

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-14-051 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	Abolghasem Edalati	43	916-327-1499

Recipient's Legal Name	Federal ID Number
All Power Labs, Inc.	80-0845968

Title of Project
Cleaner Air, Cleaner Energy: Converting Forest Fire Management Waste to On Demand Renewable Energy

Term and Amount	Start Date	End Date	Amount
	5/15/2015	3/31/2019	\$ 1,990,071

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

Proposed Business Meeting Date	4/8/2015	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Abolghasem Edalati	Time Needed:	5 minutes

Please select one list serve. Select

Agenda Item Subject and Description

Proposed resolution approving Agreement EPC-14-051 with All Power Labs, Inc. for a \$1,990,071 grant to design, deploy, and test a demonstration mobile biomass gasifier technology that can convert forest slash biomass into on demand renewable energy.

California Environmental Quality Act (CEQA) Compliance

- 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
 - 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 15306, 14 CCR 15303
 - Common Sense Exemption. 14 CCR 15061 (b) (3)
 - Explain reason why Agreement is exempt under the above section:
 - All Power Lab will field deploy the Powertainer and conduct extended testing for energy production and emissions. After field-testing, a comprehensive independent analysis and laboratory work will be conducted by the Renewable and Appropriate Energy Laboratory at the University of California at Berkeley (RAEL) and Center for Forestry at the University of California at Berkeley (CFF). RAEL and CFF will publish the results of their analysis, summarizing the air quality, climate, energy, hydrological and financial impact of the project, and the potential for scaling. As this project involves data collection and laboratory work, the Class 6 exemption can apply as this project consists of basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. (Cal. Code Regs., tit. 14, sect. 15306). The project consists of construction of a new small facility or structure; installation of small new equipment, as All Power will develop a Powertainer as a modular biomass gasification system, a series of interrelated components will be correctly sized to a 20' shipping container. This particular form factor is chosen as it combines the best compromise between scale (ability to generate power and consume forest waste) and mobility. It is assumed that multiple units can be linked together to scale energy production/waste disposal as needed. Therefore, the facilities' installations involve small structures. The Class 3 exemption can apply to this project which consists of construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure. (Cal. Code Regs., tit. 14, sect. 15303).
 - b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)
- Check all that apply
- | | |
|---|---|
| <input type="checkbox"/> Initial Study | <input type="checkbox"/> Environmental Impact Report |
| <input type="checkbox"/> Negative Declaration | <input type="checkbox"/> Statement of Overriding Considerations |
| <input type="checkbox"/> Mitigated Negative Declaration | |

GRANT REQUEST FORM (GRF)



List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)	
Legal Company Name:	Budget
Placer County Air Pollution Control District	\$ 78,000
Sierra Pacific Industries	\$ 20,000
Renewable and Appropriate Energy Lab	\$ 150,000
The Regents of the University of California; Center for Forestry/Forest	\$ 220,171
	\$
	\$
	\$
	\$
	\$

Exhibit A Scope of Work

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Qualify and Select Project Fuel Supply Chain
3		Review Alpha Requirements and Develop Beta Powertainer
4		Design and Transportation of Beta Powertainer Subsystems
5	X	Subsystem Manufacturing and Assembly
6		Powertainer Performance Testing
7		Site Qualification & Interconnection
8		Emissions Protocol, Testing and Certification
9		Energy and Emissions Modeling, Analysis and Publication of Results
10		Feedstock Locations/Siting Plans and Publication of Results
11		Evaluation of Project Benefits
12		Technology/Knowledge Transfer Activities
13		Production Readiness Plan

B. Acronym/Term List

Acronym/Term	Meaning
APL	All Power Labs
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
DVT	Design Validation Testing
Energy Commission	California Energy Commission
EVT	Engineering Validation Testing
LCOE	Levelized Cost of Energy
PT	Powertainer
TAC	Technical Advisory Committee

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

A. Purpose of Agreement

The purpose of this Agreement is to fund the design, deployment, and testing of a demonstration mobile biomass gasifier technology that can convert forest slash biomass into on demand renewable energy. The results of the demonstration will be analyzed to determine (1) optimal siting to enhance grid stability, (2) impact of monetizing current forest waste as fuel on ability to increase forest thinning and lower wildfire risk, and (3) impact of increased thinning on availability of hydrological resources.

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

B. Problem/ Solution Statement

Problem

The market has not created a mobile, cost-effective, modular biomass gasifier that can process forest-thinning waste while meeting California Air Emissions standards. In order to meet the state's competing goals of catastrophic wild fire mitigation, renewable energy generation, and air emissions standards, California needs a commercial solution for processing forest slash into on demand renewable energy.

Solution

The Recipient will develop, deploy, and test a mobile, modular biomass gasification generator, the Powertainer (PT), utilizing forest slash to produce on demand renewable energy. By making a market for forest thinning, expanded fire remediation efforts will be enabled, lowering the risk of forest fire. Using this waste will improve air quality while increasing available biomass renewable energy resources and hydrological resources.²

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Design, deploy and test a 150 Kilowatt-electric (kWe) modular, mobile biomass gasifier
- Optimize the system to meet California Air Emissions Standards
- Utilize forest slash/log landing biomass for the production of cost-effective, on-demand renewable energy
- Reduce the distance biomass feedstock must be trucked, which improves the economics of biomass energy production
- Reduce the risk of catastrophic wildfire by creating new demand for biomass energy
- Explore improving hydrological resources through increased forest thinning activity
- Analyze the optimal locations in California to deploy mobile biomass gasifiers, from a feedstock availability and electric grid reliability perspective

Ratepayer Benefits:³ This Agreement will result in greater electricity reliability, lower costs, and increased safety by demonstrating the potential capacity for low cost, on demand renewable energy to reduce peak demand in load pockets, and reducing the risk of catastrophic wildfire by creating a process to monetize forest thinning.

² Increased thinning will allow more snow to fall on the ground thereby increasing water absorption from snow. Currently thick forests prevent snow from falling and evaporate from the crown of the forest. This is outlined in the grant application document.

³ 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).

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Technological Advancement and Breakthroughs:⁴ This Agreement will lead to technological advancement and breakthroughs in mobile, low cost biomass gasification systems. This in turn will support achievement of the State of California's statutory energy goals by working to reduce greenhouse gas emissions (AB32, Núñez, Chapter 488, Statutes of 2006), improve air quality, increase the share of in state renewable energy (SB X1-2, Simitian, Chapter 1, Statutes of 2011-2012), increase the use of bio-based energy (Bioenergy Action Plan 2012), and reduce the risk of catastrophic wildfire. As all of the Recipient's products are assembled in California, the project will also support the Governor's Clean Energy Jobs Plan (2011).

Agreement Objectives

The objectives of this Agreement are to:

- Establish levelized cost of energy (LCOE) for modular biomass energy from forest waste at or below SB 1122 (Rubio, Chapter 612, Statutes of 2012) incentive target levels with mobile gasification technology.
- Reduce greenhouse gas emissions from burning of forest wastes.

⁴ 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.

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.

For all products

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

- **Electronic File Format**

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

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

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

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

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

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

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

- Terms and conditions of the Agreement;

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

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

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

The CAM shall:

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

Recipient Products:

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

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

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

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR meetings generally take place at the Energy Commission, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

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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.

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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.

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- 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.

Subtask 1.6.1 Final Report Outline

The Recipient shall:

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

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

- Style Manual

Subtask 1.6.2 Final Report

The Recipient shall:

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

Products:

- Final Report (draft and final)

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MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

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

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

The Recipient shall:

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

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

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

Products:

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

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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:
 - 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.

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- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Products:

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

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

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

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

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

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

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The Recipient shall:

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

Products:

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

Subtask 1.11 TAC Meetings

The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

The Recipient shall:

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

Products:

- TAC Meeting Schedule (draft and final)
- TAC Meeting Agendas (draft and final)
- TAC Meeting Back-up Materials
- TAC Meeting Summaries

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III. TECHNICAL TASKS

TASK 2 - Qualify and Select Project Fuel Supply Chain

The goal of this task is to qualify and select forest biomass feedstocks to utilize in the PT to produce electricity.

The Recipient shall:

- Coordinate with suppliers that can provide biomass fuels from log landings, that meet fuel requirements⁵
 - Evaluate fuel quantity/availability
 - Confirm fuel characteristics including: species, moisture content, age, non-fuel debris content
 - Research fuel transport options, costs and processes
 - Utilize learnings of supply of resources to inform specifications in design of 'beta' PT
 - Establish reporting mechanism for quantifying biomass composition and transportation, handling costs
 - Execute a Fuel Supply Agreement with (a) fuel supplier(s) to process, load, truck, and unload materials at pilot project site
 - Prepare a *Fuel Supply Agreement Memo* which will summarize the terms and conditions of the fuel supply.

Products:

- Fuel Supply Agreement Memo

TASK 3 - Review Alpha Requirements and Develop Beta Powertainer

The goal of this task is to review the lessons learned in designing and building the 'Alpha' PT, ⁶as well as requirements from external agencies, and incorporate those learnings into the design of the 'Beta' PT.

The Recipient shall:

- Review "Alpha" prototype designs, performance, and lessons learned
 - Interview key staff who worked on the project
- Review subsequent design ideas, requirements, and technological advances relevant to project
- Review & internalize California Air Resource Board and other applicable air emissions requirements into Beta Powertainer Technical Requirements Document
- Perform outreach to Pacific Gas and Electric's interconnection department to understand grid tie connection regulations and requirements, so that they may be incorporated in the Beta Powertainer Technical Requirements Document
- Develop the *'Beta' Powertainer Technical Requirements Document* based on knowledge gained from performing above tasks; determine necessary systems required

Products:

⁵ Fuel requirements refer to standard size, shape, configuration requirements as outlined here:
<http://www.allpowerlabs.com/products/appropriate-fuels>

⁶ Alpha refers to original prototype built under DOE grant, referred to in the grant application documents.

Exhibit A Scope of Work

- Beta Powertainer Technical Requirements Document

TASK 4 - Design and Transportation of Beta Powertainer Subsystems

The goals of this task are to design the subsystems, which, once assembled will create the PT, and to develop the specification documents for the transport of the system and its ancillary equipment.

Subtask 4.1 Design Powertainer Subsystems

The goal of this subtask is to design the PT subsystems.

The Recipient Shall:

- Design PT Subsystems: Gasifier, Exhaust Control System, Genset (Generation Head and Engine), Flare, Internal and External Feed/Enclosure, Automation Controls, Interconnection/Grid Tie Equipment, and Heat Mining and Recycling.
 - Perform a Technical Risk Assessment for each subsystem.
 - Prototype each component, refine and optimize.
 - Refine design based on prototype feedback and optimization.
 - Identify balance of materials required for each subsystem and potential vendors.
 - Build and test components for feasibility and validation.
 - Design analysis protocol including:
 - Prepare an *Engineering Validation Testing Plan (EVT)*. The EVT will establish a methodology and work plan for ensuring the engineering decisions made meet proposed specifications.
 - Prepare a *Design Validation Testing Plan (DVT)*. The DVT will establish a methodology and work plan for testing to ensure the incorporated designs function as intended.
- Generate *Subsystem Design Drawings*. The drawings of each subsystem will comprise the technical requirements and specifics of each subsystem and plans for validation of the designs and engineering of those drawings.

Products:

- Engineering Validation Testing (EVT) Plan
- Design Validation Testing (DVT) Plan
- Subsystem Design Drawings

Subtask 4.2 Transport Powertainer Subsystems

The goal for this subtask is to develop the protocol for transporting the PT.

The Recipient shall:

- Develop *Transportation Specifications Document* for loading, transportation, and unloading of the PT.
- Develop *Ancillary Equipment Transportation Specifications Document* for loading, transportation, and unloading of ancillary equipment, including conveyer belt for loading biomass into the hopper

Exhibit A Scope of Work

Products:

- Transportation Specifications Document
- Ancillary Equipment Transportation Specifications Document

TASK 5 - Subsystem Manufacturing and Assembly

The goals of this task are to manufacture the subsystem components, validate the components that utilized the subsystem specific engineering and design validation plans, and assemble the subsystems into the complete PT unit.

Subtask 5.1 Manufacture Powertainer Subsystems

The goal of this subtask is to manufacture and validate the PT subsystem components.

The Recipient Shall:

- Manufacture Subsystem Beta Prototype components including: Gasifier, Exhaust Control System, Genset (Generation Head and Engine), Flare, Internal and External Feed/Enclosure, Automation Controls, Interconnection/Grid Tie Equipment, and Heat Mining and Recycling.
- Perform Engineering Validation Testing
 - Generate *EVT Report* which will validate engineering and summarize the performance results of the testing.
- Perform Design Validation Testing
 - Generate *DVT Report* which will validate design and summarize the form, function and topology of the product.

Products:

- EVT Report
- DVT Report

Subtask 5.2 Fully Assemble Powertainer

The goals of this task are to assemble the fully functional PT.

The Recipient shall:

- Perform integration and assembly of subsystems into a fully assembled PT.
- Prepare an *Integration and Assembly Report* which details the integration of subsystems into a fully assembled PT.
- Participate in a CPR meeting.
- Prepare a *CPR Report*.

Products:

- Integration and Assembly Report
- CPR Report

TASK 6 – Powertainer Performance Testing

The goal of this task is to commission the fully assembled Beta PT.

The Recipient shall:

- Commission Beta PT Unit by:
 - Performing a 100 hour engine test on fully assembled system.
 - Monitor the CO and NOx emissions utilizing continuous monitoring equipment.

Exhibit A Scope of Work

- Test the biomass loading and feeding.
- Measure the gasifier performance.
- Refine the Automation Controls equipment.
- Tune and optimize the Genset.
- Test the power and energy production against an onside load bank.
- Prepare a *Commissioning Test Results Memo* which will summarize the conditions and results of the commissioning test.

Products:

- Commissioning Test Results

TASK 7 - Site Qualification & Interconnection

The goals of this task are to survey and qualify the test site to be able to deploy the PT, including site work and interconnection.

The Recipient shall:

- Survey the pilot test site including:
 - Prepare the pilot test site for the PT, and fuel supply.
 - Develop a Site Prep Plan.
- File an Interconnection Application with PG&E for the Pilot Test Site.
- Interconnect the project at the Pilot Test Site.
- Build the necessary Facilities to Interconnect the PT.
- Transport the PT to the Pilot Test Site.
- Prepare a *Pilot Test Site Report* which summarizes the results of the site qualification and preparation of the pilot site.

Products:

- Pilot Test Site Report (draft and final)

TASK 8 – Emissions Protocol, Testing and Certification

The goals of this task are to develop a protocol to test the emissions of the PT platform and then implement, test and certify the emissions.

The Recipient shall:

- Develop a continuous on-site monitoring Emissions Testing Plan; will include definitions of air sampling test methods, sampling duration, quality control and quality assurance procedures, target PT operating conditions and measurement procedures (for example, engine and gasifier temperatures and pressures, and biochar and electricity production rates), and biomass characterization.
- Observe and coordinate the air pollutant emissions testing. Ensure sampling procedures are adhered to and the proper data is collected.
- Review source test contractor final air pollutant emission test report to ensure data accuracy, quality, and completeness, including testing for the following emissions:
 - Carbon monoxide, Oxygen / carbon dioxide, volatile organic compounds, Methane, Black carbon, Particulate matter less than 2.5 microns.

Exhibit A Scope of Work

- Evaluate testing results with air pollution compliance requirements including those of New Source Review and Best Available Control Technology. Document emissions testing plan results.
- Conduct an air pollution life cycle assessment of the PT biomass system, including biomass production, processing, and transport. Compare this with alternatives including in-field disposal, open pile burning, and use in existing biomass energy facilities.
- Optimize the PT based on test results
- Work with Placer County Air Pollution Control District to Produce an *Emissions Testing Report* which will summarize the conditions and results of the emissions testing.

Products:

- Emissions Testing Report (draft and final)

TASK 9 – Energy and Emissions Modeling, Analysis and Publication of Results

The goals of this task are to analyze data generated by the PT demonstration, and apply it in market based models to determine the value and optimal locations for mass deployment of the PT. The goal is to then publish the findings of the analysis in a leading peer reviewed journal, and provide them to relevant policy makers.

The Recipient shall:

- Analyze and model the LCOE from the PT demonstration system utilizing various forest waste feedstocks.
- Analyze and model, utilizing utility dispatch models (utilizing PLEXOS software) the potential capacity benefits of mass deployment of mobile, on demand renewable energy in urban forest interface areas.
- Analyze and model the economic value of on demand biomass energy, including power (kW) and energy (kWH) values, at nodal level, to understand the optimal locations to site PT in California.
- Analyze and model scenarios of various penetrations of PTs in various California regions to meet RA/capacity requirements.
- Analyze and model impact of increased forest thinning on availability of hydrological resources.
- Analyze how displacing the current mix of electric generation resources with PT would affect grid wide emissions, including life cycle analysis of varying feedstocks and supply strategies
- Develop policy recommendations related to on demand renewable power sourced from biomass feedstocks.
- Publish *Energy Analysis and Policy Recommendations Results* in leading peer-reviewed energy journals, such as Energy Policy; grey literature (non-peer reviewed) publications in publicly available media; and give conference presentations.

Products:

- Energy Analysis and Policy Recommendations Results (draft and final)

TASK10 – Feedstock Locations/Siting Plans and Publication of Results

The goals of this task are to analyze data generated by the PT demonstration, and to conduct independent relevant research. The goal is to evaluate the results and derive values for various activities and products which would be enabled by the project, using market based models.

Exhibit A Scope of Work

Then publish the findings of the analysis in a leading peer reviewed journal, and provide them to relevant policy makers.

The Recipient shall:

- Summarize current practices and potential scope of forest thinning operations.
- Conduct economic analysis of wood biomass supply chain.
- Evaluate the value of and market potential for char and combined heat and power.
- Evaluate the economic thresholds for increased forest thinning.
- Evaluate the potential impact of APL conversion technology deployment on electricity generation and use of forest residue as fuel.
- .
- Evaluate the potential for increased water resource availability as a result of deployment and associated forest management.
- Evaluate policy issues related to increased forest thinning.
- Develop policy recommendations.
- Publish *Resource Analysis and Policy Recommendations Results* in leading peer-reviewed forest products journals; grey literature (non-peer reviewed) publications in publicly available media; and give conference presentations

Products:

- Resource Analysis and Policy Recommendations Results (draft and final)

TASK 11 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 12 - 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 13 - 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,

Exhibit A Scope of Work

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 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)

Exhibit A Scope of Work

IV. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: ALL POWER LABS, 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-14-051 from PON-14-303 with **All Power Labs, Inc.** for a **\$1,990,071** grant to design, deploy, and test a demonstration mobile biomass gasifier technology that can convert forest slash biomass into on-demand renewable energy; 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 April 8, 2015.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Harriet Kallemeyn,
Secretariat