U.S. DEPARTMENT OF ENERGY

Energy Program for Innovation Clusters (EPIC)

Report to Congress
June 2022

United States Department of Energy
Washington, DC 20585

Message from the Director, Office of Technology Transitions and Chief Commercialization Officer

The U.S. Department of Energy Office of Technology Transitions is pleased to provide an update to the House and Senate Appropriations Subcommittees on Energy and Water Development regarding the Energy Program for Innovation Clusters (EPIC).

We are excited for the impact EPIC-funded projects will bring to their individual innovation ecosystems throughout the United States, which will further the realization of our mission to bring technology to market.

In its inaugural year, EPIC is helping fill critical gaps in commercializing energy and related technologies by supporting incubators to build robust energy innovation ecosystems and stimulate energy and related development in regions across the United States.

Pursuant to statutory requirements, this report is being provided to the following members of Congress:

- **The Honorable Patrick Leahy**
  Chairman, Senate Committee on Appropriations
- **The Honorable Richard Shelby**
  Vice Chairman, Senate Committee on Appropriations
- **The Honorable Dianne Feinstein**
  Chair, Subcommittee on Energy and Water Development
  Senate Committee on Appropriations
- **The Honorable John Kennedy**
  Ranking Member, Subcommittee on Energy and Water Development
  Senate Committee on Appropriations
- **The Honorable Rosa DeLauro**
  Chair, House Committee on Appropriations
- **The Honorable Kay Granger**
  Ranking Member, House Committee on Appropriations
- **The Honorable Marcy Kaptur**
  Chairwoman, Subcommittee on Energy and Water Development
  House Committee on Appropriations
- **The Honorable Mike Simpson**
  Ranking Member, Subcommittee on Energy and Water Development
  House Committee on Appropriations

If you have any questions or need additional information, please contact me, at vanessa.chan@hq.doe.gov or Ms. Katie Donley, Deputy Director for External Coordination, Office of the Chief Financial Officer, at (202) 586-0176.

Sincerely,

Dr. Vanessa Z. Chan
Chief Commercialization Officer and Director, Office of Technology Transitions

Executive Summary

In 2020, the U.S. Department of Energy's (DOE's) Office of Technology Transitions (OTT), was mandated by Congress to fund incubators that support energy technology innovation clusters. To support OTT's compliance with this mandate, Congress has appropriated $5 million in each of Fiscal Years (FY) 2020 and 2021.

OTT leveraged these appropriations in Fiscal Year 2021 (FY21) through the Energy Program for Innovation Clusters (EPIC). Using a two-part process, OTT successful launched its ***first-ever prize program and first-ever funding opportunity announcement (FOA).***

Starting in FY20, OTT began crucial team-building activities to hire individuals with the expertise to execute and manage funding awards. As a result, in early FY21, the EPIC Prize awarded $50,000 each to 20 incubators focused on developing strong regional innovation clusters.

This was followed by the EPIC FOA in June 2021, which awarded $9.5 million—in partnership with the DOE Buildings Technologies Office, Arctic Energy Office, and Office of Electricity—to 10 incubators across the country that recognized innovation-accelerating organizations focused on stimulating energy hardware development and related supportive ecosystems.

EPIC is a vital DOE program that delivers resources to place-based regional innovation ecosystems. These funds catalyze local collaboration to enable start-ups to commercialize impactful technologies. The incubator clusters model also enables a regional approach that has resulted in geographically diverse OTT EPIC awardees that support entrepreneurs of historically under-represented groups.

For the 3-year EPIC FOA, awardees are tasked with collecting data and tracking their activities and accomplishments to enable OTT to report back to Congress on progress using metrics and impact data. The ultimate goal of EPIC is to showcase how support of the incubator community and innovation ecosystems have a direct impact on the commercial success of technology-focused start-ups and small businesses.

Energy Program for Innovation Clusters Report

Table of Contents

I. Legislative Language

During Fiscal Year (FY) 2020, Congress appropriated $5 million and tasked the U.S. Department of Energy (DOE) Office of Technology Transitions (OTT) to fund incubators that support energy technology innovation clusters:

> *The recommendation provides $5,000,000 above the budget request for the Office of Technology Transitions for a competitive funding opportunity for incubators supporting energy innovation clusters. These incubators should have the support of state, regional, and local entities. The Department is directed to provide within 120 days of awarding funds a report on the impact these incubators have on job creation and workforce development, including in low-income communities and under-represented entrepreneurs.*[1]

This report presents funding activities, award status and preliminary outcomes to date for the Energy Program for Innovation Clusters (EPIC). Through this program, OTT successfully launched its first-ever prize program in FY20, and first-ever funding opportunity announcement (FOA) in FY21.

In future reports, OTT will provide updates on any additional incubator funding activities, current project progress, as well as the impacts of funded incubators as the current cohort of EPIC FOA projects move toward completion in 2024.

II. Background

DOE is renowned for its research prowess, technology expertise, and ability to leverage American ingenuity to invent early-stage clean energy technologies. To meet the Nation's climate, employment, and economic goals, it is imperative that our early-stage technologies are successfully guided through the commercialization process.

In 2015, the Secretary of Energy authorized the formation of the Office of Technology Transitions to be responsible for developing and overseeing delivery of DOE's strategic vision and goals for technology commercialization and engagement with business and industrial sectors across the United States.

OTT's mission is to expand the commercial impact and public benefit of DOE's research, development, demonstration, and deployment (RDD&D) portfolio to advance the economic, energy, and national security interests of the nation.

According to the U.S. Department of Commerce's Economic Development Administration, over one million people in this country start a business each year, and by the end of the first year, at

[1] House Committee on Appropriations, *Energy and Water Development and Related Agencies Appropriations Bill, 2020*, 116th Cong.,1st sess., 2019, Rep. 116–83, https://www.congress.gov/116/crpt/hrpt83/CRPT-116hrpt83.pdf.

least 40 percent of them will be out of business. Within 5 years, more than 80 percent of them will have failed.[2]

Although businesses start and fail in the United States at a staggering rate, they are also critical to the economy and its growth, both in the United States and abroad. In the United States, small businesses make up 47 percent of all private-sector employees, 62 percent of net new private-sector jobs, and 44 percent of gross domestic product.[3] In addition, the bulk of science, technology, engineering, and mathematics employees work in the private-sector and, of those, 37 percent work for small firms.[4]

OTT recognizes that technology start-ups, particularly in energy-related sectors, often require a variety of services over and above capital access, including mentorship, technology validation, business development, and connections to manufacturers. In particular, barriers to market entry for hardware or hard-tech start-ups are particularly high and include large capital requirements,[5] long development times, and the need to integrate into complex systems and supply chains.[6]

With the help of targeted business assistance – through the form of company incubation – entrepreneurs are better prepared to turn their innovations into successful new ventures that have a greater-than-average chance of success.[7] Incubation services also have the potential to de-risk the start-ups for follow-on investors,[6] bolster regional economic development, strengthen national innovation capacity, and expand domestic energy-related manufacturing.

By providing due diligence, screening applicant companies, assisting with prototyping, connecting entrepreneurs with manufacturers, and advising start-ups to prudently use their capital on vital services, incubators, which include innovation-accelerating organizations, play a critical role in supporting start-ups as they transition into the market.[8]

Through EPIC, OTT underscores the importance of innovation clusters, which increase the productivity of local companies, drive the direction and pace of innovation, stimulate the formation of new businesses, and further reinforce the cluster itself.[9]

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[2] David A. Lewis, Elsie Harper-Anderson, and Lawrence A. Molnar, *Incubation Best Practices That Lead to Successful New Ventures* (Washington, DC: U.S. Department of Commerce, Economic Development Administration, 2011).
[3] U.S. Smaall Business Administration (SBA) Office of Advocacy, *Frequently Asked Questions* (Washington, DC: SBA, 2021), https://cdn.advocacy.sba.gov/wp-content/uploads/2021/12/06095731/Small-Business-FAQ-Revised-December-2021.pdf.
[4] Brian Headd, *Small Business Facts – Science/High-Tech Workers and Small* Firms (Washington, DC: SBA Office of Advocacy, 2021), https://cdn.advocacy.sba.gov/wp-content/uploads/2021/03/30103659/High-Tech-Workers-And-Small-Firms.pdf.
[5] Hara Wang and Cyril Yee, *Climate Tech's Four Valleys of Death and Why We Must Build a Bridge*, (Boulder, CO: Rocky Mountain Institute/Third Derivative, 2020), https://www.third-derivative.org/blog/climate-techs-four-valleys-of-death-and-why-we-must-build-a-bridge.
[6] David J. Garfield, Kate E. Moore, Richard Adams, *New Approaches to Energy Hardware Innovation and Incubation,* NREL/MP-6A70-73438 (Golden, CO: National Renewable Energy Laboratory, 2019), https://www.nrel.gov/docs/fy19osti/73438.pdf; K. Surana, E.D. Williams, W. Karwczyk, M. Montgomery, J. O'Neill, Z. Thomas, and Y. Zhang, *Regional Clean Energy Innovation* (College Park, MD: Energy Futures Initiative with University of Maryland Global Sustainability Initiative, 2020), https://cgs.umd.edu/sites/default/files/2020-02/Final_Regional%20Innovation%20Report_2.20.20.pdf.
[7] Lewis, Harper-Anderson, and Molnar, *Incubation Best Practices*, 2011.
[8] Ginger S. Lange, *The Value of Business Incubators and Accelerators from the Entrepreneurs Perspective*, Dissertation (Atlanta, GA: Georgia State University, 2018), https://scholarworks.gsu.edu/bus_admin_diss/92/.
[9] National Research Council, *Rising to the Challenge: U.S. Innovation Policy for the Global Economy* (Washington, DC: The National Academies Press 2012), https://doi.org/10.17226/13386.

EPIC funds incubators that develop training programs for relevant start-ups while building a localized ecosystem of resources to help these start-ups achieve commercial success. In consultation with awardees, OTT defines commercial success for start-ups as increased revenue or new pilot projects, sales relationships, licensing agreements, Cooperative Research and Development Agreements (CRADAs), Joint Development Agreements, and other partnership agreements secured. Each of these success metrics will be monitored and tracked through the 3-year contract period.

The ecosystem of resources that incubators develop as part of EPIC may include potential customers, manufacturing and supply chain partners, investors, grant writing assistance, prototyping facilities, and other services the companies can access. Since 2020, Congress has provided OTT with $5 million annually to support incubators across the country. OTT leveraged these appropriations toward two initiatives:

- The first part, awarded in October 2020, was a prize contest, which awarded $1 million to 20 incubators focused on developing strong regional innovation clusters.
- The second part, awarded in June 2021, was a FOA awarding $9.5 million (in partnership with the Buildings Technologies Office (BTO), the Arctic Energy Office (AEO), and the Office of Electricity (OE)) to 10 incubators across the country focused on stimulating energy hardware development and related supportive ecosystems.

III. EPIC Approach Overview

To meet OTT's congressional mandate to fund incubators supporting energy innovation clusters, OTT first focused on developing a strategy to operationally award and execute the $5 million in annual appropriations. Prior to EPIC, OTT had never developed or managed a funding program.

This included hiring staff into OTT with DOE program development, contracting and management experience. In addition to building out its internal skill sets and capabilities, OTT conducted research and consulted with previous DOE programs with similar goals and structures to EPIC, including the DOE Small Business and Clean Energy Alliance Partnership, Innovation Ecosystem Development Initiative, National Incubator Initiative for Clean Energy, and Innovative Pathways.

OTT also met with experts from the Small Business Administration and the Economic Development Agency to incorporate their lessons learned and to ensure all OTT-initiated programs would complement existing efforts. Ultimately, OTT decided to test two types of financing mechanisms for the first round of EPIC: prize authority and a FOA resulting in cooperative agreements.

The prize model offers fast deployment and a lower application burden for incubators; however, prizes inherently limit public sector influence since they are awarded based on the materials requested and work completed for an application. The pros and cons of FOAs are inverted relative to prize authority. FOAs take much longer to deploy and have a significant

application burden, but the use of cooperative agreements results in OTT being able to take an active project management approach with its awardees.

In order to move quickly, OTT started with the $1 million EPIC Prize, which was announced on July 20, 2020. With the prize funding structure, OTT endeavored to reach a broader set of entities (geographic, new participants, technologies, etc.) that might not have the resources to apply to a traditional FOA. OTT also entered a partnership with the National Renewable Energy Laboratory (NREL) to leverage their American-Made Challenges prize team to implement the EPIC Prize. The EPIC Prize received 64 eligible applications, which totaled $3.2 million requested. On October 7, 2020, OTT presented 20 winners with $50,000 each.[10]

After the success of the EPIC Prize, OTT began to develop the EPIC FOA with the goal to support regional clusters, entrepreneurs, and start-ups by funding innovation-accelerating organizations. In addition, in line with the DOE mission space, OTT designed the FOA such that incubator awardees were required to demonstrate their ability to advance energy and related hardware technologies in collaboration with state, regional, and/or local entities.

The EPIC FOA was published on October 29, 2020 and received 34 compliant applications for a total of $42.8 million requested. Due to the collaborative nature of OTT and its relationships with other DOE program offices, BTO, AEO, and OE, joined OTT to help enable 10 awards totaling $9.5 million.[11,12]

After OTT announced its selection of EPIC FOA awardees in June 2021, three months of rigorous negotiations ensured measurable impact and consistent expectations before the money was formally awarded and transferred to the awardees. FOA awardee projects commenced on October 1, 2021.

Both the EPIC Prize and EPIC FOA underwent a competitive multistep independent review and selection process established by DOE. Teams selected were based on application merit.

[10] U.S. Department of Energy, "Department of Energy Announces Energy Incubator Prize Selections,"https://www.energy.gov/articles/department-energy-announces-energy-incubator-prize-selections.
[11] A total of $8.7 million was provided by OTT; an additional $0.9 million in funding was provided by the Buildings Technologies Office, Arctic Energy Office, and Office of Electricity.
[12] U.S. Department of Energy, "DOE Awards $9.5 Million to Support Clean Energy Innovation and Commercialization Across America, https://www.energy.gov/articles/doe-awards-95-million-support-clean-energy-innovation-and-commercialization-across-america.

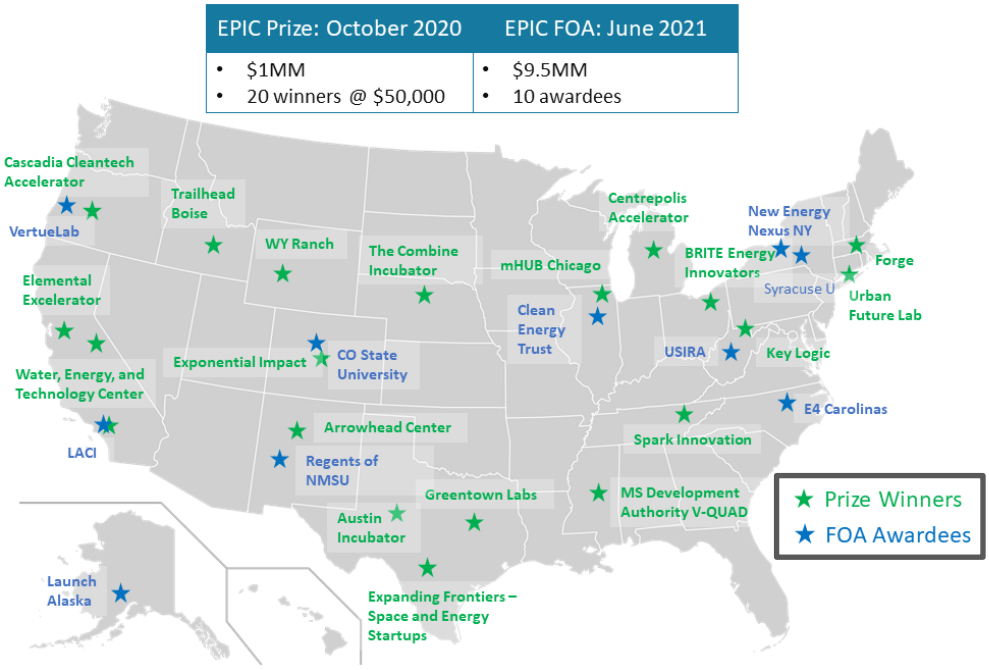


Figure 1: the combined EPIC Prize winners and FOA awardees together represented a diverse and widespread group from across the United States

IV. EPIC Part 1: Prize Approach

As stated in the previous section, on October 7, 2020, after a competitive selection process, DOE awarded a collective total of $1 million to 20 incubators from across the country, concluding the first part of this groundbreaking OTT program.

Incubators applied with plans to develop strong clusters, connections, and support for start-ups and entrepreneurs whose businesses focus on energy-related technologies and were selected based on the strength of their mission, team, operations, and strategic plan. The Prize was open from July 20, 2020, through September 10, 2020.

DOE selected 20 winning incubators out of 64 eligible applicants for cash prizes of $50,000 each, with the time from announcement to delivery of funds being approximately 80 days. Prizes are awarded based on the materials requested and work completed for an application, so winners of the EPIC Prize were unrestricted in how they chose to use funds once awarded. Section VI., “FY20 EPIC Prize: Highlights”, summarizes the accomplishments of several incubator awardees to-date. Many of the awardees decided to use the funds for new activities and a six-month check-in was done to understand the additional impact.

OTT also collaborated with DOE program offices that have prize expertise. DOE’s Water Power Technology Office assisted with originating, designing, and reviewing the EPIC Prize. A second key partner was NREL’s American-Made Challenges prize administration team, which assisted with administering the prize through their unique expertise and platform. NREL also has a connector network that OTT used to both promote the prize and bring winners and applicants together.

Figure 2: The map shows the locations of EPIC Prize winners along with a comprehensive list of EPIC Prize winners (below), which span the nation with a mix of longstanding and newly established incubators, university-affiliated entities, and even one state-affiliated entity.

EPIC Prize Winners

Project Title	Prize Winner	Location
Clean Energy Innovation Cluster & Accelerator	Arrowhead Center	Las Cruces, NM
EMPOWER - Science to Start-ups	Austin Technology Incubator	Austin, TX
Energy Storage Innovation Ecosystem	BRITE Energy Innovators	Warren, OH
The Cleantech Connectors for the PNW ecosystem	Cascadia Cleantech Accelerator	Portland, OR
Michigan CleanTech Hardware Accelerator	Centrepolis Accelerator	Southfield, MI
Elemental Excelerator	Elemental Excelerator	Honolulu, HI
Hub for Space and Energy Start-ups in South Texas	Expanding Frontiers	Brownsville, TX
Energy Entrepreneurship in Southern Colorado	Exponential Impact	Colorado Springs, CO
FORGE Innovative Manufacturing Cluster	FORGE Manufacturing Initiative	Somerville, MA
Building a Cleantech Cluster In Greater Houston	Greentown Labs Houston	Houston, TX
KeyLogic Initiative: U.S. Research Impact Alliance	KeyLogic Initiative: U.S. Research Impact Alliance	Morgantown, WV
LACI is Expanding Clean Energy Start-up Innovation	Los Angeles Cleantech Incubator Unlocking Innovation Team	Los Angeles, CA
mHUB Chicago: Nation's Largest Hardware Lab	mHUB Chicago	Chicago, IL
The Mississippi Virtual-Quad	Mississippi Development Authority V-QUAD	Jackson, MS
The Combine Incubator	The Combine Incubator	Lincoln, NE
Spark Innovation Center at UT Research Park	The Spark Innovation Center at UT Research Park	Knoxville, TN
The WY RANCH	The WY RANCH	Sheridan, WY
CleanTech Incubator for Energy Related Technologies	Trailhead Boise	Boise, ID
Urban Future Lab Northeast Cleantech Hub Growth	Urban Future Lab (UFL)	Brooklyn, NY
Bolstering Success for Energy Start-ups	Water, Energy and Technology Center Team	Fresno, CA

V. EPIC Part 2: Funding Opportunity Announcement Approach

On June 4, 2021, after another competitive selection process, DOE selected 10 incubators to be awarded a collective total of about $9.5 million – $8.9 million was provided by OTT, and an additional $0.6 million in funding was provided by BTO, AEO, and OE. The EPIC FOA awards are 3-year cooperative agreements with a minimum 20 percent cost share requirement. The time from announcement to obligation of funds (beginning of work) took approximately 1 year, which is typical for cooperative agreement funding opportunities.

The 10 awardees were selected based on how well they met the goals of the EPIC FOA topic in three main criteria categories: 1) technical merit, innovation, and impact; 2) project plan; and 3) team and resources. For the full criteria taken directly from the FOA, please see Appendix A.

The EPIC FOA supports 32 states with just 10 awardees.

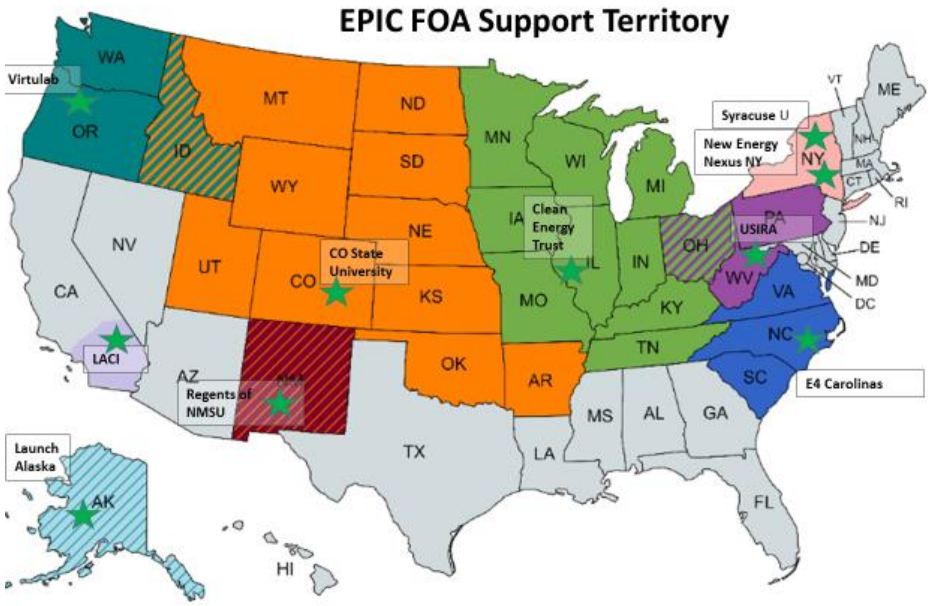


Figure 3: This map features the EPIC awardee support territory. The colors represent a single awardee, whereas the diagonal stripes show states that are supported by multiple awardees.

On the following page is a comprehensive list of EPIC FOA awardees as well as a map with their locations and support territories. Similar to the EPIC Prize winners, there is a mix of established and less established incubators and university-affiliated incubators. The incubators support a wide range of energy-related technology, including buildings, energy storage, hydrogen, water, carbon, fossil fuel transition, vehicles tech, grid-enabling tech, cybersecurity hardware, solar, wind, and general clean energy technologies. All the awardees have established partnerships with industry, national labs, or state/local government organizations, which are essential when catalyzing local innovation ecosystems.

EPIC FOA Awardees

Project Title	FOA Awardee	Location	Project Description
Leveraging a Southern California Energy Innovation Cluster to Pilot & Validate Emerging Energy Technologies	Los Angeles Cleantech Incubator (LACI)	Los Angeles, CA	LACI aims to scale the impact of its incubation program and accelerate the momentum of early-stage companies toward investment and customer-paid commercial deployments of emerging clean energy technologies. To accomplishing this, LACI is designing new start-up pilots using input from clean energy ecosystem stakeholders within the Los Angeles and greater Southern California region.
The Clean Fight: Bringing NY's Best	New Energy Nexus NY	Brooklyn, NY	New Energy Nexus NY is creating a statewide energy storage hardware innovation cluster to accelerate New York's energy storage manufacturing industry, positioning it as a hub for energy storage innovation, research, development, and manufacturing.
Midwest Regional Innovation Partnership (MRIP)	Clean Energy Trust	Chicago, IL	MRIP is enabling Midwest energy hardware and related technology start-ups to scale, attract capital, create jobs, and drive economic development in the Midwest. MRIP will launch three new accelerator programs, which will benefit from MRIP partners' collective expertise, resources, and reach.
New Mexico Clean Energy Resilience and Growth (NM CERG) Cluster	Regents of New Mexico State University (NMSU)	Las Cruces, NM	NM CERG is working with regional stakeholders to update existing and create new programming for an idea-to-business pipeline for start-ups focused on commercializing clean energy technologies.
Energy Program Innovation Cluster for Equity and Health in Grid-interactive Efficient Buildings (EPIC GEB)	Syracuse University	Syracuse, NY	Syracuse's project aims to fertilize the regional ecosystem of companies making energy hardware and related products required to achieve next-generation grid-interactive efficient buildings (GEBs). The project takes advantage of the region's long history of successful GEB-focused businesses and is supporting targeted outreach to venture firms and industry.
IMPACT Accelerator	United States Research Impact Alliance (USRIA)	Morgantown, WV	IMPACT Accelerator is identifying and supporting federally funded technologies that have the potential to solve a targeted set of challenges for the energy and manufacturing industries. The IMPACT acceleration process operates with a "market-pull" orientation and deeply engages with industry stakeholders.
Launch Alaska Transportation and Energy Accelerator (LATEA)	Launch Alaska	Anchorage, AK	Launch Alaska is stimulating energy and related hardware technology development to rapidly expand the growing cluster of innovative companies developing and deploying energy solutions in Alaska. The LATEA project focuses on enhancing resilience and operational sustainability, leading to greater development of transportation- and energy-related hardware technologies in Alaska.
Colorado Energy Innovation Collaborative (CEIC)	Colorado State University	Fort Collins, CO	The CEIC project is creating an energy hard-tech accelerator that supports two cohorts of up to 20 founders. The proposed Rockies/Plains Energy Accelerator for Commercializing Hard-tech (REACH) is specifically tailored to the needs of the region.
Regional Energy Hardware Innovation Accelerator	E4 Carolinas, Inc.	Charlotte, NC	E4 Carolinas, Inc., is engaging the region's energy hardware clusters and ecosystem to support identifying U.S. hardware-focused start-ups each year. The project aims to connect these start-ups with advisors and resources to build a regional capacity for innovation through demonstrations with prospective customers.
Northwest Cleantech Innovation Network (NWCIN)	VertueLab	Portland, OR	VertueLab is adding new programs to specifically address the challenges facing new energy hardware technology start-ups by establishing a regional entrepreneurial support network. VertueLab is targeting this support to Oregon, Washington, Idaho, and Alaska entrepreneurs and cleantech start-ups.

VI. FY20 EPIC Prize: Highlights

By design, prize winners spanned different stages of program development. By leveraging prize authority OTT was able to support a broad range of incubators, many of whom likely do not have the resources necessary to respond within the traditional FOA process. The nature of a prize is such that winners were awarded for work completed to date. However, many EPIC Prize winners used their funds to help augment existing activities and extend the longevity of their support to hard-tech start-ups. Six months post-award, OTT met with the 20 winners to create an update in the OTT website EPIC Blog Series. The summaries below provide recent updates for several of the EPIC Prize-winning incubators that used the funds for new work:

Arrowhead Center—New Mexico, established 1993

Arrowhead Center's clean-energy cluster, New Mexico Clean Energy Resilience and Growth used EPIC Prize funds for innovation ecosystem development, including engagement with national labs, universities, energy businesses, and economic development organizations. Its key EPIC-funded program, EnergySprint + Small Business Innovation Research (SBIR), an 8-week accelerator, launched in May 2021 with a second cohort launching in 2022.

Austin Technology Incubator (ATI)—Texas, established 1989

ATI is using the EPIC Prize to fund Empower Studio, a joint venture between ATI and DivInc., which supports underrepresented SBIR Phase II recipients as they make the critical transition from proof of concept to scaled enterprise. The program kicked off on June 1, 2021, and is providing classroom instruction, hands-on workshops, industry mentoring, as well as technical and business assistance to its first company cohort.

Cascadia Cleantech Accelerator—Oregon, established 2016

Cascadia Cleantech Accelerator is using its EPIC Prize funds to expand and grow its presence in the Pacific Northwest cleantech ecosystem. In particular, Cascadia is prioritizing corporate partnerships as an opportunity to help them execute on their sustainability goals, fund pilot projects for supported companies, and mentor young start-ups. They are also exploring collaboration, learning, and pipeline opportunities with other accelerators and incubators locally, regionally, and nationally. Winning the EPIC Prize is also providing Cascadia and its alumni with increased visibility to and engagement with outside investors.

Exponential Impact (XI)—Colorado, established 2017

XI is using EPIC Prize funds to expand energy entrepreneurship in Southern Colorado. In particular, XI is expanding its focus and prioritizing acceptance for green-technology start-ups into its Accelerator and Amplify programs. XI is building out capabilities to support these companies by recruiting specialized mentors and potential customers, as well as, developing a green-technology focused advisory committee.

FORGE Manufacturing Initiative—Massachusetts, established 2015

FORGE is using EPIC Prize funds to attract a greater diversity of energy innovators to its programs. The new marketing products deployed through OTT funding were pivotal to raising visibility in underrepresented founder-led companies. When FORGE first applied for the EPIC Prize, those companies made up less than 20 percent of its start-up portfolio, and now they comprise 38 percent. Since FORGE was awarded the EPIC Prize, it onboarded nearly 90 new start-ups to its network and made more than 450 connections to the regional supply chain, which contributed to a start-up survival rate of over 90 percent.

Greentown Labs Houston—Texas, established 2021

Greentown Labs is using EPIC funds to support the opening of Greentown Labs Houston, including hosting a series of entrepreneurial meetups and ecosystem networking opportunities, as well as other events and program needs. The opening of Greentown Labs Houston is a huge impact of the prize, since the office will provide support for more than 50 early-stage start-ups and will employ up to 300 people. It has already brought on more than 30 inaugural start-ups and 28 corporate partners. The EPIC Prize also helped fund development of diversity, equity, and inclusion (DEI) programming.

KeyLogic Initiative: U.S. Research Impact Alliance (USRIA)—West Virginia, established 1999

KeyLogic Systems is using EPIC funds to launch the U.S. Research Impact Alliance, a nonprofit entity being stood up by KeyLogic Systems, Mountain State Capital, Phase Four Investors, and other Appalachian Region stakeholders. USRIA has engaged in targeted outreach to bring about collaborative research between the National Energy Technology Laboratory and regional partners, such as universities, local organizations in "energy transition" communities, and entrepreneurial support organizations.

Los Angeles Cleantech Incubator Unlocking Innovation Team—California, established 2011

LACI is using EPIC funds to bolster its operations amidst the COVID-19 pandemic and economic crisis as it transitioned to a virtual environment. The funding has enabled LACI to present virtual workshops, host virtual events with regional partners, and bring together start-ups and investors through Investor Talks.

Mississippi V-QUAD—Mississippi, established 2020

Mississippi V-Quad is using EPIC funds to help new energy and agriculture technology companies find technical assistance and financial networks. As a newly established incubator, Mississippi V-Quad is actively working to connect Mississippi's research universities, industry, government, and nonprofits into a cohesive, tech-based entrepreneurial network, and through support of the EPIC funds, conducted its first pitch competition in August 2021.

mHUB Chicago—Illinois, established 2017

mHUB is using EPIC funds to support its new Accelerated Incubation program focused on climate and energy technology solutions. In May 2021, nine companies were selected

for the first cohort and were provided with a cash investment and participation in pitch events, mentorship, product design and marketing support, and workspace membership for two years. The Accelerated Incubation program will take place over three years and will consist of six cohorts, several of which incorporating energy technologies.

The Spark Innovation Center at the University of Tennessee (UT) Research Park—Tennessee, established 1988

Spark is using EPIC funding to develop an Innovation Center at the UT Research Park. This center will triple the size of Spark over the next two years to increase the maker space and the number of entities they can support. Spark leadership has also used the funds to help promote its services and recruit cleantech start-ups from UT and Oak Ridge National Laboratory.

Urban Future Lab—New York, established 2009

Urban Future Lab (UFL) is using EPIC funding to support several new initiatives including a recent partnership with the United Kingdom to increase international engagement in the region. UFL is also in the planning stages with a major wind developer to establish a regional offshore wind accelerator and has included a new Future Impact Prize to its annual Urban Future Prize Competition focused on proposals addressing climate justice.

VII. FY21 EPIC FOA: Expected Outcomes

All 10 FY21 FOA projects began on October 1, 2021. Throughout the project, OTT will collect impact data (Appendix B), mark milestones, and confer with awardees to assess progress and track impact. Furthermore, the end of each budget period has a milestone-based go/no go decision point where OTT decides whether to continue each project.

These metrics-driven decision points are outlined within the 3-year Statement Of Project Objectives (SOPO) and are negotiated between OTT and individual awardees. The table below summarizes the collective SOPO outcomes that the 10 FY21 EPIC FOA awardees expect to achieve throughout the course of their 3-year funding period:

FY21 EPIC FOA: Collective Outcomes Over the 3-Year Funding Period

160	Organizations participating in innovation clusters
180	Companies completing incubator programming
64	DEI-relevant companies completing incubator programming
64	Companies achieving commercial outcomes[13]
17	Participant companies leveraging DOE-funded technology
50	Participant companies that raised follow-on funding

In addition to the quantitative expected outcomes summarized above; the 10 incubator awardees are addressing the following six activities. It is anticipated that these will have a significant impact within the broader innovation ecosystem.

1. Activation of partnerships with the national labs
2. Advancement of innovation for a diverse range of technologies
3. Cross-cutting collaboration throughout DOE
4. Development of innovative program models
5. Facilitation of inter-regional collaborations
6. Inclusion of measures to advance diversity, equity, and inclusion

1. Activation of partnerships with the national labs

In service of OTT's mission to commercialize national lab technologies, several of the EPIC awardees are partnering with our National Labs. These partnership activities include forming companies, facilitating contractual agreements such as CRADAs, and helping companies access national lab services. In total, nine national labs are partnering with six EPIC projects, including:

EPIC Project Awardee	National Lab Partner(s)
Clean Energy Trust	Argonne National Laboratory Oak Ridge National Laboratory
Colorado State University	Idaho National Laboratory National Renewable Energy Lab
E4 Carolinas	Savannah River National Laboratory
New Mexico State University	Los Alamos National Laboratory Sandia National Laboratory
USRIA	National Energy Technology Laboratory
VertueLab	Pacific Northwest National Laboratory

[13] Defined as increased revenue or new pilots, sales relationships, licensing agreements, Cooperative Research and Development Agreements, Joint Development Agreements, and other partnership agreements secured.

2. Advancement of innovation for a diverse range of technologies
EPIC aims to support and further a wide range of energy and related hardware technology commercialization. A majority of the incubator awardees focus on supporting entrepreneurs and companies developing clean energy hardware technologies.

- Syracuse University is focusing on building technologies.
- New Energy Nexus New York is focusing on energy storage technologies.
- USRIA is focusing on carbon, hydrogen, or water technologies.
- Launch Alaska is focusing on vehicles technologies.

3. Cross-cutting collaboration throughout DOE
OTT successfully pursued a partnership strategy with the DOE program offices to expand the impact of Congress' appropriation by ensuring pathways of the incubators back to our Applied Programs. Three program offices—BTO, AEO, and OE—provided additional funds ($0.6 million in total) and support to three EPIC FOA awardees.

- BTO is providing funding and project management support to EPIC awardee Syracuse University because of their mutual emphasis on advanced building technologies.
- AEO is providing funding and project management support to EPIC awardee Launch Alaska because of its focus on leveraging harsh Arctic conditions to harden emerging energy technologies, which is well-aligned with AEO's goals.
- OE is providing funding support and technical expertise to New Energy Nexus New York. This program focuses on growth-stage energy storage companies, which aligns with DOE's Energy Storage Grand Challenge.

4. Development of innovative program models
EPIC helped spark development of program models for future use by other organizations.

- LACI proposed an innovative model to support its cohort of entrepreneurs by offering mini prizes and connecting winners with partner entities and locations throughout the region to pilot their work.
- NMSU and VertueLab are developing pipeline models with the goal of supporting and preparing start-ups for their modular program offerings, including participation in DOE research and development focused program and funding solicitations.
- Launch Alaska is incorporating a demonstration event in an extreme environment to promote the new technologies and companies going through their program as well as build local community engagement.

5. Facilitation of interregional collaborations
EPIC is working with regional communities to grow their innovation networks. We are excited about work that the incubator awardees are doing to foster these collaborations.

- Regional collaboration with state and local entities—both public and private—is key to building the EPIC regional clusters and enabling entrepreneurs and companies to succeed. All the awardees applied to EPIC with partners identified, and they will continue to grow their networks of support throughout their projects' life cycles.
- EPIC awardees are collaborating with each other, and OTT will facilitate meeting at least twice a year to share best practices and lessons learned.

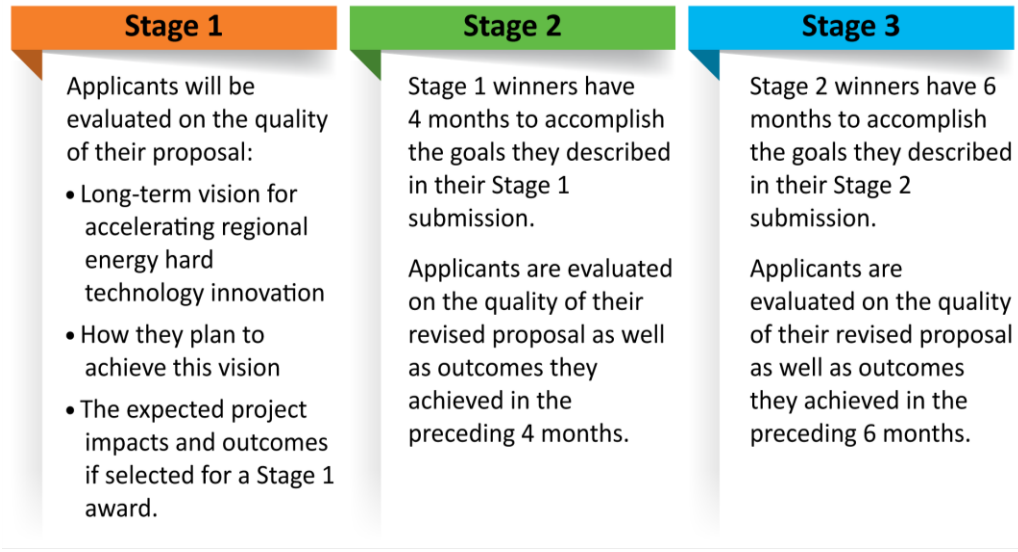
6. Inclusion of measures to advance diversity, equity, and inclusion
All 10 FOA awardees elected to include measures to advance DEI and support disadvantaged communities, with many stating that DEI was a core value of their program.

VIII. Next Steps

This report presents funding activities, award status, and preliminary outcomes to date for the Energy Program for Innovation Clusters. Through this program, OTT successfully launched its first-ever prize program in FY20 and first-ever FOA in FY21.

In future reports, OTT will provide updates on the FOA awardees with respect to any additional incubator funding activities, current project progress, as well as the impacts of funded incubators as the current cohort move toward completion in 2024.

In FY23, OTT would like to combine the prizes and FOA financing mechanisms to create a hybrid program through a multistage prize process. This new multistage EPIC program would be structured as follows:



This hybrid approach, with a multistage prize, leverages the flexibility that prize authority offers, while maintaining influence over how the awardees utilize their funding.

Furthermore, OTT launched a request for information (RFI) in October 2021. This RFI seeks industry feedback that will help OTT determine how to best support incubators and may result in further modifications to EPIC or in the development of new and other complementary funding opportunities. OTT plans to report on the RFI learnings and outline a revised approach

for its commercialization programs, including those that support incubators. As part of this effort, OTT hopes to improve upon its long-term impact tracking of commercialization metrics. Program outcomes and impacts are challenging to track beyond the lifespan of a 3-year project term as awardees are not required to report outside of the performance period. As such, long-term impact tracking often relies on manual collection and synthesis of market analysis reports, news articles and press releases. OTT is investigating alternative and new approaches for tracking metrics beyond project performance period that will better enable quantification of commercialization success.

OTT is very excited for EPIC to be underway and to collect useful metrics and impact data. OTT is open to feedback and ideas to fine-tune the approach to meet the needs of a changing landscape.

Appendix A: Technical Review Criteria for EPIC FY21 FOA

Full Applications

Applications will be evaluated against the merit review criteria shown below. All subcriteria are of equal weight.

Criterion 1: Technical Merit, Innovation, and Impact (35%)

This criterion involves consideration of the following subcriteria:

Technical Merit and Innovation

- Extent to which the proposed regional engagement strategy and implementation plans and integration of collaborators is innovative and have the potential to advance the state of the sector;
- Extent to which applications specifically and convincingly demonstrate the potential to advance energy innovation clusters; and
- Sufficiency of detail in the application to assess whether the proposed work is meritorious and innovative, including relevant data, and discussion of prior work with analyses that support the viability of the proposed work.

Planned Outcomes

- How the project supports the program objectives and metrics;
- The potential of the project outcomes to advance best practices among clusters and to increase commercialization rates through local and regional engagement; and
- The strength of the project plan to promote sustained movement of energy hardware technologies into the marketplace beyond the award period.

Criterion 2: Project Plan (45%)

This criterion involves consideration of the following factors:

Research Approach, Workplan, and Statement of Project Objectives (SOPO)

- Degree to which the approach and critical path in the Implementation Plan have been clearly described and thoughtfully considered; and
- Degree to which the task descriptions in the Implementation Plan are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals.

Identification of Programmatic Risks

- Discussion and demonstrated understanding of the key technical risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

Metrics and Deliverables

- The level of clarity in the definition of the metrics and milestones; and
- Relative strength of the quantifiable metrics, milestones, and midpoint deliverables defined in the application, such that meaningful interim progress can be tracked and measured.

Regional Engagement Strategy

- The extent to which the Regional Engagement Strategy clearly reflects the Elements in Section 1.B of the EPIC FOA.

Criterion 3: Team and Resources (20%)

This criterion involves consideration of the following factors:

- Extent to which applicant meets Applicant Characteristics from Section 1.B of the EPIC FOA;
- The capability of the Project Director(s) and the proposed team to address all aspects of the proposed work with a good chance of success, as demonstrated by qualifications, relevant expertise, and time commitment of the individuals on the team;
- The sufficiency of the facilities to support the work;
- Degree to which the proposed team and available resources demonstrate the ability to facilitate and expedite further development and commercial deployment of energy and related technologies;
- Level of participation by project participants, as evidenced by letter(s) of commitment and how well they are integrated into the workplan; and
- Reasonableness of budget and spend plan for proposed project and objectives.

Appendix B: Impact Tracking Metrics and Definitions

The metrics and definitions provided below are as stated within the Statement of Project Objectives (SOPO) for each EPIC FOA awardee

Metrics

Reported at point of cohort selection:

1. # of applicants to program (total)
2. # of applicants to program applying with a DOE-funded technology (e.g., licensed from a national lab or developed with help from a DOE award)
3. # of accepted cohort members working on a DOE-funded technology
4. Breakdown of applicants by identity categories:
    - # of executive leadership team members per racial category in Note A.
    - # of executive leadership team members per identity category in Note B.
5. Breakdown of accepted cohort members by identity categories:
    - # of executive leadership team members per racial category in Note A.
    - # of executive leadership team members per identity category in Note B.

Reported at beginning of performance period (baseline) and on an annual timescale:

6. # of companies served and types of technologies, including names and locations
7. # of jobs created by companies (have companies report total number of employees at time of survey)
    - # Full time
    - # Part time
8. # of new lab partnerships (e.g., CRADAs, licensing agreements)
9. # of grants awarded (total, summed across all companies)
10. # of companies that received investment/follow-on funding
11. $ raised by companies as investment/follow-on funding
12. $ of company revenue
    - Total, summed across all companies
    - Average across all companies
13. # of prototypes (defined in Note C) launched
14. # of demonstration projects (defined in Note D) launched

Notes

"Applicant" and "cohort member" refer to the team as a whole.

"Team members" refer to individuals on the team.

A. Racial categories:

- Indigenous/Native American/Alaska Native
- Asian
- Black/African American
- Hispanic/Latino
- Native Hawaiian/Pacific Islander
- Two or more races
- White

B. Other identity categories (self-identified):

- Female/male/nonbinary
- Lesbian, gay, bisexual, transgender, or queer (LGBTQ+)
- Veteran/active military/reserve
- Person with disability
- Rural
- Adversely affected by low socioeconomic status

C. Prototype: Component and/or breadboard validation in relevant environment. Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so the prototype can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.

D. Demonstration project: A project in which an innovation is operated at or near full scale in a realistic environment.

DEI Definition

A DEI-relevant cohort is defined as having one or more executive leadership team members who self-identify as a person of color, a female or nonbinary person, an LGBTQ+ person, a person with disabilities, a veteran, a person who lives in rural areas, or a person adversely affected by low socioeconomic status or inequality.

Disadvantaged Communities Definition

A community is a group of individuals living in geographic proximity to one another or a geographically dispersed set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions. A disadvantaged community is a community experiencing one or more of the following:

- Low income, high and/or persistent poverty
- High unemployment and underemployment
- Racial and ethnic segregation
- Linguistic isolation
- High housing cost burden and substandard housing
- Distressed neighborhoods
- High transportation cost burden and/or low transportation access
- Disproportionate environmental burden and high cumulative impacts
- Limited water and sanitation access and affordability
- Disproportionate climate impacts
- High energy cost burden and low energy access.

A project with "significant impact on disadvantaged communities" will be defined as a project whose benefits would accrue to disadvantaged communities at a greater rate than to the population at large.