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Notice of Funding Opportunity

Title: Advancing and Commercializing Energy Efficiency in California's Industrial, Agricultural, and Water Sector (2021 ACEE Program)

Website: <https://www.energy.ca.gov/solicitations/2020-12/qfo-20-309-advancing-and-commercializing-energy-efficiency-californias>

Funding: Total: \$13,000,000. Maximum awards: \$1.5M-\$6M, depending on group.

Dates: Pre-Application Workshop: January 13, 2021
Deadline for Written Questions: January 20, 2021
Application Submission Deadline: March 8, 2021

Summary: The IAW sectors have significant potential for improvements in energy and water efficiency but are difficult sectors to promote energy efficiency and to decarbonize. Each sector and the individual facilities each have unique operational needs, have a mix of old and new equipment, lack easy access to actionable operation data for decision making and lack verified performance data under real-world conditions for promising emerging technologies. The purpose of this solicitation is to fund technology development and demonstration projects of promising pre-commercial technologies to increase overall energy efficiency and reach statewide decarbonization goals set forth by SB 32, SB 100 and SB 350. Projects must fall within one of the following project groups: Group 1: Advanced Energy Management and Monitoring of the Dairy Industry; and Group 2: Advanced Treatment Processes for Wastewater Treatment Plants.

Project Topic Areas:

Group 1: Advanced Energy Management and Monitoring of the Dairy Industry

The purpose of this research area is to identify and demonstrate emerging electricity saving technologies that can directly reduce electricity use and GHG and other emissions in the dairy industry (dairy industry in this instance includes industries in the milk and cheese processing lifecycle: dairy farms, production of milk, cheese, and associated products, whey processing, etc.), and perform technology transfer to more broadly share the outcome of the research and enable further adoption by dairies and other industries. The target industries are those in the primary milk and cheese production and processing lifecycle. The aim is to digitize the dairy and dairy adjacent industries (milk, cheese, and their associated products) through the adoption of advanced sensors, data management, machine learning, and best practices to optimize electric equipment operations. The goal is to make the technology applicable and useable for other dairies and industrial operations beyond those participating as a demonstration site under this solicitation.

Technologies sought are either pre-commercial or commercialized but underutilized and are currently at a technology readiness level of 7-8 with the expectation to progress up one or more levels by the end of the project. Technologies must have a pathway to commercialization to California's dairy industry to ensure the benefits of the project will extend beyond the scope and term of the grant agreement. The goal of projects from this group is to demonstrate the technology at multiple sites in order to develop a performance baseline for dairies of different sizes and configurations across the state. The applicant will propose at least five project sites (at least three must be identified by name with commitment letters at the time of application), provide an installation price per site, identify all project fixed and variable costs, and provide an estimated GHG reduction potential per site. Projects are expected to have an independent third-party Measurement and Verification to measure and quantify project benefits per Attachment 5 Scope of Work Template.

Example research includes, but is not limited to the following: Software development and application of machine learning to control algorithms for optimization of electricity intensive processes (pumping, mixing, blending, refrigeration, etc.) in milk and cheese production and other related dairy operations; Energy-efficient programming, to optimize electricity intensive equipment used in the dairy/agriculture industry; Machine learning and cloud computing integration to optimize operations and production. This technology is intended to be used and result in benefits applicable to many similar sites, not just the specific

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demonstration site(s) under investigation as part of the proposed project; Software and sensors to monitor for and identify leaks or losses of dairy process stream liquids and steam, electrical drawdowns, thermal leaks, compressed air and other electrical inefficiencies; Integrated hardware and software solutions to identify key performance indicators (KPI) for specific electrically driven processes such as, but not limited to compressed air, refrigeration systems, pumps, fans, drive engines, mixers that will be tracked and improved using data analytics. All these metrics must be documented in both the measurement and verification plan and the technology transfer plan; and Identification of benefits, and development of best practices and analysis, to engage other dairies and industries based on research results.

In order to successfully implement the proposed project, it may be necessary to have a telemetry system to collect, store and transfer data. Applicant should consider such requirements and budget accordingly for the number of expected demonstration sites for the duration of the Agreement term. Additionally, grant funds may not be used to purchase commercially available technologies, such as pumps, motors, mixers, refrigeration units, renewable energy systems, etc. Match funds and in-kind contributions must be used to purchase commercially (and widely used) available technologies.

Research Goals for Group 1:

All eligible Group 1 technologies – Baseline Energy Use includes current dairy electricity use and costs. Research Goals include: 10 percent or greater reduction in electricity use; and Simple payback of under three years. Simple payback = (equipment cost + installation cost + annual recurring fees) ÷ (annual energy savings + demand cost savings).

Group 2: Advanced Treatment Processes for Wastewater Treatment Plants

The purpose of this research area is to demonstrate at a municipal wastewater treatment facility, that treats more than one million gallons per day, the operation of emerging advanced primary treatment and/or advanced secondary treatment technologies for municipal wastewater. The goal of this group is to demonstrate (at scale) that advanced primary and secondary treatment can increase energy efficiency and increase overall treatment plant capacity while reducing operational and maintenance costs. Technologies for this group must be at technology readiness level of 5-8 with the expectation to progress up one or more levels by the end of the project. Technologies must have a pathway to commercialization and deployment in California's municipal wastewater treatment facilities to ensure the benefits of the project will extend beyond the scope and term of the grant agreement.

Applicants may propose to focus on advanced primary treatment, advanced secondary treatment, or both at the same facility. For projects that propose both, the municipal wastewater treatment plant influent must be treated by an advanced primary treatment process where the effluent from the advanced primary is the influent for the advanced secondary and this treatment process is kept separate (in its own secondary basin) from the conventional secondary treatment process. This will allow for direct comparison of overall combined advanced treatment processes to the performance of conventional treatment. The objective is to show that the technology(ies) can meet permit requirements and are viable upgrades for existing facilities or an alternative process for new wastewater treatment plant design beyond the demonstration site.

Example research includes, but is not limited to, the following: Comparison of advanced primary treatment with conventional secondary treatment to a conventional treatment process; Comparison of advanced secondary treatment with conventional primary treatment to a conventional process; Comparison of advanced primary treatment with advanced secondary treatment to a conventional treatment process; Advanced primary treatment methods include, but are not limited to: Cloth depth filters, Compressible medium filters, Micro-screen, Rotating belt filter/screen, and Other novel filters or filter media; and Advanced secondary treatment methods include, but are not limited to: Aerobic granular sludge, and Anaerobic ammonium oxidation.

The energy consumption and performance of the advanced treatment will be compared to the baseline during the M&V period. The demonstration will be at sufficient scale (treating at a minimum 500,000 gallons average daily flow), with the necessary automation, data collection, self-diagnostics, and system redundancies to operate at design capacity (minimum 500,000 gallons average daily flow) for a minimum



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of three months of baseline M&V of the conventional treatment process and at least 8 months M&V of the advanced treatment methods under actual treatment and operation conditions. Projects are expected to have an independent third-party Measurement and Verification to measure and quantify project benefits per Attachment 5 Scope of Work Template.

Research Metrics for Group 2:

Advanced Primary Treatment – Baseline Performance/ Energy Use (to be completed by applicants) includes the Primary Clarifier Process: Primary Clarifier pumps, Suspended solids removal efficiency, Organic removal efficiency. Research Goals include: Same or lower pumping energy usage; 70 percent suspended solids removal efficiency; 40 percent-60 percent organic removal efficiency; 15 percent-30 percent decrease in aeration energy; Decrease in primary clarifier footprint by 50 percent; and Operating savings result in a rate of return of less than 10 years. Advanced Secondary Treatment – Baseline Performance/ Energy Use (to be completed by applicants) includes the Conventional Secondary: Estimate of total facility energy. Research Goals include: Reduce aeration energy consumption by at least 30 percent; and 25 percent increase in treatment capacity while maintaining the same footprint as conventional secondary treatment. Advanced Primary + Advanced Secondary Treatment – Research Goals include: 70 percent suspended solids removal efficiency; 40 percent-60 percent organic removal efficiency; 40 percent to 65 percent decrease in aeration energy; Decrease in primary clarifier footprint by 50 percent; Increase facility treatment capacity by at least 25 percent; and Operating savings result in a rate of return of less than 10 years.

Funding:

There is up to \$13,000,000 available for grants awarded under this solicitation. The total, minimum, and maximum funding amounts for each project group are listed below. Match funding is required in the amount of at least 20% of the requested grant funds. Only CEC reimbursable funds counts towards funds spent in California total.

Project Group	Available Funding	Minimum Award Amount	Maximum Award Amount	Minimum match funding (% of EPIC Funds Requested)
Group 1: Advanced Energy Management and Monitoring of the Dairy Industry	\$9,000,000	\$1,500,000	\$6,000,000	20%
Group 2: Advanced Treatment Processes for Wastewater Treatment Plants	\$4,000,000	\$2,000,000	\$4,000,000	20%

Project Requirements:

Projects must fall within the “technology demonstration and deployment” stage, which involves the installation and operation of pre-commercial technologies or strategies at a scale sufficiently large and in conditions sufficiently reflective of anticipated actual operating environments to enable appraisal of operational and performance characteristics, and of financial risks. California Public Resources Code Section 25711.5(a) requires EPIC-funded projects to: (1) benefit California IOU ratepayers by increasing reliability, lowering costs, and/or increasing safety; and (2) lead to technological advancement and breakthroughs to overcome barriers to achieving the state’s statutory energy goals. To maximize the impact of EPIC projects and to promote the further development and deployment of EPIC-funded technologies, a minimum of 5% of CEC funds requested should go towards technology transfer activities. The Project Narrative must include a Measurement and Verification Plan that describes how actual project benefits will be measured and quantified, such as by identifying measurable and quantifiable project benefit metrics that are applicable to the project group(s). Projects may identify pre and post-project energy use (kilowatt hours, kilowatts), water use (million gallons), and cost savings for energy, water, and other benefits.

Eligible Applicants:

This solicitation is open to all public and private entities with the exception of local publicly owned electric utilities. In accordance with CPUC Decision 12-05-037, funds administered by the CEC may not be used for any purposes associated with local publicly owned electric utility activities.