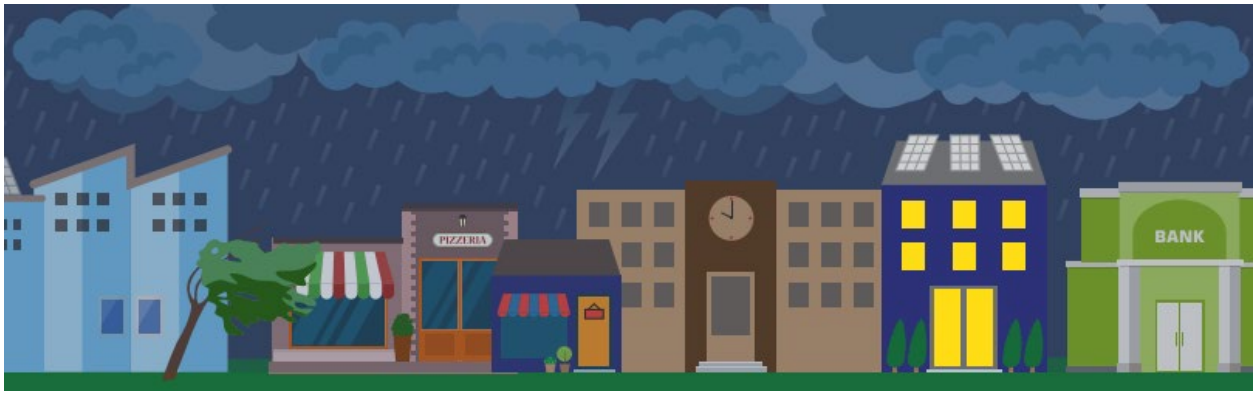

Localizing Innovative Equitable Modern Grids

Grid Innovation Program (40103(B))
Topic Area 3 – Area of Interest 2

Business Point of Contact	**Technical Point of Contact**
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Team Member Organizations:[1]	**Supporting Partners:**
▪ **Connecticut** – Connecticut Green Bank, Public Utilities Regulatory Authority ▪ **Hawaii** – Hawaii Green Infrastructure Authority, Hawaii Public Utilities Commission ▪ **Puerto Rico** – Puerto Rico Green Energy Trust, Puerto Rico Department of Economic Development and Commerce **Project Locations:** ▪ Connecticut ▪ Hawaii ▪ Puerto Rico	▪ **Minority Serving Institutions** – University of Connecticut, University of Hawaii, University of New York at Albany ▪ **Management** – Clean Energy States Alliance ▪ **Technical Assistance** – Clean Energy Group **Other Potential Partners:** ▪ **Utilities** – Luma Energy, Hawaiian Electric, Eversource Energy, United Illuminating ▪ **Consulting** – Elevate, Kevala

[1] It should be noted that there will likely be other team member organizations (e.g., state agencies, utilities, colleges, universities) if the Concept Paper is allowed to move forward.

Section 1 – Introduction

Localizing Innovative Equitable Modern Grids ("the Project" or "Concept Paper") will leverage the community networks from green banks representing Connecticut, Hawaii, and Puerto Rico to demonstrate how an increase in deployment of DERs can deliver community benefit while achieving reliability, resiliency, and decarbonization goals. The Project addresses Topic Area 3 (i.e., Grid Innovation Program) and Area of Interest 2 (i.e., Distribution System Applications). The Project will address several areas prioritized in this opportunity including 1.) Transforming community resilience, including consideration of future shifts in generation and load; 2.) Catalyzing and leveraging private sector and non-federal public capital for impactful technology and infrastructure deployment; and 3.) Advancing community benefits, including workforce development and economic benefits to low income and disadvantaged communities.

Electricity customers across the United States are currently experiencing spiking electricity rates due to global energy security issues and greater challenges for grid resilience and reliability as a result of the increasingly devastating impacts of global climate change. If deployed in new ways, the suite of commercially available distributed energy resources ("DERs" – e.g., solar PV, battery storage, EV recharging stations) can offer innovative solutions to these challenges.

The Project convenes a unique collaboration of green banks representing Connecticut, Hawaii, and Puerto Rico (together the "State Partners"). The participating Green Banks (Connecticut Green Bank, Hawaii Green Infrastructure Authority, and Puerto Rico Green Energy Trust) are mission-driven, quasi-public institutions that use innovative financing to accelerate the transition to clean energy and fight climate change. This project will be supported by the Clean Energy Group and the Clean Energy States Alliance, national nonprofit leaders. Together these State Partners will seek to leverage our experience working with low-income and disadvantaged communities ("DACs") to identify and deliver new value to these communities from DERs including grid benefits.

Although geographically small, the State Partners are among the leading residential solar PV deployment states in the country in terms of watts per capita[2] – see Figures 1 and 2.

Figure 1. "Top 10" Installed Capacity (MW) from 2018-2022

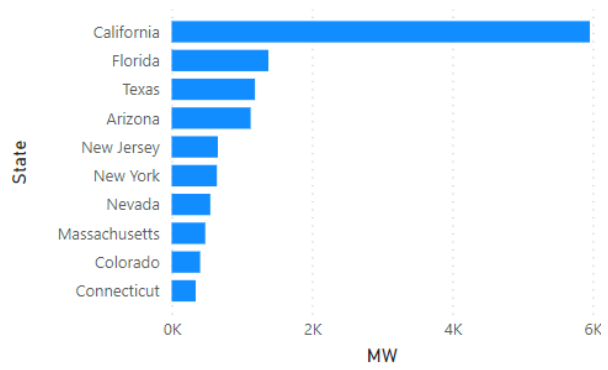
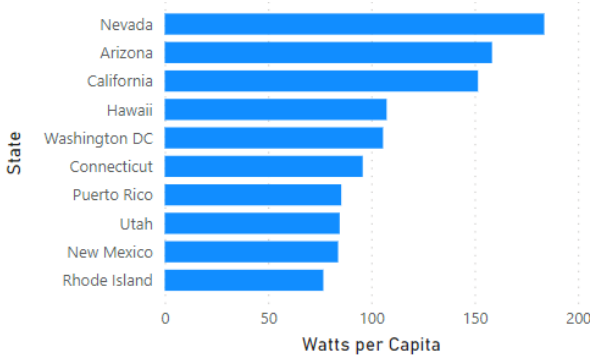


Figure 2. "Top 10" Installed Watts per Capita from 2018-2022



[2] "US Solar Market Insight – Q4 2022" by SEIA and Wood Mackenzie (December 2022)

Hawaii has the highest penetration rate of residential solar PV in the country at 32% with Connecticut at 8% and Puerto Rico at 6%. Compared to other U.S. States, a higher percentage of residential solar PV systems in Hawaii and Puerto Rico are paired with battery storage, which ensures a clean, reliable, and resilient energy supply. Each State Partner in this Project has experience supporting the deployment of this clean energy technology into low-income and underserved communities. With this Project, we seek to demonstrate and quantify the hidden and underutilized value of DERs, which will be further used to inform new technology deployment strategies to achieve lower barriers to adoption of technology to deliver community benefit.

The State Partners each face similar, but distinct grid challenges that could be addressed through innovative deployment of DERs with supportive financing provided by green banks. Specifically, the Project will have the following three (3) objectives:

1. **Address Grid Challenges:**

    a) **Ensure Reliable Grid Operations** – a focus for Hawaii in displacing fossil fuel fired powered plants with battery storage and solar PV as it plays a key role in grid reliability;

    b) **Improve Overall Grid Resilience**[3] – a focus for Puerto Rico in installing solar PV and battery storage makes the electric distribution system much more resilient to extreme weather and system-wide outages; and[4]

    c) **Decarbonize Electricity and Energy System** – a focus for Connecticut in identifying and prioritizing deployment of battery storage in high-emission regions, especially vulnerable communities,[5,6] is a priority for managed charging and discharging of battery storage.[7,8]

2. **Innovative Collaboration** – the State Partners have public policies reflecting decarbonization for their electricity sector and quasi-public green banks focused on mobilizing private investment in the deployment of DERs for families and businesses, especially those in vulnerable communities – they will collaborate to support each other

[3] "Resilience" means the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from deliberate attacks, accidents or naturally occurring threats or incidents, including, but not limited to, threats or incidents associated with the impacts of climate change.

[4] "Distributed rooftop solar and battery storage will ensure reliable and affordably electricity for all Puerto Ricans" by Earth Justice (October 7, 2022)

[5] As defined by Public Act 20-05, "vulnerable communities" means populations that may be disproportionately impacted by the effects of climate change, including, but not limited to, low and moderate income communities, environmental justice communities pursuant to section 22a-20a, communities eligible for community reinvestment pursuant to section 36a-30 and the Community Reinvestment Act of 1977, 12 USC 2901 et seq., as amended from time to time, populations with increased risk and limited means to adapt to the effects of climate change, or as further defined by the Department of Energy and Environmental Protection in consultation with community representatives.

[6] Vulnerable communities may be used interchangeably with low-income and disadvantaged communities

[7] Docket No. 22-08-05 – Annual Energy Storage Solutions Program Review – Year 2 (December 21, 2022)

[8] Integrated Resources Plan of the Connecticut Department of Energy and Environmental Protection (October 2021) (p.13)

in advancing DER interconnection and deployment towards local community benefit realization.

3. **Deliver Economic Benefits and Improve Cost-Effectiveness** – the deployment of DERs provide economic benefits to participants and improved cost-effectiveness to ratepayers. The State Partners have some of the highest residential electricity rates in the United States, making this a priority interest for the State Partners.

Section 2 – Project and Technology Description

The team proposes the following three (3) components of the Project:

1. **Planning** – based on the lessons learned from the DOE's Communities Local Energy Action Plan ("Communities LEAP") pilot program,[9] the State Partners will each develop model Community Benefit Agreements ("CBA") with a focus on DER interconnection and deployment in households and resilience hubs[10] in low-income and disadvantaged communities ("DAC"). We will seek to build on the previous knowledge generated through the Communities LEAP collaboration with NREL to generate actionable impact at the community level.

2. **Deployment** – to realize community resilience and grid benefits, the Project must increase and accelerate the deployment of DERs, which includes the following components:

    a. **Contractor Recruitment** – based on CBA-defined qualification requirements for DER-installation contractors;

    b. **Customer Acquisition** – based on CBA-defined approaches for community engagement, including community-based marketing campaigns (e.g., Solarize, Weatherize, Ruggedize) to generate DER demand; and

    c. **Funding and Financing** – leveraging green bank experience to develop incentive and financing packages specific to low-income and DACs from both state and federal sources, including tax credits and incentives through the Inflation Reduction Act ("IRA"), and financing, as well as private capital, as sources of capital for participants and match for the Project.

3. **Demonstration** – DER control and optimization (e.g., passive and active dispatch, managed charging and discharging, outage mitigation) to demonstrate measurable community resilience and grid benefits, such as improved reliability and resilience (e.g., reduced outage time for communities, energy efficiency improvement), carbon emissions reduction, and beneficial electrification.

The three key Project components are detailed below in Figure 3.

[9] https://www.energy.gov/communitiesLEAP/communities-leap

[10] "Resilience Hubs" are community-serving facilities augmented to support residents, coordinate communication, distribute resources, and reduce carbon pollution while enhancing quality of life. Hubs provide an opportunity to effectively work at the nexus of community resilience, emergency management, climate change mitigation, and social equity while providing opportunities for communities to become more self-determining, socially connected, and successful before, during, and after disruptions.

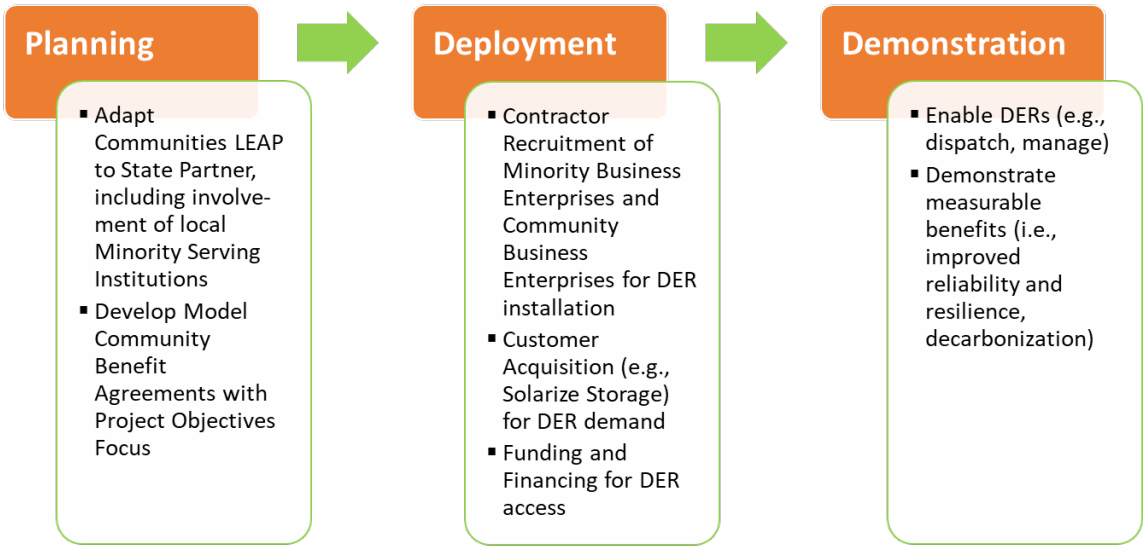


Figure 3. Components of the Project

Section 2.1 Eligible Uses and Technical Approaches

The Project seeks to demonstrate how the interconnection and integration of variable DERs such as solar PV, battery storage, beneficial electrification, and EV rechargers within the distribution system, especially in vulnerable communities, can deliver community benefit and address reliability, resiliency, and decarbonization grid challenges. The Project will focus on the deployment of DERs in low-income and DACs, and specifically residential end-use customers (i.e., single-family and multifamily; owned or rented housing units) and community resilience hubs.

The Project will demonstrate, but not be limited to the following:

- Adaptative microgrid formation, reliable islanded operations, and utilization of DERs to provide back-up power and enhance grid resilience.
- Reliable and resilient system operations utilizing high levels of DERs.
- Behind the meter asset operations, aggregation, and coordination to provide demand response ("DR") and grid services.

The Project will offer the greatest public benefits to participating low-income and DACs by deploying DERs for their residents and in resilience hubs serving these communities. The team will ensure that there is a clear pathway to replicability and scalability across multiple communities from knowledge sharing between the State Partners.

Section 2.2 State Resilience in Reducing Consequences of Disruptive Events, Decarbonization, or Other Energy Strategies or Plans

The Project supports each of the State Partner's efforts to improve reliability and resiliency of the grid and to decarbonize electricity and energy systems through the deployment of DERs, especially in vulnerable communities. The deployment of DERs will reduce the likelihood of

disruptive events resulting from climate change through increased resilience, while also reduce greenhouse gas emissions that contribute to global climate change – see Table 1.

Table 1. Examples of Disruptive Events and Decarbonization Policies in Partner States

Partner State	Disruptive Events	Decarbonization Policies
Connecticut	Tropical Storm Isaias in 2020 brought down power lines causing 800,000 customers to lose power. Public Act 20-05, colloquially known as the "Take Back Our Grid Act" established a regulatory framework for performance-based regulation, created a microgrid and resilience grant program, and defined resilience and vulnerable communities.	Public Act 18- 82 "An Act Concerning Climate Change Planning and Resiliency," established a 45% reduction of 2001 level target for GHG emissions. Public Act 21-53 "An Act Concerning Energy Storage," established a 1000 MW target by 2030. Public Act 22-5 "An Act Concerning Climate Change Mitigation," established a 100% zero carbon electric sector by 2040.
Hawaii	Hawaii is vulnerable to natural disasters such as flooding, hurricanes, tsunamis, lava flows and earthquakes, as demonstrated by the following headlines: "*Hawaii winter storm: thunder, hail and power outages*" (12/20/22); "*Hawaii Storm Ravages Islands Leaving Thousands Without Power*" (12/8/21); "*Magnitude 6.9 earthquake hits Hawaii, leaving thousands without power one day after volcanic eruption*" (5/4/18); and "*Hurricane disrupts power on Hawaii's Big Island*" (8/8/14).	269-92, HRS, "Related to Renewable Portfolio Standards," established a 100% renewable portfolio standard in the electricity sector by 2045. 225P-5, HRS, "Zero Emissions Clean Economy Target," statewide target to sequester more atmospheric carbon and greenhouse gases than emitted as quickly as practicable, but no later than 2045. 196-10.5, Hawaii Revised Statutes (HRS) "Hawaii Clean Energy Initiative Program," established a framework of statutes and regulations committed to Hawaii's clean energy future.
Puerto Rico	Hurricane Maria ("H-Maria") damaged more than 55% of Puerto Rico's transmission towers, leaving a significant portion of the island's 2,400 miles of transmission and 30,000 miles of distribution lines	As a result of H-Maria, Puerto Rico re-envisioned the energy industry by creating the Puerto Rico Energy Bureau (PREB) as an independent and specialized body created by Act 57-2014, as amended, to serve as key component for the full and transparent implementation of the Energy Reform.

	nonfunctional for months[11]. This power loss was accompanied by considerable damage to the economy and human hardship. The damage occasioned by H-Maria is considered the largest in US History[12]. More recently, Category-1 Hurricane Fiona caused relatively minor long-term damage, however, short term left the Island without power for weeks.	Specifically, the PREB has the responsibility to regulate, monitor and enforce the energy public policy of the Government of Puerto Rico. PREB executes policies to facilitate and implement the Integrated Resource Energy Plan with specific target goals of achieving 100% renewables energy generation by 2050.

The Project Manager will support the State Partners in identifying best practices in public policy and regulation through the implementation of the Project that catalyze markets for private investment.

Section 2.3 Grid-Benefitting Outcomes

As a result of the successful implementation of the Project, the following grid-benefitting outcomes are expected:

- **Advancement of Grid Services** – DER incentive programs, such as Energy Storage Solutions in Connecticut and Battery Bonus in Hawaii, essentially enable the operation of dispatchable virtual power plants ("VPP"), thereby increasing resilience to participants, reducing electricity rates for ratepayers (i.e., by reducing peak demand through passive and active dispatch), and increasing reliability and decarbonization for society (e.g., addressing local grid constraints and real-time emissions mitigation). The team will work with leading DER technology vendors, utilities, and local Minority Supporting Institutions ("MSI") within their respective states, to identify how DER deployment can value stack grid benefits to provide advanced functionality. This may also include the demonstration of non-wires solutions of the distribution system, which can result in the deferral of costly grid upgrades.

- **Improvement in Cost-Benefit Testing** – conservation, load management, and clean energy programs administered by states and/or their utilities rely on standard definitions of costs and benefits to evaluate the cost-effectiveness of energy programs (e.g., performance-based incentives). However, these frameworks have a limited language, largely defined based on impacts to the wholesale market. As part of this project, the team will seek to solicit input from local communities around what benefits are of highest priority to community members (e.g., workforce development, air quality, resilience during outages, etc.) and provide recommendations on how these benefits can be valued in program design and analysis to unlock market-based mechanisms (e.g., performance-based incentives) to catalyze private investment.

[11] Hurricane Maria Effects on Puerto Rico Electric Power Infrastructure (Journal Article) | NSF PAGES
[12] The World's Second Largest Blackout | Rhodium Group (rhg.com)

- **Enable Financial Innovation for Vulnerable Communities** – providing upfront and ongoing performance-based incentives that deliver grid services and measurable benefits, can unlock new models for financial innovation, especially for low-income and DACs. For example, through the Residential Renewable Energy Solutions and Energy Storage Solutions incentive programs in Connecticut and Battery Bonus program in Hawaii, incentives resulting from the deployment and performance of technologies (i.e., kWh produced from solar PV, kWh of power dispatched from battery storage) can partially or wholly be directed to a third-party financier as a source of revenue to finance the project – essentially eliminating the need to underwrite transactions to the credit quality of the DER host. By turning non-traditional value streams such as grid services and performance-based incentives into revenue sources for projects, then innovative financial vehicles can be created to accelerate the deployment of DERs in low income and DACs.

These are a few of the grid-benefitting outcomes from the Project.

Section 2.4 Impact of the Project – Reduce Innovative Technology Risk, Achieve Further Deployment At-Scale, and Lead to Additional Private Sector Investments

The Project seeks to accelerate and demonstrate the interconnection and deployment of DERs to unlock their associated benefits for low income and DACs by leveraging limited federal funding sources to mobilize private investment. Private sector investment will be required to achieve the scale of deployment needed to decarbonize and increase resilience against climate change. Leveraging public funds to mobilize private investment in DERs in vulnerable communities is a fundamental principle of green banks. Green banks are known for advancing innovative financing of DERs,[13] especially for vulnerable communities,[14] and will bring this expertise to the team.

The impacts from successfully implementing the Project, include (at a minimum):

1. **Planning** – during the Planning and CBA development stage, the team will develop:

    a. **Community Benefits Definitions** – development of community-led definition of the benefits resulting from the deployment of DERs

    b. **Resilience Differentiation** – ability for the local community to differentiate between blue-sky, gray-sky (i.e., relatively frequent storms), and dark-sky (i.e., relatively rate and devastating storms) conditions to increase resilience

2. **Deployment** – during the Deployment stage, the team will support:

[13] "Long-Term Performance of Energy Efficiency Loan Portfolios" by Jeff Deason, Greg Leventis, and Sean Murphy of Lawrence Berkeley National Labs (March 2022)

[14] "Performance of Solar Leasing for Low- and Moderate-Income Customers in Connecticut" by Jeff Deason, Greg Leventis, and Sean Murphy of Lawrence Berkeley National Labs (May 2021)

a. **Mobilize Private Investment** – demonstrate the financeability of these projects to drive additional private sector investment through financial innovation, including:

   i. implementing "pay for performance" models
   ii. developing a scalable financing solution for DERs for tenants and landlords
   iii. investigating how customer charging and consumption behavior can shift using prepaying/budgeting rather than post-paying for energy use

b. **Accelerate Solar + Storage Adoption** – increased community engagement, including financial and energy literacy education, will accelerate solar + storage adoption within disadvantaged communities.

3. **Demonstration** – during the Demonstration stage, the team will demonstrate:

   a. **Grid Services** – demonstrate functionality of DERs and quantify the benefit of grid services including:

      i. power for critical loads during an outage
      ii. peak demand shaving
      iii. frequency and voltage regulation
      iv. reducing DER curtailment
      v. reducing grid outage time (i.e., improving grid restoration speed)
      vi. ramping/spinning reserves
      vii. providing real time emissions mitigation displacing fossil fuel power plants
      viii. addressing local grid constraints through granular VPP-style deployments with active and passive management of DERs

   b. **Decrease system cost** – with bulk purchasing to increase economic benefits to disadvantaged ratepayers.

Section 2.5 Impact of DOE Funding

The funding from the DOE would allow the State Partners to:

- **Adapt and Scale Community Engagement Program** – understanding the best practices from Communities LEAP will enable the State Partners to adapt and scale-up community engagement that will lead to the development of model CBAs, including technical assistance transfer from DOE (e.g., National Renewable Energy Laboratory – "NREL")[15]

[15] Consideration will be given to include Argonne National Laboratory as well given their Center for Climate Resilience and Decision Science

to local Minority Serving Institutions ("MSI") partnerships (e.g., University of Connecticut);[16]

- **Support Diverse Businesses and Workforce Development** – develop processes and procedures to identify and source work from Minority Business Enterprises ("MBE") or Community Business Enterprises ("CBE"), while seeking to increase the diversity of the workforce through CBAs;

- **Support Sustainable Job Creation** – establish sustainable job creation requirements for participants through the CBA, support the retraining and upskilling of second-chance job seekers, and collaborate with credential programs to support DER-deployment careers;

- **Initiate Inclusive Community-Based Marketing Campaigns** – implement and adapt customer acquisition strategies like Solarize that have demonstrated the ability to increase and accelerate demand for DERs with a focus on low income and DACs;

- **Ensure Equitable Access to Funding and Financing** – provide household and community resilience hub participants with grant funding, including for labor and equipment where appropriate (i.e., Puerto Rico), and easy and affordable access to financing to provide the capital necessary to deploy DERs in low income and DACs; and

- **Realize Benefits through Innovative Local Modern Grids** – provide additional technical assistance to enable DERs to deliver measurable benefits to participants, ratepayers, and society.

Section 2.6 Readiness, Viability, and Expected Timing of Project

The three-year Project could start as soon as an award announcement was made, with the first 6 months being contract finalization (i.e., 14 quarters in total).

Based on the components of the Project, the following would be an anticipated timeline – see Table 2:

- **Contracting** – once the DOE announced that the Project was among the awardees, then the Applicant would begin to draft and finalize contracts with State Partners and Project Manager, as well as, if appropriate, contracts with Team Member Organizations and Other Potential Partners. The Applicant suspects that this will take 3-6 months (i.e., Q1-Q2).

- **Planning** – once the contracts for the Project are in place, then the focus will be to adapt Communities LEAP and develop a model CBA for the State Partners. The Applicant suspects that this process will take a year (i.e., Q3-Q6), with several "touch points" along the way to share "lessons learned" and "best practices" (i.e., Q8 and Q12), transfer technical assistance skills from federal laboratories to local MSIs (i.e., Q9 and

[16] UCONN and NREL Announce Partnership for Research and Innovation (October 20, 2022) – click here

Q13), as well as modify the CBA as appropriate with the State Partners (i.e., Q9 and Q13).

- **Deployment** – once the model CBA is ready, then continuous recruitment of MSEs and CSEs (i.e., every 6 months of each year),[17] launching ongoing community-based marketing campaigns, and initiating funding and financing programs to deploy DERs in low income and DACs will ensue for the entirety of the Project.

- **Demonstration** – after a year of deployment, the enablement of DERs will continuously ensue across a myriad of grid services, and the measurement of benefits will be done every 6 months through the end of the project.

Table 2. Project Timeline

Quarter	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Contracting														
a) State Partners and Project Manager	x													
b) Team Member Organizations	x	x												
c) Other Potential Partners	x	x												
Planning														
a) Adapt Communities LEAP			x	x	x	x		x	x			x	x	
b) Develop Model CBA						x			x				x	
Deployment														
a) Contractor Recruitment		x	x		x	x		x	x		x	x		
b) Customer Acquisition				x	x	x	x	x	x	x	x	x	x	x
c) Funding and Financing		x	x	x	x	x	x	x	x	x	x	x	x	x
Demonstration														
a) Enable DERs							x	x	x	x	x	x	x	x
b) Demonstrate Measurable Benefits						x		x		x		x		x

Match funding may be difficult to source, but the State Partners will seek to work together to assemble a proposal that equitably and appropriately distributes match funding, including leveraging private capital as match.

[17] https://www.eventbrite.com/e/2023-mbe-doe-connect-virtual-summit-tickets-479261452907

Section 3 – Community Benefits Plan

The Project will build on the lessons learned from the DOE's Communities LEAP pilot program to facilitate sustained community-wide economic and environmental benefits through the deployment of DERs. Bridgeport, Connecticut was among the 24 selected communities within Communities LEAP.[18] Through the leadership of the Greater Bridgeport Community Enterprises, and with support from Operation Fuel and the Connecticut Green Bank, Bridgeport, was awarded technical assistance from NREL and Elevate for community planning.

With this support, Bridgeport will develop: 1.) stakeholder mapping and community outreach tools, 2.) communications templates, 3.) model community benefits agreement, 4.) a community-driven project to address energy or environmental injustice, 5.) project screening criteria and project implementation standards, 6.) a review of existing policies and incentives, 7.) capacity and gaps assessment, 8.) a community energy profile, and 9.) renewable energy technology workshops.

The team will leverage the lessons learned through Bridgeport's involvement in Communities LEAP to develop template tools that can be used in other low-income and DACs. The State Partners will each identify their "Top 5" low-income and DACs[19] to provide technical assistance adapted from Communities LEAP with a focus on the deployment of DERs.

Section 3.1 Community and Labor Engagement Leading to Negotiated Agreements

The team will develop model CBAs (i.e., Task 2), with the following policy priorities of the Justice 40 Initiative (i.e., consistent with and additive to the Project's objectives):

1. Decrease energy burden in DACs (i.e., target less than 6% energy burden)
2. Decrease environmental exposure and burden in DACs
3. Increase parity in DER access and adoption in DACs (i.e., at least proportional adoption within communities of color)
4. Increase access to low-cost capital in DACs
5. Increase enterprise creation and contracting for MBEs or CBEs in DACs
6. Increase clean energy jobs, job pipeline, and job training for individuals from DACs
7. Increase energy resilience in DACs
8. Increase energy democracy in DACs

The CBA would express commitment towards these policy priorities, with an emphasis on contractor recruitment for priorities 5 and 6, while ensuring access to apprenticeship programs and prevailing wages.

Section 3.2 Investing in Job Quality and Workforce Continuity

In 2021, the U.S. energy sector jobs grew by 4.0% adding more than 300,000 jobs over 2020 to 7.8 million jobs in 2021 – outpacing overall U.S. employment, which climbed by 2.8% during the

[18] https://www.energy.gov/articles/doe-will-assist-24-communities-locally-tailored-pathways-clean-energy
[19] As identified by the DOE's Justice 40 Initiative – https://www.energy.gov/diversity/justice40-initiative

same period. In 2021, renewable energy jobs grew while fossil energy jobs decreased – jobs in net-zero emissions aligned areas made up approximately 40% of total energy jobs

The importance of a model CBA cannot be understated. Ensuring a "just transition" requires that the Project foster the sustained orderly development of a diverse and local DER industry, as included within Connecticut policy.[20]

Supporting and replicating workforce development programs, such as the Makaha Learning Center ("Center"), will be a focus for cross-state knowledge building and transfer will be a focus of the State Partners. The Center is a Native Hawaiian organization specializing in trade education programs in renewable energy, construction, and electrical work, to break the cycle of poverty for Native Hawaiians and residents of the Waianae, an area where Pacific Islander population and low-Income households are overrepresented. Due to its impact and track record, in July 2022, the Center received part of $3 million in federal funding from the Biden Administration's Justice40 Initiative,[21] and in January 2023, the Center was named one of Stanley Black & Decker's Makers Grant awardees, sharing a portion of a $25 million award to support workforce development in construction and manufacturing.[22] It should be noted that Stanley Black & Decker is headquartered in New Britain, Connecticut.

The Project presents a timely opportunity to meet the growing demand for workers in the clean energy sector in Connecticut, Hawaii and Puerto Rico, in a way that uplifts marginalized communities.

Section 3.3 Advancing Diversity, Equity, Inclusion, and Accessibility

Advancing diversity, equity, inclusion, and accessibility in the clean energy economy is an imperative for the Project. Diversity in the clean energy workforce varies from state to state – see Table 4.[23]

Table 3. Diversity of US Workforce, including Energy by Connecticut and Hawaii in 2021[24]

Diversity Metrics	United States Average	United States Energy	Connecticut	Hawaii
Female	47%	25%	26.5%	28.6%
Hispanic or Latino	18%	17%	16.8%	19.6%
Black or African American	12%	8%	8.6%	7.7%
Pacific Islander/Native Hawaiian	<1%	1%	0.8%	9.5%
Veteran	6%	9%	6.9%	7.1%
55 and Over	24%	17%	11.2%	10.6%
Disability	4%	2%	2.1%	1.9%

[20] Public Act 21-43 "An Act Concerning a Just Transition to Climate-Protective Energy Production and Community" and Public Act 21-53 "An Act Concerning Energy Storage"

[21] The 2021 Justice 40 Accelerator Cohort Won $3M in Federal Funding (makahalearning.org)

[22] Mākaha Learning Center named Stanley Black & Decker Makers Grant Recipient | KHON2

[23] United States Energy and Employment Report 2022 by the USDOE (June 2022)

[24] Data on territories (e.g., Puerto Rico) not available

Formerly Incarcerated	2%	1%	1.3%	0.9%

Supporting the transition of technical assistance and community engagement to local Asian American and Native American Pacific Islander Serving Institutions (e.g., University of Connecticut, University of Hawaii) and Hispanic Serving Institutions (e.g., University of Puerto Rico-Mayaguez), as well as community colleges and trade schools, will increase diversity, equity, inclusion, and accessibility for the future clean energy workforce. And providing equitable access to MBEs and CBEs to lead the work, will increase wealth and increase access to a more diverse clean energy industry.

Section 3.4 Contributing to the Justice40 Initiative

As noted throughout the Concept Paper, the Project is solely focused on community resilience and transformation with a focus on (1) the objectives consistent with the Grid Innovation Program, and (2) DER deployment in and benefits to low income and DACs consistent with the Justice 40 Initiative.

The Energy Equity Hui[25] is a group of energy stakeholders and interested community members throughout the State of Hawaii committed to ensuring the transition to clean and efficient energy is accessible, beneficial, and respectful of socioeconomically disadvantaged communities, and includes equitable and sustainable business and workforce development. The Hawaii Green Infrastructure Authority, Hawaiian Electric, and the Hawaii Public Utilities Commission are members of the Hui and are committed to its mission of an equitable energy future in the state.[26]

In Connecticut, the Governor's Council on Climate Change recommended that no less than 40 percent funding for equity and/or community benefit be directed at vulnerable communities disproportionately impacted by the effects of climate change.[27] The Connecticut Department of Energy and Environmental Protection, in collaboration with the Connecticut Institute for Resilience and Climate Adaptation at the University of Connecticut, oversee a Climate & Equity Grant Program to provide community-based organizations aligned with environmental justice, climate change adaptation, and mitigation across the state with funding support. And, the Connecticut Green Bank adopted the Justice 40 recommendation within its Comprehensive Plan.

[25] *Hui* means group or partnership in Hawaiian.

[26] Energy Equity Hui - Blue Planet - We are 100

[27] "Taking Action on Climate Change and Building a More Resilient Connecticut for All" by the Governor's Council on Climate Change (January 2021) (p.50)

Section 4 – Addendum A

Section 4.1 Project Manager and Project Team Skills and Expertise

The Clean Energy States Alliance ("CESA") will be the Project Manager. CESA is a leading bipartisan US coalition of state energy agencies working together to advance the rapid expansion of clean energy technologies and bring the benefits of clean energy to all. CESA's members include many of the nation's most innovative, successful, and influential implementers of clean energy policies. CESA facilitates the expansion of state clean energy policies, programs, and innovation, with an emphasis on renewable energy, energy storage, energy equity, and resiliency.

The Clean Energy Group ("CEG") will provide technical support to the Project. CEG is a national nonprofit organization that works at the forefront of clean energy innovation to enable a just energy transition to address the urgency of the climate crisis. CEG collaborates with partners across the private, public, and nonprofit sectors to accelerate the equitable deployment of clean energy technologies and the development of inclusive clean energy programs, policies, and finance tools.

The Connecticut Green Bank is the nation's first green bank and was established by the Connecticut General Assembly in July 2011. The Connecticut Green Bank supports the Governor's and Legislature's energy strategy to achieve cleaner, less expensive, and more reliable sources of energy while creating jobs and supporting local economic development. In 2021, the Green Bank's model was expanded to include new areas of environmental infrastructure, related to climate adaptation and resiliency, land conservation, parks and recreation, agriculture, water, waste and recycling, and environmental markets, including carbon offsets and ecosystem services.

The Hawaii Green Infrastructure Authority (HGIA) was constituted in November 2014 to democratize clean energy by making clean energy improvements affordable and accesible to broader strata of Hawaii's rate payers to advance the State's goal of a 100 percent renewable portfolio standard in the energy sector by 2045. HGIA administers non-traditional financing programs that fill market gaps, stimulate private investments, and expand access to capital. In 2019, HGIA strengthened its commitment to underserved ratepayers by limiting the use of its Green Energy Market Securitization (GEMS) loan capital to LMI homeowners and renters, nonprofits,small businesses, and multi-family rental projects. HGIA also offers financing to state departments, conducts work in promoting energy equity through community engagement and adminsters the State Small Business Credit Initiative (SSBCI) HI-CAP Collateral Support, CDFI Loan Pool and Loans Programs.[28]

[28] 2022 Hawaii Green Infrastructure Authority Annual Report to the Governor and Legislature

The Puerto Rico Green Energy Trust was established in 2019 and seeks to financially support projects that provide access to green energy to residents of low and middle-income communities, as well as promote the strengthening of the culture of saving and efficient use of energy, among others.

These lead applicants are supported by a consortium of state energy regulators, utilities, local minority serving institutions, and community partners including local universities.

Section 4.2 Prior Experience of the Team

Many of CESA's prior experiences demonstrate the ability to perform tasks of similar risk and complexity to the Project, including **managing state-focused learning exchanges** – CESA provides peer-to-peer opportunities for state clean energy program managers to 1) share information and identify best practices; 2) engage in joint efforts to create and advance successful policies and programs; and 3) contribute to and gain the collective insights of colleagues across the country who are striving to turn zero-carbon and energy equity goals into reality.

CEG has provided technical expertise to similar project such as the **Resilient Power Project** – which has advanced the deployment of resilient, clean energy solutions – primarily solar PV paired with energy storage ("solar + storage") – in critical community facilities serving environmental justice communities, low-income communities, and communities of color. The project's goal is to advance clean energy equity and build energy security by ensuring that all communities have access to the economic, health, and resilience benefits that solar + storage technologies can provide.

Since its inception, the Connecticut Green Bank has mobilized $2.26 billion of investment into Connecticut's clean energy economy at a 7 to 1 leverage ratio of private to public funds. The Green Bank has supported the creation of 27,720 direct, indirect and induced jobs, reduced the energy burden on over 66,500 families and businesses, deployed nearly 510 MW of clean renewable energy, helped avoid 10.4 million tons of CO2 emissions over the life of the projects, and generated $113.6 million in individual income, corporate, and sales tax revenues to the State of Connecticut. Our **Residential Solar Investment Program** has enabled the deployment of more than 46,000 residential rooftop solar PV systems in the state, with 42% of these systems located in low-and-moderate income households and disadvantage communities.

Since its inception in September 2022, the Hawaii Green Infrastructure Authority has facilitated over $130.0 million in clean energy investments throughout the state, including Solar Photovoltaic Systems, Energy Storage Systems, Lighting Upgrades, and HVAC Upgrades. Lifetime estimates of greenhouse gas avoided aggregate 282,225 metric tons. Economic development impacts include over $16.4 million of state tax revenues generated, a multiplier impact of $276.8 million and over 1,300 jobs created/retained.

The Puerto Rico Green Energy Trust is among the newest state-level green banks in the country. As it continues to develop, the market for residential solar PV and battery storage in Puerto

Rico is the fastest growing market in the United States. There have been nearly 69,000 residential solar PV installations, many of them including battery storage, installed in Puerto Rico totaling over 420 MW.

Among our supporting partners, the University of Connecticut is host to the **Eversource Energy Center[29] ("EEC")**, which is an interdisciplinary center focused on power system operations, operational outage prediction systems at several utilities, solar PV grid integrations, and field grid operations. EEC has secured more than $50M in funding from the power industry and federal government (DOE, NSF, NASA, NOAA), including a recently selected project by DOE Renewables Advancing Community Energy Resilience (RACER) program, to develop new technologies and science-based solutions for the distribution of reliable power and the management of risks associated with extreme weather and security events. The University of Connecticut's **Human Rights Institute** ("HRI") is a globally recognized leader in human rights research and in research, teaching, and translational policy efforts on environmental sustainability. HRI is committed to promoting the economic rights of people in marginalized communities and to forging environmental justice through partnerships and hands-on research experience involving students, faculty, alumni, and supporters in government, industry, and nongovernmental organizations globally.

The University of Hawaii System has a robust offering of opportunities in training, research, and coursework relating to grid integration, sustainable power generation, and energy efficiency. The University of Hawaii at Manoa has a Renewable Energy and Island Sustainability program which consists of coursework and research experience in clean energy, renewable energy production, energy storage, integration, and smart grids. In 2010, the program received a $2.5 million grant from the Department of Energy to train engineers in the field of clean energy technology.[30] The **Hawaii Natural Energy Institute**, also at the Unviersity of Hawaii at Manoa, conducts research, development, testing, and evaluation of utility grids, including smart and micro grid systems.[31] In August 2022, the University of Hawaii's seven Community Colleges were collective awarded $16.4 million from the US Department of Commerce to establish a sustainable workforce through the "**Resilient Hawaii**" initiative. One of four target sectors is clean energy, and the initiative is focused on equitable participation by Native Hawaiian and Pacific Islander Communities. The initiative aims at training 3,000 participants, and joins community college resources with 70 employers, training providers, and community organizations.[32] All of the University of Hawaii System's ten member campuses are recognized as Asian American and Native American Pacific Islander Serving Institutions by the US Department of Education.[33]

[29] eversource.uconn.edu
[30] Mānoa: College of Engineering awarded $2.5 million to develop clean energy program | University of Hawaii News
[31] Grid Integration & Renewable Power Generation - Hawai'i Natural Energy Institute (HNEI) (hawaii.edu)
[32] UH earns $16M federal grant to assist in sustainable workforce development | University of Hawai'i System News (hawaii.edu)
[33] Program serving Asian, Native Americans, Pacific Islanders celebrates milestone | University of Hawai'i System News (hawaii.edu)

Section 4.3 Applicant and Partners Prior History

CEG and CESA have worked together with the Connecticut Green Bank, including the following projects:

- **Scaling Up Solar for Under-Resourced Communities** – a project supported by the DOE, it focuses on accelerating the development of solar projects for three distinct subsets of the LMI solar market: single-family homes, manufactured homes, and community institutions, including multifamily affordable housing. For the single-family homes sector, the project promotes the successful initiative that has brought solar to 3,000 LMI homeowners in Connecticut from 2015 to 2021, growing by 320% over the duration of the program, and encouraging and supporting other states to adapt it to their markets.

- **Solar with Justice: Connecting States and Communities** – working with state energy agencies and community-based organizations in under-resourced communities so that they are better able to share the knowledge and information that is needed for solar to be developed efficiently, equitably, and cost-effectively in LMI communities. The project aims to create opportunities for state energy agencies to better understand the perspectives of community-based organization leaders in LMI communities, to identify and address solar information gaps, and to involve these organizations in solar initiatives.

- **Climate Smart Technology and Home Medical Devices for Affordable Housing** – affordable housing residents who are electricity-dependent for Home Medical Devices ("HMD"), including, but not limited to oxygen concentrators, ventilators, infusion and intravenous equipment, nebulizer and sleep apnea devices, are unable to shelter in place and must turn to hospitals to charge their devices. To understand the investment needed in Climate Smart Technologies ("CST") (i.e., DERs), the project seeks to understand how to increase resilience through CST deployment of people requiring HMDs, and to also realize opportunities for enabling investment in CSTs at affordable housing properties.

And CESA has also worked with the Hawaii Green Infrastructure Authority on the following initiatives:

- **GEM$ Energy Services Program Launch** – similar to a solar lease or solar power purchase agreement, the Green Energy Money $aver (GEM$) Energy Service Program provides low and moderate-income (LMI) homeowners and renters an opportunity to lower their energy burden with no upfront costs.

- **Solarize808 Waianae and Koʻolauloa** – a community-based, solar PV group purchasing campaign scheduled to launch in April 2023.

It should be noted that while CEG and CESA have both worked with partners in Puerto Rico, the organizations have not collaborated directly with the Puerto Rico Green Energy Trust. If the Project is supported by the DOE, Puerto Rico Green Energy Trust will be invited to join CESA.

Each of the green banks involved in the Project are also members of the American Green Bank Consortium.

Section 4.4 Applicant Access to Equipment and Facilities

As the Project relies on commercially available technology, the Team has sufficient access to technology, and foresees no concerns in recruiting technology partners to support the specific use cases detailed in this Concept Paper. The Team has sufficient access to our target customers and will work through our respective local engagement organizations to build out community engagement initiatives.