

# ET Summit 2021

Presented by





## **Industrial Agriculture and Water Program, an overview.**

Emerging Technologies Summit

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# 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







# 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

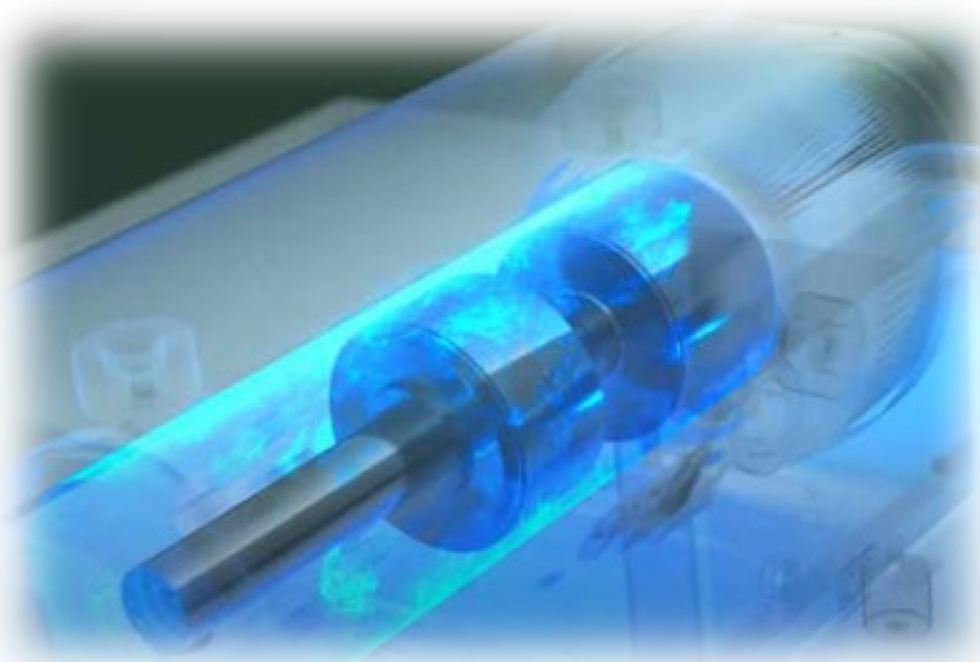
### Status:

- 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

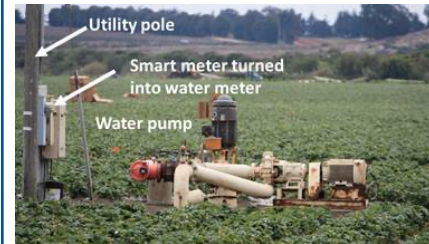
### Hybrid Gas/Electric Tunnel Drying



- 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](https://www.energy.ca.gov/epic4)

# Thank You!



Please send project follow-up inquiries to

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