

**GRANT REQUEST FORM (GRF)**

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION

New Agreement PIR-17-003 (To be completed by CGL Office)

ERDD	Kevin Uy	43	916-327-1533
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Institute of Gas Technology dba Gas Technology Institute	36-2170137
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Demonstration of 4.5 and 25 kW CARB-compliant Reciprocating Engine Micro-CHP Systems
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4/1/2018	9/30/2021	\$ 1,499,406
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<input type="checkbox"/> ARFVTP agreements under \$75K delegated to Executive Director.			
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Proposed Business Meeting Date	3/21/2018	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
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Business Meeting Presenter	Kevin Uy	Time Needed:	5 minutes
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Please select one list serve. NaturalGas (NG Research Program)

**Agenda Item Subject and Description**

IINSTITUTE OF GAS TECHNOLOGY INSTITUTE. Proposed resolution approving agreement PIR-17-003 with Institute of Gas Technology Institute for a \$1,499,406 grant to develop and demonstrate two near-zero NOx emission, micro-scale combined heat and power systems. The 4.5 kW and 25 kW systems will undergo laboratory testing to obtain California Air Resources Board Distributed Generation emissions certification to be followed by installation and operation at a commercial building and fitness center to measure system performance and perform cost-benefit analysis.



California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
[X] Yes (skip to question 2) [ ] No (complete the following (PRC 21065 and 14 CCR 15378)):
Explain why Agreement is not considered a "Project":
Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because

2. If Agreement is considered a "Project" under CEQA:
[X] a) Agreement IS exempt. (Attach draft NOE)
[ ] Statutory Exemption. List PRC and/or CCR section number:

[X] Categorical Exemption. List CCR section number: Cal. Code Regs., tit 14, § 15301; Cal. Code Regs., tit 14, § 15303; Cal. Code Regs., tit 14, § 15306

[ ] Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:

The project will develop and demonstrate two high efficiency CHP systems. The smaller, 4.5 kW system, will be demonstrated at a commercial building while the larger, 25 kW system, will be demonstrated at a fitness center.

The CHP systems consist of a natural gas-fueled distributed generator, exhaust heat recovery system, hot water storage tank, and hot water distribution system. The materials used to construct the CHP systems are chemically inert, not hazardous to human health, and do not have a significant effect on the environment. The CHP systems will undergo safety testing prior to installation at the demonstration sites to ensure compliance with relevant environmental codes and standards. In addition, the local air district will be notified and appropriate air permits will be obtained prior to system demonstration. The demonstrations will not have a significant impact on local air quality, noise, or traffic. For these reasons, the project will not have a significant effect on the environment and falls under the categorical exemption listed in 14 C.C.R. §15301.

In order to perform the demonstration the CHP systems must be installed at their respective demonstration sites. The installations will require minimal construction activity. The equipment may be placed directly on the ground, or it possible that a small concrete pad will be poured. This minimal construction is well within the size limits listed in the examples given in 14 C.C.R. § 15303 (e.g., it is less than a single-family residence, duplex, and the 2,500 square feet - or 10,000 square feet in urban areas - for a store, motel, office, restaurant, or similar structure). This construction will not have a significant impact on local air quality, noise, or traffic and will not induce additional operations at the site. For these reasons, the project will not have a significant effect on the environment and falls under the categorical exemption listed in 14 C.C.R. § 15303.

The work at the demonstration sites will involve basic data collection, research, and analysis to determine the performance of the systems. This work includes computer modeling to estimate the energy balance of the systems and the economic impacts if the systems are widely adopted in California. For these reasons, the project will not have a significant effect on the environment and falls under the categorical exemption listed in 14 C.C.R. §15306.

[ ] b) Agreement IS NOT exempt. (Consult with the legal office to determine next steps.)

Check all that apply

[ ] Initial Study

[ ] Environmental Impact Report

[ ] Negative Declaration

[ ] Statement of Overriding Considerations

[ ] Mitigated Negative Declaration

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CALIFORNIA ENERGY COMMISSION



<b>List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)</b>	
Legal Company Name:	Budget
Marathon Engine Systems	\$ 177,500
Alternative Energy Systems Consulting, Inc.	\$ 173,879
Frontier Energy, Inc.	\$ 99,000
Otto H. Rosentreter Company	\$ 99,000
DE Solutions, Inc.	\$ 99,000
Lifetime Energy	\$ 33,000
Airtech Environmental Services Inc.	\$ 14,000
A. O. Smith Corporate Technology Center	\$ 7,500
EMCOR Services Mesa Energy Systems	\$ 99,000
Innovative Power Solutions, LLC	\$ 56,000
Horizon Air Measurement services, Inc.	\$ 14,000
Environmental Catalyst Technology	\$ 10,000
Intertek Testing	\$ 7,500
Today's Conferencing	\$ 1,000
TBD – Electrical	\$ 30,000

Legal Company Name:
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Funding Source	Funding Year of Appropriation	Budget List No.	Amount
NG Subaccount, PIERDD	16-17	501.001K	\$1,499,406
			\$
			\$
R&D Program Area: EGRO: Renewables			\$1,499,406
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Name:	Kate Jauridez	Name:	Isaac Mahderekal
Address:	1700 S MOUNT PROSPECT RD	Address:	1700 S MOUNT PROSPECT RD
City, State, Zip:	DES PLAINES, IL 60018-1804	City, State, Zip:	DES PLAINES, IL 60018-1804
Phone:	847-768-0905 /	Fax:	- -
E-Mail:	kate.jauridez@gastechnology.org	E-Mail:	

<input checked="" type="checkbox"/> Competitive Solicitation	Solicitation #: GFO-17-501
<input type="checkbox"/> First Come First Served Solicitation	

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

Agreement Manager

Date

Office Manager

Date

Deputy Director

Date

# EXHIBIT A Scope of Work

## I. TASK ACRONYM/TERM LISTS

### A. Task List

Task #	CPR <sup>1</sup>	Task Name
1		General Project Tasks
2		Laboratory Testing
3	X	Pre-Installation Analysis
4	X	Engineering, Installation and Commissioning
5		Demonstration, Measurement and Verification
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities

### B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CHP	Combined Heat and Power
CPR	Critical Project Review
DG	Distributed Generation
kW	Kilowatt
M&V	Measurement and Verification
Micro-CHP	Micro Combined Heat and Power
NOx	Oxides of Nitrogen
MES	Marathon Engine Systems
TAC	Technical Advisory Committee

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

### A. Purpose of Agreement

The purpose of this Agreement is to fund a laboratory- and pilot-scale demonstration of California Air Resources Board (CARB) Distributed Generation (DG) -compliant prepackaged 4.5 and 25-kilowatt (kW) low-emission, reciprocating engine-based Combined Heat and Power (CHP) systems.

### B. Problem/ Solution Statement

#### Problem

Reciprocating engine technology likely offers the best near-term opportunity for cost-effective small-scale CHP. However, there is no commercially available CARB DG-compliant engine-based technology less than 50 kW available in the market.

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

# EXHIBIT A

## Scope of Work

### Solution

A.O. Smith Corporation and Lochinvar together with EC Power A/S and Marathon Engine Systems (MES) have developed 25 kW and 4.5 kW internal combustion engine driven CHP systems respectively. The CHP units are prepackaged with heat distribution heat exchangers and power distribution panels. The EC Power and MES teams also developed novel post-combustion Nitrogen Oxides (NOx) reduction strategies for the machines in order to meet stringent CARB DG emissions requirements. The recipient believes each of the manufacturer's novel methodologies have the potential to cost-effectively reduce exhaust gas NOx below CARB DG requirements. In order for these systems to enter the market, their performance must first be verified via laboratory- and pilot-scale demonstrations. The demonstrations will verify emissions rates under controlled and normal operating conditions. The demonstrations will also identify any penalties in electrical efficiency the processes may incur and any advantages in overall efficiencies the processes may create.

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

#### Agreement Goals

The goal of the agreement is to perform the laboratory- and pilot-demonstrations required to bring to market 25kW and 4.5 kW prepackaged, CARB DG-compliant, low-emission, reciprocating engine-based CHP systems.

#### Ratepayer Benefits:

This Agreement will result in economic and environmental benefits to the ratepayers of California, including reducing total energy consumption and criteria pollutant emissions and increasing the reliability of the state's energy supply. Micro-CHP allows for expanded distributed power generation, which reduces ratepayer susceptibility to financial costs. Considering spark-spread and interconnection standards, California is one of the most inviting states in the US for micro-CHP as long as the systems can be CARB DG-certified. The average retail commercial energy prices from 2015 Department of Energy Information Agency indicates California's commercial electricity rates are about six-times those of natural gas on an equivalent unit of energy basis (spark-spread of 6). The majority of states in the US have spark-spreads below 4. Using representative values, the payback periods for the EC Power and MES CHP systems are approximately 3 and 5 years respectively. Conservatively and assuming a 15-year life, the cost of the electricity produced is about 25% of the cost of grid electricity in California.

This project will potentially result in two engine-driven CHP technologies meeting CARB DG requirements. Generating power on site results in lower emissions per kWh delivered to the customers, as well as increased reliability of the electric energy supply associated with on-site power generation.

#### Technological Advancement and Breakthroughs:

By supporting the development of reciprocating engine technology that likely offers the best near-term opportunity for cost-effective small-scale CHP, this Agreement will lead to breakthrough technology advancements in order to overcome barriers in achieving the State of California's statutory energy goals. This project is expected to demonstrate the technical performance, including CARB DG-compliant viability, of the proposed post-combustion NOx reduction strategies, potentially leading to technological advancements that break down the barriers to widespread, relatively low-cost, small-scale, reciprocating engine-based CHP market penetration in California.

# EXHIBIT A

## Scope of Work

### Agreement Objectives

The objectives of this Agreement are to:

- Perform laboratory testing of the 25 kW and 4.5 kW engine-based CHP systems at the recipient's facilities to verify and obtain CARB DG certification.
- Install, monitor, and report performance of the 25 kW and the 4.5 kW CHP systems their respective demonstration sites in order to prove reliable, long-term operation.
- Showcase the 4.5 kW micro-CHP system via a kiosk-type demonstration and website display to generate project awareness.

### 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.

##### For all products

- Submit all data and documents required as products in accordance with the following:

##### Instructions for Submitting Electronic Files and Developing Software:

## **EXHIBIT A**

### **Scope of Work**

- **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.

## **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

## EXHIBIT A Scope of Work

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

## **EXHIBIT A**

### **Scope of Work**

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

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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.

### **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:**

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- 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 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
- Approval 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.

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- 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 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:

## EXHIBIT A Scope of Work

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

### Products:

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

### Subtask 1.8 Permits

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

### The Recipient shall:

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

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- 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.

## **EXHIBIT A**

### **Scope of Work**

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:**

## **EXHIBIT A**

### **Scope of Work**

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

# EXHIBIT A

## Scope of Work

### IV. TECHNICAL TASKS

#### TASK 2 LABORATORY TESTING

The goal of this task is to perform laboratory testing on the two CHP systems and apply for CARB DG certification.

#### Subtask 2.1 Laboratory Baseline Testing, Development, and CARB-Compliance of the 4.5 kW CHP System

The goal of this subtask is to: (1) identify and develop the 4.5 kW CHP sub-assembly system improvements required to meet technical goals and (2) assemble and laboratory test the 4.5 kW CHP system.

#### The Recipient shall:

- Install the CHP system inside an environmental test chamber and verify system connection to the utility grid.
- Conduct laboratory baseline performance and emissions testing.
- Prepare and provide a *Baseline Performance and Emissions Test Report (4.5 kW System)* which includes, but is not limited to, the following:
  - Summary of CHP system installation inside an environmental test chamber;
  - Summary of performance test results including the system efficiency, power generation capacity, power quality, heating and engine exhaust emissions and how the results compare to the targeted performance.
- Identify and develop the sub-assembly system improvements required to reduce the rate of criteria pollutant emissions with an emphasis on NO<sub>x</sub>.
- Identify and develop the sub-assembly system improvements required to increase electrical efficiency.
- Develop, conduct, and analyze CARB DG-compliant emissions testing of the 4.5 kW system.
- Verify emissions performance via an independent, third-party measurement and verification (M&V).
- Prepare and provide a *Post-Improvement CARB Emissions Test Report (4.5 kW System)* which includes, but is not limited to, the following:
  - Summary of the sub-assembly system improvements implemented to reduce the rate of criteria pollutant emissions and increase electrical efficiency;
  - Summary of the performance test results including the system efficiency, power generation capacity, power quality, heating and engine exhaust emissions and how the results compare to the targeted performance.
- Prepare and submit an application to the California Air Resources Board for CARB DG certification.
- Prepare and provide a *Written Notification of CARB DG Certification Application (4.5 kW System)* that will notify the CAM that an application has been submitted to CARB.

#### Products:

- Baseline Performance and Emissions Test Report (4.5 kW System) (draft and final)
- Post-Improvement CARB Emissions Test Report (4.5 kW System) (draft and final)
- Written Notification of CARB DG Certification Application (4.5 kW System)

## **EXHIBIT A**

### **Scope of Work**

#### **Subtask 2.2 Laboratory Baseline Testing, Development, and CARB-Compliance of the 25 kW CHP System**

The goal of this subtask is to assemble and laboratory test the 25 kW CHP system.

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

- Install the CHP system inside an environmental test chamber and verify system connection to the utility grid.
- Conduct laboratory baseline performance and emissions testing.
- Prepare and provide a *Baseline Performance and Emissions Test Report (4.5 kW System)* which includes, but is not limited to, the following:
  - Summary of CHP system installation inside an environmental chamber;
  - Summary of performance test results including the system efficiency, power generation capacity, power quality, heating and engine exhaust emissions and how the results compare to the targeted performance.
- Identify and develop the sub-assembly system improvements required to reduce the rate of criteria pollutant emissions with an emphasis on NOx.
- Identify and develop the sub-assembly system improvements required to increase electrical efficiency.
- Prepare and provide a *Post-Improvement CARB Emissions Test Report (25 kW System)* which includes, but is not limited to, the following:
  - Summary of the sub-assembly system improvements implemented to reduce the rate of criteria pollutant emissions and increase electrical efficiency;
  - Summary of the performance test results including the system efficiency, power generation capacity, power quality, heating and engine exhaust emissions and how the results compare to the targeted performance.
- Conduct CARB DG-compliant emissions testing of the 25 kW system.
- Verify emissions performance via an independent, third-party M&V.
- Prepare and submit an application to the California Air Resources Board for CARB DG certification.
- Prepare and provide a *Written Notification of CARB DG Certification Application (25 kW System)* that will notify the CAM that an application has been submitted to CARB.

##### **Products:**

- Baseline Performance and Emissions Test Report (25 kW System) (draft and final)
- Post-Improvement CARB Emissions Test Report (25 kW System) (draft and final)
- Written Notification of CARB DG Certification Application (25 kW System)

#### **TASK 3 PRE-INSTALLATION ANALYSIS**

The goal of this task is to conduct pre-installation analysis studies for installing a 4.5 and 25 kW CHP system at their respective demonstration sites.

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

- Execute a Contract with M&V Consultant and procure the subcontracts in accordance with subtask 1.9.
- Secure existing host-site systems diagrams, power, and hot water load data, electric and gas billing data.
- Conduct facility power and hot water load profile analyses.
- Prepare project concept diagrams (mechanical, electrical, arrangements).

## **EXHIBIT A**

### **Scope of Work**

- Define utility baseline costs and refine estimated installation costs.
- Manage activity for preparing measurement, verification, and showcase concepts.
- Prepare and provide a *Pre-Installation Analysis Report (4.5 kW System)* and *Pre-Installation Analysis Report (25 kW System)* which includes, but is not limited to, the following:
  - Utility interconnection requirements;
  - Facility power and hot water load profile analyses;
  - System sizing and operational schedule;
  - Project concept diagrams (mechanical, electrical);
  - Utility baseline costs;
  - Estimated installation costs;
  - Measurement, verification, and showcase concepts;
  - Final technical and economic benefits analysis,
- Prepare and provide *CPR Report #1* based on Tasks 2 and 3 products in accordance with subtask 1.3.
- Participate in a CPR meeting in accordance with subtask 1.3.

#### **Products:**

- Pre-Installation Analysis Report (4.5 kW System) (draft and final)
- Pre-Installation Analysis Report (25 kW System) (draft and final)
- CPR Report #1

#### **TASK 4 ENGINEERING, INSTALLATION AND COMMISSIONING**

The goal of this task is to perform site engineering, installation, and commissioning for the 4.5 and 25 kW CHP systems.

##### **Subtask 4.1 Site Engineering**

The goal of this subtask is to perform site engineering for the 4.5 and 25 kW CHP systems at their respective demonstration sites.

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

- Prepare and provide the Installation Engineering Package detailing the installation engineering requirements for the subcontractor.
- Confirm the installing contractor's ability to provide required material and licensed staff to conduct their defined scope during the project term.
- Execute a Contract with Installation Contractor in accordance with subtask 1.9.
- Manage Installation Engineering Contractor's study activities including:
  - Development of project design criteria including system descriptions, equipment specifications, equipment lists, and drawing lists;
  - Preparation of equipment location and interconnection diagrams;
  - Preparation of process flow and instrumentation diagrams;
  - Preparation of electrical 3-line diagrams;
  - Securing utility interconnection agreement;
  - Preparing equipment arrangement drawings;
  - Preparing piping and piping-support drawings;
  - Preparing wiring termination, and conduit drawings;
  - Updating equipment specifications;
- Manage M&V Consultants and their activities including:
  - Preparation of the instrument point list;

## **EXHIBIT A**

### **Scope of Work**

- Preparation of the website plan;
- Preparation of the final M&V plan;
- Preparing instrumentation installation drawings;
- Developing the M&V website.
- Finalize permitting costs.
- Coordinate final engineering cost estimating.
- Prepare and provide an *Engineering Design Report (4.5 kW System)* and *Engineering Design Report (25 kW System)* detailing the system description including, but not limited to, the following:
  - Product specifications;
  - Equipment lists;
  - Drawing lists;
  - Location and interconnect diagrams process flow;
  - Instrumentation and electrical 3 line diagrams.

#### **Products:**

- Engineering Design Report (4.5 kW system) (draft and final)
- Engineering Design Report (25 kW system) (draft and final)

#### **Subtask 4.2 Installation and Commissioning of the 4.5 kW CHP System**

The goal of this subtask is to install and commission the 4.5 kW CHP system at the demonstration site and integrate heat recovery with the existing hot water system.

#### **The Recipient Shall:**

- Manage installation and commissioning of the 4.5 kW CHP system including:
  - Mechanical/electrical installation;
  - Startup and commissioning;
  - Prepare and provide an *As-built Drawing Package (4.5 kW System)* which will include, but not be limited to, the following:
    - An update of select Engineering Design Report drawings modified to reflect the actual installation;
    - Potential modifications include slight changes to piping, location and electrical wiring.
- Manage M&V activities for the 4.5 kW CHP system including: instrumentation installation, startup and commissioning.
- Prepare and provide a *Commissioning Report (4.5 kW System)* which includes, but is not limited to, the following:
  - Delivery schedule for the CHP unit;
  - Installation and commissioning activities;
  - M&V installation and commissioning support activities;
  - Summary of startup and activities;
  - Any relevant permits and drawings.

#### **Products:**

- As-built Drawing Package (4.5 kW system)
- Commissioning Report (4.5 kW system) (draft and final)

#### **Subtask 4.3 Installation and Commissioning of the 25 kW CHP System**

The goal of this subtask is to install and commission the 25 kW CHP system at the demonstration site and integrate heat recovery with the existing hot water system.

## **EXHIBIT A**

### **Scope of Work**

#### **The Recipient Shall:**

- Manage installation and commissioning of the 25 kW CHP system including:
  - Mechanical/electrical installation;
  - Startup and commissioning;
  - Prepare and provide an As-built Drawing Package and *As-built Drawing Package (25 kW System)* which will include, but not be limited to, the following:
    - An update of select Engineering Design Report drawings modified to reflect the actual installation;
    - Potential modifications include slight changes to piping, location and electrical wiring.
- Manage M&V activities for the 25 kW CHP system including: instrumentation installation, startup and commissioning.
- Prepare and provide a *Commissioning Report (25 kW System)* which includes, but is not limited to, the following:
  - Delivery schedule for the CHP unit;
  - Installation and commissioning activities;
  - M&V installation and commissioning support activities;
  - Summary of startup and activities;
  - Any relevant permits and drawings.
- Prepare and provide *CPR Report #2* based on Tasks 2 and 3 products in accordance with subtask 1.3.
- Participate in a CPR meeting in accordance with subtask 1.3.

#### **Products:**

- As-built Drawing Package (25 kW system)
- Commissioning Report (25 kW system) (draft and final)
- CPR Report #2

### **TASK 5 DEMONSTRATION, MEASUREMENT AND VERIFICATION**

The goal of this task is to monitor and report performance of the 4.5 and 25 kW CHP systems.

#### **Subtask 5.1 Measurement and Verification of the 4.5 kW CHP System**

The goal of this subtask is to monitor and report performance of the 4.5 kW CHP system for one year (or shorter period as deemed appropriate by the CAM in writing) following installation.

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

- Confirm that M&V will follow utility M&V protocols, and will prepare a detailed analytical report that verifies natural gas consumption and engineering calculations for natural gas savings.
- Manage M&V activities of the 4.5 kW system including:
  - Maintaining instrumentation and data logger integrity;
  - Maintaining data collection and data point integrity;
  - Reducing data and prepare performance calculations;
  - Maintaining website integrity.
- Provide a summary of monthly operations in *Progress Report(s)* (see subtask 1.5) which will include, but not be limited to, the following:
  - A narrative on operational highlights from the previous month, including any stoppages in operation and why; and
  - A summary of operational data from the previous month.

## **EXHIBIT A**

### **Scope of Work**

- Prepare and provide a *System Demonstration Performance Report (4.5 kW System)* documenting and summarizing the test, analysis, operational, and performance data at conclusion of the measurement and verification period. This report will include, but not be limited to, the following:
  - Energy inputs (natural gas) and outputs (electricity, hot water);
  - Emissions performance;
  - Capacity factor, maintenance intervals, and summary of maintenance issues;
  - Cost-benefit performance.

#### **Products:**

- System Demonstration Performance Report (4.5 kW System) (draft and final)

#### **Subtask 5.2 Measurement and Verification of the 25 kW CHP System**

The goal of this subtask is to monitor and report performance of the 25 kW CHP system for one year (or shorter period as deemed appropriate by the CAM in writing) following installation.

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

- Confirm that M&V will follow utility M&V protocols, and will prepare a detailed analytical report that verifies natural gas consumption and engineering calculations for natural gas savings.
- Manage M&V activities of the 25 kW system including:
  - Maintaining instrumentation and data logger integrity;
  - Maintaining data collection and data point integrity;
  - Reducing data and prepare performance calculations;
  - Maintaining website integrity.
- Provide a summary of monthly operations in *Progress Report(s)* (see subtask 1.5) which will include, but not be limited to, the following:
  - A narrative on operational highlights from the previous month, including any stoppages in operation and why; and
  - A summary of operational data from the previous month.
- Prepare and provide a *System Demonstration Performance Report (25 kW System)* documenting and summarizing the test, analysis, operational, and performance data at conclusion of the measurement and verification period. This report will include, but not be limited to, the following:
  - Energy inputs (natural gas) and outputs (electricity, hot water);
  - Emissions performance;
  - Capacity factor, maintenance intervals, and summary of maintenance issues;
  - Cost-benefit performance.

#### **Products:**

- System Demonstration Performance Report (25 kW System) (draft and final)

#### **TASK 6 EVALUATION OF PROJECT BENEFITS**

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

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

## EXHIBIT A Scope of Work

- 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 project product downloads from websites, and publications in technical journals.
    - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
    - Additional Information for Product Development Projects:
      - Outcome of product development efforts, such copyrights and license agreements.
      - Units sold or projected to be sold in California and outside of California.
      - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.
      - Investment dollars/follow-on private funding as a result of Energy Commission funding.
      - Patent numbers and applications, along with dates and brief descriptions.
      - Additional Information for Product Demonstrations:
      - Outcome of demonstrations and status of technology.
      - Number of similar installations.
      - Jobs created/retained as a result of the Agreement.
  - For Information/Tools and Other Research Studies:
    - Outcome of project.
    - Published documents, including date, title, and periodical name.
    - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
    - The number of website downloads.
    - An estimate of how the project information has affected energy use and cost, or have resulted in other non-energy benefits.
    - An estimate of energy and non-energy benefits.
    - Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.

## **EXHIBIT A**

### **Scope of Work**

- A discussion of project product downloads from websites, and publications in technical journals.
- A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

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

#### **Products:**

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

#### **TASK 7 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES**

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

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

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

## **EXHIBIT A**

### **Scope of Work**

#### **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)

#### **V. PROJECT SCHEDULE**

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: INSTITUTE OF GAS TECHNOLOGY

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

**RESOLVED**, that the Energy Commission approves Agreement PIR-17-003 from GFO-17-501 with Institute of Gas Technology for a \$1,499,406 grant to develop and demonstrate two near-zero NOx emission, micro-scale combined heat and power systems. The 4.5 kW and 25 kW systems will undergo laboratory testing to obtain California Air Resources Board Distributed Generation emissions certification to be followed by installation and operation at a commercial building and fitness center to measure system performance and perform cost-benefit analysis; and

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

**CERTIFICATION**

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the California Energy Commission held on March 21, 2018.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Cody Goldthrite,  
Secretariat