

GRANT AMENDMENT REQUEST FORM (GARF)

CEC-277 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION



Original Agreement #	EPC-15-042		3
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ERDD	Brad Williams	51	916-327-3312
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California Homebuilding Foundation (CHF)	94-2581819
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<input type="checkbox"/> Term Extension	End Date: 3/31/2020	Include revised schedule and complete items A, B, C, & F below.
<input checked="" type="checkbox"/> Budget Augmentation	Amendment Amount: \$ 0	Include revised budget and complete items A, B, C, D & F below.
<input type="checkbox"/> Budget Reallocation		Include revised budget and complete items A, B, C, & F below.
<input checked="" type="checkbox"/> Scope of Work Revision		Include revised scope of work and complete items A, B, C, E & F below.
<input checked="" type="checkbox"/> Change in Project Location or Demonstration Site		Include revised scope of work and complete items A, B, C, E & F below.
<input type="checkbox"/> Novation/Name Change of Prime Contractor/Recipient		Include novation documentation and complete items A, B, C, & F below.
<input type="checkbox"/> Terms and Conditions Modification		Include applicable exhibits with bold/underline/strikeout and complete items A, B, C, & F below.

Business Meeting approval is not required for the following types of Agreements:

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

Proposed Business Meeting Date	6/13/2018	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Brad Williams	Time Needed:	5 minutes

Please select one list serve. Select

Agenda Item Subject and Description

CALIFORNIA HOMEBUILDING FOUNDATION. Proposed resolution adopting California Environmental Quality Act Findings for California Homebuilding Foundation's Zero Energy Residential Optimization - Community Achievement Project new demonstration sites at the Hillside and Highlands housing developments in the City of Clovis, and approving Amendment 3 to grant EPC-15-042 with California Homebuilding Foundation. (EPIC Funding). Contact: Brad Williams. (Staff presentation: 5 minutes)

- a. CALIFORNIA ENVIRONMENTAL QUALITY ACT FINDINGS. Findings that based on the lead agency City of Clovis' Final Environmental Impact Report and supplement thereto, Mitigated Negative Declaration, mitigation monitoring plan, and adoption of a statement of overriding considerations, the work under the proposed project's new demonstration sites at the Hillside and Highlands housing developments in the City of Clovis presents no new significant or substantially more severe environmental impacts beyond those already considered and mitigated and adopting a statement of overriding considerations.
- b. CALIFORNIA HOMEBUILDING FOUNDATION'S ZERO ENERGY RESIDENTIAL OPTIMIZATION – COMMUNITY ACHIEVEMENT PROJECT. Approving Amendment EPC-15-042-03 with California Homebuilding Foundation, as part of the original grant amount of \$4,819,805, to fund a community-scale demonstration of cost-effective Zero Net Energy construction for a subdivision of single-family homes in the City of Clovis. The project will identify, develop and demonstrate cost effective ZNE designs and will evaluate actual energy savings, costs, behavioral aspects, and indoor air quality in these homes.

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Legal Company Name:	Budget
ConSol	\$ 2,881,079
Opinion Dynamics Corporation	\$ 294,345
Desiree Webb	\$ 73,000
California Building Industry Association	\$ 65,000
To Be Determined	\$ 74,000
Energy Inspectors	\$ 75,000
McHugh Energy Consultants	\$ 85,000
Lawrence Berkeley National Laboratory	\$ 98,000
Gary Klein	\$ 85,000
Economic & Planning Systems	\$ 90,000
De Young Properties	\$ 664,608
Ferguson Enterprises	\$ 413,000
Duct Testers, Inc	\$ 90,000
TBD - Architect	\$ 82,000
Metro Study	\$ 50,000
Bulldog Event Group	\$ 18,812
Energy Solutions	\$ 222,929
UC Davis	\$ 175,000
Greenworks Consulting	\$ 75,000

Legal Company Name:

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
			\$
			\$
			\$
			\$
			\$
			\$
R&D Program Area:	EERO: Buildings		\$
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

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":
 Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because .

2. If Agreement is considered a "Project" under CEQA:
 a) Agreement **IS** exempt. (Attach draft NOE)
 Statutory Exemption. List PRC and/or CCR section number: _____
 Categorical Exemption. List CCR section number: _____
 Common Sense Exemption. 14 CCR 15061 (b) (3)
 Explain reason why Agreement is exempt under the above section:

b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)
 Check all that apply

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- Initial Study
- Negative Declaration
- Mitigated Negative Declaration

- Environmental Impact Report
- Statement of Overriding Considerations

The Energy Commission made CEQA findings pertaining to this project, including a Notice of Determination on the original demonstration site, when the project was originally adopted by the Commission on 5/17/2016. The proposed site change will move the demonstration to Clovis, CA from Chino and staff have determined that the new site will result in no impact beyond that already considered on 5/17/2016, and do not constitute a substantial change or new information of substantial importance under California Code of Regulations, title 14, section 15162.

1. Exhibit A, Scope of Work	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached
2. Exhibit B, Budget Detail	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached
3. CEQA Documentation	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached
4. Novation Documentation	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
5. CEC 105, Questionnaire for Identifying Conflicts		<input checked="" type="checkbox"/> 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		Conduct Market Assessment for Zero Net Energy New Home Construction
3		Analyze and Prioritize Above-Code Energy Savings Measures and Develop Cost-Effective Packages for Climate Zones
4	X	Support Construction of a Community of Zero Net Energy New Homes
5		Evaluate Behavioral Aspects of the Zero Net Energy Demonstration Homes
6		Assess Indoor Air Quality Effects of High Performance Envelope Measures (Air Sealing) and Various Mechanical Ventilation Strategies
7	X	Evaluate the Energy Implications of (and Control Strategies for) Plug Loads and Appliances in Zero Net Energy Homes
8		Compare Modeled to Actual Energy Use
9		Cost-benefit Analysis of All-Electric Zero Net Energy and Efficiency Measures Deployed in the Demonstration Homes
10		Develop Novel Financing Mechanisms and Overcome Policy Barriers to Using Distributed Generation
11		Independent Measurement and Verification of Project Savings and Performance
12		Evaluation of Project Benefits
13		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
BEES	Building Energy Efficiency Standards (Title 24, Part 6)
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CBECC	California Building Energy Code Compliance
CBIA	California Building Industry Association
CPR	Critical Project Review
CZ	Climate Zone
EDR	Energy Design Rating - The sum of the annual TDV energy consumption for energy use components included in the performance compliance approach for the Standard Design Energy Provisions of the California Green Building Standards Code Page 4 APPENDIX A4, RESIDENTIAL VOLUNTARY MEASURES Building (Energy Budget) and the annual TDV energy consumption for lighting and components not regulated by Title 24, Part 6 (such as domestic appliances and consumer electronics)

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

Acronym/Term	Meaning
	and accounting for the annual TDV energy offset by an on-site renewable energy system. The Design Rating is calculated by Compliance Software certified by the Energy Commission.
EPIC	Electric Program Investment Charge
ERV	Energy Recovery Ventilation
IAQ	Indoor Air Quality
M&V	Measurement and Verification
Mello Roos	District is an area where a special property tax on real estate, in addition to the normal property tax, is imposed on those real property owners within a Community Facilities District
Plug Loads	Products that are powered by means of an ordinary AC plug (e.g., 100, 115, or 230 V). This term generally excludes building energy that is attributed to major end uses (HVAC, lighting, water heating, etc.)
PV	Photo-Voltaic
TAC	Technical Advisory Committee
TDV	Time-Dependent Valuation
Title 24	California Code of Regulations, Title 24, also known as the California Building Standards Code which governs the construction of residential and non-residential buildings
Unregulated Loads	Plug Loads, appliances, etc.
USB 3.1	Short for Universal Serial Bus, is an industry standard developed in the mid-1990s that defines the cables, connectors and communications protocols used in a bus for connection, communication, and power supply between computers and electronic devices.
VE	Value Engineering
VNM	Virtual Net Metering
ZNE	Zero Net Energy

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

A. Purpose of Agreement

The purpose of this Agreement is to fund a community-scale demonstration of cost-effective Zero Net Energy (ZNE) construction for a subdivision of single-family homes. The project will serve as proof-of-concept and will provide important analysis and resources to the homebuilding industry to support the transition to ZNE single-family residential construction by 2020.

B. Problem/ Solution Statement

PROBLEM

California has set aggressive goals for all residential new construction to reach ZNE by 2020. Although the construction of a number of custom ZNE homes has established that this is a technically feasible goal, it is less clear whether ZNE construction can cost-effectively be brought to scale, especially within the context of the Building Energy Efficiency Standards (BEES) (Title 24). In order for the State to successfully adopt and implement ZNE residential new construction between now and 2020, there needs to be a significant increase in the efficiency of California new construction—without significant increases in cost. Additionally, the State will need improved

EXHIBIT A Scope of Work

methods for estimating and controlling the “unregulated loads”, which have grown and will continue to grow over the coming decades.

SOLUTION

For decades, California's Title 24 standards have created a framework within which builders have been provided the flexibility to find design, product, and equipment choices to meet the State's targets for building efficiency. And for decades, builders have found the most cost-effective means of meeting these targets. This agreement will harness that same market force by supporting the development of a ZNE community as a means to identify, develop, and demonstrate cost-effective ZNE new home designs, and providing evaluation of actual energy savings, costs, behavioral and indoor air quality (IAQ) concerns for those homes.

C. GOALS AND OBJECTIVES OF THE AGREEMENT

AGREEMENT GOALS

The goals of this Agreement are to:

- Help transition the California new home construction market to ZNE.
- Demonstrate and investigate the economic feasibility of ZNE for new construction.
- Evaluate interactions between occupants and technologies within ZNE homes.
- Monitor and develop better understanding of the role of occupant behavior, plug loads, and appliance efficiency of ZNE homes.
- Evaluate understanding, valuation, and integration of ZNE as a new home feature within consumer and real estate market-actor decision processes.
- Understand consumer energy costs and homebuilder construction costs related to various packages of efficiency features, fuel mixes, and utility rate structures.

Ratepayer Benefits:² This Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs, and increased safety to ratepayers who benefit from the Electric Program Investment Charge (EPIC) program. Increased grid reliability will be achieved through the development of 45 to 50 new homes with several efficiency measures being deployed to demonstrate substantial reductions to (and in some cases elimination of) peak demand. Deployment of envelope measures including wall and attic/roof deck insulation, installation of above code seasonal energy efficiency ratio and energy efficiency ratio ducted heat-pump air conditioners and substantially reducing attic temperatures through high performance attics will reduce the impact of new residential homes on the electric grid at peak periods in turn improves grid reliability.

Lower costs will be achieved by investigating the differences between the abstract, time-dependent valuation (TDV)-based definition of ZNE and actual consumer costs that would be incurred by residents of ZNE homes under various rate structures, which can help close the gap between policy-based TDV ZNE and real utility costs for consumers. Costs will be lowered by

² 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).

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implementing phased development, working through construction-site challenges, allowing for the identification of the most cost effective approaches to ZNE construction. The ZNE Community-Scale demonstration will increase investor owned utility ratepayer safety by measuring IAQ in homes with significant reductions in natural ventilation due to envelope infiltration to determine if the changes to envelope tightness create potentially unsafe conditions, and assessing the efficacy of balanced ventilation systems in providing adequate outdoor air.

Technological Advancement and Breakthroughs:³ This Agreement will fund a community-scale ZNE demonstration project, which will serve as proof-of-concept for large-scale deployment of ZNE single-family homes in California. The primary objective of the project is to overcome cost barriers by learning how to construct ZNE homes without creating undue cost burdens on California businesses or consumers, while also assuring that changes to home design do not pose health and safety or other risks to occupants. Additionally, the project will provide a clearer understanding of the assumptions and equations used in modeling site energy use, and renewable generation and their ability to predict when a home has achieved ZNE status.

AGREEMENT OBJECTIVES

The objectives of this Agreement are to:

- Implement and evaluate various design-based strategies to reduce building energy use to achieve ZNE.
- Install and monitor high-efficiency systems, appliances, and passive plug-load reduction strategies.
- Prioritize the relative benefit of specific efficiency measures toward achieving ZNE.
- Provide examples and proof-of-concept for ZNE residential construction.
- Provide guidance for California homebuilders interested in reaching zero energy ahead of, or in line with statutory requirements for (BEES) Title 24 standards.
- Refine the technical definition of ZNE by evaluating and suggesting improvements to modeling assumptions.

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.

³ 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.

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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.
 - 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**

EXHIBIT A Scope of Work

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
- 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.

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- 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.
- 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.

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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.
 - 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.

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- “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 end date. When creating the Final Report Outline and the Final Report, the Recipient must use the Style Manual provided by the CAM.

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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.

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- 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.,

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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.

- A copy of 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.

Products:

EXHIBIT A Scope of Work

- 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.
- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

Products:

EXHIBIT A Scope of Work

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

IV. 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: CONDUCT MARKET ASSESSMENT FOR ZERO NET ENERGY NEW HOME CONSTRUCTION

The goals of this task are to: (a.) Assess the level of awareness and interest from the home buying public with respect to ZNE construction. (b.) Understand the relationship between ZNE labeling for new homes and appraisal and sale price. (c.) Identify market barriers to integration of energy costs (or lack thereof) into the appraisal and sale price and/or mortgage underwriting process. (d.) Propose solutions to market asymmetries created by failure to include energy costs in ZNE home valuation. (e.) Identify the appropriate labeling and messaging to communicate value to home buyers, realtors, appraisers and underwriters while providing protection for consumers. (f.) Ascertain consumer attitudes towards all-electric homes, including variation in demographic preferences and acceptance for all-electric ZNE designs. **(g.) Evaluate local/regional real estate market trends and factors with respect to pricing and market absorption (sales pace) for the ZNE demonstration homes vs. otherwise comparable homes in the same region.**

The Recipient shall:

- Conduct market assessment on Zero Net Energy Homes in new construction
- Prepare and provide a *Zero Net Energy Market Report* that shall include but is not limited to:
 - Discussion of sampling plan for the homebuyer online survey.
 - Discussion of work with a homebuilder to create a relevant population of buyers interested in new homes including details on any incentives needed for buyers to participate in an online survey.
 - Results and analysis of homebuyer survey data to determine home buyers understanding of:
 - The concept of a ZNE home.
 - ZNE and ENERGY STAR homes labelling.
 - Ranking of a ZNE label compared to other home characteristics in consideration for purchases, irrespective of price (price, vintage, home features, updated kitchens, etc.).
 - Willingness to pay a premium for a ZNE home given expectation of no net energy cost increase.
 - Differences between all electric and dual-fuel homes, and their general preference.
 - Home buyers’ understanding and awareness of ZNE homes and related purchasing considerations.
 - Discussion of work to recruit real estate professionals including realtors, home appraisers, and home underwriters for participation in interviews, including a

EXHIBIT A Scope of Work

- sampling plan for in-depth interviews. Interviews will solicit participants for the following cross-disciplinary feedback:
- Realtors in different markets to establish market trends (coastal, inland and desert, as well as those in highly desirable urban centers vs. other markets).
 - Appraisers to establish how they would value energy efficient/ZNE homes in their appraisal prices.
 - Underwriters to assess whether they consider home carrying and maintenance costs in their qualification criteria for loan underwriting.
- Results and qualitative analysis of data from in-depth interviews with real estate professionals including realtors, home appraisers, and home underwriters to determine:
- Home buyers' understanding and awareness of ZNE homes.
 - Effectiveness of ZNE labeling in increased home marketing materials, appraisal and underwriting.
 - How the home buying population incorporates understanding of a ZNE home into their purchasing consideration.
 - Barriers to incorporating ZNE related costs into home purchase price.
 - Potential solutions to address market asymmetries in home price.
 - Identified barriers to integrating ZNE costs into home purchase price.
 - Potential solutions to address ZNE market challenges in home price.
- **Results and analysis of regional economics and housing market characteristics surrounding the ZNE community to determine:**
- **Demonstrated willingness to pay for ZNE as a home feature based on sales comparison "comp data" for similar new homes in the region.**
 - **Differences in market absorption rate for ZNE homes vs. conventional production homes.**
 - **Regional employment and other economic drivers effecting home prices and features.**
 - **Demographic/consumer profile for buyers most interested ZNE as a home feature, and associated marketing strategies to target that market segment and/or make ZNE more appealing to a broad audience.**
 - **What products and features ZNE homes should include in order to appeal to buyers and increase sales absorption rates.**
- **Discussion of data sources and analytical methods used to describe the regional housing market and draw conclusions about price, absorption rate and other market characteristics.**

Products:

- Zero Net Energy Market Report (draft and final)

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TASK 3: ANALYZE AND PRIORITIZE ABOVE-CODE ENERGY SAVINGS MEASURES AND DEVELOP COST-EFFECTIVE PACKAGES FOR CLIMATE ZONES

The goals of this task are to: (a.) Use energy modeling to assess the relative impact of various energy saving measures in those Climate Zones (CZs) with significant (10% or greater) new home construction activity. (b.) Analyze the ratio of cost to TDV energy savings for each measure. (c.) Prioritize measures by “bang-for-the-buck” of TDV energy savings to identify and rank the most promising measures to exceed BEES and achieve ZNE. (d.) Provide builders with a measure cost database to aid in development of ZNE performance packages. (e.) Review, refine, and prioritize the energy efficiency measures to include in the ZNE demonstration homes. (f.) Identify the optimal level of energy efficiency that can be cost-effectively achieved by building type and CZ. (g.) Assess the limitations for homes with relatively small roof areas (e.g. 3-story homes in moderate-to-extreme climates) in achieving ZNE using rooftop photo-voltaic (PV), and identify additional and/or enhanced efficiency measures to reduce building loads to enable such homes to achieve ZNE.

The Recipient shall:

- Conduct research and analysis on the most cost-effective ZNE measures including by modeling homes in Energy Software
- Provide a *Zero Net Energy Analysis and Prioritization Report* including but not limited to:
 - Discussion and results from updates to the cost database of efficiency measures, including but not limited to:
 - Results of interviews with distributors, manufacturers, builder purchasing agents, and other contacts in the construction industry to update builder costs for various measures.
 - Evaluation of variation in labor cost inputs related to different performance levels (e.g. extra labor for handling of heavier triple-pane windows).
 - Identification of current price points for various efficiency levels for each product and system type (i.e. U=0.30, SHGC=0.25 versus U=0.28, SHGC=0.25 windows, and so on).
 - Results of builder cost estimates for design-based measures such as ducts in conditioned space.
 - Results from updates of the appliance efficiency database to add appliance costs and relative efficiencies to subcontractor’s building-measure cost database.
 - Finalized dataset of 2016 builder cost for energy efficiency measures in Excel format.
 - Documentation of the development of a prototypical home model, using current California Building Energy Code Compliance (CBECC) software, to represent one, two, and three-story single-family production homes representative of current construction practices.
 - Results of CBECC software modeling of individual energy measures in each building type for every California CZ to determine impact significance.
 - Discussion identifying climate specific measures necessary to achieve ZNE buildings in each CZ including but not limited to:
 - Measures required to reduce energy use from regulated Title 24 loads (HVAC, water heating).
 - Measures required to reduce energy use from “unregulated” Title 24 loads (lighting, appliances, plug loads, and miscellaneous energy loads) including installing high-efficiency appliances at the time of

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- construction, plug load controls strategies, and passive strategies such as USB 3.1.
- Discussion and results detailing the cost-benefit ratios of TDV savings-per-dollar spent for each efficiency measure in each building type in each CZ. Results shall include but are not limited to:
 - Prioritization and rank of each energy efficiency measure by “bang-for-the-buck” of TDV energy savings.
 - Ranking of energy efficiency measures by ratio of TDV savings per dollar cost (Excel) by building type in each CZ.
 - Selection of measures from the prioritized list to develop cost-effective packages of efficiency measures for ZNE homes in each CZ and of each construction type.
 - Integration of appliance loads (and savings from high efficiency appliances) into overall TDV model to develop new energy design rating (EDR) targets for the appliance and building feature packages.
 - Integration of improved plug load model developed by subcontractor into the overall TDV model to develop new EDR totals for each building type in each CZ.
 - Identification of cost-effective combinations of building features and high-efficiency appliances to reduce building loads.
 - Identification of cost-effective strategies for integrated packages of building features and high-efficiency appliances for ZNE New Homes.
 - Discussion and results of using 2016 Title 24-compliant homes as a baseline to develop PV sizing requirements to achieve ZNE in the one, two, and three-story prototypes in all CZs. Results should include but are not limited to:
 - Overlays of available roof areas for each prototype to determine PV sizing threshold limitations for homes in each California CZ.
 - Identification of packages of efficiency measures needed to reduce the PV system size to within the threshold required to reach ZNE in each single-family housing prototype.
 - Summary of measures and energy models for cost-effective packages of efficiency measures in each California CZ.
 - Size PV systems for the new EDR’s TDV values developed with new appliance and plug load assumptions.
 - Report on PV thresholds for ZNE in one, two, and three-story homes in all California CZs.
 - Report on EDR and PV sizing variation for ZNE using new plug load and appliance models.

Products:

- Zero Net Energy Analysis and Prioritization Report (draft and final)

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TASK 4: SUPPORT CONSTRUCTION OF A COMMUNITY OF ZERO NET ENERGY NEW HOMES

The goals of this task are to: (a.) Oversee and support the construction of each phase of a large subdivision to ensure that each home is built and documented to meet or exceed the Energy Commission's definition of Zero Net Energy as stated in the 2013 Integrated Energy Policy Report. (b.) Work with the homebuilder to identify and overcome challenges to construction due to technical or practical issues related to the ZNE home features. (c.) Work with the builder to identify successful measures and to propose alternative measures in future phases for problematic or underperforming measures (as indicated from monitoring data and/or homeowner surveys as described in task 5). Construction lessons learned in each phase will be applied to subsequent phases in an effort to provide the best-case construction scenario for ZNE homes. **(d.) Develop best practices for designing ZNE homes that will be incorporated into the ZNE construction reports from this task.**

The Recipient shall:

- Conduct construction of ZNE homes and identification of best-case ZNE features including but not limited to:
 - Construction of ZNE Homes (first phase, **at least 15 8-10** homes)
 - Construction of subsequent phases (**A total of 3-5** Additional phases for a total of **50 up to 112** homes)
- Provide a *ZNE Construction: Part I Report* including but not limited to:
 - Summary of cost-effective options presented to builder for constructing ZNE homes at the demonstration site using packages of measures identified in the project narrative and refined through climate-specific modeling conducted in Task 3.
 - Presentation of Cost-effective Options (packages) for each floorplan in the ZNE subdivision
 - Summary of Interview Responses from Builder Team
 - Summary detailing the use of energy efficiency measures to reduce regulated loads to roughly 40% better than Title 24 2016 Building Energy Efficiency Code.
 - Summary detailing the integration of high efficiency appliances, plug loads, and plug load controls to further reduce loads by another 10+ percent relative to Title 24 2016 Building Energy Efficiency Code.
 - Summary of discussions and resolution with the California Energy Commission, Efficiency Division evaluating the appropriateness of sizing the PV systems based on the default Energy Design Rating (EDR) from CBECC versus using refined assumptions for appliance, lighting and plug loads.
 - If deemed appropriate, develop project-specific TDV energy targets and EDRs to size PV systems for each home in the subdivision.
 - Summary detailing PV Sizing to meet ZNE, including any alternatives to or variation from the CBECC EDR
- Provide a *ZNE Construction: Part II Report* including but not limited to:
 - Summary of **architectural design**, engineering and technical support provided to the homebuilder to **revise designs and/or** integrate the ZNE package of measures into the construction planning and implementation process.
 - Results of **Value architectural and engineering** **m**meetings with the homebuilder, **consultants** and trade subcontractors to coordinate changes **to scheduling** and

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other impacts to the construction process due to the ZNE building features **and/or design changes**.

- Notes from ~~value~~ **architectural and** engineering meetings
- Summary of oversight on the implementation of the ZNE features for the first phase (~~8-10~~ **at least 15** homes) of the ZNE subdivisions.
- Results from the identification and development of solutions to unanticipated construction challenges posed by the integration of efficiency features to reach ZNE.
 - Document ZNE constructions challenges including a complete list of process improvements and alternative measures (for each phase)
- Summary of work with the **architect and** homebuilder to make iterative changes to the home designs for the second phase including but not limited to:
 - Assisting the homebuilder to redesign pipe layout into compact format.
 - Assisting the homebuilder to develop compact layout for heating and air conditioning ducts.
 - Introducing alternative ventilation strategies ~~to replace the ERV~~
- Summary detailing continuation work to make iterative improvements to the design and equipment choices for the **demonstration** homes ~~constructed in each phase as well as the builder's next generation of ZNE homes~~ in order to reduce cost and optimize efficiency.
 - After each phase interview construction supers and subcontractors to identify challenges and process improvements.
 - Before each phase, host value engineering meetings to implement the feedback from construction supers and subcontractors, as well as planning for the integration of additional measures.
 - Include meeting notes and interviews
- Summary of work to deploy and test various control and optimization strategies for the Hybrid Electric Heat Pump Water heater **within the context and constraints of a production homebuilding environment. If it is determined a control and optimization strategy is not feasible, a summary of the barriers and potential solutions to address these barriers will be provided. Strategies may include,** but **are** not limited to, **the following**:
 - Controls to prohibit electric-resistance operation during summer peak hours (only heat-pump mode)
 - Location in outdoor cabinet and/or ducted supply air
 - Venting of cool exhaust air into unvented attic (during cooling months)
 - Using electric-resistance to store thermal energy during periods of excess PV production
- Prepare *CPR Report #1* per Subtask 1.3.
- Participate in the CPR Meeting as described in Subtask 1.3.

Products:

- ZNE Construction: Part I Report (Draft and Final)
- ZNE Construction: Part II Report (Draft and Final)
- CPR Report #1

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TASK 5: HOMEOWNER BEHAVIORAL EVALUATION OF THE ZERO NET ENERGY DEMONSTRATION HOMES

The goals of this task are to: (a.) Solicit and record feedback from residents of the homes related to their interactions with the products and systems in the ZNE home. (b.) Observe resident interactions with energy using systems within the home. (c.) Evaluate the effect of information ~~and messaging~~ provided in real-time through the ~~smart thermostat~~ home energy management system. (d.) Assess the relative importance of behavior as it relates to total home energy consumption and the ability to achieve actual ZNE performance on an annual basis.

The Recipient shall:

- Conduct Homeowner interviews and analysis of interview data
- Provide *Zero Net Energy Behavioral Evaluation Report* including but not limited to:
 - Summary of observations of customer interactions with the ZNE features of their home.
 - Results from the solicitation of customers for feedback on customer interaction with all ZNE features.
 - Results from the assessment on whether customers engaged in energy saving actions ~~following the receipt of a message through the thermostat as a result of information provided by the home energy management system.~~
 - Summary of how messages received during the home purchase process influenced post purchase energy related behavior.
 - Summary detailing customer reference to the web portal and how that influenced their energy saving behavior.
 - Summary detailing the impact of customer expectations of zero to low net energy costs and whether it led customers to increase energy consumption.
- Conduct report updates from draft to final version, incorporating lessons-learned between draft and final versions of the report

Products:

- Zero Net Energy Behavioral Evaluation Report (draft and final)

TASK 6: ASSESS INDOOR AIR QUALITY EFFECTS OF HIGH PERFORMANCE ENVELOPE MEASURES (AIR SEALING) AND VARIOUS MECHANICAL VENTILATION STRATEGIES

The overarching goal of this task is to ensure that IAQ is not adversely impacted by increasing envelope air tightness for ZNE construction. The task has the following specific objectives:

(a.) Develop recommendations for system and component specification and requirements to ensure comparable or improved IAQ relative to homes constructed under current BEES (Title 24). (b.) Evaluate the performance of one or more ventilation strategies (such as filtration of supply air) with respect to reducing the level of outdoor contaminants brought into the home. (c.) Identify IAQ issues that could result from the airtightness measures and mechanical ventilation systems selected for the ZNE community homes. (d.) Conduct measurements and analysis to assess IAQ performance of the ZNE homes. (e.) Identify opportunities for measures to improve IAQ at neutral or lower TDV energy consumption. (f.) Quantify the costs of identified IAQ measures. (g.) Understand thermal performance and potential for moisture-related risks for air-permeable insulation systems in unvented attics.

The Recipient shall:

- Conduct indoor air quality testing and analysis
- Provide *Indoor Air Quality Technical Assessment Report* including but not limited to:

EXHIBIT A Scope of Work

- Results of technical assessment of potential IAQ issues and improvement opportunities related to envelope airtightness, thermal conditioning, and mechanical ventilation at the design stage of the project.
- Results from the identification of any potential issues that need to be addressed prior to construction and prioritize the potential issues and opportunities to be evaluated and addressed post construction.
- Provide a *IAQ Measurement and Analysis Report* including but not limited to:
 - Measurement and analysis plan used to evaluate the highest priority potential IAQ issues and opportunities; the plan may include simulations, measurements in appropriately relevant existing homes, and/or measurements in the ZNE homes pre- or post-occupancy.
 - Results of measurements and analysis according to the measurement and analysis plan including the development of technical bulletins and presentations that are accessible to builders and other Title 24 stakeholders.
 - Summary of recommendations for additional IAQ protections and energy saving or energy neutral IAQ improvement opportunities.
 - Summary of the estimated cost of recommended IAQ protection measures.
 - Recommendations for IAQ protection measures (with estimated costs) to be incorporated into future Title 24 revisions for ZNE homes.
 - Results of the monitor of temperature and relative humidity in a minimum of 10 unvented attics insulated with air-permeable below-deck insulation (boxed netting).
 - Presentation for reporting results of technical assessment of potential IAQ issues.
 - Summary of technical bulletins and presentations for reporting on assessments of potential IAQ issues.
 - Documentation of a measurement and analysis plan for temperature and humidity in unvented attics.
 - Results and analysis of dataset from monitoring unvented attic temperature and moisture for 12 consecutive months.
 - Discussion on Thermal Performance and Moisture in Unvented Attics in CA CZ 130.

Products:

- Indoor Air Quality Technical Assessment Report (draft and final)
- IAQ Measurement and Analysis Report (draft and final)

TASK 7: EVALUATE THE ENERGY IMPLICATIONS OF (AND CONTROL STRATEGIES FOR) PLUG LOADS AND APPLIANCES IN ZERO NET ENERGY HOMES

The goals of this task are to: (a.) Characterize the appliances and plug loads in use in the demonstration homes. (b.) Measure and characterize energy use from unregulated Title 24 loads, including plug loads and appliances, in the demonstration homes. (c.) Evaluate the accuracy of the 2016 Title 24 compliance software in predicting energy use from unregulated loads and identify areas to improve accuracy. (d.) Evaluate behavioral aspects of appliance and plug load energy use. (e.) Evaluate success of strategies to reduce energy use from unregulated loads identified in Task 3. (f.) Identify the most promising technologies and systems for management of plug loads in new homes. **(g.) Provide ZNE homebuyer with the opportunity to receive and use highly efficient appliances in addition to the permanently installed features of the new homes.**

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The Recipient shall:

- Conduct plug load testing and analysis
- Provide an *Energy Use of Unregulated Loads Report* including but not limited to:
 - Summary of measured energy use from plug loads and appliances in demonstration homes (as measured in Task 8), including discussion on relationship between energy use and observable building characteristics (e.g., number of bedrooms, conditioned floor area).
 - Documented load profiles from devices or categories of devices in demonstration homes.
 - Discussion of if/how occupant behavior impacts energy use from unregulated loads.
 - Discussion of effectiveness of strategies to reduce energy use from unregulated loads.
 - Results from analysis of the accuracy of the 2016 Title 24 compliance software models in predicting energy use from unregulated loads
 - Results from survey to identify and characterize appliances and plug loads in use in the demonstration homes. The survey will identify, at a minimum: device type, device quantity, energy use, device age, and device efficiency and operating period.
 - **Results from monitoring of the performance of conventional appliances vs. the efficient appliances installed in the ZNE homes through the voucher program.**
- **Provide buyers of the ZNE homes with optional vouchers for more energy efficient appliances. For homeowners who accept and apply the vouchers for the equipment:**
 - **Work with appliance subcontractor to verify each voucher and schedule delivery/installation with each homebuyer.**
 - **Require homeowners to sign an agreement that they will use the new appliances for at least 12 months in place of any existing appliances they may already own.**
 - **Monitor and report on the performance of the more efficient appliances vs. conventional and Energy Star appliances installed in the control homes.**
- Prepare *CPR Report #2* per Subtask 1.3.
- Participate in the CPR Meeting as described in Subtask 1.3.

Products:

- Energy Use of Unregulated Loads Report
- CPR Report #2

TASK 8: COMPARE MODELED ENERGY USE TO ACTUAL ENERGY USE

The goals of this task are to: (a.) Use of at least ~~12 months~~**3 quarters** of disaggregated energy use data to develop hourly load profiles for each energy end-use and system within the ZNE home. (b.) Compare ~~hourly and monthly annual~~ TDV energy for each end-use to the modeled ~~hourly and monthly annual~~ TDV from CBECC. (c.) Assess the source of variations between actual and modeled energy use, and whether the variations warrant changes in the algorithms or assumptions for the software.

The Recipient shall:

- Conduct the comparative analysis of modeled energy data to actual energy use data.
- Provide a *Zero Net Energy Comparison: Actual vs Modeled Report* including but not limited to:

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- Discussion of work ~~with the PV system provider~~ to install supplemental circuit-level energy monitors on each newly constructed home (in addition to the whole-home energy monitoring typically installed).
- Discussion of work with Subcontractor to map home circuitry to the panel and the monitoring equipment.
- Results from the monitoring and recording of at least ~~42 months~~ **3 quarters** of ~~minute-by~~ **15-minute** load data on each home circuit.
- **Detailed instructions including a step-by-step guide on the methodology and assumptions used to analyze the 15-minute load data on each home circuit with the intent to provide the Energy Commission with sufficient information to analyze data collected after the close of the agreement.**
- **Results and analysis of quarterly energy use monitoring data from occupied homes conducted a minimum of three times as determined by the CAM (e.g., at the end of the 2nd, 3rd, and 4th quarter 2019)**
- **Results of normalization data to reflect actual weather during each of three or more quarterly monitoring periods.**
- Results from the creation of hourly load curves for each energy end-use (e.g., electricity and natural gas) in the home, including the regulated loads from the hybrid heat-pump water heater, ~~ERV and other~~ ventilation fans, and the heating, cooling and fan energy from the ducted heat pump system and currently “unregulated loads”. **Monitoring will occur within the granularity achievable through the configuration of the home’s circuitry and monitoring equipment such as of:**
 - Plug-in lighting
 - Refrigerator
 - Dishwasher
 - Range
 - Oven
 - Hood fan
 - Hardwired lighting by room
 - Washer
 - Dryer
 - Outlets by room/group of rooms
- Discussion with Energy Commission Efficiency Division software team and Energy Commission contract software engineers to generate reports of hourly loads from CBECC software **and discussion of subcontractor’s energy modeling and work to disaggregate loads for each energy end use calculated by the model, for use in comparison to monitored loads.**
- Results from the overlay of the load profiles from the monitored homes with the load curves estimated by ~~the 2016~~ Title 24 compliance software.
- Discussion and evaluation of the accuracy of ~~2016~~ Title 24 compliance software’s estimated energy use from unregulated loads by comparing modeled energy use to measured energy use in the monitored homes.
- Discussion of the comparison of monitored hourly appliance and plug load data to plug and appliance models recently developed by subcontractor, for integration into CBECC software.
 - Use monitored data as a means to validate and/or calibrate the plug-load and appliance models.

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- Discussion and identification of work to reconcile any significant differences in predicted end-uses and actual end-uses for residents in the ZNE home community.
- Evaluation on the applicability of the monitored circuit level data to make improvements to the Energy Commission's TDV energy model for ZNE designs for EDRs.
- Discussion of recommendations for refinements to the assumptions within Title 24 Alternate Calculation Method Reference Manual to improve the accuracy of energy use from ZNE homes. Examples may include, but are not limited to:
 - Improve estimates of energy use from unregulated loads.
 - Improve estimates of electricity generation from solar PV systems.
 - Update load profiles.
 - Update HVAC and water heating schedules.
 - Update performance curves for HVAC and/or water heating equipment.
- Results of ~~quarterly 12 months of~~ load data by measure as defined in this task (numerical and graphical).
- Comparison of CBECC modeled energy use to measured energy use in monitored homes.
- Results from the review of significant variances in modeled versus measured loads and results of attempts to reconcile differences.

Products:

- Zero Net Energy Comparison: Actual vs Modeled Report (draft and final)

TASK 9: COST-BENEFIT ANALYSIS OF ALL-ELECTRIC ZERO NET ENERGY AND EFFICIENCY MEASURES DEPLOYED IN THE DEMONSTRATION HOMES

The goals of this task are to: (a.) Evaluate the cost of providing the ZNE Demonstration Community with electricity-only service as compared to electricity and natural gas for the same community. (b.) Assess the market feasibility of providing all-electric ZNE new homes, based on regional variation in demographics, climate, and consumer costs for natural gas versus electricity. (c.) Evaluate actual annual consumer cost of operation for each system, appliance, or end-use in the home. (d.) Develop ratios of incremental first-cost-to-savings for each upgraded (high efficiency) appliance, system, and efficiency measure in the building, as well as the PV system, as compared to costs in a standard, code-compliant home. (e.) Overlay various utility tariffs including several time-of-use rate structures to assess the cost-effectiveness of each measure in the context of new utility rate structures. (f.) Update the modeled savings and cost-effectiveness estimates from Task 3 to identify and make recommendations for the most cost-effective efficiency measures for use in the demonstration site CZ (and similar climates as applicable).

The Recipient Shall:

- Provide a *ZNE Cost-effectiveness All Electric vs Dual-Fuel Report* including but not limited to:
 - Discussion on the cost-effectiveness of All-Electric ZNE Home Versus Dual-Fuel Home
 - Discussion and results to assess avoided costs due to the elimination of natural gas infrastructure from the all-electric ZNE demonstration project, as well as other subcontractor developments throughout the State using cost data from adjacent phases in the same subdivision.
- Provide a *ZNE Cost-Benefit Analysis Report* including but not limited to:
 - Discussion and results of work with the Homebuilder KB Home (KB) to acquire actual cost data to provide electricity service to the ZNE community, as well as

EXHIBIT A Scope of Work

other **Homebuilder KB** developments located throughout the State. Include any increases or decreases in infrastructure costs related to the grid impact from renewable generation substantially exceeding load at certain times throughout the year.

- Results from the integration of survey data from Task 2 and survey the homebuilder, the California Building Industry Association (CBIA), and other builders to assess market demand for/aversion to all-electric homes.
- Results of using data from homes modeled in Task 3 as well as actual site usage data from the demonstration homes to assess the cost effectiveness of all-electric versus dual-fuel ZNE homes, after incorporation of infrastructure cost savings for all-electric homes (from a builder standpoint).
- Results and analysis from the overlay of current and planned (i.e. time-of-use) electric and natural gas residential rate structures in at least five other California communities to determine actual consumer utility costs for all-electric and dual-fuel homes designed to meet the TDV-based definition of ZNE.
- Results and analysis from the overlay of tiered, flat, and one or more time-of-use electric rate structure(s) on the annual modeled and actual hourly load curves for the demonstration homes to determine which rate structure results in the lowest cost to consumers.
- Discussion on the integration of actual usage data acquired from circuit-level monitoring to update the prioritized list of energy efficiency features and packages developed in task 3.
- Datasets from Utility Rate Structure Comparison in Excel format.

Products:

- ZNE Cost-effectiveness All Electric vs Dual-Fuel Report
- ZNE Cost-Benefit Analysis Report

TASK 10: DEVELOP NOVEL FINANCING MECHANISMS AND OVERCOME POLICY BARRIERS TO USING DISTRIBUTED GENERATION

The goals of this task are to: (a.) Evaluate opportunities to leverage existing legislation such as Mello-Roos or other property-tax based financing to cover installation and maintenance costs of shared community renewable generation. (b.) Identify and develop solutions to current policy barriers that prevent homes in a subdivision from sharing electricity generated from adjacent, on-site PV, such as virtual net metering (VNM) for single family homes. (c.) Leverage secure debt available to other types of infrastructure improvements financed through land-secured financing to develop a novel financing mechanism for renewable generation.

The Recipient Shall:

- Conduct analysis on financing mechanisms for distributed energy systems
- Provide a *Zero Net Energy Financing Mechanisms and Policy Barriers Report* including but not limited to:
 - Analysis on the Regulatory Standing for Distributed Generation Projects in single family subdivisions.
 - Analysis on Existing Land-secured Financing Strategies for infrastructure improvements in new residential development.
 - Results from the review of legislation authorizing land-secured financing of infrastructure improvements such as roads, schools, parks, sewer, and water infrastructure to identify any specific prohibitions or limitations on energy infrastructure.

EXHIBIT A Scope of Work

- Results from the engagement of stakeholders including project partners to explore opportunities to deploy shared community-scale distributed generation at the project site or other new communities.
- Results from the investigation of other (non-finance) obstacles to distributed generation such as the prohibition of VNM in single-family homes.
- Results from engagement of subcontractor **Economic and Planning Systems** to integrate on-site, adjacent community solar into the Mello Roos financing district of **a the Homebuilder KB** subdivision.
- Results from Stakeholder Engagement Process.

Products:

- Zero Net Energy Financing Mechanisms and Policy Barriers Report (draft and final)

TASK 11: INDEPENDENT MEASUREMENT AND VERIFICATION OF PROJECT SAVINGS AND PERFORMANCE

The goal of this task is to establish how the pilot homes perform as ZNE buildings.

The Recipient Shall:

- Use the TDV metric definition of ZNE from the 2013 Integrated Energy Policy Report (2013 IEPR) and apply and compare against the most recent TDV values for the CZ associated with the pilot homes; including any updated window glazing values as defined in the 2016 Title 24 Building Energy Efficiency Code to create an independent M&V of ZNE standards using whole house data. This will include coordination between recipient contractors to determine if differences are present between the two values.
- Provide a *Measurement and Verification Report* including but not limited to:
 - Results from applying TDV multipliers to at least 12 months of AMI (Advanced Metering Infrastructure) hourly information for home use and PV generation.
 - Results from verification of **annual** ZNE status for each **and every** piloted home **that have been occupied for at least 12 months**.
 - Discuss, evaluate and verify ZNE (or net positive/negative) status of the community **(i.e. the entire group of homes with at least 12 months of occupancy data)**.
 - Results from the development of tables and charts illustrating variation between homes in achieving net positive, negative, or near-zero annual TDV energy, as well as community-wide ZNE status.
 - Dataset of Annual Net Energy Usage Tables and Charts on a per home level and a community-wide level (Excel).
- **At six months and 12 months beyond the term end date of this Agreement, deliver the following to the CEC:**
 - **Updated datasets:**
 - **Circuit-level monitoring data for each home in the study**
 - **Whole-home smart meter data for each home in the study**
 - **Deliver circuit-level data for download (CSV or equivalent data file) via password-protected cloud service. The cloud service will be pre-paid by the Recipient and active until September 2021 (18th months after the agreement end date).**

EXHIBIT A Scope of Work

- Acquire whole-home smart meter data from the local utility. In the event that smart meter data cannot be acquired, the circuit-level data can be used.
- Acquire and provide any available summary performance data, benefits, or other relevant summary data as determined by the CAM.

Products:

- Measurement and Verification Report

TASK 12: 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.

EXHIBIT A Scope of Work

- 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 has 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 13: 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.

EXHIBIT A

Scope of Work

- 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 on the results of the project.
- When directed by the CAM, participate in annual EPIC symposium sponsored by the California Energy Commission.
- Provide at least six *High Quality Digital Photographs (Minimum Resolution of 1300x500 Pixels in Landscape Ratio) of Pre and Post Technology Installation at the Project Sites.*
- Provide signed photo waiver release form by the Energy Commission.
- 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 (Minimum Resolution of 1300x500 Pixels) of the Pre and Post Technology Installation at the Project Sites
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

V. Project schedule

Please see the attached Excel spreadsheet.

State of California

California Natural Resources Agency

M e m o r a n d u m

To: EPC-15-042-03

Re: City of Clovis General Plan, Herndon-Shepherd Specific Plan, Loma Vista Specific Plan

Date: April 23, 2018

From: Brad Williams

Telephone: 916-327-3312

Subject: California Environmental Quality Act Analysis for EPC-15-042-03

I am a Mechanical Engineer in the Research and Development Division, California Energy Commission, and am the Commission's Agreement Manager for proposed Amendment 3 ("Amendment") to Agreement Number EPC-15-042 ("Agreement") with the California Homebuilding Foundation (the grant "Recipient")

Pursuant to my work in developing the Amendment, I have reviewed the City of Clovis' (the "City") California Environmental Quality Act ("CEQA") documents¹ for the following community planning documents:

- City of Clovis General Plan Draft and Final Program EIR²
- Herndon-Shepherd Specific Plan³
 - Draft Mitigated Negative Declaration
 - Initial study
 - Notice of Determination on the Draft Mitigated Negative Declaration
 - Notice of Intent to adopt the draft mitigated negative declaration
 - City Council Meeting Agenda Item 2-A-1-4
 - Resolution No. 18-16 of the City Council of the City of Clovis
- Loma Vista Specific Plan (formerly known as the Southeast Urban Center)⁴
 - Loma Vista Draft EIR
 - Resolution No. 03-44 of the City Council of the City of Clovis Regarding:
 - Certification of the Final Environmental Impact Report
 - Exhibit A – Facts and Findings Regarding Significant Effects and Alternatives
 - Exhibit B – Statement of Overriding Considerations
 - Exhibit C – Statement of Findings Regarding Recirculation of the EIR
 - Exhibit D – Mitigation Monitoring Program

Based on my review and consideration of the above documents, it is my independent and professional opinion that, since the above CEQA documents have been finalized, there have been no new project changes and no new, additional, or increased significant environmental impacts have occurred. Furthermore, I have not identified any new information which would change the conclusions of the City's CEQA documents, or render those conclusions inadequate.

It is also my independent and professional opinion that the work to be performed under the Agreement and proposed Amendment falls within the scope of the City's CEQA documents, and that the Agreement and proposed Amendment will not result in any new significant environmental impacts. The mitigation measures identified balance the economic, legal, social, technological and other benefits of the project and outweigh any significant unavoidable effects. Finally, I have not identified any new mitigation measures, within the Commission's authority, that would lessen or further mitigate the impacts of the existing project. The City and/or the Recipient have authority to implement the mitigation measures, or to seek any required approvals for the mitigation measures, and such measures are within the responsibility of the City and/or the Recipient.

The reasons for my conclusions are as follows:

The Agreement and proposed Amendment includes three main construction components: (1) Upgrading equipment efficiencies from the baseline energy code requirements; (2) Altering construction techniques used to

¹ http://www.energy.ca.gov/research/epic/environmental_review_documents.html

² https://www.ci.clovis.ca.us/Portals/0/Documents/Planning/GeneralPlan2014/ClovisGP_Adopted_Aug2014_wFig.pdf?ver=2015-04-03-100817-897

³ <https://www.ci.clovis.ca.us/Portals/0/Documents/Planning/SpecificPlans/HerndonShepherdSP.pdf?ver=2008-12-19-140031-000>

⁴ <https://www.ci.clovis.ca.us/Portals/0/Documents/Planning/SpecificPlans/LomaVistaSpecificPlan.pdf?ver=2016-09-12-060030-700>

build the new residential structures; and (3) Switching fuel types for some appliances installed in the new buildings (i.e., moving from gas appliances to electric appliances). The Agreement and proposed Amendment would fund Zero Net Energy upgrades for approximately one-hundred single family residences within the Loma Vista and Herndon-Shepherd Specific Plan areas. All of the construction and operation for the Agreement and proposed Amendment will be within the activities evaluated by the CEQA documents identified in this memo. The scope of work of the Agreement and proposed Amendment has no omissions from, or conflicts of information with, the City's environmental documents as listed above.

Herndon-Shepherd Environmental Review:

There were 18 specific environmental impact topics evaluated in the Herndon Shepherd project (shown below), including the CEQA Mandatory Findings of Significance. It is my independent and professional opinion that the Agreement and proposed Amendment will not have any impact on the following environmental areas and will not change the impacts identified in the City's CEQA documents.

1. Aesthetics – The proposed Agreement will not have any impact on aesthetics, and will not change the impacts identified in the City's CEQA documents.
2. Agriculture and Forest Resources - The proposed Agreement will not have any impact on agriculture and forest resources, and will not change the impacts identified in the City's CEQA documents.
3. Air Quality
 - The proposed building of Zero Net Energy homes under the Agreement and proposed Amendment would not increase local air emissions. To the contrary, the Agreement and proposed Amendment would reduce the overall on-site emissions from those identified. The Agreement and proposed Amendment would reduce greenhouse gas emissions through: (1) replacement of LNG burning appliances with electrically powered appliances; and (2) reduction of net energy consumption through the installation of high efficiency appliances and on-site renewable generation. Therefore, no new significant air emissions, beyond those originally identified in the City's CEQA documents, either for criteria pollutants or toxics, would occur should the Energy Commission approve the proposed Amendment.
4. Biological Resources - The proposed Agreement will not have any impact on biological resources, and will not change the impacts identified in the City's CEQA documents.
5. Cultural Resources - The proposed Agreement will not have any impact on cultural resources, and will not change the impacts identified in the City's CEQA documents.
6. Geology/Soils - The proposed Agreement will not have any impact on geologic or soils resources, and will not change the impacts identified in the City's CEQA documents.
7. Greenhouse Gas Emissions
 - The proposed building of Zero Net Energy homes under the Agreement and proposed Amendment would not increase greenhouse gas emissions. To the contrary, the Agreement and proposed Amendment would reduce the overall on-site emissions from those identified. The Agreement and proposed Amendment would reduce greenhouse gas emissions through: (1) replacement of LNG burning appliances with electrically powered appliances; and (2) reduction of net energy consumption through the installation of high efficiency appliances and on-site renewable generation. Therefore, no new significant air emissions, beyond those originally identified in the City's CEQA documents, either for criteria pollutants or toxics, would occur should the Energy Commission approve the proposed Amendment.
8. Hazards and Hazardous Material - The proposed Agreement will not have any hazardous materials impacts, and will not change the impacts identified in the City's CEQA documents.
9. Hydrology/Water Quality - The proposed Agreement will not have any impact on water quality, and will not change the impacts identified in the City's CEQA documents.
10. Land Use/Planning - The proposed Agreement will not have any impact on land use or planning, and will not change the impacts identified in the City's CEQA documents.

11. Mineral Resources- The proposed Agreement will not have any impact on mineral resources, and will not change the impacts identified in the City's CEQA documents.
12. Noise - The proposed Agreement will not have any noise impacts, and will not change the impacts identified in the City's CEQA documents.
13. Population/Housing - The proposed Agreement will not have any population or housing impacts, and will not change the impacts identified in the City's CEQA documents.
14. Public Services
 - Electricity: The Agreement and proposed Amendment will not significantly impact total electrical demand beyond that originally identified in the City's CEQA documents. The Agreement and proposed Amendment will develop approximately 100 zero net energy homes, which has the potential to reduce the total estimated electrical demand. As such, the activities funded by the Agreement and proposed Amendment will potentially reduce the projects impact upon electrical demand.
 - Natural Gas: The Agreement and proposed Amendment will not significantly impact total natural gas demand beyond that originally identified in the City's CEQA documents. The Agreement and proposed Amendment will develop approximately 100 zero net energy homes, which has the potential to reduce the total estimated natural gas. As such, the activities funded by the Agreement and proposed Amendment will potentially reduce the projects impact upon natural gas demand.
15. Recreation - The proposed Agreement will not have any impact on recreational resources, and will not change the impacts identified in the City's CEQA documents.
16. Transportation/Traffic - The proposed Agreement will not have any transportation or traffic impacts, and will not change the impacts identified in the City's CEQA documents.
17. Tribal Cultural Resources - The proposed Agreement will not have any impact on tribal cultural resources, and will not change the impacts identified in the City's CEQA documents.
18. Utilities/Service Systems - The proposed Agreement will not have any impact on utilities or service systems, and will not change the impacts identified in the City's CEQA documents.

Loma-Vista Environmental Review:

There were 14 specific environmental impact topics evaluated in the Loma Vista project (shown below). The statement of overriding considerations identified the following environmental areas as having potentially significant unmitigable impacts:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Noise
- Public Health and Safety
- Public Services and Utilities
- Traffic and Circulation

It is my independent and professional opinion that the Agreement and proposed Amendment will not implicate any of the findings as identified in the City's statement of overriding considerations.

It is also my independent and professional opinion that the Agreement and proposed Amendment will not have any impact on the following environmental areas and will not change the impacts identified in the City's CEQA documents.

1. Aesthetics - The proposed Agreement will not have any impact on aesthetics, and will not change the impacts identified in the City's CEQA documents.
2. Agriculture Resources- The proposed Agreement will not have any impact on agricultural resources, and will not change the impacts identified in the City's CEQA documents.
3. Air Quality
 - The proposed building of Zero Net Energy homes under the Agreement and proposed Amendment would not increase local air emissions. To the contrary, the Agreement and proposed Amendment would reduce the overall on-site emissions from those identified. The Agreement and proposed Amendment would reduce greenhouse gas emissions through: (1) replacement of LNG burning appliances with electrically powered appliances; and (2) reduction of net energy consumption through the installation of high efficiency appliances and on-site renewable generation. Therefore, no new significant air emissions, beyond those originally identified in the City's CEQA documents, either for criteria pollutants or toxics, would occur should the Energy Commission approve the proposed Amendment.
 -
4. Biological Resources - The proposed Agreement will not have any impact on biological resources, and will not change the impacts identified in the City's CEQA documents.
5. Cultural Resources - The proposed Agreement will not have any impact on cultural resources, and will not change the impacts identified in the City's CEQA documents.
6. Hydrology and Water Quality
7. Land Use and Planning
8. Noise - The proposed Agreement will not have any noise impacts, and will not change the impacts identified in the City's CEQA documents.
9. Public Health and Safety - The proposed Agreement will not have any public health and safety impacts, and will not change the impacts identified in the City's CEQA documents.
10. Public Services and Utilities
 - Electricity: The Agreement and proposed Amendment will not significantly impact total electrical demand beyond that originally identified in the City's CEQA documents. The Agreement and proposed Amendment will develop approximately 100 zero net energy homes, which has the potential to reduce the total estimated electrical demand. As such, the activities funded by the Agreement and proposed Amendment will potentially reduce the projects impact upon electrical demand.
 - Natural Gas: The Agreement and proposed Amendment will not significantly impact total natural gas demand beyond that originally identified in the City's CEQA documents. The Agreement and proposed Amendment will develop approximately 100 zero net energy homes, which has the potential to reduce the total estimated natural gas. As such, the activities funded by the Agreement and proposed Amendment will potentially reduce the projects impact upon natural gas demand.
11. Recreation - The proposed Agreement will not have any impact on recreational resources, and will not change the impacts identified in the City's CEQA documents
12. Socioeconomics - The proposed Agreement will not have any socioeconomics impacts, and will not change the impacts identified in the City's CEQA documents
13. Soils and Geology - The proposed Agreement will not have any impact on soils or geology, and will not change the impacts identified in the City's CEQA documents
14. Traffic and Circulation - The proposed Agreement will not have any traffic or circulation impacts, and will not change the impacts identified in the City's CEQA documents.

STATE OF CALIFORNIA

**STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION**

**RESOLUTION - RE: CALIFORNIA HOMEBUILDING FOUNDATION (CHF)
PROJECT**

WHEREAS, the City of Clovis is the Lead Agency for both the “Herndon-Shepherd Specific Plan” and the “Loma Vista Specific Plan” two subdivision plans under the Clovis General Plan (hereinafter collectively, “Project,"); and

WHEREAS, the City of Clovis prepared a Final Environmental Impact Report for the Loma Vista Specific Plan, (hereafter, “FEIR”), and prepared a Mitigated Negative Declaration for the Herndon-Shepherd Specific Plan to evaluate the potential environmental impacts of implementing the Project; and

WHEREAS, the City of Clovis, on March 3, 2003, certified the FEIR for the Loma Vista Specific Plan, a copy of which is on file with the California Energy Commission; and

WHEREAS, the City of Clovis reviewed and considered the FEIR for the Loma Vista Specific Plan, adopted findings required by the California Environmental Quality Act (“CEQA”), including a Mitigation Monitoring Program and a Statement of Overriding Considerations, and approved the project, by Adoption of Resolution 03-44, a copy of which Resolution is on file with the Energy Commission; and

WHEREAS, the City of Clovis, on January 16, 2018, certified the Mitigated Negative Declaration for the Herndon-Shepherd Specific Plan, a copy of which is on file with the California Energy Commission; and

WHEREAS, the City of Clovis reviewed and considered the Mitigated Negative Declaration, including the Mitigation Monitoring Plan, adopted findings required by CEQA, and approved the project, by Adoption of Resolution 18-16, a copy of which Resolution is on file with the California Energy Commission; and

WHEREAS, the Energy Commission is considering a proposed Amendment to Agreement EPC-15-042, “California Homebuilding Foundation (CHF) Project” (hereafter, “EPC-15-042-3”), a grant to fund a community-scale demonstration of Zero Net Energy (ZNE) upgrades to up to fifty single-family homes within the Project; and

Prior to acting on the Agreement EPC-15-042-3, the Energy Commission desires to make certain findings pursuant to the CEQA Guidelines, title 14, section 15096;

NOW THEREFORE, BE IT RESOLVED:

1. The Energy Commission has reviewed the information contained in the FEIR that is relevant to its approval of EPC-15-042-3, and has reviewed the CEQA findings contained in the FEIR, including the Statement of Overriding Considerations, and the City’s Resolution, which are adopted to the extent that they are relevant to the Energy Commission’s decision to approve EPC-15-042-3.

2. The Energy Commission has reviewed the information contained in the Mitigated Negative Declaration that is relevant to its approval of EPC-15-042-3, and has reviewed the CEQA findings contained in the Mitigated Negative Declaration, including the Mitigation Monitoring Plan, and the City's Resolution, which are adopted to the extent that they are relevant to the Energy Commission's decision to approve EPC-15-042-3.
3. The City of Clovis has already adopted the mitigation measures recommended in the FEIR and the Mitigated Negative Declaration, has authority to implement the mitigation measures or to seek any required approvals for the mitigation measures, and the Energy Commission has no direct authority to implement the mitigation measures.
4. The Energy Commission has reviewed and considered the FEIR and Mitigated Negative Declaration and finds that the FEIR and Mitigated Negative Declaration are adequate for its use as the decision-making body for its consideration of EPC-15-042-03.
5. Approval of EPC-15-042-03 is within the scope of Loma Vista Specific Plan and the Herndon-Shepherd Specific Plan, and the activities evaluated in the FEIR and Mitigated Negative Declaration.
6. Since the FEIR and Mitigated Negative Declaration were finalized, there have been no substantial project changes and no substantial changes in the Project circumstances that would require major revisions to the FEIR or Mitigated Negative Declaration due to the involvement of new significant environmental effects or an increase in the severity of previously identified significant impacts, and there is no new information of substantial importance that would change the conclusion set forth in the FEIR or Mitigated Negative Declaration.
7. The Energy Commission has not identified any feasible alternative or additional feasible mitigation measures within its power that would substantially lessen or avoid any significant effect the Project would have on the environment.

THEREFORE BE IT RESOLVED, that the Energy Commission finds, on the basis of the entire record before it, that the mitigation measures incorporated in the FEIR and Mitigated Negative Declaration will prevent EPC-15-042-03 from having any significant environmental impacts; and

BE IT FURTHER RESOLVED, that the Energy Commission approves Agreement EPC-15-042-03, amending the original Agreement with the California Homebuilders Association for \$4,819,805; and

BE IT FURTHER RESOLVED, that this document authorizes the Executive Director or his or her designee to execute the same on behalf of the Energy Commission.

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 California Energy Commission held on June 13, 2018.

AYE: [*List Commissioners*]

NAY: [*List Commissioners*]

ABSENT: [*List Commissioners*]

ABSTAIN: [*List Commissioners*]

*Cody Goldthrite,
Secretariat*

California Energy Commission

June 13, 2018 Business Meeting – Agenda Item #3

California Homebuilding Foundation Project: “Zero Energy Residential Optimization at Community Scale” (EPC-15-042-03)

The full California Environmental Quality Act (CEQA) supporting documentation for EPC-15-042 including EPC-15-042-03 can be obtained at:

http://www.energy.ca.gov/research/epic/environmental_review_documents.html