

**GRANT REQUEST FORM (GRF)**

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION

New Agreement PIR-14-017 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	Rajesh Kapoor	51	916-327-1388

Recipient's Legal Name	Federal ID Number
Gas Technology Institute (GTI)	36-2170137

Title of Project
Demonstration of an Advanced Low NOx Ribbon Burner Combustion System for Industrial Bakeries

Term and Amount	Start Date	End Date	Amount
	6/30/2015	3/29/2019	\$ 950,000

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

Proposed Business Meeting Date	5/13/2015	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Rajesh Kapoor	Time Needed:	5 minutes

Please select one list serve. Select

**Agenda Item Subject and Description**

GAS TECHNOLOGY INSTITUTE. Proposed resolution approving Agreement PIR-14-017 with Gas Technology Institute (GTI) for a \$950,000 grant to develop and demonstrate an advanced, cost effective, low NOx ribbon burner system that can be retrofitted to traditional combustion systems without sacrificing energy efficiency or process control. The demonstration site is a commercial bakery in Southern California. (EPIC funding) Contact: Rajesh Kapoor. (staff presentation 5 minutes)

**California Environmental Quality Act (CEQA) Compliance**

1. Is Agreement considered a "Project" under CEQA?  
 Yes (skip to question 2)  No (complete the following (PRC 21065 and 14 CCR 15378)):  
 Explain why Agreement is not considered a "Project":  
 Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment
2. If Agreement is considered a "Project" under CEQA:  
 a) Agreement **IS** exempt. (Attach draft NOE)  
 Statutory Exemption. List PRC and/or CCR section number:  
 Categorical Exemption. List CCR section number: 14 CCR 15301 "Existing Facilities"  
 Common Sense Exemption. 14 CCR 15061 (b) (3)  
 Explain reason why Agreement is exempt under the above section:  
 This project includes field demonstration of an advanced low NOx ribbon burner combustion system at an existing commercial bakery. Project activities will be performed under existing host site permits and evaluated by an independent Measurement and Verifications (M&V) vendor. The advanced ribbon burner technology will be installed as a retrofit to the traditional combustion system. The project activities include engineering modifications of the existing gas-fired combustion system, replacement of burners as needed, changes to the air manifolds, and changes to the oxygen content through modification of the mixing devices. The size of the demonstration for the combustion system component modifications will fit into the existing footprint of the existing oven. There will be no exterior work to the existing facility and no grading or trenching. Data will be collected on the energy and cost savings and environmental benefits associated with this technology. There will be negligible or no expansion of use of the facility as a commercial bakery. Therefore, this project will not have a significant effect on the environment.
- 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

**GRANT REQUEST FORM (GRF)**

<b>List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)</b>	
Legal Company Name:	Budget
Bedrosian & Associates	\$ 99,950
University of Southern California	\$ 99,950
Baker Furnace	\$ 99,950
Flynn Burner	\$ 50,000
Kroger Bakery	\$ 99,950
Tetra Tech, Inc.	\$ 99,950
General Contractor	\$ 99,950

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

<b>Budget Information</b>			
Funding Source	Funding Year of Appropriation	Budget List No.	Amount
NG Subaccount, PIERDD	13-14	501.001H	\$950,000
R&D Program Area: EERO: IAW		TOTAL:	\$950,000
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

<b>Recipient's Administrator/ Officer</b>				<b>Recipient's Project Manager</b>			
Name:	Kate Jauridez			Name:	Yaroslav Chudnovsky		
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:	- -	Phone:	847-768-0536 /	Fax:	- -
E-Mail:	kate.jauridez@gastechnology.org			E-Mail:	yaroslav.chudnovsky@gastechnology.org		

<b>Selection Process Used</b>	
<input checked="" type="checkbox"/> Competitive Solicitation	Solicitation #: PON-14-504
<input type="checkbox"/> First Come First Served Solicitation	

<b>The following items should be attached to this GRF</b>			
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 _____
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## Exhibit A Scope of Work

### I. TASK AND ACRONYM/TERM LISTS

#### A. Task List

Task #	CPR <sup>1</sup>	Task Name
1		General Project Tasks
2		Contract Execution
3		Host Site Evaluation
4		Design and Engineering
5		Fabrication and Purchasing
6	X	Assembly and Installation
7		Shakedown and Data Collection
8		Evaluation of Project Benefits
9		Technology/Knowledge Transfer Activities
10		Product Readiness Plan

#### B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
IAW	Industrial, Agricultural, Water
M&V	Measurement and Verification
NOx	Nitric Oxides
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 the demonstration of a high-efficiency and low oxides of nitrogen (NOx) direct-fired ribbon burner combustion system for industrial baking at a participating California food processing host site.

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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**

## **B. Problem/Solution Statement**

### **Problem**

Considering the broad application of ribbon burners throughout the industry for processes ranging from food processing to material thermoforming, the potential of the advanced low NOx ribbon burner concept to support industry in meeting continually more stringent emission requirements without sacrifice of efficiency, process control, or profitability is large. Ribbon burners are widely used in the industrial cooking and drying applications. These fully aerated (fully premixed) or partially aerated (partially premixed) burners use a long, thin slot filled with corrugated metal strips to create a narrow array of short interconnected flames. Ribbon burners fueled with natural gas are coming under stricter regulations in many regions of the U.S., especially in California. Reduction of NOx emissions is critical for continuous use of ribbon burners.

### **Solution**

NOx emissions directly depend on the combustion temperature. One of the successful techniques for NOx mitigation in natural gas fired systems is a reduction of the temperature in the combustion zone. The proposed project uses the ribbon design adjustment to provide the conditions that enhance the radiative component of the combustion therefore evacuating the excess heat, and reducing the process temperature. This approach has several inherent qualities that are well suited for ribbon burner applications including: low emissions, a well-distributed flame, isotropic uniform properties, and a large opportunity for increased power density through ribbon shape optimization. The proposed approach is based on modification of primary air composition by recirculation of carbon dioxide and other combustion products from an exhaust stream. The approach is expected to enable significantly improved NOx emissions without sacrificing efficiency, reliability, safety, and also being cost-effective.

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

### **Agreement Goal**

The goal of this Agreement is to demonstrate and bring to the California market direct natural gas-fired ribbon burner technology providing both cost and environmental benefits in a broad range of agricultural and industrial applications. The proposed effort is targeted to demonstrate the advanced low NOx and fuel-efficient technology that would replace the conventional ribbon burner combustion systems to reduce natural gas use and pollutant emissions in California's Industrial, Agriculture and Water (IAW) sector.

### **Agreement Objectives**

The major objectives of this Agreement are to:

- Improve efficiency, and reduce environmental impact of food processing (such as baking) operations, and reduce natural gas consumption for the same throughput by at least 10 percent with the simultaneous NOx emission reduction by at least 50 percent
- Prove the cost-effective feasibility of the proposed technology for IAW industrial operations

## Exhibit A Scope of Work

- Prove the benefits and facilitate the transformation of the baking market through demonstration

### 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

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Submit the final product to the CAM once agreement has been reached on the draft. The CAM will provide written approval of the final product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- If the CAM determines that the final product does not sufficiently incorporate his/her comments, submit the revised product to the CAM within 10 days of notice by the CAM, unless the CAM specifies a longer time period.

###### For products that require a final version only

- Submit the product to the CAM for approval.
- If the CAM determines that the product requires revision, submit the revised product to the CAM within 10 days of notice by the CAM, unless the CAM specifies a longer time period.

###### For all products

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

## **Exhibit A Scope of Work**

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 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

## **Exhibit A Scope of Work**

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

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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

## **Exhibit A Scope of Work**

meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
  - Disposition of any state-owned equipment.
  - Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
  - The Energy Commission's request for specific "generated" data (not already provided in Agreement products).
  - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
  - "Surviving" Agreement provisions such as repayment provisions and confidential products.
  - Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

### **Products:**

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

## **REPORTS AND INVOICES**

### **Subtask 1.5 Progress Reports and Invoices**

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

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

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
  - Summarize all Agreement activities conducted by the Recipient for the preceding month, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
  - Provide a synopsis of the project progress, including accomplishments, problems, milestones, products, schedule, fiscal status, and any evidence of progress such as photographs.

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- Submit a monthly or quarterly *Invoice* that follows the instructions in the “Payment of Funds” section of the terms and conditions. In addition, each invoice must document and verify:
  - Energy Commission funds received by California-based entities;
  - Energy Commission funds spent in California (*if applicable*); and
  - Match fund expenditures.

### **Products:**

- Progress Reports
- Invoices

### **Subtask 1.6 Final Report**

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

#### **Subtask 1.6.1 Final Report Outline**

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

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

##### **Recipient Products:**

- Final Report Outline (draft and final)

##### **CAM Products:**

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

##### **Recipient Products:**

- Final Report (draft and final)

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### CAM Products:

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

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### 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*.
- 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.

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- 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)
- Final Subcontracts

## **TECHNICAL ADVISORY COMMITTEE**

### **Subtask 1.10 Technical Advisory Committee (TAC)**

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

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

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

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

## **Exhibit A Scope of Work**

- Members of relevant technical society committees.

### **The Recipient shall:**

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

### **Products:**

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

### **Subtask 1.11 TAC Meetings**

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

### **The Recipient shall:**

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

### **Products:**

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

## **Exhibit A Scope of Work**

### **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 CONTRACT EXECUTION**

The goals of this task are to: (1) confirm the availability of the project demonstration or deployment site; (2) confirm the availability of a measurement and verification (M&V) subcontractor; and (3) execute any agreements necessary to secure the demonstration site and M&V subcontractor.

#### **Subtask 2.1 Execution of a Contract with the Demonstration or Deployment Site(s)**

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

- Confirm agreement with the manager(s) of the selected demonstration or deployment site regarding the project timeline, space reserved for the project, equipment installation, permit and insurance requirements, indemnity, the Recipient’s use of support staff, and installation and removal of equipment
- If a selected demonstration or deployment site becomes unavailable during the project term, work with the CAM to select a new site.
- Prepare and execute a *Contract with Each Demonstration Site* that confirms the agreement reached above on the Recipient’s use of the site.
- Provide copy of executed contract with each demonstration site to CAM.

##### **Products:**

- Copy of Contract with Each Demonstration Site

#### **Subtask 2.2 Execution of a Contract with the Selected M&V Subcontractor**

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

- Confirm the selected M&V subcontractor’s ability to provide required hardware, software, and staff to conduct the required measurements during the project term.
- Confirm that the selected M&V subcontractor will follow utility M&V protocols, and will prepare a detailed analytical report that verifies energy consumption and engineering calculations for energy and cost savings.
- If the selected M&V subcontractor becomes unavailable during the project term, work with the CAM to select a new subcontractor.
- Prepare and execute a *Contract with the M&V Subcontractor* that secures the contractor’s services during the project term.
- Provide copy of executed contract with the M&V subcontractor to CAM.

##### **Products:**

- Copy of Contract with the M&V Subcontractor

## **Exhibit A Scope of Work**

### **TASK 3 HOST SITE EVALUATION**

The goal of this task is to evaluate the host site application, carry out baseline testing and obtain the benchmark information for the follow-on field engineering and preliminary design of the technology demonstration system.

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

- Create a *Draft Piping and Instrumentation Diagram* for the technology demonstration system that shall include but is not limited to:
  - Application product specifications from the participating host site
  - Demonstration system layout
  - The equipment integration approach and control/measurement scheme
  - Baseline test system analysis and preliminary benefits estimate
- Provide copy of the *Draft Piping and Instrumentation Diagram* to CAM.

#### **Products:**

- Draft Piping and Instrumentation Diagram

### **TASK 4 DESIGN AND ENGINEERING**

The goal of this task is to design and engineer the ribbon burner combustion demonstration system along with measurement controls.

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

- Create a *Final Piping and Instrumentation Diagram* for the ribbon burner combustion demonstration system that shall include but is not limited to:
  - The critical components of the demonstration system per mutually agreed layout refined in Task 3 for manufacturing review
  - The detailed engineering of the system critical components for host site review and approval
  - Control and measurement diagram of the demonstration and data collection
  - Field engineering requirements for preliminary assessment of the demonstration system installation requirements
  - Design drawings and bill of material
- Provide copy of *Final Piping and Instrumentation Diagram* to CAM.

#### **Products:**

- Final Piping and Instrumentation Diagram

### **TASK 5 FABRICATION AND PURCHASING**

The goal of this task is to fabricate the key elements of the demonstration system along with purchasing the specified components.

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

- Create a *Fabrication and Purchase Report* that shall include but is not limited to:
  - List of the vendors and necessary components to be purchased including blowers, piping, ductworks, the industrial flow controls and measurement sensors, combustion safety, etc.
  - Quotes and bids for final vendor selection

## **Exhibit A Scope of Work**

- The purchase and fabrication orders with the pre-qualified vendors per drawings and bill of materials developed in Task 4
- Pictures of the key system components delivered to host site
- Provide copy of the *Fabrication and Purchase Report* to the CAM

### **Products:**

- Fabrication and Purchase Report

### **TASK 6 ASSEMBLY AND INSTALLATION**

The goal of this task is to install the demonstration system on site

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

- Create an *Assembly and Installation Report* that shall include but is not limited to:
  - The technical and administrative support to the host site approved installation contractor, and any issues that may occur during the assembling process for the demonstration system installation
  - The operating procedures and required protocols for the system startup
  - Drying process and shut down to ensure safety of operation during the system demonstration
  - Data collection
  - Photos of the fully assembled and installed system on site.
- Provide a copy of the *Assembly and Installation Report* to the CAM
- Participate in CPR meeting and prepare a *CPR Report* in accordance with Subtask 1.3 (CPR Meetings)

### **Products:**

- Assembly and Installation Report
- CPR Report

### **TASK 7 SHAKEDOWN AND DATA COLLECTION**

The goal of this task is to demonstrate the proposed technology and collect the performance data for comparison of the benefits against the baseline data.

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

- Prepare a *Data Collection Summary Report* including but is not limited to a discussion of the following:
  - Start up and shut down of the demonstration system per approved operating procedure and protocols
  - System parameters (operating and minor design)
  - Data collection per approved plan and matrix
  - The methodology and procedures used in data collection
  - preliminary analysis of collected data
  - Technical and economic benefits against the baseline systems including improvements to energy efficiencies and reduction in environmental impacts (e.g., NO<sub>x</sub> emissions) as indicated in Agreement objectives
- Provide copy of the *Data Collection Summary Report* to the CAM
- Prepare a *M&V Report* as specified in Subtask 2.2 to promote verification of energy and cost savings. Provide copy of the M&V report to the CAM.

## **Exhibit A Scope of Work**

### **Products:**

- Data Collection Summary Report
- M&V Report

### **TASK 8 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 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.

## **Exhibit A Scope of Work**

- For Information/Tools and Other Research Studies:
  - Outcome of project.
  - Published documents, including date, title, and periodical name.
  - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
  - The number of website downloads.
  - An estimate of how the project information has affected energy use and cost, or have resulted in other non-energy benefits.
  - An estimate of energy and non-energy benefits.
  - Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.
  - A discussion of project product downloads from websites, and publications in technical journals.
  - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

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

### **Products:**

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

### **TASK 9 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

## **Exhibit A Scope of Work**

- government policy publications, or used to inform regulatory bodies.
- The number of website downloads or public requests for project results.
- Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop on the results of the project.
- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

### **Products:**

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

### **TASK 10 PRODUCTION READINESS PLAN**

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

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

- Prepare a *Production Readiness Plan*. The degree of detail in the plan should be proportional to the complexity of producing or commercializing the proposed product, and to its state of development. As appropriate, the plan will discuss the following:
  - Critical production processes, equipment, facilities, personnel resources, and support systems needed to produce a commercially viable product.
  - Internal manufacturing facilities, supplier technologies, capacity constraints imposed by the design under consideration, design-critical elements, and the use of hazardous or non-recyclable materials. The product manufacturing effort may include "proof of production processes."
  - The estimated cost of production.
  - The expected investment threshold needed to launch the commercial product.
  - An implementation plan to ramp up to full production.
  - The outcome of product development efforts, such as copyrights and license agreements.
  - Patent numbers and applications, along with dates and brief descriptions.
  - Other areas as determined by the CAM.

### **Products:**

- Production Readiness Plan (draft and final)

## **V. PROJECT SCHEDULE**

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: GAS TECHNOLOGY INSTITUTE

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

**RESOLVED**, that the Energy Commission approves Agreement PIR-14-017 with **Institute of Gas Technology, dba Gas Technology Institute** for a **\$950,000** grant to develop and demonstrate an advanced, cost effective, low NOx ribbon burner system that can be retrofitted to traditional combustion systems without sacrificing energy efficiency or process control. The demonstration site is a commercial bakery in Southern California; 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 May 13, 2015.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Harriet Kallemeyn,  
Secretariat