STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015) CALIFORNIA ENERGY COMMISSION

New Agreement EPC-16-002 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	Brad Williams	51	916-327-3312

Recipient's Legal Name	Federal ID Number
DOE- Lawrence Berkeley National Laboratory	94-2951741

Title of Project
Pathways to More Cost-Effective ZNE Homes

Term and Amount	Start Date	End Date	Amount
	9/1/2016	6/30/2019	$ 1,000,000

Business Meeting Information

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

Proposed Business Meeting Date	7/13/2016	☐ Consent	☒ Discussion
Business Meeting Presenter	Brad Williams	Time Needed:	5 minutes

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

Agenda Item Subject and Description

LAWRENCE BERKELEY NATIONAL LABORATORY. Proposed resolution approving agreement EPC-16-002 with Lawrence Berkeley National Laboratory for a $1,000,000 grant. This paper study will investigate the benefits, feasibility and cost effectiveness of all-electric new construction Zero Net Energy (ZNE) homes in comparison to dual-fuel new construction ZNE homes with gas and electricity. This agreement will also assess the viability of off-site renewable power for meeting ZNE goals.

California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
   ☒ Yes (skip to question 2) ☐ No (complete the following (PRC 21065 and 14 CCR 15378)):
   Explain why Agreement is not considered a "Project":
   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: Cal. Code Regs., tit 14, § 15306
   ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)
   Explain reason why Agreement is exempt under the above section:
   This project is exempt under California Code of Regulations, Title 14 §15306 due to the work consisting of paper and computer studies with basic information collection related to Zero Net Energy buildings. The work includes building cost estimation, building modeling, total cost modeling of ZNE homes, developing an energy efficiency measure database, and studying energy supply and cost effectiveness models.

   ☐ b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)
   Check all that apply
   ☐ Initial Study
   ☐ Negative Declaration
   ☐ Mitigated Negative Declaration
   ☐ Environmental Impact Report
   ☐ Statement of Overriding Considerations

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

Legal Company Name:	Budget
Energy and Environmental Economics, Inc (E3)	$ 320,000
Davis Energy Group, Inc.	$ 99,000
	$
	$
	$
	$
	$
	$
	$

STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015) CALIFORNIA ENERGY COMMISSION

List all key partners: (attach additional sheets as necessary)
Legal Company Name:

Budget Information

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
EPIC	15-16	301.001C	$1,000,000
			$
			$
			$
			$
			$
R&D Program Area: EERO: Buildings		TOTAL:	$1,000,000
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Recipient's Administrator/ Officer				**Recipient's Project Manager**			
Name:	Betsy Quayle			Name:	Max Wei		
Address:	1 Cyclotron Rd Bldg 90R2000			Address:	1 Cyclotron Rd, MS 90R2002		
City, State, Zip:	Berkeley, CA 94720-8130			City, State, Zip:	Berkeley, CA 94720-0001		
Phone:	510-486-7391 /	Fax:	- -	Phone:	510-486-5220 /	Fax:	- -
E-Mail:	bequayle@lbl.gov			E-Mail:	mwei@lbl.gov		

Selection Process Used

☒ Competitive Solicitation Solicitation #: GFO-15-308

☐ First Come First Served Solicitation

The following items should be attached to this GRF

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

Agreement Manager	Date	Office Manager	Date	Deputy Director	Date

EXHIBIT A
Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Policy Scenarios, Building Measures and Costs
3	x	Energy Supply Options and Costs
4		Building Modeling and Energy Consumption
5		Cost Effectiveness and Impact Assessment
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CHP	Combined Heat and Power
CPR	Critical Project Review
CZ	Climate Zone
DR	Demand Response
EE	Energy Efficiency
GHG	Greenhouse Gas
GWP	Global Warming Potential
HFC	Hydrofluorocarbon
HVAC	Heating, Ventilation, and Air Conditioning
LCC	Life Cycle Cost
MF	Multi-family
NPV	Net Present Value
PEV	Plug-in electric vehicle
PV	Photovoltaic
REC	Renewable Energy Certificate
SF	Single Family
TAC	Technical Advisory Committee
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 additional investigation into the benefits, feasibility and cost effectiveness of all-electric, new construction Zero Net Energy (ZNE) homes in comparison

[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.

to dual-fuel ZNE homes with gas and electricity. This agreement will also assess the viability of off-site renewable power for meeting ZNE goals.

B. Problem/ Solution Statement

Problem

The State of California has the goal of all ZNE residential new construction starting in 2020. This would represent a dramatic increase in volume from approximately 40 units in 2014 to over 150,000 units in 2020. Due to the field of ZNE residential construction being a relatively new area of study, with a focus on technical feasibility and demonstration projects, there is no comprehensive study to date on the cost effectiveness of ZNE homes, the dependence of cost effectiveness with building type (single family (SF) vs multifamily (MF)); all-electric vs. non all-electric), geographical location, and the impact of high volume production of ZNE components. Such a study would be critically important to help inform policy makers on the best methods for cost effective implementation of ZNE homes.

Solution

The Recipient will provide detailed cost effectiveness modeling of all-electric ZNE homes vs. ZNE homes with gas-based heating. The evaluation will include the integration of building costs, the costs of building energy efficiency packages, installed equipment and lifetime investment costs including energy costs, and infrastructure costs (natural gas pipeline and electricity distribution system). The work will provide both spatial and temporal analysis in providing cost effectiveness assessments for four climate zones in the state and providing cost evolution scenarios as a function of time, for example as the ZNE industry scales up and under various policy and energy cost assumptions. This analysis will provide policymakers with a better understanding of the costs and benefits of ZNE policy choices they will face over the years between today and future ZNE milestones (all new residential construction will be ZNE by 2020, all new commercial construction will be ZNE by 2030), and the trade-offs for all–electric vs. electric and gas households.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

1. Provide policy makers with implementation scenarios and policies for cost-effective, new construction ZNE residential buildings;
2. Provide recommendations to policy makers about the performance of current ZNE pilot programs in California, based on real world data and experience; work with developers and the industry to ground truth constructability, costs, and market demand for a range of building features; leverage data of on-going ZNE pilots in California; and
3. Help building designers advance widespread adoption of ZNE through evaluation of the tradeoffs inherent in ZNE building design, including the cost-effectiveness of different design choices.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefits of increased safety and improved air quality.

Increased safety – Natural gas consumption will be reduced with greater adoption of alternatives such as heat-pump-based water heating or solar water heating, and consumer safety will be improved by reducing natural gas distribution, possible leakage, and combustion for onsite generation of heat.

Improved air quality - By accelerating the adoption of all-electric ZNE homes across California, this project is expected to improve health and safety for ratepayers by reducing criteria pollutants from natural gas combustion.

Technological Advancement and Breakthroughs:[3] 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 identifying key cost reduction opportunities such as the sensitivity of overall construction costs to Photovoltaic (PV) cost reduction, building shell measures, future end use appliance costs and performance, and off-site renewable energy procurement. This will lead to greater focus on specific building efficiency measures or packages, end use appliances, or distributed energy resources that need particular development or market instrument support. The project will explore the increasing role of electricity plug loads that are not currently regulated and constitute an increasing portion of overall electricity demand. This will lead to further development of energy efficient controls and management of this important segment of electricity demand.

An assessment of greenhouse gas (GHG) pollution from standard Hydrofluorocarbon (HFC) refrigerants used in heat pump technology will provide important quantification and highlight to what extent technological breakthroughs are needed in the area of lower Global Warming Potential (GWP) refrigerant heating and cooling equipment. Moreover, incorporating "total cost" valuation of items such as indoor air quality and ground based pollution from combustion utilizing the Recipient's models on air quality modeling and externality valuation will provide input to future policies on providing incentives and rebates to ZNE homes.

Agreement Objectives

The objectives of this Agreement are to:

1. Provide detailed ZNE building modeling cost and performance data;
2. Assess the feasibility, benefits and implementation issues of using off-site renewable energy to meet ZNE building goals;
3. Determine the Cost effectiveness of All-Electric ZNE homes vs. ZNE homes with Gas and Electricity as a function of geography and home type (SF vs. MF); and

[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).

[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.

4. Assess the current state of standard HFC refrigerants and provide recommendations for reducing GWP in future refrigerant generations

III. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products
The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V).** Products that require a draft version are indicated by marking **"(draft and final)"** after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, **"days"** means working days.

The Recipient shall:

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

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

For products that require a final version only

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

For all products

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

Instructions for Submitting Electronic Files and Developing Software:

- **Electronic File Format**

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

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

o **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.

EXHIBIT A
Scope of Work

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.

- 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.

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.
    - "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.

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.
    - Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
    - Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
    - Include a brief description of the project results in the Abstract.

- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt
- Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product
- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

Products:

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

CAM Product:

- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

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

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

The Recipient shall:

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

  If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:
  - A list of the match funds that identifies:
    - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
    - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (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:

- 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.

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:

- 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 POLICY SCENARIOS, BUILDING MEASURES AND COSTS (the Recipient lead with Davis Energy Group, E3)
The goal of this task is to determine ZNE building efficiency packages and end use costs including identification of policy scenarios, energy efficiency packages, framework for future plug load incorporation, and soliciting industry feedback.

The Recipient shall:

- Determine the range of policy scenarios for ZNE buildings and a finalized set of buildings and geographical locations to model e.g., all-electric vs. non all-electric, net metering policy, etc.
- Determine a set of ZNE prototype new buildings to model, e.g., SF homes and low-rise apartment buildings, based on Davis Energy Group designs (or other as approved by the CAM), Department of Energy (DOE) databases and the 2016 Title 24 building code, building upon existing ZNE building designs or other ZNE pilot studies
- Identify potential measures and their associated costs to be included in the design optimization process (e.g., building shell measures, windows, walls, heating, ventilation, and air conditioning (HVAC) equipment, solar water heating, etc.)
- Develop a set of optimal building energy efficiency (EE) measure packages (EE and demand response (DR)) for each building type and climate that span the range from Title 24 code-compliant (current standards) to levels with greater efficiency (e.g., Title 24 + 20%) where the individual measures have a cost per Time Dependent Value point that is lower than PV
- Determine a general framework for treating plug loads in future building construction based on review of literature, proposed code developments, and including discussion with the Recipient
- Review this set of building packages and building EE/DR packages with building industry advisors (Meritage Homes, Lennar Urban or others), and with other building industry contacts for viability including "constructability" considerations
- Determine and document the suite of EE appliances for ZNE homes, for the case of both an all-electric homes and homes with gas and electricity
- Summarize costs of end use electricity appliances and HVAC equipment from existing data sources including the Recipient's appliance standards, literature and other industry and market sources
- Develop estimates for infrastructure costs (gas pipeline and electric distribution costs) including maintenance and upkeep costs from literature and consultation with utility advisors
- Build a comprehensive list of building developers and contractors to survey on current ZNE costs, building EE packages, construction costs, and possible future cost reductions from subcontractor's building industry contacts, contacts in ZNE building pilots from SCE, SDG&E and PG&E utility industry advisors, and from building industry advisors such as Meritage Homes and Lennar Urban.

- Develop a set of survey questions for expert elicitation for existing ZNE building costs, the set of building EE package developed above, and construction costs
- Interview building industry representatives using the survey developed earlier in this task
- Develop cost reduction trends for EE/DR packages, construction activity and end use appliances based on historical data, learning curves, and industry advisor inputs
- Develop a dataset of EE/DR packages and building measures costs including associated material and construction costs
- Develop a dataset of infrastructure costs for gas pipeline and electric distribution costs, maintenance and upkeep costs, and electricity distribution costs.
- Provide a *ZNE Analysis Report* including but not limited to:
  - Discussion(s) of all work conducted in Task 2 including (if applicable) but not limited to :
    - A copy of any survey(s)/interview(s) questions and results
    - Discussion of work and/or research conducted and results
    - Results and discussion of any analysis conducted including copies of datasets generated in pdf and excel format

Products:

- ZNE Analysis Report (draft and final)

TASK 3 ENERGY SUPPLY OPTIONS AND COSTS (E3 Lead with LBNL)

The goal of this task is to delineate the range of energy supply options for ZNE homes and to estimate current and future anticipated costs.

The Recipient shall:

- Capture and record the set of all current relevant policies for ZNE energy supply options including but not limited to federal and state incentives, net metering policies, energy storage and Combined Heat and Power (CHP) goals and future potential policies, building upon Task 1 policy scenario definition
- Develop cost of directed biogas as an option for alternative supply to natural gas building upon earlier renewable gas options analysis work by E3 and/or others.
- Determine the range of energy supply options for (1) onsite delivery of energy; and (2) offsite delivery of energy
- Complete work for onsite options including but not limited to:
  - Delineate and develop cost projections for the set of options for onsite energy production including distributed renewable generation, combined heat and power and other options including but not limited to onsite biogas generator feeding a fuel cell system for a MF commercial building. This work will leverage existing and ongoing work within the building energy industry including that from the recipient team. Determine current temporal energy output profiles and cost structure for the onsite energy supply options identified in this task using existing literature and cost projections and modeling
- Complete work for offsite options including but not limited to:
  - Delineate and develop cost projections for the set of options for offsite energy production or renewable energy credits such as the renewable energy certificate (REC) market, power purchase agreements, batteries and community solar (e.g., SB

43) based on market data. Battery research will include published learning curves for Li-ion automotive batteries.
    - For each set of offsite options, develop a list of pros and cons and generate a range of costs based on current markets (e.g., REGIS market for RECs) for new ZNE homes and commercial buildings.
    - Develop a set of implementation issues for each offsite option which may include contractual obligation issues, tax incentive disbursement and validation/verification issues
    - Determine options, for each set of implementation issues, how offsite renewable generation can be included in Title 24 code from a literature review, utility industry advisor inputs, and tracking the state's implementation of community solar statute (SB43).
- Compile commercial building ZNE data (e.g., energy demands, available roof space, etc.) from existing building data, building developer contacts, utility industry advisors (SCE, PG&E, SDG&E), and building developer industry advisors (e.g., Lennar Urban and Meritage).
- Leverage existing and ongoing commercial building modeling data from the Recipient's Building Technologies and Urban Systems Group and team members (e.g., Tianzhen Hong); and renewable energy supply cost and policy trends for commercial buildings from expert advisors.
- Develop a database of all energy supply options including costs and cost reduction trends
- Provide a *ZNE Energy Supply Report* including but not limited to:
    - Discussion(s) of all work conducted in Task 3 including (if applicable) but not limited to :
        - A copy of any survey(s)/interview(s) questions and results
        - Discussion of work and/or research conducted and results
        - Results and discussion of any analysis conducted including copies of datasets generated in pdf and excel format
- Attend a CPR meeting and provide a *CPR Report* as described in subtask 1.3

Products:
- ZNE Energy Supply Report (draft and final)
- CPR Report

TASK 4 BUILDING MODELING AND ENERGY CONSUMPTION

The goal of this task is to determine the lifecycle costs and energy consumption by building type and geography.

The Recipient shall:
- Model prototype SF and MF homes across the range of EE packages defined in Task 2 and across at least four different climate zones (CZ) to assess incremental savings by feature by CZ. Utilize the cost and energy supply data from Tasks 2 and 3 and the BEopt[4] building software.

[4] The BEopt™ (Building Energy Optimization) software by NREL provides capabilities to evaluate residential building designs and identify cost-optimal efficiency packages at various levels of whole-house energy savings. The software is free for download at: https://beopt.nrel.gov/downloadBEopt2

- Develop building life cycle costs (LCC) and project net present values (NPV) for the cost difference between ZNE and code-built homes (2016 Title 24 Code).
- Identify leading SF and MF home design approaches for each home type (e.g., all electric, dual fuel) and climate zone based on least cost using LCC and NPV energy consumption estimates.
- Develop the costs and energy consumption as a function of energy efficiency package (e.g. 2016 Title 24 code-built, Title 24 + 20%, Title 24 + 30%) defined in Task 2.
- Provide an assessment of the trade-offs in ZNE building design and implementation of onsite and offsite energy production (e.g., degree of EE measures and packages vs. onsite solar capacity).
- Develop prototype subdivisions with homes and other building types in various orientations to determine the range of building costs and energy outcomes as a function of orientation
- Develop a side case for plug-in electric vehicle (PEV) ownership and onsite charging for electricity demand and appropriate EV sizing utilizing existing and ongoing work on PEV demands and load shapes (i.e., "Building a Healthier and More Robust Future: 2050 Low Carbon Energy Scenarios for California" project for the California Energy Commission, with PI M. Wei).
- Examine various supply options for energy supply costs and temporal matching to energy demand including but not limited to onsite PV and offsite community scale PV
- Develop a dataset of building energy costs and NPV by building type and climate zone delineated by energy efficiency package and type of energy supply
- Provide a *ZNE Building Modeling and Consumption Report* including but not limited to:
  - Discussion(s) of all work conducted in Task 4 including (if applicable) but not limited to :
    - A copy of any survey(s)/interview(s) questions and results
    - Discussion of work and/or research conducted and results
    - Results and discussion of any analysis conducted including copies of datasets generated in pdf and excel format

Products:

- ZNE Building Modeling and Consumption Report (draft and final)

TASK 5 COST EFFECTIVENESS AND IMPACT ASSESSMENT (E3 lead with LBNL)

The goal of this task is to determine the total costs and other impacts for ZNE homes that are either all electric or gas/electric.

The Recipient shall:

- Develop cost effectiveness metrics[5] as defined by the CPUC to complement the customer LCC and NPV in Task 4 such as ratepayer and utility cost effectiveness
- Perform sensitivity analysis on customer NPV and CPUC cost effectiveness metrics on key parameters such as costs of EE packages, construction costs and fuel and distributed energy supply costs
- Develop estimates for the range of cost reductions from ZNE new home material and construction costs as the volume of the industry scales up (i.e., 100's, 1000's and

[5] http://www.cpuc.ca.gov/General.aspx?id=5267

100,000s of units per year) using existing data from the housing industry, building developer expert elicitation, and utilizing the experience curve analysis methods used by staff (e.g., M. Wei in Wei et. al. (2015), and Smith, Wei, and Sohn (2015)).

- Conduct scenario analysis of possible ZNE community outcomes such as greater impacts from climate change (e.g., inputting modified weather files with hotter summers in BEopt modeling tool) or much higher prices of carbon
- Model the impact of large-scale rooftop PV installations in California on the electricity supply system in the Western Electricity Coordination Council under various ZNE implementation scenarios using an electricity supply model such as UC-Berkeley SWITCH (this will be done as part of the separately funded "Building a Healthier and More Robust Future: 2050 Low Carbon Energy Scenarios for California" project [6]).
- Investigate other qualitative or semi-quantitative impacts from all electric homes such as air quality and heat-pump based performance concerns, utilizing existing work with the Recipient's in indoor air quality modeling, heat pump water heating field testing, and externality valuation of offset fuel combustion.
- Determine GHG pollution impact of hydrofluorocarbon refrigerant leakage from heating and cooling equipment such as heat pump based water heating and compare the GHG impact to a scenario of a rapid transition to lower global warming potential refrigerants.
- Determine potential methane natural gas leakage rates associated with ZNE homes with gas-based heating
- Assess the range of possible plug load consumption based on historical trends both nationally (U.S. Energy Information Administration Residential and Commercial End-Use Energy Surveys) and for California (Residential Appliance Saturation Survey and California Commercial End-use Survey end-use surveys)
- Provide an overall GHG pollution impact assessment for the various implementation options above for ZNE homes including the case of PEV vehicle ownership and on-site charging
- Determine impacts to utilities and ratepayers from LCC, NPV, and CPUC cost effectiveness tests and sensitivity analysis.
- Review the above analysis from this Task with building and utility industry advisors and further determine stakeholder impacts of ZNE home options through expert elicitation
- Provide a synthesis of the above work to identify key cost reduction opportunities, cost effective strategies, and potential new innovative business models for implementing ZNE homes
- Provide a *ZNE Cost Effectiveness and Impact Report* including but not limited to:
  - Discussion(s) of all work conducted in Task 5 including (if applicable) but not limited to :
    - Copy of any survey(s)/interview(s) questions and results
    - Discussion of work and/or research conducted and results
    - Results and discussion of any analysis conducted including copies of datasets generated in pdf and excel format

Products:

- ZNE Cost Effectiveness and Impact Report

[6] California Energy Commission: Agreement EPC-14-072

TASK 6 EVALUATION OF PROJECT BENEFITS
The goal of this task is to report the benefits resulting from this project.

The Recipient shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:

    - For Product Development Projects and Project Demonstrations:
        - Published documents, including date, title, and periodical name.
        - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
        - GHG and criteria emissions reductions.
        - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
        - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
        - A discussion of project product downloads from websites, and publications in technical journals.
        - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
        - Additional Information for Product Development Projects:
            - Outcome of product development efforts, such copyrights and license agreements.
            - Units sold or projected to be sold in California and outside of California.
            - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.
            - Investment dollars/follow-on private funding as a result of Energy Commission funding.
            - Patent numbers and applications, along with dates and brief descriptions.
        - Additional Information for Product Demonstrations:
            - Outcome of demonstrations and status of technology.
            - Number of similar installations.
            - Jobs created/retained as a result of the Agreement.

    - For Information/Tools and Other Research Studies:
        - 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 7 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES
The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to the public and key decision makers.

The Recipient shall:
- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
  - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
  - A description of the intended use(s) for and users of the project results.
  - Published documents, including date, title, and periodical name.
  - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
  - A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
  - The number of website downloads or public requests for project results.
  - Additional areas as determined by the CAM.

- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.
- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

Products:

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

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

RESOLUTION NO: 16-0713-12b

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: DOE-LAWRENCE BERKELEY NATIONAL LABORATORY

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-16-002 from GFO-15-308 with the Department of Energy's Lawrence Berkeley National Laboratory for a $1,000,000 grant to investigate the benefits, feasibility and cost effectiveness of all-electric new construction ZNE homes in comparison to dual-fuel new construction ZNE homes with gas and electricity. This agreement will also assess the viability of off-site renewable power for meeting ZNE goals; 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 July 13, 2016.

AYE: [List of Commissioners]
NAY: [List of Commissioners]
ABSENT: [List of Commissioners]
ABSTAIN: [List of Commissioners]

Cody Goldthrite,
Secretariat