California Energy Commission
April 12, 2023 Business Meeting

Backup Materials for Agenda Item No. 06
Staff's Electric Program Investment Charge 2022 Annual Report

The following backup materials for the above-referenced agenda item are available in this PDF packet as listed below:

1. Proposed Resolution, attached below.
2. Staff's EPIC 2022 Annual Report, attached below.
3. Staff's EPIC 2022 Annual Report, Appendices A-B, attached below.

RESOLUTION NO: 23-0412-06

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION TITLE: Electric Program Investment Charge 2022 Annual Report

RESOLVED, Public Resources Code Section 25711.5(f) requires the Energy Commission to prepare and submit to the Legislature an Electric Program Investment Charge (EPIC) Program Annual Report by April 30th of each year, reporting information on activities and projects funded in the previous calendar year; and

RESOLVED, Section 25711.5(f) requires the EPIC annual reports to provide specific information for each project awarded, concluded, or ongoing during the reporting period, including, but not limited to: award recipients and amounts, project descriptions, how projects will lead to technological advancements or breakthroughs, how awards were made, administrative and overhead costs, and the impact on program administration from the low-income and disadvantaged community allocations; and

RESOLVED, Energy Commission staff have prepared the EPIC 2022 Annual Report in accordance with the requirements of Public Resources Code Section 25711.5(f), and California Public Utilities Commission (CPUC) EPIC decisions including Decisions 12-05-037, 13-11-025, and 15-04-020; and

RESOLVED, that the CEC approves the EPIC 2022 Annual Report; and directs the Executive Director, or his designee, to take the following action:

- Finalize the EPIC 2022 Annual Report, including but not limited to incorporating any changes presented and adopted today along with any non-substantive changes such as typographical corrections and graphical formatting;
- Forward the final report to the Legislature and to the CPUC;
- Make the final report available to the public on the Energy Commission's website; and

FURTHER BE IT RESOLVED, that the Executive Director or their designee shall execute the same on behalf of the CEC.

CERTIFICATION

The undersigned Secretariat to the CEC does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the CEC held on April 12, 2023.

AYE:
NAY:
ABSENT:
ABSTAIN:

Dated:

_____
Liza Lopez
Secretariat

CALIFORNIA ENERGY COMMISSION

CALIFORNIA NATURAL RESOURCES AGENCY

California Energy Commission

STAFF REPORT

Electric Program Investment Charge 2022 Annual Report

April 2023 | CEC-500-2023-012-SF

California Energy Commission

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ACKNOWLEDGEMENTS

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PREFACE

The California Energy Commission's (CEC) Energy Research and Development Division supports energy research and development programs to spur innovation in energy efficiency, renewable energy, energy-related environmental protection, energy transmission and distribution, and transportation.

In 2012, the California Public Utilities Commission (CPUC) established the Electric Program Investment Charge (EPIC) to fund public investments in research to create and advance new energy solutions, foster regional innovation, and bring ideas from the lab to the marketplace. The CPUC selected the CEC and the state's three largest investor-owned electric utilities — Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company — to administer the EPIC funds and advance novel technologies, tools, and strategies that provide benefits to electric ratepayers.

The CEC awards EPIC research funds to projects that promote greater reliability, lower costs, increase safety for the California electric ratepayer, reduce greenhouse gas emissions and other pollutants, and spur economic development, among other program objectives.

For more information about the Energy Research and Development Division, please visit the CEC's website at https://www.energy.ca.gov/programs-and-topics/programs/electric-program-investment-charge-epic-program.

ABSTRACT

The California Energy Commission (CEC) is the state's primary energy policy and planning agency. As part of its overall mission, the CEC administers several clean energy research and development programs that drive innovation and advance science and technology in energy efficiency, renewable energy, energy-related environmental protection, energy transmission and distribution, and transportation. The CEC is one of the administrators of the state's Electric Program Investment Charge (EPIC). In administering EPIC, the CEC funds research, development, and demonstrations of clean energy technologies and approaches that will benefit electricity ratepayers of California's three largest investor-owned electric utilities and lead to technological advancement and breakthroughs to overcome the barriers that prevent the achievement of the state's statutory energy goals. For information on specific projects, visit the Energize Innovation Showcase at https://www.energizeinnovation.fund/projects.

This report outlines the progress and status of CEC activities funded by EPIC from January 1, 2022, through December 31, 2022. The report was prepared in accordance with applicable California Public Utilities Commission decisions and California Public Resources Code Section 25711.5.

Keywords: Advanced generation, agriculture, batteries, buildings, California Energy Commission, California Public Utilities Commission, clean energy economy, climate change, decarbonization, demand response, disadvantaged community, distributed generation, Electric Program Investment Charge, electricity, electrification, energy efficiency, energy equity, energy policy, energy research, entrepreneurial ecosystem, environmental, greenhouse gas, jobs, low-income community, ratepayer benefits, renewable energy, resilience, safety, transportation, water

Please use the following citation for this report:

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CHAPTER 1:
2022 in Review: A Year of Bold Climate Action

Fellow Californians,

2022 was a truly historic year for the clean energy future we are all trying to build together. During a day last spring, for the first time in state history, 100 percent of California's electricity demand was met by clean, carbon-free sources. At the federal level, President Joe Biden signed into law the Inflation Reduction Act, the most significant climate legislation in our nation's history, which provides a decade of tax credits for wind, solar, geothermal, electric vehicles, energy storage, electric heat pump technology, and more. With these incentives and the federal infrastructure law, we are now seeing the massive infusion of public dollars needed to bring these technologies mainstream.

Here in California, Governor Gavin Newsom signed a suite of bold climate laws in September, including Assembly Bill 1279, which requires carbon neutrality in California by 2045. The state's unprecedented climate budget over the past two years — nearly $50 billion — will support clean energy research and deployment in areas such as direct air carbon capture, clean hydrogen, more efficient food production, industrial decarbonization, and load flexibility.

However, last year also highlighted the climate and energy challenges we face in California and globally. Extreme weather exacerbated by climate change continued to challenge our state's electricity infrastructure. Last September's heat storm resulted in the highest peak electricity demand, straining the capacity of the grid. On December 20, an earthquake along the North Coast was a stark reminder of how vital our energy infrastructure is in providing shelter and safety. Abroad, the ongoing war in Ukraine impacted global supply chains and underscored the strategic imperative of reducing our reliance on imported fossil fuels and increasing production of domestic clean energy.

Throughout all this, the Electric Program Investment Charge (EPIC) has provided a ray of light and hope by continuing to enable California to be a garden bed for new clean energy technology solutions that will help us reach our goals faster and at a lower cost. I would like to thank our colleagues at the California Public Utilities Commission for voting to extend the EPIC program for another decade. Since its inception in 2012, EPIC has invested $1.125 billion toward the state's clean energy economy, providing validation for early-stage technologies that are often deemed too risky for private investment. Companies in the program's portfolio have gone on to raise more than $10.5 billion in private investments and have commercialized more than 70 technologies.

And the rest of the world is taking notice. Technologies and companies profiled in this year's EPIC annual report are drawing broad attention, even earning places among *Time Magazine*'s "Top 200 Inventions of 2022." EPIC initiatives are providing replicable models for federal and international agencies, and EPIC investments are making real-world impacts, driving clean energy progress, and even saving lives.

EPIC remains more critical than ever in bringing cutting-edge clean energy solutions to the market and setting an example of successful public-private partnership. While much work and

increasingly difficult challenges remain, programs like EPIC that harness the innovative spirit of Californians are continuing to chart the path forward for all.

Spotlight: Blue Lake Rancheria

On December 20, 2022, a 6.4 magnitude earthquake shook the North Coast in Humboldt County, severely damaging homes, businesses, and local infrastructure. Residents reported nearly 70,000 outages in the immediate aftermath across the region – an area that includes tribal lands and has seen underinvestment. Fortunately, a microgrid funded by EPIC in 2017 at the Blue Lake Rancheria Casino was able to island itself from the grid nearly instantaneously, maintain power, and serve an estimated 20,000 people. Residents were able to refuel gasoline vehicles and charge electric vehicles with the power available, and the microgrid is credited with saving four lives with emergency medical equipment. This is the third major event since its construction where the microgrid has provided critical services following an extreme event or natural disaster.

Sincerely,

David Hochschild
Chair

California Energy Commission

CHAPTER 2:
Accelerating the Clean Energy Transition With EPIC

Continued energy innovation will play a key role in ensuring California benefits from clean, affordable, safe, and reliable energy — propelling the state as the world's fourth largest economy while advancing leading-edge climate change solutions.

Since its outset in 2012, EPIC has funded 474 project awards, encumbering about $1.125 billion. Of that, EPIC has invested more than:

- $236 million toward the clean energy Entrepreneurial Ecosystem, leveraging, aligning, and expanding California's existing assets to build a more interconnected and inclusive statewide ecosystem and helping bring innovations to market.
- $195 million for resiliency and safety, helping equip communities, businesses, and implementers of public services with the tools and technologies to provide critical resources during emergencies.
- $249 million for building decarbonization, helping improve the energy performance, health, affordability, and comfort of homes and businesses across the state.
- $223 million for grid decarbonization and decentralization, integrating and optimizing renewable energy for a cleaner electrical infrastructure.
- $119 million for industrial and agricultural innovation, supporting California's agricultural and industrial producers in achieving improved energy performance and greater energy cost savings.
- $86 million for zero-emission transportation, enhancing the benefits of electric vehicle ownership for drivers and the grid while lowering costs.

EPIC investments have delivered tremendous and diverse benefits for Californians, including:

$10.5 BILLION → Private investment raised by businesses after receiving EPIC support.

70+ → EPIC-funded technologies and related services successfully commercialized and now available to California customers.

1,300+ → Subsequent deployments that resulted from 48 EPIC-funded demonstration projects.

21% → Employment growth experienced by small- and medium-sized businesses following an EPIC award.

EPIC in Focus:
Unlocking World-Class Testing Facilities for California Innovators

The CalTestBed Initiative is a voucher program offering California's clean energy entrepreneurs access to world-class testing facilities. CalTestBed is a unique opportunity to mitigate the complicated and often financially burdensome agreements needed for such testing, making it an exceedingly valuable opportunity for California's innovators and expediting their path to commercialization.

Since 2018, the network, which spans the nine University of California campuses and Lawrence Berkeley National Lab, has grown from the initial 28 testing facilities to 73 across the state.

As of 2022, CalTestBed had awarded 40 vouchers, and counting. Those recipients have since **created more than 243 jobs** and secured more than **$295 million in follow-on funding**.

"That really established our bona fides. [CalTestBed] provides a conduit to capital and the global marketplace. A few months after we entered the program, a venture capital firm invested $10 million in our company."

Paul Donahue, NeWorld CEO and CalTestBed voucher recipient

Furthermore, EPIC advanced an inclusive clean energy economy with:

70% OF TECH DEMONSTRATION AND DEPLOYMENT FUNDS → Invested in underresourced communities — double the statutory requirement.[1]

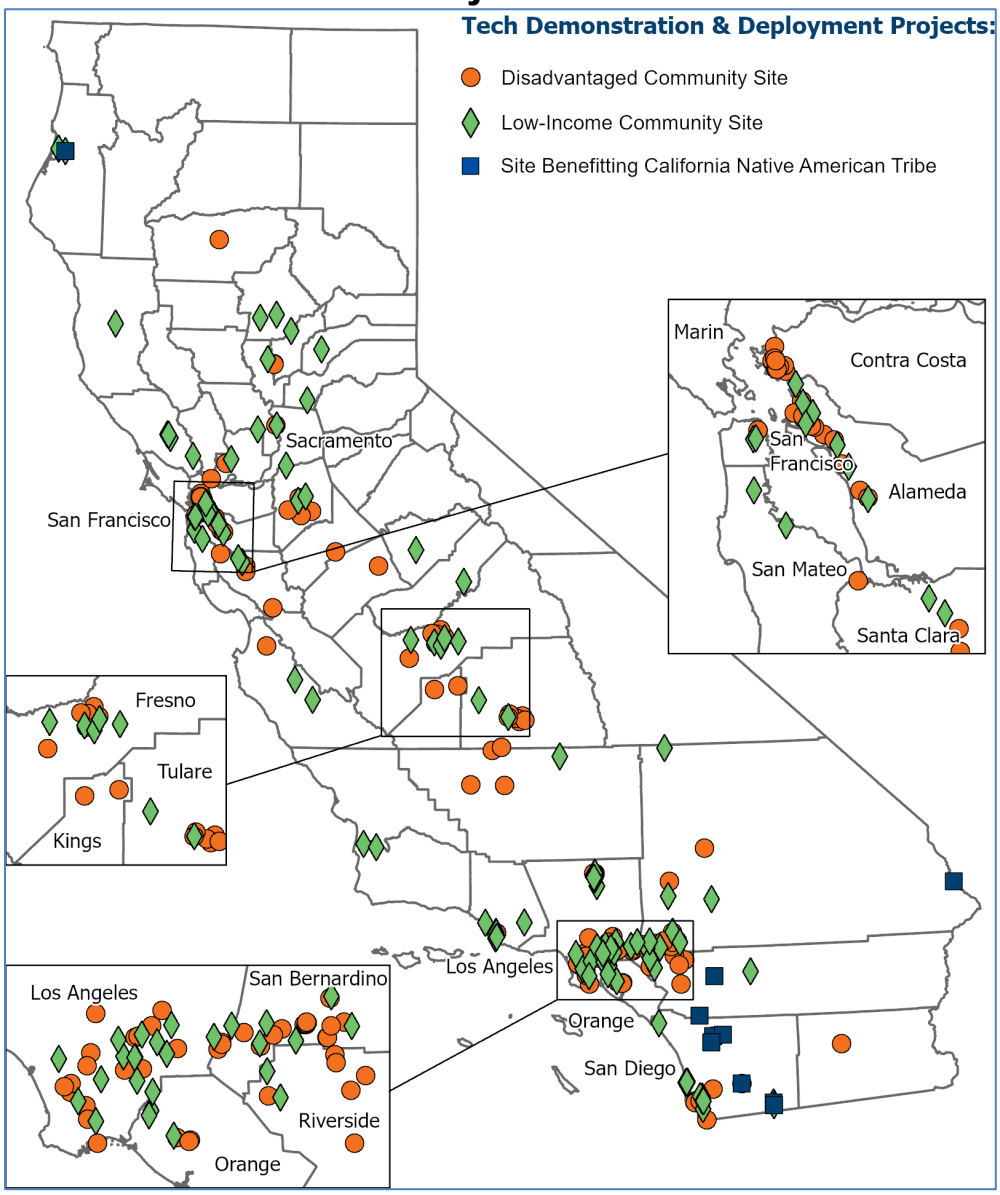
$22 MILLION OF TECH DEMONSTRATION AND DEPLOYMENT FUNDS → Invested in projects benefitting California Native American tribes.

Projects such as those spearheaded by ZNE Alliance in Richmond to develop a scalable virtual power plant model and the Electric Power Research Institute to demonstrate a cost-competitive residential zero net energy community design in Fresno have helped center underresourced communities in energy innovation.

The CEC is committed to ensuring all Californians benefit from clean energy research. Consistent with legislation including Assembly Bill (AB) 523 (Reyes, Chapter 551, Statutes of 2017) and California Public Utilities Commission (CPUC) guidance, the CEC has prioritized energy equity in its research programs to ensure that underresourced communities benefit from emerging clean energy technologies and solutions. Projects located in, and benefiting, low-income communities, disadvantaged communities, and California Native American tribes can be seen in Figure 1.

1 Including projects in disadvantaged communities and low-income communities, as defined by Assembly Bill 523.

Figure 1: EPIC Demonstration Projects in Underresourced Communities



Credit: California Energy Commission

CHAPTER 3:
2022 EPIC Features

Increasing Resilience and Reliability Amid a Changing Climate

Climate change continues to drive extreme weather events in the West, with an increased frequency and severity of heat waves and wildfires. The variability in weather patterns and increase in weather-related disasters have, in turn, challenged grid reliability. In August 2020, a west-wide heat wave resulted in rotating power outages with 1,000 megawatts (MW) of electricity that had to be taken out of service. In 2021, an Oregon wildfire impacted transmission lines that California relies on for electricity, resulting in a loss of 3,000 MW of overall import capacity to the state. Extreme weather again challenged the grid in 2022 when record-high temperatures resulted in a new record peak load at 52,061 MW — nearly 2,000 MW higher than the previous record. The CEC, through EPIC and other initiatives, is taking a multipronged approach to increase reliability and resiliency of the electric system. Within EPIC this approach includes:

- Developing **emerging, nonlithium long-duration energy storage** technologies that can deliver anywhere from 8 hours to several days of duration at a cost significantly less than lithium-ion batteries. Notable investments include Eos, Form Energy, and Antora Energy.
- Demonstrating technologies that can **unlock new load flexibility from buildings and electric vehicles** to respond to grid conditions, including enabling the use of electric vehicles as clean back-up power during outages. Notable investments include OhmConnect, Nuvve, and the CalFlexHub initiative at Lawrence Berkeley National Lab.
- Funding **first-of-their-kind microgrids** that power critical services during outages. Notable projects include BoxPower, Fremont Fire Station Microgrid, and Marine Corps Air Station Miramar.
- Advancing **climate science and tools** to better predict and respond to extreme weather events impacting the electricity sector. Notable projects in this space include Climformatics, CalAdapt, and Pyregence.

The Miramar Microgrid:
Supporting Our Military and Our Grid

"MCAS Miramar is proud of the base's work to become a military leader in energy resilience readiness. Our success with the state's Emergency Load Reduction Program was made possible by connections fostered through the CEC, Naval Facilities Engineering Command Southwest, and the CPUC. We hope this can serve as a model for bases here and abroad."

— Colonel Thomas Bedell, Commanding Officer, MCAS Miramar

Microgrids have become a frontline resiliency resource in California as climate change increasingly challenges the electricity system. A microgrid demonstration project at Marine Corps Air Station (MCAS) Miramar, funded in part through the EPIC program, is producing real-world reliability benefits to the state's electric grid while advancing technologies that support national security.

Miramar's microgrid was conceived in 2011 in partnership with the U.S. Department of Energy's (DOE) National Renewable Energy Lab to meet power requirements for the base's critical missions as part of a U.S. Department of Defense (DOD) Energy Resilience Readiness Exercise and first became operational in 2020. With follow-on funding from EPIC, the microgrid will incorporate lithium-ion battery energy storage and advanced demand-response controls. These components will enable more reliable integration of intermittent electricity generated nearby from renewable municipal landfill gas captured from methane emissions that otherwise would have been flared. When the CEC-funded battery system is fully integrated, the MCAS microgrid will be able to island for an increased amount of time, with an improved ramp-up rate and greater reliability to serve the base and the state's grid.

This capability proved a valuable resource to the grid during the heat waves in September 2022 and especially on September 6, when California recorded its highest ever peak demand on the electric grid of 52 gigawatts (GW). The ability of the microgrid to island in seconds allowed Miramar to shed 6 MW of load from the state's electric system during peak hours. Over 10 days, disconnecting at critical times, the Miramar microgrid was able to provide load flexibility and support grid stability.

The Miramar microgrid has become a reliable partner to the state in shedding load from the grid during high peak demand events, demonstrating that microgrid projects such as these can benefit both grid reliability and resiliency for the base itself. The success of the microgrid has led to further interest throughout the DOD in replicating the model at different military bases, both in the United States and internationally.

By the Numbers

16: The number of times Miramar's microgrid supported the grid during demand response events since coming on-line in 2020.

10+: The number of full, base-wide island events coming from black start or full-base outage tests since its debut.

6MW: Amount of grid capacity relief Miramar can deliver in a single demand response event.

Figure 2: Generation at MCAS Miramar

Caption: A United States Marine walks by solar panels at MCAS Miramar

Credit: U.S. Marine Corps

Pyregence:
Preventing Wildfires Through Big Data

"We came together around a common vision and cause and are now providing groundbreaking models and tools that are changing the way we plan for and mitigate natural disasters."
— David Saah, PhD –Managing Principal at Spatial Informatics Group on EPIC-funded Pyregence

With an uptick in the frequency and intensity of wildfires in California in the past decade, EPIC's investment in Pyregence is helping the state combat climate disasters while modernizing, democratizing, and accelerating wildfire science and climate change research.

Pyregence emerged directly from an EPIC call to action following the devastating Tubbs Fire in 2017 and Camp Fire in 2018. The CEC recognized a gap in available wildfire science data that impacted the ability of utilities and state emergency services to respond effectively to wildfires both in real time and in long-term planning. EPIC's $5 million grant helped create a consortium of leading scientists across the nation from government, academia, and the private sector.

Pyregence's multidisciplinary approach has created a new paradigm for how best to plan for wildfires. The consortium has developed new software tools — including the wildfire forecasting tool **PyreCast** and climate change projection modeler **PyreClimate** — that use the most current analytical models and climate change data to deliver more granular results that improve the timeliness and accuracy of estimates.

Following the group's launch in 2020, Pyregence has since generated data for a wide range of California stakeholders, including utility companies, the California Independent System Operator (California ISO), California Department of Forestry and Fire Protection (CAL FIRE), local land-use planners, and insurance companies. Its models are also contributing to new science findings in California's *Fifth Climate Change Assessment.*

Pyregence is entirely open source, enabling any member of the public to use its tools, download the source code, and submit feedback or data to improve the analyses. This approach has supported tool usage globally and exemplifies how California's public dollars can catalyze teams and benefits extending far beyond its borders.

By the Numbers

4 million: The number of acres burned in California in 2020.

7 days: Number of days that can be forecasted out for active fires compared to industry standard of 4 days.

4x/day: The frequency of updates to the PyreCast 5-day fire weather forecast, providing hourly meteorological inputs and fuel moisture content values necessary to drive real-time fire risk forecasts.

20,000+: The number of PyreCast users during fire season since its launch.

50: Active team members across the United States.

$0: Cost to users, including fire risk managers, utility companies, and concerned residents, to access information on wildfire risks.

Figure 3: 2021 California Monument Fire

Credit: USDA

Building a Circular Economy for Next-Generation Battery Technologies

Battery storage is vital to realizing the state's clean energy policy goals, with as much as 50 GW of additions anticipated by 2045 to meet the goals of SB 100. Lithium-ion batteries make up the vast majority of energy storage systems in California and are expected to remain the dominant energy storage technology going forward. However, current lithium-ion batteries have safety and supply chain concerns that could slow the deployment of electric vehicles and stationary energy storage. Furthermore, despite significant cost decreases over the past decade, the price of lithium-ion batteries remains out of reach for many customers without incentives. To ensure electric ratepayers and customers have access to safe and affordable battery storage, the CEC has **invested more than $57 million** in EPIC funding across the entire battery value chain, including:

- Technologies that can enable cost-competitive and locally beneficial **lithium recovery from geothermal brine** located in the Salton Sea. Notable investments include projects with SRI International, BHER Minerals, and Controlled Thermal Resources.
- **Advanced battery components and manufacturing** that can solve a range of technical challenges and lead to safer and cheaper battery storage. Notable investments include Sepion Technologies, Cuberg, Sparkz, and South 8 Technologies.

- Technologies that can **repurpose used electric vehicle batteries** into stationary energy storage systems at a cost much lower than that of systems using new lithium-ion batteries. Notable investments include RePurpose, ReJoule, and Smartville.
- Projects to advance the technology readiness, commercial scale-up pathways, and environmental benefits of **high-value, direct recycling processes for lithium-ion batteries**. Notable investments include UC San Diego and OnTo Technology.

South 8 Technologies: Increasing the Safety and Affordability of Lithium-Ion Batteries

"We knew it wouldn't be easy to get off the ground, and our technology needed immense derisking when we started. EPIC funding was crucial in getting our development through that early stage."

— Cyrus Rustomji, South 8 Founder

Lithium-ion batteries are ubiquitous, powering devices ranging from personal cell phones to grid-scale energy storage. However, when damaged or subjected to extreme temperatures, these battery types can experience thermal runaway events that lead to fires. South 8 Technologies, a San Diego-based diverse small business, has developed a novel, nontoxic liquefied gas electrolyte called LiGas® to replace the conventional liquid electrolytes that are the catalyst for thermal runaway.

Because LiGas® becomes gaseous at room temperature, it safely and quickly vents from a damaged battery cell before a thermal runaway event can occur. In addition, batteries using this novel electrolyte can operate across a wider range of temperatures without safety concerns or a decrease in battery performance. LiGas® can also be adapted into existing lithium-ion battery manufacturing processes and facilities — significantly reducing the time and cost for this technology to be incorporated into new lithium-ion battery products.

South 8 credits the Energy Commission's Entrepreneurial Ecosystem[2] for helping it overcome the common barriers and challenges start-up companies face in bringing new clean energy innovations to market. Beginning with an initial California Sustainable Energy Entrepreneur Development Initiative (CalSEED) grant back in 2015, South 8 has received CEC funding and support at key stages of its technology's development and company's growth and is now getting ready for commercial deployment. With a recent $3.125 million grant awarded by the U.S. DOE's Advanced Research Projects Agency-Energy (ARPA-E) to participate in its American Low-Carbon Living (EVs4ALL) program, South 8 plans to develop and evaluate high-power, rapid-charge Li-ion battery cells using its LiGas® electrolyte over the next three years in collaboration with a global automotive manufacturer. By year end, it expects to increase the size of its team from 23 to 33.

By the Numbers

30%: Anticipated reduction in battery costs using the LiGas® electrolyte.

2 The CEC's Entrepreneurial Ecosystem is a set of EPIC-funded initiatives that provide funding and support services to clean energy entrepreneurs in California.

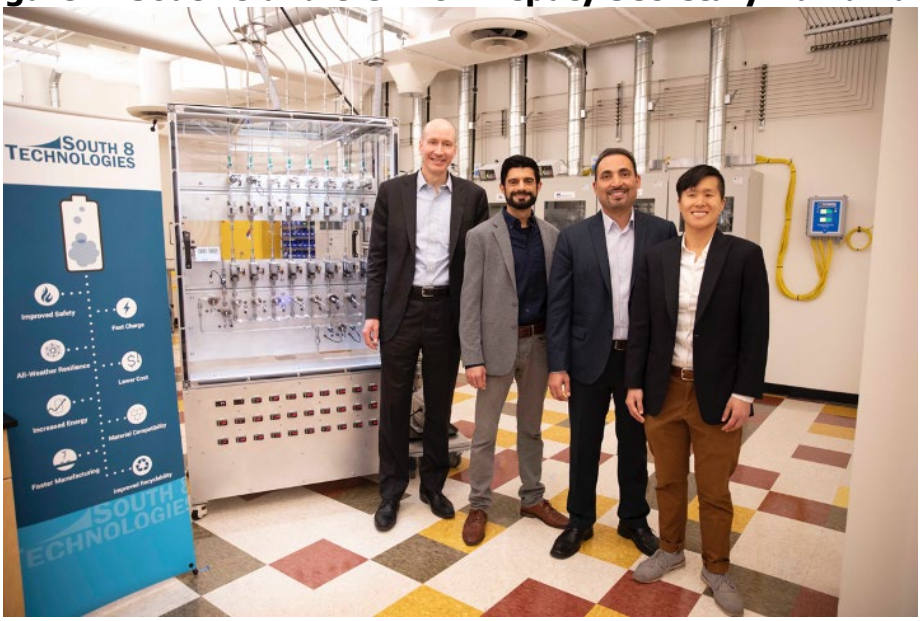
15 Minutes: Average fast-charge time goal for a South 8 battery in a light-duty vehicle.

-20 to 60 degrees Celsius: The safe temperature range for lithium-ion batteries using traditional electrolytes.

-60 to 60 degrees Celsius: The safe temperature range for lithium-ion batteries with LiGas®.

35%: Increase in lithium-ion battery energy density with LiGas®.

Figure 4: South 8 and U.S. DOE Deputy Secretary David Turk



Caption: Deputy Secretary of the U.S. Department of Energy David Turk, Cofounder and Chief Executive Officer Cyrus Rustomji, Chief Commercial Officer Hamid Sayadi and Cofounder and Chief Technology Officer Jungwoo Lee after recently being selected for a $3.1 million award from the Advanced Research Projects Agency – Energy

Credit: South 8 Technologies

Smartville, Inc.:
Giving EV Batteries a Second Life Powering California

"This project is filling a very important kind of hole in the mosaic for California to achieve its clean energy goals. Reusing EV batteries for energy storage is exactly what the state needs."

— David Hochschild, Chair, California Energy Commission

With more EVs on the road, there is a concern over how to manage the rapidly growing stock of used EV batteries. Thankfully, California researchers are developing solutions. Smartville Inc., spun out of a UC San Diego lab, has a plan to repurpose these batteries and help with energy needs beyond transportation.

Smartville works with repurposed Tesla and Nissan Leaf batteries to provide an energy storage system that delivers building resiliency and load-shifting services for commercial buildings with critical 24/7 power needs. Its prototype battery energy storage system, called MOAB™ (Modular Assembly Battery), addresses many of the challenges of repurposing EV batteries for

grid storage, including battery imbalances of used lithium-ion batteries and low-cost integration of batteries with several form factors and electrical and thermal characteristics.

Smartville's research at UC San Diego was initially funded in 2018 by ARPA-E. Since spinning out its company, Smartville has seen support from CalSEED and CalTestBed and received two EPIC awards that have helped it develop and scale the technology, explore prospective customer bases, and develop plans for expansion.

In March 2023, Smartville was also awarded $5.9 million from the U.S. DOE to scale the development of its MOAB™ energy storage systems — a grant that EPIC will also support by providing cost share funding. Smartville will use the new funds to get MOAB™ UL-certified as a second-life EV battery pack energy storage system and to fund a 4-megawatt-hour (MWh) demonstration project in Central California that is collocated with an existing power plant operated by a California independent power producer in an underresourced community. The battery pack energy storage system should help in improving local air quality in an area that has seen historically high levels of air pollution.

By the Numbers

15,000 MW: Amount of storage capacity that needs to come on-line in California by 2032.

100 MWh: Manufacturing production capacity planned by 2025, a 10x scale-up.

48+: Hours of back-up power in pilot test at the University of California, San Diego.

4 MWh: Total planned capacity at Wellhead Electric, a San Joaquin Peaker Plant.

Figure 5: Smartville MOAB™ Energy Storage System

Caption: Smartville MOAB™ Energy Storage System, powered by repurposed EV battery packs and charged by a UC San Diego solar energy array

Credit: *The San Diego Union-Tribune*

Enabling the Electrification of Everything

Electrification is a key strategy for meeting the state's carbon neutrality goals and improving local air quality. Electrifying energy uses currently served by fossil fuels also has the potential to bring additional flexible load onto the grid — enabling increased integration of renewable electricity. But while the state is poised to see significant growth in electrification, barriers remain. Existing electric options are unable to provide the high thermal requirements needed for many industrial processes, while renters and residents of existing and multifamily homes may not be able to adopt electric appliances or vehicles because of the need for panel upgrades or other barriers. As the state electrifies more of its overall energy sector, new technology solutions will be needed to reduce overall and peak electricity demand. Electricity consumption for cooling is expected to increase over the coming decades as warming temperatures drive increased demand for air conditioning and refrigeration. To enable wide-scale electrification, EPIC invested more than $17 million in 2022 in projects to drive building decarbonization and has supported a broad set of technology solutions, including:

- Technologies **such as novel electric heat pump designs** that can overcome customer barriers to electrification, particularly in multifamily and low-income buildings. Notable investments include Gradient, Neocharge, and the Sonoma Advanced Energy Center.
- **Solid-state cooling technologies** that avoid energy-intensive vapor compression systems or global-warming refrigerants. Notable investments include SkyCool Technologies and General Engineering and Research.
- Technologies to electrify **industrial processes** including electrochemical catalysts and advanced membranes to replace thermal processes using fossil fuels. Notable investments include Twelve, Porifera, and Skyven Technologies, Inc.
- **Transparent, lightweight, and flexible solar PV technologies** that can be embedded into windows, EV roofs, and building façades to reduce electricity demand from increased electrification. Notable investments include Next Generation Technologies, Ubiquitous Energy, and Swift Solar.

Gradient:
Making Building Electrification Accessible for All

"We are reimagining the HVAC industry by building products that keep homes comfortable and healthy for the people who inhabit them without compromising the environment."

— Vince Romanin, Gradient cofounder and CEO.

Multifamily units, low-income households, and renters have historically had few technology options for their heating and cooling needs, having to largely rely on inefficient cooling systems and gas wall furnaces. Gradient's window heat pump technology provides a much-needed space heating and cooling solution for these important customer groups. Gradient uses R-32, a refrigerant with a significantly lower global warming potential than others in the industry, and a design that sits below the window, allowing unimpeded light and airflow. The technology is shelf-ready and can be installed and removed without the assistance of a contractor or specialized tools, allowing renters to take the product with them when they move.

As it did for South 8 Technologies and Smartville, the CEC's Entrepreneurial Ecosystem has played a critical role in Gradient's technology development, product commercialization, and company growth. Gradient's CEO, Vince Romanin, entered the Cyclotron Road program[3] in 2017 with an idea to reimagine an industry that had previously seen little innovation. Following the Cyclotron Road program, Gradient went on to receive two Energy Commission EPIC awards to improve the heating performance of its heat pump system for colder climates and establish its initial manufacturing line in California.

Since coming to market with its product, Gradient's trajectory has been meteoric. In August 2022, Gradient was named one of two winners of New York State's Clean Heat for All Challenge and awarded a contract to manufacture and supply 10,000 units for public housing in New York City. Gradient has also received national media recognition, including from *Time Magazine*, which named the technology one of the Top 200 Inventions of 2022.[4]

By the Numbers

4 billion: Anticipated number of AC units worldwide by 2050.

95%: Reduction in greenhouse gas emissions in single-family and multifamily units when Gradient is used to both cool and heat.

$5,000: Savings on installation costs for a Gradient heat pump ($0) compared to conventional technology.

30–60 minutes: Average amount of time it takes a customer to install a Gradient heat pump in their residence.

33% and 70%: Increase in efficiency provided by Gradient's modular heat pump for cooling and heating, respectively.

3 Cyclotron Road is a two-year fellowship program supporting technology and entrepreneurship development located at Lawrence Berkeley National Lab and co-funded by EPIC.

4 Mock, Jillian. November 10, 2022. "Breaking the AC-Climate Change Doom Loop: Gradient Heat Pump AC Window Unit." *Time,* https://time.com/collection/best-inventions-2022/6224874/gradient/.

Figure 6: Gradient

Caption: Gradient fits below the window sill, allowing a better view than traditional in-window AC units.

Credit: Gradient

Twelve:
Electrifying Chemical Manufacturing

"Twelve's solution uses renewable electricity to convert CO_2 emissions into high-value products. Our system can operate at a steady state, or it can ramp from 0 to 100% capacity in seconds to operate only during periods when load is needed. We are creating the foundation for a new value chain based on recycled CO_2, rather than on fossil fuels."

— Etosha Cave, co-founder and Chief Scientific Officer, Twelve

The chemical manufacturing sector is critical to the economy, supplying many of products consumers use in their everyday lives, including plastics, cleaning supplies, and fuels.

This sector is also one of the most challenging to decarbonize, as it relies on fossil fuels for feedstock and the process heat to manufacture these products. Twelve (formerly Opus 12) is a chemical company that uses carbon dioxide (CO_2), water, and renewable electricity to produce the building blocks for a wide array of chemical products, from apparel to jet fuel.

Twelve's electrochemical reactor — a membrane electrode assembly (MEA) — is designed to be fully integrated into existing industrial processes, allowing a more seamless deployment into supply chains. Twelve's system can enable industrial facilities to quickly ramp up production capacity to take advantage of low-cost renewable overgeneration that is currently curtailed, reducing costs to the industrial producer.

The technology behind Twelve was developed by Dr. Etosha Cave and Dr. Kendra Kuhl at the Jaramillo Group at Stanford University. They cofounded their company in 2012 along with fellow Stanford graduate Nicholas Flanders. EPIC funding has supported the company at key stages of the development and growth, initially through CalSEED and more recently through the CalTestBed program. Twelve was also awarded a RAMP (Realizing Accelerated Manufacturing and Production for Clean Energy Technologies) award in 2021 to build out the initial manufacturing line for its MEA technology in Berkeley, California. Since receiving the RAMP award, Twelve has received more than $180 million in private investment and is currently working with major manufacturers and the military to produce a wide range of low-carbon industrial products — spanning car parts, detergent, sunglasses, and a jet fuel alternative.

By the Numbers

365: Number of days of renewable curtailment in California in 2022. Chemical manufacturer customers can take advantage of affordable renewable overgeneration with Twelve's technology.

50%: The share of industrial emissions that can be reduced by replacing fossil feedstocks through Twelve's technology.

5+: The number of major corporations who have officially partnered with Twelve, including Shopify, Alaska Airlines, and Microsoft.

275: Number of people Twelve plans to employ by the end of 2023, growing from four people in 2016 at the time of its CalSEED award.

Figure 7: Etosha Crave and Twelve's Reactor

Caption: Etosha Cave, cofounder and chief scientific officer of Twelve, holding the company's reactor.

Credit: Twelve

CHAPTER 4:
Looking Ahead: EPIC Opportunities in 2023

The CEC's statutory mission for EPIC is to fund projects that benefit electric ratepayers and lead to technological advancements and breakthroughs for achieving the state's statutory energy policy goals. The state's world-leading energy policy goals — including 100 percent renewable and zero-carbon electricity by 2045 — provide not only a vision of the future energy sector, but also guidance and direction for future EPIC investments. In 2023, the CEC will continue to invest EPIC funding in new and emerging science and technology topics that enable California to realize its goals at a lower cost and on an accelerated timeline. Priority investments planned for 2023 include:

- Developing and demonstrating **advanced prefabricated zero-carbon homes** that can be quickly and affordably deployed in underresourced communities.
- Developing new designs for **floating offshore wind mooring lines and anchors** and **environmental monitoring technologies** that are critical for successful offshore wind development off the coast of California.
- Advancing methods to improve the **valuation of investments in grid resilience** to weather-related events and outages, including in underresourced communities.
- Demonstrating new technology advancements in **emerging nonlithium long-duration energy storage** and associated benefits in underresourced communities.
- Supporting the state's clean energy entrepreneurs through the next round of cohorts for **CalSEED, CalTestBed,** and **RAMP.**
- Conducting objective analysis to inform the **roll out of renewable hydrogen in California** and the intersection of renewable hydrogen with the electricity sector.
- Continuing to build out California's circular battery economy and increase supply chain security by scaling up **novel lithium-ion battery recycling and reuse processes.**
- Developing a new generation of **efficient, high-power electronic devices** than can enable EVs across all market sectors to better serve customer and grid needs.
- Improving the energy efficiency and cost-competitiveness of electric technology options for **decarbonizing the industrial sector,** including concrete manufacturing.

For information on current and completed EPIC projects, visit the Energize Innovation Showcase at https://www.energizeinnovation.fund/projects.

GLOSSARY

Term	Definition
AB	Assembly Bill
ARPA-E	Advanced Research Projects Agency-Energy – a United States Department of Energy Program advancing high-impact energy technologies by providing funding, technical assistance, and market readiness
CAL FIRE	California Department of Forestry and Fire Protection
California ISO	California Independent System Operator
CalSEED	California Sustainable Energy Entrepreneur Development Initiative
CARB	California Air Resources Board
CEC	California Energy Commission
CO_2	Carbon dioxide
CPUC	California Public Utilities Commission
Disadvantaged community	A community that scores at or above 75 percent in the version of CalEnviroScreen that was available at the time of project application.
EPIC	Electric Program Investment Charge
GW	Gigawatt
MW	Megawatt
RAMP	Realizing Accelerated Manufacturing and Production for Clean Energy Technologies
SB	Senate Bill
TDD	Technology deployment and demonstration
USDOD	United States Department of Defense
USDOE	United States Department of Energy

APPENDICES

The following appendices are available as a separate volume (Publication Number CEC-500-2023-012-AP A-B):

- Appendix A: CEC EPIC Reporting Requirements and Budget Information for Calendar Year 2022
- Appendix B: CEC EPIC Projects Awarded through 2022 with Fiscal and Diversity Details

CALIFORNIA ENERGY COMMISSION

California Energy Commission

STAFF REPORT

Electric Program Investment Charge 2022 Annual Report

Appendices A-B

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APPENDIX A:
CEC EPIC Reporting Requirements and Budget Information for Calendar Year 2022

The California Energy Commission (CEC) is committed to transparency and full compliance with all applicable Electric Program Investment Charge (EPIC) reporting and informational requirements. This annual report has been prepared in accordance with applicable statutory reporting requirements and will be submitted to the California Public Utilities Commission (CPUC) after CEC adoption at a Business Meeting.

Appendix A provides required information (or its location) specified in Public Resources Code Sections 25711.5(f) and 25711.6, as well as additional budget information for the CEC's administration of EPIC. The CEC must prepare and submit its EPIC Annual Report to the Legislature no later than April 30 of each year, which shall include information shown in Table A-1. Additional reporting information follows in Table A-2, and the CEC reports on its EPIC budget in the subsequent tables.

Table A-1: CEC EPIC Reporting Requirements to the Legislature
Calendar Year 2022

Legislative Requirement	Information/Location
A. Annual Report to Legislature: Public Resources Code Section 25711.5(f) requires an annual report to the Legislature. The annual report must contain all information as described in Section 25711.5(f)(1)-(8) as follows:	See below.
(1) A brief description of each project for which funding was awarded in the immediately prior calendar year, including the name of the recipient and the amount of the award, a description of how the project is thought to lead to technological advancement or breakthroughs to overcome barriers to achieving the state's statutory energy goals, and a description of why the project was selected.	Energize Innovation Showcase at https://www.energizeinnovation.fund and EPIC Database at https://www.epicpartnership.org
(2) A brief description of each project funded by the EPIC program that was completed in the immediately prior calendar year, including the name of the recipient, the amount of the award, and the outcomes of the funded project.	Energize Innovation Showcase at https://www.energizeinnovation.fund and EPIC Database at https://www.epicpartnership.org
(3) A brief description of each project funded by the EPIC program for which an award was made in the previous years but that is not completed, including the name of the recipient and the amount of the award, and a description of how the project will lead to technological advancement or breakthroughs to overcome barriers to achieving the state's statutory energy goals.	Energize Innovation Showcase at https://www.energizeinnovation.fund and EPIC Database at https://www.epicpartnership.org
(4) Identification of the award recipients that are California-based entities, small businesses, or businesses owned by women, minorities, or disabled veterans.	Appendix B to this annual report.

Legislative Requirement	Information/Location
(5) Identification of which awards were made through a competitive bid, interagency agreement, or sole source method, and the action of the Joint Legislative Budget Committee (JLBC) pursuant to paragraph (2) of subdivision (h) for each award made through an interagency agreement or sole source method.	Appendix A, Table A-3 provides information for interagency and sole source agreements and JLBC action, as of December 31, 2022. Appendix B to this annual report provides information for competitive bid agreements.
(6) Identification of the total amount of administrative and overhead costs incurred for each project.	Appendix B to this annual report.
(7) A brief description of the impact on program administration from the allocations required to be made pursuant to Section 25711.6, including any information that would help the Legislature determine whether to reauthorize those allocations beyond June 30, 2023.	The required allocations are 25 percent of EPIC funds for technology demonstration and deployment at sites in and benefiting disadvantaged communities and an additional 10 percent of EPIC funds for technology demonstration and deployment at sites in and benefitting low-income communities. In 2022, the CEC allocated approximately two person-years to implement Section 25711.5(f)(7), for coordination among agreement managers to ensure diversity and equity are included across EPIC funding opportunities.
(8) Identify the projects that received follow-on funding, the amount of follow-on funding each project received, and the method and criteria that was used for their selection.	The CEC awarded eleven projects follow-on funding as of December 31, 2022, listed in this Appendix A, Table A-4. The criteria used to select the projects are listed in this Appendix A, Table A-5. These projects were awarded through an Invitation for Bid method. As part of this method, CEC staff identify project recipients, based on prior project performance, policy impact and statutory

Legislative Requirement	Information/Location
	requirements for follow-on funding, and invite them to submit a proposal for follow-on funding. A CEC technical evaluation committee reviews and evaluates the proposals and recommends whether the project merits follow-on funding. The proposed follow-on agreement is then considered for approval at a CEC Business Meeting.

Table A-2: CEC EPIC Reporting Requirements for the CPUC Calendar Year 2022

CPUC Requirements	Information/Location
A. Annual Report to Legislature: CPUC D.13-11-025, OP 29, requires that the annual report prepared and submitted to the Legislature pursuant to Public Resources Code Section 25711.5, also be submitted to the CPUC.	The annual report prepared and submitted to the Legislature pursuant to Public Resources Code Section 25711.5(f) will be submitted to the CPUC upon submittal to the Legislature.
B. Annual Report to CPUC: CPUC D.12-05-037, Ordering Paragraph (OP) 16, requires EPIC administrators to file an annual report each year on February 28, 2013 – February 28, 2020, with the Director of the Commission's Energy Division. This requirement in D.12-05-037 has expired. However, Public Resources Code Section 25711.5(f) continues to require the CEC to prepare and submit an EPIC Annual Report to the Legislature and CPUC D.13-11-025, OP 29, requires the CEC to submit copy of this report to the CPUC. The EPIC Annual Report is due to the Legislature no later than April 30 of each year.	This annual report has been prepared in accordance with applicable Public Resources Code reporting requirements and will be submitted to the Legislature and CPUC in accordance with Public Resources Code Section 25711.5(f) and D.13-11-025 after CEC adoption at a Business Meeting. Consistent with Rule 16.6 of the CPUC Rules of Practice and Procedure, on February 8, 2022, the CEC submitted a letter to the CPUC Executive Director proposing to submit the 2021 EPIC Annual Report and subsequent EPIC Annual Reports to the CPUC by April 30 of each year. This letter was also served on the EPIC proceeding service list. The CPUC Executive Director granted the CEC's request to

CPUC Requirements	Information/Location
	submit the EPIC Annual Report by the end of April each year going forward.
C. Service: CPUC D. 12-05-037, OP 16, requires service of the annual report on all parties in the most recent EPIC proceeding; all parties to the most recent general rate case of each investor-owned utility (IOU); and each successful and unsuccessful applicant for an EPIC funding award during the previous calendar year.	This requirement has expired, but this annual report will be served on all parties in the most recent EPIC proceeding; all parties to the most recent general rate case of each IOU; and each successful and unsuccessful applicant for an CEC EPIC funding award during the previous calendar year.
D. Information Availability: CPUC D.13-11-025, OP 13, requires EPIC administrators, except when valid reasons exist for confidentiality, to make all data, findings, results, computer models and other products developed through EPIC available upon request consistent with the treatment of intellectual property requirements.	This requirement has expired, but the CEC has and will continue to respond to all requests for information in accordance with any confidentiality requirements and consistent with the treatment of intellectual property requirements. Requests can be sent to the CEC's Energy Research and Development Division at erdd@energy.ca.gov.
E. Project Reporting: CPUC D.13-11-025, OP 14, requires annual reports to include a final report for every project completed during the previous year, including a comprehensive description of the project, detailed findings and results, a summary of all data collected, and how the data may be accessed.	This requirement has expired, but Energize Innovation Showcase at https://www.energizeinnovation.fund provides all substantive reporting for CEC EPIC projects.
F. Awards: CPUC D. 13-11-025, OP 15, requires annual reports to identify the use of noncompetitive awards.	This requirement has expired, but this Appendix A, Table A-3 provides this information.
G. Project Reporting: CPUC D.13-11-025, OP 17, requires annual reports to include project-level information on the number of bidders passing the initial pass/fail screening; the rank of the selected bidder; and if the selected bidder was not the highest scoring bidder, the project status report must also explain why a lower scoring bidder was selected.	The requirement to include a detailed bidder information has expired, and Section 25711.5(f)(5) requires only identification of bidding information, but requests can be sent to the CEC's Energy Research and Development Division at erdd@energy.ca.gov.
H. Project Reporting: CPUC D.13-11-025, OP 18, requires a justification for contracts or grants exempted from competitive bidding. Additionally, CPUC D. 18-10-052, pages 22-23, states that	The requirement to include a justification and detailed explanation has expired, and Section 25711.5(f)(5) requires only identification of bidding information,

	CPUC Requirements	Information/Location
	administrators should include a detailed explanation for the use of non-competitive processes.	but requests can be sent to the CEC's Energy Research and Development Division at erdd@energy.ca.gov. This Appendix A, Table A-3 provides information for interagency and sole source agreements and JLBC action. Through 2022, the CEC has made three EPIC awards through either an interagency or sole source method.
I.	Annual Report: CPUC D. 13-11-025, OP 23, requires the information in Attachment 6 thereto to be included as an electronic spreadsheet to report on projects described in section 4.b. of the annual report outline in CPUC D. 13-11-025, Attachment 5.	This requirement has expired, but Energize Innovation Database at https://www.energizeinnovation.fund provides all substantive reporting for CEC EPIC projects, which can be downloaded as an electronic spreadsheet
J.	Annual Report: CPUC D. 13-11-025, OP 27, requires the annual report to identify the metrics used for each project, either from CPUC D. 13-11-025, Attachment 4, or additional metrics where appropriate.	This requirement has expired, but Energize Innovation Showcase at https://www.energizeinnovation.fund provides all substantive reporting for CEC EPIC projects, including metrics used for projects.
K.	Information Availability: CPUC D. 13-11-025, OP 29(b), requires that, at the CPUC's request, the CEC give the CPUC full access rights to all EPIC research, development, and demonstration, reports, intellectual property (IP), and data to which the CEC has access, with appropriate protections for proprietary data and IP against public disclosure.	This requirement has expired, but the CEC remains able and willing to comply with any CPUC requests pursuant to this requirement. Requests can be sent to the Energy Research and Development Division at erdd@energy.ca.gov.
L.	Information Availability: CPUC D. 13-11-025, page 64, encourages the CEC to make its annual reports accessible to the public on its EPIC webpage and through its public advisor.	This requirement has expired, but the CEC posts its EPIC annual reports on its Energy Research and Development Investment Plans and Annual Reports webpage at https://www.energy.ca.gov/data-reports/reports/energy-research-and-development-investment-plans-and-annual-reports, and makes its reports available through its public advisor's office.
M.	Project Reporting: CPUC D. 15-04-020, OP 6, requires the identification of any specific CPUC	This requirement has expired, but the CEC provides this information to the

	CPUC Requirements	Information/Location
	proceedings addressing issues related to each EPIC project.	CPUC for their EPIC Database at https://www.epicpartnership.org, which identifies specific CPUC proceedings related to each CEC EPIC-funded project. In addition, CEC and CPUC staff have implemented regular coordination meetings to identify and discuss potential intersections between CEC EPIC projects and CPUC proceedings.
N.	Joint Project Reporting: CPUC D. 15-04-020, OP 24, requires that if there are joint IOU and CEC projects, the IOU shall report the project title and amount of IOU funding used for the joint project(s) and the CEC shall be responsible for all other substantive reporting.	This requirement has expired, but Energize Innovation Showcase at https://www.energizeinnovation.fund provides all substantive reporting for CEC EPIC projects, including any joint IOU and CEC projects.
O.	Project Reporting: CPUC D. 15-04-020, page 53, requires that if an IOU administrator chooses to be a necessary partner on an CEC EPIC project, the IOU may use its EPIC funds for in-house costs and the IOU's reports shall identify the CEC project title and amount of IOU funding used, but the CEC shall be responsible for all other substantive reporting as with all its other projects.	This requirement has expired, but Energize Innovation Showcase at https://www.energizeinnovation.fund provides all substantive reporting for CEC EPIC projects, including any joint IOU and CEC projects.
P.	Fund Shifts Between Program Areas: EPIC administrators were required to obtain CPUC approval to shift more than 5 percent of budgeted funds for each funding category or program area or to new categories of funding within an approved EPIC triennial investment plan.[1] D. 21-11-028, OP 9, however, eliminated the CPUC approval requirement for shifting more than 5 percent of funds. Going forward, the CEC is "authorized to reallocate up to 15 percent of funds among each of their approved initiatives without additional Commission approval."[2]	Appendix A, Table A-11 shows the funds that were shifted as of December 31, 2022. The CEC has no pending requests to CPUC to shift funds above 5% or 15% (EPIC full Plan 4).

Source: California Energy Commission

[1] CPUC Decision 13-11-025, Ordering Paragraph 36.

[2] D. 21-11-028, OP 10.

Table A-3: Awards Made through an Interagency Agreement or Sole Source Method as of December 31, 2022

Agreement Number	Agreement Title	Recipient:	Funding Amount	Joint Legislative Budget Committee Action:
300-15-004	Optimizing Hydropower Operations While Sustaining Stream Temperatures and Ecosystem Functions	The Regents of the University of California, Merced	$650,000	Approved
300-15-005	Improving Hydrologic and Energy Demand Forecasts for Hydropower Operations with Climate Change	The Regents of the University of California, on behalf of the Irvine Campus	$720,000	Approved
300-15-006	Optimizing Use of Non-traditional Waters, Drought Proofing the Electricity System, and Improving Snowpack Prediction	The Regents of the University of California, Los Angeles	$1,130,000	Approved

Source: California Energy Commission

Table A-4: Follow-on Funding Projects Awarded as of December 31, 2022

Agreement Number	Agreement Title	Recipient	Follow-on Funding Award Amount
300-15-007	California Sustainable Energy Entrepreneurial Development	(CalSEED) Initiative California Clean Energy Fund dba CalCEF Ventures	$33,000,000
EPC-15-030	San Diego Regional Energy Innovation Cluster	Cleantech San Diego Association	$5,000,000
EPC-15-032	Bay Area Regional Energy Innovation Cluster	Cleantech Activate Global, Inc	$4,980,000
EPC-15-038	BlueTechValley Innovation Cluster	California State University, Fresno Foundation	$5,000,000
EPC-16-015	Los Angeles Regional Energy Innovation Cluster	Los Angeles Cleantech Incubator	$4,999,247
EPC-16-059	Advanced VGI Control to Maximize Battery Life and Use of Second-Life Batteries to Increase Grid Service and Renewable Power Penetration	Lawrence Berkeley National Laboratory	$1,000,000
EPC-18-002	California Test Bed Initiative	California Clean Energy Fund dba CalCEF Ventures	$10,998,701
EPC-20-019	Accelerated Deployment of Irrigation Pumping Demand Flexibility	Polaris Energy Services Inc.	$2,884,912
EPC-20-034	Building Resiliency from Within	OhmConnect, Inc.	$3,000,000
EPC-20-036	Load Shifting During Critical Summer Hours via Programmable Irrigation	AgMonitor Inc.	$349,972
EPC-22-003	Accelerate Development of Smartville Second-Life Battery Repurposing Platform	Smartville, Inc.	$2,000,000

Source: California Energy Commission

Table A-5: Follow-on Funding Criteria

Section 1: Administrative Screening Criteria	Follow-on project proposals must meet all the following to be eligible for funding: • The project has a prime recipient that is located in California. • The project will spend a minimum of 80 percent of its funding from the program in California. • The project has received funding for the original project or technology through a competitive bid process from a state or federal agency. • The project has demonstrated significant results under its previous award. • The project has technology breakthrough potential that can enable the state to achieve its statutory energy policy goals ahead of schedule. • The project can address near-term priorities impacting the electricity sector and its customers such as wildfires and associated power disruptions. • Absent follow-on funding, the project would experience a gap in funding that would likely prevent the technology from achieving significant technological advancement, negatively impact the ability of the project to attract sufficient private investment, or prevent the project's commercialization and associated sales revenue. • The project has not previously received follow-on funding through a non-competitive process. • For Technology Demonstration and Deployment projects, the project has a minimum of 20 percent match share.

Section 2: Technical Evaluation Criteria	The following criteria were used to assess whether the project merits follow-on funding:
	• The technology's competitive advantages over existing commercial offerings.
	• Market adoption potential for the technology in California.
	• Quantified and qualitative benefits to electric ratepayers based on a reasonable estimate of market adoption, if applicable.
	• The project's ability to address near-term priorities impacting the electricity sector and its customers including the following:
	  ○ Wildfires and public safety power shutoff-related outages
	  ○ Grid and customer service reliability

	• Performance metrics and technical milestones that were achieved under the prior project. • Performance metrics and technical milestones being proposed for the follow-on project.

Source: California Energy Commission

CEC EPIC Budget Information for Calendar Year 2022

The following tables provide budget information for the CEC's administration of EPIC through 2022.

Table A-6: CPUC Approved, Escalated CEC EPIC Funding for 2018-2020 EPIC 3rd Investment Plan

Program Area/Funding Type	Approved Total
Applied Research and Development	$158,912,222
Technology Demonstration and Deployment	$172,237,778
Market Facilitation	$66,230,000
Subtotal	**$397,380,000**
Administration	$44,400,000
Total	**$441,780,000**

Source: California Energy Commission

Table A-7: CPUC-Approved, CEC EPIC Funding for 2021-2025 EPIC 4th Interim Investment Plan

Program Area/Funding Type	Approved Total
Applied Research and Development	$41,200,000
Technology Demonstration and Deployment	$75,000,000
Market Facilitation	$16,334,000
Subtotal	**$132,534,000**
Administration	$14,726,000
Total	**$147,260,000**

Source: California Energy Commission

Table A-8: CPUC-Approved, CEC EPIC Funding for 2021-2025 EPIC 4th Investment Plan

Program Area/Funding Type	Approved Total
Non-Variable Renewable Energy	$23,000,000
Variable Renewable Energy	$29,000,000
Clean, Dispatchable Resources	$55,000,000
Grid Modernization	$27,240,000
Distributed Energy Resource Integration and Load Flexibility	$86,000,000
Transportation Electrification	$59,000,000
Industrial Decarbonization	$46,000,000
Building Decarbonization	$60,000,000
Entrepreneurial Support	$63,800,000
Scaling Clean Energy Technology	$18,200,000
Climate Resiliency	$18,000,000
Environmental Sustainability	$15,000,000
Subtotal	**$500,240,000**
Administration	$88,800,000
Total	**$589,040,000**

Source: California Energy Commission

Table A-9: Committed and Encumbered Project Funds by EPIC Investment Plan as of December 31, 2022

Investment Plan	Approved Plan Project Funds	Committed Project Funds	Encumbered Project Funds
2012-2014	$331,800,000	$331,800,000	$328,246,114
2015-2017	$365,004,500	$365,004,500	$348,857,997
2018-2020	$397,380,000	$397,380,000	$397,380,000
2021-2025 Interim	$132,534,000	$132,534,000	$34,825,535
2021-2025	$500,240,000	$500,240,000	$15,854,142
Total	**$1,726,958,500**	**$1,726,958,500**	**$1,125,163,788**

Source: California Energy Commission

Table A-10: Encumbered and Unencumbered Project Funds by EPIC Investment Plan as of December 31, 2022

Investment Plan	Approved Plan Project Funds	Encumbered Project Funds	Unencumbered Project Funds
2012-2014	$331,800,000	$328,246,114	$3,553,886
2015-2017	$365,004,500	$348,857,997	$16,146,503
2018-2020	$397,380,000	$397,380,000	$0
2021-2025 Interim	$132,534,000	$34,825,535	$97,708,465
2021-2025	$500,240,000	$15,854,142	$484,385,858
Total	**$1,726,958,500**	**$1,125,163,788**	**$601,794,712**

Source: California Energy Commission

Table A-11: EPIC Fund Shifts for 2018-2020 EPIC 3rd Investment Plan as of December 31, 2022

Program Area/ Funding Type	Approved Plan	Funding Shifts	Current Total
Applied Research and Development	$158,912,222	$217,065	$159,129,287
Technology Demonstration and Deployment	$172,237,778	-$101,802	$172,135,976
Market Facilitation	$66,230,000	-$115,263	$66,114,737
Subtotal	**$397,380,000**	**$0**	**$397,380,000**
Administration	$44,400,000	$0	$44,400,000
Total	**$441,780,000**	**$0**	**$441,780,000**

Source: California Energy Commission

Table A-12: EPIC Fund Shifts for 2021-2025 EPIC 4th Interim Investment Plan as of December 31, 2022

Program Area/ Funding Type	Approved Plan	Funding Shifts	Current Total
Applied Research and Development	$41,200,000	-$1,200,000	$40,000,000
Technology Demonstration and Deployment	$75,000,000	$1,200,000	$76,200,000
Market Facilitation	$16,334,000	$0	$16,334,000
Subtotal	**$132,534,000**	**$0**	**$132,534,000**
Administration	$14,726,000	$0	$14,726,000
Total	**$147,260,000**	**$0**	**$147,260,000**

Source: California Energy Commission

Table A-13: EPIC 2023 Funding Opportunities

Title	Release Dates
Advanced Prefabricated Zero Carbon Homes	January 10, 2023
Precipitation Enhancement and Environmental Research for Hydropower Generation (PEER-Hydro)	March 8, 2023
Energy Efficiency and Demand Response in Industrial and Commercial Cold Storage	March 2023 - June 2023
Nanogrid HVAC Module Development and Demonstration	March 2023 - June 2023
HVAC Decarbonization for Large Buildings	March 2023 - June 2023
Advancing Behind-the-Meter Resiliency-Enabling Power Electronics	April 2023 - June 2023
Optimizing Long-Duration Energy Storage to Improve Grid Resiliency and Reliability in Disadvantaged and Low-Income Communities and Native American Tribes	April 2023 - July 2023
Enabling Load Shifting and Energy-efficiency in Indoor Farms (ELSE-IF)	November 2022 - February 2023

Source: California Energy Commission

Appendix B: EPIC Projects Awarded through 2022 with Fiscal and Diversity Details

Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
300-15-004	The Regents of the University of California, Merced	Optimizing Hydropower Operations While Sustaining Stream Temperatures and Ecosystem Functions	$650,000	$114,054	$0	CBE
300-15-005	The Regents of the University of California, on behalf of the Irvine Campus	Improving Hydrologic and Energy Demand Forecasts for Hydropower Operations with Climate Change	$720,000	$144,000	$0	CBE
300-15-006	The Regents of the University of California, on behalf of the Los Angeles Campus	Optimizing Use of Non-traditional Waters, Drought Proofing the Electricity System and Improving Snowpack Prediction	$1,130,000	$198,000	$0	CBE
300-15-007	California Clean Energy Fund dba CalCEF Ventures	California Sustainable Energy Entrepreneurial Development (CalSEED) Initiative	$60,000,000	$1,563,250	$3,396,223	None
300-15-008	Itron, Inc., dba IBS	Research Roadmap for Getting to Zero Net Energy Buildings	$999,884	$171,332	$0	CBE
300-15-009	Guidehouse Inc.	Connecting Emerging Energy Technologies and Strategies to Market Needs and Opportunities	$6,937,889	$2,714,986	$0	None
300-15-010	Energetics Incorporated	Research Roadmap for Advancing Technologies in California's Industrial, Agricultural, and Water Sectors	$647,728	$122,646	$29,610	CBE
300-15-011	ADM Associates, Inc.	California Commercial End-Use Survey	$7,990,063	$3,426,324	$100,893	Small Business, Micro Business, CBE
300-15-013	ADM Associates, Inc.	California Investor-Owned Utility Electricity Load Shapes	$1,147,406	$430,673	$58,330	Small Business, Micro Business, CBE
300-17-003	Guidehouse Inc.	Distributed Energy Resources (DER) Roadmap	$499,065	$242,382	$0	None
300-17-004	Industrial Economics, Incorporated	Measuring Innovation Progress to Guide Future Investment: Evaluation of EPIC Benefits Methodology	$3,000,000	$1,716,826	$0	None
300-17-005	Energetics Incorporated	Research Roadmap for Cost and Technology Breakthroughs for Renewable Energy Generation	$338,059	$86,365	$0	None
300-18-001	Gladstein, Neandross & Associates, LLC	Technology Transfer for EPIC Research Projects	$3,788,265	$881,903	$1,310,568	Small Business, CBE
EPC-14-001	Itron, Inc., dba IBS	Improving Solar & Load Forecasts: Reducing the Operational Uncertainty Behind the Duck Chart	$998,926	$268,243	$453,462	CBE
EPC-14-002	Geysers Power Company, LLC	Investigating Flexible Generation Capabilities at the Geysers	$3,000,000	$0	$4,362,373	CBE
EPC-14-003	University of California, Los Angeles	Low- Cost Thermal Energy Storage for Dispatchable CSP	$1,497,024	$198,528	$300,000	CBE

Appendix B: EPIC Projects Awarded through 2022 with Fiscal and Diversity Details

Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-14-004	Halotechnics	Systems Integration of Containerized Molten Salt Thermal Energy Storage in Novel Cascade Layout	$1,500,000	$283,080	$19,038	None
EPC-14-005	The Regents of the University of California, San Diego	Solar Forecast Based Optimization of Distributed Energy Resources in the LA Basin and UC San Diego Microgrid	$999,984	$157,282	$999,984	CBE
EPC-14-007	University of California - Davis	Improving Short-Term Wind Power Forecasting through Measurements and Modeling of the Tehachapi Wind Resource Area	$1,000,000	$247,542	$90,325	CBE
EPC-14-008	The Regents of the University of California, San Diego	High-Fidelity Solar Power Forecasting Systems for the 392 MW Ivanpah Solar Plant (CSP) and the 250 MW California Valley Solar Ranch (PV)	$999,898	$168,624	$764,019	CBE
EPC-14-009	The Regents of the University of California on behalf of the Berkeley campus	Optimizing Radiant Systems for Energy Efficiency and Comfort	$2,939,964	$450,466	$299,194	CBE
EPC-14-010	Lawrence Berkeley National Laboratory	Solar-Reflective "Cool" Walls: Benefits, Technologies, and Implementation	$2,500,000	$908,941	$610,800	CBE
EPC-14-011	Regents of the University of California, Davis - California Lighting Technology Center	From the Laboratory to the California Marketplace: A New Generation of LED Lighting Solutions	$2,995,187	$557,072	$5,000	CBE
EPC-14-012	Lawrence Berkeley National Laboratory	Comparing Attic Approaches for Zero Net Energy Homes	$1,000,000	$563,439	$0	CBE
EPC-14-013	The Regents of the University of California on behalf of the Berkeley campus	Very Low-cost MEMS-based Ultrasonic Anemometer for Use Indoors and in HVAC Ducts	$2,488,964	$214,202	$249,000	CBE
EPC-14-015	Lawrence Berkeley National Laboratory	Direct Current as an Integrating and Enabling Platform	$1,000,000	$495,365	$100,000	CBE
EPC-14-016	BIRA Energy	Cost- and Energy-Efficient Attic Designs for California Homes	$1,000,000	$228,148	$265,000	CBE
EPC-14-017	Lawrence Berkeley National Laboratory	Developing Flexible, Networked Lighting Control Systems That Reliably Save Energy	$1,875,000	$216,162	$0	CBE
EPC-14-019	Electric Power Research Institute, Inc.	Validated and Transparent Energy Storage Valuation and Optimization Tool	$1,000,000	$482,416	$901,944	CBE
EPC-14-021	Electric Power Research Institute, Inc.	Development and Testing of the Next Generation Residential Space Conditioning System for California	$2,993,005	$1,072,105	$322,281	CBE
EPC-14-022	ABEC #3 LLC, dba Lakeview Farms Dairy Biogas	The Lakeview Farms Dairy Biogas - To - Electricity Project	$4,000,000	$29,498	$4,500,000	CBE
EPC-14-023	Eos Energy Storage, LLC	Utility Demonstration of Znyth Battery Technology to Characterize Performance and Grid Benefits	$2,156,704	$691,504	$1,167,607	None

Appendix B: EPIC Projects Awarded through 2022 with Fiscal and Diversity Details

Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-14-024	West Biofuels, LLC	Modular Biomass Power Systems to Facilitate Forest Fuel Reduction Treatment	$2,000,000	$330,466	$730,148	CBE
EPC-14-025	Sunfolding Inc.	Mass-manufactured, Air Driven Trackers for Low Cost, High Performance Photovoltaic Systems	$1,000,000	$157,497	$1,171,565	CBE
EPC-14-026	The Regents of the University of California, Berkeley Campus	Examining the Heterogeneity of Energy Efficiency Adoption and Savings Across Socio-Economic and Ethnic Groups Using a Large Scale Quasi-Experiment	$360,632	$65,406	$150,784	CBE
EPC-14-027	Regents of the University of California, Los Angeles	High Temperature Hybrid Compressed Air Energy Storage (HTH-CAES)	$1,621,628	$206,222	$0	CBE
EPC-14-028	InnoSepra, LLC	Low Cost Biogas Power Generation with Increased Efficiency and Lower Emissions	$1,318,940	$105,570	$959,150	CBE
EPC-14-029	ABEC #2 LLC, dba West Star North Dairy Biogas	The West Star North Dairy Biogas-to -Electricity Project	$4,000,000	$32,107	$5,000,000	CBE
EPC-14-030	Lawrence Berkeley National Laboratory	Paths to Sustainable Distributed Generation Through 2050: Matching Local Waste Biomass Resources with Grid, Industrial, and Community Levels	$1,500,000	$670,276	$282,000	CBE
EPC-14-031	University of California, Irvine	Pollution Control and Power Generation for Low Quality Renewable Fuel Streams	$1,499,386	$145,560	$438,345	None
EPC-14-032	Inova Energy Group, LLC	Capturing Cultural Diversity in California Residential Energy Efficiency Potential: An Energy Ethnography of Hispanic Households	$224,593	$10,681	$0	CBE
EPC-14-033	The Watershed Research and Training Center	North Fork Community Power Forest Bioenergy Facility Demonstration	$4,965,420	$87,680	$1,361,360	CBE
EPC-14-034	Interra Energy, Inc.	Interra Reciprocating Reactor for Low-Cost & Carbon Negative Bioenergy	$2,000,000	$264,400	$4,627,400	CBE
EPC-14-035	Lawrence Berkeley National Laboratory	Demonstration of integrated photovoltaic systems and smart inverter functionality utilizing advanced distribution sensors	$1,000,000	$375,000	$25,000	CBE
EPC-14-036	SunSpec Alliance	Smart Inverter Interoperability Standards and Open Testing Framework to Support High-Penetration Distributed Photovoltaics and Storage	$2,000,000	$162,005	$2,066,875	CBE
EPC-14-037	Center for Sustainable Energy	Home Energy Efficiency Retrofits in California: An Analysis of Sociocultural Factors Influencing Customer Adoption	$599,924	$166,993	$214,000	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-14-038	Indicia Consulting	Fieldwork to Document Technology Adoption and Behavior Change Across Diverse Geographies and Populations to Inform Energy Efficiency Program Design	$574,545	$40,208	$52,500	None
EPC-14-039	TRC Engineers, Inc.	Cultural Factors in the Energy Use Patterns of Multifamily Tenants	$379,019	$107,714	$100,000	CBE
EPC-14-040	Glint Photonics, Inc.	Self-Tracking Concentrator Photovoltaics for Distributed Generation	$999,940	$282,545	$2,500,000	CBE
EPC-14-041	Biogas & Electric, LLC	Installation of a Lean Burn Biogas Engine with Emissions Control to Comply with Rule 1110.2 at a Wastewater Treatment Plant in South Coast Air Quality Management District	$2,249,322	$0	$450,000	CBE
EPC-14-044	Lawrence Berkeley National Laboratory	Enabling Anaerobic Digestion Deployment for Municipal Solid Waste-to-Energy	$4,300,000	$1,497,504	$1,500,000	CBE
EPC-14-045	Taylor Energy	Advanced Recycling to 1-MW Municipal Solid Waste of Electricity Generation	$1,499,481	$168,742	$46,616	CBE
EPC-14-046	Kennedy/Jenks Consultants	Lowering Food-Waste Co-digestion Costs through an Innovative Combination of a Pre-Sorting Technique and a Strategy for Cake Solids Reduction	$1,496,902	$323,906	$2,630,000	CBE
EPC-14-047	Southern California Gas Company (SoCalGas)	Dairy Waste-to-Bioenergy via the Integration of Concentrating Solar Power and a High Temperature Conversion Process	$1,494,736	$96,773	$600,000	CBE
EPC-14-050	Gridscape Solutions, Inc.	City of Fremont Fire Stations Microgrid Project	$1,817,925	$73,475	$657,260	CBE, Minority Owned
EPC-14-051	All Power Labs, Inc.	Cleaner Air, Cleaner Energy: Converting Forest Fire Management Waste to On Demand Renewable Energy	$1,890,125	$311,727	$686,038	Small Business, Micro Business, CBE
EPC-14-052	Organic Energy Solutions, LLC	Community Scale Digester with Advanced Interconnection to the Electrical Grid	$5,000,000	$252,977	$7,775,939	CBE
EPC-14-053	Robert Bosch LLC	A Renewable Based Direct Current Building Scale Microgrid	$2,817,566	$276,825	$1,797,544	CBE
EPC-14-054	Humboldt State University Sponsored Programs Foundation	Demonstrating a renewable based microgrid for a critical facility at the Blue Lake Rancheria	$5,000,000	$832,908	$1,318,422	CBE
EPC-14-055	Chabot-Las Positas Community College District	Las Positas College Microgrid	$1,522,591	$260,719	$450,000	CBE
EPC-14-056	Regents of the University of California, Los Angeles	Demonstrating Plug-in Electric Vehicles Smart Charging and Storage Supporting the Grid	$1,989,432	$358,770	$500,000	CBE

Appendix B: EPIC Projects Awarded through 2022 with Fiscal and Diversity Details

Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-14-057	Lawrence Berkeley National Laboratory	Smart Charging of Plug-in Vehicles with Driver Engagement for Demand Management and Participation in Electricity Markets	$1,993,355	$812,829	$536,761	CBE
EPC-14-059	Trane U.S., Inc.	Laguna Wastewater Treatment Plant Microgrid	$4,999,804	$187,080	$2,290,000	CBE
EPC-14-060	San Diego Gas & Electric Company	Demonstrate a utility-owned renewable based community microgrid at Borrego Springs California	$4,724,802	$923,165	$1,739,560	CBE
EPC-14-061	U.S. Geological Survey (Forest and Rangeland Ecosystem Science Center - FRESC)	Learning from Real-World Experience to Understand Renewable Energy Impacts to Wildlife	$1,000,000	$262,924	$1,617,177	CBE
EPC-14-062	University of California, Riverside	Energy Efficiency in California's Water Sector Using Customized Energy Management and Supervisory Control and Data Acquisition Systems	$3,017,034	$452,544	$1,722,732	CBE
EPC-14-063	Porifera, Inc.	Advance Wastewater Treatment Using Forward Osmosis to Produce High Quality Water	$3,230,420	$964,131	$646,493	CBE, Minority Owned, Woman Owned
EPC-14-064	The Regents of the University of California - Riverside	Aerosol Impacts on the Hydrology and Hydropower Generation in California	$399,818	$92,951	$306,237	CBE
EPC-14-065	Porifera, Inc.	Demonstration of Forward Osmosis to Produce Juice Concentrate, Purify and Reuse Wastewater and Reduce Energy Use	$2,499,289	$621,536	$628,568	CBE, Minority Owned, Woman Owned
EPC-14-066	Lawrence Berkeley National Laboratory	High-Performance Integrated Window and Facade Solutions for California Buildings	$3,000,000	$1,308,929	$450,000	CBE
EPC-14-067	The Regents of the University of California, Berkeley Campus	Improving Hydrological Snowpack Forecasting for Hydropower Generation Using Intelligent Information Systems	$1,100,000	$205,897	$236,263	CBE
EPC-14-068	Maulbetsch Consulting	Evaluation of Cost, Performance and Water Conserving Capability of Hybrid Cooling	$581,580	$0	$0	CBE
EPC-14-069	Energy and Environmental Economics, Inc. (E3)	Develop Analytical Tools and Technologies to Plan for and Minimize the Impacts of Climate Change on the Electricity System	$700,000	$286,936	$0	Small Business, CBE
EPC-14-070	Wexus Technologies, Incorporated	Wexus Energy and Water Management Mobile Software for the Agricultural Industry	$4,000,000	$571,397	$1,000,000	CBE
EPC-14-071	Frontier Wind	Rotor-Mounted Bat Impact Deterrence System Design and Testing	$862,875	$31,238	$36,313	CBE
EPC-14-072	Lawrence Berkeley National Laboratory	Building a Healthier and More Robust Future: 2050 Low Carbon Energy Scenarios for California	$700,000	$236,701	$65,000	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-14-073	Lawrence Berkeley National Laboratory	Monitoring the Urban Heat Island Effect and the Efficiency of Future Countermeasures	$500,000	$116,818	$4,000	CBE
EPC-14-074	The Regents of the University of California, on behalf of the Irvine Campus	Building a Climate Change Resilient Electricity System for Meeting California's Energy and Environmental Goals	$698,792	$181,613	$300,000	CBE
EPC-14-075	The Regents of the University of California, Berkeley Campus	Unlocking Industrial Energy Efficiency Through Optimized Energy Management Systems	$4,981,729	$451,253	$1,530,590	CBE
EPC-14-076	Kennedy/Jenks Consultants	Raw Wastewater Filtration to Increase Organic Removal Efficiency and Achieve Significant Electrical Savings	$3,476,085	$1,184,735	$1,288,340	CBE
EPC-14-077	Center for Sustainable Energy	Enable Standardized Vehicle-Grid Integration through Development of Universal Standard	$1,499,999	$193,033	$162,474	CBE
EPC-14-078	ChargePoint, Inc.	Next-Generation Grid Communication for Residential PEVs	$1,500,000	$139,418	$142,500	CBE
EPC-14-079	Electric Power Research Institute, Inc.	Assessing the Ability of Smart Inverters and Smart Consumer Devices to Enable more Residential Solar Energy	$1,705,478	$400,537	$891,414	CBE
EPC-14-080	Charge Bliss, Inc.	Renewable Microgrid for a Medical Center	$4,776,171	$729,842	$2,095,835	Micro Business, CBE
EPC-14-081	AgMonitor Inc.	Irrigation Optimization and Well Pump Monitoring to Reduce Energy and Water Consumption	$2,292,829	$332,162	$535,568	Small Business, CBE
EPC-14-082	Sierra Institute for Community and Environment	Advancing Biomass Combined Heat and Power Technology to Support Rural California, the Environment, and the Electrical Grid	$2,385,261	$262,813	$593,316	CBE
EPC-14-083	Prospect Silicon Valley	College of San Mateo Internet of Energy	$2,999,601	$411,350	$1,235,000	CBE
EPC-14-084	ABEC #4 LLC CE&S Dairy Biogas	ABEC #4 Renewable Combined Heat and Power Project	$3,000,000	$0	$4,983,619	CBE
EPC-14-085	UC Davis	Demonstration of Community Scale Low Cost Highly Efficient PV and Energy Management System	$1,238,491	$124,883	$739,726	CBE
EPC-14-086	Electric Power Research Institute, Inc.	Distribution System Aware Vehicle to Grid Services for Improved Grid Stability and Reliability	$1,499,977	$666,988	$795,754	CBE
EPC-14-088	Asetek USA, Inc.	Demonstration of Low-Cost Liquid Cooling Technology for Data Centers	$3,552,678	$1,038,931	$1,519,738	CBE
EPC-15-003	The Regents of the University of California, on behalf of the Riverside Campus	Demonstration of Community Scale Generation System at the Chemehuevi Community Center	$2,588,906	$525,157	$802,478	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-15-004	Electric Power Research Institute, Inc.	Climate appropriate HVAC Systems for Commercial Buildings to Reduce Energy Use and Demand	$2,834,721	$1,088,673	$440,509	CBE
EPC-15-005	ICF Incorporated, L.L.C.	Potential Impacts and Adaptation Options for the Electricity System from Sea Level Rise in the San Diego Area.	$499,929	$240,425	$166,200	CBE
EPC-15-006	Lawrence Berkeley National Laboratory	Modeling the Impact of Wildfires on California's Transmission and Distribution Grid	$500,000	$169,786	$17,157	CBE
EPC-15-007	The Regents of the University of California, on behalf of the Los Angeles Campus	Climate Change in Los Angeles County: Grid Vulnerability to Extreme Heat	$500,000	$84,000	$183,753	CBE
EPC-15-008	The Regents of the University of California, Berkeley Campus	Visualizing Climate-Related Risks to the Electricity System using Cal-Adapt	$400,000	$74,324	$0	CBE
EPC-15-009	California Homebuilding Foundation (CHF)	Workforce Instruction for Standards and Efficiency (WISE)	$4,431,918	$1,667,291	$15,685,075	CBE
EPC-15-010	Center for Sustainable Energy	Expanding Energy-Related Career Pathways in the Electrical Industry: Increasing Workforce Development Opportunities in Disadvantaged Communities and Delivering Training on Automated Demand Response Communication Equipment to Inside Wireman Apprentice	$4,476,189	$863,874	$16,165,080	CBE
EPC-15-012	Kennedy/Jenks Consultants	Improving Membrane Treatment Energy Efficiency through Monitoring the Removal of Colloidal Particle Foulants	$1,167,034	$429,784	$336,000	CBE
EPC-15-013	The Regents of the University of California, Berkeley Campus	Open Source Platform For Plug-in Electric Vehicle Smart Charging in California	$1,500,000	$262,826	$90,000	CBE
EPC-15-015	Andromeda Power, LLC	Grid Communication Interface for Smart Electric Vehicle Services Research and Development	$681,693	$223,081	$465,000	CBE
EPC-15-016	Amber Kinetics, Inc.	A Transformative Flywheel R&D Project	$2,000,000	$388,000	$7,500,000	CBE
EPC-15-018	Eos Energy Storage, LLC	Pilot Testing of Eos' Znyth Battery Technology in Distributed Energy Storage Systems	$1,894,866	$218,866	$1,436,801	None
EPC-15-019	Regents of University of California, Davis	Low Cost, Large Diameter, Shallow Ground Loops for Ground-Coupled Heat Pumps	$1,212,186	$338,049	$18,826	CBE
EPC-15-020	Electric Power Research Institute, Inc.	Intelligent HVAC Controls for Low Income Households: A Low Cost Non-connected Device that Understands Consumer Preferences and Performs Adaptive Optimization	$2,705,759	$903,766	$427,072	CBE
EPC-15-021	AGGIOS, Inc	Mobile Efficiency for Plug Load Devices	$1,996,999	$136,800	$6,030,450	Micro Business, CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-15-022	The Regents of the University of California, on behalf of the Irvine Campus	Power Management User Interface	$785,124	$300,159	$0	CBE
EPC-15-023	Lawrence Berkeley National Laboratory	Gaming System Energy Efficiency without Performance Compromises	$1,386,530	$658,250	$0	CBE
EPC-15-024	Lawrence Berkeley National Laboratory	Efficient and ZNE-Ready Plug Loads	$1,600,000	$634,531	$495,000	CBE
EPC-15-025	Home Energy Analytics	Plug Load Reduction App:RYPL	$884,100	$634,531	$350,000	Small Business, Micro Business, CBE, Woman Owned
EPC-15-026	Lawrence Berkeley National Laboratory	Unlocking Plug Load Energy Savings through Energy Reporting	$1,630,699	$123,700	$494,318	CBE
EPC-15-027	Fisher-Nickel, Inc.	Electric Plug Load Savings Potential of Commercial Foodservice Equipment	$937,469	$392,763	$202,450	CBE
EPC-15-028	Electric Power Research Institute, Inc.	Real World Electrification Options of Energy Services and Environmental Justice (EJ) Considerations	$799,444	$234,351	$759,213	Woman Owned
EPC-15-029	Black & Veatch Corporation	Distributed Generation Environmental Planner	$199,976	$44,350	$0	CBE
EPC-15-030	Cleantech San Diego Association	San Diego Regional Energy Innovation Cluster	$10,000,000	$880,681	$4,668,434	CBE
EPC-15-031	Electric Power Research Institute, Inc.	Flexible Control Strategies for Plug Loads with Context-Aware Smart Power Outlets to Mitigate Electricity Waste and Support Demand Response	$1,050,022	$366,082	$335,120	CBE
EPC-15-032	Activate Global, Inc	Bay Area Regional Energy Innovation Cluster	$9,960,000	$282,411	$10,245,061	CBE
EPC-15-033	Regents of the University of California, Davis	Ventilation Solutions for Energy Efficient California Schools: Improving Indoor Air Quality through Advanced, High Performance HVAC	$1,500,000	$439,287	$0	CBE
EPC-15-034	Public Health Institute	Emerging Energy Public Health Research Roadmap	$151,000	$0	$0	CBE
EPC-15-035	Lawrence Berkeley National Laboratory	Clarifying and Quantifying Current and Near-Term Groundwater Pumping Energy Use and Costs in California to Improve Energy and Water Systems Reliability	$625,000	$260,000	$22,550	CBE
EPC-15-036	Eagle Rock Analytics, Inc.	Probabilistic Seasonal and Decadal Forecasts for the Electricity System Using Linear Inverse Modeling	$400,000	$26,898	$0	CBE
EPC-15-037	Lawrence Berkeley National Laboratory	Smart Ventilation for Advanced California Homes	$1,500,000	$649,037	$1,300,000	CBE
EPC-15-038	California State University, Fresno Foundation	BlueTechValley Innovation Cluster	$10,000,000	$718,347	$2,655,684	CBE
EPC-15-039	The Regents of the University of California, Berkeley Campus	Carbon Balance with Renewable Energy: Effects of Solar Installations on Desert Soil Carbon Cycle	$499,181	$80,312	$72,000	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-15-040	Zoological Society of San Diego dba San Diego Zoo Global	Assessing California's Mitigation Guidelines for Burrowing Owls Impacted by Renewable Energy	$598,671	$54,425	$602,936	CBE
EPC-15-041	Prospect Silicon Valley	MarketZero: Taking an existing grocery store to scalable near-ZNE	$2,999,591	$846,723	$650,000	CBE
EPC-15-042	California Homebuilding Foundation (CHF)	Zero Energy Residential Optimization - Community Achievement (ZERO-CA)	$4,819,805	$1,488,701	$2,611,014	CBE
EPC-15-043	Regents of the University of California, Los Angeles	Development of a Genoscape Framework for Assessing Population-Level Impacts of Renewable Energy Development on Migratory Bird Species in California	$599,236	$114,848	$888,250	CBE
EPC-15-044	Electric Power Research Institute, Inc.	Certified Open-Source Software to Support the Interconnection Compliance of Distributed Energy Resources	$816,539	$203,973	$243,722	CBE
EPC-15-045	Electric Power Research Institute, Inc.	Transactive Incentive Signals to Manage Electricity Consumption for Demand Response	$498,054	$190,201	$110,450	CBE
EPC-15-046	Siemens Corporation, Corporate Technology	Developing a Distribution Substation Management System	$500,000	$171,526	$455,000	CBE
EPC-15-047	SLAC National Accelerator Laboratory	Powernet - A Cloud Based Method for Managing Distribution Resources	$2,210,720	$865,939	$0	CBE
EPC-15-048	Alternative Energy Systems Consulting, Inc.	Residential Intelligent Energy Management Solution: Advanced Intelligence to Enable Integration of Distributed Energy Resources	$3,996,560	$637,870	$0	CBE
EPC-15-049	Antelope Valley Water Storage, LLC	Electricity Pumped Storage Systems Using Underground Reservoirs: A Feasibility Study for the Antelope Valley Water Storage System	$197,300	$15,276	$199,353	CBE
EPC-15-050	Regents of the University of California, Davis	Winery Water and Energy Savings	$1,989,201	$157,088	$404,625	CBE
EPC-15-051	Lawrence Berkeley National Laboratory	The Value Proposition for Cost-Effective, DR-Enabling, Nonresidential Lighting System Retrofits in California Buildings	$500,000	$130,529	$138,648	CBE
EPC-15-053	Electric Power Research Institute, Inc.	Customer-Centric Approach to Scaling IDSM Retrofits	$3,894,721	$1,382,796	$799,559	Woman Owned
EPC-15-054	Universal Devices, Inc.	Complete and Low Cost Retail Automated Transactive Energy System (RATES)	$3,187,370	$0	$1,087,710	Small Business, CBE
EPC-15-055	Charge Bliss, Inc.	The Charge Bliss Advanced Renewable Energy Community for a Disadvantaged Southern California Community	$1,500,000	$197,815	$96,937	Micro Business, CBE
EPC-15-056	Natural Capitalism Solutions, dba Clean Coalition	Peninsula Advanced Energy Community (PAEC)	$1,318,997	$312,711	$330,000	None

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-15-057	The Regents of the University of California (CIEE)	Customer-controlled, Price-mediated, Automated Demand Response for Commercial Buildings	$4,000,000	$1,373,762	$424,000	None
EPC-15-058	The Regents of the University of California, Berkeley Campus	The Oakland EcoBlock - A Zero Net Energy, Low Water Use Retrofit Neighborhood Demonstration Project	$1,500,000	$117,432	$769,846	CBE
EPC-15-059	Onset, Inc.	UniGen Smart System for Renewable Integration	$638,993	$0	$0	CBE
EPC-15-060	Regents of the University of California, Davis	Optimizing Solar Facility Configuration Effects on Habitat, Managed Plants, and Essential Species Interactions	$597,865	$99,801	$103,297	CBE
EPC-15-061	Regents of the University of California, Los Angeles	Using Data-Driven Approaches to Design Advanced Energy Communities for Existing Buildings	$1,497,996	$449,666	$381,074	CBE
EPC-15-062	The Regents of the University of California, Irvine	Robust, Low-Cost, Real-Time, NOx Sensor for Optimization of Dispatchable Distributed Generation Systems	$200,000	$53,531	$0	CBE
EPC-15-064	Prospect Silicon Valley	Innovative Net Zero: ZNE Demonstration in Existing Low-Income Mixed-Use Housing	$2,995,653	$408,130	$800,000	CBE
EPC-15-065	Office of Energy and Sustainable Development, City of Berkeley	Berkeley Energy Assurance Transformation (BEAT) Project	$1,499,214	$500,070	$250,121	CBE
EPC-15-066	Groundwork San Diego-Chollas Creek	Developing an Advanced Energy Master Plan for the Encanto Neighborhood in San Diego	$1,500,000	$129,898	$520,000	CBE
EPC-15-067	Local Government Commission	Integrated Community Resource Marketplace	$1,500,000	$432,890	$12,445	CBE
EPC-15-068	Lawrence Berkeley National Laboratory	Understanding and Mitigating Barriers to Wind Energy Expansion in California	$200,000	$74,830	$70,000	CBE
EPC-15-069	Zero Net Energy (ZNE) Alliance	Lancaster Advanced Energy Community (AEC) Project	$1,469,779	$507,982	$1,500,000	CBE
EPC-15-070	Altostratus, Inc.	Intra-urban Enhancements to Probabilistic Climate Forecasting for the Electric System	$193,326	$14,035	$5,000	Small Business, CBE
EPC-15-071	Biodico, Inc.	Zero Net Energy Farms	$1,175,919	$122,540	$1,140,419	CBE
EPC-15-072	The Regents of the University of California, Davis Campus	New Chemical Compounds for Cost-Effective Carbon Capture	$200,000	$40,000	$0	CBE
EPC-15-073	Regents of the University of California, Los Angeles	Identifying Effective Demand Response Program Designs to Increase Residential Customer Participation	$2,007,875	$203,115	$562,633	CBE
EPC-15-074	Center for Sustainable Energy	Meeting Customer and Supply-side Market Needs with Electrical and Thermal Storage, Solar, Energy Efficiency and Integrated Load Management Systems	$3,960,805	$746,794	$1,981,262	CBE

Appendix B: EPIC Projects Awarded through 2022 with Fiscal and Diversity Details

Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-15-075	Electric Power Research Institute, Inc.	Customer-centric Demand Management using Load Aggregation and Data Analytics	$3,998,587	$1,163,894	$1,270,312	CBE
EPC-15-076	Zero Net Energy (ZNE) Alliance	Richmond Advanced Energy Community Project	$1,480,111	$370,990	$2,590,134	CBE
EPC-15-077	The Regents of the University of California, Irvine	Huntington Beach Advanced Energy Community Blueprint	$1,500,000	$508,226	$810,998	CBE
EPC-15-078	The Regents of the University of California, Berkeley Campus	Risk Modeling and Cognitive Science Characterization of Barriers to Climate Change Adaptation in California Electricity Sector	$350,000	$48,887	$0	CBE
EPC-15-079	Victor Valley Wastewater Reclamation Authority (VVWRA)	Advanced Renewable Energy Storage and Recycled Water Project	$1,734,059	$220,423	$902,215	CBE
EPC-15-080	Thalassa Research & Consulting, LLC	Interdependencies of Electric Grid and Critical Lifelines: Identifying Climate Exposure and Adaptation Strategies	$128,188	$0	$0	None
EPC-15-081	Ghoulem Research	Historical Insights for Electricity Transition Scenarios in California and Flexible Energy Demand Modeling for Residential Air Conditioning with Improved Behavioral Specificity	$400,000	$0	$0	CBE, Woman Owned
EPC-15-082	The Regents of the University of California, Merced	Low-Temperature Microplasma-Assisted Hydrogen Production from Biogas for Electricity Generation	$200,000	$35,171	$47,199	CBE
EPC-15-083	OhmConnect, Inc.	Empowering Proactive Consumers to Participate in Demand Response Programs	$3,995,028	$245,265	$1,877,378	CBE
EPC-15-084	BMW of North America, LLC	Total Charge Management: Advanced Charge Management for Renewable Integration	$3,999,900	$330,779	$444,931	CBE
EPC-15-085	Center for Sustainable Energy	San Diego Libraries Zero Net Energy and Integrated Demand Side Management Demonstration Project	$2,715,516	$725,052	$544,312	CBE
EPC-15-086	Advanced Power and Energy Program (APEP) - University of California, Irvine	Substation Automation and Optimization of Distribution Circuit Operations	$932,718	$124,021	$112,281	CBE
EPC-15-087	Electric Power Research Institute, Inc.	Cooling Tower Water Treatment using Vortex Process Technology for Energy and Water Savings	$1,999,995	$485,121	$449,990	CBE
EPC-15-088	Kennedy/Jenks Consultants	Biofiltration as an Advanced Primary Treatment Method to Achieve Substantial Energy Savings	$1,306,185	$442,698	$271,750	CBE
EPC-15-089	Electric Power Research Institute, Inc.	Expanding Standards and Developing Tools to Enable DNP3 Support of Energy Storage Use Cases	$873,516	$187,517	$360,828	CBE
EPC-15-090	The Regents of the University of California (UC Riverside)	Integrated Distributed Energy Resources Management System (iDERMS)	$1,119,437	$97,356	$530,392	CBE

Appendix B: EPIC Projects Awarded through 2022 with Fiscal and Diversity Details

Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-15-091	Electric Power Research Institute, Inc.	Energy Efficiency and Water Savings in Agriculture by Innovative Plant-Aware Irrigation System	$1,097,990	$220,794	$331,000	CBE
EPC-15-092	Tomorrow Water dba BKT United	Low Energy Biofiltration System with Low Backwash Rate for Groundwater Contaminant Removal	$1,722,072	$0	$417,497	CBE, Minority Owned
EPC-15-093	Water Energy Innovations, Inc.	Accelerating Drought Resilience Through Innovative Technologies	$1,000,000	$178,824	$5,000	Small Business, CBE, Minority Owned, Woman Owned
EPC-15-094	Electric Power Research Institute, Inc.	Demonstration of Affordable, Comfortable, Grid Integrated Zero Net Energy Communities	$4,942,809	$1,460,838	$1,109,482	CBE
EPC-15-096	American Water Works Company, Inc.	Demonstrating Innovative Leakage Reduction Strategies: Correlating Continuous Acoustic Monitoring, Satellite Imagery and Flow Sensitive Pressure Reducing Valve System	$1,517,780	$222,664	$391,461	None
EPC-15-097	Franklin Energy Services, LLC	Achieving Zero Net Energy in Multi-family Buildings	$1,955,811	$180,555	$290,090	CBE
EPC-16-001	Institute of Gas Technology dba Gas Technology Institute	Measure Results from Affordable Zero Net Energy Homes	$1,000,000	$325,815	$168,500	None
EPC-16-002	Lawrence Berkeley National Laboratory	Pathways to More Cost-Effective ZNE Homes	$1,000,000	$436,541	$50,000	CBE
EPC-16-003	Regents of the University of California, Davis - California Lighting Technology Center	Pilot-Scale Evaluation of an Integrated Building Control Retrofit Package	$1,999,089	$349,266	$267,363	CBE
EPC-16-004	Lawrence Berkeley National Laboratory	Integrated Whole-Building Zero Net Energy Retrofits for Small Commercial Offices	$2,000,000	$781,092	$2,000,000	CBE
EPC-16-005	Regents of the University of California, Davis	Energy Efficient HVAC Packages for Existing Residential Buildings	$1,200,000	$366,421	$0	CBE
EPC-16-006	ES Engineering Services, LLC	Low Energy, Zero Liquid Discharge Adsorption Technology to Remove Contaminants and Recover Source Water	$986,262	$0	$194,904	CBE
EPC-16-007	Regents of the University of California, Davis	Optimization of Energy Efficiency to Achieve Zero-Net Energy in Multifamily and Commercial Buildings	$1,000,000	$151,821	$105,000	CBE
EPC-16-008	City of Santa Monica	Santa Monica Advanced Energy District	$1,487,609	$570,347	$253,030	CBE
EPC-16-009	Porifera, Inc.	Testing a Low-Energy Water Treatment System for Fail-Safe Direct Potable Reuse	$999,795	$248,634	$144,784	CBE, Minority Owned, Woman Owned
EPC-16-010	Regents of University of California, Davis	Improving Water and Energy Efficiency in California's Dairy Industry	$1,000,000	$191,936	$164,710	CBE

Appendix B: EPIC Projects Awarded through 2022 with Fiscal and Diversity Details

Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-16-011	Kennedy/Jenks Consultants	Novel Membrane Technology to Improve Energy Efficiency and Water Savings in Wastewater Treatment Operations	$882,430	$304,611	$98,600	CBE
EPC-16-012	Altex Technologies Corporation	Power and Water Saving Advanced Hybrid Air/Wet Cooling System	$999,994	$529,685	$187,207	CBE
EPC-16-013	The Regents of the University of California on behalf of the Berkeley campus	Integrating Smart Ceiling Fans and Communicating Thermostats to Provide Energy-Efficient Comfort	$1,888,683	$188,176	$315,926	CBE
EPC-16-014	Lawrence Livermore National Laboratory	A New Solution to California's Energy and Water Challenges: Reducing the Cost of Desalination and Increasing Water Reuse	$999,040	$448,176	$0	CBE
EPC-16-015	Los Angeles Cleantech Incubator	Los Angeles Regional Energy Innovation Cluster	$9,998,494	$541,645	$3,658,099	CBE
EPC-16-016	Hyperlight Energy	Commercializing a Disruptively Low Cost Solar Collector	$750,000	$177,896	$0	CBE
EPC-16-017	Silicon Valley Clean Water	Maximizing Energy Efficiency and Reducing Bio-solids Waste from New Anaerobic Wastewater Treatment Technology	$1,999,962	$327,386	$1,219,943	None
EPC-16-018	BDP Technologies	Biological Double-Efficiency Process as an Advanced Wastewater Treatment Method to Achieve Substantial Energy and Water Savings	$1,565,400	$15,486	$330,904	CBE
EPC-16-019	Regents of University of California, Davis	21st Century Solutions for 20th Century Wind Projects	$810,438	$322,793	$124,916	CBE
EPC-16-020	SRI International	Recovery of Lithium from Geothermal Brines	$873,387	$452,445	$0	CBE
EPC-16-021	Lawrence Berkeley National Laboratory	High-Resolution Imaging of Geothermal Flow Paths Using a Cost Effective Dense Seismic Network	$1,672,639	$678,255	$50,000	CBE
EPC-16-022	Lawrence Berkeley National Laboratory	Comprehensive Physical-Chemical Modeling to Reduce Risks and Costs of Flexible Geothermal Energy Production	$999,032	$480,995	$0	CBE
EPC-16-024	San Gabriel Valley Water Company	San Gabriel Valley Water Company "Plug and Play" In-Conduit Hydropower Development Project (SGVWC Project)	$500,000	$13,082	$782,000	CBE
EPC-16-025	Stantec Consulting Services Inc.	Comprehensive Assessment, Tools and Resources for Advancing In-Conduit Hydropower in California	$400,000	$121,338	$83,018	CBE
EPC-16-026	Electric Power Research Institute, Inc.	Develop and Pilot Test Flexible Demand Response Control Strategies for Water Pumping Stations and Industrial Refrigeration Plants	$3,000,000	$888,920	$465,000	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-16-027	Irrigation for the Future, Inc.	Facilitating On-farm Participation in Energy Demand Management Programs	$1,588,872	$153,035	$126,663	None
EPC-16-028	Advanced Microgrid Solutions, Inc.	Irvine Ranch Water District Load Shifting and Demand Response Pilot Project	$1,403,465	$832,615	$760,427	CBE, Woman Owned
EPC-16-029	Antelope Valley Water Storage, LLC	Water/Energy Bank Proof-of-Concept	$1,000,000	$150,000	$225,000	CBE
EPC-16-030	The Regents of the University of California - Riverside	Enabling Energy Efficient Data Centers in Smart Power Distribution Systems	$1,783,118	$306,631	$297,064	CBE
EPC-16-031	SLAC National Accelerator Laboratory	VOLTTRON Testing Tool Kit	$70,000	$28,501	$0	CBE
EPC-16-032	New Buildings Institute, Inc.	Leading in Los Angeles: Demonstrating Scalable Emerging Energy Efficient Technologies for Integrated Facade, Lighting and Plug Loads	$4,981,000	$1,767,847	$1,725,500	CBE
EPC-16-033	CSU Long Beach Research Foundation	Internet of Things and Ubiquitous Sensing in University Building Energy Management: Design Optimization and Technology Demonstration	$2,509,946	$78,271	$1,072,958	None
EPC-16-034	Zero Net Energy (ZNE) Alliance	Automated Cloud-Based Continuously Optimizing Building Energy Management System	$2,500,000	$552,488	$1,184,891	CBE
EPC-16-035	Sunpreme, Inc.	High-Performance Cu-Plating for Heterojunction Silicon Cells, Based on Ultra-Low-Cost Printed Circuit Board (PCB) Technology (Stage II)	$2,430,000	$730,620	$0	CBE
EPC-16-036	AltaRock Energy, Inc.	Thermoelectric Generator Application and Pilot Test in a Geothermal Field	$1,280,000	$310,473	$118,095	None
EPC-16-037	Amador Water Agency	The Amador Water Agency In-Conduit Hydropower Development Project (AWA Project)	$750,000	$0	$1,115,000	CBE
EPC-16-038	Regents of University of California, Davis	Use of Indoor Rearing for Head-Starting Desert Tortoises	$493,089	$106,461	$61,119	CBE
EPC-16-039	The Regents of the University of California, on behalf of the Irvine Campus	A Life Cycle Assessment of the Environmental and Human Health Impacts of Emerging Energy Storage Technology Deployment	$600,000	$98,142	$186,219	CBE
EPC-16-040	The Regents of the University of California, Davis Campus	Assessing Cooling Tower PM2.5 and PM10 Emissions using Advanced Instrumentation, Plume Transects, and Plume Modeling	$700,000	$108,004	$0	CBE
EPC-16-041	Lawrence Berkeley National Laboratory	Benefits and Challenges in Deployment of Low GWP A3 Refrigerants in Residential and Commercial Cooling Equipment	$500,000	$221,625	$500,000	CBE
EPC-16-042	Lawrence Berkeley National Laboratory	Low-Cost High-Reliability Thermoelectrics for Waste Heat Conversion	$2,000,000	$734,167	$516,502	CBE
EPC-16-043	Natel Energy	Cost-Effective and Climate Resilient In-Conduit Hydropower and Civil Works Innovation	$954,715	$0	$954,715	None

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-16-044	Terzo Power Systems, LLC.	Hyper Efficient Pump Motor Unit with Fully Integrated Permanent Magnet Motor and Motor Controls with Combined Liquid Cooling	$2,311,050	$99,350	$145,689	CBE
EPC-16-045	Polaris Energy Services Inc.	Development of New Technologies for Agricultural Loads to Participate in Renewables Integration, RTP Programs, and/or New Time of Use Rates	$2,884,912	$415,408	$649,485	CBE
EPC-16-046	Institute of Gas Technology dba Gas Technology Institute	Pilot Testing of Isothermal Compression	$2,570,946	$628,022	$238,700	None
EPC-16-047	Humboldt State University Sponsored Programs Foundation	California Biopower Impact Project	$1,000,000	$247,784	$131,575	CBE
EPC-16-048	Electric Power Research Institute, Inc.	Development and Testing of an Energy Efficient Ultra-low Charge Ammonia Refrigeration System in a Food Processing Plant	$2,406,054	$804,238	$605,000	CBE
EPC-16-049	University of California - Merced	Ultra-High Power Density Roadway Piezoelectric Energy Harvesting System	$1,270,000	$310,100	$0	CBE
EPC-16-050	The Regents of the University of California, San Diego	Scaling Reliable, Next-Generation Perovskite Solar Cell Modules	$1,450,000	$184,540	$146,050	CBE
EPC-16-051	AgMonitor Inc.	Increased Energy Efficiency via Programmable Irrigation and Fertigation	$2,992,660	$341,285	$350,547	Small Business, CBE
EPC-16-052	Pyro-E, LLC	Force Multiplier Actuated Piezoelectric Energy Harvester for Roadway Energy Recovery	$1,000,000	$234,596	$100,007	CBE
EPC-16-053	Zoological Society of San Diego dba San Diego Zoo Wildlife Alliance	Habitat Influences on Desert Tortoise Translocation Success	$499,605	$32,237	$390,528	CBE
EPC-16-054	Electric Power Research Institute, Inc.	Open Vehicle to Building/Microgrid Integration Enabling ZNE and Improved Distribution Grid Services	$1,500,000	$540,024	$2,341,001	CBE
EPC-16-055	Zeco Systems, Inc. dba Greenlots	Improving Commercial Viability of Fast Charging by Providing Renewable Integration and Grid Services with Integrated Multiple DC Fast Chargers	$826,250	$0	$302,008	CBE
EPC-16-056	Lawrence Berkeley National Laboratory	Open Building Control- Performance Evolution, Specification and Verification of Building Control Sequences	$1,000,000	$473,633	$0	CBE
EPC-16-057	Board of Trustees of the Leland Stanford Junior University (SLAC National Accelerator Laboratory)	Development of Smart Charging Infrastructure Planning Tool (SCRIPT)	$1,500,000	$328,945	$94,153	CBE
EPC-16-058	Prospect Silicon Valley	Advanced Transit Bus VGI Project	$1,675,417	$412,909	$1,064,569	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-16-059	Lawrence Berkeley National Laboratory	Advanced VGI Control to Maximize Battery Life and Use of Second-Life Batteries to Increase Grid Service and Renewable Power Penetration	$2,500,000	$407,071	$1,700,000	CBE
EPC-16-061	Nuvve Holding Corp.	Intelligent Electric Vehicle Integration (INVENT)	$3,967,165	$212,026	$3,697,744	None
EPC-16-062	Regents of the University of California, Davis	Advancing Demand Response in the Water Sector	$2,984,983	$295,427	$90,865	CBE
EPC-16-063	University of California, San Diego Scripps Institution of Oceanography 0955	Advanced Statistical-Dynamical Downscaling Methods and Products for California Electricity System Climate Planning	$1,399,888	$192,928	$0	CBE
EPC-16-064	US Geological Survey	Investigating Avian Attraction to Solar Energy Facilities Through a Lake Effect	$499,785	$200,240	$739,757	None
EPC-16-065	Zero Net Energy (ZNE) Alliance	California E-Bus to Grid Integration Project	$2,633,670	$658,112	$2,900,097	Micro Business, Minority Owned
EPC-16-067	Lawrence Berkeley National Laboratory	Robust Super Insulation at a Competitive Price	$100,000	$42,679	$0	CBE
EPC-16-068	Electric Power Research Institute, Inc.	Integrated Community-Level Solutions for Resource Management for a Grid and Customer Benefits	$2,976,991	$864,761	$1,030,166	CBE
EPC-16-070	Electric Power Research Institute, Inc.	Integrating Front-of-the-Meter Energy Storage with Smart PV Inverters and Solar Forecasting	$1,832,770	$604,973	$591,438	CBE
EPC-16-073	Natural Capitalism Solutions, dba Clean Coalition	Valencia Gardens Energy Storage	$1,994,687	$251,310	$620,470	None
EPC-16-077	The Regents of the University of California - Riverside	Solar+ Storage Integrated Energy Management Demonstration in a Supportive Housing Facility	$2,110,657	$332,995	$411,509	CBE
EPC-16-079	Electric Power Research Institute, Inc.	Impact Assessment & Secure Implementation of California Rule 21 Phase 3 Smart Inverter Functions to Support High PV Penetration	$2,935,822	$601,394	$1,659,077	CBE
EPC-17-001	Taylor Engineering	Best-in-Class: Demonstrating Scalable Operational Efficiency through Optimized Controls Sequences and Plug-and-Play Solutions	$2,966,716	$934,507	$2,773,750	Small Business, CBE
EPC-17-002	Humboldt State University Sponsored Programs Foundation	Scaling Solar+ for Small and Medium Commercial Buildings	$1,500,000	$413,443	$354,959	CBE
EPC-17-003	Clean Power Research, L.L.C.	Developing a Comprehensive, System-Wide Forecasting to Support High-Penetration Solar	$750,000	$261,080	$320,000	CBE
EPC-17-004	Energy and Environmental Economics, Inc. (E3)	Enhanced Modeling Tools to Maximize Solar + Storage Benefits	$987,379	$457,030	$115,463	Small Business, CBE
EPC-17-005	Electric Power Research Institute, Inc.	Integrating Building-Scale Solar + Storage Advanced Technologies Maximizing Value to Customer and the Distribution Grid	$1,491,764	$360,079	$271,090	CBE
EPC-17-006	Electric Power Research Institute, Inc.	Development, Implementation, and Integration of a Holistic Solar Forecasting System for California	$749,740	$365,395	$324,830	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-17-007	Center for Sustainable Energy	Integrated Community Solar and Storage at a Low-Income Mobile Home Park	$2,005,923	$499,016	$340,905	CBE
EPC-17-008	Center for Sustainable Energy	Empowering Energy Efficiency in Existing Big-Box Retail/ Grocery Stores	$2,824,685	$544,329	$759,984	CBE
EPC-17-009	Willdan Energy Solutions	Bundle-Based Energy Efficiency Technology Solutions for California (BEETS for California)	$3,994,256	$875,037	$2,382,225	CBE
EPC-17-010	Lawrence Berkeley National Laboratory	Integrated Heat and Moisture Calculation Tool for Building Envelopes	$125,000	$59,209	$0	CBE
EPC-17-011	HZIU Kompogas SLO Inc.	Demonstration of an Innovative, Community-Scale, Organic Waste-to-Energy Facility	$4,000,000	$0	$5,278,373	None
EPC-17-012	Taylor Energy	Biomass-to-Electricity: Pilot-Scale Testing of Baseload Compared to Flexible Power	$1,499,000	$254,980	$0	CBE
EPC-17-013	Altex Technologies Corporation	Small Scale Forest Waste Power System	$1,499,994	$768,611	$161,728	CBE
EPC-17-014	Newcomb Anderson McCormick, Inc.	Advanced Plug Load Controls and Management in the Educational Environment	$1,264,296	$181,505	$625,486	CBE
EPC-17-015	Nevados Engineering, Inc.	Installation and Soft Cost Reduction for Horizontal Single Axis Trackers (Stage II)	$999,822	$76,846	$0	CBE
EPC-17-016	The Regents University of California, Davis	An Online Siting Tool Application for Woody Biomass-to-Electricity Facilities in California	$1,222,284	$203,977	$28,523	CBE
EPC-17-017	All Power Labs, Inc.	The Nexus of Clean Energy, Healthy Forests, and a Stable Climate: Innovative Biomass Gasification for Sustainable Forest Management	$1,500,000	$0	$750,000	Small Business, Micro Business, CBE
EPC-17-018	The Regents University of California, Davis	Demonstrating the Potential for On-Site Electricity Generation from Food Waste Using Containerized Anaerobic Digestion Units	$2,411,007	$171,649	$756,133	CBE
EPC-17-019	Fall River Resource Conservation District	Burney-Hat Creek Bioenergy	$5,000,000	$0	$5,000,000	None
EPC-17-020	Board of Trustees of the Leland Stanford Junior University (SLAC National Accelerator Laboratory)	Demonstration of Vehicle-Grid Integration under Non-residential Scenarios	$2,340,000	$741,146	$597,593	CBE
EPC-17-021	Mariposa County Resource Conservation District (MCRCD)	Mariposa Biomass Project	$5,000,000	$8,842	$11,135,367	CBE
EPC-17-022	Lystek International Limited	Skid Mounted Mobile Pilot/Education Unit for Source Separated Organics Processing with Cogeneration Capabilities	$1,589,163	$19,396	$493,075	CBE
EPC-17-023	RCAM Technologies	High Performance, Ultra-Tall, Low Cost Concrete Wind Turbine Towers Additively Manufactured On-Site	$1,249,982	$164,368	$62,558	CBE
EPC-17-024	Southern California Edison	Electric Access System Enhancement (EASE)	$2,000,000	$75,160	$8,008,123	CBE
EPC-17-025	Cohen Ventures, Inc. dba Energy Solutions	TradePro Connect Product and Service Procurement Project	$991,110	$159,260	$994,084	Small Business

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-17-026	Lawrence Berkeley National Laboratory	Accelerating the Adoption of EVs as DERs through Fleet Procurement	$1,000,000	$115,875	$1,779,718	CBE
EPC-17-027	The Regents of the University of California, Berkeley Campus	The Distributional Electricity Impacts of Climate Change on California's Residential Communities	$200,000	$36,240	$0	CBE
EPC-17-028	Lawrence Berkeley National Laboratory	High Resolution Source Importance Mapping to Minimize Impacts of Waste Biomass Distributed Generation on Ozone Air Quality in Disadvantaged Communities in the San Joaquin Valley	$200,000	$89,052	$0	CBE
EPC-17-029	Cal Poly Corporation	Lowering Costs of Underwater Biological Surveys to Inform Offshore Renewable Energy	$199,978	$29,057	$0	CBE
EPC-17-030	Prospect Silicon Valley	California Opportunities for Procurement to Accelerate Clean Energy (Cal-OP ACE)	$3,998,715	$128,875	$1,244,450	CBE
EPC-17-031	City of Long Beach, Harbor Department (Port of Long Beach)	Port of Long Beach Microgrid - Resilience for Critical Facilities	$5,000,000	$95,909	$2,120,000	CBE
EPC-17-032	The Regents of the University of California, San Diego	Miramar Microgrid - Flight Line Resilience through Landfill Gas and Energy Storage	$5,000,000	$425,962	$6,002,320	CBE
EPC-17-033	The Regents of the University of California, Berkeley Campus	Building on the Cal-Adapt Platform to Deliver Actionable Information in Support of Electricity Sector Resilience	$900,000	$172,916	$0	CBE
EPC-17-034	Western Cooling Efficiency Center - UC Davis	California Energy Product Evaluation Hub	$10,993,646	$3,915,128	$2,347,629	CBE
EPC-17-035	Lawrence Berkeley National Laboratory	Building Healthier and More Energy-Efficient Communities in Fresno and the Central Valley	$1,100,000	$401,103	$0	CBE
EPC-17-038	Lawrence Berkeley National Laboratory	Camp Parks Army Microgrid - A Blueprint for Nested, Modular Design	$5,000,000	$817,221	$11,410,900	CBE
EPC-17-039	Electric Power Research Institute, Inc.	Validated, Transparent, and Accessible Microgrid Valuation and Optimization Tool (DER-VET)	$2,000,000	$530,067	$568,110	Woman Owned
EPC-17-040	Rocky Mountain Institute	Mass Deployment of Energy Efficiency Retrofits in Disadvantaged Communities	$7,204,308	$1,555,647	$6,705,308	None
EPC-17-041	Sonoma Clean Power Authority	Lead Locally	$9,814,596	$4,687,705	$3,335,500	CBE
EPC-17-042	Camptonville Community Partnership	Camptonville Biomass-to-Energy Project	$4,999,830	$110,031	$13,030,225	CBE
EPC-17-043	Hitachi America LTD	GLOW: A User-friendly Interface for GridLAB-D	$2,999,699	$193,906	$1,255,060	None
EPC-17-044	InTech Energy, Inc.	Researching, Developing, Demonstrating the Commoditization of Building Energy Efficiency Retrofits in Southern California	$7,199,315	$2,139,730	$2,600,274	CBE
EPC-17-045	The Regents of the University of California, on behalf of the Irvine Campus	Oak View Microgrid: Using Microgrid Technologies to Simultaneously Improve Quality of Life and Electric Grid Operations	$1,099,760	$157,594	$367,804	CBE

Appendix B: EPIC Projects Awarded through 2022 with Fiscal and Diversity Details

Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-17-046	SLAC National Accelerator Laboratory	HiPAS GridLAB-D: A High-Performance Agent-based Simulation using GridLAB-D	$3,068,781	$1,149,270	$300,000	CBE
EPC-17-047	SLAC National Accelerator Laboratory	OpenFIDO: An Open-source Framework for Integrated Data Operations	$1,000,000	$367,282	$30,000	CBE
EPC-17-048	The Regents of the University of California, Berkeley Campus	Engaging Communities in the Design of Sustainable Energy and Localized Futures (SELF) Models in California's San Joaquin Valley	$1,100,000	$228,397	$0	CBE
EPC-17-049	San Diego Unified Port District (Port of San Diego)	Port of San Diego Microgrid - Resiliency in Terminal Operations	$4,985,272	$528,929	$4,629,936	CBE
EPC-17-050	The Regents of the University of California, on behalf of the Los Angeles Campus	Using Big Data to Holistically Assess Benefits from Building Energy System Transition Pathways in Disadvantaged Communities	$1,098,662	$233,968	$54,740	CBE
EPC-17-051	The Regents of the University of California, San Diego	LEED: A Lightwave Energy-Efficient Datacenter	$475,000	$78,440	$0	CBE
EPC-17-052	Gridscape Solutions, Inc.	Urban Microgrids for Grid Resiliency and Disaster Readiness	$4,995,498	$581,491	$4,136,602	CBE, Minority Owned
EPC-17-053	Sonoma County Junior College District/ Santa Rosa Junior College	Santa Rosa Junior College Urban Microgrid Project	$4,999,005	$359,118	$8,689,759	CBE
EPC-17-054	Rialto Bioenergy Facility LLC	Rialto Resilient Clean Power Microgrid	$5,000,000	$627,582	$6,515,000	CBE
EPC-17-055	Humboldt State University Sponsored Programs Foundation	Redwood Coast Airport Microgrid	$5,000,000	$546,796	$6,322,728	CBE
EPC-18-001	Electric Power Research Institute, Inc.	Port Hueneme Navy Data Center Microgrid	$4,998,345	$848,609	$3,502,754	Woman Owned
EPC-18-002	California Clean Energy Fund dba CalCEF Ventures	California Test Bed Initiative	$21,998,402	$566,364	$916,095	None
EPC-18-003	Lucent Optics, Inc.	Ultra-thin Flexible LED Lighting Panels	$1,692,069	$516,434	$169,207	CBE
EPC-18-004	Ubiquitous Energy, Inc.	Accelerating Commercialization of Advanced Energy Efficient Windows	$2,998,055	$407,192	$4,310,659	None
EPC-18-005	Heliotrope Technologies, Inc.	Building Energy Impact Analysis of Low Cost NanoEC Electrochromic Window Control Algorithm Optimization	$3,667,104	$1,182,911	$952,276	None
EPC-18-006	SkyCool Systems Inc.	Radiative Sky Cooling-Enabled Efficiency Improvements on Commercial Cooling Systems	$1,770,563	$332,658	$303,139	CBE
EPC-18-007	Glint Photonics, Inc.	High Efficiency Dynamic Lighting Systems	$1,999,990	$43,764	$200,064	CBE
EPC-18-008	MicroBio Engineering, Inc.	Improving Energy Efficiency and Performance of Wastewater Recycling	$1,550,227	$548,356	$160,000	CBE
EPC-18-009	Porifera, Inc.	Energy Savings Through Osmotic Concentration for the Food and Beverage Processing Industry	$2,800,687	$908,606	$605,073	CBE, Minority Owned, Woman Owned

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-18-010	Porifera, Inc.	Energy and Water Savings in Food and Beverage Wastewater Reuse	$1,777,132	$480,430	$225,000	CBE, Minority Owned, Woman Owned
EPC-18-011	Zero Net Energy (ZNE) Alliance	Lancaster Advanced Energy Community (AEC) Project	$4,999,060	$809,583	$5,674,720	CBE
EPC-18-013	The Regents of the University of California, Berkeley	The Oakland EcoBlock, Phase II: A Zero Net Energy, Low Water-Use Retrofit Neighborhood	$5,000,000	$700,249	$3,491,600	CBE
EPC-18-014	Spark Thermionics, Inc.	Production Scale-Up of Thermionic Energy Harvesters	$1,349,933	$382,031	$270,000	CBE
EPC-18-015	Cuberg, Inc.	Improved Batteries for California's Zero-Emissions Vehicle Future	$1,566,639	$229,783	$316,200	None
EPC-18-016	Halo Industries, Inc.	Production Scale-Up of Advanced Wafer Technology for Drastic Solar Photovoltaics Cost Reduction	$4,000,000	$584,267	$1,250,000	None
EPC-18-017	Sepion Technologies, Inc.	Scaling Up Pilot Production of Nanoporous Membranes for Battery Storage Technologies	$2,675,793	$382,307	$2,489,417	CBE
EPC-18-018	Caban Systems, Inc.	Prototype to Production: Modular Battery Platform Project for California Critical Infrastructure	$1,878,760	$0	$1,396,943	CBE
EPC-18-019	Treau, Inc.	Treau: Low-GWP, High-Efficiency Heat Pump and Air Conditioner	$2,805,907	$834,152	$1,901,907	CBE
EPC-18-020	Glint Photonics, Inc.	Production Scale-Up of High Efficiency Adjustable Lighting Products	$1,998,922	$619,177	$399,831	CBE
EPC-18-021	South 8 Technologies	Production Scale-Up for Next Generation Batteries Using Liquefied Gas Electrolytes	$1,028,059	$230,205	$466,416	CBE
EPC-18-022	Natron Energy, Inc.	Advanced Energy Storage for Electric Vehicle Charging Support	$2,998,064	$96,753	$1,239,515	CBE
EPC-18-023	Eos Energy Storage, LLC	Utility Demonstration of Non-Flammable, Aqueous-Zinc Battery Storage: Innovation Scale-Up to Alleviate T&D Congestion and Mitigate Wildfire Risks	$2,986,110	$356,447	$3,122,852	None
EPC-18-024	Element 16 Technologies, Inc	Large-Scale Sulfur Thermal Battery Demonstration for Enhanced Grid Flexibility and Increased Renewable Penetration	$3,000,000	$430,000	$640,000	CBE
EPC-18-025	General Engineering & Research, L.L.C.	Scale-up of Magnetocaloric Materials for High Efficiency Magnetic Refrigeration	$1,088,188	$409,462	$306,791	Small Business, CBE, Woman Owned

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-18-026	Spatial Informatics Group, LLC	Comprehensive Open Source Development of Next Generation Wildfire Models for Grid Resiliency	$5,000,000	$546,431	$1,656,600	Micro Business, CBE
EPC-19-002	University of California, Los Angeles	"Smart Greenhouse": Integrated Photovoltaics/Photosynthesis for Energy and Food	$600,000	$97,807	$60,000	CBE
EPC-19-003	Tandem PV, Inc.	Processing and Architecture Design to Develop and Demonstrate Stable and Efficient Perovskite + Silicon Tandem Modules	$999,802	$161,295	$999,986	CBE
EPC-19-004	The Regents of the University of California, San Diego	High-Efficiency Perovskite Tandem Modules with Resilient Interfaces	$993,458	$103,945	$659,295	CBE
EPC-19-005	Zero Net Energy (ZNE) Alliance	Richmond Advanced Energy Community (AEC) Phase II Project	$4,998,555	$1,092,030	$2,813,454	CBE
EPC-19-006	The Energy Coalition	Basset-Avocado Advanced Energy Community	$9,093,833	$0	$5,459,863	CBE
EPC-19-007	RCAM Technologies	On-site 3D Concrete Printing for Next-Generation Low-Cost Wind Plants	$2,999,979	$507,530	$302,000	None
EPC-19-008	Aker Offshore Wind	NextWind Real-time Monitoring System	$2,000,000	$503,271	$201,775	None
EPC-19-009	Integral Consulting Inc.	A Risk Assessment Framework to Evaluate Effects of Offshore Wind Farms on the California Upwelling Ecosystem	$500,000	$174,739	$152,821	None
EPC-19-010	Lawrence Berkeley National Laboratory	Integrated Distributed Fiber Optic Sensing for Real-Time Monitoring of OWT Gearbox and Tower Operation and Marine Animal Activities	$2,000,000	$684,912	$520,000	CBE
EPC-19-011	Humboldt State University Sponsored Programs Foundation	Seabird 3D Distribution and Relative Risk from California Offshore Wind Turbines	$500,000	$123,126	$20,046	CBE
EPC-19-012	Franklin Energy Services, LLC	Affordable Space Conditioning and Domestic Hot Water Systems with Low Emissions and High Performance	$1,499,925	$305,761	$163,750	CBE
EPC-19-013	Lawrence Berkeley National Laboratory	HP-Flex: Next Generation Heat Pump Load Flexibility	$3,000,000	$989,122	$386,500	CBE
EPC-19-014	Electric Power Research Institute, Inc.	A zero GWP heat pump and distribution system for all-electric heating and cooling in California	$2,498,557	$648,140	$440,000	CBE
EPC-19-015	Western Cooling Efficiency Center - UC Davis	Optimizing Heat Pump Load Flexibility for Cost, Comfort, and Carbon Emissions	$2,537,436	$570,955	$256,701	CBE
EPC-19-016	Western Cooling Efficiency Center - UC Davis	Affordable Near- and Medium-Term Solutions for Integration of Low GWP Heat Pumps in Residential Buildings	$1,916,306	$455,123	$200,000	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-19-017	Materials Research LLC	Pilot Scale Recovery of Lithium from Geothermal Brines	$1,878,634	$25,000	$0	CBE
EPC-19-018	Hell's Kitchen Geothermal LLC	Hell's Kitchen Geothermal Lithium Extraction Pilot	$1,460,735	$117,874	$480,000	CBE
EPC-19-019	Lawrence Berkeley National Laboratory	Joint Time-Lapse Acquisition and Inversion of Passive Seismic and Magnetotelluric Data for Monitoring Reservoir Processes at the Geysers Geothermal Field	$1,661,032	$720,023	$247,611	CBE
EPC-19-020	BHER Minerals, LLC	Salton Sea Geothermal Lithium Recovery Demonstration Project	$6,000,000	$107,508	$4,025,000	CBE
EPC-19-021	General Engineering & Research, L.L.C.	High Efficiency Magnetic Refrigeration for Industrial Cryogenic Applications	$1,699,066	$0	$545,658	Small Business, CBE, Woman Owned
EPC-19-022	The Regents of the University of California, Merced	Stirling cycle heat pumps for industrial heat recovery	$656,630	$0	$135,927	CBE
EPC-19-023	Institute of Gas Technology dba Gas Technology Institute	Booster Ejector Enhancement of Compressor Refrigeration Facilites Utilizing Industrial Process Waste Heat	$1,621,556	$404,995	$173,707	None
EPC-19-024	Electric Power Research Institute, Inc.	Development of an Advanced High Temperature Heat Pump for the Efficient Recovery of Low-Grade Industrial Waste Heat	$1,999,483	$458,916	$405,848	CBE
EPC-19-025	Nelumbo Inc.	Advanced Heat Exchanger Coatings to Improve Energy Efficiency of Industrial Refrigeration System	$1,997,411	$59,837	$925,500	CBE
EPC-19-026	Center for Sustainable Energy	Developing Lessons Learned, Best Practices, Training Materials, and Guidebooks for Customer Side of the Meter Energy Storage	$1,000,000	$349,527	$244,000	CBE
EPC-19-029	Hell's Kitchen Geothermal LLC	Improved Silica Removal for Enhanced Geothermal Plant Performance	$2,999,599	$326,428	$45,000	CBE
EPC-19-030	Association for Energy Affordability	Large Capacity CO2 Central Heat Pump Water Heating Technology Evaluation and Demonstration	$2,800,193	$422,709	$1,227,128	CBE
EPC-19-031	Antora Energy, Inc.	Solid-state Long Duration Energy Storage for Industrial Applications	$1,999,787	$99,176	$2,071,313	CBE
EPC-19-032	Association for Energy Affordability	Low-GWP Mechanical Modules for Rapid Deployment Project (LG-MM)	$1,499,926	$104,657	$58,520	CBE
EPC-19-033	Lawrence Berkeley National Laboratory	Demonstrating Benefits of Highly Insulating Thin-Triple Window Retrofits in California	$1,850,000	$465,885	$630,000	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-19-034	e-Zn Inc.	Commercialization of Lowest-Cost, Long Duration Energy Storage Systems	$1,286,777	$73,640	$411,010	None
EPC-19-035	Electric Power Research Institute, Inc.	Advancing Energy Efficiency in Manufactured Homes Through High Performance Envelope	$1,999,982	$457,245	$402,998	CBE
EPC-19-036	Rocky Mountain Institute	Varieties of Prefabricated Envelope Solutions for CA Low-Rise Buildings	$1,917,967	$269,494	$170,624	None
EPC-19-037	DasH2energy LLC	Demand Based Renewable Hydrogen Power-to-Power Project	$1,275,475	$70,935	$275,000	CBE, Minority Owned
EPC-19-038	Smartville, Inc.	Low-Cost and Easy-to-Integrate Second-Life Battery HUB	$2,035,787	$79,875	$955,256	CBE
EPC-19-039	RePurpose Energy, Inc.	Reuse of Electric Vehicle Batteries for Solar Energy Storage	$3,000,000	$210,998	$1,042,541	CBE
EPC-19-040	Salient Energy Inc.	California Zinc-ion Energy Storage Development and Validation Project	$1,583,125	$64,904	$1,416,613	None
EPC-19-041	Form Energy, Inc.	Demonstrating an Aqueous Air-Breathing Energy Storage System for Multi-Day Resiliency	$1,998,215	$0	$1,603,079	None
EPC-19-042	Anzode Inc.	Anzode: Zinc Batteries for California Electrical Customer Power Backup	$1,747,721	$355,461	$621,870	None
EPC-19-043	Institute of Gas Technology dba Gas Technology Institute	Advanced Energy-efficient and Fire-resistive Envelope Systems Utilizing Vacuum Insulation for Manufactured Homes	$2,000,000	$658,603	$801,557	None
EPC-19-044	T2M Global LLC	Ultra-high Efficiency, Lower-Cost, Green Electrolytic H2 for Microgrids in California	$995,250	$117,500	$288,437	CBE
EPC-19-045	GRID Alternatives	Critical Resilience for Fire and Emergency Facilities with the Soboba Band of Luiseño	$1,710,494	$298,664	$472,610	CBE, Woman Owned
EPC-19-046	Indian Energy LLC	Demonstrating a Long-duration Flywheel Energy Storage System	$1,218,374	$32,360	$822,400	CBE, Minority Owned
EPC-19-047	BoxPower Inc.	CATAPULT: "California Title 24 Advanced Power Utilization Technology"	$999,099	$287,885	$253,095	Micro Business, CBE
EPC-19-050	Rincon Band of Luiseño Indians	Rincon Long Duration Multi-Storage Solar Microgrid	$7,282,496	$5,000	$9,500,454	CBE
EPC-19-051	Indian Energy LLC	Hybrid Modular Storage System (HMSS) as a long-duration energy storage technology Demonstration	$5,002,334	$0	$10,766,756	CBE, Minority Owned
EPC-19-053	San Diego State University Foundation	Cost-Effective Integration of Second-life EV Batteries with Solar PV Systems for Commercial Buildings	$2,837,672	$407,945	$835,375	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-19-054	Electric Power Research Institute, Inc.	Demonstrating Code-compliant Energy Storage Systems and Their Capabilities for Grid Harmonization	$999,841	$344,172	$200,017	CBE
EPC-19-055	ReJoule Incorporated	Enabling EV Battery Circular Economy	$2,970,774	$162,057	$331,891	Minority Owned
EPC-19-056	Energy and Environmental Economics, Inc. (E3)	Assessing Long-duration Energy Storage Deployment Scenarios to Meet California's Energy Goals	$1,500,000	$540,062	$315,322	Small Business, CBE
EPC-19-058	Antelope Valley Water Storage, LLC	Long Duration 50 kW Energy Storage with Aquifer Pumped Hydro	$2,000,000	$12,402	$500,000	CBE
EPC-19-059	The Regents of the University of California, Riverside	Residential Solar+Storage Control Unit for Providing Grid Services and Demand Side Management	$939,232	$147,600	$362,250	CBE
EPC-19-060	The Regents of the University of California, Merced	Modeling of Long-Duration Storage for Decarbonization of California Energy System	$1,254,955	$188,844	$505,826	CBE
EPC-20-001	Lawrence Berkeley National Laboratory	Energy-Water Desalination Hub	$3,000,000	$1,493,597	$0	CBE
EPC-20-002	Charge Bliss, Inc.	Essential Power Support for the Kaiser Permanente Ontario Medical Center using Long Duration Batteries within a Renewable Energy Microgrid	$8,351,000	$142,698	$7,549,000	Micro Business, CBE
EPC-20-003	The Pechanga Band of Luiseño Indians	Pechanga Tribal Microgrid Long Duration Storage Project	$1,998,101	$0	$849,140	CBE
EPC-20-004	Redwood Energy	Central Heat Pump Water Heater Load Flexibility	$2,043,755	$119,460	$48,200	CBE
EPC-20-005	Technology & Investment Solutions, LLC	Hy2green - Electrolytic Hydrogen Energy Storage Using Novel Metal Hydrides	$1,766,775	$0	$167,450	CBE
EPC-20-006	The Regents of the University of California, San Diego	Development of Climate Projections for California and Identification of Priority Projections	$1,500,000	$289,305	$116,955	None
EPC-20-007	Eagle Rock Analytics, Inc.	A Co-Produced Climate Data and Analytics Platform to Support California's Electricity Resilience Investments	$3,500,000	$728,552	$339,500	CBE
EPC-20-008	Antelope Valley Water Storage, LLC	Long Duration 200 kW Energy Storage with Aquifer Pumped Hydro	$6,406,950	$70,470	$3,200,000	CBE
EPC-20-009	The Regents of the University of California, San Diego	Smart Plug Load Controls Integrated with Building Energy Management Systems	$1,028,125	$73,078	$370,125	CBE
EPC-20-010	California Energy Alliance	Energy and Appliance Standards for Plug Loads: Assessing Current Needs and Future Opportunities	$996,974	$198,525	$19,580	None

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-20-011	Packetized Energy	Increasing Access to Smart and Affordable Energy for Customers and Resource Adequacy for the California Grid	$2,000,000	$0	$1,500,000	None
EPC-20-012	All Power Labs, Inc.	Development and Demonstration of Distributed Biomass CHP Microgrid Systems	$3,287,890	$0	$1,988,074	Small Business, Micro Business, CBE
EPC-20-013	Noon Energy Inc.	Pilot Demo of Ultra Low Cost, Long-Duration Energy Storage Coupled to Solar Power	$2,166,000	$438,095	$1,950,000	CBE
EPC-20-014	Next Energy Technologies	Rapid Innovation Development of Energy Generating Windows for Zero- and Negative-Carbon Emission Buildings	$3,000,000	$923,875	$2,500,000	CBE
EPC-20-015	Sepion Technologies, Inc.	Hybrid Lithium-Metal Batteries for Low-Cost and Long-Range Electric Vehicles	$1,400,000	$260,994	$1,299,897	CBE
EPC-20-016	South 8 Technologies	Advanced Li-ion Chemistry for Safer and Greener Electric Vehicle and Energy Storage Systems	$1,010,227	$0	$506,381	CBE
EPC-20-017	Treau, Inc.	Increasing the Thermal Range and Efficiency of Affordable User-Installable Room Heat Pumps	$2,761,606	$0	$1,669,742	CBE
EPC-20-018	Skyven Technologies, Inc.	Transforming the techno-economics of decarbonization in California's bespoke industrial sector with a scalable front-end engineering AI	$1,110,500	$157,000	$1,001,100	None
EPC-20-019	Polaris Energy Services Inc.	Accelerated Deployment of Irrigation Pumping Demand Flexibility	$2,884,912	$466,190	$576,982	CBE
EPC-20-020	Feasible, Inc.	Machine Learning Enhanced Acoustic Inspection to Improve Battery Manufacturing	$1,000,000	$0	$925,568	None
EPC-20-021	The Regents of the University of California, San Diego	LEED: A Lightwave Energy-Efficient Datacenter Phase 2	$425,000	$137,496	$0	CBE
EPC-20-022	FreeWire Technologies, Inc.	FreeWire Boost 2.0 Development and Demonstration Project	$3,468,490	$0	$4,895,575	Small Business, CBE
EPC-20-023	Rocky Mountain Institute	Scaling Industrialized Zero Emissions Retrofits in California and Beyond	$1,312,500	$0	$58,520	None
EPC-20-025	Lawrence Berkeley National Laboratory	Achieving Integrated and Equitable Decarbonized Loads with CalFlexHub	$16,000,000	$4,213,091	$3,362,000	CBE
EPC-20-026	Caban Systems, Inc.	Advanced Energy Storage for California's Critical Infrastructure Project	$1,095,264	$0	$987,764	CBE
EPC-20-027	Cuberg, Inc.	High-Performance Battery Systems to Power the Rise of Electric Mobility	$3,499,525	$1,124,175	$3,322,300	None
EPC-20-028	Nextech Batteries, Inc.	Bringing Lithium Sulfur Technology to Market	$2,996,782	$279,928	$1,500,000	None

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-20-029	Antora Energy, Inc.	Manufacturing Scale-up of Record-Breaking Solid-State Heat Engine for Deep Decarbonization in California	$2,999,695	$0	$2,745,457	CBE
EPC-20-030	Electric Power Research Institute, Inc.	Smart, Hybrid, Grid-Connected Exterior Lighting Systems.	$3,308,595	$790,343	$983,000	CBE
EPC-20-031	The Regents of the University of California, Davis	Renewable Energy & Advanced Lighting Systems for Exterior Applications	$4,166,306	$506,771	$1,250,000	CBE
EPC-20-032	Ubiquitous Energy, Inc.	Productizing Transparent Solar Windows: Enabling Production of Transparent Renewable Energy Generating Windows	$2,997,343	$50,976	$5,181,615	None
EPC-20-033	Halo Industries, Inc.	Production Scale-Up of Conductive Silicon Carbide Wafer Technology for Electric Vehicle and Charging Infrastructure Power Electronics Cost Reduction	$3,000,000		$2,700,000	None
EPC-20-034	OhmConnect, Inc.	Building Resiliency from Within	$3,000,000	$0	$600,000	CBE
EPC-20-035	Opus 12 Incorporated	Low rate production pilot line for CO2 electroreduction Membrane Electrode Assembly fabrication	$3,000,000	$0	$1,811,065	None
EPC-20-036	AgMonitor Inc.	Load Shifting During Critical Summer Hours via Programmable Irrigation	$349,972	$59,400	$87,368	Small Business, CBE
EPC-20-037	Stasis Energy Group LLC	Stasis Energy Group Thermal Energy Storage System (TESS) for Packaged HVAC Systems	$1,634,740	$0	$1,169,571	CBE
EPC-20-038	MOEV Inc.	Artificial Intelligence Based Heavy-Duty Fleet Charging to enable Distributed Energy Resource Integration	$3,319,387	$555,129	$3,000,000	CBE
EPC-20-039	EPC Power Corp.	Solid-State DC-DC Power Electronics for Grid-Scale Lithium EV Battery Pack Integration	$3,499,532	$784,760	$1,750,246	CBE
EPC-20-040	Lawrence Berkeley National Laboratory	Innovative School Bus Charging for Resilient Communities	$4,000,000		$1,285,822	CBE
EPC-20-042	TA Operating LLC	TAking Charge: TravelCenters of America Ultra-Fast En-Route Charging	$4,000,000	$0	$1,200,000	None
EPC-20-043	The Regents of the University of California, Davis Campus	Optimized Controls for Cooling California Dairy Cows	$1,529,705	$0	$306,451	CBE
EPC-20-044	Caliskaner Water Technologies, Inc.	Demonstration of Advanced Primary and Secondary Treatment Technologies for Energy and Performance Benefits to Wastewater Treatment	$4,000,000	$1,289,918	$2,669,214	CBE

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Agreement #	Recipient/ Contractor	Project Title	Encumbered Project Funds	Project Administrative and Overhead Costs	Match Funding	CA-Based Entity (CBE), Diversity and Equity Information
EPC-20-045	Enpowered Solutions, LLC	Artificial Intelligence for Energy Efficiency Optimization in California Dairy Operations	$1,638,868	$169,163	$350,274	None
EPC-20-046	Sysco Riverside, Inc.	Distributed Resources for Diversified Renewable Energy Project	$4,000,000	$0	$2,758,537	None
EPC-20-047	Zira Group Inc (DBA Lightapp)	Leveraging Artificial Intelligence and Machine Learning to Increase Energy Efficiency in California Dairies	$4,227,648	$0	$1,665,912	CBE
EPC-20-048	Gate 5 Energy Partners, Inc	Demonstration of Advanced Primary and Secondary Wastewater Treatment Technology	$1,603,779	$0	$332,920	CBE
EPC-21-001	GRID Alternatives	Enabling California's Resilient Tribal Communities with Mobile Renewable Power	$1,000,000	$51,319	$200,157	CBE, Woman Owned
EPC-21-002	One-Cycle Control, Inc.	Demonstration of 15 kW Silicon-Carbide enabled OCC-MORBUGs	$1,971,467	$0	$394,901	CBE
EPC-21-003	Electric Power Research Institute, Inc.	Mobile Hydrogen Fuel Cell Generation System	$1,999,953	$0	$932,121	CBE
EPC-21-004	Uprise Energy, LLC	Demonstrating Mobile Renewable Back-up generation with Uprise Energy’s Mobile Power Station	$1,589,012	$348,637	$663,598	CBE
EPC-21-006	WattEV, Inc.	21st Century Truck Stop: 1st MD/HD eTruckStop in California	$4,000,000	$0	$6,758,594	None
EPC-21-007	eIQ Mobility	Building a Scalable and Repeatable School Bus Electrification Business (BuSy Bees)	$2,192,175	$0	$197,586	None
EPC-21-008	The Regents of the University of California, San Diego	Development of Efficient and Scalable Direct Recycling Technology for Lithium-Ion Batteries	$1,684,308	$141,867	$1,364,060	CBE
EPC-21-009	OnTo Technology LLC	Cathode-Healing for Recycling and Manufacturing of Lithium-ion Batteries	$1,001,807	$282,761	$924,651	None
EPC-21-010	Electric Power Research Institute, Inc.	Electric Truck Research and Utilization Center (eTRUC) for RHETTA	$12,999,155	$2,158,367	$6,327,619	CBE
EPC-21-011	Center for Transportation and the Environment, Inc.	Hydrogen Back-Up Generation Vehicle (H2BUG)	$3,000,000	$471,522	$2,022,702	CBE
EPC-21-012	Swift Solar Inc.	High Efficiency Perovskite Tandems for Solar Electric Vehicles	$2,995,200	$0	$1,760,000	CBE
EPC-21-013	Yotta Energy, Inc.	Demonstrating Distributed Solar Plus Storage with Battery Backup Capability for Grid Resilience and Reliability	$1,229,174	$0	$861,650	None
EPC-21-014	Intertie Incorporated	Advanced Power Electronics to Enable Fast Charging While Avoiding Grid Upgrades	$2,000,000		$1,000,000	CBE
EPC-21-015	GreenFire Energy, Inc.	Steam Dominated GreenLoop: Proof of Concept at The Geysers, California	$2,705,228	$123,584	$1,486,008	CBE

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EPC-21-016	Icarus RT, Inc.	R3A08: Icarus Hybrid Photovoltaic/Thermal Solar Plus Storage Cogeneration System	$1,087,588	$21,048	$346,253	CBE
EPC-21-017	Carnot Compression Inc.	R3A05: Carnot Compressor Field Testing	$2,028,350	$183,032	$510,000	None
EPC-21-018	RockeTruck, Inc.	Development and Demonstration of a Mobile Fuel Cell Generator (MFCG)	$3,000,000	$0	$1,210,567	None
EPC-21-019	Porifera, Inc.	Manufacturing of Large Format Osmotic Membrane Module	$2,980,226		$2,156,461	CBE, Minority Owned, Woman Owned
EPC-21-020	SPARKZ, Inc.	Ultra-High Energy Lithium Metal Battery System Based on Solid Electrolyte and Cobalt Free Cathode	$2,676,670	$726,751	$1,142,346	CBE
EPC-21-021	ConSol	Reimagining Affordable Mixed-Use Development in a Carbon-Constrained Future	$999,936		$180,338	Small Business, CBE
EPC-21-022	Innovative Housing Opportunities, Inc.	Santa Ana Environmental Justice Innovation Zone	$998,630		$800,000	None
EPC-21-023	National Community Renaissance	Zero Emission Affordable Housing Design: Palm City Village	$1,000,000	$0	$1,000,000	None
EPC-21-024	Communities for Global Sustainability LLC (C4GS-ZEDlife - DBA)	The Zero Energy Live/Learn Residential Ecovillage	$1,000,000	$110,583	$146,309	CBE
EPC-21-025	Family Health Centers of San Diego, Inc.	The Newton Avenue Project	$1,000,000		$0	CBE
EPC-21-026	Jamboree Housing Corporation	Paseo Adelanto: City Hall and Zero-Emission Affordable Housing Design	$1,000,000	$0	$443,025	CBE
EPC-21-027	Mutual Housing California	Mutual Housing at Fairview Terrace	$1,000,000		$211,175	CBE
EPC-21-028	Electric Power Research Institute, Inc.	Net Positive Resilient All-Electric Affordable Housing at Pacific Station North Transit Center in Downtown Santa Cruz	$1,000,000	$0	$800,000	CBE
EPC-21-029	Northern California Land Trust, Inc.	Berkeley Efficient & Resilient Mixed-Use Showcase (BERMUS)	$999,595	$0	$1,061,733	CBE
EPC-21-030	Association for Energy Affordability	Harmonized Resilience at Roosevelt Village: A zero-emissions model for supportive housing	$999,315	$0	$0	CBE
EPC-21-031	Self-Help Enterprises	Colegio ZNE Village	$1,000,000		$586,600	CBE
EPC-21-032	SoLa Impact Opportunity Zone Fund, LP	Making Green Accessible	$1,000,000	$0	$0	CBE, Minority Owned
EPC-21-033	Lawrence Berkeley National Laboratory	The Cooking Electrification and Ventilation Improvements for Children's Asthma (CEVICA)	$4,000,000	$717,899	$409,280	CBE
EPC-21-034	Enzinc Inc.	A Safe, High-Performance, Rechargeable, Recyclable Zinc-Based Battery for Stationary Energy Storage Applications	$1,807,600	$232,521	$1,183,308	None
EPC-21-035	Lookin, Inc.	In-Line Quality Control of Lithium-Ion Battery Electrodes through Terahertz Scanning	$999,947	$0	$424,857	CBE

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EPC-21-036	Element 16 Technologies, Inc	Electrification of Industrial Processes with Sulfur Electric Thermal Storage	$1,000,000	$170,390	$660,000	CBE
EPC-21-037	Eagle Rock Analytics, Inc.	Climate-Informed Generation Capacity Modeling to Support a Climate Resilient Transition to a Clean Electricity System	$900,000	$229,460	$81,001	CBE
EPC-21-038	Eagle Rock Analytics, Inc.	Climate-Informed Energy Sector Adaptation Planning Web Application via Cal-Adapt	$750,000	$167,816	$67,501	CBE
EPC-21-039	Solid Energies Inc.	High Safety, Wide-operation-temperature, Low-cost All Solid-state Li-ion Battery Energy Storage Systems	$3,000,000	$173,585	$1,810,080	CBE
EPC-21-040	Pyro-E, Inc.	Residential Water Bill Reduction with Self-powered Diagnostics & Services	$1,548,602	$282,333	$795,311	CBE
EPC-21-041	Energy & Environmental Economics, Inc.	Climate-Informed Load Forecasting & Electric Grid Modeling to Support a Climate Resilient Transition to Zero-Carbon	$1,950,000	$1,069,682	$97,500	CBE
EPC-22-001	Lumen Energy Strategy, LLC	Advancing California's Electricity Resource Planning Tools to Assess and Improve Climate Resilience	$1,950,000	$0	$195,000	Woman Owned
EPC-22-002	The Regents of the University of California, on behalf of the Davis Campus	Heavy-Duty Vehicle Electrification and its Potential as a Clean Energy Alternative for Critical Operations	$3,000,362	$339,391	$2,027,631	None
EPC-22-003	Smartville, Inc.	Accelerate Development of SmartvilleSecond-Life Battery Repurposing Platform	$2,000,000	$72,000	$0	CBE
EPC-22-004	Gridtractor, Inc.	Electric Farm Vehicles as Reliable Grid Assets	$2,999,567	$222,172	$1,071,244	CBE
EPC-22-005	Gridscape Solutions, Inc.	Scalable, Resilient V2B Multi-Vehicle DC Platform (MVP DC) Demonstration at Public Buildings in California	$4,000,000	$274,978	$1,071,162	CBE, Minority Owned
EPC-22-006	Center for Transportation and the Environment, Inc.	"V2B Oakland"	$3,199,969	$477,109	$400,000	CBE
EPC-22-007	Andromeda Power, LLC	Integrated Powertrain System - MotorTransformer	$3,675,637	$0	$1,066,500	CBE
EPC-22-008	The Latino Equity Advocacy & Policy Institute, The LEAP Institute	LEAP MORBUG	$675,103	$77,119	$152,039	CBE, Minority Owned

Total Agreements	Total Encumbered Project Funds	Total Project Administrative and Overhead Costs	Total Match Funding
474	**$1,125,163,788**	**$178,004,820**	**$564,463,777**