, such as the SSTI Innovation Advocacy Coalition, to obtain federal support and funding for science.

RECOMMENDATIONS

Securing funding from other partners to support building regional technology hubs is important, whether from the state, private sector, foundation, county, or city resources since some of the hubs need match funding for the federal support.

If you don't have an existing regional coalition, begin to reach out to other stakeholders. Some examples are:

Oklahoma Innovation District in Oklahoma: okcinnovation.com

Connected DMV in the DC/Maryland/Virgina region: connecteddmv.org

Bio Health Innovation also in the DC/Maryland/Virgina region: biohealthinnovation.org/

University City Science Center with stakeholders from Pennsylvania, Delaware, and New Jersey: sciencecenter.org

NYC Builds Bio with connections to Connecticut, New Jersey, and Greater NY bio ecosystems: nancyjkelley.com/case/nyc-builds-bio

Because SBIR and STTR programs are funded as a percentage of overall R&D funding in each agency, the CHIPS and Science Act should increase SBIR and STTR opportunities for small technology business funding. Ensure you have technical assistance programs in your region to support SBIR and STTR applicants.

Addressing workforce needs is an important element of any technology hub. Make sure you work with your local workforce support groups, including labor unions. The EDA Good Jobs Challenge provides ideas on what other regions have used to build workforce coalitions: eda.gov/arpa/good-jobs-challenge

Make sure you are using data to assess county level economic infrastructure: The Economic Development Capacity Index (EDCI), a new tool developed through a partnership between EDA and Argonne National Laboratory, uses publicly available data to assess critical elements that contribute to a county's overall economic development capacity, including prosperity, innovation, entrepreneurship, and quality of life: anl.gov/dis/economic-development-capacity-index

In addition, The Economic Innovation Group (EIG) recently released a novel Innovation Hubs Index that balances economic need with innovation potential to inform the selection of 20 regional Innovation Hubs authorized in the CHIPS and Science Act funded by DOC. eig.org/innovation-hubs

Other ideas on competing for technology hub funding are available in this AURP Blog Post: aurpceo.blogspot.com/2021/07/endless-frontier-act-update.html

Finally, the appendix includes a deeper dive into the EDA regions; descriptions of organizations that can be helpful in building regional ecosystems; and a representative list of books and publications discussing geography of jobs and innovation and federal support policies in the U.S.

Brian Darmody is Chief Strategy Officer for AURP and former CEO. Previously he worked at UMD College Park and University System of Maryland in a variety of economic development and research administration roles, and before then was a staff member for a U.S Congress-woman and member of Maryland House of Delegates and served in the U.S Health Care Financing Administration Office of Attorney Advisor.

Appendix

APPENDIX 1

Select organizations working to develop communities of science and technology innovation and economic growth through regional, state, local, and institutional partnerships:

National organizations:

AURP: AURP, a global nonprofit, represents research parks and innovation districts sponsored by universities, hospitals, government labs and cities, plus the firms planning, building, and managing these communities of innovation. AURP includes members supporting bio research, air and space technologies and clean energy through its technology groups. AURP hosts its Bio Health Caucus in Boston in June 2022 in conjunction with BIO and announced its annual conference in fall 2023 in Delaware. aurp.net

SSTI: SSTI, a national nonprofit, offers information and services that are needed to succeed in today's innovation economy. SSTI conducts research on common performance standards, identifies best practices and analyzes policies affecting the innovation economy. SSTI holds an annual conference each year. ssti.org

UEDA: The University Economic Development Association (UEDA) connects its members—higher education institutions, private sector businesses, and economic development organizations — to resources that facilitate economic growth in their communities. Many EDA University Centers are UEDA members. universityeda.org

AUTM: AUTM is the non-profit leader in efforts to educate, promote and inspire professionals to support the development of academic research that changes the world and drives innovation forward. Their community is comprised of more than 3,000 members who work in more than 800 universities, research centers, hospitals, businesses, and government organizations around the globe. AUTM's international conference is in Austin, Texas, February 19-22, 2023. autm.net

TECNA: The Technology Council of North America, TECNA, represents approximately 60 IT and technology trade organizations that, in turn, represent more than 22,000 technology related companies in North America and empower regional technology organizations. tecna.org

UIDP: UIDP is a solutions-oriented organization where its members identify issues impacting university-industry relations and opportunities to develop new approaches to working together. UIDP is hosting a special pre-conference for HBCUs, industry, government, nonprofits, and other institutions in Nashville April 18-19, 2023, before the start of its national UIDP conference. uidp.org

BIO Council of State Bioscience Associations (CSBA): The Council of State Bioscience Associations (CSBA) is a confederation of state-based, non-profit trade organizations each governed by its own board of directors and affiliated with BIO. The common mission of CSBA is to promote public understanding and to advocate for public policies that support the responsible development of the bioscience industry. Five of the EDA Build Back Better winners were in the bioscience sector. BIO is holding its international convention in Boston, June 5-8, 2023. AURP will be holding its Bio Health Caucus in Boston, prior to BIO, and will feature EDA bio Build Back Better winners. bio.org/csba and aurp.net

NACRO: The Network for Academic Corporate Relations Officers (NACRO) serves as a professional development community for individuals working in higher education and tasked with facilitating collaboration with industry. Over time the organization has grown and now includes members from industry as well as higher education. The NACRO National Conference takes place July 11-13, 2023, in Portland Oregon. nacrocon.org

IEDC: The International Economic Development Council (IEDC) is a non-profit, non-partisan membership organization serving economic developers. With more than 5,000 members, IEDC is the largest organization of its kind. Economic developers promote economic well-being and quality of life for their communities by creating, retaining, and expanding jobs that facilitate growth, enhance wealth, and provide a stable tax base. IEDC administers a $30 million grant from EDA to establish and operate a nationwide Economic Recovery Corps program. IEDC is holding its international conference September 17-20, 2023, in Dallas, Texas. iedconline.org

ITIF: The Information Technology Innovation Foundation (ITIF) is an independent nonprofit, nonpartisan research, and education institute. ITIF's mission is to formulate, evaluate, and promote policy solutions that accelerate innovation and boost productivity to spur growth, opportunity, and progress. itif.org

APLU Commission on Economic and Community Engagement (CECE): A Commission of the Association of Public and Land Grant Universities, CECE convenes senior university economic development and community engagement administrations, presidents and chancellors, provosts, senior research officers, Cooperative Extension leaders, government affairs administrators focused on talent, innovation and place. plu.org/members/commissions/economic-and-community-engagement

FLC: The Federal Laboratory Consortium for Technology Transfer (FLC) is the Congressionally chartered, nationwide network of over 300 federal laboratories, agencies, and research centers, that fosters commercialization, best practices strategies and opportunities for accelerating federal technologies out the labs and into the marketplace. The FLC national meeting is in Cleveland, Ohio, and will include a session on federal labs connecting with local resources for development of innovation districts. federallabs.org

International Organizations:

UIIN: The University Industry Innovation Network (UIIN) is a knowledge leader on university-industry engagement, entrepreneurial and engaged universities and knowledge transfer. UIIN is dedicated to supporting its global community of university and industry professionals to advance the future of higher education and its impact on society through its community of more than 80 organizations and more than 500 individual members. UIIN is holding its international conference in Budapest on May 9-11, 2023. uiin.org

IASP: The International Association of Science Parks and Areas of Innovation (IASP) is an association of innovative ecosystems worldwide. IASP's mission is to be the global network for science parks, innovation districts and other areas of innovation. IASP hosts its conference in Luxembourg, September 12-15, 2023. iasp.ws

Global Institute on Innovation Districts: The Global Institute on Innovation Districts is a global-reaching non-profit organization dedicated to conducting independent and practice-oriented research on geographies of innovation emerging primarily in cities and urbanizing areas. The Global Institute is comprised of researchers, practitioners, and policy members working together to help shape the broader research and impact agenda. giid.org

APPENDIX 2

Detailed EDA Regions Analysis: Notes: HBCUs: Historically Black Colleges and Universities; HSIs: Hispanic Serving Institutions and Special Focus Research Institutions are mostly university teaching hospital systems that are administered outside of principal research university under Carnegie Commission classification.

Atlanta Regional Office (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)

Carnegie R1 Universities: 27 | Carnegie R2 Universities: 22 | AAU Universities: 6 | EPSCOR States: 4 | Higher Education R and D Expenditures: $12,379 (in millions) | HBCUs: 61 | HSIs:28 Special Focus Research Institutions: 2

Austin Regional Office (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)

Number of Carnegie R1 Universities: 18 | Number of Carnegie R2 Universities: 17
Number of AAU Universities: 4 | EPSCOR States: 4 | HBCUs: 20 | HSIs:121
Higher Education R and D Expenditures: $8,174 | Special Focus Research Institutions: 8

Chicago Regional Office (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)

Carnegie R1 Universities: 18 | Carnegie R2 Universities: 22 | AAU Universities: 11
EPSCOR States: none | Higher Education R and D Expenditures: $12,013 | HBCUs: 2 | HSIs: 29
Special Focus Research Institutions: 2

Denver Regional Office (Colorado, Iowa, Kansas, Missouri, Montana, North Dakota, Nebraska, South Dakota, Utah, Wyoming)

R1 Universities: 17 | Carnegie R2 Universities: 13 | AAU Universities: 6 | EPSCOR States: 6
Higher Education R and D Expenditures: $6,586 (in millions) | HBCUs: 2 | HSIs: 17
Special Focus Research Institutions: 1

Philadelphia Regional Office (Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New Your, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia)

Carnegie R1 Universities: 46 | Carnegie R2 Universities: 32 | AAU Universities: 21
EPSCOR States: 6 | Higher Education R and D Expenditures: $26,636 (in millions) | HBCUs: 16
HSIs: 64 | Special Focus Research Institutions: 9

Seattle Regional Office (Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Washington)

Number of Carnegie R1 Universities: 20 | Number of Carnegie R2 Universities: 21
Number of AAU Universities: 13 | EPSCOR States: 4 | Higher Education R and D Expenditures: $15, 347 (in millions) | HBCUs: none | HSIs: 201 | Special Focus Research Institutions: 2

APPENDIX 3: FOR FURTHER READING

Gruber, Jonathan and Johnson, Simon, **Jump Starting America**, Public Affairs Press, 2019

Moretti, Enrico, **New Geography of Jobs**, Harper Collins, 2012

Case, Steve, **Rise of the Rest: How Entrepreneurs in Surprising Places are Building the New American Dream**, Simon and Schuster, 2022

Spirou, Costas, **Anchoring Innovation Districts**, Johns Hopkins University Press, 2021

Darmody, Brian, **Power of Place**, **Power of Place 2.0**, and **Creating Life Science Communities of Innovation in the U.S.**, Association of University Research Parks, 2008, 2021 and Journal of Commercial Biotechnology, March 2021, vol. 26, all available at aurp.net/publications

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