Questions and Answers

**GFO-23-301**

**Energy Efficiency and Load Flexibility in Industrial and Commercial Cold Storage Facilities**

[~~November 8th, 2023~~]

**December 14th, 2023**

Added language appears in **bold underline**, and deleted language appears in [~~strikethrough~~] and within square brackets.

 The following answers are based on California Energy Commission (CEC) staff’s interpretation of the questions received. It is the Applicant’s responsibility to review the purpose of the solicitation and to determine whether their proposed project is eligible for funding by reviewing the Eligibility Requirements within the solicitation. The CEC cannot give advice as to whether a particular project is eligible for funding, because not all proposal details are known.

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1. **Q:** Section I.C states that integrated thermal energy storage technologies, such as dedicated ice storage, brine cold storage that enables operational flexibility, and electric load shifting are eligible technologies for this solicitation.

The above sentence is structured so as to suggest that “electric load shifting”, can be accomplished by a technology other than “integrated thermal energy storage”. Can this be clarified to make it clear that an innovative, TRL 7 to 8 technology that significantly advances the current state of the art in “electric load shifting” is eligible even if it does not rely on “integrated thermal energy storage”? Load shifting alternatives to thermal energy storage could be evaluated during CEC proposal review on the relative potential and cost effectiveness of providing GHG and energy cost reductions.

**A:** Section I.C. of the solicitation document provides a list of eligible technologies and integrated thermal energy storage is an example of an eligible technology that can enable industries to shift their electrical loads. There could be other approaches to load shifting, such as use of advanced controls to enable shifting of equipment operating schedules in response to grid conditions. If you are recommending technologies other than those listed in Section I.C., please submit the request in writing by November 17, 2023, to the email address noted in Section I.E. Please provide justification on why the technology meets the solicitation’s requirements. Please also see Section I.C. of the addendum for additional information.

Please note that the proposal can include a package of load shift and/or efficiency technologies that are beneficial to industrial or commercial cold storage facilities. In the October addendum, we indicated a preference for proposals that have load shifting capability for both Groups 1 and 2. The latest addendum can be found at:

[GFO-23-301 - Energy Efficiency and Load Flexibility in Industrial and Commercial Cold Storage Facilities (ca.gov)](https://www.energy.ca.gov/solicitations/2023-08/gfo-23-301-energy-efficiency-and-load-flexibility-industrial-and-commercial)

1. **Q:** Solar Ice LLC’s goal is to reduce the power consumption of ice skating rinks by 50%! Ice rinks are one of the largest recreational consumers of electricity. On average, an ice rink consumes around 750,000 kWh just to keep a single ice surface frozen year-round. Our project introduces a revolutionary approach to solar thermal-powered refrigeration using non-imaging optics solar thermal collectors and phase change materials (PCMs) incorporated into our absorption chiller. This enhanced thermal storage enables extended refrigeration hours, even during sunless periods and evening hours. The system employs an absorption chiller, which, powered by the stored thermal energy, provides efficient refrigeration without the use of greenhouse gas refrigerants. This design not only promotes sustainable energy usage but also alleviates grid load during peak hours and the hottest times of the day. Currently, Solar Ice is building a 2,000 sq ft demonstration ice rink in the Los Angeles area to validate our innovation, and test in controlled settings, aiming to showcase its real-world feasibility. Clarify if reducing 50% of the electrical load during peak hours of refrigerating ice rinks would qualify for this program?

**A:** The focus of this solicitation is on existing industrial and commercial cold storage facilities which handle food, pharmaceutical and other products. Ice rinks are ineligible for this solicitation. However, it’s possible that your technology could be applicable for industrial and commercial cold storage facilities if it meets the requirements of the solicitation. The 50 percent electrical load reduction during peak hours appears to be aligned with the GFO if it is for an eligible cold storage facility. The amended GFO manual indicates that “Load flexibility projects must be able to shift load out of CAISO net peak demand hours driven by the respective IOU’s electricity tariff or other incentive programs available at the time of the project demonstration.”

1. **Q:** Does GFO-23-301 fund a Combined Heat and Power (CHP) installation with an adsorption chiller that uses the waste heat from the CHP for cooling? The power would be used to offset the energy usage of the chilling equipment, while the adsorption chiller would offset the chilling load directly.

**A:** No, this GFO does not fund CHP systems.

1. **Q:** Will the CEC consider smart charging of refrigerated trucks (not prime mover, but refrigeration compressor) in industrial warehouses, to reduce demand and shift load?

**A:** Possibly if smart charging of the refrigeration compressor on trucks can be demonstrated to have greenhouse gas reductions, ratepayer benefits, electric demand/load shift potential at the cold storage facility and meet all state regulations and requirements on transportation refrigeration units.[[1]](#footnote-2) In addition, the proposal should identify other opportunities, such as compressors, for potential load flexible operations to be competitive. A previous EPIC research project identified compressors, electric floor heating systems, and electric forklift charging as major electrical loads within a cold storage facility with potential to load shift.[[2]](#footnote-3) The electricity required for the truck refrigeration compressors must come from the electric grid or a renewable energy source. As noted in the GFO manual eligible technologies must also fall within a Technology Readiness Level (TRL) of 7-8. TRL 7 means a pre-commercial system that has been demonstrated in the field, and TRL 8 means pre-commercial system that has been demonstrated in the field with no significant design changes. As indicated in Section I.B of the solicitation manual, pre-commercial technologies are those that have not reached commercial maturity or been deployed at scales sufficiently large and in conditions sufficiently reflective of anticipated actual operating environments to enable the appraisal of operational and performance characteristics, or of financial risks.

1. **Q:** Will the CEC consider smart charging of forklifts in refrigerated warehouses to reduce demand and shift load?

**A:** Yes. Smart charging of devices and electrically propelled equipment required for operation within a cold storage facility is eligible for funding. This includes smart charging of forklifts. Eligible technologies must also fall within a Technology Readiness Level (TRL) of 7-8. In addition, the proposal should identify other opportunities, such as compressors, for potential load flexible operations in order to be competitive. See also response to question 4.

1. **Q:** Group 1: Industrial Refrigerated Warehouses, page 8 states: “In the Disadvantaged & Low-Income Communities section, indicate if the project location(s) are in disadvantaged, low-income, or tribal communities. If the project benefits these communities, indicate specific benefits it will provide to the communities. Include information on past and planned community engagement activities.”

The above paragraph appears to prioritize the physical location of the project, rather than the beneficiaries of the project. In the scoring section the metrics reference only the beneficiaries of the project. Please clarify that eligibility and scoring of a particular project does not depend on the physical location, and that projects not located within a disadvantaged, low income, or tribal community geographic boundaries would be eligible for preference points based on demonstrating that the project benefited those targeted communities.

**A:**  In order to obtain the preference points, the project sites must be located in a disadvantaged, low income, or tribal community and the projects must justify how the project will directly benefit these communities. Further clarification on this requirement can be found in Section II.4 of the solicitation manual. A project not located in and benefiting disadvantaged and low-income communities is still eligible under this GFO; however, it will not be eligible for preference points as indicated in Section IV.F., scoring criteria 9.

1. **Q:** Section 1.K – Match Funding, Pages 14/15 states: “Match funds” includes cash or in-kind (non-cash) contributions provided by the applicant, subcontractors, or other parties including pilot testing, demonstration, and/or deployment sites (e.g., test site staff services) that will be used in performance of the proposed project. “Match funds” do not include: CEC awards, EPIC funds received from other sources, future/contingent awards from other entities (public or private), the cost or value of the project work site, or the cost or value of structures or other improvements affixed to the project work site permanently or for an indefinite period of time (e.g., photovoltaic systems).”

The above paragraph makes it clear that real property, in particular pre-existing equipment and structures at a project site, cannot qualify as eligible expenses or in-kind match funding. Our technology can integrate photovoltaic (PV) systems to improve the project economic and GHG metrics. Please clarify if photovoltaic systems, purchased and installed as part of and during a proposed project work plan, and integrated with an eligible technology, would qualify as eligible for match funding.

**A:** If a PV system is an integral part of your proposed project and this project meets the requirements in the solicitation, then it would be eligible for match funding. As a result, the solicitation manual has been amended to read, “Match funds do not include: CEC awards, EPIC funds received from other sources, future/contingent awards from other entities (public or private), the cost or value of the project work site, or the cost or value of structures or other improvements that do not provide value to the project”.

1. **Q:** Section IV.E, Page 32, Screening Criteria #5, Please clarify if it is permissible for a single application to request funding for demonstrating the same technology at multiple sites (both within the same project group per Section I.C.1 on page 7), sites that are owned and operated by the same organization.

**A:** Multiple demonstrations of the same technology at multiple sites are permissible and encouraged. Demonstration sites may be owned and operated by the same or different companies.

1. **Q: The Balakian family intends to construct an adjacent agricultural waste conversion system that will consume 75,000 tons of orchard prunings annually to produce 100% renewable electricity and thermal energy. The facility will provide a productive disposal alternative to open field burning while generating 2 MW of renewable power, as well as steam and heat, to operate an on-site cold storage facility that has been idle for 10 years, and making available an additional 3 MW to be placed on the grid or delivered to local businesses and residential users via a microgrid, thereby increasing cold storage capacity in the state, while resulting in a reduction of emissions and net demand on the CAISO grid. This program will address such goals of your grant funding opportunity as: demonstrating and deploying an advanced energy efficiency and load reduction technology; reducing greenhouse gas emissions; shifting load requirements away from the grid, thus reducing fossil-based energy use and costs; and resulting in the first “Green” cold storage facility in the State of California, enabling its clients to reduce the carbon intensity of the products stored there. All of the technology and equipment involved in the project, which the grant will assist in funding, will be at least at the TRL level of 9.**

**A: Energy generation and combined heat and power (CHP) systems are not eligible for funding under this GFO. The solicitation seeks projects that specifically demonstrate advanced energy efficiency and load reduction technologies at operating cold storage warehouses and facilities. The technology readiness level (TRL) should be 7 to 8 at the start of the project and advance to TRL 9 by the end of the project with market-ready technologies and approaches. Additionally, demonstration sites must be at an operating cold storage facilities to demonstrate the pre- and post-installation GHG, energy, and load reductions.**

1. **Q: Redflow LLC, a long-duration electrochemical energy storage manufacturer, would like to express interest in requesting the inclusion of their Long Duration Energy Storage system’s solutions on the list of eligible technologies in GFO-23-301.**

**A: This GFO is not seeking battery-based solutions or energy storage solutions. This solicitation seeks innovative solutions that focus on the capability to shift or shed cold storage equipment operations to provide load flexibility capabilities, such as through the use of control technologies.**

1. [Transport Refrigeration Unit (TRU or Reefer) Regulation | California Air Resources Board](https://ww2.arb.ca.gov/our-work/programs/truckstop-resources/truckstop/regulations/transport-refrigeration-unit-tru-or#:~:text=2022%20Amendments,-New%20amendments%20to&text=Lower%20global%20warming%20potential%20refrigerant,or%20no%20refrigerant%20at%20all.) [↑](#footnote-ref-2)
2. Amarnath, Ammi, Andrea Mammoli, Angela Chuang, David Showunmi, Don Shirey, Colin Lee, Alekhya Vaddiraj, and Steve Hoffman. 2022. *Develop and Field Test Flexible Demand Response Control Strategies for Water Pumping Station and Industrial Refrigeration Plant*. California Energy Commission. Publication Number CEC-500-2023-060. [https://www.energy.ca.gov/publications/2023/develop-and-field-test-flexible-demand-response-control-strategies-water-pumping](https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.energy.ca.gov%2Fpublications%2F2023%2Fdevelop-and-field-test-flexible-demand-response-control-strategies-water-pumping&data=05%7C01%7C%7C262d35aaf784409701bb08dbdbc647a7%7Cac3a124413f44ef68d1bbaa27148194e%7C0%7C0%7C638345416899958590%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=DwmNKmr7tPJVYorUFZXFbKZysXwUC%2FjB4F0%2B8iG73%2Bw%3D&reserved=0) [↑](#footnote-ref-3)