Exhibit A
Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Project Preparation
3	X	Design and Engineering
4		Procurement – Hardware and Biomass Feedstock
5		Construction, Installation, and Commissioning
6	X	Operations and Measurement and Verification
7		Evaluation of Project Benefits
8		Technology/Knowledge Transfer Activities
9		Production Readiness Plan

B. Acronym/Term List

Acronym/Term	Meaning
BDT	Bone Dry Ton
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CO	Carbon Monoxide
CPR	Critical Project Review
LCOE	Levelized Cost of Electricity
MWnet	Megawatts Net (power available for grid export)
NOx	Nitrogen Oxides
PM	Particulate matter
TAC	Technical Advisory Committee
VOC	Volatile Organic Compound

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

A. Purpose of Agreement

The purpose of this Agreement is to fund the demonstration and deployment of a 3 MW_{net} biomass power plant. The biomass facility will include advanced low-emissions control technology to reduce NOx, CO, and Volatile Organic Compound (VOC) emissions, and the facility will include a state-of-the-art low-water consumption condenser.

B. Problem/ Solution Statement

<u>Problem</u>
California is experiencing unprecedented levels of tree die-off. Factors that are contributing to

[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.

the die-off include several consecutive years of drought, warmer temperatures, and an infestation of bark beetles. The U.S. Forest Service estimated in 2016 that there were more than 102 million dead trees over 7.7 million acres in California, the majority of which are located in the central and southern Sierra Nevada.[2] The dead tree population in California greatly exceeds the level expected for healthy forests, and this overabundance of forest fuel increases the risk of catastrophic wildfires that threaten property and lives.

Open pile burning is the conventional approach for treating dead trees. However, open pile burning creates unwanted air pollution and generates no useful output from the biomass resource. An alternative to open pile burning is to utilize a bioenergy facility that generates electricity[3] using dead trees as a fuel source. There is a substantial shortage, however, of existing bioenergy facilities can address the tree mortality crisis in California.

Solution

The biomass power plant will help reduce the population of dead and diseased trees by consuming up to 30,000 bone dry tons (BDT) per year of forest biomass. This consumption rate equates to approximately 2,307 acres per year based on removing 13 BDT per acre of dead or diseased trees along with other biomass generated as a byproduct of forest management practices. This forest biomass will be sourced from within 50 miles of the plant, and will help reduce the threat of wildfire in this region. In addition to reducing the wildfire threat, the biomass plant will produce up to 3 MW of electricity for grid export (3 MWnet) in an environmentally responsible manner.

A direct combustion design, consisting of a boiler and a steam turbine, has been used for decades, and these systems are proven technologies for utilizing a wide range of feedstocks, including biomass. The technical risk for direct combustion is considerably lower compared to biomass gasification, which is more complex, far less tolerant to feedstock variations, and still developmental in North America. The direct combustion design further benefits from innovations in the low-emissions control technology and low-water consumption condenser which further lower risks of the technology.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Build a forest biomass power plant that will consume up to 30,000 BDT/yr of dead trees with a design rating of 3 MW_{net}.
- Demonstrate low NOx, CO, and VOC emissions performance
- Demonstrate low water consumption

Ratepayer Benefits:[4] This Agreement will result in the ratepayer benefits of greater electricity reliability and increased safety (reduced wildfire threat) by reducing the population of dead trees.

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[2] United States Department of Agriculture, Office of Communications, "New Aerial Survey Identifies More Than 100 Million Dead Trees in California," (news release, November 2016, https://www.fs.fed.us/news/releases/new-aerial-survey-identifies-more-100-million-dead-trees-california).

[3] Bioenergy facilities can also produce useful thermal energy in addition to electricity if configured for Combined Heat and Power operation.

[4] 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,

The dead trees will be used as fuel for the biomass plant and converted to electricity that will be available for grid export (up to 3 MW).

Technological Advancement and Breakthroughs:[5] 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 demonstrating a 3 MW_{net} biomass plant integrated with advanced low emissions control technology and a state-of-the-art low water consumption condenser. The technologies that comprise the integrated system have all been successfully used at larger scales (e.g., coal-fired power plants and larger biomass plants), but have not been demonstrated as an integrated system at the relatively small scale (3 MW_{net}) planned for this project. Nor has the concept for this proposed project been demonstrated using woody biomass.

Additional Co-benefits:

- **Electricity and Thermal Savings** – Generate up to 23.7 GWh/yr of renewable electricity for grid export and recover up to 473,040 therms of thermal energy when operated as a combined heat and power plant.
- **Peak Load Reduction** – Reduce peak load on the grid by 3 MW when operating.
- **Reduced Risk of Forest Fires –** Protect biomass facility and neighboring communities by removing excess forest fuels from surrounding areas, which will help reduce the potential for forest fires and the costs required for fire suppression.
- **Open Pile Burning** – Avoid open pile burning of up to 30,000 BDT/yr of forest biomass (up to 8.5 million BDT/yr at full market penetration)
- **Air Quality Benefits** – Through offsets, reduce GHG emissions by 9,582 metric tonnes CO_{2eq}/yr. Reduce NOx, VOC, CO, and PM compared to the pile and burn method, where that method would have been used.
- **Water Use Reductions** – This facility will consume about 29 million gallons of water per year less than a conventional condenser technology (79% savings).
- **Watershed Benefits –** The proposed project will promote forest health within the Yuba and Feather River watersheds, thereby protecting water quality, quantity, and reliability for local and downstream domestic and agricultural users. The Yuba and adjacent Feather River watershed are major drainages of the western slope of the Sierra Nevada. They each contain extensive forested landscapes that support recreation, hydropower generation, tourism, agriculture, and species/habitats of local and statewide significance.
- **Economic Development –** Create living-wage jobs in an economically distressed community.
- **Knowledge and Awareness** – The project will fill a knowledge gap by developing technical performance and cost characteristics based on actual operating data for a small scale forest biomass facility in California.
- **Diversify Renewable Energy Portfolio** – The project will produce baseload energy that, in combination with the ultimate large number of community scale Bioenergy Market Adjustment Tariff (BioMAT) facilities, will be more reliable in aggregate than a few large scale power plants. Forest biomass-to-energy will serve as a stable back-up to wind and

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).

[5] 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.

solar-derived energy, and will help diversify California's portfolio of renewable energy sources.

Agreement Objectives

The objectives of this Agreement are to:

- Develop technical performance and cost characteristics based on actual operation of 3 MW_{net} biomass power plant.
- Measure actual NOx, CO, and VOC emissions.
- Measure actual water consumption.
- Develop publicly available information that can help accelerate the adoption of forest biomass power plants throughout California.

III. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V).** Products that require a draft version are indicated by marking **"(draft and final)"** after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, **"days"** means working days.

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

- Submit the product to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

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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:
  - 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.

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MEETINGS

Subtask 1.2 Kick-off Meeting
The goal of this subtask is to establish the lines of communication and procedures for implementing this Agreement.

The Recipient shall:

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

  The administrative portion of the meeting will include discussion of the following:
  - Terms and conditions of the Agreement;
  - Administrative products (subtask 1.1);
  - CPR meetings (subtask 1.3);
  - Match fund documentation (subtask 1.7);
  - Permit documentation (subtask 1.8);
  - Subcontracts (subtask 1.9); and
  - Any other relevant topics.

  The technical portion of the meeting will include discussion of the following:
  - The CAM's expectations for accomplishing tasks described in the Scope of Work;
  - An updated Project Schedule;
  - Technical products (subtask 1.1);
  - Progress reports and invoices (subtask 1.5);
  - Final Report (subtask 1.6);
  - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
  - Any other relevant topics.

- Provide an *Updated Project Schedule, List of Match Funds,* and *List of Permits*, as needed to reflect any changes in the documents.

The CAM shall:

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

Recipient Products:

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

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

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

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

The Recipient shall:

- Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Submit the CPR Report along with any other *Task Products* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 products along with the CPR Report).
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

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

Recipient Products:

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

CAM Products:

- CPR Agenda
- List of Expected CPR Participants

- Schedule for Providing a Progress Determination
- Progress Determination

Subtask 1.4 Final Meeting
The goal of this subtask is to complete the closeout of this Agreement.

The Recipient shall:

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

  The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.
  - The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
  - The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
    - Disposition of any state-owned equipment.
    - Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
    - The Energy Commission's request for specific "generated" data (not already provided in Agreement products).
    - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
    - "Surviving" Agreement provisions such as repayment provisions and confidential products.
    - Final invoicing and release of retention.

- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary *(if applicable)*
- Schedule for Completing Agreement Closeout Activities
- All Draft and Final Written Products

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices
The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

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The Recipient shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
  - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns.. See the Progress Report Format Attachment for the recommended specifications.

- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions, including a financial report on Match Fund and in-state expenditures.

Products:

- Progress Reports (as applicable, include information on feedstock types (including categorization as primary and other) and quantity (wet/dry tons). Feedstocks information should be reported with the progress reports and, at the end of the year, should include the total annual amounts by feedstock types).
- Invoices

Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. The CAM will review the Final Report, which will be due at least **two months** before the Agreement end date. When creating the Final Report Outline and the Final Report, the Recipient must use the Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Recipient shall:

- Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the CAM. *(See Task 1.1 for requirements for draft and final products.)*

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

- Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Style Manual, and Final Report Template provided by the CAM with the following considerations:
  - Ensure that the report includes the following items, in the following order:
    - Cover page (**required**)
    - Credits page on the reverse side of cover with legal disclaimer (**required**)

        - Acknowledgements page (optional)
        - Preface (**required**)
        - Abstract, keywords, and citation page (**required**)
        - Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
        - Executive summary (**required**)
        - Body of the report (**required**)
        - References (if applicable)
        - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
        - Bibliography (if applicable)
        - Appendices (if applicable) (Create a separate volume if very large.)
        - Attachments (if applicable)
    - Ensure that the document is written in the third person.
    - Ensure that the Executive Summary is understandable to the lay public.
        - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
        - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
        - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.
    - Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
    - Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
    - Include a brief description of the project results in the Abstract.

- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt
- Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product
- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

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

CAM Product:

- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds
The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

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

The Recipient shall:

- Prepare and provide a *Match Funds Financing Documentation* that shows verifiable evidence that the source of financing for at least the amount committed as match funds for this project has been secured. Financing Documentation may include, but not be limited to, Certification Letter from Financing Institution that summarizes the terms of financing or Copy of Loan Contract or Grant from a financing institution.
- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement. If <u>no match funds</u> were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

  If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:
  - A list of the match funds that identifies:
    - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
    - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
    - 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 Financing Documentation
- 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:
    - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
    - The schedule the Recipient will follow in applying for and obtaining the permits.

  The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

- Permit Status Letter
- Updated List of Permits *(if applicable)*
- Updated Schedule for Acquiring Permits *(if applicable)*
- Copy of Each Approved Permit *(if applicable)*

Subtask 1.9 Subcontracts
The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Recipient shall:

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.

- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of the executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Products:

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

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

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

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

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

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

The Recipient shall:

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, 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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IV. TECHNICAL TASKS

*Products that require a draft version are indicated by marking **"(draft and final)"** after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear after the product name, only a final version of the product is required. **Subtask 1.1 (Products)** describes the procedure for submitting products to the CAM.*

TASK 2 PROJECT PREPARATION

The goal of this task is to secure the project site(s) and develop a detailed Measurement and Verification Plan.

Subtask 2.1 Execute a Contract with the Selected Deployment Site

The goals of this subtask are to: confirm the availability of the project deployment site; and (2) execute any agreements necessary to secure the demonstration site.

The Recipient shall:

- Reach agreement with the manager(s) of the selected deployment site(s) regarding the project timeline, space reserved for the project, equipment installation, permit and insurance requirements, indemnity, and the Recipient's use of any removal or support staff.
- The site identified as of the commencement date of this grant is: Former Sierra Mountain Mills sawmill site in Celestial Valley, approximately two miles south of the town of Camptonville, Yuba County, California (APN 064-250-029). The site is interchangeably referred to as "Camptonville" or the "Forest Biomass Business Center."
- Recipient must check with their CAM who will provide guidance regarding the level of Commission approval required for any site changes. Recipient must receive CAM written approval for project site changes prior to changing sites.
- Prepare and provide a *Site Readiness Verification Document* (e.g. Copy of Contract, Lease Agreement, Memorandum of Understanding).

Products:

- Site Readiness Verification Document

Subtask 2.2 Project Measurement and Verification

The goal of this subtask is to develop a detailed Measurement and Verification Plan for each site.

The Recipient shall:

- Develop a detailed *Measurement and Verification Plan* for each site to include but not be limited to:
    - A description of the monitoring equipment and instrumentation which will be used at each site.
    - A description of the key input parameters and output metrics which will be measured.
    - A description of the analysis methods to be employed.
    - Independent, third-party measurement and verification services to be employed, if applicable.

Products:

- Measurement and Verification Plan (draft and final)

TASK 3 DESIGN AND ENGINEERING
The goal of this task is to complete engineering and design plans for the project.

The Recipient shall:

- Prepare an *Engineering and Design Report* that describes:
    - Site layout
    - Major pieces of equipment
    - Mechanical design
    - Electrical design
- Prepare a *CPR Report #1* in accordance with subtask 1.3.
- Participate in a CPR meeting in accordance with subtask 1.3.

Products:

- Engineering and Design Report (draft and final)
- CPR Report #1

TASK 4 PROCUREMENT – HARDWARE AND BIOMASS FEEDSTOCK
The goal of this task is to procure the hardware specified in Task 3, and also to begin procuring biomass feedstock required to sustain operation of the plant.

The Recipient shall:

- Initiate the procurement process for the system hardware; negotiate and establish procurement agreement as needed and start procuring biomass feedstock.
- Prepare a *Hardware Procurement Report* and a *Biomass Procurement Report*. These reports will:
    - Describe what was procured
    - Timeline for completing procurement
    - Site delivery activities
    - Any lessons learned from procurement process

Products:

- Hardware Procurement Report (draft and final)
- Biomass Procurement Report (draft and final)

TASK 5 CONSTRUCTION, INSTALLATION, AND COMMISSIONING
The goal of this task is to install and commission the hardware procured in Task 4.

The Recipient shall:

- Prepare and provide a *Construction, Installation and Commissioning Schedule* for the plant.
- Install the equipment per the Construction, Installation and Commissioning Schedule.
- Prepare a *Construction, Installation, and Commissioning Report* that describes:
    - Site preparation work
    - Installation of all major pieces of equipment
    - Commissioning process
    - Lessons learned

- Prepare and provide a *Testing Plan* for the facility that will detail the process, deliverables, and milestones. The Testing Plan will include plans for cold testing and hot testing and will also include at least a description of the equipment, goals and objectives, and methodology for testing.
- Implement the Testing Plan.
- Prepare and provide a *Testing Report* for the facility that will include results of testing and evaluation, major findings and conclusion and any modifications or changes to the facility that occurred during the period of testing.

Products:

- Construction, Installation and Commissioning Schedule
- Construction, Installation, and Commissioning Report
- Testing Plan
- Testing Report (draft and final)

TASK 6 OPERATIONS AND MEASUREMENT AND VERIFICATION

The goal of this task is to operate the biomass plant commissioned at the end of Task 5 and to collect data and measure and verify performance per the Measurement and Verification Plan from Task 2.

The Recipient shall:

- Implement the Measurement & Verification Plan.
- Prepare an *Operations Report* that at least describes:
    - Operating time over a planned 12 month period
    - Biomass feed consumption
    - Electricity production
    - Planned and unplanned outages
    - Design changes or modifications required to ensure reliable operation
    - Other data specified in the Measurement and Verification Plan prepared in Subtask 2.2
    - Lessons learned
- Prepare *Engineering Measurement Verification Report* that at least describes:
    - Actual field performance
    - Comparison of actual performance against expected performance
    - Analysis of what factors may have contributed to differences between actual and expected performance
- Prepare a *CPR Report* #2 in accordance with subtask 1.3..
- Participate in a CPR meeting in accordance with subtask 1.3..

Products:

- Operations Report
- Measurement and Verification Report (draft and final)
- CPR Report #2

TASK 7 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*. Update *Attachment 12 Cost and Benefit Calculations and Small-Scale Bioenergy Levelized Cost of Electricity (LCOE) calculator.* If not using LCOE calculator, clearly explain why not applicable, provide other cost measures and justify the measures.
  - Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:

    - <u>For Product Development Projects and Project Demonstrations:</u>
      - Published documents, including date, title, and periodical name.
      - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
      - Greenhouse gas and criteria emissions reductions.
      - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
      - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
      - A discussion of project product downloads from websites, and publications in technical journals.
      - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
      - <u>Additional Information for Product Development Projects</u>:
        - 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.
      - <u>Additional Information for Product Demonstrations</u>:
        - Outcome of demonstrations and status of technology.
        - Number of similar installations.
        - Jobs created/retained as a result of the Agreement.

    - <u>For Information/Tools and Other Research Studies:</u>
      - 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 has 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, *Attachment 12 Cost and Benefits Calculations*, LCOE calculator or other, as applicable.
- Mid-term Benefits Questionnaire, *Attachment 12 Cost and Benefits Calculations*, LCOE calculator or other, as applicable.
- Final Meeting Benefits Questionnaire, *Attachment 12 Cost and Benefits Calculations*, LCOE calculator or other, as applicable.

TASK 8 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

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

The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
    - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
    - A description of the intended use(s) for and users of the project results.
    - Published documents, including date, title, and periodical name.
    - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
    - A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.

  - The number of website downloads or public requests for project results.
  - Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.
- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

Products:

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

TASK 9 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 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)

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet. Without the Project Schedule in the Excel Attachment, the proposal will fail screening.