STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 02/13) CALIFORNIA ENERGY COMMISSION

New Agreement EPC-15-022

Division	Agreement Manager:	MS-	Phone
ERDD	Bradley Meister	51	916-327-1722

Recipient's Legal Name	Federal ID Number
The Regents of the University of California, Irvine Campus	95-2226406

Title of Project
Power Management User Interface

Term and Amount	Start Date	End Date	Amount
	4/1/2016	4/30/2019	$ 785,124

Business Meeting Information			
☐ ARFVTP agreements under $75K delegated to Executive Director.			
Proposed Business Meeting Date	3/9/2016	☐ Consent	☒ Discussion
Business Meeting Presenter	Felix Villanueva	Time Needed:	5 minutes
Please select one list serve. EPIC (Electric Program Investment Charge)			

Agenda Item Subject and Description

Proposed resolution approving Agreement EPC-15-022 with The Regents of the University of California, on behalf of the Irvine Campus for a $785,124 grant to fund the development and testing of a user interface that will facilitate and encourage greater utilization of computer power management features by users and to improve understanding of user behavior as it relates to computer power management.

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":

2. If Agreement is considered a "Project" under CEQA:
   ☐ a) Agreement **IS** exempt. (Attach draft NOE)
   ☐ Statutory Exemption. List PRC and/or CCR section number:
   ☒ Categorical Exemption. List CCR section number: Cal. Code Regs., tit 14, §15306
   ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)
   Explain reason why Agreement is exempt under the above section:
   The work being undertaken in this agreement consists of data collection and research to develop and test a computer user interface designed to facilitate and encourage greater utilization of low-power modes by computer users. These activities do not result in any serious or major disturbance to an environmental resource because they involve (1) a literature review of current relevant knowledge of human-computer interaction, graphical user interface, and user behavior research; (2) software development of the new interface; (3) lab tests of the developed interface; (4) field tests by several hundred volunteers in response to the new interface, measuring the resulting changes in computers' duty cycle outcomes and energy consumption; and (5) creating various reports throughout the project about its progress and outcomes.

   ☐ 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
	$

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

STATE OF CALIFORNIA

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Budget Information			
Funding Source	**Funding Year of Appropriation**	**Budget List No.**	**Amount**
EPIC	14-15	301.001B	$785,124
			$
R&D Program Area: EERO: Buildings		TOTAL:	$785,124
Explanation for “Other” selection			
Reimbursement Contract #:		Federal Agreement #:	

Recipient’s Administrator/ Officer		Recipient’s Project Manager	
Name:	Jeff Warner	Name:	GP Li
Address:	Research Admin, UC Irvine 5171 California Avenue, Suite 150	Address:	Calit2/CalPluc University of California, Irvine 4100 Calit2 Building
City, State, Zip:	Irvine, CA 92697-7600	City, State, Zip:	Irvine, CA 92697-2800
Phone:	949-824-3171 Fax: - -	Phone:	949-824-9073 Fax: - -
E-Mail:	warnerj@uci.edu	E-Mail:	gpli@uci.edu

Selection Process Used

☒ Competitive Solicitation Solicitation #: GFO-15-310

☐ 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	X	Develop Power Management User Interface
3	X	Field Test of Power Management User Interface
4		Evaluation of Project Benefits
5		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
EPIC	Electric Program Investment Charge
PM	Power Management
NRDC	National Resources Defense Council
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 the development and testing of a user interface that will facilitate and encourage greater utilization of computer power management features by users and to improve understanding of user behavior.

B. Problem/ Solution Statement

Problem
Plug load devices that are left on while idle make up an increasingly large proportion of energy consumption in homes and businesses. Computers have low-power modes built in, and can be set to automatically transition to these modes when not needed. Unfortunately, studies repeatedly show that this potential for energy saving is not being realized, especially for desktop computers: the majority of desktops are not effectively utilizing existing power management (PM) options. A recent study conducted by the Recipient showed that 86% of desktops observed had no automatic PM settings enabled, and spent an average of 68% of the time on and idle. The problem is one of user behavior. Some enterprises address the problem by taking choice away from their employees with centralized control of PM functions. However, this solution is not appropriate for all commercial situations and does not apply to residential uses. The problem of user behavior is exacerbated by limited knowledge about that behavior: little

[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.

research has directly examined which automatic PM settings users employ in real life settings, or how often they use manual PM options such as shutting their computers down.

In the current environment, there is limited ability to affect users' power management behavior, or there is no market or regulatory incentive for doing so. ENERGY STAR® guidelines only address the state of the device when it leaves the manufacturer. These guidelines cannot regulate what consumers do to the devices after purchase. If the estimated power draw of a device assumes use of power-saving options, but users disable or fail to use those options, the manufacturer cannot be held responsible. In the case of computer PM, this is especially problematic due to the extent to which user choices can affect optimal energy savings. The mechanism through which users enable or disable energy-saving features—the PM user interface—could be the key to influencing user PM habits. Recent research conducted by the Recipient suggests that many users may fail to engage sleep settings because they are confused about PM. Yet those who design computers have little control over the PM interface software, and those who design the software have little incentive to design it for optimal use.

Solution
The Recipient will develop and test a PM user interface designed to facilitate and encourage greater utilization of low-power modes by computer users. The interface design will incorporate lessons from the fields of human-computer interaction and behavior theory. Possible features that will be explored include making the PM user interface easier to access, understand, and use, as well as incorporating feedback, reminders, and intrinsic rewards.

The Recipient will verify the effectiveness of the new PM user interface by an extensive field test experiment. This experiment will observe the behaviors of several hundred users in response to the new interface, and measure the resulting changes in computers' duty cycle outcomes and energy consumption. The field test will provide data that will improve understanding of user behavior toward computer power management.

C. Goals and Objectives of the Agreement

Agreement Goals
The goals of this Agreement are to reduce energy used by computers by introducing a new user interface that could increase the use of existing PM, and to collect data on users' behaviors toward PM in computers that will be useful for future innovation in energy-efficient design.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefit of lower energy costs by decreasing electricity consumed by residential and commercial personal computers. Although fewer desktop computers are sold each year, they remain common in residential and especially in enterprise settings. In the 2014 CalPlug study at UC Irvine, 71% of faculty and staff reported regularly using at least one desktop on campus, and 31% reported using one at home. An improved PM user interface would lead to personal energy savings and thus cost savings for any ratepayers who use it. The Recipient estimates that enabling sleep functions on one residential desktop could save $24 to $55 per year. It would also lower costs for business

[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).

owners whose employees use desktop computers. As ratepayers are also taxpayers, they indirectly benefit from any cost savings gained by any California public universities, colleges, schools, and governmental offices who use the PM user interface to save energy.

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 developing a user interface for computer power management that will positively influence user habits, thus reducing energy wasted by idle desktop computers, and by increasing understanding of user behavior toward computer power management that will benefit future energy-efficient designs.

Reducing idle consumption in plug load devices is an important part of achieving zero-net energy goals. Recent findings from National Resources Defense Council (NRDC) show that consumer electronics, including computers, account for 51% of the always-on electricity consumption in homes. That report listed desktop computers in the top ten devices contributing to household idle loads. A new PM user interface that improves users' behaviors toward power management would be a relatively simple and low-cost way of reducing energy use by computers. By increasing utilization of existing low-power options without requiring any mechanical changes, it could help close the gap between potential energy savings and realized energy. Despite increased use of laptops and tablets, many Californians still use desktops and will continue to do so for the foreseeable future. A software solution has the advantage that it can be used with existing, older desktops as well as new desktops, expanding the reach of its benefits. This is especially important as trends suggest that users may be upgrading and keeping older desktops for longer than in the past. The user interface will be made freely available, increasing its distribution and use by existing and new computers.

Agreement Objectives

The objectives of this Agreement are to:

- Develop a new user interface for power management designed to facilitate and encourage greater utilization of PM features by desktop computer users.
- Conduct a field test to determine the extent to which the new user interface encourages users to utilize existing power-saving options on their desktops, and to estimate the resulting energy savings.
- Obtain better measurements for users' behavior toward power management in computers: specifically, how automatic PM settings are used in an office environment, how users combine automatic PM settings with manual PM behaviors, and the corresponding differences in duty cycle outcomes.

[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:

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

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

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

o **Software Application Development**

Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:

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

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

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 <u>administrative portion</u> 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 <u>technical portion</u> 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:
  - o 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:
  - o Ensure that the report includes the following items, in the following order:

        - Cover page (**required**)
        - Credits page on the reverse side of cover with legal disclaimer (required)
        - Acknowledgements page (optional)
        - Preface (required)
        - Abstract, keywords, and citation page (required)
        - Table of Contents (required, followed by List of Figures and List of Tables, if needed)
        - Executive summary (required)
        - Body of the report (required)
        - References (if applicable)
        - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
        - Bibliography (if applicable)
        - Appendices (if applicable) (Create a separate volume if very large.)
        - Attachments (if applicable)
    - Ensure that the document is written in the third person.
    - Ensure that the Executive Summary is understandable to the lay public.
        - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
        - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
        - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.
    - Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
    - Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
    - Include a brief description of the project results in the Abstract.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt
- Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product
- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

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

CAM Product:
- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

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

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

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

  If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:
- A list of the match funds that identifies:
  - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
  - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
  - A copy of a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

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

Subtask 1.8 Permits

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

The Recipient shall:

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
  - o 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.
  - o 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: DEVELOP POWER MANAGEMENT USER INTERFACE

The goal of this task is to develop a new user interface for computer power management designed to facilitate and encourage greater use of low-power states. Development will prioritize achieving a functional prototype that operates on desktops with current and recent Windows operating systems, is easy to access and easy to use, is non-intrusive, and offers at least one type of message or positive feedback for more energy-efficient settings (which will be determined in the initial review stage).

The Recipient shall:

- Determine best practices based on a thorough review of current relevant knowledge of human-computer interaction, graphical user interface, and user behavior research.
- Develop new user interface for PM functions with, at minimum, the following features:
  - Operates on Microsoft Windows operating system, versions 10, 8, and 7
  - Functions interactively with the standard PM user interface, such that changes to one interface are reflected in the other
  - Can be easily accessed, e.g., from a desktop or taskbar icon
  - Includes simple, intuitive settings for CPU sleep and display sleep
  - Incorporates positive normative, social, and/or informational messages or feedback related to the settings the user has selected
- Prepare *PM User Interface Software Prototype*.
- Conduct lab tests, as needed, of the new PM user interface to ensure all functions of the design process work as expected.
- Revise PM user interface based on lab tests.
- Prepare *Online Help Pages* that are comparable for new and extant PM user interfaces.
- Conduct limited pilot tests of new PM user interface to test subject comprehension.
- Revise PM user interface based on pilot tests.
- Prepare a *Software Development Report* that describes the features of the PM user interface prototype and includes a summary of all work and results completed in this task.
- Participate in a CPR meeting, per subtask 1.3 and prepare *CPR Report #1.*

Products:

- PM User Interface Software Prototype.pe (draft and final)
- Online Help Pages (draft and final)
- Software Development Report (draft and final)
- CPR Report #1

TASK 3: FIELD TEST OF POWER MANAGEMENT USER INTERFACE

The goals of this task are (1) to test the extent to which the new PM user interface affects user behavior toward PM (i.e., changing PM settings and manually turning computers off or switching into sleep mode) and thus reduces energy use, and (2) to collect and analyze data on how users behave toward power management in desktop computers. The field test will collect five types of data: (1) researchers' observations of which automatic PM settings are enabled; (2) computer state monitoring data (i.e., off, sleep, user-active, and user-idle), using Surveyor software; (3) computer energy use data, using plug meters (and hubs to transmit the plug meter data); (4) questionnaire data on subject characteristics; and (5) feedback from subjects on the PM user interface.

The Recipient shall:

- Develop protocol for field tests, including training materials, protocol for installations, recruitment materials and questionnaire for subjects.
- Obtain approval to conduct research on human subjects from the recipient's Institutional Review Board
- Develop a plan to identify and recruit UC Irvine departments and other work units appropriate for the field test.
- Recruit individual staff and faculty within those work units.
- Develop questionnaire for questionnaire participants
- Train research assistants in research protocol and software installation.
- Obtain one month of pretest data and two months of posttest data for each subject, unless a different timeframe is approved in writing by the CAM. Include data for a control group who receive the same interactions, but continue to use standard PM user interface.
  - Research visit 1:
    - Install Surveyor monitoring software
    - Observe and record current PM settings
    - Administer brief questionnaire to subjects
    - Install plug meters and hubs
  - Research visit 2:
    - Observe and record current PM settings
    - Install new PM user interface (for experimental group only)
    - Advise subject about Help functions for new or extent user interface
    - Uninstall plug meters and hubs
  - Research visit 3:
    - Observe and record current PM settings
    - Obtain feedback from users on PM user interface
    - Uninstall Surveyor monitoring software
    - Offer to uninstall new PM user interface, if desired
- Collect and process data from Surveyor on computer states.
- Collect and process data from plug meters on computer energy use, determine energy used in each state (i.e., off, sleep, user-active, user-idle) for each computer sampled.
- Analyze data and prepare a *User Behavior Report* that describes behaviors toward PM in the pretest period and includes reasons such as: save energy, prevent screen from going dark while using, office policy, needs to stay on, usually return shortly, security, restart too slow. This report can also include a section at the beginning to include:
  - Summary of protocol developed for field tests, including training materials, protocol for installations, recruitment materials and questionnaire for subjects.

- Obtain approval to conduct research on human subjects from the recipient's Institutional Review Board
- Summary of the plan used to identify and recruit UC Irvine departments and other work units appropriate for the field test.
- Questionnaire used with participants.
- Summary of recruiting process used to obtain individual staff and faculty human subjects for questionnaire.

- Analyze data and prepare *Field Test Report* that includes but is not limited to the following:
  - A comparison of posttest behaviors to pretest behaviors (automatic settings, manual PM usage) for experimental versus control subgroups to quantify the extent of behavior change associated with the user interface intervention
  - A calculation of total energy savings due to behavior change based on baseline plug meter data and change in states.
  - A discussion of user feedback in response to the PM user interface.
- Prepare *Dataset* with information identifying how subjects were selected and the relevance to the state, why subjects were removed, and include codebook describing variables
- Participate in a CPR meeting, per subtask 1.3 and prepare *CPR Report #2*

Products:

- User Behavior Report (draft and final)
- Field Test Report (draft and final)
- Dataset (draft and final)
- CPR Report #2

TASK 4: 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:

  - <u>For Product Development Projects and Project Demonstrations:</u>
    - 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 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 5: Technology/Knowledge Transfer Activities
The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to the public and key decision makers.

The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
    - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
    - A description of the intended use(s) for and users of the project results.
    - Published documents, including date, title, and periodical name.
    - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
    - A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
    - The number of website downloads or public requests for project results.
    - Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.
- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

Products:

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

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

RESOLUTION NO: 16-0309-12b

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: UNIVERSITY OF CALIFORNIA, IRVINE

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-15-022 from GFO-15-310 with The Regents of the University of California, on behalf of the Irvine campus, for a $785,124 grant to fund the development and testing of a user interface to encourage greater utilization of computer power management features and to improve understanding of user behavior; 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 March 9, 2016.

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

Tiffani Winter,
Secretariat