

ET Summit 2021

Presented by





Industrial Agriculture and Water Program, an overview.

Emerging Technologies Summit

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November 17, 2021



Background

- Energy efficiency research funded by the Electric Program Investment Charge (EPIC) program and the natural gas research program
- Research projects span the innovation pipeline
- Goals:
 - help achieve the state's greenhouse gas and other energy policies
 - benefit IOU ratepayers
 - ensure underresourced communities' benefit
 - Deploy successful technologies into the marketplace, such as utility programs, codes and standards and regular public uptake





CEC Fostering Innovation Across the Energy Sector

Core mission: strategically invest funds to catalyze change and accelerate achievement of policy goals

- ✓ **Electric Program Investment Charge (EPIC), \$133 million annually**
- ✓ **Natural Gas Research, Development and Demonstration Program, \$24 million annually**
- ✓ **Food Production Investment Program \$124 million**





Industrial R&D Focus Areas

- Increase energy efficiency, such as through cost-effective decarbonization with low/no carbon resources and increasing load flexibility
- Large scale demonstration of pre-commercial efficiency technologies, examples:
 - Energy management systems to minimize energy losses and maximize efficiency
 - Low-carbon process heating (industrial heat pumps) and process heat recovery
 - Energy efficient refrigeration with low global warming potential refrigerants
 - Electrification and decarbonization technologies



Food Processing R&D



Recipient: Porifera
Project Location: CA

Forward Osmosis to Produce Juice Concentrate and Purify Reusable Water

- Dewater fruits and vegetables to produce juice concentrates and purees without the use of energy intensive evaporators.
- Extracted water can be purified for on-site reuse.

Benefits:

- 80% thermal and electrical energy savings compared to conventional technologies
- More than 50% water reuse.

Status:

- Commercialized and currently expanding business opportunities.



Dairy R&D



Recipient: University of California, Davis
Project Location: CA

Optimized Controls for Cooling California Dairy Cows

Develop and demonstrate a controller for dairy cooling systems to reduce electricity and water consumption for cooling

Benefits:

- 50 GWh/year saved in 10 years assuming annual 2% adoption rate

Status:

- Currently, developing heat and mass transfer model into control system



Industrial Heat Recovery Research



Recipient: Trevi
Project Location: CA

Polymer Heat Exchangers for Heat Recovery

Demonstrating Replicable, Innovative, Large-Scale Heat Recovery in the Industrial Sector

Benefits:

- < \$100/kW-thermal energy recovered
- Estimated 20% natural gas use reduction

Status:

- Successful prototype procured
- Installation at Old Caz Beer Brewery and DuMol Winery expected in early 2022



Industrial Heat Recovery Research



High Temperature Heat Pumps (UC Merced)

Develop heat pumps using Stirling cycle and liquid pistons to efficiently handle high temperatures typical to the industrial sector.

Benefits

- Recycle waste heat up to 300°C
- COP over 6
- 20% reduction in capital and operational costs

Status: Currently developing mathematical models

Recipient: UC Merced
Project Location: CA



Other Innovative Food and Agriculture R&D

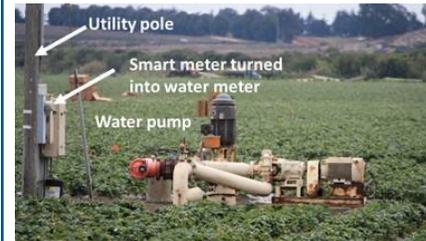
Hybrid Gas/Electric Tunnel Drying



- Utilizes an indirect gas fired rotary dryer with advanced heat pump.
- Aims to reduce natural gas use by at least 60%.

Recipient: Gas Technology Institute
Location: Maxwell Farms, Corona, CA

Energy Irrigation Optimization



Recipient: AgMonitor
Location: Various (6 farms in CA)

- Software tool which links groundwater extraction with smart meter data.
- Applied at over 1,000 acres of farms growing alfalfa, tomatoes, pistachios, and almonds.

Solar Thermal for Wine Processing



- Evacuated tube solar thermal collector.
- Provides hot water to supplement steam boilers at a winery.

Recipient: ergSol
Location: Treasury Wine Estates, Sonoma, CA

Innovative Waste Heat Recovery



- Integrates waste heat recovery and an absorption chiller into a biogas generator.
- Provides heating and cooling to the dairy processing facility.

Recipient: Gallo Cattle Company
Location: Joseph Gallo Farms, Atwater, CA



How to Connect and Stay Informed



- Find a Partner and other resources on [EmpowerInnovation.net](https://www.empowerinnovation.net)
- Learn more about other projects on <https://www.energizeinnovation.fund>
- Subscribe to CEC EPIC and Natural Gas R&D Program Listserv to receive emails on new funding opportunities and initiatives: <https://ww2.energy.ca.gov/listservers/>
- Check the CEC Calendar for upcoming events: <https://www.energy.ca.gov/events>

See the planned EPIC R&D Plan for 2021-2025: www.energy.ca.gov/epic4

Thank You!



Please send project follow-up inquiries to

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