**Energy Research and Development Division – Electric Program Investment Charge (EPIC) Program**

**Questions and Answers**

**GFO-24-310**

**Retrofitting Existing Residential Buildings with Innovative Envelope Solutions**

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**Disclaimer:** The following answers are based on the California Energy Commission (CEC) staff’s interpretation of the questions received during the pre-application workshops and those submitted in writing prior to the deadline of May 26, 2025. 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 Manual. The CEC cannot advise as to whether a particular project is eligible for funding, because not all application details are known.

# **General/Administrative**

1. **Question:** Will CEC facilitate a list of interested parties for partnering on this GFO?

**Answer:** TheCEC will not facilitate a list of interested parties for partnering on this GFO. The CEC hosts an online platform called Empower Innovation (<https://www.empowerinnovation.net/> ) that applicants can use to indicate interest in partnering opportunities, search for funding opportunities, and identify potential partnerships. This platform is designed specifically for the cleantech community and provides networking opportunities for individuals and organizations.

1. **Question:** Are cooling technologies like heat pumps eligible under any of the project groups?

**Answer**: No. Cooling technologies like heat pumps are not eligible under any of the project groups.

1. **Question:** Can you please restate the scoring impacts for being located outside of CA?

**Answer:** While projects must be located within the California Electric Investor-Owned Utility territories (Pacific Gas and Electric Co., San Diego Gas and Electric Co., and/or Southern California Edison), applicants, subrecipients, and vendors may be located out of state.

Scoring Criteria 6, **CEC Funds Spent in California,** is worth up to 10 points. This criterion is a formula-based point system, and points are assigned based on the amount of CEC funds that are spent in California. See Section I.L. for more information. Projects that maximize the spending of CEC funds in California will receive more points. Match funds may help to offset funds spent outside of California. To maximize spending in California, some competitive applicants in the past have utilized match funds for their out of state expenses and used CEC funds for expenses within California.

Another strategy to increase funds spent in California is to partner with California-based applicants or interested parties. Applicants may use CEC’s Empower Innovation (<https://www.empowerinnovation.net/>) platform to explore opportunities, indicate interest in partnering opportunities, and identify potential partnerships with California-based applicants or interested parties.

1. **Question:** Can an existing project funded by federal gov with outcomes aligned with the goals of this GFO be eligible as match fund?

**Answer:** Yes. If the existing project is federally funded, aligns with the project requirements, and meets the other requirements and goals of the project group, the federal funds spent during the duration of this EPIC project may be eligible as match funds. Funds spent prior to the start of the project will not count.

1. **Question:** In response to GFO-21-310 please advise, is it acceptable to extend the grant funding to support fire rebuild victims?

I am currently working with the Clean Coalition on the Green Rebuild Initiative, which is working to support homeowners in rebuilding 100% electric, NetZero homes using non-toxic sustainable materials. The homes will feature an extremely energy efficient envelope targeting Passive House standards. Many of the homes which would have benefited from this Grant's supportive financing as retrofits are now required to be rebuilt. By extending the Grant to fire victims it will help ensure more homes are built using these design parameters, and will especially help those that are under-insured or fall within a lower-income bracket.

**Answer:** Staff supports the Clean Coalition on the Green Rebuild Initiative goals; however, this GFO is targeting the retrofit market, not new construction.

The EPIC 5 Investment Plan is currently under development. The EPIC 5 Investment Plan will drive the development of future funding opportunities, and stakeholders may submit comments to the CEC Docket 23-ERDD-01 (<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-ERDD-01>) and specify “EPIC 5 Development Comments” in the title.

# **Match Funding**

1. **Question:** For the cost share waiver or reduction, is it an either DAC/LI or CBO OR both DAC/LI and CBO are required to fulfill the requirements?

**Answer**: Match funding reduction requirements for Groups 1, 2, and 3 must meet both requirements. That is, a) demonstrations must be located in AND demonstrate benefits to a tribe, DAC, or LI community and b) have a non-profit or local for-profit organization that can serve the role of a CBO as described in the Project Focus Section of each respective group. Also see Section II.B..5. for characteristics of a CBO.

Match is waived for Group 4 only if the project is a pilot demonstration located in AND demonstrating benefits to a tribe, DAC, or LI community.

# **Project Scope** – All or multiple Groups

1. **Question:** Would a secondary window approach (essentially an interior installation of a storm window) be considered a responsive technology for group 2 or possibly group 4?

**Answer:** Groups 2 and 4 of this GFO are targeting insulated glass units (IGU) or vacuum insulated glass (VIG) windows. Secondary or storm windows will not be considered responsive.

1. **Question:** Are only physical technologies eligible? Would a software that would enable an acceleration of the market adoption of envelope measures potentially be eligible? If not, are there any other programs that would fund this type of innovation?

**Answer:** Groups 1, 2, 3, and 4 are primarily focused on the development and demonstration of physical technologies, so standalone software technologies are not eligible; however, software and other types of automation and digital tools may be a component of the project or demonstration and would be eligible as a complement under this GFO.

For example, a software tool that can optimize the performance of the hardware, for instance aiding in speeding up or increasing accuracy of installation or production, may be eligible for funding within the overall budget set for each group, as long as the software contributes to the overall goals within each Group.

1. **Question**: Is there a way to get more clarity on what technology is eligible without fully disclosing the technology in an offline setting to see if it is eligible or not before proceeding with a submittal?

**Answer**: Staff cannot evaluate material submitted outside of the official submittal process. Applicants must submit a full package in order to have their application evaluated.

1. **Question**: Will a staff member of the participating CBO be eligible to be a demonstration site host/owner? Or is there a conflict-of-interest issue?

**Answer**: A staff member of the participating CBO may be eligible to participate as a demonstration site host.

1. **Question**: Is code approval required prior to installing a new envelope technology on the demo homes? Such as Fire, wind, seismic?

**Answer**: At the demonstration stage, full code compliance with fire, wind, seismic, and other relevant codes is not required; however, since full compliance with all relevant codes is necessary for Title 24 (T24) compliance and installation in buildings, the researchers must document and take all necessary steps during this project term to ensure the research products will be able to achieve full code compliance before commercialization of these technologies.

1. **Questions**:

* **Part 1- Site Requirement:** The CEC defines and counts 5 buildings as meeting the requirement, whether they are multifamily (MF) or single family (SF) buildings. A MF building is likely to contain many more dwelling units and significantly more conditioned floor area, than a typical SF home. For this reason, the cost per unit in MF construction is not equivalent to SF and counting that many buildings as a unit of progress may be more prohibitively difficult for MF developments to demonstrate true efficiency of scale with a proposed technology.
  + Would the Commission consider using an alternative or normalized metric for multifamily projects, such as: square footage, equivalent wall area, dwelling units per building, or a unit equivalency factor to reflect scale relative to single-family homes?
* **Part 2- For Groups 1 and 3,** the performance targets are only given as R-value per inch. No requirement is given for increasing the assembly or building overall R-value or energy performance. Does this mean that targeted partial installations are accepted?
  + Example: The team chooses an insulation product that is R-8/inch, thereby meeting performance targets for both Group 1 and Group 3. Is there a minimum amount of this product that must be installed? Is there a minimum amount of energy savings that need to be demonstrated? In this example, can the team choose to install only at major thermal bridges and ignore the rest of the demonstration building?
* **Part 3- For group 3,** given the thermal performance target of R7/inch, the only readily-available products exceeding this are VIPs. However, VIPs are present significant challenges for low-income housing providers, due to maintenance procedures that are not cost-effective nor practical for long-term asset management.     
  Additionally, our demonstration sites are primarily low-rise wood-frame construction with limited structural load capacity. VIPs often increase weight and the next closest solution would be foam-based materials, that have higher embodied carbon.
  + Since Group 1 is focused on VIP technologies, would the CEC alternative pathway for group 3 based on total assembly R-value, especially where solutions can demonstrate equivalent performance, reduced embodied carbon, and improved long-term viability.

**Answers:** An Addendum will be released with more clarification on the demonstration site and performance requirements.

Part 1**:** There is no need to normalize or scale the number of sites required. Group 3 does not specify that the number of sites be 5 buildings but 5 demonstration sites. A demonstration site is considered to be one residential unit. The minimum number of sites required for this group is 5 proposed demonstration sites with one additional backup site.

* For SF or manufactured homes, the minimum is 5 homes.
* For MF buildings, the minimum is one building with at least 5 units in the demonstration.For example, if 2 MF buildings are in the demonstration, at least 1 building must have a minimum of 5 units.
* Demonstration sites may be mixed building types if more than 5 sites will be in the demonstration AND if the minimum is met for 1 of the building types (e.g., 5 MF units and 1 SF unit OR 5 SF units and 1 MF unit).

Part 2: Both Groups 1 and 3 do not have a final targeted assembly or building performance R-value, but demonstrations must use insulation materials that meet the minimum per inch performance metric and must be, at a minimum, T24 compliant when installed. See Question 12 Part 3 if Group 3 minimum per inch performance metric is not met.

Group 1 has an energy savings goal of at least 10 percent reduction in HVAC gas and electric consumption using this technology. Group 3 does not have an energy savings goal. For both Groups 1 and 3, partial installations are allowed as long as the technology meets the required performance metric, can be scaled up, and can be installed to ensure that T24 code compliance is met.

Part 3: Group 1 is not focused solely on VIP technology. It is open to other technologies that can meet the R-8/inch to R-14/inch performance metric. For example, technologies like aerogel would likely meet the lower end performance (R-8/inch) while technologies like VIPs will meet the higher end performance (R-14/inch). Other non-VIP technologies will be expected to be between R-8/inch to R-14/inch.

For Group 3, the ideal technologies selected would be ones that meet the R-7/inch minimum performance but technologies that do not meet the minimum performance in Table 5 (Table 4 in the addendum) may still be eligible if applicants can explain a) why their technology or approach cannot meet the performance, b) how their project can simplify installation processes, decrease occupant disruption, and/or reduce retrofit time, c) how the project will benefit California Electric Ratepayers, such as GHG reductions and cost and energy savings and d) why their project is still a good candidate for meeting Group 3’s goals.

## **Group 1:** Residential Opaque Envelope Retrofits - Value Proposition Improvement

1. **Question**: For Group 1, what insulation level is required for the requirements on cost per unit wall area?

**Answer:** The performance requirements for Group 1 are R-8/inch or greater for products that do not include vacuum, and R-14/inch for products that include vacuum. These products must be available up to a thickness of 4 inches in 0.5-inch increments as one component or as layers. The cost per square foot requirement has been removed from this group. The Addendum to the GFO will reflect this clarification.

1. **Question**: Thank you for the response to my question above. I want to make sure we are talking about the same thing. I'm wondering about the total R-value for the installation and not the R-value per inch. The values you indicate seem to match the R value per inch indicated in the GFO, so I'm wondering if that is what you are meaning. Please confirm whether there is a particular total installed R-value required (i.e., R-value per inch multiplied by the number of inches installed) for the specified costs per unit wall area.

**Answer:** The solicitation does not specify a “total” R-value for these products. However, these products must be available up to a thickness of 4 inches in 0.5-inch increments, as one component or as layers attached to each other. The total installed R-value must meet T24 code compliance, at a minimum. Table 1 for the specific cost per unit wall area has been removed from the solicitation and will no longer be used in this GFO. This solicitation will be using only the Life Cycle Cost Effectiveness Methodology described in Section 1.C., Common Group Requirements, for cost analysis. The Addendum to the GFO will reflect this clarification.

1. **Question**: Is the example you provided the requirement? In other words, do we need to provide a total R value of 22 for less than or equal to $14 per square foot? Please confirm or indicate if the requirements are different.

**Answer**: Staff has removed Table 1 with the current cost metric. Table 1 was used for Group 1 only, and this metric is no longer required. Group 3 had no specific cost metric. The Life Cycle Cost Effectiveness Methodology described in Section I.C., Common Group Requirements must be used for all Groups’ project proposals.

1. **Question**: For group 1, what technologies are you envisioning that are able to meet a R/inch of 8-14 as well as a TRL of 6-7?

**Answer:** Technologies such as aerogel and VIP technologies, for instance, meet these criteria. VIPs are expected to be able to meet the higher R-14/inch, and aerogel technologies should be able to meet the R-8/inch performance. However, there are other non-VIP technologies that may have performances between R-8/inch and R-14/inch that would also be eligible in this project group.

An Addendum to the GFO manual will reflect this clarification.

1. **Question:** Is there any maximum amount of disruption that is allowed in Group 1? For example, is removal of siding allowed?

**Answer:** The technology and/or approach must be no more disruptive than the current technology. A disruption like siding removal may be allowed if the project can demonstrate an improvement in the value proposition for this type of retrofit, such as improving performance while reducing occupant disruption, installation time, and/or complexity compared to current technologies and/or approaches.

## **Group 2**: Residential Vacuum Insulated Glass Retrofits - Value Proposition Improvement

1. **Question:** Group 2: Does it need to be the same technology provider for both Method 1 and Method 2, or can we partner with different vendors (one for each Method)?

**Answer**: You may use the same or different vendors to provide the technology and installation for the two installation methods.

1. **Question:** For Group 2 project, VIG in existing frame, how will final U value be measured following installation? Is there an existing standard method or methodology (e.g., NFRC, AERC, etc.)?

**Answer:** Current rating for a VIG in a site-built assembly requires using NFRC 700, which must be done in a certified lab. However, NFRC 700 will soon be replaced by NFRC 715, which also requires certified lab testing.

Applicants may use this method for certification or develop a new method that is simpler to apply.

1. **Question**: It is my understanding that there is no procedure for testing site-built windows, using an IGU replacement with existing frame. Are you aware of what methodology can be used for site-built VIG windows?

**Answer**: See Answer to Question 19.

1. **Question**: The solicitation states the following requirements:

* At least 7 Single-Family (SF) units and 2 Multi-Family (MF) buildings with a minimum of 8 total units.
* At least one additional SF and one additional MF building backup site to ensure that the minimum continues to be met throughout the project term.
* Method 1 must have a minimum of 3 SF and 4 MF units.
* Method 2 must have a minimum of 2 SF and 2 MF units.

Could you clarify the **total number of SF units and MF buildings** required for Method 1 and Method 2 to meet the minimum requirements? Also, what is the total number of backup sites needed for both Methods?

**Answer**: The total minimum number of units for this group are 7 SF units and 8 MF units located in 2 MF buildings. For example, an applicant can have 5 SF and 6 MF units under Method 1 and the remaining 2 SF and 2 MF units under Method 2. The sites must be located in at least two different climate zones (CZ), excluding CZ 5, 6, and 7.

Each method requires at least one SF and one MF backup site. The Addendum to the GFO will reflect this clarification.

## **Group 3**: Residential Envelope Retrofits with Advanced Building Construction Techniques

1. **Question**: In table 5, three measures are listed indicating minimum requirements for the potential retrofit projects. One has to do with wall insulation the other with window and the third one with air sealing.

For a given retrofit project is it required that the project satisfies all the three requirements in table 5, or is it the case that the subset of them is sufficient?

**Answer**: All projects will require a combination of measures. Depending on the measures proposed, a subset of the minimum performance metrics (two or all three) will apply. For example, a project may be using an Advanced Building Construction (ABC) approach to apply wall insulation and air sealing so two of the measures will apply. Since Group 3’s focus is on technologies and approaches using ABC Methods, applicants must remember to consider not only the performance metrics, but also the approaches used to apply the measures.

1. **Question:** Is the R-7/in requirement for Group 3 relevant only if the technology is insulation-specific, or is that required for any demonstration using the ABC-type technology being proposed?

**Answer**: Yes, this requirement is insulation specific. Depending on the measures and the ABC methods and techniques selected to apply high-performance envelope solutions, only specific metrics may be applicable. If one of the measures selected is to improve wall insulation using a specific ABC strategy, then the insulation metric applies, but if none of the measures selected involve insulation, then the R-7/in metric does not apply. See Question 12, Part 3 Answer for how to qualify if the measure selected does not meet insulation minimum performance metric.

1. **Question:** Is there a TRL level required for Group 3?

**Answer:** No. There is no specific TRL level for Group 3 since a variety of technologies and strategies will be involved. However, the strategy or technology that is proposed must have received prior state or federal funding and have beensuccessfully demonstrated previously. See the GFO manual, Section I.C. Group 3, and Section II.A.1. for full details on eligibility requirements.

1. **Question**: Is there any requirement on the building type(s) for Group 3?

**Answer:** The only building type requirement is that demonstration sites be residential buildings.

1. **Question**: And can you clarify/confirm whether group 3 demonstration requirement is 5 sites = 5 buildings, 5 sites = 5 properties, other?

**Answer**: See Answer to Question 12, Part 1.

1. **Question**: Group 3: Residential Envelope Retrofits with Advanced Building Construction Techniques states we must have 5 proposed demonstration sites and one additional backup site, but does not confirm whether project sites can be single-family, multi-family, or both.  The other group categories specify that both single-family and multi-family qualify. Is it possible to clarify that single-family, multi-family, or a mix of both qualify for Group 3?

**Answer**: See Answer to Question 12 Part 1. An Addendum will be released with this clarification.

1. **Question**: Are you able to comment on the intent of the required 5 demonstration sites for group 3? is CEC interested in seeing incremental improvements across sites, compare apples to apples approaches, or demonstrated economy of scale? or other?

**Answer:** The 5 proposed demonstration sites and one additional backup site requirement for Group 3 is intended to demonstrate repeatability and scalability.

1. **Question**: Can local, for-profit companies with community engagement backgrounds and connections to communities replace a CBO? In other words, would companies that can perform the same role as a CBO, but do not have a CBO designation, be acceptable to support the site recruitment and workforce development tasks and be eligible for the lower match fund requirement?

**Answer**: Yes, local, for-profit companies with community engagement backgrounds and connections to communities that can fulfill the role of a Community Based Organization (CBO) may qualify for match reduction. Applicants must also demonstrate how the project will provide benefits to the tribe or disadvantaged and/or low-income community. See Section II.B..5. for characteristics of a CBO. An Addendum to the GFO manual will reflect this clarification.

1. **Question**: We are planning to submit a robotic insulation solution for attics as group 3 proposal for GFO 24-310.

We would like to ask the following question regarding the R-7/inch insulation you are looking for in GFO 24-310 for group 3. R7/inch is not feasible with fibrous and spray insulation methods, and won’t be feasible for attic retrofits. Even on exterior wall retrofits, unless using aerogel or VIPs, R7/inch is not feasible and those two technologies may not work with robotic installation methods.

Can you pls clarify / and or advise?

**Answer**: Applicants that have a technology or approach that do not meet the performance metrics laid out in the GFO manual Table 5 (Table 4 in Addendum) but have a technology or an approach that can be used to simplify installation processes, decrease occupant disruption, and/or reduce retrofit time may still be eligible. See to Question 12, Part 3 Answer and the Addendum on how to qualify.

1. **Question**: A related question on Group 3. One of the requirements is as listed below. Can CEC clarify what is meant by the measurement and assessment of retrofits on air quality? Is the intent to assess the improvement in community / state-wide air quality if the retrofits are broadly adopted or is this related to indoor air quality? Retrofits have some impact, but do not majorly impact the indoor air quality in residential buildings.

“Measurement and assessment of the retrofit on air quality (e.g., CO2, PM, NOX) and related impacts (e.g., thermal comfort, noise, building resilience, energy or load reduction, and HVAC sizing needs) pre- and post-retrofit”.

**Answer**: The air quality measurement and assessment of the retrofits are indoor and building-based measurements only. This requirement was meant to assess the indoor air quality and other non-energy related impacts both pre- and post- retrofit on a building scale.

1. Question: We are a perfect fit for Group 3 and have an existing $277k grant from MassCEC. MassCEC is not listed as one of the printmaking agencies. Is it possible for us to submit for Group 3 with funding from MassCEC meeting the requirement for prior funding for the proposed technology?

**Answer**: MassCEC funding is eligible to meet the prior funding requirement for Group 3.  This agency will be included in Section II.A.1 of the Addendum.

## **Group 4**: Residential Window Retrofits using Existing Frames

1. **Question**: What are the glazing and frame characteristics of the baseline window for Group 4?

**Answer:** There is no baseline window frame or glazing characteristics specified in the GFO, but Applicants will need to use the characteristics (U-factor and SHGC) of the existing pre-retrofitted window system as the baseline. Improvements of the overall installed system (new IGU and the improved existing frame) will be compared to the pre-existing system.

1. **Question**: What are the R or U values for each of the glazing and frame?

**Answer**: We do not have specific U-factors for the glazing or frame. The baseline metrics will be the pre-retrofit U-factors of the glazing and frame and the installed window system as a whole. There is no specific required U-factor for the separate post-retrofit components of the window system, but the overall installed system thermal performance (new IGU and improved existing frame) must have a U-0.22 performance factor. The strategy to improve the existing frame must be applicable to both wood and vinyl.

1. **Question:** Is there a TRL requirement for Group 4?

**Answer:** Group 4 is an Applied Research and Development (ARD) group. The CEC defines ARD technologies as having a TRL between 3 and 5.