

**GRANT REQUEST FORM (GRF)**

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-14-005 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	Zhiqin (Jessica) Zhang	43	916-327-1397

Recipient's Legal Name	Federal ID Number
The Regents of the University of California, San Diego	95-2872494

Title of Project
Solar Forecast Based Optimization of Distributed Energy Resources in the LA Basin and UC San Diego Microgrid

Term and Amount	Start Date	End Date	Amount
	1/15/2015	3/15/2018	\$ 999,984

**Business Meeting Information**
 ARFVTP agreements under \$75K delegated to Executive Director.

Proposed Business Meeting Date	12/10/2014	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Zhiqin (Jessica) Zhang	Time Needed:	5 minutes

Please select one list serve. Select

**Agenda Item Subject and Description**

Proposed resolution approving Agreement EPC-14-005 with The Regents of the University of California on behalf of the San Diego campus for a \$999,984.00 grant to optimize energy storage charge / discharge, electric vehicle charging with bi-directional communication, and demand to reduce peak electricity load, increase electricity reliability, reduce ratepayer cost, and increase electricity safety. The goal will be accomplished by developing emerging utility-scale renewable energy integration technologies and strategies through improving the accuracy of solar forecasting technologies, increasing the value of distributed energy resources (DERs), and achieving near real-time optimal control of DERs. Contact: (Zhiqin Zhang) EPIC funding

**California Environmental Quality Act (CEQA) Compliance**

1. Is Agreement considered a "Project" under CEQA?  
 Yes (skip to question 2)  No (complete the following (PRC 21065 and 14 CCR 15378)):  
 Explain why Agreement is not considered a "Project":  
 Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because UC San Diego is the site host and all of the electrical vehicle charging systems to be tested in this project are approved, installed, and operational except the last one that will be operational at the end of this year. The ones installed and operational are providing very positive feedback.
2. If Agreement is considered a "Project" under CEQA:  
 a) Agreement **IS** exempt. (Attach draft NOE)  
 Statutory Exemption. List PRC and/or CCR section number: \_\_\_\_\_  
 Categorical Exemption. List CCR section number: \_\_\_\_\_  
 Common Sense Exemption. 14 CCR 15061 (b) (3)  
 Explain reason why Agreement is exempt under the above section:
- b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)  
 Check all that apply  
 Initial Study  Environmental Impact Report  
 Negative Declaration  Statement of Overriding Considerations  
 Mitigated Negative Declaration

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

Legal Company Name:	Budget
South Coast Air Quality Management District	\$ 0
San Diego Gas & Electric Company	\$ 99,000
The Regents of the University of California on behalf of the Los	\$ 0
Strategen	\$ 36,100
Mason Willrich	\$ 36,000
Olivine	\$ 0
	\$
	\$
	\$



## Exhibit A Scope of Work

### A. Task List

Task #	CPR <sup>1</sup>	Task Name
1		General Project Tasks
2		Advance high fidelity solar forecast algorithms for minutes-ahead and day-ahead solar PV generation
3	X	Develop Use Cases
4		Optimization of Controllable Loads and Aggregation to Virtual Power Plants
5		Pilot Testing and Simulation
6		Evaluation of Project Benefits
7		Technology/ Knowledge Transfer and Outreach

### B. Acronym/Term List

Acronym/Term	Meaning
CA	California
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CARB	California Air Resource Board
CDR	charge detail records
CPR	Critical Project Review
DER	Distributed Energy Resources
DERMS	Distributed Energy Resources Management Systems
EV	Electric Vehicle
EVSE	Compliant Electric Vehicle Service Equipment
GHG	Greenhouse Gas
IEEE	Electrical & Electronics Engineers
IOU	Investor-Owned Utility
NERC	North American Electric Reliability Corporation
PV	Photovoltaic(s)
RE	Renewable Energy
SCE	Southern California Edison
SDG&E	Diego Gas and Electric
SONGS	San Onofre Nuclear Generation Station
T&D	Transmission & Distribution
TAC	Technical Advisory Committee
VGI	Vehicle Grid Integration
VPP	Virtual Power Plant

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

### A. Purpose of Agreement

The purpose of this Agreement is to fund the integration of high accuracy solar forecasting to increase the value of other energy resources.

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

# Exhibit A

## Scope of Work

### B. Problem/ Solution Statement

#### Problem

The variable nature of solar power is of concern to electric grid operators in California (CA) where dramatic growth in Photovoltaic (PV) installations is occurring. As already experienced in Puerto Rico, Hawaii and other island grids, if short term solar variability cannot be predicted or reduced, the integration cost of solar power increases through investment in energy storage or regulation capacity by the grid operator. This is especially true at the microgrid and distribution feeder level where the geographic diversity is less, and the available solar generation is the primary contributor to net load variability, causing voltage issues affecting service quality and reliability. While other distributed energy resources (DER) are required to mitigate solar integration issues, solar forecasting can dramatically increase the value of these controllable resources. One application of DER is energy storage used to mitigate fluctuations in net load. Without accurate solar forecasting, it is very difficult to efficiently operate storage resources for this purpose, which may limit the value of distributed PV.

#### Solution

High fidelity solar forecasting tools developed at UC San Diego over the last 6 years will be integrated with the operation of an abundance of controllable non-critical distributed energy resources within the Los Angeles-Orange-Riverside-San Bernardino-San Diego Counties' 800 million sq. ft of warehouse rooftop area and UC San Diego microgrid. Energy storage charge / discharge, electric vehicle (EV) charging with bi-directional communication, and demand response will be optimized given solar and net load forecasts to demonstrate how the value of DERs increases with the integration of high accuracy solar forecasting. For example, coupling solar power forecasting to a feed-forward battery controller, the battery state of charge can be controlled in advance of sharp changes in solar energy production. Thus limited and costly battery capacity will be used more intelligently and efficiently, reducing the size of battery required. In addition, the frequency of deep discharges will be reduced extending battery life and reducing system life cycle costs. Optimizing EV charging at the workplace is an enabler for successful solar power integration as it represents a potential and significant load sink during over-generation of local and grid wide solar energy resources.

### C. Goals and Objectives of the Agreement

#### Agreement Goals

The goals of this Agreement are to:

- improve the state of the art of solar forecasting
- develop emerging utility-scale renewable energy integration technologies and strategies
- utilize the value of solar forecasting in utility grid operations
- enable mitigating measures for high PV and EV penetrations on transmission & distribution (T&D)
- improve grid reliability, reduce ratepayer costs and increase safety
- improve public health in "at risk" communities by reducing exposure to mobile air emission contaminants.

## Exhibit A Scope of Work

1 Ratepayer Benefits:<sup>2</sup> This Agreement will result in the ratepayer benefits of greater electricity  
2 reliability, lower costs, and increased safety particularly to economically disadvantaged and at  
3 risk communities. The ratepayer reliability benefits of high accuracy solar forecasting include  
4 greater grid optimization, simpler renewables integration, Greenhouse Gas (GHG) reduction,  
5 increased efficiency of fossil generation, reduced renewable energy curtailment, T&D  
6 investment deferral, mitigating measures for high renewable energy (RE) penetration on T&D  
7 circuits, lowering imbalances on the grid, reconciling Institute of Electrical & Electronics  
8 Engineers (IEEE) standards vs. North American Electric Reliability Corporation (NERC) codes,  
9 and resolving utility planning and operations challenges.

10  
11 The selection of Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E)  
12 service territories addresses the well-documented imperativeness to achieve a high penetration  
13 of ultra-efficient, safe, reliable, survivable, resilient and California Air Resource Board (CARB)  
14 compliant self-generation resource in Southern California due to the growing demand for  
15 electricity, the future elimination of once-through cooling in coastal area natural gas-fired power  
16 plants, the recent closure of San Onofre Nuclear Generation Station (SONGS), and the  
17 resultant pressures on the electrical and natural gas transmission systems.

18  
19 Technological Advancement and Breakthroughs:<sup>3</sup> This Agreement will lead to technological  
20 advancement and breakthroughs to overcome barriers to the achievement of the State of  
21 California's statutory energy goals by developing high fidelity forecasting technologies that will  
22 be demonstrated to increase the value of DERs. Further technological advancements will occur  
23 in the area of optimization methods that consider a portfolio of DERs to maximize their value in  
24 mitigation high PV penetration impacts.

### 25 26 **Agreement Objectives**

27 The objectives of this Agreement are to:

- 28 • improve the accuracy of solar forecasting technologies to 45% improvement over current  
29 state of the art of persistence forecasts.
- 30 • increase the value of DERs by 15% through integration with solar forecasting and a feed-  
31 forward charge controller.
- 32 • Accomplish near real-time optimal control of DERs.

## 33 34 35 **II. TASK 1 GENERAL PROJECT TASKS**

### 36 37 **PRODUCTS**

#### 38 39 **Subtask 1.1 Products**

40 The goal of this subtask is to establish the requirements for submitting project products (e.g.,  
41 reports, summaries, plans, and presentation materials). Unless otherwise specified by the  
42 Commission Agreement Manager (CAM), the Recipient must deliver products as required below

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<sup>2</sup> 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](http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF)).

<sup>3</sup> 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

1 by the dates listed in the **Project Schedule (Part V)**. Products that require a draft version are  
2 indicated by marking “**(draft and final)**” after the product name in the “Products” section of the  
3 task/subtask. If “(draft and final)” does not appear after the product name, only a final version of  
4 the product is required. With respect to due dates within this Scope of Work, “**days**” means  
5 working days.  
6

### 7 **The Recipient shall:**

#### 8 For products that require a draft version

- 9 • Submit all draft products to the CAM for review and comment in accordance with the  
10 Project Schedule (Part V). The CAM will provide written comments to the Recipient on  
11 the draft product within 15 days of receipt, unless otherwise specified in the task/subtask  
12 for which the product is required.
- 13 • Submit the final product to the CAM once agreement has been reached on the draft. The  
14 CAM will provide written approval of the final product within 15 days of receipt, unless  
15 otherwise specified in the task/subtask for which the product is required.
- 16 • If the CAM determines that the final product does not sufficiently incorporate his/her  
17 comments, submit the revised product to the CAM within 10 days of notice by the CAM,  
18 unless the CAM specifies a longer time period.

#### 19 For products that require a final version only

- 20 • Submit the product to the CAM for approval.
- 21 • If the CAM determines that the product requires revision, submit the revised product to  
22 the CAM within 10 days of notice by the CAM, unless the CAM specifies a longer time  
23 period.

#### 24 For all products

- 25 • Submit all data and documents required as products in accordance with the following  
26 Instructions for Submitting Electronic Files and Developing Software:

- 27
- 28 • **Electronic File Format**

29 Submit all data and documents required as products under this Agreement in an  
30 electronic file format that is fully editable and compatible with the Energy  
31 Commission’s software and Microsoft (MS)-operating computing platforms, or  
32 with any other format approved by the CAM. Deliver an electronic copy of the full  
33 text of any Agreement data and documents in a format specified by the CAM,  
34 such as memory stick or CD-ROM.  
35

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

- 40 • Data sets will be in MS Access or MS Excel file format  
41 (version 2007 or later), or any other format approved by the CAM.
- 42 • Text documents will be in MS Word file format, version 2007 or  
43 later.
- 44 • Documents intended for public distribution will be in PDF file format.  
45 The Recipient must also provide the native Microsoft file format.
- 46 • Project management documents will be in Microsoft Project file  
47 format, version 2007 or later.  
48

## Exhibit A Scope of Work

### • **Software Application Development**

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

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

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

## **MEETINGS**

### **Subtask 1.2 Kick-off Meeting**

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

#### **The Recipient shall:**

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

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

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

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

- The CAM's expectations for accomplishing tasks described in the Scope of Work;

## Exhibit A 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.

## Exhibit A Scope of Work

1  
2 **The CAM shall:**

- 3
- 4 • Determine the location, date, and time of each CPR meeting with the Recipient's input.
  - 5 • Send the Recipient a *CPR Agenda* and a *List of Expected CPR Participants* in advance  
6 of the CPR meeting. If applicable, the agenda will include a discussion of match funding  
7 and permits.
  - 8 • Conduct and make a record of each CPR meeting. Provide the Recipient with a  
9 *Schedule for Providing a Progress Determination* on continuation of the project.
  - 10 • Determine whether to continue the project, and if so whether modifications are needed  
11 to the tasks, schedule, products, or budget for the remainder of the Agreement. If the  
12 CAM concludes that satisfactory progress is not being made, this conclusion will be  
13 referred to the Deputy Director of the Energy Research and Development Division.
  - 14 • Provide the Recipient with a *Progress Determination* on continuation of the project, in  
15 accordance with the schedule. The Progress Determination may include a requirement  
16 that the Recipient revise one or more products.

17 **Recipient Products:**

- 18
- 19 • CPR Report(s)
  - 20 • Task Products (draft and/or final as specified in the task)

21 **CAM Products:**

- 22
- 23 • CPR Agenda
  - 24 • List of Expected CPR Participants
  - 25 • Schedule for Providing a Progress Determination
  - 26 • Progress Determination

27 **Subtask 1.4 Final Meeting**

28 The goal of this subtask is to complete the closeout of this Agreement.

29  
30 **The Recipient shall:**

- 31
- 32 • Meet with Energy Commission staff to present project findings, conclusions, and  
33 recommendations. The final meeting must be completed during the closeout of this  
34 Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The  
35 meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval  
36 of the CAM.

37 The technical and administrative aspects of Agreement closeout will be discussed at the  
38 meeting, which may be divided into two separate meetings at the CAM's discretion.

- 39
- 40 • The technical portion of the meeting will involve the presentation of findings,  
41 conclusions, and recommended next steps (if any) for the Agreement. The CAM will  
42 determine the appropriate meeting participants.
  - 43 • The administrative portion of the meeting will involve a discussion with the  
44 CAM and the CAO of the following Agreement closeout items:
    - 45 • Disposition of any state-owned equipment.
    - 46 • Need to file a Uniform Commercial Code Financing Statement (Form  
47 UCC-1) regarding the Energy Commission's interest in patented  
48 technology.
    - 49 • The Energy Commission's request for specific "generated" data (not  
already provided in Agreement products).

## Exhibit A Scope of Work

- 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 all Agreement activities conducted by the Recipient for the preceding month, including 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.
  - Provide a synopsis of the project progress, including accomplishments, problems, milestones, products, schedule, fiscal status, and any evidence of progress such as photographs.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions. In addition, each invoice must document and verify:
  - Energy Commission funds received by California-based entities;
  - Energy Commission funds spent in California (*if applicable*); and
  - Match fund 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 and approve the Final Report, which will be due at least **two months** before the

## Exhibit A Scope of Work

1 Agreement end date. When creating the Final Report Outline and the Final Report, the  
2 Recipient must use a Style Manual provided by the CAM.

### 3 4 **Subtask 1.6.1 Final Report Outline**

#### 5 6 **The Recipient shall:**

- 7 • Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the  
8 CAM.
- 9 • Submit a draft of the outline to the CAM for review and comment.
- 10 • Once agreement has been reached on the draft, submit the final outline to the CAM.  
11 The CAM will provide written approval of the final outline within 10 days of receipt.

#### 12 13 **Recipient Products:**

- 14 • Final Report Outline (draft and final)

#### 15 16 **CAM Product:**

- 17 • Style Manual

### 18 19 **Subtask 1.6.2 Final Report**

#### 20 21 **The Recipient shall:**

- 22 • Prepare a *Final Report* for this Agreement in accordance with the approved Final Report  
23 Outline and the Style Manual provided by the CAM.
- 24 • Submit a draft of the report to the CAM for review and comment. Once agreement on the  
25 draft report has been reached, the CAM will forward the electronic version for Energy  
26 Commission internal approval. Once the CAM receives approval, he/she will provide  
27 written approval to the Recipient.
- 28 • Submit one bound copy of the Final Report to the CAM.

#### 29 30 **Products:**

- 31 • Final Report (draft and final)

## 32 33 **MATCH FUNDS, PERMITS, AND SUBCONTRACTS**

### 34 35 **Subtask 1.7 Match Funds**

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

38 While the costs to obtain and document match funds are not reimbursable under this  
39 Agreement, the Recipient may spend match funds for this task. The Recipient may only spend  
40 match funds during the Agreement term, either concurrently or prior to the use of Energy  
41 Commission funds. Match funds must be identified in writing, and the Recipient must obtain any  
42 associated commitments before incurring any costs for which the Recipient will request  
43 reimbursement.  
44

#### 45 46 **The Recipient shall:**

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

## Exhibit A Scope of Work

1  
2 If match funds were a part of the proposal that led to the Energy Commission awarding  
3 this Agreement, then provide in the letter:

- 4
- 5 • A list of the match funds that identifies:
    - 6 • The amount of cash match funds, their source(s) (including a contact name,  
7 address, and telephone number), and the task(s) to which the match funds  
8 will be applied.
    - 9 • The amount of each in-kind contribution, a description of the contribution type  
10 (e.g., property, services), the documented market or book value, the source  
11 (including a contact name, address, and telephone number), and the task(s)  
12 to which the match funds will be applied. If the in-kind contribution is  
13 equipment or other tangible or real property, the Recipient must identify its  
14 owner and provide a contact name, address, telephone number, and the  
15 address where the property is located.
  - 16 • A copy of a letter of commitment from an authorized representative of each  
17 source of match funding that the funds or contributions have been secured.
  - 18 • At the Kick-off meeting, discuss match funds and the impact on the project if they are  
19 significantly reduced or not obtained as committed. If applicable, match funds will be  
20 included as a line item in the progress reports and will be a topic at CPR meetings.
  - 21 • Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of  
22 additional match funds.
  - 23 • Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds  
24 are reduced during the course of the Agreement. Reduction of match funds may trigger  
25 a CPR meeting.

### 26 **Products:**

- 27
- 28 • Match Funds Status Letter
  - 29 • Supplemental Match Funds Notification Letter (*if applicable*)
  - 30 • Match Funds Reduction Notification Letter (*if applicable*)

### 31 **Subtask 1.8 Permits**

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

### 38 **The Recipient shall:**

- 39
- 40 • Prepare a *Permit Status Letter* that documents the permits required to conduct this  
41 Agreement. If no permits are required at the start of this Agreement, then state this in the  
42 letter. If permits will be required during the course of the Agreement, provide in the letter:
    - 43 • A list of the permits that identifies: (1) the type of permit; and (2) the name,  
44 address, and telephone number of the permitting jurisdictions or lead agencies.
    - 45 • The schedule the Recipient will follow in applying for and obtaining the permits.

46 The list of permits and the schedule for obtaining them will be discussed at the Kick-off  
47 meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and  
48 copies of the permits will be developed. The impact on the project if the permits are not

## Exhibit A Scope of Work

1 obtained in a timely fashion or are denied will also be discussed. If applicable, permits  
2 will be included as a line item in progress reports and will be a topic at CPR meetings.

- 3 • If during the course of the Agreement additional permits become necessary, then  
4 provide the CAM with an *Updated List of Permits* (including the appropriate information  
5 on each permit) and an *Updated Schedule for Acquiring Permits*.
- 6 • Send the CAM a *Copy of Each Approved Permit*.
- 7 • If during the course of the Agreement permits are not obtained on time or are denied,  
8 notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

### 9 10 **Products:**

- 11 • Permit Status Letter
- 12 • Updated List of Permits (*if applicable*)
- 13 • Updated Schedule for Acquiring Permits (*if applicable*)
- 14 • Copy of each Approved Permit (*if applicable*)

### 15 16 **Subtask 1.9 Subcontracts**

17 The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under  
18 this Agreement; and (2) ensure that the subcontracts are consistent with the terms and  
19 conditions of this Agreement.

### 20 21 **The Recipient shall:**

- 22 • Manage and coordinate subcontractor activities in accordance with the requirements of  
23 this Agreement.
- 24 • Incorporate this Agreement by reference into each subcontract.
- 25 • Include any required Energy Commission flow-down provisions in each subcontract, in  
26 addition to a statement that the terms of this Agreement will prevail if they conflict with  
27 the subcontract terms.
- 28 • If required by the CAM, submit a draft of each *Subcontract* required to conduct the work  
29 under this Agreement.
- 30 • Submit a final copy of the executed subcontract.
- 31 • Notify and receive written approval from the CAM prior to adding any new  
32 subcontractors (see the discussion of subcontractor additions in the terms and  
33 conditions).

### 34 35 **Products:**

- 36 • Subcontracts (*draft if required by the CAM*)

## 37 38 **TECHNICAL ADVISORY COMMITTEE**

### 39 40 **Subtask 1.10 Technical Advisory Committee (TAC)**

41 The goal of this subtask is to create an advisory committee for this Agreement. The TAC should  
42 be composed of diverse professionals. The composition will vary depending on interest,  
43 availability, and need. TAC members will serve at the CAM's discretion. The purpose of the  
44 TAC is to:

- 45 • Provide guidance in project direction. The guidance may include scope and  
46 methodologies, timing, and coordination with other projects. The guidance may be based  
47 on:
  - 48 • Technical area expertise;
  - 49 • Knowledge of market applications; or

## Exhibit A Scope of Work

- 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.

## Exhibit A Scope of Work

1   **The Recipient shall:**

- 2       • Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the  
3       number and location of meetings (in-person and via teleconference) in consultation with  
4       the CAM.
- 5       • Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during  
6       recruiting. Revise the schedule after the first TAC meeting to incorporate meeting  
7       comments.
- 8       • Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC  
9       meeting.
- 10      • Organize and lead TAC meetings in accordance with the TAC Meeting Schedule.  
11      Changes to the schedule must be pre-approved in writing by the CAM.
- 12      • Prepare *TAC Meeting Summaries* that include any recommended resolutions of major  
13      TAC issues.

14

15   **Products:**

- 16      • TAC Meeting Schedule (draft and final)
- 17      • TAC Meeting Agendas (draft and final)
- 18      • TAC Meeting Back-up Materials
- 19      • TAC Meeting Summaries
- 20

## Exhibit A Scope of Work

### 1 III. TECHNICAL TASKS 2 3

#### 4 **TASK 2 ADVANCE HIGH FIDELITY SOLAR FORECAST ALGORITHMS FOR MINUTES- 5 AHEAD AND DAY-AHEAD SOLAR PV GENERATION**

6 The goal of this task is to improve the accuracy of intra-hour and day-ahead solar forecasting  
7 products.  
8

#### 9 **The Recipient shall:**

- 10 • Convene a workshop and prepare a report on *Solar Forecast Use Scenarios with*  
11 *Maximum Operational Impact for Utility-Scale Solar*. For each solar forecast use  
12 scenario, the report shall describe how the forecast would have an impact on solar  
13 power integration, what value streams would result from improvement forecast accuracy,  
14 and what time constraints exist that inform the most important forecast horizons.
- 15 • Deploy a pilot test network of 6 sky imaging systems within Economic Disadvantaged  
16 and At Risk communities with the LA warehouse area and 3 at the UC San Diego  
17 microgrid.
- 18 • Improve the accuracy of solar forecast algorithms by integrating cloud decision and  
19 cloud motion algorithms for intra-hour forecasting. Integrate a forecast confidence  
20 indicator to indicate forecast reliability for use in the optimization models in Task 4.
- 21 • Apply high-resolution, rapid update solar forecasts based on numerical weather  
22 prediction for 36 hours ahead.
- 23 • Implement deep machine learning tools to optimize forecast accuracy.
- 24 • Integrate load forecast tools to forecast net load.
- 25 • Analyze 6 months of solar and net load forecast data and compose a *Solar Forecast*  
26 *Accuracy Report* that shall include, but not be limited to, the following:
  - 27 • Solar forecast model description.
  - 28 • Validation metrics and dataset description.
  - 29 • Solar forecast accuracy analysis for 5 minute to 36 hour time horizons.

#### 30 31 **Products:**

- 32 • Solar Forecast Use Scenarios with Maximum Operational Impact Report (Draft and  
33 Final).
- 34 • Solar Forecast Accuracy Report (Draft and Final).

#### 35 36 37 **TASK 3 DEVELOP USE CASES** 38

39 The goal of this task is to develop use cases for forecast integration with controllable loads for  
40 Non-Critical, Controllable Loads Serving as Mitigating Measures to California Investor Owned  
41 Utilities (IOU's) Planning and Operations on Distribution Circuits with High PV Penetration.  
42

#### 43 **The Recipient shall:**

- 44 • Convene a workshop on *Mitigating High PV Impacts through Non-Critical, Controllable*  
45 *Loads* to:
  - 46 • Identify existing business models and propose new business models as necessary to  
47 fit the unique needs of the proposed project's combination of solar forecasting, EV  
48 Vehicle Grid Integration (VGI), and on-site energy storage

## Exhibit A Scope of Work

- 1 • Isolate key regulatory and market barriers and recommend mitigation alternatives for
- 2 the proposed business models
- 3 • Identify the use cases for the representative systems based on the most promising
- 4 business models
- 5 • Construct a framework for evaluating the value proposition for each of the use cases:
- 6 • Identify the potential benefit streams, including benefits to the end customers and
- 7 local and system-wide benefits to the grid/ratepayers
- 8 • Categorize the operational modes of the system components to provide the potential
- 9 benefits
- 10 • List the required data inputs and outputs for the value proposition analysis
- 11 • Prioritize the primary benefits for the detailed value proposition analysis outlined
- 12 below and list secondary, intrinsic benefits for future study
- 13 • Develop distribution feeder specifications in the Electric Power Research Institute's open
- 14 source OpenDSS software and hardware deployment scenarios for UC San Diego
- 15 Microgrid and LA Warehouse feeders including:
- 16 • High PV penetration
- 17 • Utility-scale energy storage
- 18 • High penetration of on-peak workplace and off-peak fleet EV smart chargers
- 19 • Demand response assets
- 20 • Develop operational specifications and restrictions for each asset such as availability
- 21 (days of week and times of day), energy and power, maximum ramping capacity, cost,
- 22 etc.
- 23 • Determine distribution feeder hot spots and optimally site energy storage systems.
- 24 • Prepare *Use-cases for Non-Critical, Controllable Loads for Mitigating High PV*
- 25 *Penetration Report*. This report shall include, but not be limited to, the following:
- 26 • A framework for evaluating the value proposition for each of the use cases,
- 27 • Distribution feeder specifications,
- 28 • Operational specifications and restrictions for each load, and
- 29 • Value streams resulting from each load and an estimate of its potential impact.
- 30

31 In particular the following use cases will be examined:

- 32 • Peak (net) load shifting (electric energy storage, thermal energy storage tank)
- 33 • PV smoothing and ramp rate mitigation (medium to large commercial and industrial
- 34 customers' workplace EV charging)
- 35 • Participate in a CPR meeting and prepare a *CPR Report* consistent with Task
- 36 1.3.
- 37

### 38 **Products:**

- 39 • Use-cases for Non-Critical, Controllable Loads for Mitigating High PV Penetration Report
- 40 (Draft and Final).
- 41 • Critical Project Review Report.
- 42

### 43 **TASK 4 OPTIMIZATION OF CONTROLLABLE LOADS AND AGGREGATION TO VIRTUAL**

### 44 **POWER PLANTS**

45 The goal of this task is to optimize the scheduling of controllable loads to accomplish the

46 objectives in Task 3 and increase the value of the Virtual Power Plant (VPP) system by at least

47 10% versus the standalone operation.

48

## Exhibit A Scope of Work

### 1 The Recipient shall:

- 2 • Design VPPs by
- 3 • Identifying energy services to be provided by VPPs and retail/wholesale market
- 4 products, including products that may not be available today. This will include
- 5 possible revenues.
- 6 • Identifying scenarios for VPPs to provide such energy services and resultant
- 7 requirements on VPP assets.
- 8 • Enumerating gaps and barriers, including regulatory and jurisdictional, that would
- 9 require further study or policy change to implement
- 10 • Grading the various scenarios based on any existing gaps and barriers.
- 11 • Identifying possible pathways for mitigating such gaps and barriers.
- 12 • Formulate the use cases and VPPs in an optimal predictive controls framework to
- 13 accomplish the objectives given in Task 3. Cost functions should quantify electricity
- 14 tariffs (in fixed and time-of-use pricing scenarios), O&M expenses, incentives, power
- 15 quality on the distribution feeder, and uncertainty in user behavior.
- 16 • Create an agent-based model to simulate real-time power flow with responses of
- 17 participants.
- 18 • Acquire data from the UC San Diego microgrid to calibrate the model and replicate real
- 19 conditions on the distribution feeders.
- 20 • Given the use cases defined in Task 3, quantify the value of distributed energy
- 21 resources for
- 22 • Base case: No solar forecast
- 23 • Actual case: Solar forecasts as developed in Task 2.
- 24 • Prepare *Optimal Control Algorithms and Value of Solar Forecasting to Distributed*
- 25 *Energy Resources Report*. This report shall include, but not be limited to, the following:
- 26 • Description of VPP specifications and energy services.
- 27 • Description of control algorithms.
- 28 • Analysis of solar forecasts value

### 29 Products:

- 30 • Optimal control algorithms.
- 31 • Value of Solar Forecasting to Distributed Energy Resources Report (Draft and Final).

## 32 TASK 5: PILOT TESTING AND SIMULATION AND VALUE PROPOSITION ANALYSIS

### 33 Task 5.1 Pilot Testing and Simulation

34 The goal of this task is to conduct pilot testing of the solar forecasts, optimization algorithms,  
35 and distributed energy resources to validate the optimization methods and demonstrate that the  
36 value streams of solar forecasts combined with net load materialize. Pilot testing on solar  
37 forecasting and Spirae Distributed Energy Resources Management Systems (DERMS) will be  
38 conducted at the UCSD microgrid and/or off-campus university owned warehouse facilities  
39 located within the CA (IOU) service territory of SDG&E and/or in the LA Basin in partnership  
40 with SCAQMD within the SCE IOU service territory. Sky imagers for unprecedented short-term  
41 solar forecast accuracy will be sited. Sky imagers can provide granular and low latency solar  
42 forecasting typically within a 3 mile radius which allows a single instrument to cover an entire  
43 warehouse cluster or microgrid. The DERMS controller will administer all controllable DER  
44 assets within a single distribution feeder. The UCSD microgrid has the greatest density of  
45 existing DER infrastructure, while the LA warehouse areas provide large potential for clean in-

## Exhibit A Scope of Work

1 basin generation, but integration requires on-site, flexible, non-critical and controllable load  
2 sinks. Using existing load and solar resource data, recipient will simulate load demand, solar  
3 generation, and solar forecasts. Solar PV penetration & DER scenarios and use cases from  
4 Task 3 will be considered using characteristic diurnal cycles in different seasons. The control  
5 algorithms developed under Task 4 will be applied to control DERs. EV will be charged flexibly  
6 while adhering to usage constraints and energy storage will be dispatched to satisfy the  
7 objective function.  
8  
9

### 10 **The Recipient shall:**

- 11 • Utilize the following *self-funded* distributed energy resources on the UC San Diego  
12 microgrid and/or off-campus university facilities to conduct pilot testing
  - 13 • Energy Storage charge / discharge and charge state data from: BMW demonstration  
14 projects, 2.5 MW/5 MWH Lithium ion batteries, electric Chillers for thermal energy  
15 storage, and/or Auxiliary Services.
  - 16 • Electric Vehicles charge / discharge and charge state data from: twenty-six outlets of  
17 RWE ISO 15118 Compliant Electric Vehicle Service Equipment (EVSE), Daimler ISO  
18 15118 Compliant Smart Cars (40 to faculty, staff and students), EVSE Service  
19 Providers, KnGrid bi-directional communication optimization and scheduling, and/or  
20 BMW 180 kWh PV Integrated Storage Using 2nd Life EV batteries with a single  
21 Level II EVSE.
- 22 • Simulate warehouse rooftop PV and workplace EV charging scenarios in the LA Basin  
23 using PV system information from the California Solar Initiative database and EV  
24 workplace adaptation assumptions given energy demand, PV production forecasts, and  
25 EV availability, the ability of the control algorithm to flatten net load and generate value  
26 will be simulated.
- 27 • Implement solar forecast-responsive EV charging:
  - 28 • Set up Web Service (ftp) from UC San Diego's energy management platform to  
29 KnGrid's Demand Energy Management Server.
  - 30 • Define charge station clusters and energy parameters by cluster.
  - 31 • Work with Original Equipment Manufacturer (OEM)s that use the ISO 15118  
32 standard including but not limited to ISO Daimler Smart Gen III and IV to enable PEV  
33 owners/users to enter departure time.
  - 34 • Acquire solar forecast and create algorithm to maximize solar utilization for daytime  
35 workplace charging.
  - 36 • Establish energy management success metrics and targets with project team.
  - 37 • Consolidate and reduce charge detail records (CDR) into formatted reports.
  - 38 • Measure effectiveness of system in meeting energy management targets.
  - 39 • Gather PEV owner/user feedback on user experience.
- 40 • Prepare report on *Pilot Testing and Simulation Results*. This report shall include, but not  
41 be limited to, the followings:
  - 42 • UC San Diego and LA warehouse virtual power plant (VPP) configuration.
  - 43 • Simulation setup in terms of time period, time steps, and input data.
  - 44 • Description of the methods for quantifying solar forecast and optimal control value.
  - 45 • Quantification of value generated from solar forecast and optimal control.
  - 46 • Recommendations for future work.

### 47 **Products:**

- 48 • Pilot Testing and Simulation Results Report (Draft and Final).

## Exhibit A Scope of Work

### Task 5.2 VALUE PROPOSITION ANALYSIS

The goal of this task is to conduct a measurement and verification and value proposition analysis including a cost effectiveness evaluation.

#### The Recipient shall:

- Estimate ratepayer benefits including lowered costs and improved reliability and security, in addition to others, of forecast-enhanced solar systems combined with on-site storage capacity for three types of utility procurement programs. UC Los Angeles will create a *Table Estimating the Aggregate and Per Capita Impacts on Ratepayers for the Proposed System* for:
  - a program that sells all power to the utility at fixed price such as a Power Purchase Agreement or Feed in Tariff
  - a Net Energy Metering -type program that meets only on-site load, and
  - a hybrid program that first meets on-site load and then sells excess power to the utility at a fixed price
  
- Conduct the value proposition analysis:
  - Issue a data request for the required inputs identified in the framework value proposition
  - Setup the uses cases and corresponding data inputs in the appropriate models, which will include Strategen's proprietary customer-sited optimization model and EPRI's Energy Storage Evaluation Tool
  - Run the model(s) for the use cases based on the categories of operational modes identified in the framework of Task 3.
  - Collect key output data from the model(s), including key metrics to understand the value proposition from the perspectives of the host, end customers, investors, and the grid
  - Apply cost effectiveness tests, using the modeling output data above, including but not limited to Total Resource Cost
  - Utilize the value proposition modeling and cost effectiveness testing to support the impacts and benefits for California *ratepayers* identified in Section 3 of the Project Narrative
  
- Summarize the findings of the value proposition analysis into a *Value Proposition Report* with the following outline:
  - Description of the value proposition methodology and frameworks
  - Review of the assumptions and modeling limitations
  - Summary of the value proposition modeling results, cost effectiveness, and ratepayer impacts
  - List of conclusions and recommendations

#### Products:

- Value Proposition Report Module (Draft and Final).
- Table Estimating the Aggregate and Per Capita Impacts on Ratepayers for the Proposed System.

### TASK 6 EVALUATION OF PROJECT BENEFITS

## Exhibit A Scope of Work

1 The goal of this task is to report the benefits resulting from this project.  
2

### 3 **The Recipient shall:**

- 4 • Complete three Project Benefits Questionnaires that correspond to three main intervals  
5 in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits*  
6 *Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- 7 • Provide all key assumptions used to estimate projected benefits, including targeted  
8 market sector (e.g., population and geographic location), projected market penetration,  
9 baseline and projected energy use and cost, operating conditions, and emission  
10 reduction calculations. Examples of information that may be requested in the  
11 questionnaires include:
  - 12
  - 13 ○ For Product Development Projects and Project Demonstrations:
    - 14 • Published documents, including date, title, and periodical name.
    - 15 • Estimated or actual energy and cost savings, and estimated statewide energy  
16 savings once market potential has been realized. Identify all assumptions used in  
17 the estimates.
    - 18 • Greenhouse gas and criteria emissions reductions.
    - 19 • Other non-energy benefits such as reliability, public safety, lower operational  
20 cost, environmental improvement, indoor environmental quality, and societal  
21 benefits.
    - 22 • Data on potential job creation, market potential, economic development, and  
23 increased state revenue as a result of the project.
    - 24 • A discussion of project product downloads from websites, and publications in  
25 technical journals.
    - 26 • A comparison of project expectations and performance. Discuss whether the  
27 goals and objectives of the Agreement have been met and what improvements  
28 are needed, if any.
    - 29 • Additional Information for Product Development Projects:
      - 30 • Outcome of product development efforts, such copyrights and license  
31 agreements.
      - 32 • Units sold or projected to be sold in California and outside of California.
      - 33 • Total annual sales or projected annual sales (in dollars) of products  
34 developed under the Agreement.
      - 35 • Investment dollars/follow-on private funding as a result of Energy  
36 Commission funding.
      - 37 • Patent numbers and applications, along with dates and brief descriptions.
    - 38 • Additional Information for Product Demonstrations:
      - 39 • Outcome of demonstrations and status of technology.
      - 40 • Number of similar installations.
      - 41 • Jobs created/retained as a result of the Agreement.
  - 42
  - 43 ○ For Information/Tools and Other Research Studies:
    - 44 • Outcome of project.
    - 45 • Published documents, including date, title, and periodical name.
    - 46 • A discussion of policy development. State if the project has been cited in  
47 government policy publications or technical journals, or has been used to inform  
48 regulatory bodies.
    - 49 • The number of website downloads.

## Exhibit A Scope of Work

- 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 Recipient shall:

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

## Exhibit A Scope of Work

1 conducted during the project.  
2

3 ***Products:***

- 4 • Initial Fact Sheet (draft and final)
  - 5 • Final Project Fact Sheet (draft and final)
  - 6 • Presentation Materials (draft and final)
  - 7 • Technology/Knowledge Transfer Plan (draft and final)
  - 8 • Technology/Knowledge Transfer Report (draft and final)
- 9

10

11

12 **IV. PROJECT SCHEDULE**

13

14 Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, SAN  
DIEGO

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

**RESOLVED**, that the Energy Commission approves Agreement EPC-14-005 with **The Regents of the University of California on behalf of the San Diego campus** for a **\$999,984** grant to optimize energy storage charge/discharge, electric vehicle charging with bi-directional communication, and demand to reduce peak electricity load, increase electricity reliability, reduce ratepayer cost, and increase electricity safety. The goal will be accomplished by developing emerging utility-scale renewable energy integration technologies and strategies through improving the accuracy of solar forecasting technologies, increasing the value of distributed energy resources (DERs), and achieving near real-time optimal control of DERs; 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 December 10, 2014

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Harriet Kallemeyn,  
Secretariat