



GRANT REQUEST FORM (GRF)

A) New Agreement # EPC-19-030 (to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Amir Ehyai		916-327-3094

C) Recipient's Legal Name	Federal ID Number
Association for Energy Affordability, Inc.	13-3374285

D) Title of Project
Large Capacity CO2 Central Heat Pump Water Heating Technology Evaluation and Demonstration

E) Term and Amount

Start Date	End Date	Amount
6/17/2020	3/31/2024	\$ 2,800,193

F) Business Meeting Information

ARFVTP agreements \$75K and under delegated to Executive Director

Proposed Business Meeting Date 6/10/2020 Consent Discussion

Business Meeting Presenter: Karen Perrin Time Needed: 5 minutes

Please select one list serve. EPIC (Electric Program Investment Charge)

Agenda Item Subject and Description:

Association for Energy Affordability

ASSOCIATION FOR ENERGY AFFORDABILITY.

Proposed resolution approving Agreement EPC-19-030 with Association for Energy Affordability, Inc. for a \$2,800,193 grant to install and test the performance of low-global warming potential central heat pump water heating systems at five multifamily buildings located in disadvantaged or low-income communities, and adopting staff's determination that this action is exempt from CEQA. The project will develop design configurations for easier adoption; provide best practices to ensure continued performance; and educate the design community to promote confidence in this emerging technology. (EPIC funding) Contact: Karen Perrin.

G) California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?

Yes (skip to question 2)

No (complete the following (PRC 21065 and 14 CCR 15378)):

Explain why Agreement is not considered a "Project":

2. If Agreement is considered a "Project" under CEQA:

a) Agreement **IS** exempt.

Statutory Exemption. List PRC and/or CCR section number:

Categorical Exemption. List CCR section number: Cal. Code Regs., tit 14, §§ 15301, 15306

Common Sense Exemption. 14 CCR 15061 (b) (3)



GRANT REQUEST FORM (GRF)

Explain reason why Agreement is exempt under the above section:

This project involves the installation and testing of an innovative central heat pump water heating system in a total of 5 sites located in existing multifamily buildings. The systems will be integrated into the structures and may require the pouring of a concrete pad and slight modifications to the existing boiler rooms at the sites. The systems will take the place of existing hot water heaters and will result in negligible or no expansion of any existing or former uses at the sites.

This project is therefore categorically exempt from environmental review pursuant to CEQA Guidelines Section 15301 as minor alterations to existing facilities that involve no expansion of an existing or former use. This project is also categorically exempt pursuant to CEQA Guidelines Section 15306 as basic data collection, research, and resource evaluation activities that will not result in a serious or major disturbance to an environmental resource. Further, none of the exceptions to exemptions listed in CEQA Guidelines Section 15300.2 applies to this project.

b) Agreement **IS NOT** exempt. (consult with the legal office to determine next steps)

Check all that apply

- Initial Study
- Negative Declaration
- Mitigated Negative Declaration
- Environmental Impact Report
- Statement of Overriding Considerations

H) List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)

Legal Company Name:	Budget
Ecotope, Inc.	\$ 55,608
Electric Power Research Institute, Inc.	\$ 407,063
New Buildings Institute, Inc.	\$ 99,650
Mitsubishi	\$ 0
Bright Power, Inc.	\$ 0
TBD - Contractor (Site #1)	\$ 271,000
TBD - Contractor (Site #2)	\$ 271,000
TBD - Contractor (Site #3)	\$ 271,000
TBD - Contractor (Site #4)	\$ 271,000
TBD - Contractor (Site #5)	\$ 271,000
San Diego Gas & Electric	\$ 0
	\$

I) List all key partners: (attach additional sheets as necessary)

Legal Company Name:
Mitsubishi



GRANT REQUEST FORM (GRF)

J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	18-19	301.001F	\$2,800,193
			\$
			\$
			\$

R&D Program Area: EERO: Buildings

TOTAL: \$ 2,800,193

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Andrew Brooks
Address: 5900 Hollis St Ste R2

City, State, Zip: Emeryville, CA
94608-2098

Phone: 510-431-1791

E-Mail: abrooks@aea.us.org

2. Recipient's Project Manager

Name: Andrew Brooks
Address: 5900 Hollis St Ste R2

City, State, Zip: Emeryville, CA
94608-2098

Phone: 510-431-1791

E-Mail: abrooks@aea.us.org

L) Selection Process Used

- Competitive Solicitation Solicitation #: GFO-19-301
- First Come First Served Solicitation Solicitation #:

M) The following items should be attached to this GRF

- 1. Exhibit A, Scope of Work Attached
- 2. Exhibit B, Budget Detail Attached
- 3. CEC 105, Questionnaire for Identifying Conflicts Attached
- 4. Recipient Resolution N/A Attached
- 5. CEQA Documentation N/A Attached

Agreement Manager

Date

Office Manager

Date

Deputy Director

Date

EXHIBIT A Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2	X	Comprehensive System Evaluation
3		Develop Design, Operational, and Measurement and Verification Test Plans
4		Finalize Demonstration Project Site Selection and Recruitment
5	X	Demonstration Site Design Engineering
6		Evaluation, Measurement, and Verification
7		Product Enhancement and Design Guide Development
8		Evaluation of Project Benefits
9		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CBECC	California Building Energy Code Compliance
CO2	Carbon Dioxide
CPR	Critical Project Review
DAC	Disadvantaged Community
EM&V	Evaluation, Measurement, and Verification
GWP	Global Warming Potential
HPWH	Heat Pump Water Heater
M&V	Measurement and Verification
Recipient	Association for Energy Affordability, Inc.
T24	Title 24
TAC	Technical Advisory Committee
U.S.	United States

II. PURPOSE OF AGREEMENT, PROBLEM/SOLUTION STATEMENT, AND GOALS AND OBJECTIVES

A. Purpose of Agreement

The purpose of this Agreement is to demonstrate an innovative low global warming potential (GWP) central heat pump water heater (HPWH). This HPWH is highly configurable, offers grid integration flexibility, uses the most benign (carbon dioxide) refrigerant available, and has potential to address the needs of a large percentage of the California multifamily market. The demonstrations will occur in multifamily buildings located in disadvantaged communities (DACs)

¹ Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

EXHIBIT A

Scope of Work

or low-income communities. Information and data from these demonstrations will inform the development of design guidelines for these systems.

B. Problem/ Solution Statement

Problem

As California continues to reach towards a zero-emission building sector, there is a need for low emission systems in the multifamily market. Electrification has been an attractive solution for many applications, but central heat pump water heating has faced a unique set of barriers around market availability and design complexity that have hindered its widespread adoption.

While the market for low GWP HPWHs is growing, there is still a dearth of products currently available in the United States (U.S.) that are appropriate for use in central water heating applications in multifamily buildings. To date, there is only one low-GWP product readily available in the U.S. market, which was designed for single-family home applications and requires multiple units to meet the significantly larger load of a multifamily building. While these systems are efficient and highly functional, they are still quite complicated from an installation and operation standpoint and lack staging control options that make them an ideal solution for central system applications. Non-low GWP commercial sized heat pumps are available in the U.S. However, up until recently, there have been no alternatives that both utilize a low GWP refrigerant and are easily configured for multifamily applications.

Solution

New low GWP central HPWH systems, such as the Mitsubishi model QAHV-N560YA-HPB² are coming to the U.S. market. Though these systems are highly configurable, offer integration flexibility, and address the California multifamily market, they are complex from an engineering design perspective.

These systems fill an increasingly large hole in the water heating market, but they have not been demonstrated and the performance evaluated based on operating conditions in the California multifamily market. In addition, the availability of configurations may be difficult for the design community to navigate. In response to this, the project team will perform field demonstrations in at least five multifamily building applications, each with a different design, approach, and control strategy to determine performance, energy savings and cost effectiveness. The project team will develop a best practices design guide using extensive real-time performance data and compare operational efficiencies across the different design approaches used in each of the demonstrations. This will help the design community select the configurations that are most suitable to their particular applications and ease some of the deployment, education and market readiness barriers associated with emerging technologies. Furthermore, insights from the demonstration site deployments will be shared with the Mitsubishi engineering team and others to direct future central heat pump water heating development to better serve California's multifamily market. The data collected will also be used to inform the Title-24 (T24) modeling assumptions and algorithms in the California Building Energy Code Compliance (CBECC) engine.

² <https://www.mitsubishi-electric.co.nz/hotwater/c/9571/qahv-series-hot-water>

EXHIBIT A Scope of Work

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are:

- Demonstrate an innovative low global warming potential central heat pump water heater system that has potential to address the needs of a large percentage of the California multifamily buildings.
- Quantify the performance and economic characteristics of the central heat pump system in real-world field applications and that the system can achieve or exceed the performance metrics in Table 1.
- Use the real-time performance data, operational efficiencies across the different design approaches from the demonstrations to develop design guidelines for commercial low-GWP central HPWH that will serve to:
 - Educate the design community and bolster confidence in this emerging technology
 - Recommend configurations based on building characteristics for easier adoption
 - Provide best practices to ensure continued performance and energy savings throughout the product's lifetime
- Document increased adoption and acceptance of low GWP HPWHs as a result of the research project.

Table 1

Performance Metric	Baseline Performance ³ (Colmac CxA-30)	Target Performance (Mitsubishi QAHV or equivalent)	Evaluation Method (Field demonstration)
Heating COP	4.4	3.65	Field data logging of input over output energy over a variety of actual operating conditions
TRL		9 (currently 7-8)	
GWP	1430	1	
Cost		>10% reduction over baseline system	

³ From an applications, form factor, capacity and installation perspective the most comparable system that is commercially available is the Colmac CxA, while from a refrigerant standpoint it is the Sanden SanCO2. The Colmac CxA is shown as the baseline comparison because it is a more direct overall comparison.

EXHIBIT A

Scope of Work

Ratepayer Benefits:⁴

The Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs, and increased safety. The electrification of water heating in multifamily buildings represents a huge opportunity for grid harmonization through thermal load shifting. During off peak times, these systems can be programmed to heat and store water, even when there is little domestic hot water demand in the building. Off peak hot water charging not only reduces costs for the owner, but also provides increased electricity reliability by putting less strain on the grid at peak times.

Traditionally, central water heaters have relied on natural gas to heat water. If not fully combusted, natural gas produces harmful exhaust that can be detrimental to human health. Under the worst conditions, gas leaks from improper installation can pose an explosion risk to the building. Additionally, in the low-GWP refrigerant market, ammonia has become increasingly popular for both its efficiency and environmental benefits. This gas, like many of the traditional refrigerants, such as R-410 and R-22, is highly toxic and poses a health risk if the system is not properly operated and maintained. Carbon dioxide is much less toxic and significantly safer to handle. The low GWP central heat pump water heater system to be demonstrated will use carbon dioxide as its refrigerant.

Technological Advancement and Breakthroughs:⁵

The Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by demonstrating an innovative low global warming potential central heat pump water heater system that has potential to address the needs of a large percentage of the California multifamily buildings and by producing design guidelines to simplify the design process and help open the market for low-GWP HPWHs. This simplification is integral for these systems to be deployable at scale and will need to become much more plug-and-play than they are currently.

Field testing to support the development of the design guide will include some of the following:

- Different design approaches and applications (e.g., tanks in series versus parallel, with and without the use of a secondary heat exchanger, variable speed vs. single speed pumps, etc.)
- Different operation modes
- Different sensor control modes
- Different tank and piping configurations
- Use of equipment or specific controllers
- Load shifting capabilities

Agreement Objectives

The objective of this agreement is to accelerate the market for low-GWP HPWHs in central multifamily applications by demonstrating new and emerging CO₂ based products in a series of instrumented field trials in multifamily buildings located in DACs or low-income communities.

⁴ California Public Resources Code, Section 25711.5(a) requires projects funded by the Electric Program Investment Charge (EPIC) to result in ratepayer benefits. The California Public Utilities Commission, which established the EPIC in 2011, defines ratepayer benefits as greater reliability, lower costs, and increased safety (See CPUC "Phase 2" Decision 12-05-037 at page 19, May 24, 2012, http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF).

⁵ California Public Resources Code, Section 25711.5(a) also requires EPIC-funded projects to lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory and energy goals.

EXHIBIT A Scope of Work

These demonstration projects and the associated research will then be used to inform the development of a set of design guidelines that will help promote the widespread adoption of this technology in California.

III. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V)**. Products that require a draft version are indicated by marking “**(draft and final)**” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, “**days**” means working days.

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

- Submit the product to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

For all products

- Submit all data and documents required as products in accordance with the following Instructions for Submitting Electronic Files and Developing Software:
 - **Electronic File Format**
 - Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the Energy Commission’s software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick or CD-ROM.

The following describes the accepted formats for electronic data and documents provided to the Energy Commission as products under this Agreement, and establishes the software versions that will be required to review and approve all

EXHIBIT A

Scope of Work

software products:

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
- Text documents will be in MS Word file format, version 2007 or later.
- Documents intended for public distribution will be in PDF file format.
- The Recipient must also provide the native Microsoft file format.
- Project management documents will be in Microsoft Project file format, version 2007 or later.

○ **Software Application Development**

Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:

- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
- Microsoft Internet Information Services (IIS), (version 6 and up)

Recommend 7.5.

- Visual Studio.NET (version 2008 and up). Recommend 2010.
- C# Programming Language with Presentation (UI), Business Object and Data Layers.
- SQL (Structured Query Language).
- Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
- Microsoft SQL Reporting Services. Recommend 2008 R2.
- XML (external interfaces).

Any exceptions to the Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the Energy Commission's Information Technology Services Branch to determine whether the exceptions are allowable.

MEETINGS

Subtask 1.2 Kick-off Meeting

The goal of this subtask is to establish the lines of communication and procedures for implementing this Agreement.

The Recipient shall:

- Attend a "Kick-off" meeting with the CAM, the Commission Agreement Officer (CAO), and any other Energy Commission staff relevant to the Agreement. The Recipient will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The administrative portion of the meeting will include discussion of the following:

- Terms and conditions of the Agreement;
- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);
- Permit documentation (subtask 1.8);
- Subcontracts (subtask 1.9); and

EXHIBIT A

Scope of Work

- Any other relevant topics.

The technical portion of the meeting will include discussion of the following:

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
 - An updated Project Schedule;
 - Technical products (subtask 1.1);
 - Progress reports and invoices (subtask 1.5);
 - Final Report (subtask 1.6);
 - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
 - Any other relevant topics.
- Provide an *Updated Project Schedule*, *List of Match Funds*, and *List of Permits*, as needed to reflect any changes in the documents.

The CAM shall:

- Designate the date and location of the meeting.
- Send the Recipient a *Kick-off Meeting Agenda*.

Recipient Products:

- Updated Project Schedule (*if applicable*)
- Updated List of Match Funds (*if applicable*)
- Updated List of Permits (*if applicable*)

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

The goal of this subtask is to determine if the project should continue to receive Energy Commission funding, and if so whether any modifications must be made to the tasks, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the Energy Commission and the Recipient. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Recipient, and may include the CAO and any other individuals selected by the CAM to provide support to the Energy Commission.

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR meetings generally take place at the Energy Commission, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

EXHIBIT A

Scope of Work

The Recipient shall:

- Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Submit the CPR Report along with any other *Task Products* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 products along with the CPR Report).
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Recipient's input.
- Send the Recipient a *CPR Agenda* and a *List of Expected CPR Participants* in advance of the CPR meeting. If applicable, the agenda will include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Recipient with a *Schedule for Providing a Progress Determination* on continuation of the project.
- Determine whether to continue the project, and if so whether modifications are needed to the tasks, schedule, products, or budget for the remainder of the Agreement. If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Deputy Director of the Energy Research and Development Division.
- Provide the Recipient with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Recipient revise one or more products.

Recipient Products:

- CPR Report(s)
- Task Products (draft and/or final as specified in the task)

CAM Products:

- CPR Agenda
- List of Expected CPR Participants
- Schedule for Providing a Progress Determination
- Progress Determination

Subtask 1.4 Final Meeting

The goal of this subtask is to complete the closeout of this Agreement.

The Recipient shall:

- Meet with Energy Commission staff to present project findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.

EXHIBIT A

Scope of Work

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
 - Disposition of any state-owned equipment.
 - Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
 - The Energy Commission's request for specific "generated" data (not already provided in Agreement products).
 - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
 - "Surviving" Agreement provisions such as repayment provisions and confidential products.
 - Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary (*if applicable*)
- Schedule for Completing Agreement Closeout Activities
- All Draft and Final Written Products

EXHIBIT A

Scope of Work

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

The Recipient shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
 - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the “Payment of Funds” section of the terms and conditions, including a financial report on Match Fund and in-state expenditures.

Products:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. The CAM will review the Final Report, which will be due at least **two months** before the Agreement end date. When creating the Final Report Outline and the Final Report, the Recipient must use the Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Recipient shall:

- Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the CAM. (See Task 1.1 for requirements for draft and final products.)

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

- Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Style Manual, and Final Report Template provided by the CAM with the following considerations:

EXHIBIT A

Scope of Work

- Ensure that the report includes the following items, in the following order:
 - Cover page (**required**)
 - Credits page on the reverse side of cover with legal disclaimer (**required**)
 - Acknowledgements page (optional)
 - Preface (**required**)
 - Abstract, keywords, and citation page (**required**)
 - Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
 - Executive summary (**required**)
 - Body of the report (**required**)
 - References (if applicable)
 - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
 - Bibliography (if applicable)
 - Appendices (if applicable) (Create a separate volume if very large.)
 - Attachments (if applicable)
- Ensure that the document is written in the third person.
- Ensure that the Executive Summary is understandable to the lay public.
 - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
 - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
 - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.
- Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
- Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
- Include a brief description of the project results in the Abstract.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt
- Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product
- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

Products:

- Final Report (draft and final)
- Written Responses to Comments on the Draft Final Report

CAM Product:

- Written Comments on the Draft Final Report

EXHIBIT A Scope of Work

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Recipient may spend match funds for this task. The Recipient may only spend match funds during the Agreement term, either concurrently or prior to the use of Energy Commission funds. Match funds must be identified in writing, and the Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement. If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:

- A list of the match funds that identifies:
 - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
 - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
 - If different from the solicitation application, provide a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

- Match Funds Status Letter
- Supplemental Match Funds Notification Letter (*if applicable*)
- Match Funds Reduction Notification Letter (*if applicable*)
-

EXHIBIT A Scope of Work

Subtask 1.8 Permits

The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
 - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
 - The schedule the Recipient will follow in applying for and obtaining the permits.

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

- Permit Status Letter
- Updated List of Permits (*if applicable*)
- Updated Schedule for Acquiring Permits (*if applicable*)
- Copy of Each Approved Permit (*if applicable*)

Subtask 1.9 Subcontracts

The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Recipient shall:

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of the executed subcontract.

EXHIBIT A Scope of Work

- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Products:

- Subcontracts (*draft if required by the CAM*)

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
 - Technical area expertise;
 - Knowledge of market applications; or
 - Linkages between the agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.
- Review products and provide recommendations for needed product adjustments, refinements, or enhancements.
- Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.

The TAC may be composed of qualified professionals spanning the following types of disciplines:

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);
- Public interest market transformation implementers;
- Product developers relevant to the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;
- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

The Recipient shall:

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The list will be discussed at the Kick-off meeting, and a schedule for recruiting members and holding the first TAC meeting will be developed.
- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.

EXHIBIT A

Scope of Work

- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Products:

- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

Subtask 1.11 TAC Meetings

The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

The Recipient shall:

- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule. Changes to the schedule must be pre-approved in writing by the CAM.
- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

The TAC shall:

- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

Products:

- TAC Meeting Schedule (draft and final)
- TAC Meeting Agendas (draft and final)
- TAC Meeting Back-up Materials
- TAC Meeting Summaries

IV. TECHNICAL TASKS

TASK 2: COMPREHENSIVE SYSTEM EVALUATION

EXHIBIT A

Scope of Work

The goal of this task is to perform a comprehensive review of available Mitsubishi QAHV literature and partner with the manufacturer's engineering team to evaluate the configurability of the product. This includes potential design configurations, unique engineering requirements, control options, operational modes, and applications.

The Recipient shall:

- Review existing product literature to establish a baseline understanding of the product's offerings.
- Partner with Mitsubishi's engineering team to be familiarized with the QAHV's capabilities and configuration options.
- Meet with design teams that have installed the QAHV outside of the U.S. for lessons learned and obtain available design documents to assess for strengths and weaknesses.
- Summarize findings in a *Quality Assessment Summary of Product Literature* document to include, but not be limited to: a) results of product literature review, b) configuration options, c) lessons learned from previous installations, d) strengths and weaknesses based on design document review, and d) other information that can be used as a reference during the design of the demonstration site systems and development of the design guidelines.
- Develop an approximately 10-page *Quick Design Guide* and approximately two-page *Quick Guide* that highlights key high-level design considerations.
- Prepare *CPR Report #1* in accordance with Subtask 1.3 (CPR Meetings).
- Participate in a CPR Meeting

Products:

- Quality Assessment Summary of Product Literature
- Quick Design Guide (draft and final)
- Quick Guide (draft and final)
- CPR Report #1

TASK 3: DEVELOP DESIGN, OPERATIONAL, AND MEASUREMENT AND VERIFICATION TEST PLANS

The goals of this task are to select design configurations for evaluation and develop an operational test plan to compare performance across the different configurations. The selected configurations will be determined based on the results of Task 2 and the project team's knowledge of California's existing multifamily building stock for most common applications.

Subtask 3.1 System Design Selection

The goal of this subtask is to identify the three to five most promising design configurations to apply and test in at least five multifamily demonstration projects located in low income or disadvantaged communities.

The Recipient shall:

- Assess potential design options and select the most promising and applicable to the largest array of building stock in California.
- Develop a *Design Selection List* of the configurations to be tested at the demonstration sites and include a description of the targeted multifamily building stock.

EXHIBIT A

Scope of Work

Products:

- Design Selection List (draft and final)

Subtask 3.2 Operational Test Plan

The goal of this subtask is to develop a test plan of operational setups to compare across the selected design configurations.

The Recipient shall:

- Compare different operations setups, including operation modes, control sequences, and system sensor options.
- Create an *Operational Test Plan* that will detail the operations setups to be tested and compared across the selected design configurations of the targeted multifamily building stock.

Products:

- Operations Test Plan (draft and final)

Subtask 3.3 Measurement and Verification (M&V) Plan

The goal of this subtask is to establish a process for monitoring, measuring, and evaluating the system performance at each of the demonstration sites.

The Recipient shall:

- Develop *M&V Plans* for each of the demonstration sites that will detail the approach for instrumentation, pre- and post-data collection, data to be collected, duration period, data analyses, and statistical analyses. M&V Plans shall be prepared per the International Performance Measurement and Verification Protocol (or equivalent protocol) and shall capture at least nine (9) months of performance data (Summer, Winter, and Spring/Fall) under real-world operating conditions.

Products:

- M&V Plans (draft and final)

TASK 4: FINALIZE DEMONSTRATION PROJECT SITE SELECTION AND RECRUITMENT

The goal of this task is to finalize the selection of at least five demonstration sites and ensure that they can suitably accommodate the design configurations selected in Subtask 3.1.

EXHIBIT A

Scope of Work

Subtask 4.1 Confirm Final Availability and Feasibility of Pre-Selected Sites

The goal of this subtask is to determine if sites that were committed in the proposal stage are able to serve as demonstration sites and have characteristics that are aligned with the project team's intended design configurations.

The Recipient shall:

- Contact sites that were committed during the proposal stage to confirm both availability and high-level feasibility for the determined design configurations.
- Find suitable alternate sites in the case that the original sites are poor candidates for the selected design configurations or are no longer able to serve as a demonstration site.
- Obtain advance approval from the CAM for alternate site selections.
- Create a *Demonstration Site List* that lists the final selections for demonstration sites, including address and property description that made them good sites for the demonstration.
- Submit *Letter of Commitment* from demonstration site owners identified in the *Final Demonstration Site List*. Letters of commitment shall identify the demonstration site by address, confirm that the site is in a low income or disadvantaged community, and state the demonstration site owner's unconditional commitment to the project.

Products:

- Demonstration Site List (draft and final)
- Letter of Commitment

Subtask 4.2 Obtain and Analyze Site Utility Data

The goal of this subtask is to obtain baseline energy consumption data and establish a pre-retrofit baseline.

The Recipient shall:

- Collaborate with property management at each demonstration site to access utility (electric and natural gas) data and establish WegoWise⁶ accounts for increased data transparency.
- Provide *Benchmarking Results* to include an analysis of baseline utility data for each demonstration site, including both energy and cost, showing monthly consumption over a 12-month period.

Products:

- Benchmarking Results

TASK 5: DEMONSTRATION SITE DESIGN ENGINEERING

The goal of this task is to design the retrofit systems for the five or more demonstration sites using the design configurations and operation setups outlined in Task 3. The CAM may, in writing, approve a reduction in the number of demonstration sites.

Subtask 5.1 Review Existing Conditions at Demonstration Sites

The goal of this subtask is to familiarize the project team with the selected demonstration sites through plan review, evaluation of owner provided documentation of current equipment and

⁶ WegoWise is an online tool for tracking utility data, benchmarking energy and water use, prioritizing retrofits, and measurement and verification. <https://www.wegowise.com/>

EXHIBIT A

Scope of Work

electric infrastructure, and site visits.

The Recipient shall:

- Review building plans and owner documentation to understand the existing building characteristics, equipment, electrical infrastructure configuration, hot water operational parameters and set points, and tenant issues with current system.
- Visit site to confirm building details and install data monitoring equipment to measure existing hot water load.
- Perform feasibility assessments based on existing infrastructure, such as equipment locations, electrical capacity, and load assessments.
- Summarize findings from the site visits, data monitoring and feasibility assessments in an *Energy Audit Report* that discusses all the items in subtask 5.1
- Prepare *CPR Report* in accordance with Subtask 1.3 (CPR Meetings).
- Participate in a CPR Meeting

Products:

- Energy Audit Report
- CPR Report #2

Subtask 5.2 Systems Engineering and Design

The goal of this subtask is to design and engineer a set of building plans for each of the demonstration sites. These plans will include replicable and standardized designs that are transferable to a large volume of multifamily buildings that the demonstration sites were selected to represent.

The Recipient shall:

- Design, engineer, and prepare a set of mechanical, electrical and plumbing plans for each demonstration site.
- Develop *Building Specifications Report* that discusses in narrative form the installation requirements for each of the demonstration projects, highlights any non-standardized requirements, identifies any local building permit and utility requirements, and provides a schematic of each installation.

Products:

- Building Specifications Report

Subtask 5.3 Retrofit Delivery and Commissioning

The goal of this subtask is to oversee the installation of the low-GWP central HPWHs at each of the demonstration sites (at least five (5) total) and to provide building commissioning to optimize the performance of the HPWHs and reduce the performance risks associated with this emerging technology.

The Recipient shall:

- Review submittals and work with installation contractors to ensure that they understand all elements of the design.
- Perform pre-installation and mid-construction site visits to ensure quality control for each site.
- Install low GWP central HPWH units in each of the demonstration sites (at least five (5) total)

EXHIBIT A

Scope of Work

- Perform on-site post installation verifications for each site to ensure the as-built conditions match the design documents and to confirm installation quality.
- Conduct commissioning and quality control on each demonstration site
- Prepare *Commissioning Reports* for each site to discuss the commissioning plan, and that as built conditions match design documents and installation quality.

Products:

- Commissioning Reports

TASK 6: EVALUATION, MEASUREMENT, AND VERIFICATION

The goal of this task is to install M&V packages to monitor and verify retrofit system performance.

The Recipient shall:

- Install additional M&V equipment, if not included as part of HPWH installation (subtask 5.3).
- Collect at least nine (9) months of field data and analyze to quantify system performance based on the M&V plan (subtask 3.3). The CAM may, in writing, approve a reduction in the length of data collection.
- Identify unexpected performance and adjust system to improve overall efficiency.
- Prepare *EM&V Report* that will include but not be limited to: a) summary of data collection and analysis findings for each site, b) summary of any equipment adjustments made to improve system performance, c) discussion of whether the goals in Table 1, objectives, benefits and other advancements described in this agreement were met, d) input from tenants, and e) provide support on T24 modeling assumptions and algorithms in the CBECC engine.

Products:

- EM&V Report (draft and final)

TASK 7: PRODUCT ENHANCEMENT AND DESIGN GUIDE DEVELOPMENT

The goals of this task are to summarize the findings of this project in a design guide that will enable the design community and trades to deploy successful installations of low-GWP central HPWHs.

The Recipient shall:

- Share lessons learned and areas for improvement with Mitsubishi's engineering team and others to direct development of low-GWP central HPWHs towards options that will best serve California's multifamily housing market.
- Determine cost reduction strategies to enable commercial scaling.
- Publish a *Low Global Warming Potential Central Heat Pump Water Heater Design Guide* that details the recommended design configurations based on building characteristics, as well as best practice installation.
- Circulate the Low Global Warming Potential Central Heat Pump Water Heater Design Guide to industry stakeholders and make the guide publicly available.
- Identify areas for process improvements with recommendations to be published in an *Installation Guidance Manual*.

EXHIBIT A Scope of Work

Products:

- Low Global Warming Potential Central Heat Pump Water Heater Design Guide (draft and final)
- Installation Guidance Manual

TASK 8: EVALUATION OF PROJECT BENEFITS

The goal of this task is to report the benefits resulting from this project.

The Recipient shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
 - For Product Development Projects and Project Demonstrations:
 - Published documents, including date, title, and periodical name.
 - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
 - Greenhouse gas and criteria emissions reductions.
 - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
 - A discussion of project product downloads from websites, and publications in technical journals.
 - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
 - Additional Information for Product Development Projects:
 - Outcome of product development efforts, such copyrights and license agreements.
 - Units sold or projected to be sold in California and outside of California.
 - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.
 - Investment dollars/follow-on private funding as a result of Energy Commission funding.
 - Patent numbers and applications, along with dates and brief descriptions.
 - Additional Information for Product Demonstrations:
 - Outcome of demonstrations and status of technology.
 - Number of similar installations.
 - Jobs created/retained as a result of the Agreement.
 - For Information/Tools and Other Research Studies:

EXHIBIT A Scope of Work

- Outcome of project.
 - Published documents, including date, title, and periodical name.
 - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
 - The number of website downloads.
 - An estimate of how the project information has affected energy use and cost, or have resulted in other non-energy benefits.
 - An estimate of energy and non-energy benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.
 - A discussion of project product downloads from websites, and publications in technical journals.
 - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

The Energy Commission may send the Recipient similar questionnaires after the Agreement term ends. Responses to these questionnaires will be voluntary.

Products:

- Kick-off Meeting Benefits Questionnaire
- Mid-term Benefits Questionnaire
- Final Meeting Benefits Questionnaire

TASK 9: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to develop a plan and conduct activities to make the knowledge gained, experimental results, and lessons learned available and impactful to the public, the industry and key decision makers.

Subtask 9.1 Technology/Knowledge Transfer

The goal of this subtask is to develop key resources for technology transfer activities.

The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
 - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
 - A description of the intended use(s) for and users of the project results.
 - Published documents, including date, title, and periodical name.
 - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the

EXHIBIT A

Scope of Work

Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.

- A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
- The number of website downloads or public requests for project results.
- Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.
- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

Products:

- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- High Quality Digital Photographs
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

Subtask 9.2 Moving the Market

The goal of this subtask is to create and build on mandatory project requirements to further the adoption of HPWHs. This subtask includes marketing and outreach activities to help develop the central HPWH market.

The Recipient shall:

- Conduct outreach and engagement with manufacturers, product representatives, distributors, installers and facility managers and multifamily property owners to better understand the research knowledge of product barriers and solutions.
- Refine and expand a collaboration of west coast entities pursuing the advancement of HPWHs.
- Work with efficiency program administrators to establish the incentive structures necessary to increase uptake at various market adoption phases and penetration rates
- Create a *Supply-Side Strategic Plan for Accelerating Availability of HPWHs* that will discuss how the outreach and engagement described in the previous bullets will occur and the impact of the outreach (e.g., number of downloads on the design documents, number of entities contacted). (Stand-alone report and incorporated as sections of the Technology/Knowledge Transfer Plan in Task 9.1)
- Prepare *Workshop Agenda* and conduct workshops targeting the engineering and design communities, energy consultants, developers, program administrators, and other key

EXHIBIT A

Scope of Work

stakeholders at three California locations to demonstrate product features, availability, cost and operational savings, and benefits. (Stand-alone report and incorporated as sections of the Technology/Knowledge Transfer Report in Task 9.1)

- Market and publicize the technology and the project and the findings through *Articles and Presentations* and provide the CAM with copies of the articles and the publication name and dates.
- Promote the technology within utility programs and propose incentive structures.
- Develop a set of three-five *Central HPWH Case Studies*.
- Aggregate findings into a *Summary of the West Coast HPWH Collaborative* (Stand-alone report and incorporated as sections of the Technology/Knowledge Transfer Report in Task 9.1).

Products:

- Supply-Side Strategic Plan for Accelerating Availability of HPWHs
- Workshop Agenda (3)
- Articles and Presentations
- Central HPWH Case Studies (3-5)
- Summary of the West Coast HPWH Collaborative

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

To: Office of Planning and Research
 PO Box 3044
 1400 Tenth Street, Room 113
 Sacramento, CA 95812-3044

From: California Energy Commission
 1516 Ninth Street, MS-48
 Sacramento, CA 95814

Project Applicant: Association for Energy Affordability, Inc.

Project Title: Large Capacity CO2 Central Heat Pump Water Heating Technology Evaluation and Demonstration

Project Location:

<u>Address</u>	<u>City</u>	<u>County</u>
1401 J St	San Diego 92101	San Diego
515 13Th St	San Diego 92101	San Diego
6001 International Blvd	Oakland 94621	Alameda
720 E 11Th St	Oakland 94606	Alameda
174 Ellis St	San Francisco 94102	San Francisco

Description of Nature, Purpose and Beneficiaries of Project:

This technology demonstration project funds the replacement of existing hot water heating equipment at multifamily buildings with new low-global warming potential central heat pump water heaters. Project data and performance will be collected, and research results disseminated to encourage installation of central heat pump water heater technology in California.

Name of Public Agency Approving Project: California Energy Commission

Name of Person or Agency Carrying Out Project: Association for Energy Affordability, Inc.

Exempt Status: *(check one)*

- Ministerial Exemption (Pub. Resources Code § 21080(b)(1); Cal. Code Regs., tit 14, § 15268);
- Declared Emergency (Pub. Resources Code § 21080(b)(3); Cal. Code Regs., tit 14, § 15269(a));
- Emergency Project (Pub. Resources Code § 21080(b)(4); Cal. Code Regs., tit 14, § 15269(b)(c));
- Categorical Exemption. State type and section number
Cal. Code Regs., tit. 14, §§ 15301, 15306
- Statutory Exemptions. State code number.
- Common Sense Exemption. (Cal. Code Regs., tit 14, §15061(b)(3))

Reasons why project is exempt:

This project involves the installation and testing of an innovative central heat pump water heating system in a total of 5 sites located in existing multifamily buildings. The systems will be integrated into the structures and may require the pouring of a concrete pad and slight modifications to the existing boiler rooms at the sites. The systems will take the place of existing hot water heaters and will result in negligible or no expansion of any existing or former uses at the sites.

This project is therefore categorically exempt from environmental review pursuant to CEQA Guidelines Section 15301 as minor alterations to existing facilities that involve no expansion of an existing or former use. This project is also categorically exempt pursuant to CEQA Guidelines Section 15306 as basic data collection, research, and resource Authority cited: Sections 21083 and 21110, Public Resources Code. Reference: Sections 21108, 21152, and 21152.1, Public Resources Code.

Association for Energy Affordability

evaluation activities that will not result in a serious or major disturbance to an environmental resource. Further, none of the exceptions to exemptions listed in CEQA Guidelines Section 15300.2 applies to this project.

Responsible Agency

Contact Person: Amir Ehyai **Area code/Telephone/Ext:** 916-327-3094

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? Yes No

Signature: _____ **Date:** _____ **Title:** _____

Signed by Responsible Agency

Signed by Lead Agency

Signed by Applicant

Date received for filing at OPR: _____

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: ASSOCIATION FOR ENERGY AFFORDABILITY

RESOLVED, that the State Energy Resources Conservation and Development Commission (CEC) adopts the staff CEQA findings contained in the Agreement or Amendment Request Form (as applicable); and

RESOLVED, that the CEC approves Agreement EPC-19-030 with Association for Energy Affordability, Inc. for a \$2,800,193 grant to install and demonstrate the performance of low-global warming potential central heat pump water heating systems in multifamily buildings located in disadvantaged or low-income communities. The project will develop design configurations for easier adoption; provide best practices to ensure continued performance; and educate the design community on the potential of this emerging technology; and

FURTHER BE IT RESOLVED, that the Executive Director or his/her designee shall execute the same on behalf of the CEC.

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the CEC held on June 10, 2020.

AYE:

NAY:

ABSENT:

ABSTAIN:

Cody Goldthrite
Secretariat