STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-17-043 (To be completed by CGL Office)

ERDD	Kenneth Schumann	43	916-327-1556

Hitachi America LTD	13-1896069

GLOW: A User-friendly Interface for GridLAB-D

	5/11/2018	3/31/2023	$ 2,999,699

☐ ARFVTP agreements under $75K delegated to Executive Director.			
Proposed Business Meeting Date	05/09/2018	☐ Consent	☒ Discussion
Business Meeting Presenter	Jamie Patterson	Time Needed:	10 minutes
Please select one list serve. EPIC (Electric Program Investment Charge)			
Agenda Item Subject and Description			
HITACHI AMERICA LTD. Proposed resolution approving agreement EPC-17-043 with Hitachi America LTD for a $2,999,699 grant to develop a intuitive user interface for GridLAB-D that provides a user-friendly environment for researchers, planners, developers, and regulators involved in distribution grid modeling.			

1. Is Agreement considered a "Project" under CEQA?
   ☐ Yes (skip to question 2) ☒ No (complete the following (PRC 21065 and 14 CCR 15378)):
   Explain why Agreement is not considered a "Project":
   Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because the activities for this project are computer software development, testing and distribution only.
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

Legal Company Name:	Budget
SLAC National Accelerator Laboratory	$ 680,000
Green Technology Leadership Group DBA Gridworks Organization	$ 399,818
DOE- Pacific Northwest National Laboratory	$ 58,000
5 TBD Subcontractors	$ $1,124,040
	$
	$
	$
	$
	$

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

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
EPIC	17-18	301.001E	$2,999,699
			$
			$
			$
			$
			$
R&D Program Area: ESRO: ETSI			$2,999,699
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Name:	Hiroko Houston	Name:	Bo Yang
Address:	3315 Scott Blvd Fl 4	Address:	3315 Scott Blvd Fl 4
City, State, Zip:	Santa Clara, CA 95054-3140	City, State, Zip:	Santa Clara, CA 95054-3140
Phone:	408-986-6304 / Fax: - -	Phone:	669-261-9318 / Fax: - -
E-Mail:	Hiroko.houston@hal.hitachi.com	E-Mail:	bo.yang@hal.hitachi.com

☒ Competitive Solicitation — Solicitation #: GFO-17-305
☐ First Come First Served Solicitation

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		GLOW Specifications
3	X	GLOW Implementation
4		Quality Test
5	X	Release and Maintenance
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities
8		Production Readiness Plan

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
DER	Distributed Energy Resources
DOE	U.S. Department of Energy
GLOW	GridLAB-D Open Workspace
HAL	Hitachi America Ltd.
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 of Open-Source GridLAB-D Open Workspace (GLOW) interface software for intuitive grid modeling and simulation.

B. Problem/ Solution Statement

<u>Problem</u>

GridLAB-D is an open-source agent-based power system simulation tool developed by the U.S. Department of Energy (DOE) and released in 2008. The tool enables the detailed modeling not only of DER impacts on unbalanced individual phases of power systems, but also energy markets, building technologies, and other resources such as demand response that are becoming part of modern electricity systems. A weakness identified that hinders its adoption by more users is its use of only a command line interface. Due to a higher degree of memorization and familiarity needed for navigation, new users find operating GridLAB-D overly challenging.

[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.

This results in increased training costs for new personnel and requires additional knowledge not only of grid modeling, but of scripting languages such as Python for entering data into the model.

DOE has not supported the development of an intuitive user environment for GridLAB-D, and is currently scaling back its investment in the tool, a desire to defer more to regional agencies with potentially different use cases than DOE. The California user community has identified the needs for an open-source user environment that can reduce future learning curves for GridLAB-D and improve modeling and simulation efficiency.

Solution

This project will develop an open-source user environment for GridLAB-D, GLOW, to provide a more intuitive and user-friendly environment and replace the command line based interface. GLOW will have flexible visualization, charting and reporting for input models, as well as execution and control of the simulations. With the help of a Technical Advisory Committee (TAC), GLOW will also provide simulation and reporting templates for predefined use cases and utility work flows. GLOW will be fully functional, made freely available and will be fully supported as an open-source tool in the same manner as the existing GridLAB-D for a period of at least five years after the Final Meeting as described in Subtask 1.4.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Deliver an intuitive, fully functional, and freely available open-source user environment for GridLAB-D, GLOW
- Provide post-project maintenance support for five years after the Final Meeting in Subtask 1.4
- Improve the efficiency of using GridLAB-D for distribution grid modeling and simulation

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefits of (1) greater electricity reliability, (2) lower electricity production costs, and (3) increased safety. Greater electricity reliability will be achieved by enabling easier and more consistent DER integration technical assessment for California utilities, local communities, developers, researchers, public agencies and other organizations. Lower electricity production costs will be achieved through reducing total system loss and escalating the speed of DER integrations in the California distribution systems. Increased safety will be achieved by ensuring that DER integration permitting is comprehensively reviewed for grid impacts and completed quickly for the large amount of requesters who are interested in deploying renewables and other DERs in California.

[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 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).

EXHIBIT A
Scope of Work

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 creating GLOW, an intuitive and widely available user interface for GridLAB-D, a software simulation tool of advanced distribution system technology developed by the DOE.

Agreement Objectives

The objectives of this Agreement are to:

- Define user requirements and technical specifications for GLOW with input from the user community
- Design and implement GLOW and integrate it with GridLAB-D
- Perform Quality Testing for GLOW with the GridLAB-D user community
- Support GLOW's production release and provide post-project maintenance support for it.

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

EXHIBIT A
Scope of Work

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.
- Presentations will be in Microsoft PowerPoint 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 <u>administrative portion</u> of the meeting will include discussion of the following:
  - Terms and conditions of the Agreement;

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

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

- o The CAM's expectations for accomplishing tasks described in the Scope of Work;
- o An updated Project Schedule;
- o Technical products (subtask 1.1);
- o Progress reports and invoices (subtask 1.5);
- o Final Report (subtask 1.6);
- o Technical Advisory Committee meetings (subtasks 1.10 and 1.11);
- o Technology/Knowledge Transfer (Task 7); and
- o 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.
    - If different from the solicitation application, provide 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, phone numbers of potential members, summaries of relevant experience, and descriptions of potential value added to the project for each. 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 GLOW SPECIFICATIONS

The goal of this task is to identify user requirements and technical specifications for GLOW.

SUBTASK 2.1 UI Design

The goal of this subtask is to perform a study to identify user preferences for interaction design, information architecture and visual design.

The Recipient shall:

- Work with the TAC through workshops to understand user contexts, needs, and wants
- Propose multiple candidates for visual design, interactive design and information architecture
- Work with the TAC to finalize plans for visual design, interactive design and information architecture
- Prepare UI Design Packages for developers including icons, images, UI templates etc.
- Prepare the *UI Design Presentations*. The presentation shall summarize: (1) findings and recommendations from the workshops, and (2) finalized UI Design Packages including finalized plans for visual design, interactive design and information architecture

Products:

- UI Design Presentation

SUBTASK 2.2 Use Case Selection

The goal of this subtask is to identify likely future users, popular use cases, and workflows that GLOW will support. This subtask will be structured to ensure that the developed use cases both fit the needs of envisioned end users and assist the state in meeting its DER policy objectives.

The Recipient shall:

- Conduct a needs gap assessment to compare user needs against existing distribution modeling tools
- Work with the TAC to identify potential users, likely use cases and workflows for GLOW to support
- Work with the TAC to understand use cases in the context of near term and future state policy goals
- Work with the TAC to define simulation performance requirements
- Define templates of technical specifications
- Develop simulation baselines in GridLAB-D for each use case using available distribution models
- Define requirements for input and output contents
- Prepare *User Requirements Presentation.* The presentation shall summarize: (1) Potential users, use case and workflow selection, (2) Performance requirements, (3) Simulation baselines for each use case, and (4) Input and output content requirements.

Products:

- User Requirements Presentation

SUBTASK 2.3 Technical Requirements For Emerging Analysis

The goal of this subtask is to define input and output data requirements for future GLOW users.

The Recipient shall:

- Identify current GridLAB-D compatible input and output data format
- Define related GLOW requirements for data loading and reporting
- Prepare and provide an *Input/Output Data Requirement Document* that is suitable as an inclusion to the appendix of the final report. The document shall include: (1) Compatible input and output data formats, and (2) Requirements for GLOW to accommodate input data loading and output data exporting

Products:

- Input/Output Data Requirement Document

TASK 3 GLOW IMPLEMENTATION

The goal of this task is to design and implement GLOW following an iterative/Agile approach, perform Pre-Release testing with TAC users, and release Production One for external user test.

SUBTASK 3.1 Architecture And Project Management

The goal of this subtask is to design GLOW's technical architecture, implementation management plan, and test procedures, in an iterative/Agile approach.

The Recipient shall:

- Develop a software implementation management plan, including, but not limited to, sprint planning, responsibility assignment matrix, interim deliverables, and milestones
- Develop a quick prototype for the technical architecture in an iterative/Agile approach
- Define component test procedures and identify test cases
- Perform an analysis of: Failure mode, effects and criticality. Prepare and provide an *Architecture and Implementation Plan Presentation*. The presentation will include a summary of: (1) Implementation management plan, (2) Software architecture, (3) Component test procedures and cases, and (4) Failure mode, effects and critical analyses results.

Products:

- Architecture and Implementation Plan Presentation

SUBTASK 3.2 Component Coding, Verification and Validation

The goal of this subtask is to implement the components of GLOW and perform verification and validation of said components in an iterative/Agile methodology.

The Recipient shall:

- Set up the development environment on GitHub
- Develop GLOW UI components in iterations / sprints
- Perform Verification & Validation based on functional and nonfunctional requirements
- Amend the *User Requirements Presentation* as needed
- Prepare and provide an *Implementation Checklist*. This brief document will show: (1) the progress of the implementation of GLOW features, and (2) revisions to the User Requirement Presentation

Products:

- Implementation Checklist
- User Requirements Presentation with revisions highlighted

SUBTASK 3.3 GridLAB-D Integration And Validation

The goal of this subtask is to integrate GLOW with GridLAB-D for functional and performance validation.

The Recipient shall:

- Develop the necessary Application Program Interface (API) in GridLAB-D and GLOW to enable the integration of GridLAB-D and GLOW
- Validate functionalities and performance using standard GridLAB-D test cases
- Prepare GLOW and GridLAB-D integration
- Prepare an *Integration Test Presentation*. The presentation will include a summary of: (1) the interface between GLOW and GridLAB-D, and (2) validation test results

Products:

- Integration Test Presentation including a summary of: (1) the interface between GLOW and GridLAB-D, and (2) validation test results

SUBTASK 3.4 Pre-Release User Test And Documentation

The goal of this subtask is to evaluate the Pre-Release GLOW Package (With GridLAB-D) with TAC members, receive feedback, address issues and prepare necessary documentation for the Production Release.

The Recipient shall:

- Work with TAC members to review Pre-Release GLOW package
- Define a Pre-Release user test plan, including, but not limited to, user selection, test procedure, test objectives, durations, and performance evaluation metrics
- Evaluate the technical performance of the Pre-Release version
- Develop and provide a *Manual and Instruction Document* for Pre-Release user test
- Prepare and provide a *CPR Report #1* for CPR Meeting #1 as described in subtask 1.3.
- Attend CPR MEETING #1 to report project status and Pre-Release Test Plan

Products:

- Manual and Instruction Document
- CPR Report #1

SUBTASK 3.5 Production Candidate One Release
The goal of this subtask is to release a Production Candidate One version for an Alpha test, and develop a test plan and objectives. The purpose of the Alpha Test is to validate designed functionalities and software features.

The Recipient shall:

- Develop an *Alpha Test Plan*, including, but not limited to, test case inventory, test management plan, traceability matrix, signoff criteria, test types, Scorecard (system, integration, performance, Unit Acceptance Test, regression)
- Develop automatic test packages
- Prepare GLOW for Production Candidate One release and notify the CAM by email when released

Products:
- Alpha Test Plan (draft and final)
- Email Notification for GLOW - Production Candidate One Package Release

TASK 4 QUALITY TEST
The goal of this task is to perform a necessary quality test with the user community of GridLAB-D in preparation for the GLOW 1.0 release.

SUBTASK 4.1 Production Candidate One Test (Alpha Test)
The goal of this subtask is to conduct the Alpha Test, fix bugs, and provide necessary technical support to the user community.

The Recipient shall:

- Execute the Alpha Test
- Fix bugs and develop necessary enhancements
- Prepare GLOW for Production Candidate Two Release and notify the CAM by email when released. The prepared software will fix/repair all major bugs found in the Alpha Test, and will be ready for a Beta Test.

Products:
- Email Notification for GLOW - Production Candidate Two Package Release

SUBTASK 4.2 Production Candidate Two Test (Beta Test)
The goal of this subtask is to perform a Beta Test, fix bugs, and provide necessary technical support to the user community. The purpose of the Beta Test is to phase out any remaining software quality issues.

The Recipient shall:

- Develop a *Beta Test Plan*, with a testing scope including, but not limited to, unit, usability, system, interface, automation, performance, and regression
- Execute the Beta Test with the user community
- Fix bugs and develop necessary enhancements
- Prepare a Version 1.0 release plan, including, but not limited to, version management governance, user community interactions
- Prepare and provide a *GLOW Production Test Document*. The document shall include: (1) Alpha and Beta Test results, and (2) Major code revisions.

Products:

- Beta Test Plan (draft and final)
- GLOW Production Test Document

SUBTASK 4.3 Use Case Driven Validation

The goal of this subtask is to work closely with the user community to validate GLOW on selective distribution simulation scenarios.

The Recipient shall:

- Develop new testing scenarios on practical challenges, e.g., an Oakland Chinatown Microgrid Integration case, or a National Grid DER Integration use case
- Evaluate GLOW performance and user experiences
- Prepare and provide a *New Use Cases Using GLOW Document* that is suitable as an inclusion to the appendix of the final report. The document will include: (1) User experiences, (2) Performance comparison with and without GLOW, and (3) Future development recommendations.

Products:

- New Use Cases Using GLOW Document

TASK 5 RELEASE AND MAINTENANCE

The goal of this task is to release GLOW 1.0 and provide maintenance support during and after the project.

SUBTASK 5.1 GLOW 1.0 Release

The goal of this subtask is to prepare and release GLOW 1.0 to user community.

The Recipient shall:

- Prepare and provide a *CPR Report #2* for CPR Meeting Two as described in subtask 1.3. The report shall include information to be discussed at that CPR meeting, including (1) Alpha and Beta Tests, (2) Performance evaluation results and (3) Version 1.0 release plan
- Attend *CPR Meeting #2* to review project status and Version 1.0 release summary
- Develop a release document and user manual to encourage future adoptions
- Prepare the GLOW Version 1.0 Release and notify the CAM by email when released.

- Prepare and provide a *GLOW Version 1.0 Release Document*. The document will include (1) Download instructions, (2) A description of functionalities, (3) I/O instructions, and (4) Examples.

Products:
- CPR #2 Report
- Email Notification for GLOW – Version 1.0 Release
- GLOW Version 1.0 Release Document (draft and final)

SUBTASK 5.2 Software Maintenance
The goal of this subtask is to provide maintenance support for the duration of the project and for 5 years after the Final Meeting conducted in Task 1.4.

The Recipient shall:

- Assign a maintenance team for post release and 5-year post Final Meeting (Task 1.4)maintenance support
- Monitor downloads and report progress
- Develop the GLOW user eco-system to encourage adoption
- Develop training materials to speed up adoption
- Deliver workshops or seminars on GLOW to professional users at the California Energy Commission, CPUC, and CA IOUs
- Fix bugs and develop necessary feature enhancements

Because the Recipient's duties under this Subtask 5.2 continue for 5 years after the Final Meeting conducted under Task 1.4, the Recipient will continue to perform them after the Agreement's end date. Accordingly, the Parties agree to the following:

1. Recipient's duties relative to this Subtask 5.2 survive the end date of this Agreement.

2. The Recipient is solely responsible for all costs of performing Subtask 5.2 for the 5 years after the Final Meeting. The Recipient hereby acknowledges and understands that the Commission has no duty to pay such costs.

3. The access to Recipient's sites and records described Exhibit C, section 23 part (i), and its survival of the Agreement end date by part (k) in the same section, includes sites and records related to Recipient's entire performance of this Subtask 5.2, even for Recipient's performance after the end date of this Agreement. The purpose of ensuring the Parties' agreement on this point is for the Commission to be able to verify, via access to sites and records, Recipient's entire performance of this subtask.

TASK 6 EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

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

  - For Product Development Projects and Project Demonstrations:
    - Published documents, including date, title, and periodical name.
    - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
    - 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 7 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to the public and key decision makers.

The 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:

- Submit a monthly Updated Progress Power Point Slide that will be used by CAM for internal Energy Commission knowledge transfer activities (template supplied by CAM).
- Prepare a CAM Site Visit Schedule for 2 site visits per year for the CAM to observe project progress and verify installations.
- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Using the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Using the format provided by the CAM.
- Conduct training webinars for each identified use case that reviews use of tool, conclusions of the project, and reviews of public availability of the tool
- 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:
- Updated Progress Power Point Slide
- CAM Site Visit Schedule
- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- Training webinars
- 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: 18-0509-24d

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: HITACHI AMERICA, LTD

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

RESOLVED, that the Energy Commission approves Agreement EPC-17-043 with Hitachi America, Ltd., for a $2,999,699 grant to develop an intuitive user interface for GridLAB-D that provides a user-friendly environment for researchers, planners, developers, and regulators involved in distribution grid modeling; 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 9, 2018.

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

Cody Goldthrite,
Secretariat