

GRANTS/CONTINGENT AWARD REQUEST



To: Grants and Loans Office

Date: 4/20/2012

Project Manager: Michael Lozano

Phone Number: 916-327-1425

Office: Energy Efficiency Research Office

Division: Energy Research and Development

MS- 51

Project Title: Demonstration of Waste Heat Recovery for Power Generation

Type of Request: (check one)

[X] New Agreement: (include items A-F from below) Agreement Number: PIR-11-029
Program: PIER E / Industrial/ Ag/ Water
Solicitation Name and/or Number: PON-11-501-20 (2011 Emerging Technology Demonstration Grant)
Legal Name of Recipient: Gas Technology Institute
Recipient's Full Mailing Address: 1700 S MOUNT PROSPECT RD
DES PLAINES, IL 60018-1804
Recipient's Project Officer: David Cygan Phone Number: 847-768-0524
Agreement Start Date: 6/29/2012 Agreement End Date: 3/31/2015

[ ] Amendment: (Check all that apply) Agreement Number: \_\_\_\_\_
[ ] Term Extension - New End Date: \_\_\_\_\_
[ ] Work Statement Revision (include Item A from below)
[ ] Budget Revision (include Item B from below)
[ ] Change of Scope (include Items A - F as applicable from below)
[ ] Other: \_\_\_\_\_

ITEMS TO ATTACH WITH REQUEST:

- A. Work Statement
B. Budget
C. Recipient Resolution, if applicable. (Resolution may be requested in Special Conditions if not currently available.)
D. Special Conditions, if applicable.
E. CEQA Compliance Form
F. Other Documents as applicable
• Copy of Score Sheets
• Copy of Pre-Award Correspondence
• Copy of All Other Relevant Documents

California Environmental Quality Act (CEQA)

[ ] CEC finds, based on recipient's documentation in compliance with CEQA:
[ ] Project exempt: \_\_\_\_\_ NOE filed: \_\_\_\_\_
[ ] Environmental Document prepared: \_\_\_\_\_ NOD filed: \_\_\_\_\_
[ ] Other: \_\_\_\_\_
[X] CEC has made CEQA finding described in CEC-280, attached

Funding Information:

\*Source #1: PIER-NG Amount: \$ 398,267.00 Statute: 10- FY: 11-12 Budget List #: 501.001E
\*Source #2: PIER-NG Amount: \$ 1,334,733.00 Statute: 11- FY: 11-12 Budget List #: 501.001F
\*Source #3: \_\_\_\_\_ Amount: \$ \_\_\_\_\_ Statute: \_\_\_\_\_ FY: \_\_\_\_\_ Budget List #: \_\_\_\_\_

If federally funded, specify federal agreement number: \_\_\_\_\_

\* Source Examples include ERPA, PIER-E, PIER-NG, FED, GRDA, ARFVT, OTHER.

Business Meeting Approval: (refer to Business Meeting Schedule)

Proposed Business Meeting Date: 6/13/2012 [ ] Consent [X] Discussion
Business Meeting Participant: Michael Lozano Time Needed: 5 minutes

Agenda Notice Statement: (state purpose in layperson terms)

Possible approval of a [X] Grant / [ ] Contingent Award to...
Possible approval of Agreement PIR-11-029 for a grant of \$1,733,000.00 to the Gas Technology Institute to demonstrate waste heat recovery in industrial exhausts for stackless furnaces. The length of this agreement is 33 months. This project includes \$850,000 in match funding. (PIER natural gas funding)

# EXHIBIT A SCOPE OF WORK

## TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2		Verification of Demonstration Site and Independent Measurement and Verification Contractor
3		Demonstration Site Agreement
4		Design, Engineering, and Fabrication of Exhaust Waste Heat-to-Electricity System
5	X	Field Unit Installation and Shakedown
6		Data Collection, Processing, and Analysis
7		Technology Transfer Activities
8		Production Readiness Plan

## KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1-8			Gas Technology Institute

## GLOSSARY

*Specific terms and acronyms used throughout this scope of work are defined as follows:*

Term/ Acronym	Definition
CPR	Critical Project Review
EWHE	Exhaust Waste Heat to Electricity
FTA	Field Trial Agreement
GTI	Gas Technology Institute
GWh	Gigawatt hours
HRWH	Heat Recovery Water Heater
N2E	N2 Energy Solutions
ORCE	Organic Rankin Cycle Engine
PAC	Professional Advisory Committee
PBI	Pressure-Balance Intake
PIER	Public Interest Energy Research
RD&D	Research, Development, and Demonstration
TBtu/yr	Trillion British Thermal Units per Year

### Problem Statement:

The industrial sector in California consumes 286.6 Trillion British Thermal Units per Year (TBtu/yr) of natural gas and 42,724 Gigawatt hours (GWh) of electricity. Of this, approximately 218 TBtu/yr of natural gas and 15,800 GWh of electricity are consumed in the chemicals, petroleum, glass/cement, and metals sectors. A significant portion of this energy is used in relatively high temperature furnaces for metals refining, glass

## **EXHIBIT A SCOPE OF WORK**

melting, and hydrogen production activities that generate exhaust gases above 800°F. Many of these furnaces are stack-less and emit exhaust directly in buildings. In addition, most furnaces require strict pressure controls to avoid infiltration and exfiltration of gases, which impacts productivity, product quality, efficiency life, and emissions.

Effective heat recovery technologies do not exist for the stack-less furnaces or for furnaces with stacks due to material limitations, low gas-to-gas heat transfer rates, surface heat losses, gas leakages, and additional pressure losses. These heat recovery devices are able to recover only a portion of the heat in the exhaust gases. Additional issues to be addressed include furnace downtime for retrofit, heat exchanger fouling, and corrosion. A significant opportunity exists to recover additional heat from process heaters, even from those already equipped with heat recovery systems.

The proposed emerging technology effectively recovers waste heat in industrial exhaust gases above 800°F and converts it into power, while addressing many limitations of current technologies. The proposed technology is applicable to furnaces with stacks exhausting outside of buildings, as well as furnaces with no stack and exhaust directly inside of buildings. The technology is especially attractive for furnaces with demanding pressure controls, and can be retrofitted without any furnace downtime. Additionally, the Pressure-Balance Intake (PBI) device adds hot air from around the exhaust to increase heat recovery, increases exhaust gas flow rate through the Heat Recovery Water Heater (HRWH) and consequently increases heat transfer rates, and reduces the dew point preventing condensation of corrosive components.

The overall Exhaust Waste Heat-to-Electricity (EWHE) technology concept has been developed by N2 Energy Solutions (N2E) and combines its proprietary PBI connection between a stack-less furnace and a HRWH. A commercially available HRWH and an Organic Rankin Cycle Engine (ORCE) that has been demonstrated in many other hot water driven applications, especially in geothermal energy production, will be used. This project will demonstrate the technical and economic feasibility of the proposed waste-to-electricity technology, and demonstrate the performance of the proprietary PBI connection and the ORCE technology in an industrial setting. The key barrier addressed is the lack of field data proving reliable, safe, and economic operation of the proposed waste-to-electricity technology on industrial furnaces, especially those that emit exhaust inside the building, without any adverse impacts on furnace productivity or life, product quality, efficiency, and emissions.

### **Goals of the Agreement:**

Development and demonstration of an effective waste heat recovery system for no-stack process heaters above 800°F.

### **Objectives of the Agreement:**

The objectives of this project are to:

- Prove the feasibility and safety of a commercial waste heat-to-electricity

## **EXHIBIT A SCOPE OF WORK**

technology with the potential for effectively recovering waste heat in industrial furnace exhaust gases above 800°F and converting it to electricity

- Prove the possibility of installing the system as a retrofit without downtime or any adverse impacts on furnace performance
- Prove the benefits and facilitate the transformation of the waste heat recovery market through demonstration
- Achieve a payback of less than 4.5 years for the demonstration system and projected paybacks of below 3 years for commercial systems.

### **TASK 1 ADMINISTRATION**

#### **Task 1.1 Attend Kick-off Meeting**

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

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

- Attend a “Kick-Off” meeting with the California Energy Commission (Energy Commission) Project Manager, the Grants Officer, and a representative of the Accounting Office. The Recipient shall bring its Project Manager, Agreement Administrator, Accounting Officer, and others designated by the Energy Commission Project Manager to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the Energy Commission Project Manager will provide an agenda to all potential meeting participants.

The administrative portion of the meeting shall include, but not be limited to, the following:

- Discussion of the terms and conditions of the Agreement
- Discussion of Critical Project Review (Task 1.2)
- Match fund documentation (Task 1.6)
- Permit documentation (Task 1.7)

The technical portion of the meeting shall include, but not be limited to, the following:

- The Energy Commission Project Manager’s expectations for accomplishing tasks described in the Scope of Work
- An updated Schedule of Products
- Discussion of Progress Reports (Task 1.4)
- Discussion of Technical Products (Product Guidelines located in Section 5 of the Terms and Conditions)
- Discussion of the Final Report (Task 1.5)

## **EXHIBIT A SCOPE OF WORK**

### **The Energy Commission Project Manager shall:**

- Designate the date and location of this meeting.

### **Recipient Products:**

- Updated Schedule of Products (no draft)
- Updated List of Match Funds (no draft)
- Updated List of Permits (no draft)

### **Energy Commission Project Manager Product:**

- Kick-Off Meeting Agenda (no draft)

### **Task 1.2 Critical Project Review (CPR) Meetings**

The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and to identify any needed modifications to the tasks, products, schedule or budget.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Recipient. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Energy Commission Project Manager and as shown in the Technical Task List above. However, the Energy Commission Project Manager may schedule additional CPRs as necessary, and any additional costs will be borne by the Recipient.

Participants include the Energy Commission Project Manager and the Recipient and may include the Energy Commission Grants Officer, the Public Interest Energy Research (PIER) Program Team Lead, other Energy Commission staff and Management as well as other individuals selected by the Energy Commission Project Manager to provide support to the Energy Commission.

### **The Energy Commission Project Manager shall:**

- Determine the location, date, and time of each CPR meeting with the Recipient. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Recipient the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.
- Conduct and make a record of each CPR meeting. One of the outcomes of this meeting will be a schedule for providing the written determination described below.
- Determine whether to continue the project, and if continuing, whether or not modifications are needed to the tasks, schedule, products, and/or budget for the remainder of the Agreement. Modifications to the Agreement may require a formal amendment (please see the Terms and Conditions).

## **EXHIBIT A SCOPE OF WORK**

- Provide the Recipient with a written determination in accordance with the schedule. The written response may include a requirement for the Recipient to revise one or more product(s) that were included in the CPR.

### **The Recipient shall:**

- Prepare a CPR Report for each CPR that discusses the progress of the Agreement toward achieving its goals and objectives. This report shall include recommendations and conclusions regarding continued work of the projects. This report shall be submitted along with any other products identified in this scope of work. The Recipient shall submit these documents to the Energy Commission Project Manager and any other designated reviewers at least 15 working days in advance of each CPR meeting.
- Present the required information at each CPR meeting and participate in a discussion about the Agreement

### **Energy Commission Project Manager Products:**

- Agenda and a list of expected participants (no draft)
- Schedule for written determination (no draft)
- Written determination (no draft)

### **Recipient Product:**

- CPR Report(s) (no draft)

### **Task 1.3 Final Meeting**

The goal of this task is to closeout this Agreement.

### **The Recipient shall:**

- Meet with Energy Commission staff to present the findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement.

This meeting will be attended by, at a minimum, the Recipient, the Energy Commission Grants Office Officer, and the Energy Commission Project Manager. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be two separate meetings at the discretion of the Energy Commission Project Manager.

The technical portion of the meeting shall present an assessment of the degree to which project and task goals and objectives were achieved, findings, conclusions, recommended next steps (if any) for the Agreement, and recommendations for improvements. The Energy Commission Project Manager will determine the appropriate meeting participants.

The administrative portion of the meeting shall be a discussion with the

## **EXHIBIT A SCOPE OF WORK**

Energy Commission Project Manager and the Grants Officer about the following Agreement closeout items:

- What to do with any equipment purchased with Energy Commission funds (Options)
- Energy Commission's request for specific "generated" data (not already provided in Agreement products)
- Need to document 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 schedule for completing the closeout activities for this Agreement

### **Products:**

- Written documentation of meeting agreements (no draft)
- Schedule for completing closeout activities (no draft)

### **Task 1.4 Monthly Progress Reports**

The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the research objectives of this Agreement on time and within budget.

The objectives of this task are to summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, and to form the basis for determining whether invoices are consistent with work performed.

### **The Recipient shall:**

- Prepare a Monthly Progress Report which summarizes all Agreement activities conducted by the Recipient for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due to the Energy Commission Project Manager within 10 days of the end of the reporting period. The recommended specifications for each progress report are contained in Exhibit A, Attachment A-2.

### **Product:**

- Monthly Progress Reports (no draft)

### **Task 1.5 Final Report**

The goal of the Final Report is to assess the project's success in achieving its goals and objectives, advancing science and technology, and providing energy-related and other benefits to California.

## **EXHIBIT A SCOPE OF WORK**

The objectives of the Final Report are to clearly and completely describe the project's purpose, approach, activities performed, results, and advancements in science and technology; to present a public assessment of the success of the project as measured by the degree to which goals and objectives were achieved; to make insightful observations based on results obtained; to draw conclusions; and to make recommendations for further RD&D projects and improvements to the PIER project management processes.

The Final Report shall be a public document. If the Recipient has obtained confidential status from the Energy Commission and will be preparing a confidential version of the Final Report as well, the Recipient shall perform the following activities for both the public and confidential versions of the Final Report.

### **The Recipient shall:**

- Prepare an Outline of the Final Report.
- Prepare a Final Report following the approved outline and the latest version of the PIER Final Report guidelines published on the Energy Commission's website at <http://www.energy.ca.gov/contracts/pier/contractors/index.html> at the time the Recipient begins performing this task, unless otherwise instructed in writing by the Energy Commission Project Manager. Instead of the timeframe listed in the Product Guidelines located in Section 5 of the Terms and Conditions, the Energy Commission Project Manager shall provide written comments on the Draft Final Report within fifteen (15) working days of receipt. The Final Report must be completed on or before the end of the Agreement Term.
- Submit one bound copy of the Final Report with the final invoice.

### **Products:**

- Draft Outline of the Final Report
- Final Outline of the Final Report
- Draft Final Report
- Final Report

### **Task 1.6 Identify and Obtain Matching Funds**

The goal of this task is to ensure that the match funds planned for this Agreement are obtained for and applied to this Agreement during the term of this Agreement.

The costs to obtain and document match fund commitments are not reimbursable through this Agreement. Although the PIER budget for this task will be zero dollars, the Recipient may utilize match funds for this task. Match funds shall be spent concurrently or in advance of PIER funds for each task during the term of this Agreement. Match funds must be identified in writing and the associated commitments obtained before the Recipient can incur any costs for which the Recipient will request reimbursement.

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### **The Recipient shall:**

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Energy Commission Project Manager at least 2 working days prior to the kick-off meeting. 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 such 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 each cash match fund, its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied
  - Amount of each in-kind contribution, a description, documented market or book value, and its 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 shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located
- Provide a copy of the letter of commitment from an authorized representative of each source of cash match funding or in-kind contributions that these funds or contributions have been secured
- Discuss match funds and the implications to the Agreement if they are reduced or not obtained as committed, at the kick-off meeting. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide the appropriate information to the Energy Commission Project Manager if during the course of the Agreement additional match funds are received
- Notify the Energy Commission Project Manager within 10 days if during the course of the Agreement existing match funds are reduced. Reduction in match funds must be approved through a formal amendment to the Agreement and may trigger an additional CPR.

### **Products:**

- A letter regarding match funds or stating that no match funds are provided (no draft)
- Copy(ies) of each match fund commitment letter(s) (if applicable) (no draft)
- Letter(s) for new match funds (if applicable) (no draft)
- Letter that match funds were reduced (if applicable) (no draft)

### **Task 1.7 Identify and Obtain Required Permits**

The goal of this task is to obtain all permits required for work completed under this

## **EXHIBIT A SCOPE OF WORK**

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. Although the PIER budget for this task will be zero dollars, the Recipient shall budget match funds for any expected expenditures associated with obtaining permits. Permits must be identified in writing and obtained before the Recipient can make any expenditures for which a permit is required.

### **The Recipient shall:**

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Energy Commission Project Manager at least 2 working days prior to the kick-off meeting. If there are no permits required at the start of this Agreement, then state such in the letter. If it is known at the beginning of the Agreement that permits will be required during the course of the Agreement, provide in the letter:
  - A list of the permits that identifies the:
    - Type of permit
    - Name, address and telephone number of the permitting jurisdictions or lead agencies
- The schedule the Recipient will follow in applying for and obtaining these permits.
- Discuss the list of permits and the schedule for obtaining them at the kick-off meeting and develop a timetable for submitting the updated list, schedule and the copies of the permits. The implications to the Agreement 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 the Progress Reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, provide the appropriate information on each permit and an updated schedule to the Energy Commission Project Manager
- As permits are obtained, send a copy of each approved permit to the Energy Commission Project Manager
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Energy Commission Project Manager within 10 days. Either of these events may trigger an additional CPR.

### **Products:**

- Letter documenting the permits or stating that no permits are required (no draft)
- A copy of each approved permit (if applicable) (no draft)
- Updated list of permits as they change during the term of the Agreement (if applicable) (no draft)

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- Updated schedule for acquiring permits as changes occur during the term of the Agreement (if applicable) (no draft)

### **TECHNICAL TASKS**

The Recipient shall prepare all products in accordance with the requirements in Task 1.5. Products not requiring a draft version are indicated by marking “no draft” after the product name.

### **TASK 2 Verification of Demonstration Site and Third Party Measurement and Verification Contractor**

#### **Task 2.1 Verification of Demonstration Site**

The goal of this task is to verify that the proposed demonstration site can host the project, or obtain a new demonstration site if the proposed site is unavailable.

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

- Identify a demonstration site in a California investor-owned utility service territory (subject to approval of the Commission Project Manager).
- Secure the selected demonstration site, or secure a new site in a California investor-owned utility service territory (subject to approval of the Commission Project Manager) if the original site is no longer available to host the project.
- Prepare a Demonstration Site Verification Letter that verifies the demonstration site’s availability for the project.

#### **Products:**

- Demonstration Site Verification Letter (no draft)

#### **Task 2.2 Verification of Independent Measurement and Verification Contractor**

The goal of this task is to confirm the availability of a third party measurement and verification (M&V) contractor for the project.

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

- Identify an M&V contractor.
- Verify the M&V contractor’s availability to conduct the third party measurements and verification M&V of emerging technology performance
- Secure a new third party contractor if the original contractor is no longer available to conduct the performance verification measurements
- Prepare a Measurement and Verification Contractor Verification Letter that verifies the contractor’s availability for the project.

# EXHIBIT A

## SCOPE OF WORK

### Products:

- Measurement and Verification Contractor Verification Letter (no draft)

### TASK 3 Demonstration Site Agreement

The goal of this task is to secure a formal agreement from a California site for field demonstration of the proposed EWHE system. An agreement with a new site will be secured if original site is no longer available.

### The Recipient shall:

- Conduct a site visit to the current or new demonstration site facility to assess the current site conditions required to successfully complete the system design, installation, permitting, and integration with the site infrastructure
- Initiate negotiations of a Field Trial Agreement (FTA) that defines the rights and responsibilities of the Recipient, partners, subcontractors, and host site operator during the field demonstration period. Major topics covered by the FTA will include:
  - Period of performance,
  - Responsibilities,
  - Charges or costs,
  - Tracking of co-funding,
  - Site access,
  - Ownership of system, warranty, indemnification, and limitation of liability,
  - Force majeure, termination, and governing law
- Complete negotiations and draft the FTA
- Prepare a Notification Letter regarding completion of negotiations with the host site. The letter will include but not be limited to: documentation that the selected host site has agreed to the terms and conditions in the FTA; and a copy of the signed FTA.

### Products:

- Notification Letter regarding completion of negotiations with host site (including the signed FTA) (no draft)

### TASK 4 Design, Engineering, and Fabrication of Exhaust Waste Heat-To-Electricity System

The goal of this task is to design and fabricate a commercial-sized EWHE system for the host site in California.

### The Recipient shall:

- Engineer and produce a design for the EWHE system for retrofit to the host furnace
- Generate installation drawings including system integration with host site utilities

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- Complete a system design
- Prepare and provide a Notification Letter regarding release of the design for fabrication. The letter will include but not be limited to documentation that the complete system has been designed, and will include a copy of the overall layout
- Fabricate a EWHE system based on the approved engineering drawings
- Procure the equipment required for the EWHE system
- Prepare the Field Demonstration Performance Test Plan based on host site requirements. The plan will include but not be limited to:
  - A rationale for the selection of test conditions,
  - Predicted performance based on the results of previous project work,
  - Test objectives and technical approaches,
  - A test matrix showing the number of test conditions and replicated runs,
  - A description of the facilities, equipment, and instrumentation required for the EWHE system evaluation,
  - A description of the test procedures, including parameters to be controlled and how they will be controlled, parameters to be measured and instruments to measure them, calibration procedures, and maintenance of experimental records, and
  - A description of the data analysis procedures
- Conduct team meetings to review project progress
- Deliver the complete EWHE system components to the test site
- Teleconference with the Energy Commission Project Manager to review the complete engineering package

### **Products:**

- Notification Letter on release of the design for fabrication (no draft)
- Field Demonstration Performance Test Plan

### **TASK 5 Field Unit Installation and Shakedown**

The goal of this task is to complete the mechanical and electrical installation of the EWHE system at the selected host site. This task encompasses such activities as: installing the HRWH, ORCE, water heater pumps, cooling tower, structural steel, mechanical items, piping, and electrical items; and connecting all required electrical power, testing and balancing, and performing final commissioning.

### **The Recipient shall:**

- Complete and submit building applications and permits for the installation of the EWHE system at the host site
- Conduct a site visit and meet with the installation contractor prior to beginning installation of equipment
- Supervise the installation of the EWHE system and the auxiliary

## **EXHIBIT A SCOPE OF WORK**

- equipment required per the installation specifications
- Prepare a Notification Letter on Installation. This letter will include but not be limited to: a summary of the work completed in this task, confirmation that the installation has been successfully completed, and copies of all permits.
- Prepare a CPR Report
- Participate in a CPR meeting

### **Products:**

- Notification Letter on Installation (no draft)
- CPR Report

### **TASK 6 Data Collection, Processing, and Analysis**

The goal of this task is to validate the field performance of the EWHE system via a comprehensive testing program at the selected host site.

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

- Conduct all required system shakedowns, baseline check-ups, and calibrations including calibration and verification of data acquisition equipment
- When appropriate, provide a Notification Letter instructing the Commission Contract Manager that the EWHE field demonstration system is ready for testing
- Conduct performance testing in accordance with the Field Demonstration Performance Test Plan
- Analyze field test results
- Service and maintain the EWHE system during the data collection period
- Conduct independent third party verification M&V testing
- Prepare a Task Summary Report that includes: the field test plan, a summary of the demonstration site performance testing and third party measurement and verification testing results, feedback from the host site, a discussion of whether the project met all the objectives stated on page 3 of 15, and the amount of electricity reduced.

### **Products:**

- Notification Letter of readiness for performance testing (no draft)
- Task Summary Report on operation of the EWHE system (no draft)

### **TASK 7 Technology Transfer Activities**

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

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

- Prepare a Technology Transfer Plan that explains how the knowledge

## **EXHIBIT A SCOPE OF WORK**

gained in this project will be made available to the public. The level of detail expected is least for research-related projects and highest for demonstration projects. Key elements from this report shall be included in the Final Report for this project.

- Help guide the deployment of the EWHE system in a way that makes it practical and sustainable from a field-installation perspective, based on both economic and technical factors

### **Products:**

- Technology Transfer Plan

### **TASK 8 Production Readiness Plan**

The goal of the plan is to determine the steps that will lead to the manufacturing of the 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 Production Readiness Plan discussion should be proportional to the complexity of producing or commercializing the proposed product and its state of development. The plan shall include, as appropriate, but not be limited to:
  - Identification of critical production processes, equipment, facilities, personnel resources, and support systems needed to produce a commercially viable product
  - Internal manufacturing facilities, as well as supplier technologies, capacity constraints imposed by the design under consideration, identification of design critical elements and the use of hazardous or non-recyclable materials. The product manufacturing effort may include "proof of production processes"
  - A projected "should cost" for the product when in production
  - The expected investment threshold to launch the commercial product
  - An implementation plan to ramp up to full production

### **Products:**

- Production Readiness Plan