

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-17-050 (To be completed by CGL Office)

| | | | |
|------|--------------|----|--------------|
| ERDD | Guido Franco | 43 | 916-327-2392 |
|------|--------------|----|--------------|

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| The Regents of the University of California, on behalf of the Los Angeles Campus | 95-6006143 |
|----------------------------------------------------------------------------------|------------|

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|-----------------------------------------------------------------------------------------------------------------|
| Using Big Data to Holistically Assess Benefits from Building Energy System Transition Pathways in Disadvantaged |
|-----------------------------------------------------------------------------------------------------------------|

| | | |
|------------|------------|--------------|
| 07/11/2018 | 12/31/2021 | \$ 1,098,662 |
|------------|------------|--------------|

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

| | | | |
|--------------------------------|------------------|----------------------------------|------------------------------------------------|
| Proposed Business Meeting Date | 7/11/2018 | <input type="checkbox"/> Consent | <input checked="" type="checkbox"/> Discussion |
| Business Meeting Presenter | Katharina Snyder | Time Needed: | 5 minutes |

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

Agenda Item Subject and Description

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, ON BEHALF OF THE LOS ANGELES CAMPUS.
 Proposed resolution approving Agreement EPC-17-050 with The Regents of the University of California, on behalf of the Los Angeles campus, for a \$1,098,662 grant for detailed urban energy planning that considers urban renewable sources, energy efficiency, building retrofits, electrification, air quality and greenhouse gas emissions, and environmental justice concerns resulting in actionable recommendations for the targeted area. (EPIC funding)
 Contact: Katharina Snyder. (Staff presentation: 5 minutes)

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 the project does not involve a change in environmental conditions. It is basically a paper study with some measurements of ambient conditions.

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

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

| Legal Company Name: | Budget |
|----------------------|------------|
| Day One | \$ 155,043 |
| The Energy Coalition | \$ 154,383 |
| | \$ |
| | \$ |

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION



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|---------------------|
| |
| Legal Company Name: |
| |

| Funding Source | Funding Year of Appropriation | Budget List No. | Amount |
|-----------------------------------|-------------------------------|----------------------|-------------|
| EPIC | 17-18 | 301.001E | \$1,098,662 |
| | | | \$ |
| | | | \$ |
| R&D Program Area: EGRO: EA | | | \$1,098,662 |
| Explanation for "Other" selection | | | |
| Reimbursement Contract #: | | Federal Agreement #: | |

| | | | |
|-------------------|-----------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------|
| Name: | Alice Young-Singleton | Name: | Felicia Federico |
| Address: | Ucla Office Of Contract & Grant BOX 951406, 11000 Kinross Bldg, Ste. 211 | Address: | UCLA Inst of the Environment 619 Charles E. Young Drive East. La Kretz, Suite 300 |
| City, State, Zip: | Los Angeles, CA 90095-1406 | City, State, Zip: | Los Angeles, CA 90095 |
| Phone: | 310-794-0236 / | Fax: | - - |
| E-Mail: | alice.young-singleton@research.ucla.edu | E-Mail: | ffederico@ioes.ucla.edu |

| | |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <input checked="" type="checkbox"/> Competitive Solicitation <input type="checkbox"/> First Come First Served Solicitation | Solicitation #: GFO-16-311 |
|-------------------------------------------------------------------------------------------------------------------------------|----------------------------|

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Exhibit A, Scope of Work 2. Exhibit B, Budget Detail 3. CEC 105, Questionnaire for Identifying Conflicts 4. Recipient Resolution 5. CEQA Documentation | <input checked="" type="checkbox"/> Attached <input checked="" type="checkbox"/> Attached <input checked="" type="checkbox"/> Attached <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Attached <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Attached |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | | | | | |
|-------------------|------|----------------|------|-----------------|------|
| Agreement Manager | Date | Office Manager | Date | Deputy Director | Date |
|-------------------|------|----------------|------|-----------------|------|

EXHIBIT A

Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

| Task # | CPR ¹ | Task Name |
|--------|------------------|------------------------------------------------------------------------------------|
| 1 | | General Project Tasks |
| 2 | | Survey of Community Natural Gas Appliances and Usage Behaviors |
| 3 | X | Implementation of Indoor Air Quality Monitoring Program |
| 4 | | Development of Customized Indoor and Ambient Natural Gas Combustion Impact Factors |
| 5 | | Generation of Baseline Electricity and Natural Gas Hourly Load Profiles |
| 6 | | Evaluation of Energy System Transformation Pathway Scenarios |
| 7 | | Assessment of Relative Indoor and Ambient Air Emissions Impacts |
| 8 | | Communication of Study Findings to Community Members |
| 9 | | Evaluation of Project Benefits |
| 10 | | Technology/Knowledge Transfer Activities |

B. Acronym/Term List

| Acronym/Term | Meaning |
|--------------|------------------------------|
| CAM | Commission Agreement Manager |
| CAO | Commission Agreement Officer |
| CPR | Critical Project Review |
| GHG | Greenhouse Gas |
| PM | Particulate Matter |
| TAC | Technical Advisory Committee |

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

A. Purpose of Agreement

The purpose of this Agreement is to fund a study that uses big data to address some of the uncertainty around the ways in which buildings and urban energy system transitions are likely to affect the exposure of Californians to various health risks associated with the combustion of natural gas. The results will be actionable, including a suite of technology options that will yield significant reductions in criteria and greenhouse gas (GHG) emissions at the lowest cost.

B. Problem/ Solution Statement

Problem

As California moves forward with its aggressive agenda to decarbonize its energy system, care must be taken to assess the degree to which its pursuit of various energy system transformation pathways is likely to result in additional benefits for Californians. One extremely important category of benefits is the reduction of health risks that result from exposure to natural gas

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

EXHIBIT A

Scope of Work

combustion by-products, both from appliances within homes and from grid scale generation stations. There is no study that currently assesses these benefits at a local scale as they relate to various building energy system decarbonization pathways.

Solution

The Recipient will use big data to quantify the extent to which various decarbonization pathways are likely to modify the shape of a real world disadvantaged community's hourly electricity and natural gas load profiles. These load curve changes will then be propagated into indoor and ambient air quality impacts through a set of impact factors that will be customized to the specific community's local context through an integrated community outreach and measurement program.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Perform a quantitative analysis of the various interactions between the electricity and natural gas systems and how decisions that are made with respect to one are likely to influence the operation of the other.
- Describe and measure the various ways in which energy consumption within homes can put residents at risk of adverse health consequences due increased exposure to noxious fossil fuel combustion co-products both within and outside of doors.
- Better understand the degree to which different energy transition pathways are likely to naturally be pursued within disadvantaged communities by facilitating direct informational exchange through on-the-ground community outreach efforts.
- Build upon the work done under EPIC agreement 300-16-002, Economic Impact Analysis of Long-Term Energy Scenarios and Disadvantaged Communities.

Ratepayer Benefits:² This Agreement will result in the ratepayer benefits of lower costs and increased safety by reducing the uncertainty around the following questions:

- Which energy system transformations are likely to be naturally pursued, and to what extent, by disadvantaged community members within one Investor Owned Utilities territory.
- Which energy system transformation pathways are associated with maximum benefits, both in terms of carbon emissions reductions and in terms of improved public health.
- What is the proportionality of risk experienced by exposure to the indoor air pollution versus ambient air pollution generated by the combustion of natural gas. This is necessary to estimate the potential benefits of electrification.

Technological Advancement and Breakthroughs:³ This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of

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.

EXHIBIT A

Scope of Work

California's statutory energy goals by creating a community based, integrated modeling framework capable of quantitatively evaluating a holistic set of benefits associated with the pursuit of various energy system transformation pathways. This framework will be highly flexible with respect to: (1) the geographic scale of the target case study community, (2) the unique on-the-ground characteristics present within the target case study community, (3) the set of energy system transformations whose relative benefits are sought to be evaluated.

This study will have immediate application to the disadvantaged communities within the case study area by informing decisions related to energy transitions and will also be scalable and transferrable to communities statewide.

Agreement Objectives

The objectives of this Agreement are to:

- To solicit qualitative and quantitative information from members of a disadvantaged community about the characteristics of their existing natural gas appliances and their usage behaviors as pertains to their potential risk of negative health impacts due to natural gas combustion co-product exposure.
- To develop a technical modeling framework capable of using real world monthly metered consumption data for electricity and natural gas to generate hourly load curve profiles for a disadvantaged community of significant size.
- To quantitatively articulate a set of feasible endpoint scenarios for the pursuit of various energy system transformation pathway scenarios and evaluate their expected influence on the case study community's electricity and natural gas hourly load profiles.
- To evaluate relative changes in anticipated levels of indoor and ambient human health impacts expected from the pursuit of the various different energy system transformation pathway scenarios previously articulated.
- Quantify the potential GHG reduction benefits of the different urban energy scenarios developed under this grant.
- Work with our partner Community Based Organization (CBO) throughout the project to solicit community feedback for the calibration of baseline modeling assumptions for the various pathway scenarios and for the identification of potential obstacles and likely solutions.
- To develop an effective communication strategy to motivate the implementation of win-win measures as revealed by the studies' findings.

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.

EXHIBIT A

Scope of Work

The Recipient shall:

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

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

For products that require a final version only

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

For all products

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

Instructions for Submitting Electronic Files and Developing Software:

○ **Electronic File Format**

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

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

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

○ **Software Application Development**

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:

EXHIBIT A

Scope of Work

- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
- Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
- Visual Studio.NET (version 2008 and up). Recommend 2010.
- C# Programming Language with Presentation (UI), Business Object and Data Layers.
- SQL (Structured Query Language).
- Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
- Microsoft SQL Reporting Services. Recommend 2008 R2.
- XML (external interfaces).

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

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

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

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

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

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
- An updated Project Schedule;
- Technical products (subtask 1.1);
- Progress reports and invoices (subtask 1.5);
- Final Report (subtask 1.6);
- Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
- Any other relevant topics.

EXHIBIT A

Scope of Work

- 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.

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- 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.

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- 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)

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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.

EXHIBIT A

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- 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.

EXHIBIT A

Scope of Work

- 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.

EXHIBIT A

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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;

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- 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

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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: SURVEY OF COMMUNITY NATURAL GAS APPLIANCES AND USAGE BEHAVIORS

The goals of this task are to conduct surveys of local community members to collect information on the number and type of natural gas appliances installed within their homes, the physical characteristics of those appliances' installation, and any behaviors involved with their use that might be relevant to the experience of health impacts due to exposure to natural gas combustion co-products.

The Recipient shall:

- Develop a set of survey questions to be administered to local community members capable of eliciting relevant information to the study's various modeling objectives.
- Develop a *Survey / Monitoring Design Plan* that includes the survey questions, identifies the outreach process and venues at which the survey will be conducted, as well as the process for recruiting volunteers for indoor air monitoring (implementation of monitoring is under Task 3). Describe the incentives to be provided to participants.
- Administer the surveys to a statistically meaningful sub-set of community members as determined in the Survey / Monitoring Design Plan.
- Prepare a *Summary Report of Survey Findings* that synthesizes survey response data and includes the results of survey analyses as an appendix.

Products:

- Survey / Monitoring Design Plan
- Summary Report of Survey Findings (draft and final)

TASK 3: IMPLEMENTATION OF INDOOR AIR QUALITY MONITORING PROGRAM

The goal of this task is to implement an indoor air quality monitoring program throughout homes in the Avocado Heights / Bassett community in Los Angeles County (or similar disadvantaged community approved by the CAM). This will be done in coordination with community-based organizations. In conjunction with the survey activities in Task 2, the recipient will identify a sub-set of community members (up to 75) who are willing and able to host a web-connected indoor air quality data monitor within their homes for real time measurement of particulate matter (PM) concentrations, as well as to host a passive indoor NO₂ monitor. PM data will be available (with the homeowner's consent) via a web monitoring platform where it can be accessed by the homeowner and the project team, as well as in an anonymized form by other interested parties.

The Recipient shall:

- Solicit community members for their willingness to participate in a continuous air quality monitoring effort.
- Oversee the purchase, installation, and validation of indoor and paired outdoor air quality monitoring logging equipment at participants' homes.

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- Prepare a *Summary Report of Indoor and Outdoor Air Quality Findings* that synthesizes collected monitoring data and includes maps as appropriate while protecting confidential/private information. Include summary results of paired indoor/outdoor air quality monitoring data in an appendix.
- Prepare *CPR Report* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:

- Summary Report of Indoor Air Quality Monitoring Results (draft and final)
CPR Report

TASK 4: DEVELOPMENT OF CUSTOMIZED INDOOR AND AMBIENT NATURAL GAS COMBUSTION IMPACT FACTORS

The goals of this task are to develop a customized set of human health impact factors for two different exposure pathways (indoor & ambient) to a set of criteria pollutants emitted as co-products of the combustion of natural gas. These impact factors will be based upon a synthesis of reference literature values, survey responses about the characteristics of natural gas appliances and combustion behaviors within the community (from Task 2), indoor air quality monitoring data collected from community members as part of this study (from Task 3), as well as regional air quality management district emissions data quantifying the pollutant output intensity of associated grid level point source natural gas generator facilities.

The Recipient shall:

- Perform a literature review of relevant previous air-quality monitoring and epidemiological studies to determine reference ranges for the diversity and severity of human health impacts associated with acute and chronic exposure to various concentrations of chemical species emitted as co-products from the combustion of natural gas both within the home and by large point source generators.
- Calibrate the target case study community taking into account the similarities and differences relative to what is available in the literature. Estimate impact factor value ranges on the basis of qualitative information obtained from the on the ground survey efforts as well as on the basis of quantitative information obtained from the indoor air-quality monitoring effort conducted as part of this analysis.
- Develop a *Summary Report on the Specification of Local Indoor and Ambient Natural Gas Combustion Impact Factors* to be used within the context of the subsequent energy system transformation pathway scenario analysis.

Products:

- Summary Report on the Specification of Local Indoor and Ambient Natural Gas Combustion Impact Factors (draft and final)

TASK 5: GENERATION OF BASELINE ELECTRICITY AND NATURAL GAS HOURLY LOAD PROFILES

The goals of this task are to generate a set of baseline hourly load curve profiles for the consumption of both electricity and natural gas by all of the residential properties contained within a defined community boundary to be specified by the project team with approval by the CAM. These hourly load curve profiles will be used as the basis of comparison for the project's

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subsequent evaluation of different energy system transformation pathway scenarios. The modeling tools used to generate these baseline scenarios will be calibrated using real world account level consumption data for Southern California Edison and Southern California Gas customers contained within the LA Energy Atlas backend database stored on the UCLA campus and administered under secure protocols by researchers from the UCLA's California Center for Sustainable Communities.

The Recipient shall:

- Define the boundaries of the target case study community (Avocado Heights/Bassett or similar community approved by the CAM).
- Collect data about the characteristics and geographic distribution of residential properties within the target case study community from the Los Angeles County Assessor's office tax roll parcel database.
- Collect data about the monthly total energy consumption characteristics of residential properties within the target case study community from the LA Energy Atlas consumption database using values averaged across available time periods within the Atlas.
- Use the two preceding data sets to parameterize the development of a community scale energy system model within National Renewable Energy Laboratory's OpenStudio modeling platform (or similar software acceptable to the CAM) capable of outputting accurate hourly load curves for both electricity and natural gas on the basis of monthly calibration data.
- Generate baseline hourly load curve profiles for the cumulative electricity and natural gas consumption in all of the residential properties located within the target case study community (this is an intermediate data product that will be consumed by subsequent analyses within the project).
- Prepare a *Building Models and Summary Report* that describes the load profile modeling process and results including but not limited to final load profiles that will be used for modeling, and other information needed to understand how they were derived.

Products:

- Building Models and Summary Report (draft and final)

TASK 6: EVALUATION OF ENERGY SYSTEM TRANSFORMATION PATHWAY SCENARIOS

The goals of this task are to quantitatively express different possible trajectories for potential future energy system transformations expected to take place with respect to (1) vehicle electrification, (2) electrification of natural gas appliances, (3) penetration of distributed renewable energy generation and energy storage technologies, and (4) the scale and extent of energy efficiency improvements within existing residential buildings. The quantitative articulation of different scenarios both within and among each of these four pathways will be accomplished through the synthesis of literature data and forecast predictions regarding the anticipated future rates of technological learning and market penetration within various sectors. Scenarios which involve the specification of potential future levels of natural gas appliance electrification will also be determined on the basis of survey responses about community members' attitudes and preferences in this area. Finally, the various technological development scenarios' expected impacts on the community's hourly load profiles for both electricity and natural gas will be

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evaluated using the Hybrid Renewable and Distributed Energy System optimization model (or similar software acceptable to the CAM).

The Recipient shall:

- Prepare an *Initial Energy System Pathway Transformation Scenarios Report* comprising combinations of future end-point states defined with respect to the four pathways previously defined.
- Prepare a *Scenario Assessment Methodology Plan* that documents the process for evaluating the extent to which these energy system pathway scenarios would be expected to modify the respective shapes of the community's hourly electricity and natural gas load profiles.
- Prepare a *Final Energy System Pathway Transformation Scenarios Report* that incorporates survey data from Task 2.
- Apply the scenario assessment methodology to conduct the evaluation.
- Prepare a *Summary Report on the Expected Hourly Load Profile Changes from Various Energy System Transformation Scenarios*.

Products:

- Initial Energy System Pathway Transformation Scenarios Report
- Scenario Assessment Methodology Plan
- Final Energy System Pathway Transformation Scenarios Report
- Summary Report on the Expected Hourly Load Profile Changes from Various Energy System Transformation Pathway Scenarios (draft and final)

TASK 7: ASSESSMENT OF RELATIVE INDOOR AND AMBIENT AIR EMISSIONS IMPACTS AND GREENHOUSE GAS EMISSIONS

The goals of this task are to integrate the localized indoor and ambient air-quality impact factors (Task 4) with the expected hourly load curve profile changes associated with the various energy system transformation pathway scenarios under consideration (Task 6). This procedure will result in a holistic estimation of benefits associated with realization of the various transformation pathway scenarios.

The Recipient shall:

- Estimate the relative magnitude of change in indoor and ambient air-quality impacts associated with the various endpoint states captured within the set of proposed energy system transformation pathway scenarios.
- Estimate the potential implications on GHG emissions from the urban energy scenarios developed under this task.
- Prepare a *Summary Report on the Holistic Benefits from Various Energy System Transformation Pathways*, including the estimated benefits and the method used to estimate benefits.

Products:

- Summary Report on the Holistic Benefits from Various Energy System Transformation Pathways (draft and final)

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TASK 8: COMMUNICATION OF STUDY FINDINGS TO COMMUNITY MEMBERS

The goals of this task are to prepare a set of documentation materials as well as organize one or more community events to share the findings of our analysis to interested parties.

The Recipient shall:

- Translate the technical findings generated by the study into a set of communication materials suitable for interested local community members with limited technical background. Print the communication materials.
- Conduct at least two community events where the communication materials will be used to convey the study's results to community members, and where they will have the opportunity to ask questions related to the study's findings and its implications for their future decisions. Facilitate participation as needed, such as providing translation devices.
- Prepare a *Summary Report of the Community Events* that describes the events, contains the communications materials, and summarizes the community feedback.

Products:

Summary Report of the Community Events

TASK 9: 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.

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

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

Products:

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

TASK 10: 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.

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- 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 on the results of the project.
- 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.

STATE OF CALIFORNIA

**STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION**

**RESOLUTION - RE: THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, ON
BEHALF OF THE LOS ANGELES CAMPUS**

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-17-050 with The Regents of the University of California, on behalf of the Los Angeles campus, for a \$1,098,662 grant for detailed urban energy planning that considers urban renewable sources, energy efficiency, building retrofits, electrification, air quality and greenhouse gas emissions, and environmental justice concerns resulting in actionable recommendations for the targeted area; 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 11, 2018.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Cody Goldthrite,
Secretariat