

GRANT REQUEST FORM (GRF)New Agreement EPC-14-025 (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 |
|------------------------|-------------------|
| Sunfolding, Inc. | 46-1117294 |

| Title of Project |
|--|
| Mass-manufactured, Air Driven Trackers for Low Cost, High Performance Photovoltaic Systems |

| Term and Amount | Start Date | End Date | Amount |
|-----------------|------------|-----------|--------------|
| | 5/15/2015 | 3/29/2019 | \$ 1,000,000 |

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

| | | | |
|--------------------------------|------------------------|----------------------------------|--|
| Proposed Business Meeting Date | 3/11/2015 | <input type="checkbox"/> Consent | <input checked="" type="checkbox"/> Discussion |
| Business Meeting Presenter | Zhiqin (Jessica) Zhang | Time Needed: | |

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

Agenda Item Subject and Description

SUNFOLDING, INC. Proposed resolution approving Agreement EPC-14-025 with Sunfolding, Inc., for a \$1,000,000 grant to develop a new solar tracker that lowers the levelized cost of solar electricity by reducing tracker component costs, improves efficiencies in construction and site design, and improves long-term reliability.

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
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: 14 CCR §§ 15301, 15304, and 15306
 Common Sense Exemption. 14 CCR 15061 (b) (3)
 Explain reason why Agreement is exempt under the above section: The project will install a 300 kW photovoltaic solar system with trackers for research purposes at a facility that is already used for these types of activities.
- 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 |
| PV Evolution Labs | \$ 40,000 |

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

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

Budget Information

| Funding Source | Funding Year of Appropriation | Budget List No. | Amount |
|------------------------------------|-------------------------------|-----------------|-------------|
| EPIC | 13-14 | 301.001A | \$1,000,000 |
| | | | \$ |
| | | | \$ |
| R&D Program Area: EGRO: Renewables | | TOTAL: | \$1,000,000 |
| Explanation for "Other" selection | | | |

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION



| | | | | | | | |
|---|------------------------------|------|-----|------------------------------------|------------------------------|------|-----|
| Reimbursement Contract #: | | | | Federal Agreement #: | | | |
| Recipient's Administrator/ Officer | | | | Recipient's Project Manager | | | |
| Name: | Gwen Rose | | | Name: | Leila Madrone | | |
| Address: | 3101 20TH ST | | | Address: | 3101 20TH ST | | |
| City, State, Zip: | SAN FRANCISCO, CA 94110-2714 | | | City, State, Zip: | SAN FRANCISCO, CA 94110-2714 | | |
| Phone: | 415-562-5060 / | Fax: | - - | Phone: | 415-483-5268 / | Fax: | - - |
| E-Mail: | gwen@otherlab.com | | | E-Mail: | leila@sunfolding.com | | |

| | | | | | | | |
|---|--|--|--|----------------------------|--|--|--|
| Selection Process Used | | | | | | | |
| <input checked="" type="checkbox"/> Competitive Solicitation | | | | Solicitation #: PON-14-303 | | | |
| <input type="checkbox"/> First Come First Served Solicitation | | | | | | | |

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

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

Exhibit A Scope of Work

A. Task List

| Task # | CPR ¹ | Task Name |
|--------|------------------|--|
| 1 | | General Project Tasks |
| 2 | X | Scale-up, Design, and Procurement |
| 3 | | Installation |
| 4 | | Testing and Verification |
| 5 | | Evaluation of Project Benefits |
| 6 | | Technology/Knowledge Transfer Activities |
| 7 | | Production Readiness Plan |

B. Acronym/Term List

| Acronym/Term | Meaning |
|--------------|---|
| CAM | Commission Agreement Manager |
| CAO | Commission Agreement Officer |
| CPR | Critical Project Review |
| EPC | Engineering, Procurement and Construction |
| kW | kilowatt |
| PVSYST | Photovoltaic Software |
| PV | Photovoltaic |

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

A. Purpose of Agreement

The purpose of this Agreement is to fund the pilot-scale test for a new solar tracking technology.

B. Problem/ Solution Statement

Problem

Solar tracking has taken off in the last few years, but current trackers have run out of options for cost reduction. The state-of-the-art designs use a traditional approach of motors, gearboxes, and bearings; these components are manually assembled with high-cost materials, leading to limits in cost reduction and scale up. Further, this approach includes many points of failure and has high maintenance costs.

Low cost renewables are crucial to achieving the state's distributed generation, Renewable Portfolio Standard and Greenhouse Gas emission reduction goals. Solar and wind are on the trajectory to become the lowest price renewables, but new innovations are necessary to continue moving down that path.

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

Exhibit A Scope of Work

Solution

Sunfolding has developed a tracker that takes advantage of high volume manufacturing methods with the lowest cost commodity materials, which opens up a whole new paradigm for solar tracker cost reductions. Our trackers are built with high-strength, blow-molded parts made of well-established performance polymers for scalable, reliable systems suited for 30-year lifetimes in harsh environments.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to develop a new solar tracker that lowers the levelized cost of solar electricity by reducing tracker component costs, improving efficiencies in construction and site design, and improving long-term tracker reliability.

Ratepayer Benefits:² This Agreement will result in the ratepayer benefits of lower cost by demonstrating a new type of ground mount tracker that adds 20 – 40% more power over fixed tilt systems at a cost that is well below the cost of solar trackers today. It will also provide reliability benefits because the additional power delivered to the grid occurs in the late afternoon, which has been identified as a serious challenge for grid operators in a high renewable penetration scenario.

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 making solar energy systems with solar tracking the lowest cost and highest performance electric generating systems available in the electricity market.

Agreement Objectives

The objectives of this Agreement are to:

- Design and scale up a novel tracking technology from the lab into a field to reduce solar's levelized cost of electricity (LCOE) to 40 – 50% lower than the LCOEs of currently available solar energy systems with trackers.

² California Public Resources Code, Section 25711.5(a) requires projects funded by the Electric Program Investment Charge (EPIC) to result in ratepayer benefits. The California Public Utilities Commission, which established the EPIC in 2011, defines ratepayer benefits as greater reliability, lower costs, and increased safety (See CPUC "Phase 2" Decision 12-05-037 at page 19, May 24, 2012, http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF).

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

Exhibit A

Scope of Work

II. 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

- 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.
- Submit the final product to the CAM once agreement has been reached on the draft. The CAM will provide written approval of the final product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- If the CAM determines that the final product does not sufficiently incorporate his/her comments, submit the revised product to the CAM within 10 days of notice by the CAM, unless the CAM specifies a longer time period.
- NOTE: All confidential products shall only contain confidential information, be marked as confidential on each page, and presented to the Contracts, Grants, and Loans office, instead of to the CAM, in a sealed package.

For products that require a final version only

- Submit the product to the CAM for approval.
 - If the CAM determines that the product requires revision, submit the revised product to the CAM within 10 days of notice by the CAM, unless the CAM specifies a longer time period.
- NOTE: All confidential products shall only contain confidential information, be marked as confidential on each page, and presented to the Contracts, Grants, and Loans office, instead of to the CAM, in a sealed package.

For all products

- Submit all data and documents required as products in accordance with the following Instructions for Submitting Electronic Files and Developing Software:
 - **Electronic File Format**

Exhibit A Scope of Work

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

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

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

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

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

Exhibit A Scope of Work

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

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

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

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

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
 - An updated Project Schedule;
 - Technical products (subtask 1.1);
 - Progress reports and invoices (subtask 1.5);
 - Final Report (subtask 1.6);
 - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
 - Any other relevant topics.
- Provide an *Updated Project Schedule*, *List of Match Funds*, and *List of Permits*, as needed to reflect any changes in the documents.

The CAM shall:

- Designate the date and location of the meeting.
- Send the Recipient a *Kick-off Meeting Agenda*.

Recipient Products:

- Updated Project Schedule *(if applicable)*
- Updated List of Match Funds *(if applicable)*
- Updated List of Permits *(if applicable)*

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

The goal of this subtask is to determine if the project should continue to receive Energy Commission funding, and if so whether any modifications must be made to the tasks, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the Energy Commission and the Recipient. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if

Exhibit A Scope of Work

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.

Exhibit A Scope of Work

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.

Exhibit A Scope of Work

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 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.

Exhibit A Scope of Work

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

The Final Report shall be a public document. If the Recipient would like to submit confidential information to the Energy Commission in the Final Report Outline and Final Report, the Recipient shall create and submit a public version of the Final Report Outline and Final Report and a confidential version of those documents that only contains confidential information. The public version of the Final Report shall include all information specified in the outline approved by the CAM, but does not reveal Sunfolding’s trade secrets or other confidential information. When submitting the confidential versions of the Final Report Outline and Final Report, the recipient must mark each page of the Final Report Outline and Final Report as “confidential” and present them in sealed packages to the Contracts, Grants, and Loans office. Recipient shall perform the following activities for both the public and confidential versions of the Final Report Outline and Final Report.

Subtask 1.6.1 Final Report Outline

The Recipient shall:

- Prepare both confidential and public versions of *Final Report Outline* in accordance with the *Style Manual* provided by the CAM.
- Submit draft of the confidential version of the Final Report Outline to the Contracts, Grants, and Loans office. The Contracts, Grants, and Loans office shall forward the draft confidential version of the Final Report outline to the CAM/a designated staff or technical expert for review and comment.
- Once agreement has been reached on the draft, submit the confidential version of the Final Report outline to the Contracts, Grants, and Loans office.
- Submit draft of public version of the Final Report outline to the CAM for review and comment.
- Once agreement has been reached on the draft, submit final of public version of the final outlines to the CAM. The CAM will provide written approval of the final outlines within 10 days of receipt.

Recipient Products:

- Confidential Final Report Outline (draft and final)

Exhibit A Scope of Work

- Public Final Report Outline (draft and final)

CAM Product:

- Style Manual
- Comments on Draft Final Report Outlines
- Approval of Final Report Outlines

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare both confidential and public versions of *Final Report* for this Agreement in accordance with the approved Final Report Outline and the Style Manual provided by the CAM.
- Submit draft of the confidential version of the Final Report to the Contracts, Grants, and Loans office. The Contracts, Grants, and Loans office shall forward the draft confidential version of the Final Report to the CAM/a designated staff or technical expert for review and comment.
- Once agreement has been reached on the draft, submit the final confidential version of the Final Report to the Contracts, Grants, and Loans office.
- Submit draft of public version of the Final Report to the CAM for review and comment. Once agreement on the draft report has been reached, the CAM will inform the recipient of approval of the public version of the Final Report and forward the electronic version of the Final Report for Energy Commission internal approval. Once the CAM receives approval of the public version of the Final Report, he/she will provide written approval to the Recipient.
- Submit one bound copy of the public version of the Final Report to the CAM.
- Submit one bound copy of the confidential version of the Final Report.

Products:

- Public Final Report (draft and final)
- Confidential Final Report (draft and final)

CAM Product

- Comments on Draft Public Final Report
- Comments on Draft Confidential Final Report
- Approval of Public Final Report
- Approval of Confidential 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

Exhibit A Scope of Work

associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

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

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

- A list of the match funds that identifies:
 - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.

The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.

- A copy of a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

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

Subtask 1.8 Permits

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

The Recipient shall:

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

Exhibit A Scope of Work

- 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,

Exhibit A Scope of Work

availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
 - Technical area expertise;
 - Knowledge of market applications; or
 - Linkages between the agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.
- Review products and provide recommendations for needed product adjustments, refinements, or enhancements.
- Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.

The TAC may be composed of qualified professionals spanning the following types of disciplines:

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);
- Public interest market transformation implementers;
- Product developers relevant to the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;
- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

The Recipient shall:

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The list will be discussed at the Kick-off meeting, and a schedule for recruiting members and holding the first TAC meeting will be developed.
- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Products:

- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

Exhibit A Scope of Work

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

III. 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: Scale-up, Design, and Procurement

The goals of this task are to: (1) develop the test site for installation and (2) develop the design of the trackers for scale-up to demonstration level.

The Recipient shall:

- Identify and develop relationship with the EPC (Engineering, Procurement and Construction) contractor or contractors for installation.
- Perform site preparation to:
 - The location for this project has been identified. If the location changes and the Recipient needs to identify a new location and buy/obtain permission to use that land for tracker system installation, Recipient will see Exhibit C, Electric Program Investment Charge Standard Grant Terms and Conditions, Section 6.b for information on approval of changes.
 - Assess expected output of site via environmental data.
 - Determine the boundaries of 4 test sections of the installation.
 - Verify that soil type and condition is appropriate for installation method specific to test section.

Exhibit A Scope of Work

- Regrade land in areas where existing grade is unacceptable for installation.
- Install office field trailer for monitoring equipment and on-site engineering.
- Test field design with Photovoltaic Software (PVSYST) or comparable software to determine expected output from field.
- Procure panels and inverter for installation:
 - Secure complimentary panels and inverters from PV Evolution Labs or identify alternative provider.
- Design and produce trackers:
 - Production run and quality control of all tracker parts.
 - Factory assembly of actuator parts into deliverable units.
 - Quality control testing of tracker units and approval for field placement.
- Procure pneumatics:
 - Procure air sources for field pneumatic system.
 - Procure pneumatic harness.
 - Production run and quality control of pneumatic parts.
 - Factory assembly of pneumatic harness with field connections.
 - Quality control testing of pneumatic harness.
- Design and procure racking and mounting and prepare report on:
 - Design and procure mounts for single axis sub-fields
 - Design and procure the engineering and materials necessary to connect the PV panels to the actuators; may include racking structure and clips and any additional fasteners.
- Prepare both confidential and public versions of *Scale-up, Design, and Procurement Report* that shall include, but not be limited to, all the activities performed under this task. The public version of the *Scale-up, Design, and Procurement Report* shall not reveal Sunfolding's trade secrets or other confidential information and shall be sent to the CAM for review and approval. The draft and final confidential report shall only contain confidential information, be marked as "confidential" on each page and presented in a sealed package to the Contacts, Grants, and Loans office.
- Participate in a CPR meeting and prepare a CPR Report consistent with Task 1.3.

Products:

- Confidential Scale-up, Design, and Procurement Report (draft and final)
- Public Scale-up, Design, and Procurement Report (draft and final)
- CPR Report

TASK 3: Installation

The goals of this task are to: (1) install a 300 kW PV tracker system in the test field, (2) work closely with the EPC contractor(s) and related experts to develop the methodology and best-practices for installation of the trackers including mounting trackers to the PV panels and connecting them to the ground/foundation on a field of the level found at the testing site and (3) develop the official installation method for future deployments and product launch.

The Recipient shall:

- Work with EPC and industry experts to develop installation methodologies
- Prepare both confidential and public versions of *Installation Plan* and *Tracker Installation Best Practices* detailing the installation tasks below.

Exhibit A Scope of Work

- Install mounting:
 - Install ground driven posts and/or ballasts for test plots
 - Install tracker actuators on top of ground mounts
 - Install PV panel-tracker interface rack
 - Install PV panels onto racking mount
- Install pneumatic system:
 - Install air source and electrical control system in environmental resistant housing
 - Install pneumatic harness
 - Connect pneumatic harness to tracker actuators
 - Connect pneumatic harness to air source
 - Field test pneumatics
- Install electrical system:
 - Appropriately ground exposed metal in contact with PV panels
 - Connect panels in appropriate string lengths
 - Connect PV panel strings to inverters
 - Test PV string – Inverter circuit for proper function
- The public version of the *Installation Plan* and *Tracker Installation Best Practices Report* shall not reveal Sunfolding’s trade secrets or other confidential information and shall be sent to the CAM for review and approval. The draft and final confidential report shall only contain confidential information, be marked as “confidential” on each page, and presented in a sealed package to the Contacts, Grants, and Loans office.
- Prepare a *Completion of Installation Letter* to inform the CAM that the mounting, pneumatic system, and electrical system are installed in the test field

Products:

- Confidential Installation Plan and Tracker Installation Best Practices Report (draft and final)
- Public Installation Plan and Tracker Installation Best Practices Report (draft and final)
- Completion of Installation Letter

TASK 4: Testing and Verification

The goals of this task are to test and verify the 300 kW PV tracker system installed at the test field.

The Recipient shall:

- Collect performance, weather and environmental data:
 - Acquire and analyze inverter data
 - Acquire and install inclinometers and/or sun sensors on subset of trackers to gather temporal positioning and tracker consistency data
 - Analyze inclinometer/sun sensor data
 - Acquire and install video monitoring system
 - Install pressure sensors in subset of pneumatic harnesses to assess pneumatic performance
 - Assess failure rate for installed components
 - Assess up-time of field which is the percentage of time the system is operational. It refers to the measure of reliability or stability of a system
 - PVSYST analysis of field and comparison to performance data

Exhibit A Scope of Work

- Implement additional sensor and performance monitoring as needed
- Collect at least 6 months of data from weather stations in each of the tracker plots
- Collect at least 6 months of data on the 300 kW PV tracker system performance
- Perform custom data analysis to assess performance of trackers.
- Work closely with EPC contractor(s) and related experts to develop the methodology and best-practices for installation of trackers including mounting trackers to the PV panels and connecting them to the ground/foundation on a field of the level found at the testing site.
- Develop the official installation method for future deployments and product launch.
- Prepare both confidential and public versions of *Testing and Verification Report* that shall include, but not be limited to, all the activities performed under this task. The public version of the *Testing and Verification Report* shall not reveal Sunfolding's trade secrets or other confidential information and shall be sent to the CAM for review and approval. The draft and final confidential report shall only contain confidential information, be marked as "confidential" on each page and presented in a sealed package to the Contacts, Grants, and Loans office.

Products:

- Confidential Testing and Verification Report (draft and final)
- Public Testing and Verification Report (draft and final)

TASK 5: 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.

Exhibit A Scope of Work

- 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

Exhibit A Scope of Work

TASK 6: Technology/Knowledge Transfer Activities

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

The Recipient shall:

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

Products:

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

TASK 7: Production Readiness Plan

The goal of this task is to determine the steps that will lead to the manufacturing of technologies developed in this project or to the commercialization of the project's results.

The Recipient shall:

- Prepare a *Production Readiness Plan*. The degree of detail in the plan should be proportional to the complexity of producing or commercializing the proposed product, and to its state of development. As appropriate, the plan will discuss the following:
 - Critical production processes, equipment, facilities, personnel resources, and support systems needed to produce a commercially viable product.
 - Internal manufacturing facilities, supplier technologies, capacity constraints imposed

Exhibit A Scope of Work

by the design under consideration, design-critical elements, and the use of hazardous or non-recyclable materials. The product manufacturing effort may include “proof of production processes.”

- The estimated cost of production.
- The expected investment threshold needed to launch the commercial product.
- An implementation plan to ramp up to full production.
- The outcome of product development efforts, such as copyrights and license agreements.
- Patent numbers and applications, along with dates and brief descriptions.
- Other areas as determined by the CAM.

Products:

- Production Readiness Plan (draft and final)

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: SUNFOLDING, INC.

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-14-025 with **Sunfolding, Inc.** for a **\$1,000,000** grant to develop a new solar tracker that lowers the levelized cost of solar electricity by reducing tracker component costs, improves efficiencies in construction and site design, and improves long-term reliability; and

FURTHER BE IT RESOLVED, that the Executive Director or his/her designee shall execute the same on behalf of the Energy Commission.

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the California Energy Commission held on March 11, 2015.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Harriet Kallemeyn,
Secretariat