



**GRANT REQUEST FORM (GRF)**

**A) New Agreement # EPC-19-035 (to be completed by CGL office)**

<b>B) Division</b>	<b>Agreement Manager:</b>	<b>MS-</b>	<b>Phone</b>
ERDD	Jackson Thach	51	916-327-1625

<b>C) Recipient's Legal Name</b>	<b>Federal ID Number</b>
Electric Power Research Institute, Inc.	23-7175375

<b>D) Title of Project</b>
Advancing Energy Efficiency in Manufactured Homes Through High Performance Envelope

**E) Term and Amount**

<b>Start Date</b>	<b>End Date</b>	<b>Amount</b>
6/30/2020	3/31/2024	\$ 1,999,982

**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 Jackson Thach Time Needed: 5 minutes

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

**Agenda Item Subject and Description:**

**Electric Power Research Institute, Inc.**

ELECTRIC POWER RESEARCH INSTITUTE, INC.. Proposed resolution approving agreement EPC-19-035 with Electric Power Research Institute, Inc. for a \$1,999,982 grant to integrate several advances in manufactured home design and construction to provide a model for how the industry can cost-effectively achieve the state's energy and fire safety goals, and adopting staff's determination that this project is exempt from CEQA. (EPIC funding) Contact: Jackson Thach.

**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, § 15332

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

Explain reason why Agreement is exempt under the above section: The project will build and test advanced manufactured home designs and construction in order to promote energy efficiency advances in the manufactured home industry. This project will build and install 3 mobile homes no more than 1,200 square feet



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each and temporarily collect data from them. The three single-family mobile homes will be divided up and placed in two different existing mobile home parks, and these projects sites are all of the following: (a) consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations; (b) within city limits on a site of no more than five acres substantially surrounded by urban uses; (c) on sites that have no value as habitat for endangered, rare or threatened species; (d) not going to result in any significant effects relating to traffic, noise, air quality, or water quality; and (e) adequately served by all required utilities and public services. Thus, they meet the requirements of 14 CCR 15332.

- 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
Systems Building Research Alliance	\$ 700,000
The Levy Partnership, Inc.	\$ 700,000
Mark Ezzo	\$ 25,000
	\$
	\$
	\$
	\$
	\$
	\$
	\$

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

Legal Company Name:



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## J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	18-19	301.001F	\$1,999,982
			\$
			\$
			\$
			\$
			\$

R&D Program Area: EERO: Buildings

TOTAL: \$ 1,999,982

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

## K) Recipient's Contact Information

### 1. Recipient's Administrator/Officer

Name: Cynthia Toth

Address: 942 Corridor Park Blvd

City, State, Zip: Knoxville, TN  
37932-3723

Phone: 865.218.8106

E-Mail: ctoth@epri.com

### 2. Recipient's Project Manager

Name: Martin Prado

Address: 3420 Hillview Ave

City, State, Zip: Palo Alto, CA  
94304-1355

Phone: 650-855-8628

E-Mail: mprado@epri.com

## L) Selection Process Used

Competitive Solicitation Solicitation #: GFO-19-307

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. Identifying Conflicts CEC 105, Questionnaire for  Attached
- 4. Recipient Resolution  N/A  Attached
- 5. CEQA Documentation  N/A  Attached

\_\_\_\_\_  
Agreement Manager

\_\_\_\_\_  
Date

\_\_\_\_\_  
Office Manager

\_\_\_\_\_  
Date



STATE OF CALIFORNIA

# GRANT REQUEST FORM (GRF)

CEC-270 (Revised 12/2019)

CALIFORNIA ENERGY COMMISSION

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**Deputy Director**

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**Date**

**Exhibit A  
Scope of Work  
Electric Power Research Institute**

**I. TASK ACRONYM/TERM LISTS**

**A. Task List**

<b>Task #</b>	<b>CPR<sup>1</sup></b>	<b>Task Name</b>
1		General Project Tasks
2	X	Technology Specification and Prototype Fabrication
3	X	Transport, Site Installation, Commissioning, and Unoccupied Performance Evaluation
4		Occupied Performance Evaluation
5		Evaluation of Market Potential, Cost Effectiveness and Technology Commercialization
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities
8		Production Readiness Plan

**B. Acronym/Term List**

<b>Acronym/Term</b>	<b>Meaning</b>
ACH50	Air Changes Per Hour at 50 Pascals
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
EDR	Energy Design Rating
HUD	U.S. Department of Housing and Urban Development
PV	Photovoltaics
TAC	Technical Advisory Committee
TRL	Technology Readiness Level

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

**A. Purpose of Agreement**

The purpose of this Agreement is to design, advance, and develop prototype TRL 3-5 envelope technologies for manufactured homes that meet Title 24 (2019) requirements and provide increased fire resilience, and to provide strategies to increase adoption of high efficiency manufactured homes.

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<sup>1</sup> 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 Electric Power Research Institute

## **B. Problem/ Solution Statement**

### **Problem**

Current manufactured housing in California is subjected to national U.S. Department of Housing and Urban Development (HUD) standards which are significantly less stringent than California Title 24 requirements, disproportionately increase the energy burden on low-income families who commonly own and occupy manufactured homes. Typical construction of manufactured homes built to HUD standards uses fiberglass batt insulation, reaching between R-11 and R-19 in the walls and between R-40 and R50 in the roofs with typical overall air leakage rates of 5 to 8 ACH50. When compared to Title 24 compliant stick frame construction that requires R-26 to R-29 for walls, R-49 for roofs and 1 to 2 ACH50, HUD construction falls short and increases energy consumption and costs while likely reducing occupant comfort.

Beyond the technical limitations, plant acceptance and product cost remain as key barriers to improving energy efficiency and fire resilience within manufactured homes. Unless mandated, plants see little value to add more costly, unfamiliar technologies into their manufacturing process, which will slow down production. The current products and fabrication methods are embedded in the manufacturing process and, unless the technology is clearly more cost-effective, plants will likely not pursue the technology further. Additionally, any added cost of manufactured homes may affect the ability of low income families to finance and purchase these homes.

### **Solution**

The project will develop prototype designs for all-electric manufactured home that meet Title 24 (2019) standards using a combination of low TRL envelope technologies integrated with high TRL mechanical systems such as heat pump water heaters and heat pump HVAC. In order to identify low TRL cost effective envelope solutions, the project will provide initial product and design review to find potential envelope technologies that can improve the overall envelope performance of manufactured homes while meeting 2-hour fire resistance ratings. To determine cost-effectiveness, feasibility of integration and to identify specific barriers to entry into the manufacturing process or market, the project will convene an industry subject matter expert technical advisory committee to vet potential technology options and identify technology packages with higher chances of success and scaled implementation.

A key objective of the project is to evaluate the field performance of the prototype designs using energy, temperature, moisture and indoor air quality monitoring. Data collection and analysis will determine if the prototypes maintain an EDR of 0 as designed and built. Experiential learning from the design, manufacturing and installation process will further inform on the barriers to commercialization of the proposed technologies and identify areas for process and manufacturing improvements to improve the technology's feasibility for scaled production and cost effectiveness.

## **C. Goals and Objectives of the Agreement**

### **Agreement Goals**

The goals of this Agreement are to:

- Evaluate multiple high efficiency envelope technologies with potential for integration into manufactured housing;

## Exhibit A Scope of Work Electric Power Research Institute

- Inform on and determine the envelope technology with the greatest feasibility and potential for successful commercialization, while meeting Title 24 (2019) prescriptive requirements;
- Design all-electric, prototype manufactured homes that meet or exceed Title 24 (2019) requirements;
- Analyze performance data to verify field performance of low TRL envelope technology;
- Compare installation of photovoltaics (PV) on-site and in the factory to determine the most cost-effective pathway to integration of PV on manufactured homes with minimal plant disruption;
- Improve access to efficient, affordable housing by reducing the energy burden on low-income manufactured housing communities, without increasing up-front costs;
- Achieve the performance metrics in Table 1.

Table 1 – Performance Metrics

Technology	Baseline	Research Goal
<b>Characteristics of pre-fabricated homes</b>	<ul style="list-style-type: none"> <li>● Dual fuel homes with Energy Design Rating (EDR) of 100 (this score meets the 2016 International Energy Conservation Code).</li> </ul>	<ul style="list-style-type: none"> <li>● All electric mobile homes designed to have an EDR of 0.</li> </ul>
<b>Performance</b>	<p>Energy use per square foot using HUD Manufactured Homes Construction Standards published in Code of Federal Regulations under 24 CFR Part 3280<sup>[1]</sup></p> <p><sup>[1]</sup> HUD – Manufactured Housing and Standards. <a href="https://www.ecfr.gov/cgi-bin/text-idx?SID=a2c5655a37054c584f7dd6a0ed240fb8&amp;node=pt24.5.3282&amp;rgn=div5">https://www.ecfr.gov/cgi-bin/text-idx?SID=a2c5655a37054c584f7dd6a0ed240fb8&amp;node=pt24.5.3282&amp;rgn=div5</a></p>	<p>Energy use per square foot using 2019 Building Energy Efficiency Standards for Residential Buildings – Title 24<sup>[1]</sup></p> <p><sup>[1]</sup> California Energy Commission - 2019 Building Energy Efficiency Standards for Residential and NonResidential Buildings. <a href="https://ww2.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf">https://ww2.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf</a></p>
<b>Fire Resiliency</b>	HUD Standards	Construction practices and techniques to result in a fire resistance rating of at least 2 hours for roofs and exteriors, tempered windows, and back-draft dampers

**Exhibit A**  
**Scope of Work**  
**Electric Power Research Institute**

<b>Envelope</b>	HUD Standards	Walls: R-26 to R-29 Roof: R-49 Air change: 1-2 ACH 50
<b>HVAC Energy Use</b>	HUD Standards	Proposed designs should meet annual electrical use per home when compared to a comparable home built to the 2019 California Code of Regulations Title 24 residential building energy efficiency standards. Energy savings will be based on both simulation and testing of full- scale prototype homes
<b>Cost</b>	Construction Cost \$300/ sq. ft.	Decrease both overall electric and natural gas energy use and decrease in construction cost: \$150-200/ sq. ft.

Ratepayer Benefits:<sup>2</sup> This Agreement will result in the ratepayer benefits of:

- Lower costs: The increased energy efficiency of the home due to improved envelope measures will significantly reduce heating and cooling costs. Integration of other high efficiency systems including the heat pump water heater, heat pump HVAC, and the PV array will further reduce energy bills for home owners. With the higher upfront cost but reduced energy bills, the project will calculate the projected return on investment of meeting Title 24 (2019) standards for manufactured housing.
- Increased safety: Improvements from the HUD fire safety standard to the 2-hour fire resilience standard will improve the overall fire resilience of the manufactured home while simultaneously providing extra energy efficiency and additional occupant comfort. Moving from mixed fuel to all-electric may also improve the indoor air quality of the homes reducing any health issues caused by combustion and/or gas leaks.

Technological Advancement and Breakthroughs:<sup>3</sup> This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California’s statutory energy goals by increasing the scalability of high-performance envelope technologies for manufactured homes to meet Title 24 (2019) requirements. Technical due diligence, engagement with major industry players, and other direct market engagement will identify potential low TRL envelope technologies that could meet or exceed Title 24

<sup>2</sup> 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](http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF)).

<sup>3</sup> 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 Electric Power Research Institute**

requirements, such as metal sandwich panels with foam insulation, spray foam, or high density mineral wool with foam sheathing. Engagement with the TAC will determine the technology with the largest potential for successful implementation and scale. Direct engagement with the plants will help identify manufacturing pain points caused by integration of new technology and will inform pathways to improve manufacturing efficiencies for the new technology.

Additionally, this project will present a technology package for manufactured homes to reach high efficiency, all-electric design with an EDR of 0. The primary focus of this project is to design, implement and evaluate the performance of low TRL envelope measures. However, to increase market potential and adoption, a full technology package to meet Title 24 will be created to address the barriers and considerations for other technologies, including heat pump water heating and HVAC and use of PV.

### **Agreement Objectives**

The objectives of this Agreement are to:

- Increase the TRL level of the evaluated envelope technology from 3-5 to 4-6. I;
- Design and prototype 3 manufactured homes that meet Title 24 (2019) requirements and stringent fire safety standards that exceed the HUD 2-hour fire resilience standard;
- Install 3 manufactured homes in the field for field evaluation and testing;
- Present a set of various envelope technologies with corresponding evaluations of cost-effectiveness, performance, factory feasibility and market acceptance;
- Present the most feasible all-electric energy efficiency technology package that incorporates high efficiency envelope measures with high efficiency electric appliances (e.g., heat pump water heaters and HVAC), as determined by the TAC;
- Perform data collection and analysis for an 18-month period to evaluate both unoccupied and occupied performance of the 3 manufactured homes;
- Determine the ROI for the manufactured homes based on energy savings and other benefits;
- Document and present lessons learned from factory fabrication and site installation of high efficiency mobile homes;
- Provide potential solutions to reduce costs and other barriers to scale;
- Produce a design guideline for integration of PV onto manufactured homes either in the factory or at the site.
- At the end of the project, ownership of the homes will be transferred to a non-profit low-income housing organization. Data monitoring and testing equipment will be removed for future project use.

**Exhibit A**  
**Scope of Work**  
**Electric Power Research Institute**

**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 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.

## **Exhibit A Scope of Work Electric Power Research Institute**

- 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 Electric Power Research Institute

- 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.

### **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.

**Exhibit A**  
**Scope of Work**  
**Electric Power Research Institute**

- 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.

- 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.

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- 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

**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

# Exhibit A

## Scope of Work

### Electric Power Research Institute

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:
  - 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.

## Exhibit A Scope of Work Electric Power Research Institute

- 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

## **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



## Exhibit A Scope of Work Electric Power Research Institute

(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*)

### 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.

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### **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.
- 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.

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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.
- 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.

**Exhibit A**  
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- 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 ensure 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

# Exhibit A

## Scope of Work

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#### III. TECHNICAL TASKS

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. **Subtask 1.1 (Products)** describes the procedure for submitting products to the CAM.

#### TASK 2: TECHNOLOGY SPECIFICATION AND PROTOTYPE FABRICATION

The goals of this task are to: (1) develop manufactured home designs that achieve the energy and fire safety goals discussed in the purpose, goals, and objective sections; and, (2) to manufacture three prototype homes incorporating these high-performance technologies.

##### The Recipient shall:

- Identify two to four advanced wall technologies and two to four roof technologies with a TRL of between 3 and 5 that have the potential to significantly increase manufactured home performance. The estimated energy use of the proposed design with the advanced components will be simulated and compared with the baseline, HUD standard fabrication.
- With industry participation through the TAC, thoroughly vet the wall and roof options applying a robust set of criteria. Select one or more technologies for further development, testing and evaluation. As required to refine the designs, fabricate subcomponent prototype of selected technologies.
- Identify and document other energy related building components that are required for Title 24 compliance. Components will include: envelope sealing, space conditioning and water heating equipment, distribution system and site power generation.
- Design the advanced envelope components that achieve high R-values and fire safety goals through the application of innovative technologies. The design-development effort will raise the TRLs of the technologies closer toward full commercialization.
- Develop a full set of home specifications incorporating all of the technologies culled through the design/analysis process described above. Designs and specifications will be created for both single and multi-section manufactured homes.
- Prepare a *Task 2 Design Summary* that includes, but is not limited to, the following:
  - Designs of advanced envelope components
  - Detailed technologies and fabrication protocols for achieving lowered building air tightness levels.
  - Design for factory/site installation of photovoltaic arrays on manufactured homes.
  - Solution for incorporating space conditioning and water heating heat pumps into homes during plant fabrication.
  - Design for incorporating ducts fully within the conditioned space of the home.
  - Report of findings documenting the component design and full compliance with Title 24 and achieving an EDR of 0.
  - Designs and specifications of prototype single and multi-section homes with the selected advanced technologies
- Create bid documents that home manufacturers will use as the basis for estimating the cost of building prototypes of the single and multi-section designs.
- Conduct a bidding process and select one to three plants to manufacture three (3) prototypes: two single section homes; and, one multi-section home. Summarize the bidding process in the *Bidding Summary Report*, which will include bid documents and manufacturer selection(s) to build prototype based on the designs and specifications.

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- Prepare a *Test Plan* for future Measurement and Verification of prototype home performance. The *Test Plan* will cover the following:
  - Document all costs for producing and installing the homes
  - Identify all measurement points and sensors to be used by model number
  - Identify data logging devices, frequency of data logging and method by which data is to be stored, transmitted and checked for errors on an ongoing basis
  - Placement of sensors within building cavities to be installed in the plant
  - Placement of sensors to be installed on site
  - Equipment to be used to simulate occupancy (sensible and latent gains) and operation schedule of occupancy simulation equipment
  - Set-up of the home, including foundation conditions and site orientation
  - Commissioning of the home equipment to confirm proper operation
  - Commissioning tests performing envelope leakage, duct leakage, airflow rates, one-time power measurements and duration
  - Configuration and operation of home equipment such as position of window coverings and doors; heating and cooling setpoints; fan speeds for space conditioning and ventilation
  - Frequency of site visits to check on the test homes and plan for addressing and curing any problems that may arise on site during the monitoring period.
  - Duration of the pre-unoccupied and post-occupied measurement and verification
- Oversee fabrication of the prototypes, documenting the manufacturing process and identifying methods for improving the design of the key energy and fire safety components. During fabrication, and as defined by the *Test Plan*, incorporate sensors and other devices into building cavities for later use in monitoring performance (e.g., heat flux, moisture flow, temperature, etc.).
- Prepare a *Task 2 Testing Report* reporting monitoring results, observations, findings and recommendations for changes in the designs and specifications to better achieve project goals.
- Prepare *CPR Report #1* and participate in a CRP Meeting per subtask 1.3.

### Products:

- Task 2 Design Summary (Draft and Final)
- Test Plan
- Bidding Summary Report
- Task 2 Testing Report (Draft and Final)
- CPR Report #1

### **TASK 3: TRANSPORT, SITE INSTALLATION, COMMISSIONING, AND UNOCCUPIED PERFORMANCE EVALUATION**

The goal of this task is to fully assess the efficacy of the project technologies through the monitoring of prototype homes.

#### **The Recipient shall:**

- Identify the three test sites to be located in electric IOU service territory.
- Arrange for the transport of the three prototypes from the manufacturing facility to test sites.
- Arrange for and oversee the proper installation of the units on appropriate sites.

## **Exhibit A Scope of Work Electric Power Research Institute**

- Verify the operation of building systems and monitoring devices for remote data collection.
- Following the Test Plan, monitor performance of the three homes for a period of no less than 12 months (full heating and cooling seasons). Collect and analyze data on an interim and full test period basis. Compile the results of the full year of assessment of performance in the *Task 3 Test Report*.
- Prepare *CPR Report #2* and participate in a CPR Meeting per subtask 1.3.

### **Products:**

- Task 3 Test Report (Draft and Final)
- CPR Report #2

### **TASK 4: OCCUPIED PERFORMANCE EVALUATION**

The goal of this task is to assess the impact of homeowner behavior and occupancy on the energy and thermal performance of the 3 mobile homes, and their ability to reach an EDR of 0.

#### **The Recipient shall:**

- Work with site management to identify and recruit potential customers for occupancy. Arrange for the occupancy of the 3 mobile homes onsite.
- Following the Test Plan, monitor performance of the 3 homes for a period of no less than 6 months, bridging heating and cooling seasons. Prepare a *Task 4 Test Report* that contains the results of the 6 months of assessment of performance.
- In collaboration with the test sites, create and distribute a data privacy statement and execute a customer data agreement to grant access to monitored data during the 6 months of occupancy. Agreements will be executed between site owner, Recipient, and the occupants.
- Collect and analyze data on an interim and full test period basis. Use cases for evaluation may include, but are not limited to:
  - Modeled energy performance compared against measured energy performance
  - Peak load attribution of all-electric Title 24 mobile homes
  - Impact of occupant behavior on energy consumption, indoor air quality and moisture
- Create and distribute pre-occupancy and post-occupancy surveys to the occupants to identify reception of and perception of high-performance all-electric mobile homes. Prepare a *Survey Report* that contains analysis and commentary on results from the occupant surveys, performance monitoring and all work completed in this task.

### **Products:**

- Task 4 Test Report (Draft and Final)
- Survey Report

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**TASK 5: EVALUATION OF MARKET POTENTIAL, COST EFFECTIVENESS AND TECHNOLOGY COMMERCIALIZATION**

The goal of this task is to assess the market penetration potential, cost effectiveness and path to commercialization of the technologies developed through this effort.

**The Recipient shall:**

- Assess the potential for market penetration for the full suite of technologies developed as part of this initiative, including an evaluation of the barriers and methods of overcoming market hurdles. Summarize findings into the *Market Adoption and Perception Report*.
- Interview and document the reactions to the project technologies by key stakeholders, including manufacturers, retailers and impacted suppliers into the *Survey of Key Industry Stakeholders*.
- Prepare a *Marketing Plan* with recommendations for how to move the project innovations forward, factors that would impact market uptake and other steps that can be taken to move the technologies toward broad commercialization.
- Make available the results to all mobile home manufacturers to guide marketing design and future commercialization of high-performance manufactured homes.
- Engage with TAC members the results of this task, and incorporate any feedback into the products.

**Products:**

- Market Adoption and Perception Report.
- Survey of Key Industry Stakeholders.
- Marketing Plan

**TASK 6: 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.



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- 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:
  - 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

**Exhibit A**  
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**TASK 7: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES**

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

**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 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)

**Exhibit A**  
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**TASK 8: Production Readiness Plan**

The goal of this task is to determine the steps that will lead to the manufacturing of technologies developed in this project or to the commercialization of the project's results.

**The Recipient shall:**

- Prepare a *Production Readiness Plan*. The degree of detail in the plan should be proportional to the complexity of producing or commercializing the proposed product, and to its state of development. As appropriate, the plan will discuss the following:
  - Critical production processes, equipment, facilities, personnel resources, and support systems needed to produce a commercially viable product.
  - Internal manufacturing facilities, supplier technologies, capacity constraints imposed by the design under consideration, design-critical elements, and the use of hazardous or non-recyclable materials. The product manufacturing effort may include "proof of production processes."
  - The estimated cost of production.
  - The expected investment threshold needed to launch the commercial product.
  - An implementation plan to ramp up to full production.
  - The outcome of product development efforts, such as copyrights and license agreements.
  - Patent numbers and applications, along with dates and brief descriptions.
  - Other areas as determined by the CAM.

**Products:**

- Production Readiness Plan (draft and final)

**IV. PROJECT SCHEDULE**

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: ELECTRIC POWER RESEARCH INSTITUTE INC. (EPRI).

**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-19-035 with EPRI for a \$1,999,982 grant to integrate and test several advances in manufactured home design and construction to provide a model for how the industry can cost effectively achieve the state's energy and fire safety goals. The advancements will be installed in new manufactured homes to be located in Northern California; 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:

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Cody Goldthrite  
Secretariat