GFO-19-301 Pre-Application Workshop

Advancing Next-Generation Heating, Cooling and Water Heating Systems

Energy Research and Development Division

Brad Williams
November 5, 2019
California Energy Commission
<table>
<thead>
<tr>
<th>Time</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30 AM</td>
<td>Welcome and Introduction</td>
</tr>
<tr>
<td>9:45 AM</td>
<td>Solicitation Background</td>
</tr>
<tr>
<td></td>
<td>• Program Background, Drivers, and Motivation</td>
</tr>
<tr>
<td></td>
<td>• Purpose, Groups, and Funding</td>
</tr>
<tr>
<td></td>
<td>• Key Dates</td>
</tr>
<tr>
<td></td>
<td>• Application Requirements</td>
</tr>
<tr>
<td>10:05 AM</td>
<td>Application Requirements</td>
</tr>
<tr>
<td></td>
<td>• Project Group Requirements</td>
</tr>
<tr>
<td></td>
<td>• Attachments</td>
</tr>
<tr>
<td></td>
<td>• Submission Process</td>
</tr>
<tr>
<td>10:30 AM</td>
<td>Q&amp;As</td>
</tr>
<tr>
<td>12:00 PM</td>
<td>Adjourn</td>
</tr>
</tbody>
</table>
Housekeeping

• In case of emergency
• Facilities
• Sign-in sheet
• Updates on solicitation documents including this presentation will be posted at the Grant Funding Opportunity’s webpage:
The Energy Commission adopted a resolution strengthening its commitment to diversity in our funding programs. We continue to encourage disadvantaged and underrepresented businesses and communities to engage in and benefit from our many programs.

To meet this commitment, Energy Commission staff conducts outreach efforts and activities to:

• Engage with disadvantaged and underrepresented groups throughout the state.
• Notify potential new applicants about the Energy Commission’s funding opportunities.
• Assist applicants in understanding how to apply for funding from the Energy Commission’s programs.
• Survey participants to measure progress in diversity outreach efforts.
We Want to Hear From You!

1 Minute Survey
The information supplied will be used for public reporting purposes to display anonymous overall attendance of diverse groups.

• WebEx participants please use the link https://www.surveymonkey.com/r/CEC-11-5-2019
• iPads are being passed around the room

Thank you for your time!
Empower Innovation strives to accelerate your clean tech journey with easy access to funding opportunities from the Energy Commission and other funding providers, curated resources and events, and connections to people and organizations.

**FIND A PARTNER**
Announce your interest in this funding opportunity and message other interested parties to find potential partners.

**RESOURCES & TOOLS**
Browse the collection of resources for clean tech innovators including Resource Libraries, Funding Sources, Tools, and Databases.
Research Program Background

- The Electric Program Investment Charge (EPIC) Program is an electricity ratepayer surcharge established by the California Public Utilities Commission (CPUC) in December 2011.

- The purpose of the EPIC program is to benefit the ratepayers of three investor-owned utilities (IOUs)*

- The EPIC program funds clean energy technology projects that promote greater electricity reliability, lower costs, and increased safety:
  - Applied research and development
  - Technology demonstration and deployment
  - Market facilitation

* Pacific Gas and Electric Co., San Diego Gas and Electric Co., and Southern California Gas Company
Policy Drivers

- **AB 32**: reduce GHG emissions to 1990 levels by 2020.
- **SB 32**: reduction of GHG emissions to 40% below 1990 levels by 2030.
- **SB 100**: requires that 60 percent of California's electricity be powered by renewable by 2030 and 100 percent by 2045.
- **SB 350 Clean Energy and Pollution Reduction Act of 2015**: California’s Renewables Portfolio Standard and Energy Efficiency for End-Use Customers
Background of the Solicitation

Issue
- More than half of the GHG emissions from buildings come from burning natural gas or propane in space and water heaters - predominant heating fuel in 90 percent of California homes.
- In order to meet the state’s GHG emission reduction goals, electrification of water heating and HVAC systems is a key strategy. This creates new challenges from a grid and consumer perspective.
- Current systems have high capital cost, often require major electrical infrastructure upgrades, and lack controls that enable utilization as a grid resource.

Solutions
- Develop and demonstrate innovative, efficient and cost-effective approaches to overcome these challenges.
- Develop and test advanced heat pumps utilizing low-GWP refrigerants and non-vapor compression (NVC) technologies (e.g., thermoelastic, membrane, magnetocaloric).
- Develop and test heat pumps and NVC technologies with potential to respond to price and/or demand response signals to minimize cost and grid impacts and increase building load flexibility as a grid resource.
- Maintain system efficiencies, including ensuring proper system refrigerant charge and reducing refrigerant leaks.
Purpose of Solicitation

Fund Next-Generation Heating, Cooling and Water Heating Systems (4 funding groups):

1. Advanced heat pumps using low or zero-GWP refrigerants or Non-Vapor Compression (NVC) systems for space conditioning.
2. Advanced heat pumps using low or zero-GWP refrigerants or Non-Vapor Compression (NVC) systems for water heating.
3. Innovative approaches and technology to reduce refrigerant leakage in HVAC and water heating.
4. Load flexibility optimization for advanced heat pump technologies.
Technology Readiness Level

Groups 1, 2a, 3, 4 – Achieve at least one TRL level improvement

Group 2b – Achieve at least one TRL level improvement

*Technology Readiness Assessment Guide*. Department of Energy
http://www2.lbl.gov/dir/assets/docs/TRL%20guide.pdf
Group 1: Low Carbon Space Conditioning
(Section II.B.2.a)

Purpose:
• Develop, test and demonstrate advanced reversible heat pumps or NVC technology for space conditioning while utilizing low- or zero-GWP refrigerants (TRL 3-6 / Applied Research).

Requirements during agreement term:
• Performance - meet the requirements of Table 1a.
• Achieve continuous and real-time monitoring
• Collect at least nine months of monitoring data
• Location and sample size
• Cost reduction
Group 2A: Low Carbon Water Heating (Section II.B.2.b)

Purpose:
• Develop, test and demonstrate advanced heat pumps or NVC technology for water heating while utilizing low or zero-GWP refrigerants (TRL 3-6 / Applied Research)
• Develop, test and demonstrate advanced combination HVAC and water heating systems (TRL 3-6 / Applied Research).

Requirements:
• Performance - meet the requirements of Table 2a.
• Achieve continuous and real-time monitoring
• Collect at least nine months of monitoring data
• Location and sample size
• Cost reduction
Group 2B: Low Carbon Water Heating (Section II.B.2.b)

Purpose:

- Test and demonstrate the field performance of retrofit capable (110/120V) HPWH for residential applications-including installation of electric heat pump water heaters using low or zero-GWP refrigerants that can be plugged into 110/120 volt sockets and meet the specifications developed by the Building Decarbonization Coalition. (Technology demonstration - TRL 7-8)

- Test and demonstrate the field performance (e.g., operating COP, reliability, maintenance) of central HPWH for multifamily applications, documentation of best-class design and installation practices, and provide data to support Title 24, Part 6 energy modeling assumptions. (Technology demonstration - TRL 7-8)

Requirements

- Performance - meet the requirements of Table 2a.
- Achieve continuous and real-time monitoring
- Collect at least nine months of monitoring data
- Location and sample size (low-income or disadvantaged communities)
- Cost reduction
Group 3: Advanced Methods for Refrigerant Leak Prevention (Section II.B.2.c)

Purpose:

• Research and develop hybrid joining connections that combine a torque fitting with a secondary non-mechanical joining technique (TRL 3-6 / Applied Research).
• Research and develop low-temperature, non-torque-based joining technologies and techniques (TRL 3-6 / Applied Research).
• Develop coatings, compounds, or tapes that improve joint connections and leakage rates during installation and servicing (TRL 3-6 / Applied Research).
• Develop an improved, consistent evaluation process or technology for verifying joints in both factory and field application (TRL 3-6 / Applied Research).
• Develop on-board FDD systems to detect leakage from packaged HVAC&R systems (TRL 3-6 / Applied Research).

Requirements

• Performance - meet the requirements of Table 3a.
• Achieve continuous and real-time monitoring
• Collect at least six months of monitoring data
• Location and sample size
• Cost reduction
Group 4: Heat Pump Load Flexibility in Existing Buildings (Section II.B.2.d)

Purpose:
• Test and demonstrate an open-source, integrated or add-on, advanced heat pump load control system that does all of the following:
  – responds to hourly or sub-hourly price and demand response signals to minimize cost and grid impacts
  – optimizes energy use based on building owner/occupant preferences, and
  – provides reliable and cost-effective load flexibility as a grid resource.

Requirements:
• Performance – meet the requirements of table 4a.
• Grid and customer benefits
• Achieve continuous and real-time monitoring
• Collect at least nine months of monitoring data
• Location and sample size (low-income or disadvantaged communities)
• Cost Reduction
<table>
<thead>
<tr>
<th>Project Group</th>
<th>Available Funding</th>
<th>Minimum Award Amount</th>
<th>Maximum Award Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1: Low Carbon Space Conditioning (Applied Research)</strong></td>
<td>$4,000,000</td>
<td>$1,500,000</td>
<td>$2,500,000</td>
</tr>
<tr>
<td><strong>Group 2A: Low Carbon Water Heating (Applied Research)</strong></td>
<td>$1,500,000</td>
<td>$500,000</td>
<td>$1,500,000</td>
</tr>
<tr>
<td><strong>Group 2B: Low Carbon Water Heating (Technology Demonstration in low-income or Disadvantaged Communities)</strong></td>
<td>$3,000,000</td>
<td>$1,500,000</td>
<td>$3,000,000</td>
</tr>
<tr>
<td><strong>Group 3: Refrigerant Leakage (Applied Research)</strong></td>
<td>$2,000,000</td>
<td>$1,000,000</td>
<td>$2,000,000</td>
</tr>
<tr>
<td><strong>Group 4: Heat Pump Load Flexibility in Existing Buildings (Applied Research in low-income or Disadvantaged Communities)</strong></td>
<td>$3,000,000</td>
<td>$1,500,000</td>
<td>$3,000,000</td>
</tr>
</tbody>
</table>
Eligible Applicants

- This is an open solicitation for public and private entities.
- Applicants must accept the EPIC terms and conditions.
  - Standard, UC, and DOE T&Cs available online: [https://www.energy.ca.gov/funding-opportunities/funding-resources](https://www.energy.ca.gov/funding-opportunities/funding-resources)
- Applicants are required to register with the California Secretary of State and be in good standing to enter into an agreement with the Energy Commission: [http://www.sos.ca.gov](http://www.sos.ca.gov)
# Application Requirements

Each Applicant must complete and including the following:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Application Form <em>(wet signature)</em> (.pdf)</td>
</tr>
<tr>
<td>2.</td>
<td>Executive Summary (.docx)</td>
</tr>
<tr>
<td>3.</td>
<td>Fact Sheet (.docx)</td>
</tr>
<tr>
<td>4.</td>
<td>Project Narrative (.docx)</td>
</tr>
<tr>
<td>5.</td>
<td>Project Team (.docx, .pdf)</td>
</tr>
<tr>
<td>6.</td>
<td>Scope of Work (.docx)</td>
</tr>
<tr>
<td>6a.</td>
<td>Project Schedule (.xlsx)</td>
</tr>
<tr>
<td>7.</td>
<td>Budget (.xlsx)</td>
</tr>
<tr>
<td>8.</td>
<td>CEQA Compliance Form (.docx)</td>
</tr>
<tr>
<td>9.</td>
<td>References and Work Product Form (.docx, .pdf)</td>
</tr>
<tr>
<td>10.</td>
<td>Contact List (.docx)</td>
</tr>
<tr>
<td>11.</td>
<td>Commitment and Support Letters <em>(wet signature)</em> (.pdf)</td>
</tr>
<tr>
<td>12.</td>
<td>Applicant Declaration <em>(wet signature)</em> (.docx)</td>
</tr>
<tr>
<td>13.</td>
<td>Energy Efficiency Data (.xlsx)</td>
</tr>
</tbody>
</table>
This is your opportunity to explain the entirety of the project. The narrative should explain:

- Why is your project important?
- What will you be doing in your project?
- How are you going to complete the project?
- How will this benefit electric IOU ratepayers?
- Address the requirements for your group as described in Section II.B.2.
- Respond to the scoring criteria described in Section IV.F.
Scope of Work (Attachment 6)

• Tell us exactly what you are proposing to do in your project.
• Identify what you will deliver to the Energy Commission.
• Be sure to include in the technical tasks:
  – At least one product deliverable per task.
  – Address requirements in Section II.B.
• Be sure to include in the Project Schedule (Attachment 6a):
  – Product deliverables that correspond with the Scope of Work.
  – Realistic dates on when product deliverables can be completed.
Budget (Attachment 7)

- Identify how you will be spending Energy Commission funds and match funds to complete the project.
- Subcontractors receiving $100,000 or more Energy Commission funds must complete a separate budget form.
- Submit in the format provided. **Do not delete sheets or rows, use the hide/unhide functions.**
- Ensure that all rates provided are maximum rates for the entire project term.
  - Consider salary adjustments of staff within the project term when determining maximum rates.
Commitment and Support Letter Forms (Attachment 11)

• Follow guidelines provided for commitment and support letters.
  – Commitment letters are required for entities or individuals that are committing match funding, testing/demonstration sites, including the Prime.
  – Support letters describe a project stakeholder’s interest or involvement in the project.

• All applicants must submit at least one support letter.
• Match funding must be supported by a match fund commitment letter.
• Any project partners that will make contributions to the project (other than match and sites) must submit a commitment letter.
• Limit to two pages per letter, excluding the cover page.
How will my Application be Evaluated?

Application Screening

Admin Screening Process
1. Energy Commission staff screens applications per criteria in Section IV.E.
2. Criteria are evaluated on a pass/fail basis.
3. Applicants must pass all screening criteria or the application will be disqualified.

Some Reasons for Disqualification
- Application is not submitted by the specified due date and time.
- Applicant did not sign the Application Form (Attachment 1).
- Application does not include one or more support letters.
- Application doesn’t meeting minimum match requirement.
How will my Application be Evaluated?
Application Scoring, Section IV.F

- Evaluation Committee applies the scoring scale to the scoring criteria.
- Applications must obtain a minimum passing score of 6 points for Criteria 1 in order to continue evaluation.
- Applications must obtain a minimum passing score of 63.00 points for Criteria 1-5 in order to continue evaluation.
- Applications must obtain a minimum passing score of 80.50 points for Criteria 1-8 in order to be considered for funding.
- Review Section IV of the manual and ensure the application provides a clear and complete response to each scoring criteria in the Project Narrative, Attachment 4.

<table>
<thead>
<tr>
<th>Scoring Criteria</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Project Team Past Performance</td>
<td>15</td>
</tr>
<tr>
<td>2. Technical Merit and Need</td>
<td>15</td>
</tr>
<tr>
<td>3. Technical Approach</td>
<td>25</td>
</tr>
<tr>
<td>4. Impacts and Benefits for CA IOU Ratepayers</td>
<td>20</td>
</tr>
<tr>
<td>5. Team Qualifications</td>
<td>15</td>
</tr>
<tr>
<td>6. Budget and Cost-Effectiveness</td>
<td>10</td>
</tr>
<tr>
<td>7. Funds Spent in CA</td>
<td>10</td>
</tr>
<tr>
<td>8. Ratio of Direct Labor Costs to Loaded Labor Costs</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>115</strong></td>
</tr>
<tr>
<td><strong>Minimum Points to Pass</strong></td>
<td><strong>80.5</strong></td>
</tr>
</tbody>
</table>

12/3/2019
How will my Application be Evaluated? 
Application Scoring, Section IV.F

- Criteria 9 only applies to Group 2b
- Minimum Passing Score for Criteria 9 is 70% or 35.00 points for Group 2b

<table>
<thead>
<tr>
<th>Scoring Criteria</th>
<th>Maximum Points (Groups 2b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.Benefits to Disadvantaged or Low-Income Communities and Localized Health Impacts</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total Points</strong></td>
<td><strong>1050</strong></td>
</tr>
</tbody>
</table>

12/3/2019
How will my Application be Evaluated?
Application Scoring, Section IV.F

• Passing applications (score of 80.5 or more from Criteria 1-8) will be considered for bonus points.
• Criteria 10, match funding, is required in the amount of at least 20% for Group 2b.
• Criteria for bonus points include:
  • Match Funding
  • Projects located in and benefiting disadvantaged or low-income communities

### Scoring Criteria

<table>
<thead>
<tr>
<th>Scoring Criteria</th>
<th>Maximum Bonus Points (Groups 1, 2a, 3, 4)</th>
<th>Maximum Points (Groups 2b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Match</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>11. Disadvantaged or Low-income Communities</td>
<td>5</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total Points</strong></td>
<td><strong>15</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>
Match Funding Points

Refer to Section IV.F in the Solicitation Manual for more details on the match funding scoring criteria.

• Applicants may receive up to 10 additional preference points based on the criteria below:
  – Up to 5 points will be awarded based on the ratio of proposed Cash and In-Kind contributions using the Match Scoring Table in the Scoring Criteria.
  – The remaining 5 points will be awarded to applications that exceed the minimum match requirements up to 100 percent using the Exceeds Minimum Match Scoring table.
Match Funding

Match funding contributors must submit match funding commitment letters that meet the requirements of Attachment 11. Failure to do so will disqualify the match funding commitment from consideration.

Refer to Section I.F.2 in the Solicitation Manual for more details on eligible match funding and Section IV.F., criteria 10 on how match will be scored.

**Group 2b** (Demonstration and deployment)

- Match funding in the amount of 20% of the grant amount requested is required.
- Applications that include more than the minimum match funding will receive additional points during the scoring phase.

**Groups 1, 2a, 3, and 4** (Applied research)

- No match required, but those with match will receive higher scores.
Disadvantaged & Low-income Communities

• Projects with all test or demonstration sites located in disadvantaged and/or low-income communities and justifies how the project will benefit these communities may receive additional points (Groups 1, 2a, 3, 4)

• A disadvantaged community is identified by census tract and represents the 25% highest scoring tracts in CalEnviroScreen 3.0 or later versions: https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30

• Low-income communities are defined as communities within census tracts with median household incomes at or below 80 percent of the statewide median income, or at or below the threshold designated as low-income by the California Department of Housing and Community Development. http://www.hcd.ca.gov/grants-funding/income-limits/index.shtml
GFO Submission Requirements (Electronic)

- Preferred method of Delivery is the Energy Commission Grant Solicitation System, available at: [https://gss.energy.ca.gov/](https://gss.energy.ca.gov/)
- Electronic files must be in Microsoft Office Word (.doc, .docx) and Excel (.xls, .xlsx) formats, unless originally provided in solicitation in another format.
- Attachments requiring signatures (Application Form and Support/Commitment Letters) may be scanned and submitted in PDF format.
- First-time users must register as a new user to access system.
- “How to Apply” video: [https://youtu.be/A1CDtvKI3UE](https://youtu.be/A1CDtvKI3UE)
GFO Submission
Requirements (Hard Copy)

• Submit Applications with all attachments in the order specified by the due date and time listed in Section III of the manual.
• Application documents should meet formatting requirements, page limits, and number of copies specified on page 22.
• Provide one hard copy and one electronic copy (CD-ROM or USB stick) containing electronic files of the application.
Next Steps After Grant Award

- **Notice of Proposed Award**: Shows total proposed funding amounts, rank order of applicants by project group, and the amount of each proposed award.
- **Agreement Development**: Proposal documents will be processed into a legal agreement.
- **Failure to Execute**: The Energy Commission reserves the right to cancel the pending award if an agreement cannot be successfully executed with an applicant. (See Section IV.B)
- **Project Start**: Recipients may begin work on the project only after the agreement is fully executed (approved at an Energy Commission business meeting and signed by the Recipient and the Energy Commission).
# Key Dates

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solicitation Release</td>
<td>October 24, 2019</td>
</tr>
<tr>
<td>Pre-Application Workshop</td>
<td>November 5th</td>
</tr>
<tr>
<td><strong>Deadline for Written Questions</strong></td>
<td><strong>November 6th at 5:00 pm</strong></td>
</tr>
<tr>
<td>Anticipated Distribution of Questions and Answers</td>
<td>Week of November 25th</td>
</tr>
<tr>
<td><strong>Deadline to Submit Applications</strong></td>
<td><strong>December 30th at 5:00 pm</strong></td>
</tr>
<tr>
<td>Anticipated Notice of Proposed Award Posting</td>
<td>February 17, 2020</td>
</tr>
<tr>
<td>Anticipated Energy Commission Business Meeting</td>
<td>May 2020</td>
</tr>
<tr>
<td>Anticipated Agreement Start Date</td>
<td>June 30, 2020</td>
</tr>
<tr>
<td>Anticipated Agreement End Date</td>
<td>June 30, 2024</td>
</tr>
</tbody>
</table>
Questions and Answers

• Please introduce yourself by stating your name and affiliation.
• Keep questions under 3 minutes to allow time for others.
• Note that our official response will be given in writing and posted on the GFO webpage in two weeks.
Additional Questions

Please send all questions related to GFO-19-301 to:

Crystal Presley-Willis
Commission Agreement Officer
1516 Ninth Street, MS-18
Sacramento, CA 95814
(916) 654-6110
(916) 654-4423 (fax)
Crystal.Presley-Willis@energy.ca.gov

Deadline to submit questions:
Wednesday, November 6th 5:00 PM