

**GRANT REQUEST FORM (GRF)**

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION

New Agreement PIR-13-004 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	Mike Kane	47	916-327-1530

Recipient's Legal Name	Federal ID Number
The Regents of the University of California on behalf of the Irvine campus	95-2226406

Title of Project
Low Cost Micro DG/CHP for Use in Laundry Facilities

Term and Amount	Start Date	End Date	Amount
	6/30/2014	3/31/2017	\$ 994,307

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

Proposed Business Meeting Date	5/14/2014	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Mike Kane	Time Needed:	5 minutes
Please select one list serve. Research (Energy RDD/PIER Program)			

**Agenda Item Subject and Description**

Proposed resolution approving Agreement PIR-13-004 with The Regents of the University of California, on behalf of the Irvine campus, for a \$994,307 grant to demonstrate a low-cost micro-scale combined heat and power system based on a natural gas-fueled rotary engine at a Southern California laundry facility. (PIER natural gas funding)  
Contact: Mike Kane. (5 minutes)

**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:
  - 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 15329
    - Common Sense Exemption. 14 CCR 15061 (b) (3)
 Explain reason why Agreement is exempt under the above section:  
 Class 29 - Installation of certain cogeneration equipment of less than 50 megawatts capacity at existing facilities.
  - 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	

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

Legal Company Name:	Budget
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<b>List all key partners:</b> (attach additional sheets as necessary)
Legal Company Name:

Budget Information			
Funding Source	Funding Year of Appropriation	Budget List No.	Amount
NG Subaccount, PIERDD	12-13	501.001G	\$994,307
R&D Program Area: EGRO: Renewables		TOTAL:	\$994,307
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Recipient's Administrator/ Officer		Recipient's Project Manager	
Name:	Natalie Nodianos	Name:	Gary Scott Samuelsen
Address:	University Of California Irvine Office of Research 5171 California Ave., Suite 150	Address:	University Of California Irvine Advanced Power And Energy Program Building 233, Rm 221
City, State, Zip:	IRVINE, CA 92697-7600	City, State, Zip:	IRVINE, CA 92697-7302
Phone:	949-824-8109	Fax:	- -
E-Mail:	natalie.nodianos@.uci.edu	E-Mail:	gss@apep.uci.edu

Selection Process Used	
<input checked="" type="checkbox"/> Competitive Solicitation	Solicitation #: PON-13-502
<input type="checkbox"/> First Come First Served Solicitation	

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

\_\_\_\_\_  
Agreement Manager\_\_\_\_\_  
Date\_\_\_\_\_  
Office Manager\_\_\_\_\_  
Date\_\_\_\_\_  
Deputy Director\_\_\_\_\_  
Date

# ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION GRANTS

## Exhibit A SCOPE OF WORK PIR-13-004, UC Irvine

### I. TASK AND ACRONYM/TERM LISTS

#### A. Task List

Task #	CPR	Task Name
1		Administration
2		Project Initiation
3		Design of System Integration
4		Engine / Generator Mating
5		Balance of Plant Design/Integration
6	X	Initial Operational Tests
7		System Upgrade/Modifications
8	X	Upgraded System Tests/ ASERTTI Tests
9		Beta Testing / Long term Operation
10		Evaluation of Project Benefits
11		Technology Transfer Activities
12		Production Readiness Plan

#### B. Acronym/Term List

Acronym	Definition
ASERTTI	Association of State Energy Research and Technology Transfer Institutions
BACT	Best Available Control Technology
Btu	British Thermal Unit
Btu/hr	British Thermal Units per Hour
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CARB / ARB	(California) Air Resources Board
CCHP	Combined Cooling, Heating, and Power
CHP	Combined Heat and Power
CO	Carbon Monoxide
CPR	Critical Project Review
DG	Distributed Generation
ECM	Engine Control Module
GHG	Greenhouse Gas
gr/mi	Grams per mile
H2RE	Hydrogen Fuel Rotary Engine
HHV	Higher heating value of fuel (1,040 btu/scf for natural gas)
hp	Horsepower
IEPR	Integrated Energy Policy Report

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kW	Kilowatt (= 1,000 watt)
kW-hr	Kilowatt hour
lb / MW-h	Pound per Megawatt hour
MC	Mazda Corporation – Japan (Hiroshima Japan)
MNAO	Mazda North American Operations – Irvine (Irvine, CA)
MT	Metric Tons (1000 kg, 2200 lbs)
MW	Megawatt (= 1,000,000 watts)
MW-hr	Megawatt hour
NO <sub>x</sub>	Oxides of Nitrogen
O & M	Operations and Maintenance (not including fuel costs)
PIER	Public Interest Energy Research
RD&D	Research, Development and Demonstration
RE	Rotary Engine (aka Wankel Engine)
scf	Standard cubic foot (14.7 psia, 70 deg F)
SoCAB	South Coast Air Basin
SONGS	San Onofre Nuclear Generation Station
TAC	Technical Advisory Committee
UCI-APEP	UC Irvine Advanced Power and Energy Program
VOC	Volatile Organic Compounds
Wobbe Index	Ratio of fuel energy content to square root of density.

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

### A. Purpose of Agreement

The purpose of this Agreement is to fund the development and deployment of a low cost, rotary engine based, “micro” distributed generation system with waste heat recovery for deployment at commercial laundry facilities in the Los Angeles Basin and San Diego County San Onofre Nuclear Generation Station (SONGS) service territory.

### B. Problem/ Solution Statement

#### **Problem**

Distributed generation and combined heat and power are critical components needed to support reliability of the electric grid in regions of Southern California impacted by the closure of the SONGS. However, widespread deployment of Distributed Generation/Combined Heat and Power (DG/CHP) continues to encounter barriers, especially at scales appropriate to many smaller commercial applications. Specific issues include: (1) perception of technology as “exotic” or “risky,” (2) difficulty meeting local air quality standards and obtaining permits (3) matching of electric and waste heat loads for maximum efficiency, and (4) cost, both initial and continuing operations and

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maintenance (O&M) costs. Expectations of developing a low cost reliable micro-DG/CHP system (approx. 35 kW or less) will be a major step forward in the wide spread deployment sought and provide the territory grid support desired.

### **Solution**

To address the goals of the SONGS Territory grid reliability as well as tap a nearly untouched market, this program will seek to develop and deploy a Mazda Rotary Engine (RE) as a low cost, automotive engine based micro-DG/CHP system (35 kW max output). Initially targeting commercial/industrial laundry facilities, the potential in the SONGS Territory is more than 3,700 installation sites at hotels, hospitals, jails/prisons, and Laundromats and representing an estimated 130-260 MW of electric grid support. This project will specifically address engine operation and control in a generator application with emphasis on engine availability/reliability and serviceability. Further, the project will address waste heat recovery to maximize utilization and overall thermal efficiency of the micro DG/CHP system specifically for commercial laundry facilities. The system addresses small power “need” markets that have not been satisfactorily addressed by existing DG/CHP systems. The proposed micro-DG/CHP system addresses and is expected to overcome all of the current deployment hindrances identified for DG/CHP systems. Its small low power output should find widespread acceptance and indications of possible multiple unit placement opportunities for a given facility, at or adjacent to the need, further reducing site modification needs. The project will develop a system that is compliant with California Air Resources Board (CARB) 2007/2013 standards and will result in a system that can be readily sited. The longer range vision is the project will demonstrate a siting flexible system that will find wider acceptance in other sectors that can benefit from DG/CHP applications.

### **C. Goals and Objectives of the Agreement**

#### **Agreement Goals**

The goals of this Agreement are to:

- Develop a micro-DG/CHP system based upon a automotive sourced rotary engine
- Demonstrate the applicability of the developed RE micro-DG/CHP system for commercial laundries.
- Demonstrate RE micro-DG/CHP system will meet all emission standards
- Demonstrate advantages in size, noise, vibration, initial capital cost, and lifetime operational and maintenance costs as compared to existing benchmark systems
- Demonstrate the applicability of the RE micro-DG/CHP concept for applications beyond commercial laundry facilities.
- Through wide spread deployment of developed product and support of Mazda Corporation/Mazda North American Operations (MC/MNAO) in production and marketing, promote the opportunity for the application of the low cost RE micro-DG/CHP system to the more than 3700 commercial laundry sites in the SONGS Territory and to nearly 10,000 commercial laundries in the State of California.

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### Agreement Objectives

The objectives of this Agreement are to:

- Demonstrate a RE based DG/CHP system that will support commercial laundry facilities with well matched electric and waste heat streams,
- demonstrate a lower initial capital and on-going operating cost as compared to other, current market DG/CHP systems, and
- Demonstrate operational life cycle based upon the expected reductions in mechanical wear and maintenance/failure that results in lower on-going operating cost as compared to other natural gas based DG/CHP systems.
- Demonstrate emissions in line with CARB certification standards
- Demonstrate the potential for wide spread grid support in the SONGS Territory in both commercial laundry and other applications that can benefit from micro-DG/CHP
- Demonstrate how the system can positively impact State of California goals for emission, carbon reduction, and grid support goals consistent with:
  - PIER's Natural Gas Program through increased DG/CHP deployment
  - Governor's Clean Energy Job Plan by supporting the goals of increased localized generation and the addition of CHP capacity
  - The Integrated Energy Policy Report (IEPR) strategies through further promotion of DG/CHP systems
  - AB1613 objectives of increased customer-owned CHP through the development of low cost, high reliability system.
  - The Federal Clean Air Act through the deployment of low cost, emissions-compliant distributed generation.

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### III. TASK 1 PROJECT ADMINISTRATION

#### **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:

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- **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*

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*Commission's Information Technology Services Branch to determine whether the exceptions are allowable.*

### MEETINGS

#### Subtask 1.2 Kick-off Meeting

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

#### The Recipient shall:

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

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

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

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

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

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### 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.

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### 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.

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- 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 research 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 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.

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- Submit one bound copy of the Final Report to the CAM.

### Products:

- Final Report (draft and final)

## **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.

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- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

### Products:

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

### Subtask 1.8 Permits

The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are reimbursable under this Agreement. 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*.

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## Exhibit A SCOPE OF WORK PIR-13-004, UC Irvine

- 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 research direction. The guidance may include research scope and methodologies, timing, and coordination with other research. The guidance may be based on:

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- Technical area expertise;
- Knowledge of market applications; or
- Linkages between the agreement work and other past, present, or future research (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 project research 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 research 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

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### Subtask 1.11 TAC Meetings

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

#### The Recipient shall:

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

#### Products:

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

## IV. TECHNICAL TASKS

*Products that require a draft version are indicated by marking “(draft and final)” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required.*

**Subtask 1.1 (Products)** describes the procedure for submitting products to the CAM.

### TASK 2 Project Initiation

The goal of this task is to confirm the willingness/availability of the host site for the demonstration, confirm the agreement with Mazda, and begin detailed energy monitoring of the host site laundry facility.

#### The Recipient shall:

- Obtain letter from the host site confirming its commitment to host the project. In the event the primary choice for the host site is unable to support the demonstration, the identified back-up host site will be approached for a similar confirmation letter to be obtained. If possible, a copy of the *Host Confirmation Letter* will be presented to the CAM at the project Kick-Off meeting.

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- Finalize an appropriate non-disclosure/confidentiality agreement between University of California, Irvine (UCI) (hereafter “recipient”) and MNAO/MC related to converting the rotary engine to natural gas fuel, including reprogramming the engine control module. Application specific data determined by the CAM to be critical to determining successful attainment of the goals and objectives of this grant agreement shall not be protected under the non-disclosure/confidentiality agreement. These data include, but are not limited to: Specific fuel consumption; emissions (post treatment), including NO<sub>x</sub>, CO, CO<sub>2</sub>, and unburned hydrocarbons; engine speed and torque at load; exhaust and coolant temperature and flow; engine noise and vibration at load; oil consumption and other data necessary to determine cost and performance of the rotary engine in the designed CHP configuration.
- Provide *written notification* to the CAM that the non-disclosure/confidentiality agreement with MNAO/MC has been successfully executed. Notification will include a brief description of the kinds of data that will be made available to the Energy Commission.
- Initiate site instrumented measurements for electric power, gas, and water consumption as well as emission measurements directly associated with the laundry facility.

### Products:

- Host Confirmation Letter
- Written notification of execution of non-disclosure/confidentiality agreement with MNAO/MC

### TASK 3 Design of System Integration

The goal of this task is to obtain all of the relevant mechanical interface information of the RE from MNAO/MC as well as specifications for the balance of plant necessary for the engine operation and conceptualize and develop the mechanical and control system interconnection between the rotary engine and the generator.

### The Recipient shall:

- Obtain engine specifications from MNOA/MC associated with:
  - Mechanical interface points
  - Engine controls including but not limited to:
    - Fuel/air specifications over the range of anticipated load
    - Fuel injection control
    - Emission/oxygen sensor feedback control
- Work with MNOA/MC to develop integration of load signal with an Engine Control Module (ECM).
- Identify generator, grid compatible 3-phase inverter that will provide the electric generation balance of plant to which the RE will be mated.
- Engineer and produce an engineering package including but not limited to development drawings for necessary mechanical interface components or

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identify existing commercially available hardware that can be utilized for the mechanical connection.

- Develop a parts list and preliminary work plan for the control systems integration.
- Notify CAM of completion of initial design activities. *Notification* may be included as write-up in a monthly progress report, and will include general specifications and/or schematics if applicable.
- Convene a TAC per Task 1.11.

### Products:

- Written notification of completion of initial design included in monthly report.

### TASK 4 Engine / Generator Mating

The goal of this task is to mechanically interconnect the RE with the donor generator.

#### The Recipient shall:

- Take delivery of two production Renesis 13B rotary engines, or equivalent, and all ancillary equipment.
- Purchase and take delivery of generator system.
- Issue purchase orders for commercial products and/or custom machining work necessary for the mechanical interface.
- Monitor fabrication of equipment and provide engineering support to manufacturer, as necessary.
- Take delivery of mechanical interface hardware.
- Integrate, mechanically, the RE with the generator.
- Inform CAM of completion of mechanical integration of engine-generator with *write-up in monthly report*, including *pictures*.

### Products:

- Write-up of mechanical integration of engine-generator in monthly report.
- Photos of project.

### TASK 5 Balance of Plant Design/Integration

The goal of this task is to complete the balance of plant integration of the RE/generator to provide a complete, operational system ready for tests. This task will acquire current electric, water, and gas consumption measurements in the host site laundry facility as well as exhaust emissions measurements from the dryers at the host site to provide a full understanding of the energy and emission characteristics site, pre-system installation. Finally, this task will begin to design the balance of plant at the host site (storage tank, heat exchangers, ductwork integration) in anticipation of the system deployment in task 9.

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### The Recipient shall:

- Assess the control systems and balance of plant from the donor generator and develop a revised parts list and working plan based upon what is available and compatible with the proposed control system integration plan.
- Purchase the balance of the system components necessary to complete the system construction and control system development/integration. Purchased parts can include but are not limited to:
  - Electronic speed governor for primary engine speed control to maintain desired output frequency over varying load ranges.
  - Air to water heat exchanger for exhaust waste heat recovery.
  - Auxiliary radiator (water to water heat exchanger) for water jacket waste heat recovery.
  - Auxiliary radiator (liquid to water heat exchanger) for oil system waste heat recovery.
  - ECM, with MC guidance, for overall engine control
  - Commercial, interconnect approved solar system inverter with all protective functionality for grid connectivity
- Integrate control components with mated RE/generator package.
- Conduct a thorough review of all system integration and to the extent possible, test control systems in a simulated environment (without starting engine) to verify operational control. Specifically look for positive control and unstable operational scenarios and rectify as necessary.
- Include *written notification of completion of Balance of Plant* in monthly report. Written notification will include general specifications, schematics, pictures, etc. as applicable.
- Initiate the design of the balance of plant necessary for the system integration at the laundry facility to be implemented in Task 9.
- Prepare and provide a written notification *Letter of Readiness to Test*. Written notification will include general information regarding specifications of the test.

### Products:

- Written notification of completion of Balance of Plant
- Written notification Letter of Readiness to Test

### TASK 6 Initial Operational Tests

The goal of this task is to conduct initial operational testing of the RE DG/CHP system at the UC Irvine Advanced Power and Energy Program (UCI APEP) test facility and conduct preliminary performance evaluation consistent with the Association of State Energy Research and Technology Transfer Institutions (ASERTTI) protocols and in accordance with the test plan generated and approved for the performance validation.

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### The Recipient shall:

- Prepare a draft *Performance Test Plan* based upon the ASERTTI performance testing protocols and submit to the CAM for review and comments. The plan shall include, but not be limited to:
  - A description of the ASERTTI Performance Testing and Reporting Protocols and explanation of how the installed system testing will comply with these standards. Note any deviations from the ASERTTI protocols deemed acceptable for the initial operational testing.
  - Predicted performance based on the results of previous project work
  - Test objectives and technical approaches
  - A test matrix showing the number of test conditions and replicated runs
  - A description of the facilities, equipment, and instrumentation required
  - A description of the test procedures, including parameters to be controlled and how they will be controlled, parameters to be measured and instruments to measure them, calibration procedures, and maintenance of experimental records
  - A description of the data analysis procedures
  - Contingency measures to be considered if the test objectives are not met
- Prepare and submit a revised final *Performance Test Plan*, based upon comments received from CAM to the draft *Performance Test Plan*.
- Operate engine and conduct testing in accordance with the Performance Test Plan for the fuels of interest taking particular care to:
  - Confirm stable engine operation within manufacturer specifications
  - Confirm acceptable generator output
  - Adjust engine tuning and operational parameters as necessary to achieve proper engine operation.
  - Once acceptable operation is achieved, conduct tests.
  - Monitor and characterize the waste heat energy streams (exhaust, water jacket, oil cooler) as a function of engine load.
- Conduct team meetings (UCI/MNOA/MC/TAC) as necessary to review and evaluate operational and performance results.
- Prepare the *Initial Performance Test Report* documenting the initial performance test results and submit to the CAM. This report shall include, but not be limited to the following:
  - CHP system description and specifications
  - Performance Test Plan execution
  - Test results
  - Graphical representations of key test data
  - Analysis of the test results, focusing on the degree to engine generator system performed as predicted. Of particular interest are operational characteristics, engine heat rate, system waste heat recovery, and emissions.

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- Evaluation of the system performance and making particular note for any departure of results from predictions, any unusual findings, and the impact on CHP system design
- Recommendations for system upgrades to rectify any deficiencies noted in the performance.
- Photographs as appropriate
- Participate in first CPR upon completion of Task 6 (see Subtask 1.3 for requirements)

### Products:

- Performance Test Plan (draft and final)
- Initial Performance Test Report
- First CPR Report

### TASK 7 System Upgrade/Modifications

The goal of this task is to identify and incorporate modifications to correct operational and performance deficiencies noted in the Initial Operational tests (Task 6), reviewed/vetted with team members and the CAM, in preparation for Task 8 tests. This task will also address any modifications to the site balance of plant design initiated in task 3 as necessary based upon any of the identified system upgrades. Finally, prior to the CPR called for in Task 6, measured data from the host site will be retrieved and processed for presentation to the Technical Team at the CPR to assess any discrepancies in energy needs and micro-DG/CHP system energy streams.

### The Recipient shall:

- Develop a System Upgrades Plan and Schedule of system upgrades and modifications identified in Task 6 by the team members, reported to the Energy Commission Program Manager in the Initial Performance Test Report Deliverable from Task 6, and agreed upon with the Energy Commission Program Manager as a result of the first CPR.
- Purchase, fabricate, modify and otherwise implement the system upgrades.
- Provide a *Written Notification of Completion of Modifications* and *Written Notification of Readiness for Testing Upgraded System* upon completion and verification/validation of modification effort. Notification of CAM via email is acceptable.

### Products:

- System Upgrades Plan and Schedule (may be included in monthly report)
- Written notification of Completion of Modifications
- Written notification Readiness for Testing of Upgraded System

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### **TASK 8 Upgraded System Tests/ ASERTTI Tests**

The goal of this task is to conduct operational testing of the upgraded RE DG/CHP system at the UCI APEP test facility and conduct formal performance evaluation consistent with the ASERTTI protocols prior to the long term deployment.

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

- Prepare and provide a draft *Upgraded System Performance Test Plan* based upon the ASERTTI performance testing protocols and submit to the CAM for review and comments. The general plan will be similar to the Performance Test Plan described in Task 6 but with emphasis on the “Field” protocol.
- Prepare and submit a revised final Upgraded System Performance Test Plan, based upon comments received from CAM on the draft plan.
- Operation of Engine at UCI APEP:
  - Conduct initial tests to confirm satisfactory operation after system upgrades. Take particular note of:
    - Stable engine operation within manufacturer specifications.
    - Acceptable generator output.
  - Conduct tests per approved *Upgraded System Performance Test Plan*.
- Upon completion, engine will be removed, disassembled and evaluated to quantify dimensional variations (e.g. wear) as a result of the operation and note any anomalies.
- Conduct team meetings (UCI/MNOA/MC/TAC) as necessary to review and evaluate operational and performance results (see Subtask 1.11 for requirements)
  - Evaluate condition of engine relative to wear and tear. If acceptable and engine is anticipated to perform well through the long term testing, engine will be reassembled and readied for Task 9. If not, a new engine with modifications deemed necessary to provide the desired performance will be installed.
  - Evaluation of exhaust emissions control system will be made and items replaced as necessary.
- Prepare the *Upgraded System Performance Test Report* and submit to the CAM. This report will be similar to the Initial Performance Test Report defined in Task 6.
- If deemed necessary by the CAM, a second CPR will be held at the end of Task 8. See Subtask 1.3 for requirements and products.

#### **Products:**

- Upgraded System Performance Test Plan (draft/final)
- Written notification of Readiness to Operate/Test
- Upgraded System Performance Test Report
- Second CPR Report (if required by CAM)

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### TASK 9 Beta Testing / Long term Operation

The goal of this task is to move the micro-DG/CHP system to the host site for long term operation and performance assessment to gain operating hours and evaluate the operations performance.

#### The Recipient shall:

- Working with the host test site, prepare facility for placement of the DG/CHP system.
  - Develop plan with host site for location, plumbing modifications, and electrical connections as necessary.
  - Confirm interconnect agreement is in place.
  - Move DG/CHP system into position.
- Operation of Engine at Host site
  - Conduct “shakedown” tests to confirm satisfactory operation after transfer, taking particular note of:
    - Stable engine operation within manufacturer specifications,
    - Acceptable generator output
- Initiate operation of engine at host site operation for a period of six to twelve month continuously except for necessary service and maintenance during the operational period.
- Prepare and submit a draft *Host Site Operational Performance Evaluation Test Plan* based upon the Long Term Testing ASERTTI protocols and following the guidelines and general plans developed in Task 6 and Task 8, as appropriate, to the Energy Commission Program Manager. The performance evaluation is anticipated to be limited to the heat rate, overall efficiency (i.e. inclusive of waste heat recovery), and emissions at nominal maximum load.
- Prepare and submit a revised final *Host Site Operational Performance Evaluation Test Plan*, based upon comments received from CAM on the draft plan.
- Conduct performance evaluation tests on the RE DG/CHP at the host site in accordance with the final *Host Site Operational Performance Evaluation Test Plan* as approved by CAM. At a minimum, performance evaluation will occur at both at the beginning and near the end of the long term operation period.
- Evaluate and document changes in performance between beginning and end of long term operational period and compare to *Upgraded System Performance Test Report* (Task 8).
- Conduct a post long term operational test engine teardown and evaluation to quantify dimensional variations (e.g. wear) as a result of the operation and note any anomalies.
- Evaluate the life expectancy of the engine relative to the target life expectancy.
- Prepare and submit to the CAM a *Host Site Operational Performance Evaluation and Test Report*. This report will include data and calculations of performance as defined in the Host Site Operational Performance Evaluation Test Plan. In addition, this report shall document: RE DG/CHP system long-term variances

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from and comparisons to the Upgraded System Performance Test Report; results from the post long term operational test engine tear down; and, estimates of the life expectancy of the RE DG/CHP system.

### Products:

- Host Site Operational Performance Evaluation Test Plan (draft/final)
- Host Site Operational Performance Evaluation Test Report

### TASK 10 Evaluation of Project Benefits

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

### The Recipient shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
  - For Product Development Projects and Project Demonstrations:
    - Published documents, including date, title, and periodical name.
    - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
    - Greenhouse gas and criteria emissions reductions.
    - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
    - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
    - A discussion of research 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.

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- 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 research.
  - Published documents, including date, title, and periodical name.
  - A discussion of policy development. State if the research 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 information and research have 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 research.
  - A discussion of research product downloads from websites, and publications in technical journals.
  - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

*The Energy Commission may send the Recipient similar questionnaires after the Agreement term ends. Responses to these questionnaires will be voluntary.*

### **Products:**

- Kick-off Meeting Benefits Questionnaire
- Mid-term Benefits Questionnaire
- Final Meeting Benefits Questionnaire

### **TASK 11 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.

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### The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project research. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses research 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 research 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 research 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.
- 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)
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

### TASK 12 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 and submit 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

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- 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.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION RE: THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

**WHEREAS** the **The Regents of the University of California** seeks to enter into Grant Number PIR-13-004 with the State Energy Resources Conservation and Development Commission (Energy Commission) for the amount of **\$994,307**;

**WHEREAS** the purpose of the Grant is to demonstrate technology for accelerating the deployment of localized power and combined heat in power in a region of California affected by the closure of the San Onofre Nuclear Generating Station;

**WHEREAS** The Regents of the University of California will provide \$95,000 in co-funding for the project;

**WHEREAS** the Energy Commission has reviewed the project for compliance with the California Environmental Quality Act and found that it is exempt as specified in Form CEC-94 for Grant Number PIR-13-004;

**THEREFORE BE IT RESOLVED**, that the Energy Commission approves Contract Number PIR-13-004 with **The Regents of the University of California** in the amount of **\$994,307**.

**FURTHER BE IT RESOLVED**, that this document authorizes the Executive Director to execute the same on behalf of the Energy Commission.

**CERTIFICATION**

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the California Energy Commission held on May 14, 2014.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Harriet Kallemeyn,  
Secretariat