2019 EPIC FALL WORKSHOP

Energy Commission
Enabling a 100% Clean Energy Future

Energy Commission's Commitments

Decarbonization

Achieve a decarbonized electricity system and economy by 2045

- Advance clean energy supply
- Increase efficiency and load flexibility
- Electrify energy end uses

Affordability & Equity

Lower energy burden and support vulnerable communities

- Address the challenges of low-income and disadvantaged communities
- Reduce costs and increase access to clean energy technologies

Resiliency

Increase the responsiveness of the grid in the face of risks

- Understand and anticipate grid risks
- Develop technologies and strategies to manage risks

Research and Development for California's Clean Energy Future

Efficiency and Flexible Load

Renewable Generation

Storage & Grid Integration

Electrification

Climate Research

Entrepreneurship

Benefiting Disadvantaged and Low-income Communities

Scalable Retrofits in Lancaster Disadvantaged Community

Village at Beechwood, Lancaster

Blower door testing of units

Solar thermal heat exchanger piping

- Comprehensive retrofit solutions in 32 apartments
- Documenting technical and financial value
  - ≈**27%** annual electricity savings for units
  - ≈**30%** annual natural gas savings for the complex
- Learnings applied to two EPIC-funded multifamily retrofits in disadvantaged communities in Fresno and Ontario, CA.

EPIC Demonstration Funding:

- **32%** in **disadvantaged** communities
- **34%** in **low-income** communities

Recipient: Electric Power Research Institute

Storage & Grid Integration

HIGHLIGHTS

Solving Intermittency and Building Resilience with Storage

Storage Research Priorities:

- Reduce cost
- Improve functionality
- Demonstrate performance
- Ensure safety
- Diversify storage types

Benefits:

- Providing grid support
- Increasing resiliency to utilities and customers to prevent outages
- Enabling integration of renewables

Alternate Chemistry Aimed at Lower Cost

Eos Energy Storage

- Zynth™: Novel aqueous, zinc-based battery
- Abundant, non-toxic, fully recyclable, and lower-cost materials
- Critical data on energy response time, peak shaving, load following, cost savings
- Reduced system cost by **54%** as a result of EPIC funding
- Eos became the 1st company to accept orders below $100 per kWh for a DC battery system
- **$95M+** in follow-on investment

CEC Awarded: $2.1 M

Flywheel Achieves 50% Cost Reduction

Amber Kinetics Inc.

- Demonstration of a 8 kW, 32 kWh flywheel system with a 4-hr discharge duration
- Established a baseline record for the reliability of the FESS for utility scale storage
- Advanced the commercial and technological viability of flywheels
- **50%+** cost reduction
- **$50M** in follow-on investment

CEC Awarded: $2 M

Energy Storage Solicitations

2019-2020

- Developing Lessons Learned, Best Practices, Training Materials and Guidebooks for Customer Side of the Meter Energy Storage, $1M, released September 9 & proposals due Today
- Energy Storage Demonstrations, $20M, Anticipated by December 31
- Developing Emerging non-Lithium Ion Technologies, $11M, Anticipated by December 31
- Simulation of Long Duration Energy Storage in CA, $3M, Anticipated in December or January 2020

A Decade of Microgrid Research

Early Stage Microgrid Development	Overcoming Integration Challenges	Developing Commercialization Pathways
2009 – 2015	**2015 – 2019**	**2018 – 2023**
• Supported controllers development • Developed approaches to integrating multiple resources	• Demonstrated resiliency value of microgrids for critical facilities • Integrated large number of resources and refined controller designs	• Creating business plans and commercialization pathways for microgrids in California

Example Microgrid Demonstrations

Critical Facilities

Shelter

Medical Center

Fire Stations

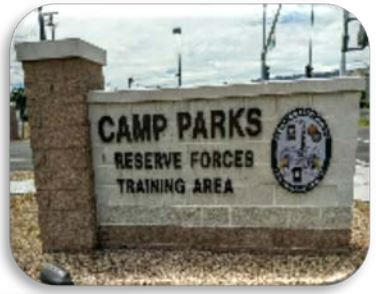
City Hall, Police HQ, and Community Centers

Waste Water Treatment Plant

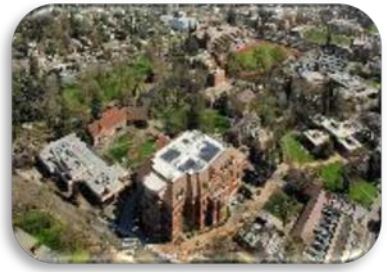
Airport

Ports

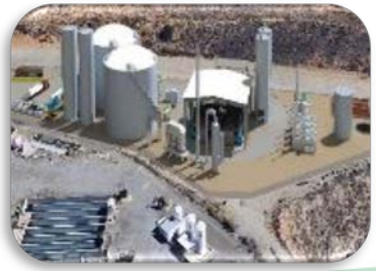
Military



Communities



Industrial



Digester

Distribution Center

Microgrids on the Frontline of PSPS Resilience

Blue Lake Rancheria

Fremont Fire Station

Kaiser Permanente Richmond

Los Positas Community College

In an October 17, 2019 North Coast Journal article, Jana Ganion, Sustainability Director at the Blue Lake Rancheria said, "They credit us with saving lives. That's one of the things we get a little emotional about."

Microgrids on Frontline of PSPS Resilience

Blue Lake Rancheria Microgrid

- Integration of solar electric power with battery energy storage and conventional generators
- Seamlessly "islanded" during a wildfire-caused power outage and maintained critical operations and services during wildfires
- Reduced power costs **$160k+** per year – a **25%+** reduction – and **158** metric tons of CO_2 per year

Source: Siemens USA

First commercial project to test Siemen's Advanced Microgrid Software

CEC Awarded: $5M

Equipping Firefighters with Reliable Energy

Fremont Fire Station Microgrid

- Microgrids achieved **4 – 12 hours** of islanding for three fire stations
- 1st solar microgrid with battery back-up for fire stations
- **$250,000** savings over the 10-year PPA term
- Decreases GHGs by 142,000 lb annually

CEC Awarded: $1.45 M

Recipient: [add here]

Anticipated Solicitations

2019-2020

- Microgrids – In scoping phase: Learn more about nine active microgrids and provide critical information to CPUC for SB 1339 efforts to commercialize microgrids, Anticipated 2020

- Wildfires – In scoping phase: Considering solar + storage, mobile microgrids and other technologies to help manage grid risks, Anticipated 2020

Find a Partner on EmpowerInnovation.net

- Empower Innovation strives to accelerate your cleantech journey with easy access to funding opportunities from the Energy Commission and other funding providers, curated resources and events, and connections to people and organizations.

FIND A PARTNER
Announce your interest in this funding opportunity and message other interested parties to find potential partners.

RESOURCES & TOOLS
Browse the collection of resources for cleantech innovators including Resource Libraries, Funding Sources, Tools, and Databases.

Questions

Fernando Pina, Manager
Energy Systems Research Office
Research and Development Division
916 327-2388
Fernando.pina@energy.ca.gov