GRANT REQUEST FORM (GRF)

New Agreement EPC-15-073 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	David Weightman	51	916-327-1631

Recipient's Legal Name	Federal ID Number
The Regents of the University of California, on behalf of the Los Angeles campus	95-6006143

Title of Project
Identifying Effective Demand Response Program Designs to Increase Residential Customer Participation

Term and Amount	Start Date	End Date	Amount
	6/30/2016	3/31/2019	$ 2,007,875

Business Meeting Information			
☐ ARFVTP agreements under $75K delegated to Executive Director.			
Proposed Business Meeting Date	5/11/2016	☐ Consent	☒ Discussion
Business Meeting Presenter	David Hungerford	Time Needed:	5 minutes
Please select one list serve. EPIC (Electric Program Investment Charge)			
Agenda Item Subject and Description			
REGENTS OF THE UNIVERSITY OF CALIFORNIA, LOS ANGELES. Proposed resolution approving agreement EPC-15-073 with Regents of the University of California, Los Angeles for a $2,007,875 grant to assess and demonstrate alternative demand response strategies that will increase residential customer participation in future demand response programs offered by California's Investor-Owned Utilities.			

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 this is a study to measure demand response from residential customers based in economic and social incentive messages. No construction of any kind is associated with this study and is not foreseen as a result of the data collected in this study.
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
   - ☐ 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
Chai Energy	$ 1,176,989
	$
	$
	$
	$
	$
	$
	$
	$

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	14-15	301.001B	$2,007,875
			$
			$
			$
			$
			$
R&D Program Area: EERO: Buildings		TOTAL:	$2,007,875
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Recipient's Administrator/ Officer		**Recipient's Project Manager**	
Name:	Flora O'Brien	Name:	JR DeShazo
Address:	PO Box 11000 PO Box 11000	Address:	337 Charles E Young Dr E
City, State, Zip:	Los Angeles, CA 90095-1406	City, State, Zip:	Los Angeles, CA 90095-0001
Phone:	310-206-0807 / Fax: - -	Phone:	310-267-5435 / Fax: - -
E-Mail:	flora.obrien@research.ucla.edu	E-Mail:	deshazo@ucla.edu

Selection Process Used

☒ Competitive Solicitation — Solicitation #: GFO-15-311
☐ 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		Recruit Study Participants
3		Connect Customers with Gateway Device and Technology Platforms
4	X	Design Alternative Demand Response Treatments
5		Implement Feedback Services and Measure and Conduct Response Analytics
6		Pilot Test strategies with Time of Use and Statewide Transactive Signals
7		Develop Program Recommendations
8		Evaluate Project Benefits
9		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAISO	California Independent System Operator
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
Energy Commission	California Energy Commission
CPR	Critical Project Review
CPUC	California Public Utilities Commission
DR	Demand Response
DRP	Demand Response Providers
IOU	Investor-Owned Utilities
TAC	Technical Advisory Committee
TOU	Time of Use
T&D	Transmission and Distribution (of electricity)

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

A. Purpose of Agreement

The purpose of this Agreement is to fund a pilot study that will test the effectiveness of innovative designs for demand response programs using a behind-the-meter customer engagement platform.

B. Problem/ Solution Statement

[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

Problem

Electric load aggregation programs provided by the Investor-Owned Utilities (IOUs) and third party Demand Response Providers (DRPs) could enable large numbers of small loads across multiple customers to participate in wholesale market and load peak shaving. However, participation logistics still serve as a barrier to wider participation.

Past empirical studies that evaluate the effectiveness of demand response incentives to induce participation have been limited. Critical peak pricing during the hottest days of summer have been shown to reduce demand among various sub population groups across the United States and the impact of these peak time prices appears to be greatest among households in hot climates, and households that have smart thermostats. Other studies have compared the use of different incentive structures, the interaction of real-time electricity consumption feedback and peak prices and compared financial incentives with non-financial appeals. However, the wealth of new studies that demonstrate the effectiveness of non-financial incentives and the interactions between information and prices suggests that there is much more work to be done to identify the most effective approaches to incentivizing participation in DRPs among different household groups.

Solution

This pilot study will test the effectiveness of innovative design strategies a.k.a. “treatments” for residential DRPs using a behind-the-meter customer engagement platform. These strategies include providing households with 1) tailored energy-analytic feedback, 2) aggregated versus single-period incentive information, 3) non-financial environmental-health benefit frames and 4) social comparisons. An additional strategy (5) will explore how the timing of the delivered demand response (DR) information affects the magnitude of household participation and response.

Researchers will use the customer engagement platform to undertake five randomized controlled studies that test these strategies. The subcontractor will deliver and test these alternative DRP designs on subsets of 12,500 expected customers within Pacific Gas & Electric, Southern California Edison and San Diego Gas and Electric service territories. This larger sample will enable researchers to also identify how different customer classes respond to each of these alternative DR strategies, including those with differing incomes (including disadvantaged communities), household structures, plug-in electric vehicles, rooftop solar and who live in different climate zones.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Develop and pilot test strategies in order to increase customer participation to demand respond programs.
- Compare and understand the participation rate and performance of different incentive/information structures, simulating the new time of use (TOU) rates designed under California Public Utilities Commission (CPUC) direction as a baseline.
- Identify how different customer classes respond to each of these alternative DR strategies, including those with differing incomes (including disadvantaged

communities), household structures, plug-in electric vehicles, rooftop solar and who live in different climate zones.
- Evaluate the baseline load impacts under existing tariffs and new residential TOU rates authorized under CPUC Decision 15-07-001.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs and increased safety. Lowering ratepayer costs is accomplished by better utilization of existing generation resources (including both renewable and fossil) and transmission and distribution (T&D) assets, deferral of T&D upgrades, load shifting, and lower consumer cost per kWh. More broadly the technology transfer will directly benefit IOUs' residential customers, the CPUC, California Energy Commission, California Independent System Operator (CAISO), California legislative bodies, and other entities working to modernize California's electricity grid and related infrastructure. Greater reliability and increased safety will be achieved through improved residential DR including greater grid optimization, greenhouse gas reduction, increased efficiency of fossil generation, reduced renewable energy curtailment, mitigating measures for high renewable energy penetration on the T&D circuits, lowering imbalances on the grid, and resolving utility planning and operations challenges. Expanded residential DR permits increase efficiency in the contemplated CAISO Flexible Ramping Product that is designed to deal with uncertainties that are realized before binding real-time dispatch.

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 assisting customers in learning how to optimally participate in DR events while minimizing their own costs, finding the most efficient form of DR signal depending on household characteristics, and developing policy recommendations to brief IOUs, the Energy Commission, and the CPUC on the report's findings.

Agreement Objectives

The objectives of this Agreement are to:

- Obtain real-time information of targeted households who receive demand response signals and assess their energy reduction in response to those events;
- Evaluate how the amount of energy analytic feedback impacts customers' participation in demand response programs;
- Determine the right message [framing] and timing of incentives in order to maximize the magnitude and persistence of treatment effect;
- Understand how the addition of health and environmental messages to monetary incentives affects the magnitude of demand response observed;
- Assess how effective social comparisons are in inducing peak period DR and energy waste reduction; and
- Understand the efficiency of various DRP designs as they relate to unique households' characteristics.

[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.

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.

- **Software Application Development**
  Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:
  - Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
  - Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
  - Visual Studio.NET (version 2008 and up). Recommend 2010.
  - C# Programming Language with Presentation (UI), Business Object and Data Layers.
  - SQL (Structured Query Language).
  - Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
  - Microsoft SQL Reporting Services. Recommend 2008 R2.
  - XML (external interfaces).

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

MEETINGS

Subtask 1.2 Kick-off Meeting
The goal of this subtask is to establish the lines of communication and procedures for implementing this Agreement.

The Recipient shall:

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

  The administrative portion of the meeting will include discussion of the following:
  - Terms and conditions of the Agreement;

- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);
- Permit documentation (subtask 1.8);
- Subcontracts (subtask 1.9); and
- 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 <u>no match funds</u> 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 <u>no permits</u> 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: RECRUIT STUDY PARTICIPANTS

The goal of this task is to recruit enough customers with different household characteristics, such as income, household structure, living in different climate zone, within each of the three IOUs territories (Pacific Gas & Electric, Southern California Edison and San Diego Gas & Electric), in order to study the impact of different demand response signal across the population of California.

The Recipient shall:

- Supervise the subcontractor in order to expand the sample of customers with a potential target of up to 50,000 smartphone application downloads.
  - Target the right IOUs' customers through an advertising platform
  - Assure the right distribution of participants between household categories
  - Prepare a *Task 2 Memo* that lists the average and range of costs of recruitment, the amounts of participants recruited by household categories without and within disadvantaged communities, the amounts of customers recruited that have electric vehicles, and the amounts of customers recruited that have rooftop photovoltaic panels on their homes. The memo will confirm that targets for the all of these categories for recruitment meet the study target minimums for each IOU service territory participating in the research study. The memo should also discuss any instances in which study target minimums were not reached and why and contingency plans in cases where minimum targets were not met.

Products:

- Task 2 Memo

TASK 3: CONNECT CUSTOMERS WITH GATEWAY DEVICE AND TECHNOLOGY PLATFORMS

The goal of this task is to ensure the correct flow of bi-directional information between the participants and the research through the application and devices.

The Recipient shall:

- Ensure that subcontractor will distribute the free ZigBee Gateway Device to 5,000 of the participants, and deliver Pro energy analytic services to customers and real-time energy consumption data to researchers.
- Prepare a *Task 3 Memo* that documents achieved distribution targets for ZigBee Gateway Devices and also the delivery of Pro energy analytic service to customers and real-time energy consumption data to researchers. This memo must also document how raw data will be collected, the completion of algorithms for appliance-specific consumption data collection and analyze, and report on the analysis that characterizes how customers reduce energy use waste.

Products:

- Task 3 Memo

TASK 4: DESIGN ALTERNATIVE DEMAND RESPONSE TREATMENTS

The goal of this task is to design different DR treatments and assign them to the study groups of participants identified in Task 2. Customers will be notified through their smartphones for each event during Task 5.

The Recipient shall:

- Review the literature to adapt recent advances in effecting behavioral change.
- Collaborate with Electric Power Research Institute (EPRI) and understand all the interfaces to and from the Transactive Signal Server (TSS) developed by EPRI.
- Document end-to-end use cases and sequence diagrams for interactions with the TSS
- Develop mechanisms to receive the transactive signal made available by the TSS
- Process/incorporate the transactive signal
- Design different demand response messages.
- Diversify the communication method or content of the various demand response signals.
- Diversify the timing of the delivery of various DR treatments.
- Refine the intervention and the type of DR signal sent to the participants based on past learning experience.
- Prepare a *Task 4 Memo* that describes and specifies the different demand response treatments that include changes in messages, methods or content of communication and delivery timing and how they will be assigned to the different study groups. The memo will discuss the collaboration with EPRI and document the interaction with the TSS.
- Prepare and submit the *CPR Report*
- Participate in a CPR meeting.
- Present the *CPR Report* and any other required information at the CPR meeting.

Products:

- Task 4 Memo
- Task 4 CPR Report

TASK 5: IMPLEMENT FEEDBACK SERVICES AND MEASURE AND CONDUCT RESPONSE ANALYTICS

The goal of this task is to measure the effectiveness of the DR signals, and find a correlation between certain types of message formats, timing, and incentives, and household characteristics.

The Recipient shall:

- Implement the different DR treatments designed in Task 4.
- Vary the format and timing of DR treatment as designed in Task 4, throughout the study.
- Adjust the content, the format and/or the timing of DR treatments, based on past learning experience.
- Test the communication mechanisms with the TSS in real time, in a staging environment
- Move to production and repeat measurements of the following:
  - Reduction in peak time consumption.
  - Conservation actions taken.
  - Durability of treatment effects.
  - Spillovers into non-peak periods.
  - Changes in dynamic electricity profile during non-event day.
  - Effect of heterogeneity
- Assess how timing of DR treatments affect measurement variables.
- Assess the impact of message format on measurement variables.
- Assess how non-monetary incentives effect measurement variables.
- Evaluate the impact difference between financial incentives and non-monetary incentives.
- Run a demonstration of signal receipt for the Energy Commission in a Dispatch Demonstration
- Prepare a *Task 5 Memo* that discusses and quantifies (as applicable) the reduction in peak time consumption, conservation actions taken by participants, the persistence or durability of treatment effects, incidences of spillovers into non-peak electric demand period, changes in dynamic electricity profile during non-event days, and an analysis of the effect of heterogeneity. The *Task 5 Memo* should also discuss the effect of timing and message format on demand response effectiveness and participation rates and how that varies by social groups and impact of financial versus non-monetary incentives. Discuss the results of the demonstration of the signal receipt for the Energy Commission in the Dispatch Demonstration.

Products:

- Task 5 Memo

TASK 6: PILOT TEST STRATEGIES WITH TIME OF USE AND STATEWIDE TRANSACTIVE SIGNALS

The goal of this task is to estimate the financial benefit of the results from Tasks 2-5 and the impact of existing tariffs and soon-to-be available wholesale and retail tariffs and programs such as TOU developed under CPUC Decision 15-07-001.

The Recipient shall:

- Estimate the potential financial benefits based on the observed consumption reduction under the existing tariffs with wholesale and retail tariffs and programs for residential customer household research group based classes.
- Estimate the potential financial benefits based on the observed consumption reduction under the future TOU tariffs, for each household research group based classes.
- Analyze how this study's results could be applied to a broader region, and, if so, the potential financial impact on demand response participants and non-participants.
- Prepare a *Task 6 Memo* that describes and quantifies the potential benefits of the observed consumption reduction under the existing retail tariffs and future tariffs (TOU and their tier rates or programs). The memo will also discuss how these study findings could be applied to a broader region, and estimates the potential financial impact for demand response participants and non-participants.

Products:

- Task 6 Memo

TASK 7: DEVELOP PROGRAM RECOMMENDATIONS

The goal of this task is to make research findings available via briefings to the Energy Commission, the State' Electric IOUs and other groups and through publically published papers and reports and present via webinars and conferences.

The Recipient shall:

- Create *Briefing Materials* that advise the Energy Commission and other decision-makers on how to apply insights in near-term program design and how to specifically design DR programs that target different sub-populations.
- Create a *Task 7 Memo* that summarizes the insights and conclusions regarding how near–term residential customer side-of-the-meter demand response programs should be designed for the different sub-populations that participated in the research study.

Products:

- Task 7 Memo
- Briefing Materials (Draft and Final)

TASK 8: EVALUATE PROJECT BENEFITS

The goal of this task is to report the benefits resulting from this project.

The Recipient shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
  - For Product Development Projects and Project Demonstrations:
    - Published documents, including date, title, and periodical name.
    - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
    - Greenhouse gas and criteria emissions reductions.
    - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
    - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
    - A discussion of project product downloads from websites, and publications in technical journals.
    - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
    - Additional Information for Product Development Projects:
      - Outcome of product development efforts, such copyrights and license agreements.
      - Units sold or projected to be sold in California and outside of California.
      - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.
      - Investment dollars/follow-on private funding as a result of Energy Commission funding.
      - Patent numbers and applications, along with dates and brief descriptions.
    - Additional Information for Product Demonstrations:
      - Outcome of demonstrations and status of technology.
      - Number of similar installations.
      - 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 9 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 on the results of the project.

- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

Products:
- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

RESOLUTION NO: 16-0517-17f

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: UNIVERSITY OF CALIFORNIA, LOS ANGELES

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

RESOLVED, that the Energy Commission approves Agreement EPC-15-073 from GFO-15-311 with the Regents of the University of California, on behalf of the Los Angeles campus, for a $2,007,875 grant to assess and demonstrate alternative demand response strategies that will increase residential customer participation in future demand response programs offered by California's Investor-Owned Utilities; 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 May 17, 2016.

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

Cody Goldthrite,
Secretariat