

Bridging the Gap for Diverse Clean Energy Entrepreneurs

CalSEED

Investing in California's Equitable Energy Future



“It is exciting to see the new ideas that come into the CalSEED program and be able to help advance their development. These are technological solutions that will make our energy systems more resilient, and these are leaders in our transition to an equitable clean energy economy.”

—JOY LARSON, CALSEED DIRECTOR

“Since the inception of CalSEED, our team has developed well-rounded programming that includes a constituency-centric approach that enables us to be highly effective stewards of public funding while providing mentorship, professional development and strategic guidance to awardees.”

—SARAH CHESTER, DIRECTOR OF GRANTS MANAGEMENT & COMPLIANCE

“The CalSEED program has been successful in helping entrepreneurs working on promising climate solutions to get the support they need to scale up. The Energy Commission is proud to partner with New Energy Nexus with the next round of CalSEED funding and to help these innovators bring new clean energy technologies to life.”

—DAVID HOCHSCHILD, CHAIRMAN OF THE CEC

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INTRODUCTION

ACCELERATING AN EQUITABLE CLEAN ENERGY TRANSITION

Resilience Through Innovation and Diverse Entrepreneurship

The people of California want clean, affordable energy delivered by safe and reliable systems now. Record-breaking weather patterns, rolling blackouts, wildfires, and fluctuating energy costs all demand it. The state's bold renewable energy, ¹ vehicle electrification, ² and environmental health goals³ invite new approaches to investing in emerging clean technology to balance potential benefits with the unknown financial risk of methods that have yet to be proven. The clean energy transition must be just and swift, building energy resilience in all communities across the state, but especially in those most vulnerable to climate disruption, compromised air quality, emergency power outages, and the rising cost of electricity. The California Sustainable Energy Entrepreneur Development (CalSEED) Initiative mobilizes funds to meet these needs by awarding a large amount of early-stage grants to diverse innovators with breakthroughs on decarbonization technology, providing them with both monetary and strategic aid that enables them to reach the next phase of development and investment.



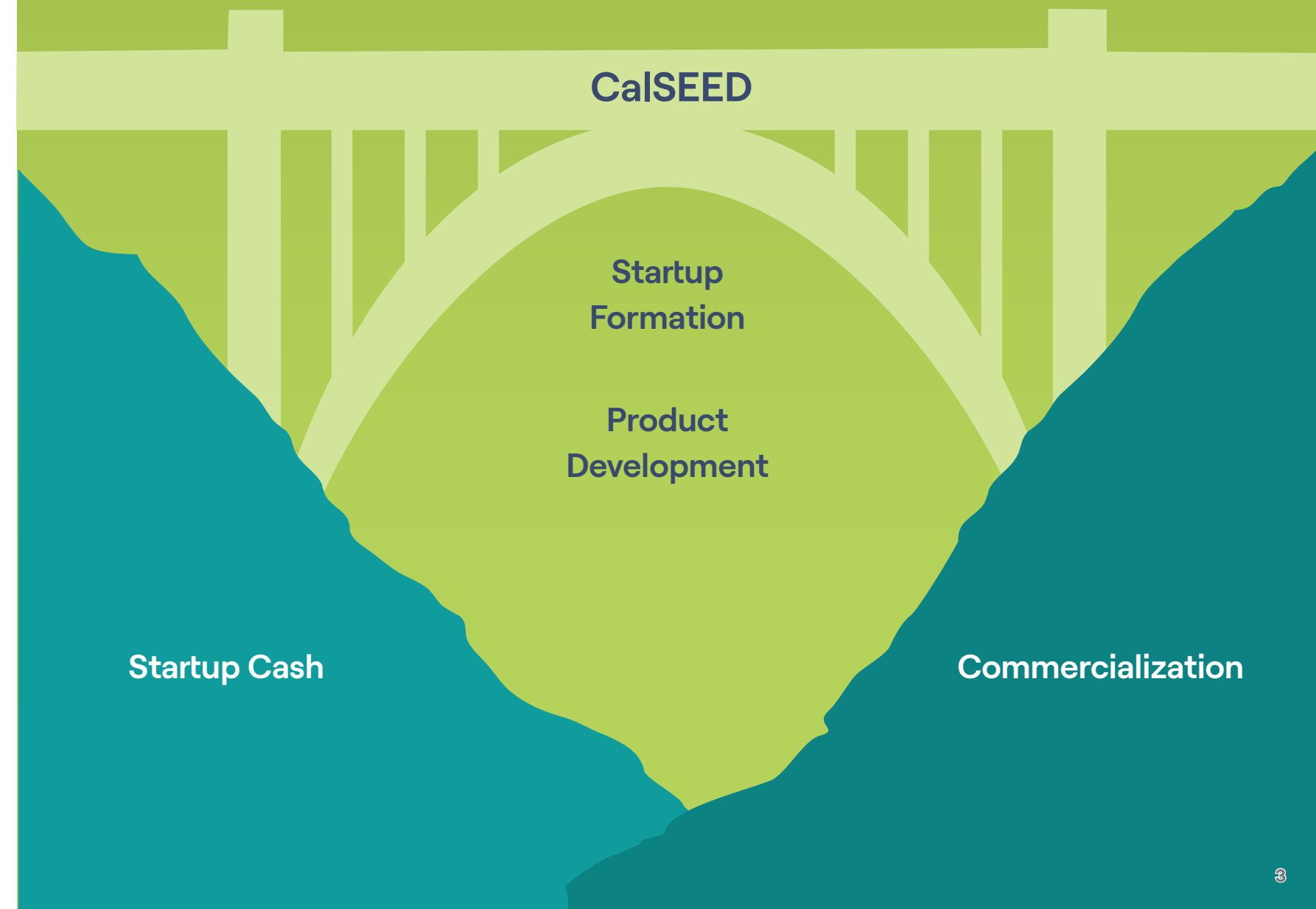
Devised by the California Energy Commission (CEC) utilizing funding from the Electric Program Investment Charge (EPIC) program, CalSEED is made possible by the electric ratepayers* whose dollars are reinvested to accelerate the clean energy transition. CalSEED delivers the full benefits of these innovations back to all Californians by implementing an impartial, straightforward, and transparent awardee selection process that identifies companies with the highest technical merits, commercial promise, potential ratepayer benefits and energy equity outcomes. Once accepted into the program, companies receive access to professional networks and expert business development strategy training to bolster startup formation, product development, and evaluation practices. Discover more about the CEC's Energy Innovation Ecosystem in Appendix B.

Many early-stage startups lack the sustained capital, professional networks, and industry training to validate their innovation's journey from concept to market, often succumbing to the famed valley(s) of death, which leaves innovations unlaunched and unproven. The challenge is heightened for clean energy companies, as conventional investors are less likely to fund products in emerging markets. This traditional venture capitalist culture also favors established entrepreneurs and prioritizes exponential growth at any social cost over patient capital that provides equitable outcomes for all.

*Customers in Pacific Gas and Electric, Southern California Edison, and San Diego Gas & Electric service territories.

Bridging the “Valley of Death”

CalSEED ushers startups through the “valley of death” filling the gap between initial capital and commercialization or maturation, by offering non-dilutive seed funding and unprecedented professional support



The California Sustainable Energy Entrepreneur Development (CalSEED) Initiative systematically identifies early-stage companies and bridges the gap by funding diverse entrepreneurs and equitable clean energy innovations.

California's ambitious plan to ensure a safe and healthy power supply requires urgent and equitable action. Representing approximately 60% of California's population, disadvantaged communities of color are disproportionately affected by greenhouse gas emissions and other pollutants, for example, commonly situated where poor air quality contributes to adverse health outcomes.⁴ Low-income communities are similarly impacted, often lacking access to cleaner environments, technologies, and economic opportunities. CalSEED companies have innovations to meet this pivotal moment.

Now in its fifth year of operation, CalSEED addresses critical funding and strategy gaps to strengthen company formation and technology development. Over \$24.3 million has been awarded to 93 startups, and this financial support combined with expert advising on business strategy has elevated companies to the next level of development to attract private sector interest and capital. This investment in the CalSEED initiative has positioned awardees to amass \$155.5 million in other follow-on funding, multiplying the benefits to California's local economies. On average companies advanced by 2 levels on the Technology Readiness Level (TRL)* scale over the course of the program. This report highlights CalSEED's success in accelerating the clean energy transition, its challenges and opportunities, and the program's commitment to innovation and equity from start to finish.

CalSEED Impact Highlights

The CalSEED program institutes an impartial awardee selection process followed by high quality business strategy coaching for entrepreneurs that deliver clean energy benefits to California's ratepayers



1100+ Applicants



93 Concept Awards



23 Prototype Awards



2 Technology Readiness Levels (TRL)* Advanced on Average



\$24M Non-dilutive Funding



\$155M External Follow-on Funding



386 Jobs Supported



145 Pilot Projects



51% Companies Led by Women, Underrepresented Ethnic and Racial Groups, or Disabled Veterans



26 Company Headquarters or Pilot Projects Located in Disadvantaged Communities (DACs) or Underrepresents Counties**



37 Company Headquarters or Pilot Projects Located in Low-income Communities



21 California Counties Represented

⁴Technology Readiness Level (TRL): A measurement system developed by NASA for DOE, used to assess the maturity level of an emerging technology company.⁵
⁵Disadvantaged Communities (DAC): the areas throughout California which most suffer from a combination of economic, health, and environmental burdens. These burdens include poverty, high unemployment, air and water pollution, presence of hazardous wastes as well as high incidence of asthma and heart disease.⁶ Underrepresented counties: Colusa, Del Norte Fresno, Glenn, Humboldt, Inyo, Kern, Kings, Lake, Lassen, Madera, Mendocino, Merced, Modoc, Plumas, Riverside, San Bernardino, San Joaquin, Shasta, Siskiyou, Stanislaus, Tehama, Trinity and Tulare.

“Companies need a good idea, to know the market, and help coming up with a core business plan. CalSEED is the perfect spot for companies who have product ideas thought out but not developed for investment.”

—INTERIM REPORT SURVEY
RESPONDENT, CALSEED
PROGRAM AWARDEE

OVERVIEW

BUILDING RESILIENT CLEAN ENERGY COMPANIES

A Public-Private Partnership to Bolster Innovation

The CalSEED Initiative

CalSEED funds early-stage clean energy technologies that provide important ratepayer benefits, but also lack access to private-sector capital. To address this, CalSEED primarily provides Concept Awards to California’s most promising innovators through a competitive solicitation. Innovators are awarded \$150,000 in non-dilutive funding, leadership development resources, and access to the best accelerator and incubator programs and test facilities in California. Concept Award winners are subsequently eligible to compete for a \$450,000 Prototype Award in an annual Business Plan Competition.

These small grants coupled with strategic support services provide a critical foundation that enables these diverse entrepreneurs to succeed in their clean energy journey within and well beyond the program.

See additional metrics on pages 14-18.



Noble Thermodynamic Systems

The CalSEED program, with its strategic focus on equitable outcomes, strives for a 100% clean energy economy for 100% of Californians.

CalSEED is committed to bringing the benefits of a clean energy economy to the most underrepresented communities by encouraging a diverse entrepreneurial pipeline and ensuring access and inclusion are at the center of their ideations. Tapping into innovations led by women, underrepresented racial and ethnic groups, veterans, disabled-veterans, rural, disadvantaged (DACs) and low-income communities, are all key to the success of the initiative and broader state equity goals. Since inception, over half of awarded funds have supported companies led by underrepresented groups, while 17 CalSEED companies operate directly in DACs and 37 are headquartered in low-income communities.

The CALSEED Journey. In addition to grant funding, Concept Awardees join a global community of clean energy entrepreneurs, participate in webinars and networking events, and have their work promoted through the program's media channels to amplify their accomplishments. Each CalSEED company takes part in Cleantech Open (CTO), the world's largest clean technology accelerator program. Through CTO, entrepreneurs attend clinics to receive training in business plan strategy and benefit from industry-leading resources and mentorship that inform customer discovery, financial planning, and pitch delivery. After completing the CTO program, startups implement learnings and compete for the organization's Regional Awards, participate in Innovation Showcases and are eligible to enter the CalSEED Business Plan Competition, where they pitch their technology to contend for a Prototype Award in the amount of \$450,000.

CalSEED Roadmap

ORIENTATION:

Receive a robust onboarding that introduces Concept Awardees to the program, the team, and guides them through the contracting process.

WRAP-AROUND PROGRAM SERVICES:

Access mentorship, webinars and training on business development strategy through program partners, and connect with investors, scientists, and other entrepreneurs at industry networking events. Receive specialized, individual guidance on planning and project management, research and development, budgeting and impact evaluation from CalSEED staff. Gain publicity through the CalSEED website, with select companies featured on program social media channels to amplify accomplishments.

PARTICIPATE IN CLEANTECH OPEN:

CleanTech Open is the largest clean technology accelerator in the world, where awardees gain a better understanding of their target markets and potential customers. This summer program includes networking events, regional business clinics and webinars, culminating in a Global Forum.

CONNECT WITH REGIONAL PARTNERS:

Gain access to four Regional Energy Innovation Clusters for training and mentoring. These partners help Awardees develop concrete next steps in their technology and business development pathway, as well as navigate opportunities for follow-on funding.

COMPETE IN A BUSINESS PLAN COMPETITION:

Opportunity to pitch business ideas in front of industry experts, investors, established clean energy entrepreneurs, and not-for-profit organizations for the chance to receive a CalSEED Prototype Award of \$450,000.

“When people talk about commercializing new technology, they always talk about this ‘valley of death.’ Programs like CalSEED hit the mark. It gives ideas a chance to really grow outside of a lab and into a business.”

—LORENZO MANGOLINI, FOUNDER,
SILI-ION, INC.

Ecosystem Opportunities. CalSEED leverages existing technology innovation resources within the California Energy Innovation Ecosystem, consisting of four Regional Energy Innovation Clusters. These organizations support and accelerate the commercial success of startups in the corresponding counties, ensuring location specific assistance and resources.

Collaboration with the clusters provides:

- » Key services, infrastructure, expertise, and resources to awardees in a specific cluster region, to support the successful deployment and commercialization of their innovations.
- » Connections for emerging energy technologies to region-specific needs, opportunities, and assets.
- » Direct support for the commercialization of technically promising innovations.

Technological Advancements. CalSEED’s portfolio of startups are accelerating technological advancements across sectors to advance decarbonization, from building energy efficiency to clean energy generation to energy storage. During their time in the program, awardees in cohorts 1 through 4 have advanced by an average of 2 levels on the TRL scale, tested their technology through 145 pilot or demonstration projects, and have secured 132 patents. Detailed information about the companies and their technology breakthroughs are shared

Regional Energy Innovation Clusters

CalSEED leverages four Regional Energy Innovation Clusters to support companies located throughout 21 counties in California to accelerate the success of energy innovation



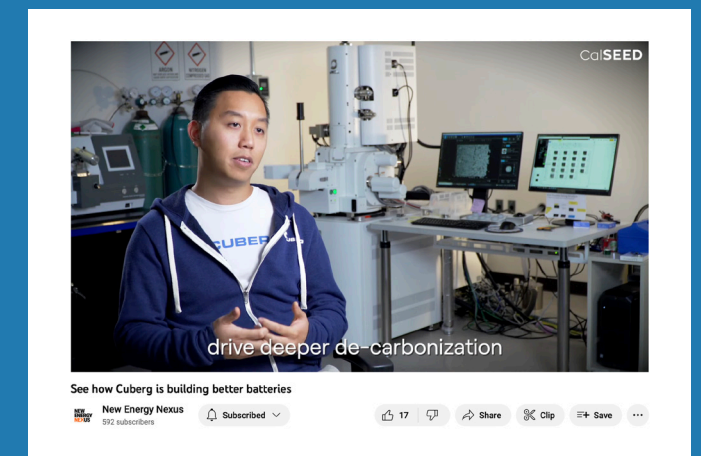
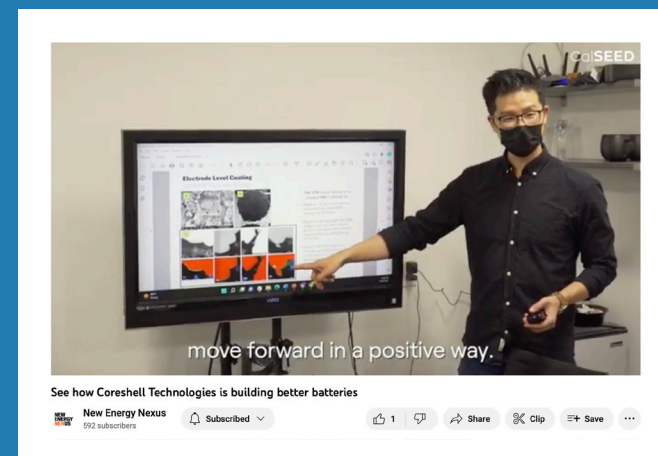
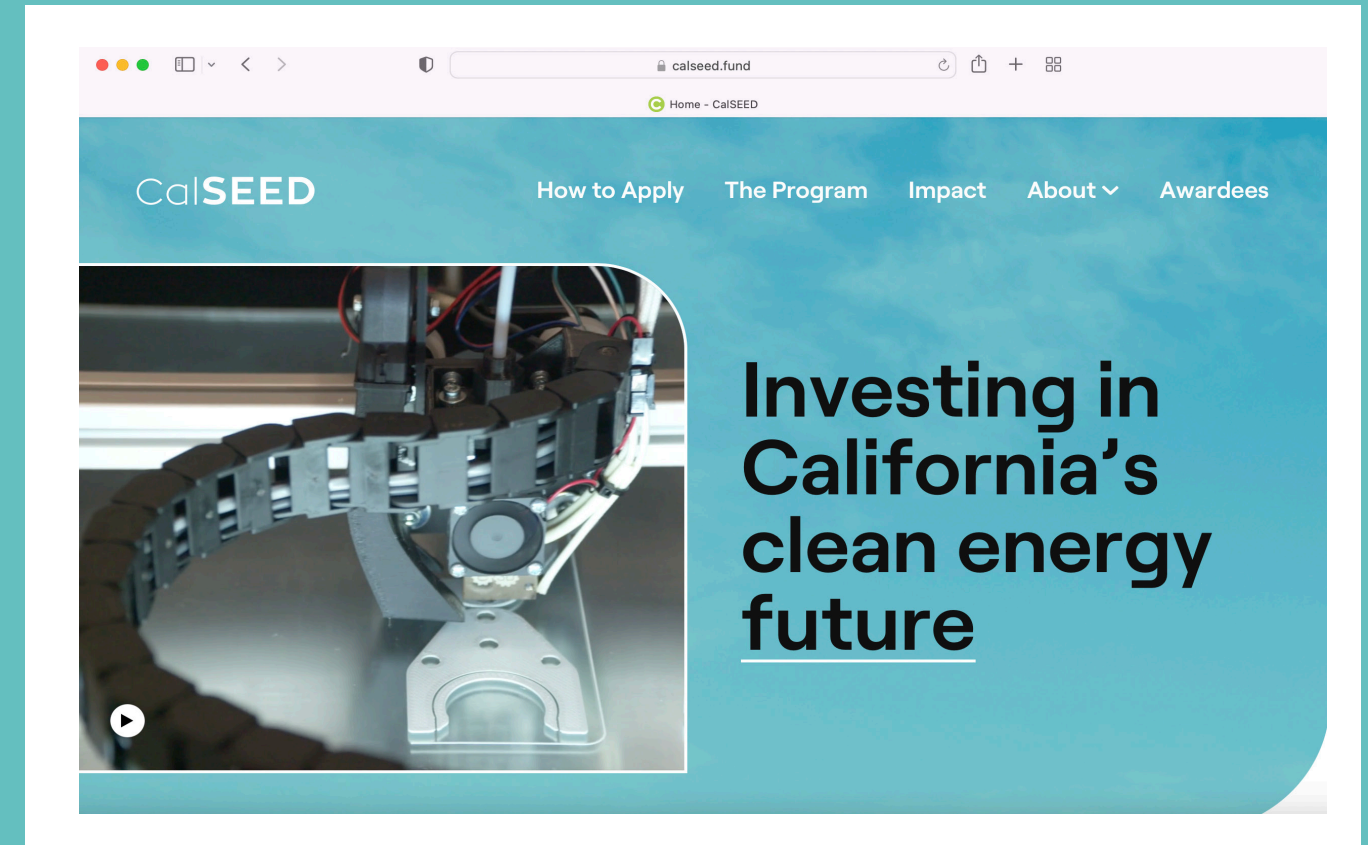
with the public through CalSEED and New Energy Nexus communications channels including websites and social media.

Several videos highlight the groundbreaking work of awardees:

- » [Hago Energetics](#): producing green hydrogen from agricultural waste in pursuit of carbon negative energy.
- » [Cuberg](#): creating the next generation of batteries to decarbonize the transportation industry, with an emphasis on aviation.
- » [Sepion](#): improving energy density and range while decreasing costs of electric vehicle batteries.
- » [Coreshell](#): developing materials for high energy, high-capacity batteries for electric vehicles and the stationary energy storage needed to make large scale renewable energy adoption possible.

The [CalSEED website](#) offers a comprehensive company directory of awarded startups, which includes technology descriptions, ratepayer benefits, and links to company websites.

Steps Towards Success. Given resources and opportunities, CalSEED companies are primed to advance their technology and grow their businesses. As with any ambitious endeavor, entrepreneurs each face unique challenges when developing brand new technology to meet milestones and step up to the next level. According to past CalSEED Prototype Awardees, success requires an enduring commitment to the journey, a strong team, the ability to be resourceful and resilient, hard work and determination, and willingness to learn.



STRATEGY

ADVANCING SOCIAL IMPACT AND ENERGY EQUITY

Implementing the CalSEED Path to Equitable Clean Energy Entrepreneurship

California is a recognized leader in progressive energy, climate policies and technology innovation, but many communities still lack access to clean energy resources. As CalSEED promotes energy innovation and leadership diversity, the program is committed to bringing the full benefits of a clean energy economy to the most underserved communities by making equity a key component throughout the program's administration. It guides every step of the work.

The approach, termed 'equity in, equity out', is a framework developed by program partner, the Greenlining Institute. CalSEED encourages a diverse pool of applicants—"in"—and advocates for technological solutions that provide affordable access to energy, greater economic opportunities, and enhanced resilience to California's disadvantaged and low-income communities—"out". The practice ensures that from inception, fairness and equitable outcomes are prioritized and permeate throughout the program.

CASE STUDY



HAGO ENERGETICS

SECTOR:
Energy Generation

RATEPAYER BENEFITS:
Grid Reliability

HAGO ENERGETICS: ELEVATING RENEWABLE ENERGY AND LOWERING COSTS AND EMISSIONS

Hago Energetics is transforming the way we think about agricultural waste by converting it to green hydrogen. Coming from rural Ecuador and spending his entire career devoted to chemistry, founder and CEO Wilson Hago is dedicated to reducing greenhouse gas emissions by finding ways to produce fuels from already existing products. In addition to a commitment to energy equity, gender equity is also part of Hago Energetics' core values; the dynamic team includes women in leadership.

Green hydrogen is one of the best ways to reduce carbon emissions across the industrial and transportation sectors as it has significantly lower carbon emissions than the current industry standards. What sets Hago Energetics apart from their competitors is that their technology is projected to be carbon negative, storing six tons of carbon for every ton of hydrogen produced. Working with farms to create green hydrogen from their agricultural waste serves not only to reduce emissions but also has a variety of positive social equity outcomes including creating new profit streams for farmers in the Central Valley and lowering the cost of renewable energy.

As a CalSEED Concept Award recipient, Hago Energetics participated in CleanTech Open's business plan competition and were subsequently selected to receive a Prototype Award to continue to develop their technology.

"We intend to scale up our technology as fast as humanly possible, for there is no time to lose if we want to leave a habitable planet for future generations."

—WILSON HAGO, CEO, HAGO ENERGETICS

“Equity should be built into the foundation of how ideas are conceived, how products are designed, and how companies are run.”

—PARWANA AYUB,
ENVIRONMENTAL
EQUITY FELLOW,
THE GREENLINING
INSTITUTE

Equity In – Equity Out Framework: Practices and Outcomes

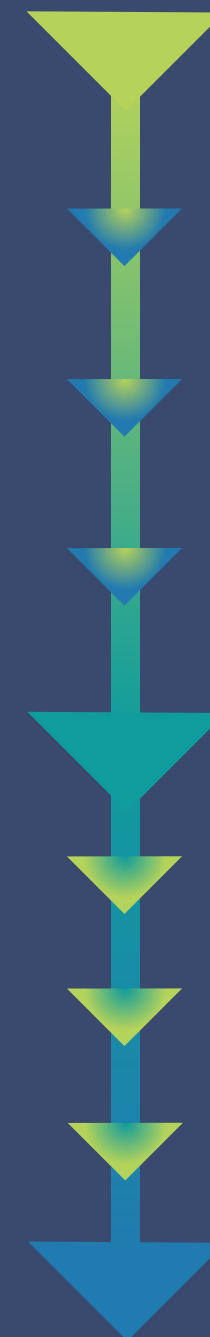
With equity as the guide, participation in CalSEED starts with a public call for application and continues through a comprehensive, unbiased, and transparent review of the proposed innovation, impact, and overall team readiness.

Solicitation. CalSEED seeks California’s most promising innovations through annual competitive solicitations, encouraging individuals, teams and businesses throughout the state to apply. Conducting extensive marketing outreach, hosting informational sessions, and collaborating with the Regional Energy Innovation Clusters, CalSEED ensures the application pool is representative of all Californians. The outreach strategy leverages the CalSEED brand and community partner network to strategically target hard-to-reach regions. To ensure an increase in the number of diverse applicants, the team utilizes a strategic communications approach that focuses on promoting the CalSEED opportunity throughout the state with an emphasis on appropriate channels for:

- » Women
- » Communities of color
- » Veterans and disabled veterans
- » Indigenous communities
- » LGBTQAI+ communities
- » Low-income communities
- » Rural communities

Application Review. Applications that pass an initial eligibility screening are scored by a Technical Advisory

Social Impact and Energy Equity Framework



EQUITY IN ▶ ATTRACT A DIVERSE POOL OF APPLICANTS

We actively seek diverse communities across California to fully participate in the development and implementation of clean energy solutions through inclusive outreach to encourage applicants from businesses and communities that are women-owned businesses, diverse-owned businesses, low-income, racially diverse, LGBTQAI+, rural, and veterans. We also drive equity into our programs by having:

- ▶ Impartial selection process
- ▶ Impact and equity award selection criteria
- ▶ Balanced award distribution throughout the state to ensure geographic diversity

EQUITY OUT ▶ ENCOURAGE EQUITABLE ENERGY SOLUTIONS

Disadvantaged communities need clean energy investments that create healthier environments and reduce the cost of basic necessities. CalSEED encourages entrepreneurs to develop equitable energy solutions that positively impact our most vulnerable populations. We support and coach entrepreneurs to:

- ▶ Develop innovations that can improve environmental, health and economic conditions in disadvantaged communities,
- ▶ Promote diversity, equity, and inclusion practices into their growing companies and teams
- ▶ Encourage early relationship-building and partnership with community-based organizations and inclusive businesses

CASE STUDY

—**twelve**

Opcondys

Maxout
Renewables

SECTOR:
Energy Generation, Energy
Storage, Energy Efficiency

EQUITABLE BENEFIT:
Lower energy costs,
Grid reliability

“A GOLDEN TIME” FOR WOMEN IN CLEAN ENERGY

Representation matters. And although women have been historically underrepresented in cleantech, among other industries, recent participants of the CalSEED program are optimistic about the future. CalSEED’s commitment to reaching entrepreneurs from underrepresented groups particularly includes women of all backgrounds.

Dr. Etosha Cave, Co-founder of Twelve, a carbon transformation company from the first CalSEED cohort notes, the “golden time” for women in clean energy. The current climate has welcomed more women into cleantech and ecosystems like CalSEED invite change. With support from CalSEED in 2017, Dr. Cave and her team transformed lab discoveries into a commercial solution now used by some of the world’s biggest brands for climate mitigation.

Balancing titles of “Mom” and CEO of Opcondys, Kristin Sampayan has always felt encouraged to fulfill both roles despite challenges, and especially so as a participant in CalSEED. Opcondys produces an innovative semi-conductor providing faster, higher temperature operation and greater power-handling enabling a wide variety of applications across industries.

Kirsten Pace, COO of Maxout Renewables observed the same inclusivity in the clean energy space citing the urgency of the climate crisis keeps the collective more focused on results and less on bias. Maxout Renewables technologies enable cost-effective solar solutions that easily compete with other energy sources. For aspiring entrepreneurs, she points to the work of CalSEED as a strong example of a launchpad for ideas that still need proving and funding to do so.

Committee (TAC) composed of a robust and diverse team of impact investors, venture capitalists, community-based organizations, academics, energy consultants, Regional Energy Innovation Cluster representatives, and other subject matter experts. The impartial review process is structured by an equal weighting of innovation, impact & equity, team, and approach.

To ensure that awardees are geographically distributed throughout the state, the top applicants from four geographic regions are selected for an award. The strategy seeks to ensure that award funds are allocated across the entire state, and not concentrated in the San Francisco Bay Area and Los Angeles area that may already have access to funding networks and other start up support resources.

Leadership Diversity. Research indicates that diverse teams make more accurate, fact-based decisions than non-diverse teams; furthermore, businesses with higher cultural and gender diversity are more innovative and create more new products. Studies also show that companies with women in leadership are more profitable than companies without.⁷ Despite these statistics there is a notable lack of inclusivity in the climate tech industry. What was once referred to as a “pipeline problem” is now termed the “leaky pipeline,”⁸ wherein employee diversity is hampered by company cultures that fuel turnover and inhibit professional advancement.

Over the first four years of the CalSEED program, internal reporting documented an increase in the number of women and people of underrepresented ethnic and racial groups in leadership positions. Cumulatively, 28% of companies in Cohorts 1 and 2 reported having women and/or people of underrepresented ethnic and racial groups in leadership when starting the program, but over the course of program and with the addition of Cohorts 3 and 4 the number increased to 49%. Of the 22 companies that have women in leadership, almost half also have people of underrepresented ethnic and racial groups in leadership as well.

Among the 93 Concept Awardees, 25% of companies have women in leadership positions. Of the 23 companies that have gone on to receive Prototype Awards, 35% have women in leadership positions. Historically, startups with women in leadership have faced barriers to funding through traditional

“I love how the program encourages diversity, equity and inclusion. If we are to truly enable the clean energy transition, we need to be aware of the impact we have on communities that have historically been left behind or bear the brunt of the impact of climate change.”

—ZORA CHUNG, CO-FOUNDER, REJOULE

sources, in contrast, the CalSEED metrics suggest that this program is providing more opportunity for female cleantech entrepreneurs.⁹

Energy Equity. Many of California's ratepayers reside in underserved communities that have been excluded from the benefits of traditional energy systems and disproportionately exposed to the pollution and adverse health impacts these systems produce. A just and equitable clean energy transition supports energy investments that create the following benefits for these communities:

- » **Increase energy affordability**
- » **Improve access to clean or efficient energy**
- » **Enhance resiliency, safety, and health outcomes by reducing pollution and power shutoffs**
- » **Create employment, training opportunities, or vendor relationships**

Startup headquarters or pilot projects located in California disadvantaged communities (DACs) or low-income communities (as defined by the CalEnviroScreen and California Air Resources Board¹⁰), have the potential to contribute to small economies, increase access to clean technologies, and improve health outcomes, imparting positive impacts on these communities. To date, 28% of CalSEED companies have headquarters or pilot projects located in DACs, representing an investment of over \$7 million.

Diversity, Equity, and Inclusion (DEI). For each cohort, two webinars are delivered by program partners focused on internal and external diversity, equity, and inclusion practices. Through these interactive presentations all companies, regardless of size or stage of technology development, are encouraged to consider equitable outcomes from diverse perspectives not only for the external community but for the internal success of the company as well. Entrepreneurs are guided to integrate equity, diversity, and inclusion into company culture by adopting policies and practices that reduce bias, foster inclusion, and reach beyond their established networks. Startups are also encouraged to design products and business plans that create benefits for underserved communities, such as, increasing access and affordability for clean technology, establishing genuine community partnerships, supporting local economies through job creation and training, and decreasing public health and safety impacts.

“Before the CalSEED program, we did not think much about social equity, diversity, and inclusion. We are now trying to implement these ideas in our current and future plans for the company.”

—INTERIM REPORT SURVEY RESPONDENT,
CALSEED PROGRAM AWARDEE

IMPACT

THE OUTCOME

Measurable Impacts that Benefit California's Ratepayers, Underserved Communities, and Clean Energy Startups

Starting with an innovative solution, CalSEED startups embark on a journey to grow their company with the support of the California Energy Innovation Ecosystem and wrap-around program services that guide the way. The CalSEED initiative has been intentionally designed and redesigned to eliminate bias in the traditional startup funding process and create a level playing field for entrepreneurs across the state of California.

The first four years of investment in the CalSEED program produced substantial benefits for participants as well as the California ratepayers that fund a broad range of decarbonization innovations. On the state level, awardees have demonstrated technological advances that enable greenhouse gas (GHG) emission reductions, electricity cost savings, and enhanced grid safety and reliability. Many CalSEED companies also engage with underserved communities and provide innovations that contribute to energy equity through employment, pilot projects, community partnerships, and improved public health and safety. The ongoing success of CalSEED companies is evident in measures of increasing leadership diversity, company maturation, and follow-on funding.

CASE STUDY



SECTOR:
Distribution

RATEPAYER BENEFITS:
Increasing grid
safety and reliability

GRIDWARE'S WILDFIRE RESILIENCE: AVERTING PUBLIC SAFETY POWER SHUT-OFFS

Wildfires continue to rage across the state as a result of utility neglect, aging grid infrastructure and drought, but also until recently, limited innovation. Mitigation technologies have been slow to innovate as they require extended time to develop and even longer for traditional utilities to adopt. Equally as challenging is the lack of funding to support development through commercialization. It can be a long process that cautious investors are not willing to endure.

To fill this critical gap, in 2020, the CalSEED team added evaluation criteria for innovations that improve the resiliency and reliability of electricity services in locations that are being impacted by extreme weather events, such as wildfires. As a result of this strategy, concept awards were given to 5 companies with specific technologies for wildfire resilience, helping spur innovation in the impermeable, high-risk market. The company's focus on protecting the grid from wildfires and limiting utility shut offs. Among these awardees was Gridware.

Gridware provides a grid monitoring system of sensors and software for the power distribution grid. The platform detects and predicts faults that ignite wildfires, expedites repairs during a power outage, and helps utilities demonstrate risk reduction. Gridware received both a Concept and Prototype Award, using the funding to build its hardware and firmware going from a TRL of 3 to 6.

Since participating in CalSEED, the company deployed its first device in 2021, secured over \$5 million in additional funding and currently employs 22 full-time employees in California. In 2022, the company's three Co-founders, Tim Barat, Abdulrahman Bin Omar and Hall Chen were named in Forbes 30 under 30 in the Social Impact category. Gridware's technology, the GridScope, was listed as one of Time Magazine's Best Inventions of 2022.

SOLUTIONS

Budding Startups Offer
Fresh Innovation and
Measurable Results

CLEAN ENERGY SOLUTIONS

CalSEED companies advance technologies that contribute to California's goals towards decarbonization, public safety, grid reliability, and energy cost reduction

INCREASING



Reliability, life cycle,
or safety of next-
generation batteries
18 companies



Energy efficiency of
buildings with new
materials or
management platforms
12 companies



Efficiency, cost savings,
or reliability of electric
vehicles
6 companies

DECREASING



Cost of solar while
enhancing
performance
18 companies



Waste by
transforming it
to energy and
valuable products
4 companies



GHG emissions
through emergent
technology
10 companies

+ CREATING



New lighting, lamps,
and fixtures to improve
energy efficiency
7 companies



Energy grid and
transmission
wildfire resiliency
5 companies



Emerging forms of
energy generation
and storage, such
as thermal, green
hydrogen, & hydro
15 companies

COMPANY GROWTH

145

Pilot Projects

386

Jobs Supported

2

Levels of Average TRL Advancement

TECHNOLOGY

Creating a Broad Array
of Positive Impacts

TECHNOLOGY BENEFITS FOR CALIFORNIA RATEPAYERS



REDUCE
ELECTRICITY COSTS



IMPROVE GRID
RELIABILITY



INCREASE
SAFETY

TECHNOLOGY TYPE



PROJECTED OUTCOMES

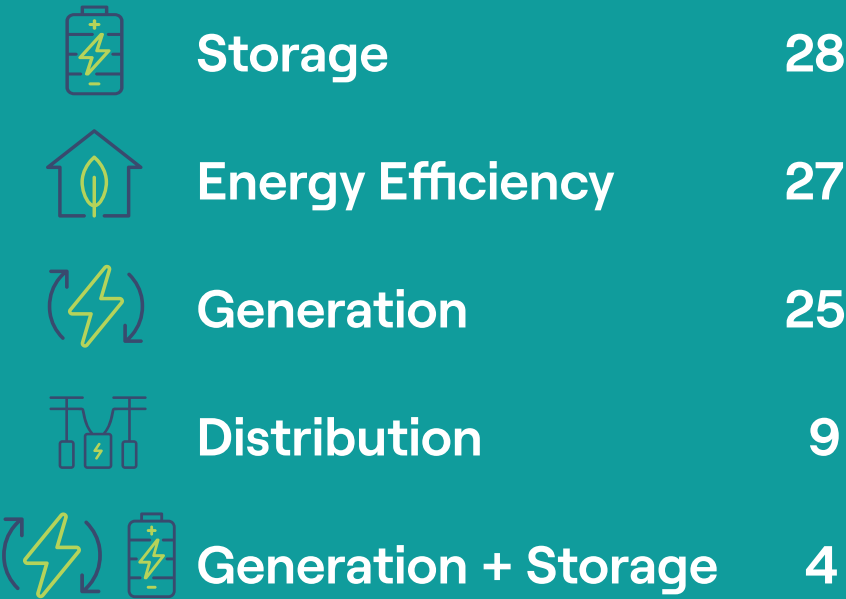


1% MARKET
ADOPTION

9.2 Billion
kWh Electricity **SAVED**

96.8 Million
Metric Tons Of Co2e **AVOIDED**

COMPANY SECTOR



DIVERSITY

Increasing Leadership Diversity Since Program Inception

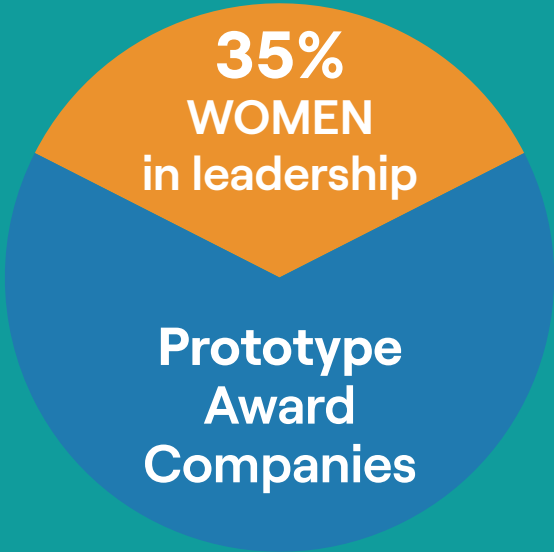
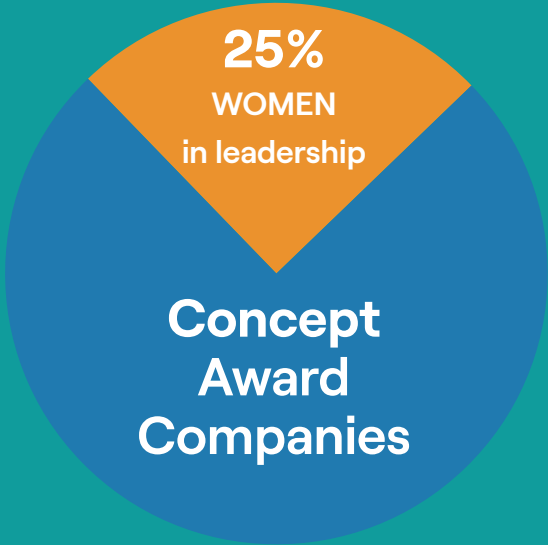
DIVERSITY IN LEADERSHIP



CalSEED funds have been awarded to companies led by women, underrepresented ethnic and racial groups, and disabled veterans



Company with disabled veterans in leadership positions



ENERGY EQUITY

Equitable Innovation
Drives the Clean Energy
Transition

ENERGY EQUITY OUTCOMES

Throughout the program, awardees document benefits to underserved communities and efforts to integrate diversity, equity, and inclusivity practices into their businesses

29% Partner with local organizations for pilot or demonstration projects

24% Direct cost savings or clean energy access for consumers

22% Establish diversity, equity, and inclusion policies for employee recruitment and retention

13% Workforce training program, direct hires, or vendor relationships

60% Report practices in more than one of these categories

12

Companies have technology that improves stationary or grid-scale energy storage, which may decrease the use of peaker plants¹¹ that disproportionately pollute underserved communities¹²

5

Companies work on technology that improves grid reliability and safety, in effort to reduce power shutoffs that have the greatest impact on low-income residents¹³



26

Company headquarters or pilot projects located in DACs or underserved counties

37

Company headquarters or pilot projects located in low-income communities

MATURATION

Next Steps Toward
Product Launch or
Commercialization

EXTERNAL FOLLOW-ON FUNDING

CalSEED companies have cumulatively secured \$155.5 million in follow-on funding, half of which was received by Prototype Awardees



Private
Investment

*Friends, family,
family office*



CA Public
Funding

*CA public funding
agencies*



Federal
Funding

Federal agencies



Other
Funding

*Angel investors,
VCs, miscellaneous*

BEYOND CALSEED



Alumni



BRIDGE or RAMP
Participants



CalTestBed
Participants



Series A
Venture Capital



Acquired

THE BLUEPRINT FOR EQUITABLE CLEAN ENERGY INCUBATION

Stepping Forward After Looking Back on Lessons Learned

In June 2021, the California Energy Commission reauthorized EPIC funding for the CalSEED Initiative through 2025. With CalSEED, another \$25 million will be deployed to over 50 new early-stage startups with energy innovations. This funding will help address challenges facing the state's clean energy startup sector from COVID-19-related impacts. To meet this demand, CalSEED has reviewed and evaluated program results from the past five years. Integrating feedback from stakeholders and other lessons learned, the program is charting a new path for years of future impact.

Administration

CalSEED Team. CalSEED is a woman-led team that manages the multi-year program of wrap-around services, provided in-house and by partner organizations. Successful implementation requires:

- » Management of program partner services including mentorship, webinars, training and networking events relevant to early-stage energy startups.

- » Thorough programmatic technical guidance on contracting protocols, budgeting, recordkeeping, project management and research and development.
- » Resources and consultation on impact evaluation to calculate or project ratepayer and energy equity benefits, such as GHG emission reduction and public health outcome improvements.
- » Thoughtful communications for applicant outreach, awardee storytelling and promotions.

Each of these elements are executed in compliance with state mandated terms and conditions and financial management best practices.

CalSEED was initially launched and supervised by a two-person team. Stakeholder feedback has emphasized the important role of program staff in delivering enhanced services to awardees and the need to further expand capacity. In 2018, a Grants Compliance Officer was hired to streamline the contracting and invoicing processes between the awardees, CEC and program partners. The following year a Communications Manager was added to the team to build out the program's storytelling capabilities to better promote entrepreneur successes. Later in 2019, a Grants Manager was brought on board and the subsequent renewal of CalSEED's funding in 2021 enabled the recruitment of a Grant Administration Associate and an Impact and Reporting Manager. All three of these new positions have rounded out a now highly functioning grants, reporting and compliance management team that provides expert consulting to the awardees and contractual oversight and due diligence to the program overall. In 2022, a Managing Director was hired, and a full-time Program Manager at the Greenlining Institute was dedicated to the expansion of well-established social equity strategies and outreach efforts to diverse communities.

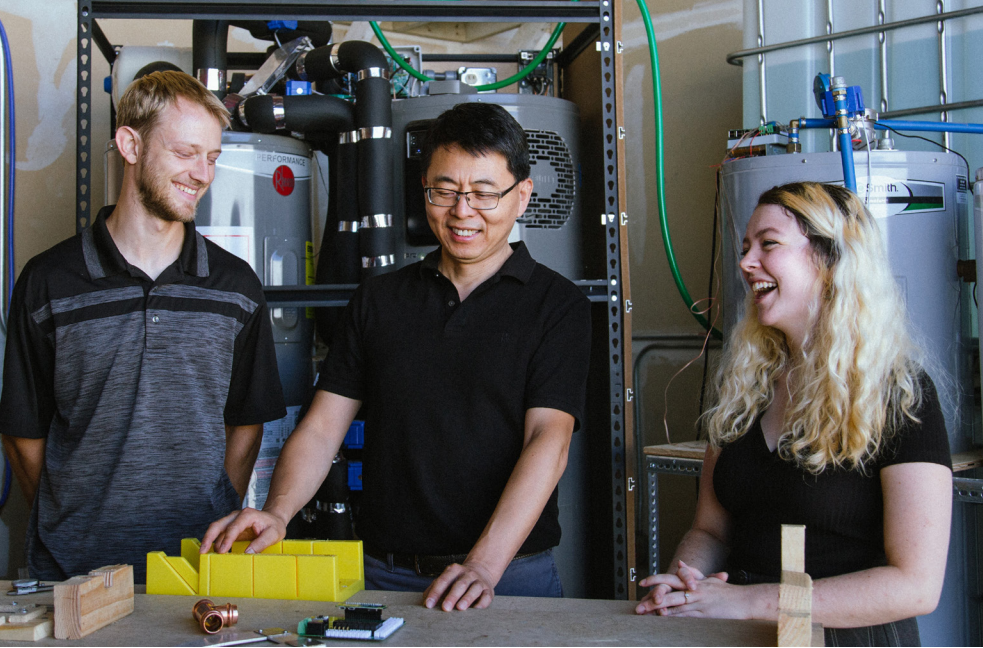
Public-Private Collaboration. The CalSEED team acts as stewards of an innovative public-private partnership that com-



CalSEED Cohort 3 onboarding event in 2019, including CalSEED's two program leaders at the time, Sarah Chester, Grants and Compliance Director and Joy Larson, Program Director.



Prototype Awardee, Antora Energy, builds ultra-low-cost electricity storage and high-efficiency industrial waste heat recovery.



ZYD Energy team members working on the company's heat pump water heating control technology to improve energy efficiency of this common home appliance.



Hago Energetics' Founder and CEO, Wilson Hago, PhD, looking down a line of cattle. Hago Energetics, Inc. aims to help farms become more profitable by converting farm waste to high-value products.

binés early-stage startup companies with public funding that requires rigorous approval, financial and reporting mechanisms. Over CalSEED's five years in operation, the CEC has increased its hands-on support for the program, actively working towards a collaborative approach, which has greatly benefited the growth of the program. Additionally, the CEC's demonstrated adaptability and flexibility around entrepreneurs' confidential business documentation has helped shape the process for the annual Business Plan Competition.

Solicitation & Award

Marketing & Outreach. CalSEED's marketing and outreach efforts to promote the program are elaborate, involving multiple forms of communications through media channels, information sessions, events, and a network of stakeholders, including contracted partners.

In 2020, the CalSEED Team started a storytelling strategy to leverage the successes of the program's innovative clean energy entrepreneurs by creating a variety of marketing materials on entrepreneur stories and success, while amplifying the benefits to California ratepayers. The team has gone on to develop impact reports, spotlight stories, published articles, short videos, and translated social media content to spread awareness of the program and expand the accessibility of information to be available to underrepresented communities throughout California.

Application & Eligibility Screening. To date, CalSEED has received over 1,000 applications during four annual solicitations. Over the years, the application process has been modified and informed by applicant feedback received following the close of the solicitation processes. The application is intended to capture vital information on location, technology applications and benefits to ratepayers. The eligibility screen-

ing process requires all-hands-on-deck from the CalSEED staff to respect the time sensitivity of the applicants.

Scoring & Selection. CalSEED leverages a Technical Advisory Committee (TAC), consisting of an extremely loyal group of volunteers, engaged and retained through high caliber project management. The program has integrated an innovation screening and vetting process developed by Lawrence Berkeley National Lab to guide TAC members in evaluation and scoring. This process provides clear expectations, implementation guidelines and committee facilitation to conduct the selection process.

The CalSEED application scoring criteria historically gave equal weight to Innovation, Impact, Team, and Readiness. In 2021, the team refined the application scoring criteria to address concerns from internal and external stakeholders. Feedback from the CEC raised the question of how to weight innovation higher in the scoring process, while The Greenlining Institute advocated for placing a higher value on the potential social equity impact of projects. In response, the team analyzed hundreds of scores from the prior solicitations and found that team and readiness have historically had more influence over which companies were selected. Upon reflection, the team questioned whether too much weight was given to startups that have mature, well rounded teams, which does not reflect the intention of small grants that are for companies at Technology Readiness Levels (TRL) 2-4 or companies that do not typically have access to state funding. For the forthcoming round of funding, scoring criteria will consist of three equally weighted categories: Innovation, Impact & Equity, Team & Approach. This will increase the weight of both Innovation and Impact & Equity, while removing a source of bias towards mature companies.

Contracting. Program contracting processes utilize CalSEED created standardized templates and tools for creating customized scopes of works, budgets and other required docu-

ments. As a result of ongoing collaborations with the CEC, the team has been able to contribute to revisions of programmatic terms and conditions which, as a result, have vastly lessened companies' risk and bureaucratic load.

After the first two cohorts of the program, the team identified circumstances that prevented contract acceptance by awardees, then modified the eligibility criteria to prevent similar applications from being considered in the future. These additional criteria effectively narrow the applicant pool to companies that are intended for this early-stage funding, specifically, entrepreneurs who lack resources for the early phases of startup development. The eligibility criteria now include a \$1 million funding ceiling and excludes applications from people associated with universities who have not already formed their own company in advance, as these applicants already have resources to support their innovation. These modifications ensure that the application process thoroughly screens early-stage entrepreneurs with promising cleantech proposals that face barriers to accessing capital.

Awardee Success. The CalSEED program has a high retention rate of 92%. Of the 101 companies that were approved for an award by the CEC, only eight declined the contract or were unable to complete the program milestones. The highest rates of turnover were in Cohorts 1 and 2, as several companies were too advanced for a program focused on early-stage startups or were deterred by the intellectual property terms within the contract at that time. Other reasons that startups did not enter into contract or complete the program milestones include the following:

- » **Entrepreneur was not prepared for administrative requirements of a government funded program. Even with guidance and resources provided, and numerous attempts made by CalSEED staff and partners, at least one company was not prepared for the administrative requirements of a**

government funded program while some others became unresponsive after getting into contract.

- » **Company pivoted away from their initial project concept and pursued unrelated technologies.**
- » **Entrepreneur relocated to a different country.**
- » **Change in the point of contact for the company. The length of time between applying and beginning the program can be relatively lengthy for an early-stage company. It is crucial that companies remain responsive during the grantmaking process.**

Ongoing Management

Invoicing & Payments. The team receives and evaluates milestone deliverables, then manages intricate invoicing procedures in alignment with CEC accounting requirements, involving a multi-layered approval process. The four milestones eligible for reimbursement consist of:

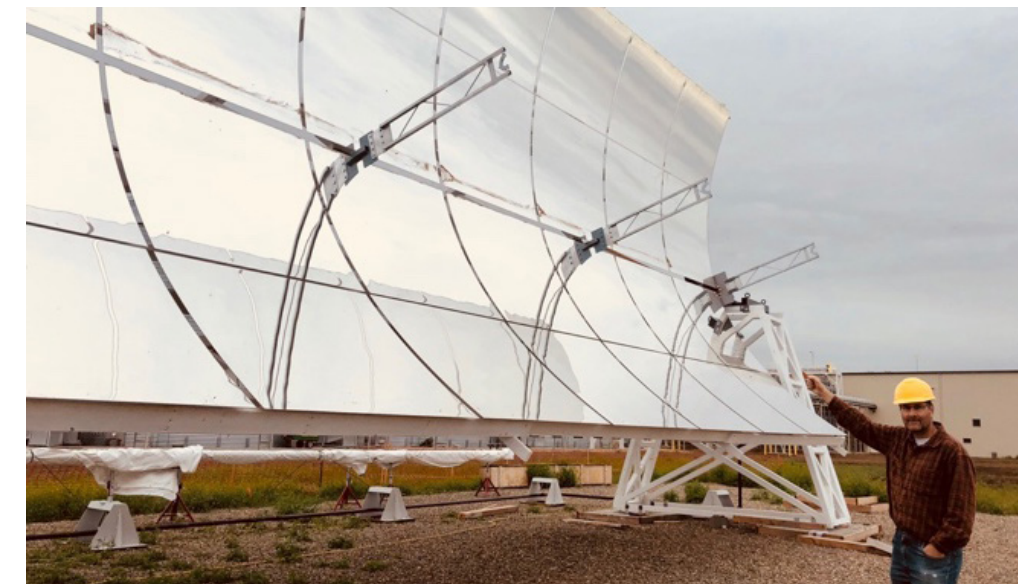
1. **Ratepayer benefit and impact calculations or projections**
2. **Market research, customer profiles, and value proposition**
3. **Technical research and development specific to the innovation and stage of development (tasks and deliverables co-designed by the awardee and CalSEED)**
4. **Final report**

By design, the CalSEED team carries a large amount of administrative work on behalf of awardees to lighten their load in consideration of their early-stage of development. Regardless, the most noted concern among all stakeholders was the invoicing processes and slow payments. The team has sought to expedite the invoice and payment process as much as possible within the confines of the CEC system.

In 2019, the hybrid milestone payment structure was implemented for Concept Awardees to streamline the invoicing



Stasis Energy Group's installation crew for their Thermal Energy Storage System. The system shifts cooling energy use in buildings from peak periods of high electricity cost to lower cost, off-peak, periods to allow business owners to save on their electric bills.



Sunvapor's low-cost solar thermal collector technology generates industrial process heat that is cost-competitive with natural gas and produces virtually zero carbon emissions.



Gridware's Co-Founder and CEO, Timothy Barat, installing their first unit on a service utility pole. Gridware is developing industrial internet of things (IOT) systems and risk simulation software for utilities that own and maintain electricity distribution grids that will monitor poles, conductors, and equipment to predict where they may fail and ignite a wildfire.

process and expedite payments to awardees. Rather than monthly invoicing, which would place an insurmountable administrative burden on these early-stage companies, awardee invoices are submitted for payment when a series of milestones (described above) are completed. Upon completion of milestone one, which is possible immediately after orientation and contract signing, companies may invoice for almost half the total amount of the award, providing awardees with upfront funding, creating a substantial runway for getting started on their project.

In 2021, the provision of new staff specializing in grants administration has enabled our team to further streamline our invoicing processes, including more mentorship and coaching to help awardees navigate the invoicing process, including budget development and receipt requirements. Awardees now receive additional assistance to navigate these procedures and provide the needed documentation for invoice completion, which is the first step in a lengthy process required to ensure compliance with state regulations and policies.

Reporting. The CalSEED team initiates quarterly and annual progress reports that are recorded in a data management system then compiled into comprehensive deliverables for CEC review. Both Concept and Prototype Awardees are prompted to complete report forms that cast a wide net, gathering an array of information about the company's experience in the program to help the team improve the quality of offerings.

To project the potential benefits that companies will confer on California ratepayers, CalSEED engaged the UC Davis Energy and Efficiency Institute to develop a comprehensive Ratepayer Benefits Framework. Awardees complete the template to report on a broad range of both quantitative and qualitative projections based on their proposed technology. Calculations include energy savings, CO₂e reductions, peak power reduction, job creation, cost savings, commercialization timeline,

contribution to grid efficiency and resilience, reduction in hazardous events and decrease in air and water pollution. Over the course of the program, awardees have confirmed that calculations they developed for the framework were later used in successful proposals for other funders or investors.

Surveys. Applicants, awardees, and stakeholders have provided extensive feedback through survey mechanisms:

Applicant Survey. Upon the approval by the CEC of an incoming cohort, all applicants engaged in the solicitation are surveyed. Applicants are asked questions pertaining to the application user experience as well as demographic data to gauge the effectiveness of outreach efforts geared towards attracting a diverse pool of applicants.

Cohort Survey. Approximately one year into the program, each cohort is surveyed to receive feedback on the administration of the program. Any additional feedback on programming is often feasible for implementation for the following cohort. For example, awardees from Cohort 3 voiced interest in more training on product marketing and public relations, consequently CalSEED collaborated with a content partner to provide a webinar on this topic. One of the key metrics gathered from the cohort survey is a rating of participant satisfaction, indicating whether the program would be recommended to other early-stage startups. The CalSEED cumulative rating across Cohorts 2 through 4 was 9 out of 10.

Technical Advisory Committee (TAC) Survey. Upon completion of each solicitation cycle, the dedicated committee of subject matter experts is surveyed for feedback on the application evaluation process, including the training, webinar, software platform, and technology areas for future solicitations.

Stakeholder Survey. In 2021, project partner Momentum conducted a third-party survey of CalSEED stakeholders to reflect

on the previous four years and gather feedback on areas of improvement for the program. Those surveyed included administrative staff, Commission Agreement Managers (CAM), subcontractors, and Prototype Awardees. Much of the feedback has been included in this Interim Report.

Service Partnerships. Several contracted program partners provide essential services directly to startups, such as legal services, training, webinars, and strategic planning. Management of these relationships and contracts represent a significant investment of time and resources for the team. Partners include The Greenlining Institute, the regional innovation clusters, Cleantech Open National Academy, Momentum, and Umberg Zipser.

Over the past four years, CalSEED has worked with The Greenlining Institute to:

- » Develop outreach mechanisms to track demographic data of applicants (gathered once the competition closes to ensure impartiality).
- » Establish an Equity Subcommittee that contributes expertise to award recommendation.
- » Add more weight to the social equity section when scoring applications.
- » Include stronger language in all public communications and materials about what social equity means for CalSEED.
- » Deliver trainings for building diverse, equitable, and inclusive companies from this early stage through scaling and commercialization.

Planned Program Enhancement

According to stakeholder feedback, awardees have requested more events, services, community development, education opportunities and general support. Though many of these

activities have been hindered by the COVID-19 pandemic, the team is hopeful that continued funding will enable these program enhancements.

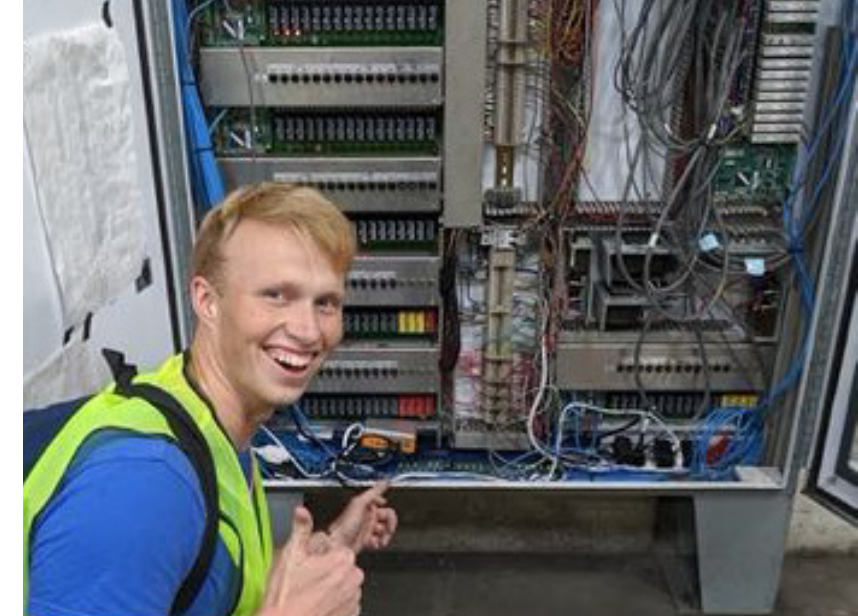
Community Building. The CalSEED team and awardees have voiced an interest in building a stronger community amongst early-stage clean energy companies to cultivate a culture of sharing and support. This can be accomplished through:

- » Outreach to expand the CalSEED network and provide additional networking opportunities.
- » Increased collaboration amongst the Regional Energy Innovation Clusters.
- » A CalSEED alumni program.
- » Official showcases of awardees.

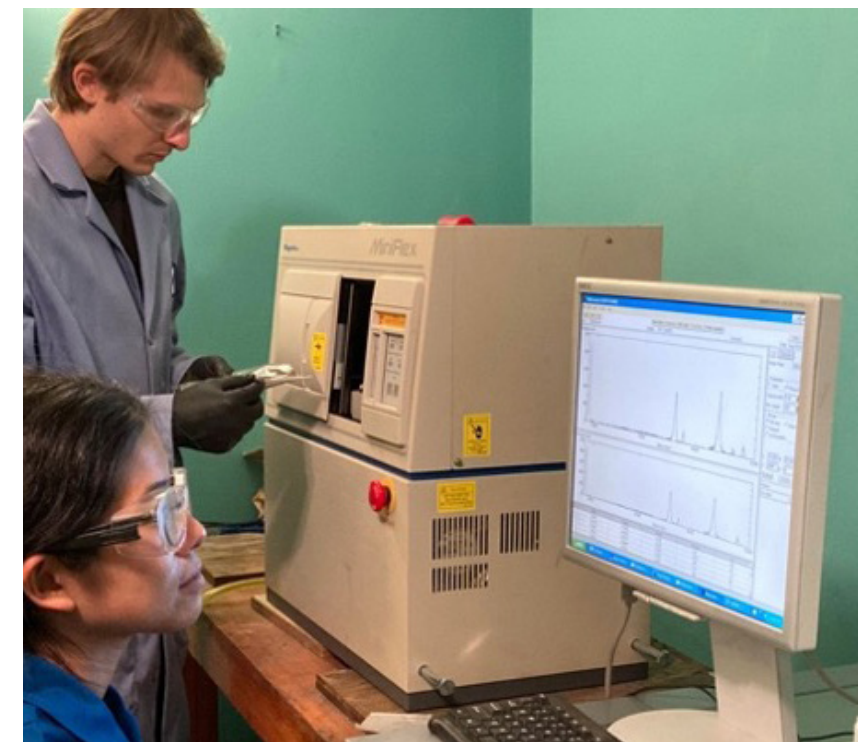
Development Services. Survey results indicate that both the CalSEED team and awardees would like to see additional services be made available to early-stage companies pursuing clean energy innovation, such as: accounting, finance, human resources, legal, marketing.

Social Impact & Energy Equity Strategy. The team advocates for more webinars, training, and workshops related to social impact and diversity hiring practices. The next steps for the partnership with The Greenlining Institute include co-developing a program definition of “social equity” and strengthening stakeholder education and evaluation of DEI goals and a just energy transition.

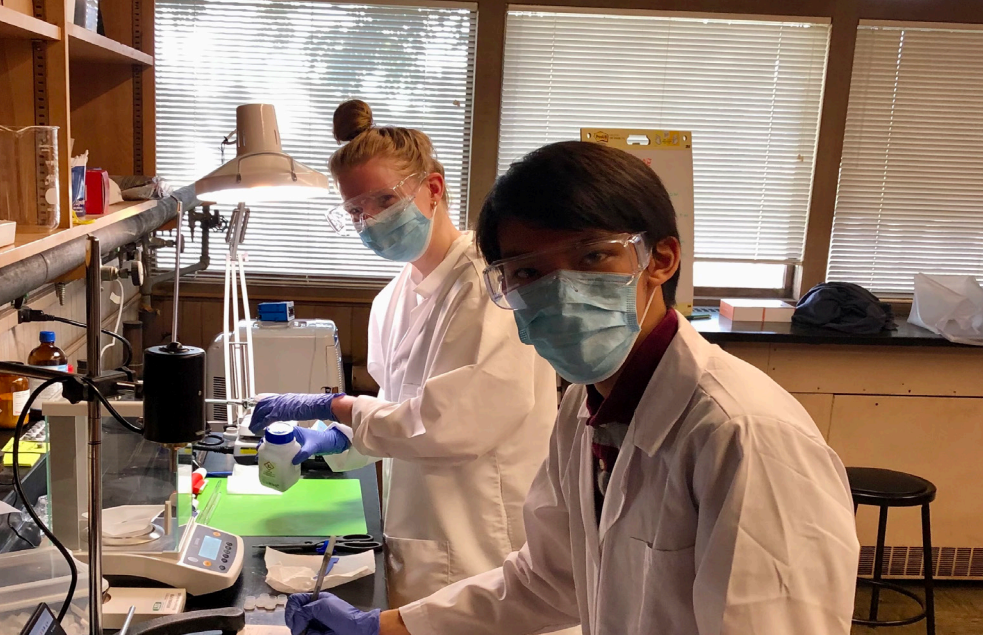
Impact Measurement. The Ratepayer Benefit Framework has provided a valuable resource for awardees to develop quantitative measures and qualitative narratives that demonstrate their business case as well as non-monetary value for social and environmental health. In collaboration with a contracted partner, CalSEED seeks to enhance the usability of



Crossno & Kaye, LLC is developing refrigeration technology that uses an algorithm to safely enable energy efficiency and load shifting.



NanoDian designs lower cost, safer and more sustainable batteries for portable electronic devices.



Enzinc uses safe, plentiful zinc, providing three times the power and lifetime of the most commonly used rechargeable batteries.



ReJoule enables unprecedented insights into a battery's state of health, charge, power and makes testing easy.

the framework and provide additional resources for awardees. Several measures will be added, including the social cost of carbon, terms of natural gas saved, and benefits to underserved populations in California.

Review Committee Compensation. In recognition of their expertise and commitment to the program and awardees, the CalSEED team seeks to compensate committee members for their time.

Disrupted by a Global Pandemic

Beginning in 2020, the COVID-19 pandemic severely disrupted workflows, supply chains, businesses, and ways of life. In response, CalSEED administrators adjusted programming and procedures to adapt to the impacts of a multi-year pandemic. To date, effectively, half the term of the CalSEED Initiative has taken place under continued uncertainty, precautionary measures, and a consequently precarious economic environment.

Social Distance. The transition to remote work impacted many of the programmatic processes such as moving all meetings, networking, and competitions to a video format for the CalSEED team as well as participants. The inability to meet-in person hindered some companies that required lab space for pilots or demonstration projects in collaboration with external partners. Project delays ranged 1-9 months, at times pushing the completion date to the following year. However, the transition has had positive impacts such as expediting the review, approval, and contracting processes at the CEC, as contracts, payments, and other programmatic materials are now submitted digitally.

Supply Chain Impacts. Other complications due to the pandemic included supply chain issues that persist to date. Many awardees reported supply chain gaps that hindered production schedules and often increased costs. The CalSEED team worked with multiple entrepreneurs to adjust contracts

for physical lockdown conditions and supply chain challenges (e.g., deliverable changes, due date extensions, travel cost removal).

External Funding. An analysis of external follow-on funding over the past two years indicates that the pandemic had a substantial impact on outside investment in CalSEED companies. Initially awardees garnered significant funds between 2018 and 2019, however, funding slowed in 2020.

With support from Momentum, CalSEED entrepreneurs and those in the CEC's Empower Innovation Network, kept apprised of the various economic support opportunities made available to small businesses throughout the year. Furthermore, the CalSEED team continued to look for ways to provide support to its startups. These efforts may have contributed to modest positive funding outcomes for CalSEED companies in 2020 when, cumulatively, companies received the most funding from angel investors and venture capitalists, totaling over \$7 million. The second largest source of funding was California public funding, representing over \$5 million.

Fortunately, the rate of follow-on funding began to rebound in 2021 when CalSEED companies received almost \$71 million, an increase of 105% compared to 2020. The majority of these funds were provided by angel investors and venture capitalists, over \$45 million. Again, the second biggest contributor was California public funding sources, which garnered over \$13 million.

Maturation Delays. Pandemic related project delays and fluctuations in available funding have impacted the trajectory of company growth and development. Not surprisingly, the cumulative program completion rate of 77% appears relatively low. Notably, only four Prototype Awardees have completed the program thus far.

CONCLUSION

Message from the CalSEED Team

The continued success of the CalSEED Initiative would not be possible without the extraordinary efforts and collaboration of multiple entities and individuals. The CalSEED team and NEX administrators would like to first express its appreciation to the California Energy Commission (CEC) for the opportunity to implement this impactful program and its continued support for advancing early-stage cleantech innovations and providing benefits to the ratepayers of California.

We deeply appreciate the contributions made by our program partners, including Cleantech Open, The Greenlining Institute, Center for Sustainable Energy, Umberg Zipser LLC, Lawrence Berkeley National Lab, UC Davis Energy Efficiency Center, and Momentum, all of whom have provided valuable support to the foundation and growth of the program. Additionally, CalSEED would like to recognize the support and value provided by its regional ecosystem partners, the Los Angeles Cleantech Incubator, Activate, Cleantech San Diego, BlueTechValley to the program and its entrepreneurs.

We would like to thank the members of our Technical Advisory Committee (TAC) who have volunteered their time to evaluate applications and make award recommendations. Renowned subject matter experts, TAC members come to us from a variety of organizations including the Regional Energy Innovation Clusters, environmental and social NGOs, universities, national labs, venture capital firms, impact investment firms, research institutions, community choice aggregation organizations,

successful energy entrepreneurs, consulting firms, law firms, and incubators.

Additionally, we appreciate each of the more than 1,000 applicants who applied to the CalSEED program over the past four annual solicitations. These are the people who are working on innovations that will enable the transition to a clean energy economy, while providing benefits to the citizens of the state in the form of greater environmental justice, economic opportunities, better health, and access to clean energy.

In light of CalSEED's reauthorization by the CEC, we have valued the opportunity to be involved in the advancement of these diverse entrepreneurs and witness their success in and beyond the program. In anticipation of the road ahead, we and our partners are prepared for another five years of continuous improvement and new initiatives to take the program to new heights. A 100% clean energy economy for 100% of Californians has never been more critical. CalSEED will continue to forge the path to an equitable and just clean energy economy.



CALIFORNIA
ENERGY COMMISSION



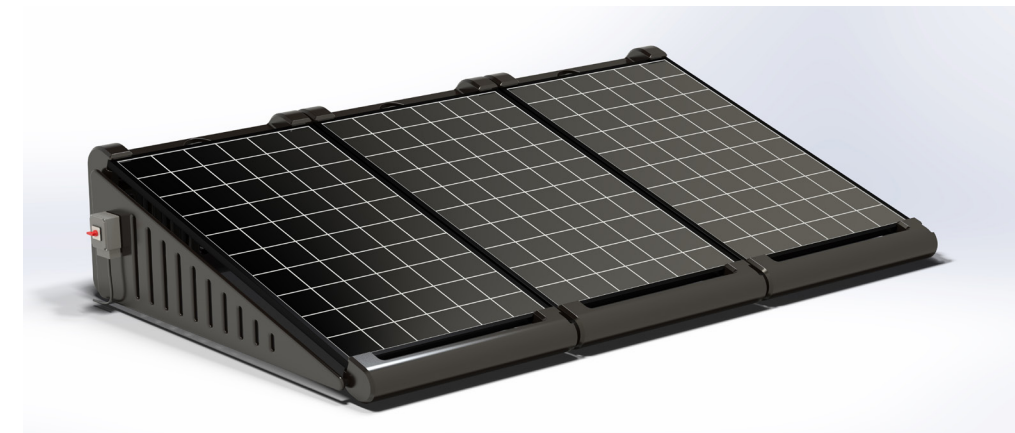
CalSEED Solution Type Index

Solution Type	Number of Companies
Ag/Irrigation	1
Battery Management System	3
Biomass	2
Building Management	3
Building Materials	4
Dispatchable Generation	1
Electric Vehicles	1
Geothermal	1
Green Hydrogen	2
Grid Enhancement	3
Grid-Scale Storage	3
Industrial Feedstock	1
HVAC	6
Hydroelectric	2
Li-ion Battery	12

Solution Type	Number of Companies
Lighting	7
Microgrid	1
Motor Controller	1
Non-Li-ion Battery	4
Passive Cooling Packaging	1
Piezoelectric Energy	1
Portable Small Engine	1
PV Access	4
PV Inverter	4
PV Installation	2
PV Manufacturing	2
PV Novel Design	4
PV + Battery	1
PV + Thermal	3
Refrigeration	1
Superfast EV Charging	1
Thermal Storage	3
Transmission Lines	2
Vehicle to Grid Integration (VGI)	3
Water and Wastewater Treatment	1
Wave Energy	1



Neocharge's Smart Splitter™ is the first UL-listed 240V outlet splitter that addresses major installation costs and barriers for home EV charging. With proprietary switching and easy plug-in options, it provides simple installation for home renters to install charging and homeowners to avoid panel upgrades, saving \$2,200 on average.



Portable Solar Inc is developing a 2kW portable solar system that can knock 30-40% off your electric bill, earn your money back in 2-4 years, and if you move, you can take it with you!

California Energy Innovation Pipeline

The CalSEED Initiative is funded by the California Energy Commission (CEC) and administered by California Clean Energy Fund (CalCEF) operating under the brand umbrella New Energy Nexus (NEX). Through the CEC's Electric Program Investment Charge (EPIC) program¹⁴, over \$130 million of California's electricity customer, or ratepayer, dollars are reinvested into research and development to accelerate the transformation of the energy sector to meet the state's climate goals.

EPIC investments aim to:

- » Expand the use of renewable energy.
- » Build a safe and resilient electricity system.
- » Advance electric technologies for buildings, businesses, and transportation.
- » Enable a more decentralized electric grid.
- » Improve the affordability, health, and comfort of California's communities.
- » Support the state's local economies and businesses.
- » Advance electric technologies for buildings, businesses, and transportation.

EPIC established and fostered a robust statewide Energy Innovation Ecosystem, supporting innovators through early to middle stages of the energy technology innovation pipeline. CalSEED supports startups at the earliest stage in this pipeline, providing small grant funds and professional development support to diverse entrepreneurs looking to advance their concept to prototype. CalSEED is followed by CalTestBed, also administered by NEX, which provides testing vouchers to clean energy innovators with hardware and integrated solutions to use at one of more than 60 world-class testing facilities throughout California. Additionally, the CEC established Bringing Rapid Innovation Development to Green Energy (BRIDGE) and Realizing Accelerated Manufacturing and Production for Clean Energy Technologies (RAMP) funding opportunities to build out further support to accelerate emerging technologies.

COMPANIES BY COHORT

Prototype Awardees in Bold

COHORT 1

Arctica Solar, dba PD3 Technologies, Inc.

BK Litec, Inc.

CodeCycle, LLC

Correlate, Inc.

Cuberg, Inc.

General Engineering & Research

Glint Lighting

Halo Industries, Inc.

Hank

Intertie Incorporated

Lucent Optics, Inc.

Maxout Renewables

MMCI Solar

MOEV Inc.

Nativus

Opcondys, Inc.

PARC, a Xerox Company
(Energy Storage & Desalination)

PARC, a Xerox Company
(Membrane CO2 Removal)

PowerFlex Systems, LLC

Samuel Zhang (Super Long Lift, Ultra-High-Power Hybrid Battery)

Sepion Technologies

South 8 Technologies

Sunvapor, Inc.

Sunswarm Community Solar

The Sustainable Economies Law Center

Twelve

COHORT 2

Aura Technology, LLC

Crossno & Kaye, LLC

DTE Materials

Empow Lighting

FerroPower Technologies

GenH

InPipe Energy

OceanForesters

Ocean Motion Technologies

Perigo Welding Works

Pick My Solar

Pronoia, Inc.

SiLi-ion Inc.

SkyCool Systems, Inc.

Smartville LLC

Stasis Group

COMPANIES BY COHORT

Prototype Awardees in Bold

COHORT 3

ActiveMEMS

Antora Energy, Inc.

Arvind Simhadri (MoBi)

Coreshell Technologies, Inc.

DAE Technologies

EndLiS Energy

EnZinc, Inc.

GreenTech Motors Corp.

Icarus RT

Ivy Energy

Luciant, Inc.

Luminescent Energy

NanoDian, Inc.

Noon Energy, Inc.

Nrgtek Inc.

Optec Led (Optimized Fuel Technologies)

P-Kap Systems

RAF Electronics Corp

ReJoule, Inc.

RePurpose Energy, Inc.

SierraCrete LLC

SolarFlexes

T2M Global, LLC

Takachar

ZYD Energy, Inc.

COHORT 4

ALD Technical Solutions

Cyclonatix, Inc.

Cypris Materials, Inc.

EH Group Technologies, Inc.

EV Life, LLC

Flowing Energy, Inc. (Idealab)

Gridware Inc.

Hago Energetics

infiniRel Corporation

Innovasion Labs PINC, Inc.

inRG Solutions, LLC

Leap Photovoltaics, Inc.

MIplus Solar, Inc.

NeoCharge

Noble Thermodynamic Systems, Inc.

Parthian Energy

Paulsson, Inc.

Photia Incorporated

Planet A Energy, Inc.

Portable Solar, Inc.

Sonocharge

Taka Solar Corporation

Tolo Inc.

Topolonet Corporation

Trianon Renewable Grid Reliability, LLC

UNIGRID, LLC

Waterhound Futures

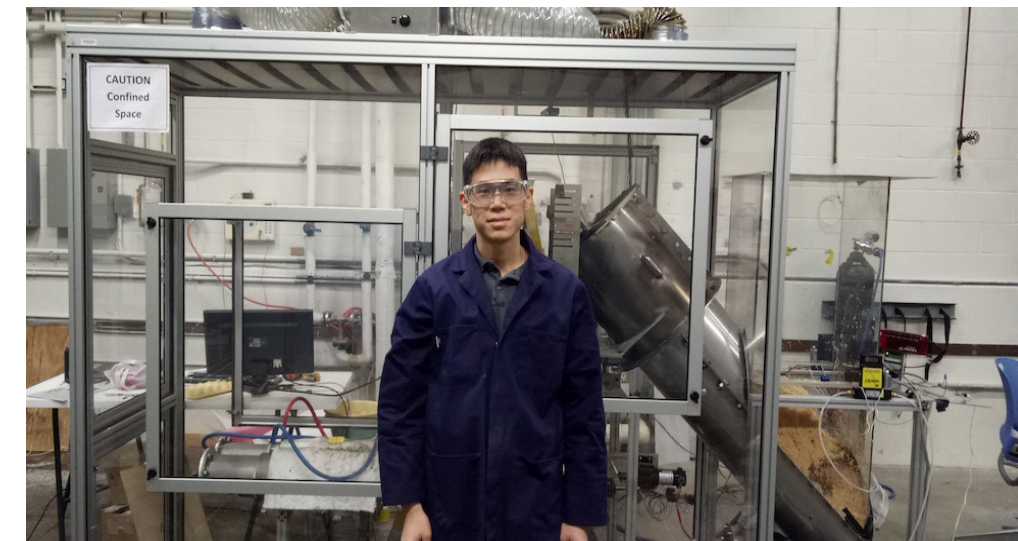
Whisper Energy Systems, Inc.

ENDNOTES

1. U.S. Energy Information Administration <https://www.eia.gov/state/data.php?sid=CA#SupplyDistribution>
2. California Air Resources Board <https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035>
3. California's Fourth Climate Change Assessment U.S. Energy Information Administration <https://www.climateassessment.ca.gov>
4. U.S. Census Bureau <https://www.census.gov/quickfacts/fact/table/CA/PST045221>
5. National Aeronautics and Space Administration https://www.nasa.gov/directorates/heo/scan/engineering/technology/technology_readiness_level
6. California Public Utilities Commission <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/infrastructure/disadvantaged-communities>
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10. California Climate Investments Priority Populations 2022 <https://webmaps.arb.ca.gov/PriorityPopulations/>
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13. San Francisco Chronicle <https://www.sfchronicle.com/california-wildfires/article/Power-outages-hit-some-of-state-s-poorest-14804853.php>
14. California Energy Commission <https://www.energy.ca.gov/programs-and-topics/programs/electric-program-investment-charge-epic-program>



Perigo's Hybrid Low Pressure Water Filtration System will make it possible to filter and self-clean at low pressure, significantly reducing the energy consumption of these systems.



Takachar has developed and patented the design of small-scale, low-cost, portable equipment to convert waste biomass into solid fuel, fertilizer, and other specialty chemicals.



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Ivy Energy