

**GRANT REQUEST FORM (GRF)**

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-15-009 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	Rachel Salazar	51	916-445-5316

Recipient's Legal Name	Federal ID Number
California Homebuilding Foundation (CHF)	94-2581819

Title of Project
Workforce Instruction for Standards and Efficiency (WISE)

Term and Amount	Start Date	End Date	Amount
	11/30/2015	03/31/2020	\$ 4,431,918

**Business Meeting Information**
 ARFVTP agreements under \$75K delegated to Executive Director.

Proposed Business Meeting Date	11/12/15	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Rachel Salazar	Time Needed:	5 minutes

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

**Agenda Item Subject and Description**

CALIFORNIA HOMEBUILDING FOUNDATION (CHF). Proposed resolution approving agreement EPC-15-009 with California Homebuilding Foundation (CHF) for a \$4,431,918.00 grant to fund market assessment, targeted outreach, dissemination of information, and workforce training on the High Performance Attics (HPAs) and High Performance Walls (HPWs), two of the new requirements in California's Building Energy Efficiency Standards for 2016. This agreement will ensure that an adequate number of California workers have the skills needed to properly install high performance products and systems.

**California Environmental Quality Act (CEQA) Compliance**

- 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
  - 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: 14 CCR 15301 "Existing Facilities"  
14 CCR 15302 "Replacement or Reconstruction"  
14 CCR 15322 "Educational or Training Programs Involving No Physical Changes."
      - Common Sense Exemption. 14 CCR 15061 (b) (3)
      - Explain reason why Agreement is exempt under the above section:  
The project funds workforce training on High Performance Attics and High Performance walls. The training involves installation of insulation and changes to other building systems. The instructional training will be conducted at existing facilities, and the on-the-job training will be conducted at existing residential construction sites that have already undergone CEQA review and have permits in place. Therefore, the project consists of minor alterations of existing private facilities involving negligible or no expansion of use, and replacement or reconstruction of existing structures or facilities on the same site having substantially the same purpose and capacity as the structure replaced. Additionally, part of the training will be classroom-based and will not involve physical alternations.
    - b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)
- Check all that apply
- |   |   |
|---|---|
| <input type="checkbox"/> Initial Study                  | <input type="checkbox"/> Environmental Impact Report            |
| <input type="checkbox"/> Negative Declaration           | <input type="checkbox"/> Statement of Overriding Considerations |
| <input type="checkbox"/> Mitigated Negative Declaration |   |

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<b>List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)</b>	
Legal Company Name:	Budget
ConSol	\$ 2,994,405
TRC Engineers, Inc.	\$ 295,030
Davis Energy Group, Inc.	\$ 316,934
Steve Easley & Associates	\$ 174,456
Wallrich Creative Communications	\$ 192,558

<b>List all key partners: (attach additional sheets as necessary)</b>	
Legal Company Name:	
SEE ATTACHED FOR ADDITIONAL SUBCONTRACTORS	

<b>Budget Information</b>			
Funding Source	Funding Year of Appropriation	Budget List No.	Amount
EPIC	14-15	301.001B	\$4,431,918
			\$
			\$
			\$
			\$
			\$
R&D Program Area:	EDMFO: EDMF	TOTAL:	\$4,431,918
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

<b>Recipient's Administrator/ Officer</b>				<b>Recipient's Project Manager</b>			
Name:	Jill Herman			Name:	Terri Brunson		
Address:	1215 K St Ste 1200 Suite 1200			Address:	1215 K St Ste 1200 Suite 1200		
City, State, Zip:	Sacramento, CA 95814-3947			City, State, Zip:	Sacramento, CA 95814-3947		
Phone:	916-340-3340 /	Fax:	- -	Phone:	916-340-3340 /	Fax:	- -
E-Mail:	jherman@mychf.org			E-Mail:	tbrunson@mychf.org		

<b>Selection Process Used</b>	
<input checked="" type="checkbox"/> Competitive Solicitation	Solicitation #: GFO-15-302
<input type="checkbox"/> First Come First Served Solicitation	

<b>The following items should be attached to this GRF</b>			
1. Exhibit A, Scope of Work		<input checked="" type="checkbox"/>	Attached
2. Exhibit B, Budget Detail		<input checked="" type="checkbox"/>	Attached
3. CEC 105, Questionnaire for Identifying Conflicts		<input checked="" type="checkbox"/>	Attached
4. Recipient Resolution		<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached
5. CEQA Documentation		<input type="checkbox"/> N/A	<input checked="" type="checkbox"/> Attached

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

Date \_\_\_\_\_

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

Date \_\_\_\_\_

Deputy Director \_\_\_\_\_

Date \_\_\_\_\_

## **Minor Subs for California Homebuilding Foundation (CHF)**

### **EPC-15-009**

Greenworks Consulting

Building Media, Inc.

Selby Energy

Western Cooling Efficiency Center – UC Davis

California Building Industry Associates (CBIA)

High Performance Building and Code Solutions

Chitwood Energy Management

Energy Docs Home Performance

The Energuy, Inc.

Desiree Webb

**EXHIBIT A**  
**Scope of Work**  
**California Homebuilding Foundation**

**I. TASK ACRONYM/TERM LISTS**

**A. Task List**

<b>Task #</b>	<b>CPR<sup>1</sup></b>	<b>Task Name</b>
1		General Project Tasks
2		Conduct Market Assessment of Trends and Current Construction Practices by Geographical Region
3		Conduct Regional BIA Forums and Develop Information Clearinghouse (Web Portal)
4		Engage with Builders, Installing Subcontractors, Building Officials, and HERS Raters
5	X	Deliver and Oversee Job-site Training
6		Coordinate with IOUs and Administer Above-code Training with Leading-edge Builders
7		Develop Third-party Verification Requirements and Provide Insulation Installer Training and Certification
8		Expand Existing High School Building Technology Programs and Connect Workers to Employment Opportunities
9		Data Collection, Measurement, Verification and Evaluation
10		Evaluation of Project Benefits
11		Technology/Knowledge Transfer Activities

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

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**B. Acronym/Term List**

<b>Acronym/Term</b>	<b>Meaning</b>
ACE	Energy Code ACE
AIA	The American Institute of Architects
APA	The Engineered Wood Association (Formerly American Plywood Assoc.)
BECT	Builder Energy Code Training
BIA	Building Industry Association
C&S	Codes and Standards
CABEC	The California Association of Building Energy Consultants
CAHP	California Advanced Homes Program
CALBO	California Building Officials
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CBECC	California Building Energy Code Compliance
CBIA	California Building Industry Association
CEU	Continuing Education Units
CHF	California Homebuilding Foundation
CIRB	Construction Industry Research Board
CMFNH	California Multi-Family New Homes
CPR	Critical Project Review
CZ	Climate Zone
EPIC	Electric Program Investment Charge
HERS	Home Energy Rating System
HPA	High Performance Attic (per 2016 California Building Energy Efficiency Standards)
HPW	High Performance Wall (per 2016 California Building Energy Efficiency Standards)
HVAC	Heating, Ventilation, and Air Conditioning
ICC	International Code Council
IOU	Investor Owned Utility
KSAs	Knowledge, skills, and abilities
M&V	Measurement and Verification
MSA	Metropolitan Statistical Area
QI	Quality Installation
QII	Quality Insulation Installation
SIPA	Structural Insulated Panel Association
SIPS	Structural Insulated Panels
SPFA	Spray Polyurethane Foam Alliance
TAC	Technical Advisory Committee
TDV	Time-Dependent Valuation
VE	Value Engineering
WIB	Workforce Investment Board
WISE	Workforce Instruction for Standards and Efficiency
ZNE	Zero Net Energy

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

**A. Purpose of Agreement**

The purpose of this Agreement is to fund market assessment, targeted outreach, dissemination of information, and workforce training on High Performance Attics (HPAs) and High Performance Walls (HPWs); two of the new requirements in California's Building Energy Efficiency Standards<sup>2</sup> for 2016 (California Code of Regulations Title 24, Part 6 (California Energy Code)) ("2016 Standards"). Additionally, this agreement will ensure that an adequate number of California workers have the skills needed to properly install high performance products and systems that can be used to meet the new requirements.

**B. Problem/ Solution Statement**

**Problem**

The HPA and HPW requirements in the 2016 Standards will create some of the most significant changes to construction practice the industry has ever seen. Without proper training on the new Standards and the methods and materials that can be used for prescriptive and performance compliance, the building industry will struggle to find safe, cost-effective approaches to meeting the new Standards and find enough skilled workers for the installation of HPA and HPW.

**Solution**

This Agreement will influence all levels of the California home construction value chain, fundamentally transforming California new home construction practices to integrate the use of HPA and HPW systems. The Recipient will facilitate this market transformation through upstream education of construction-specification decision makers, and through downstream implementation of installation training for installers and inspectors.

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

**Agreement Goals**

The goals of this Agreement are to:

- Transition the California new home construction market to HPA and HPW construction practices.
- Prepare workers for employment, provide skills for career advancement, and increase the supply of workers with the skills needed to install HPA and HPW assemblies.
- Ease the cost burden and risks to California businesses to make significant changes to construction practices.
- Encourage early adoption of HPA and HPW resulting in Zero Net Energy (ZNE)-ready envelope design.

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<sup>2</sup> Requirements adopted by the California Energy Commission on June 11, 2015.

# EXHIBIT A

## Scope of Work

### California Homebuilding Foundation

**Ratepayer Benefits:**<sup>3</sup> This Agreement will result in the ratepayer benefits of greater electricity reliability due to reduced peak heating, ventilation, and air conditioning (HVAC) loads on the grid. This benefit is provided by constructing homes with lower peak cooling demand resulting from better insulation of ducts and living space.

The Agreement will also result in lower electricity rates and costs to ratepayers. As demands for expensive peak power production are reduced through improvements to wall and attic insulation, the overall generation costs to utilities will be lowered and savings will be passed on to ratepayers. The costs of home ownership will be lowered due to more efficient home envelope designs, which result in lower utility bills throughout life of the home, as well as lower initial purchase price due to builder cost savings resulting from process and technological improvements to construction practice.

**Technological Advancement and Breakthroughs:**<sup>4</sup> This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by providing training on successful implementation of HPA and HPW construction techniques that are not yet widely deployed in California.

By involving builders, manufacturers, and other market actors in early adoption of HPA and HPW systems in California, the Agreement will create a space for collaborative development of new HPA and HPW approaches prior to code enforcement deadlines, resulting in real-world cost-effective advancements in ZNE-ready envelope design, which removes a major barrier to meeting the State's statutory energy goals.

#### **Agreement Objectives**

The objectives of this Agreement are to:

- Provide Builders, Building Officials, and Home Energy Rating System (HERS) Raters with the tools, information, and support to prepare each group to build, permit, and verify HPA and HPW techniques as an accepted part of the residential new construction process.
- Dramatically increase the number of homes constructed with HPA and/or HPW assemblies (as defined by the 2016 Standards) prior to the enforcement of the new standards, and to measurably improve the quality of HPA and HPW installations over the course of the project.
- Provide workers in the construction trades with supplemental job skills, training.
- Update existing HERS inspection guidelines, training, and compliance documentation to include material specific to HPA and HPW assemblies.

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<sup>3</sup> California Public Resources Code, Section 25711.5(a) requires projects funded by the Electric Program Investment Charge (EPIC) to result in ratepayer benefits. The California Public Utilities Commission, which established the EPIC in 2011, defines ratepayer benefits as greater reliability, lower costs, and increased safety (See CPUC "Phase 2" Decision 12-05-037 at page 19, May 24, 2012, [http://docs.cpuc.ca.gov/PublishedDocs/WORD\\_PDF/FINAL\\_DECISION/167664.PDF](http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF)).

<sup>4</sup> California Public Resources Code, Section 25711.5(a) also requires EPIC-funded projects to lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory and energy goals.

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**III. TASK 1 GENERAL PROJECT TASKS**

**PRODUCTS**

**Subtask 1.1 Products**

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

**The Recipient shall:**

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

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

For products that require a final version only

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

For all products

- Submit all data and documents required as products in accordance with the following:

Instructions for Submitting Electronic Files and Developing Software:

○ **Electronic File Format**

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

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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**
- 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.

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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.
- 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

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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.

**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

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- 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.
  - "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

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**REPORTS AND INVOICES**

**Subtask 1.5 Progress Reports and Invoices**

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

**The Recipient shall:**

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

**Products:**

- Progress Reports
- Invoices

**Subtask 1.6 Final Report**

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

**Subtask 1.6.1 Final Report Outline**

**The Recipient shall:**

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

**Recipient Products:**

- Final Report Outline (draft and final)

**CAM Product:**

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

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**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.
  - 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

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additional time.

- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

#### **Products:**

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

#### **CAM Product:**

- Written Comments on the Draft Final Report

### **MATCH FUNDS, PERMITS, AND SUBCONTRACTS**

#### **Subtask 1.7 Match Funds**

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

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

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

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

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

- A list of the match funds that identifies:
  - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
  - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (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.

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- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

**Products:**

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

**Subtask 1.8 Permits**

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

**The Recipient shall:**

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

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

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

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**Products:**

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

**Subtask 1.9 Subcontracts**

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

**The Recipient shall:**

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of the executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

**Products:**

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

**TECHNICAL ADVISORY COMMITTEE**

**Subtask 1.10 Technical Advisory Committee (TAC)**

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

- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
  - Technical area expertise;
  - Knowledge of market applications; or
  - Linkages between the agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.

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- Review products and provide recommendations for needed product adjustments, refinements, or enhancements.
- Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.

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

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

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

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

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**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:**

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

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**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 Assessments of Trends and Current Construction Practices by Geographical Region**

The goal of this task is to coordinate the with Energy Commission forecasting group, conduct surveys, and use in-house California Homebuilding Foundation (CHF)/Construction Industry Research Board (CIRB) data to characterize the homebuilding market and the residential construction labor market. This data will be compiled and used to develop projections to help target and tailor training to the real-time needs of the construction employment and labor market, and to set a baseline against which program success can be measured.

**The Recipient shall:**

- Work with in-house CIRB data and outside sources to compile and analyze labor statistics for the residential construction industry to assess the following as it relates to the 2016 Standards:
  - Labor supply and demand trends by construction trade.
  - Availability of skilled and unskilled workers by region.
  - Employment statistics by region.
- Prepare *Report on Construction Labor Trends and Availability of Skilled Workers* as it relates to the 2016 Standards.
- Evaluate recent home construction data to identify geographic and other construction trends such as rate of multifamily vs single family construction.
- Prepare *Report on California Construction Activity Trends*.
- Survey homebuilders to determine current insulation practices for walls and attic construction and availability of skilled and unskilled labor.
- Prepare *Homebuilder Wall and Attic Construction Practices Report*.
- Estimate construction activity and develop statistical rankings for single family home and low-rise multifamily dwelling unit construction by California Climate Zone (CZ) and major Metropolitan Statistical Area (MSA).
- Use data to prioritize training activities to regions of the State undergoing, or predicted to undergo, high growth and residential construction activity and/or a short supply of workers with knowledge, skills and abilities (KSAs) to meet the 2016Standards.
- Prepare *Builder Wall and Attic Construction and Labor Rankings Report (by CZ and MSA)*.

**Products:**

- Report on Construction Labor Trends and Availability of Skilled Workers
- Report on California Construction Activity Trends

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- Homebuilder Wall and Attic Construction Practices Report
- Builder Wall and Attic Construction and Labor Rankings Report (by CZ and MSA)

**TASK 3 Conduct Regional BIA Forums and Develop Information Clearinghouse (Web Portal)**

The goals of this task are to (a.) Disseminate information about the new code changes to multiple audiences involved with the planning, permitting, and construction of residential buildings in California. This training and informational campaign will coordinate closely with existing Codes and Standards (C&S) training and education programs such as Builder Energy Code Training (BECT), the Investor Owned Utilities' (IOUs) Energy Code ACE (ACE) training and the statewide new construction programs (California Advanced Homes). (b.) Position the CHF team to schedule and conduct direct, 1-to-1, meetings with builders, installing subcontractors, building officials, and HERS Raters, which have been identified as the four key stakeholder groups for successful implementation. (c.) Create an accessible and free web portal with extensive information about different approaches to improving wall and attic performance as required by 2016 Standards. This will include technical analysis of product and design methods, as well as identification of the different job tasks, KSAs required for proper installation of each system.

**The Recipient shall:**

- Work with manufacturers to develop *HPA/HPW General Training Curriculum* designed to educate suppliers, installers and builders about available products, systems, and strategies for compliance with the HPA and HPW requirements in the 2016 Standards.
  - Include case studies on the successful installation of HPA and HPW systems in both single family and low-rise multifamily projects in California, and lessons learned from instances of product failure.
  - Solicit input from Trade Associations (Spray Polyurethane Foam Alliance (SPFA), The Engineered Wood Association (APA), Structural Insulated Panel Association (SIPA), etc.) on best practices and to leverage their existing expertise and curriculum on these topics.
- Integrate HPA and HPW curriculum with the structure and content of existing Title 24 training programs in IOU electric territories.
  - Meet with IOU program managers and their program implementers, for C&S, California Multi-Family New Homes (CMFNH), and California Advanced Homes Program (CAHP).
  - Develop *IOU Title 24 HPA/HPW Training Coordination and Integration Plan* including:
    - Identify HPA/HPW training plans under development or already created by IOU programs (ACE, CMFNH and CAHP Code Readiness), BECT, building officials (California Building Officials' (CALBO's) program), architects (The American Institute of Architects (AIA)) and trades.
    - Identify resources that can be shared or leveraged among various training programs and offerings.

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- Identify and work to reduce redundancies among various training programs and offerings.
- Develop *IOU HPA/HPW Training Modules*
- Coordinate with California Building Industry Association (CBIA) and local/regional Building Industry Associations (BIAs) throughout the State.
  - Promote early adoption of HPA and HPW construction techniques to homebuilders as a means of:
    - Transitioning to and preparing for the 2016 Standards.
    - Providing a value-add and product differentiation for homebuyers (customers).
    - Meeting the requirements of above-code incentive programs such as CAHP and CMFNH.
  - Identify and secure locations for regional forums.
  - Develop *Master training schedule*, including coordination and integration tracking.
  - Invite, schedule, and enroll the following audiences in HPA/HPW forums:
    - Builders
    - Suppliers/manufacturers
    - Installing contractors/trades
    - Energy Consultants
    - Architects and Engineers
    - Building Officials
    - Other BIA members
- Conduct 5-10 Regional HPA/HPW forums in each of the first two years of the program, focusing on BIAs in the 5 largest MSAs in the State.
  - Educate participants on the HPA/HPW requirements for 2016 Standards and compliance options.
    - Provide information on additional code-training resources.
    - Present multiple technologies, systems, and design strategies that could be employed to meet code.
    - Solicit open feedback to address concerns about code changes and work collaboratively to resolve.
  - Presentations at forums by manufacturers and installers who have HPA/HPW market ready products (committed partners include: ALCAL Specialty Contracting, Inc. (ALCAL), TruTeam, Owens Corning, APA, BASF Corporation, Bayer, Insulfoam, Green Hybrid Roofing, RMax, Quiet Cool and Panasonic).
  - Identify and record obstacles and barriers to HPA and HPW installations that arise in relation to:
    - Building code
    - Energy code
    - Product availability, requirements (evaluation reports) and warranties
    - Training guidelines
    - Installation guidelines
    - Incremental builder cost

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- Builder or Building Official concerns regarding fire, structural, & moisture-related construction complications
- Create an *Annual HPA/HPW Implementation Barriers and Solutions Guide* to identify and draft solutions to implementation challenges.
  - *Outline for the Implementation Barriers and Solutions Guide*
  - Write *Articles and Technical Briefs* for email Correspondence through trade associations.
  - Circulate guidance/solutions and publish articles and membership alerts through newsletters from respective organizations, such as:
    - CBIA's Monday Report
    - CALBO's monthly newsletter
    - Energy Commission Blueprint
    - The California Association of Building Energy Consultants (CABEC) newsletter
    - Utility efficiency program e-newsletters
    - Trade groups
- Assist manufacturers in developing training material and installation guidelines.
  - Create CA CZ specific guidelines as needed.
- Schedule separate follow up (direct engagement) meetings with:
  - Builders,
  - Installing subcontractors,
  - Building officials, and
  - HERS Raters (See Task 4 for detail)
- Recruit builders for 1-to-1 meetings (Task 4) and to begin selecting HPA/HPW products for installation and job-site training in targeted subdivisions (Task 5).
- Identify and schedule additional, more focused, educational forums with specific audiences.
- Educate energy consultants using the following methods:
  - Coordinate with CABEC and the IOU C&S training team to prepare specific training modules on the new HPA and HPW requirements in the 2016 Standards.
  - Support the delivery of these modules through the existing utility training infrastructure.
- Orient Architects and Engineers on the new HPA and HPW requirements in the 2016 Standards.
  - Coordinate with AIA to certify the curriculum to Continuing Education Unit (CEU) requirements, and present the new requirements at AIA chapter meetings throughout the state.
- Prepare an *Annual Report on Lessons Learned from Forums*, following the conclusion of forums provided each year.
  - Outline HPA and HPW construction techniques
  - Summary of installation best practices including:
    - Manufacturer installation guidelines
    - Code clarifications

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- HERS inspection requirements
- Present code changes and solutions at trade shows including:
  - PCBC
  - CABEC
  - CALBO Ed Week
  - Insulation Contractors of America (ICAA)
- Conduct Product and Technique Assessment: Comprehensive evaluation of all design and product-focused approaches to creating HPAs and HPWs.
  - Review all methods and materials and determine relative efficacy (Time-Dependent Valuation (TDV) savings) in key (cooling dominated) CA CZs.
  - Review, incorporate, and build upon existing design specifications from literature, CAHP Code Readiness program collateral and Codes and Standards Enhancement CASE reports.
  - Evaluate potential concerns related to compliance with 2016 Standards and other sections of the California building code for each approach to constructing HPAs and HPWs.
  - Evaluate interface/interaction between HPA and HPW construction techniques and other building components/systems.
  - Identify the KSAs necessary for workers to understand and install each specific wall and attic assembly.
  - Prepare a *Product and Design Strategy Assessment Report* for HPA strategies and separate report for HPW strategies. Each report will include details on various products and design strategies as well as an objective evaluation of code and field logistical issues.
  - Prepare an Annual Report on KSAs for Workers to Understand Each HPA or HPW Completed To-Date that will be necessary for successful installation of HPAs and a separate report for HPWs.
- Design and build HPA/HPW Information Clearinghouse.
  - Document Clearinghouse design and coding specifications in *CA HPA/HPW Clearinghouse Web Portal Code/Design Specifications*.
  - Prepare *CA HPA/HPW Clearinghouse Web Portal Design/Launch Project Plan* that includes, but is not limited to:
    - Detailed coding specifications outlined in scheduled tasks with estimated duration and owner(s).
    - Task contingencies and critical milestones.
    - Adequate time for review, testing, and launch activities.
    - Proper site vetting and quality reviews during project stages.
  - Complete formal testing and review of Clearinghouse.
  - Develop *Clearinghouse Update Guidelines*.
    - Provide detail on how the Clearinghouse will be maintained and updated throughout the project and beyond. Clarify specific feedback loops, process, and ownership for completing content updates from:

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- Educational/Informational Forums (Task 3)
  - Direct engagement with builders, building officials, and Installers (Task 4)
  - HPA/HPW job site training (Task 5)
  - Above code design and product training sessions (Task 6)
  - HERS Verification Protocol Development and Training (Task 7)
  - Expansion of Vocational HS programs to include HPA/HPW (Task 8)
  - Measurement & Verification (Task 9)
  - Evaluation of Project Benefits (Task 10)
  - Technology Transfer Activities (Task 11)
  - Confirm quality assurance guidelines being followed to ensure 100% impartiality and objectivity relating to site content (e.g. – no favoritism to particular products, manufacturers, etc.).
- Organize CA HPA/HPW content and post to Clearinghouse. Content includes, but will not be limited to the following:
  - Results of the product and design evaluation task and condensed summaries of the information in the finalized HPA and HPW Product and Design Strategy Assessment Reports.
  - Summary and detailed links on the 2016 Standards.
    - Field Guides (PDF) – mobile device friendly
  - Products and strategies for meeting the new 2016 Standards.
    - Optimization Tools – California Building Energy Code Compliance (CBECC)
  - Manufacturer and trade association links with product informational resources.
    - Product installation videos/animations/PDF's
  - Online training resources.
    - Searchable by trade
    - Searchable by technology
    - CEU reporting and certificates
  - Checklists and tools.
  - Best practices photo library – illustrate right and wrong.
  - Reference library.
  - FAQs.
  - Webinar platform.
  - Schedules and online registration for:
    - Public in-person HPA and HPW training events
    - Webinars
  - Any other relevant Products from this agreement, as directed by the CAM.
- Market and launch *CA HPA/HPW Clearinghouse Web Portal*, making it free for the public.
  - Work with Wallrich Creative to develop *Web Portal Marketing Collateral* including print and online advertising, brochures, articles, and newsletters.
  - Implement strategies to publicize CA Info Clearinghouse, including, but not limited to:
    - Trade journals

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- Energy Commission Blueprint
- CABEC and utility efficiency program newsletters
- CALBO
- CBIA
- AIA

**Products:**

- HPA/HPW General Training Curriculum (Draft and Final)
- Annual Report on KSAs for Workers to Understand Each HPA Completed To-Date
- Annual Report on KSAs for Workers to Understand Each HPW Completed To-Date
- IOU Title-24 HPA/HPW Training Coordination and Integration Plan (Draft and Final)
- IOU HPA/HPW Training Modules
- Master Training Schedule
- Outline for the Implementation Barriers and Solutions Guide
- HPA/HPW Implementation Barriers and Solutions Guide
- Articles and Technical Briefs
- Annual Report on Lessons Learned from Forums
- HPA Product and Design-Strategy Assessment Report (Draft and Final)
- HPW Product and Design-Strategy Assessment Report (Draft and Final)
- CA HPA/HPW Clearinghouse Web Portal Code/Design Specifications
- CA HPA/HPW Clearinghouse Web Portal Design/Launch Project Plan
- Clearinghouse Update Guidelines
- CA HPA/HPW Clearinghouse Web Portal (Draft and Final and Launch)
- Web Portal Marketing Collateral

**TASK 4 Engage with Builders, Installing Subcontractors, Building Officials, and HERS Raters**

The goals of this task are to drive high quality, cost-effective HPA/HPW installations into the broader construction market; conduct focused and direct engagement with builders, installing subcontractors, building officials, and HERS Raters; and to deliver focused, builder value engineering (VE) seminars and broader VE meetings to builders, building officials, installing subcontractors, and HERS raters.

**The Recipient shall:**

- Develop building science and VE seminars, and provide these seminars at the offices of leading California builders in order to assure attendance from purchasing, construction, warranty/customer service, marketing and engineering/architectural divisions within the company.
  - Create *HPA/HPW Installation and Training Site Schedule*.
  - Engage in candid discussion of the risks and benefits of various products and systems for constructing HPAs and HPWs.

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- Provide energy modeling and cost data analysis to assist builders with cost-benefit assessment of the various systems and publish *HPA/HPW Energy Modeling and Cost Analysis* to the project Web Portal.
- Identify and leverage existing relationships between builders and insulation contractors to ensure successful collaboration.
- Provide review of energy models and plan sets.
- Confirm specific sites for installation and training demos for each system.
- Provide phone support to answer follow-on questions and to provide design assistance to builders.
  - Engage experts from trade associations or manufactures to assist with technical questions about specific products.
- Prepare *VE Seminar Final Report* which includes, but is not limited, to:
  - Risk/benefit analysis of construction of various HPA/HPW systems.
  - Overview of energy modeling and cost data leveraging HPA/HPW.
  - Confirmation of installation and training demonstration sites.
  - Stakeholder next steps and action items.
- Host/facilitate VE meeting between builder, impacted trades, installing contractors, and HERS Raters.
  - Explain HPA/HPW product requirements and installation requirements.
  - Work with subcontractors to understand code requirements and manufacturer installation requirements for the product or system being installed.
  - Include product manufacturer representation as needed.
  - Determine impact on subcontractor (HVAC, solar, roofing, plumbing, electrical, stucco, framing, etc.) schedules and processes.
  - Determine impact on builder cost, schedule, etc. due to alteration of subcontractors' process. Assist builder to develop/revise schedules and processes as needed to accommodate changes to construction process for HPA and/or HPW installation.
  - Enlist builders who committed match funding and job sites, as well as others recruited at the Task 3 Forums to select specific HPA/HPW product(s), systems, and design options for installation in new subdivisions.
  - Work with insulator and other builder subcontractors (e.g. roofers who may use insulated roof decking) to select new/advanced HPA/HPW products offered by suppliers/vendors within their existing supply-chain.
  - Draft *VE Meeting Final Report* which includes, but is not limited, to:
    - Overview of HPA/HPW product and installation requirements.
    - Summary of the new HPA/HPW requirements in the 2016 Standards.
    - Manufacturer installation requirements for products/systems being installed.
    - Impact and resolutions on all cost, schedule, process, and quality issues reviewed by meeting members.
- Schedule collaborative training at construction sites (Task 5).
- Coordinate with CALBO and local International Code Council (ICC) chapters to invite local building officials to attend job site trainings and installation demonstrations.

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**Products:**

- HPA/HPW Installation and Training Site Schedule
- HPA/HPW Energy Modeling and Cost Analysis
- VE Seminar Final Report
- VE Meeting Final Report

**TASK 5 Deliver and Oversee Job-site Training**

The goal of this task is to train the construction superintendent for the participating builder, insulation installers, and subcontractor crews on proper installation of HPA and HPW assemblies<sup>5</sup>.

**The Recipient shall:**

- Facilitate scheduling of manufacturer/trade association trainer, subcontractor crew chief, and builder superintendent to perform installation.
  - Schedule initial meeting to review goals and objectives with training participants.
  - Facilitate interactions and logistics between trades, builders, building officials, and manufacturer trainers.
  - Explain technique, answer questions, and record concerns from building officials, trades, and builders.
- Oversee and coordinate on-site training of builders, subcontractors, trades, and building officials at first available construction phase (3 to 5 homes).
  - Evaluate installation process (on-site demonstration-based training) against installation guidelines and training materials developed in Task 3.
  - At the conclusion of the onsite training/installation, solicit initial feedback from installers, builders, manufacturers and building officials on successes and challenges from each successive installation.
- Conduct off-site review of initial phase job-site training and compile lessons learned in the field.
  - Maintain contact with the builder and the manufacturer to identify any shortcomings or challenges with the training or method(s) employed during the first phase.
  - Provide feedback to manufacturer to improve training delivery.
  - Work with manufacturers to revise installation guidelines and/or training process.
  - Compose and publish *Summary of Job Site Training Lessons Learned* to the Information Clearinghouse. Summary will include lessons learned to:
    - Improve installation process and installation quality,

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<sup>5</sup> The CHF consultant team will be responsible for training the construction superintendents, while manufacturer and trade association expert trainers will provide the technical training to installing crews, as they have the expertise and hold the liability with respect to the proper installation of their insulation products. In some cases the installing subcontractor will be an insulation contractor, but in other cases it will be a framer learning advanced framing technique from APA, a roofer learning how to install SIPs from a SIPA trainer, or how to use Wedge-It or Green Hybrid Roofing products to provide above-deck insulation.

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- Recommended improvements to process,
- Reduce construction costs, and
- Address any outstanding practical installation and/or market barriers.
- Repeat trainings/installations in successive building phases for each builder/installer until installation practice for each particular technique is optimized (anticipated 3 – 5 phases). The team will work with each builder/installer and the Measurement and Verification (M&V) contractor to assess when it is appropriate to conclude the training activities.
- Follow up with building officials, the builder job-site superintendent, and subcontractor crew leaders in attendance to verify they understand the manufacturer's installation specifications and product approvals (*Evaluation Reports*).
- Respond to any code or building-science questions/concerns raised by builders and/or building officials or others on site.
  - Determine whether the concerns are adequately addressed by manufacturer training and installation specifications.
  - If inadequate, work with manufacturers and builders to revise specifications to building officials' satisfaction.
- Use this feedback to develop a *HPA Compliance Guide*, *HPW Compliance Guide*, and *Product-Specific Guidelines for HPA and HPW Installations in California*, for both print and Web Portal.
- Provide continued stakeholder support throughout project trainings and facilitate market transformation by:
  - Addressing existing market barriers, such as:
    - Concerns and hesitancy on the part of builders due to lack of familiarity with the products and methods for HPAs and HPWs.
    - Limitations of local building official knowledge base or product/design familiarity.
    - Need to obtain exemption for local building codes such as codes requiring attic ventilation.
  - Obtaining ICC evaluation reports for code acceptance.
  - Serving as liaison between building officials, builders, and manufacturers to overcome concerns.
- Support training and builder utilization of underfunded but promising emerging technologies including Wedge-It, Green Hybrid Roofing, and Western Cooling Efficiency Center's Aerosol Sealant (for application as an air-sealant in unvented attics with air-permeable insulation) by:
  - Assisting each product group to develop training materials.
  - Assessing, evaluating and developing solutions to code or practical barriers for each product.
- Once installation techniques have been perfected, record video footage of proper installation for three to five of the most successful product and design approaches to HPAs and two or three of the most successful HPW approaches.
  - Use this footage to produce succinct *HPA Installation Training Videos* for select HPA strategies and *HPW Installation Training Videos* for select HPW strategies. These

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videos will not be designed to provide a comprehensive resource, but rather a quick overview of each strategy to familiarize builders with different techniques and demonstrate ease of application for each technique (after sufficient training).

- Publish these videos to the project Web Portal and Energy Commission website, if requested by CAM.

#### **Products:**

- Summary of Job Site Training Lessons Learned
- HPA Compliance Guide (Draft and Final)
- HPW Compliance Guide (Draft and Final)
- Product-Specific Guidelines for HPA and HPW Installations in California
- HPA Installation Training Videos
- HPW Installation Training Videos
- Copies of Evaluation Reports (upon request of the CAM)

#### **TASK 6 Coordinate with IOUs and Administer Above-code Training with Leading-edge Builders**

The goals of this task are to (a.) leverage and coordinate with IOU residential new construction incentive programs to encourage early adoption of HPA and HPW designs, and (b.) support leading-edge single family and multifamily builders interested in developing homes that exceed the HPA/HPW requirements in the 2016 Standards, including support for the development of ZNE homes.

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

- Develop *CAHP/CMFNH/EPIC Coordination Plan*
- Engage participants in IOU new construction incentive programs, primarily the CAHP Code Readiness sub-program, in a collaborative design process aimed at exceeding the HPA and HPW requirements in the 2016 Standards.
- Identify builders interested in using HPAs and HPWs as part of a package to build ZNE homes.
- Provide design, product, and technical support to builders willing to exceed the 2016 Standards HPA and HPW prescriptive requirements.
- Prepare *Guidelines for ZNE-ready or near-ZNE HPA and HPW designs*.
- Coordinate closely with the CAHP program to provide incentives to participating builders.
  - Prepare a *Report on Leveraged CAHP/EPIC Program Savings* from HPA and HPW.
- Identify code, market, and practical barriers to exceeding 2016 HPA and HPW prescriptive requirements.
  - Expand the *Product and Design-Strategy Assessment Report (Appendix)* to address beyond-options and alternatives for HPW assemblies and attic configurations in the 2016 Standards.

#### **Products:**

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- CAHP/CMFNH/EPIC Coordination Plan
- Guidelines for ZNE-ready or near-ZNE HPA and HPW designs
- Report on Leveraged CAHP/EPIC Program Savings
- Product and Design-Strategy Assessment Report (Appendix)

**TASK 7 Develop Third-party Verification Requirements and Provide Insulation Installer Training and Certification**

The goal of this task is to improve the quality of insulation installation through improvements and updates to inspection protocols and training and certification of California installers. This task will also examine whether credentialing of insulation installers in California is a viable tool for improving the quality and durability of installations.

**The Recipient shall:**

- Work with Energy Commission Building Standards staff, HERS raters, and insulation installers, to identify and develop new HERS inspection protocols for verification of HPA and HPW systems.
- Prepare *Graphical and Written HERS HPA Inspection Protocols*.
- Prepare *Graphical and Written HERS HPW Inspection Protocols*.
- Create *Draft Updated HERS HPA/HPW Verification Forms* and solicit feedback by reviewing with insulation installers, HERS Raters, and Energy Commission staff.
- Submit proposed HERS verification form revisions to the Energy Commission for approval.
- Create *Final Updated HERS HPA/HPW Verification Forms*.
- Develop *HPA/HPW HERS Training Curriculum* for HERS rater training for first-time HERS certification and re-certification of existing raters.
- Deliver HPA/HPW training to HERS raters throughout IOU electric service territory.
  - Host trainings at IOU training centers and at leading HERS companies/organizations.
- Coordinate updates to all HERS Registries.
  - Post revised HERS verification forms to Registries and notify all Registry clients.
  - Confirm process for confirming, tracking, and disseminating updates to Rater certification/re-certifications.
- Create *Insulation Installer Certification Training and Testing Plan*.
- Provide training and certify workers through industry-recognized installation certification programs including SPFA Professional Certification Program (PCP), SIPAs Builder Education with Structural Insulated Panels (SIPS) Training program, and other existing installer/builder certification programs.
  - Deliver a series of exam-prep trainings to insulation crews including TruTeam (formerly Masco) and ALCAL (two of California's largest insulation contractors) for workers interested in entry-level or advanced installer certification.
  - Deliver multiple 1-hour early morning trainings to crews before they leave the warehouse (in order to avoid disrupting work schedules).

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- Provide mobile exam-proctoring services across the State to workers seeking certification.
- Assess the relevance of installer certification programs as a tool for ensuring insulation quality in California.
  - Categorize and evaluate existing certification programs offered through suppliers and trade associations.
  - Examine the potential for State recognition or requirements for existing installer certifications, or the need for new statewide insulation installer certification standards.
  - Assess the relationship between Quality Insulation Installation (QII) HERS inspection requirements and the level of training/certification of the installer.
  - Evaluate the pertinence of QII inspection training or certification for insulation installers.
  - Develop and submit an *Analysis of Insulation Installer Certification Programs* in the California construction market.

**Products:**

- Graphical and Written HERS HPA Inspection Protocols
- Graphical and Written HERS HPW Inspection Protocols
- Updated HPA/HPW Verification Forms (Draft and Final)
- HPA/HPW HERS Training Curriculum
- Insulation Installer Certification Training and Testing Plan
- Analysis of Insulation Installer Certification Programs

**TASK 8 Expand Existing High School Building Technology Programs and Connect Workers to Employment Opportunities**

The goals of this task are to (a) expand training curriculum and program infrastructure of a successful, existing vocational program operating in high schools throughout California, and (b.) build upon the Building Industry Technology Academy (BITA) program to enhance job-placement and higher education opportunities by connecting BITA graduates to community college and four-year programs as well as immediate job opportunities with insulators, framers, roofers, and other trades responsible for building envelope construction.

**The Recipient shall:**

- Work with BITA instructors to assess needs for curriculum and training resources in each BITA school, and use that information to develop *BITA Expansion Plan*.
- Expand the homebuilding industry's BITA program to include specific curriculum on construction of HPAs and HPWs.
- Coordinate with product manufacturers and builders to develop vocational training focused on the needs of industry and make accessible to high school students.
  - Use feedback to develop an *Industry Partnership Plan*.

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- Conduct job-site visits with BITA to observe the installation of HPA and HPW systems as part of the BITA training curriculum.
- Develop *HPA and HPW Job and Higher Ed Placement Plan* and coordinate with State and local Workforce Investment Boards (WIBs), BIAs, insulation installers, and other trades to provide job placement services for graduating students trained on the construction of HPAs or HPWs.
  - Leverage existing funding and established infrastructure for energy efficiency training (such as the CA WIB Proposition 39 grant for workforce training) to connect workers to jobs in the construction and insulation industry, and/or to further education through community college, apprentice, and four-year degree programs.
- Provide detailed *Report on Program Expansion* to document successes and challenges in implementing new curriculum, reaching new schools, and placing graduates into industry jobs.

#### **Products:**

- BITA Expansion Plan
- Industry Partnership Plan
- HPA and HPW Job and Higher Ed Placement Plan
- Report on Program Expansion

#### **TASK 9 Data Collection, Measurement, Verification and Evaluation**

The goals of this task are to (a) conduct an independent, third-party unbiased M&V and evaluation in order to assess the effectiveness of the training by verifying that the execution and quality of work is consistent with the training objectives, and (b.) to estimate the energy and durability impacts and benefits of the high performance wall and attic systems that are implemented in this project.

#### **The Recipient Shall:**

- Coordinate with the project team to clearly identify the specifications for the wall and attic systems to be implemented by the participating manufacturers and builders, and to develop the criteria on which the systems and installations are to be evaluated.
- Develop an *M&V Plan* that will identify M&V methods in detail, including:
  - Quality installation (QI) protocols for evaluating training effectiveness.
  - Methods for acquiring field data and information to support energy benefits and risk assessments (for example, prevention of moisture damage).
  - Definition of baseline construction practices and methods for using field data to develop estimates of energy savings relative to baseline practices.
- Coordinate with the project team to identify the specific sites, builders, and wall/attic assemblies to be evaluated.
- Schedule and conduct site visits to collect the information and data specified in the M&V plan, which in addition to QI observations may include contractor interviews, photographs, and collection of quantitative data such as dimensional measurements and temperature and moisture measurements (of baseline as well as HPW / HPA houses).

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- Use the qualitative information to assess differences between the QI protocols and actual practice for the purpose of verifying training effectiveness. As specified in the *M&V Plan*, methods may include:
  - Comparison of detailed construction and product installation methods and practices to curriculum training objectives to identify discrepancies and gaps.
  - Contractor interviews to identify reasons for discrepancies between QI specifications and practice, for example was the training inadequate, were untrained workers being used, or was the training ignored because contractor experience dictated other methods of construction or product installation?
- Use the construction specifications, QI information, and other data collected to characterize the performance of the HPW and HPA assemblies relative to baseline construction practices. As specified in the *M&V Plan*, this task shall include the following but not limited to:
  - EnergyPlus and/or CBECC-Res modeling of baseline houses, which are the same plans selected for application of HPW and HPA, except using 2013 Title 24 prescriptive measures (depending on the baseline chosen).
  - THERM analysis to characterize the thermal performance of the baseline wall and attic assemblies relative to HPW and HPA applied to the baseline houses.
  - EnergyPlus and/or CBECC-Res modeling the wall and roof assemblies applied to each plan using the thermal performance data from THERM.
  - For HPAs, calibration of models using measured attic temperatures.
  - For HPWs and HPAs, an assessment of moisture risks (using WUFI as needed).
- Prepare a *Training Effectiveness Report* that summarizes observations from all houses inspected, which will be categorized by:
  - Wall/attic system type,
  - Builder,
  - CZ.

And will provide assessment of:

- Contractor/installer field practice,
- Adherence to the training curriculum and objectives,
- Causes of discrepancies, and recommended remedial actions.

This report will also document how many of the workers that engaged in the construction of HPW & HPA components of each house, received training.

- Prepare a *Performance Assessment Report* that describes field measurements and observations, estimates energy savings (site and TDV), electricity demand impacts, and GHG impacts relative to the selected baselines, identifies durability issues related to installation quality and risks such as the potential for condensation under the roof deck; and highlights potential building code issues. This report will focus on electricity use and demand, but will include natural gas savings for space heating.
- Prepare a *Product and Practice Recommendations Report* that lists potential areas of technical improvement and identifies modifications to product design and/or methods of

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application, including framing and insulation methods, and adequacy of documentation and guidelines.

#### Products:

- M&V Plan
- Training Effectiveness Report
- Performance Assessment Report
- Product and Practice Recommendations Report

#### TASK 10 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.

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- Investment dollars/follow-on private funding as a result of Energy Commission funding.
- Patent numbers and applications, along with dates and brief descriptions.
- Additional Information for Product Demonstrations:
  - Outcome of demonstrations and status of technology.
  - Number of similar installations.
  - Jobs created/retained as a result of the Agreement.
- For Information/Tools and Other Research Studies:
  - Outcome of project.
  - Published documents, including date, title, and periodical name.
  - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
  - The number of website downloads.
  - An estimate of how the project information has affected energy use and cost, or have resulted in other non-energy benefits.
  - An estimate of energy and non-energy benefits.
  - Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.
  - A discussion of project product downloads from websites, and publications in technical journals.
  - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

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

**Products:**

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

**TASK 11 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:

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- An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
- A description of the intended use(s) for and users of the project results.
- Published documents, including date, title, and periodical name.
- Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
- A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
- The number of website downloads or public requests for project results.
- Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop on the results of the project.
- 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)
- 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

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: CALIFORNIA HOMEBUILDING FOUNDATION (CHF)

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

**RESOLVED**, that the Energy Commission approves Agreement EPC-15-009 from GFO-15-302 with California Homebuilding Foundation (CHF) for a \$4,431,918 grant to fund market assessment, targeted outreach, dissemination of information, and workforce training on High Performance Attics (HPAs) and High Performance Walls (HPWs), two of the new requirements in California's Building Energy Efficiency Standards for 2016. This agreement will ensure that an adequate number of California workers have the skills needed to properly install products and systems; and

**FURTHER BE IT RESOLVED**, that the Executive Director or his/her designee shall 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 November 12, 2015.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Tiffani Winter,  
Secretariat